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**MANAGING OCCUPATIONAL PSYCHOLOGICAL HEALTH  
OF GHANAIAAN CONSTRUCTION EMPLOYEES**

**FORDJOUR GENEVIEVE ATAA**

**PhD**

**The Hong Kong Polytechnic University**

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**The Hong Kong Polytechnic University**

**Department of Building and Real Estate**

**Managing Occupational Psychological Health of  
Ghanaian Construction Employees**

**Fordjour Genevieve Ataa**

**A thesis submitted in partial fulfilment of the requirements for  
the degree of Doctor of Philosophy**

**August 2020**

## **CERTIFICATE OF ORIGINALITY**

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\_\_\_\_\_ (Signed)

Fordjour Genevieve Ataa (Name of student)

## **DEDICATION**

I dedicate this thesis to God Most High, my husband (Louis), and two children (Jeshurun and Gavriel).

## **ABSTRACT**

Previous research works on the management of health in the construction industry have largely focused on injuries and physical health. There has been a diminutive look into an important, complex issue such as the psychological health and well-being of construction employees, leaving a significant knowledge gap in construction literature globally. Hence, this research aimed at investigating the factors associated with the psychological health of construction employees and develop a framework of preventive psychological health management strategies for the construction industry. The psychological health of construction employees is a more serious concern, especially in less resourced developing countries with extreme weather conditions, warranting extensive research in these countries. Experiences obtained from working with six construction companies in Ghana for internship programmes during undergraduate and graduate study, kindled an interest to investigate into the psychological issues at the construction workplace; the Ghanaian construction industry was therefore chosen as the geographical context for this study. Socio-ecological theory was used to identify the psychological health risks factors and derived solutions from multiple perspectives such as individual level, organizational level, working-groups level and community or country's level. Five research questions were explored to achieve the aim of this study. This study adopted the sequential mixed-methods strategy whereby both qualitative methods of focus groups discussions and interviews and quantitative method of questionnaire survey were employed. A total of 16 focus group discussions with 90 construction employees were held in Ghana to answer the first research question on identifying the causes, effects and coping mechanisms. Questionnaire survey was then conducted with a target respondents of 150 construction professionals and 150 construction trade workers, to confirm the findings from the focus groups discussions, to identify the primary factors and to compare the results from the construction professionals and the construction trade workers. Finally, to answer the research question on

identifying the preventive management strategies and factors for effective implementation of psychological health interventions, 53 interviews and 264 questionnaire surveys were conducted in Ghana with construction professionals, construction trade workers, regulatory personnel, and occupational health psychologist. The findings from the study confirm the need for psychological health management and interventions for employees in the construction industry of Ghana and to some extent globally. Despite the apparent indications of occupational psychological ill-being conditions among the construction employees in Ghana, these indications cannot be defined or proved with evidence, as they are based on the respondents' subjective judgment. Notwithstanding, the findings from the study provides valuable insights into occupational psychological health issues in the construction industry of Ghana. Based on the results from the study, preventive psychological health management models were designed for the construction employees and the construction industry. This study recommends the input of construction employees, managers and supervisors in providing organizational psychological health support to enhance the well-being of construction employees. This research contributes significantly to knowledge and practice. For knowledge, the study adds a new dimension to occupational psychological health research in construction literature, which concerns socio-psychological aspects, rather than the traditional, physical, technical and managerial dimensions. For practice, the study offers a holistic framework for policymakers and construction stakeholders to adopt measures to improve the psychological health conditions of construction employees. Similarly, valuable insights are offered for construction organization as to how their occupational health management systems might be improved to promote a psychologically safe and healthy construction industry.

**Keywords:** Occupational Psychology; Psychological Health; Management Strategies; Construction Industry; Construction Employees; Ghana.

## LIST OF RESEARCH PUBLICATIONS

The following provides a list of research publications that the author of this thesis made during her Ph.D. study, and, as shown within the text, chapters of this thesis have been fully or partially published in academic journals.

### A. Refereed Journal Papers (Published)

1. Fordjour, G. A., Chan, A.P.C., and Tuffour-Kwarteng, L. (2020). “Exploring construction employees’ perspectives on the potential causes of psychological health conditions in the construction industry: A study in Ghana”. *International Journal of Construction Education and Research*, DOI: 10.1080/15578771.2020.1804491.
2. Fordjour, G. A., Chan, A. P. C. and Tuffour-Kwarteng, L. (2020). “Factors Associated with Effective Implementation of Psychological Health Interventions in the Construction Industry”. *Journal of Civil Engineering Research & Technology*, 2(1), 1-17.
3. Fordjour, G. A. and Chan, A. P. (2020). “Exploring the effects of occupational psychological disorders on construction employees and the construction industry”. *Occupational Diseases and Environmental Medicine*, 8(1), 1-25.
4. Fordjour, G. A., Chan, A. P. C., and Fordjour, A. A. (2020). “Exploring potential predictors of psychological distress among employees: a systematic review”. *International Journal of Psychiatry Research*, 3(1), 1-11.
5. Fordjour, G. A., and Chan, A. P. C. (2020), “Tracing Symptoms of Psychological Health Status among Construction Employees”. *Journal of Health and Medical Sciences*, 3(1), 104-118.
6. Fordjour, G. A. and Chan, A.P.C. (2020). “Historical Review of Occupational Psychological Health Research and Philosophy”. *Journal of Neurology Research Review & Reports*, 2(1), 1-11.



7. Fordjour, G. A., Chan, A. P. C. and Amoah, P. (2019). “Exploring Personal Factors That Might Influence the Vulnerability of Construction Employees to Occupational Psychological Disorders”. *Health*, 11, 546-566.
8. Fordjour, G. A. and Chan, A. P. C. (2019). “Exploring Occupational Psychological Health Indicators Among Construction Employees: A Study in Ghana”. *Journal of Mental Health and Clinical Psychology*, 3(2): 6-18.
9. Fordjour, G. A., Chan, A.P.C., Amoah, P. and Tuffour-Kwarteng, L. (2019). “Coping Strategies Adopted by Construction Employees to Deal with the Causes and Effects of Occupational Psychological Disorders: A Study in Ghana”. *Health*, 11, 755-782.

#### **B. Refereed Journal Papers (Submitted)**

10. Fordjour, G. A., Chan, A. P. C. and Tuffour-Kwarteng, L. (2020). “Exploring organizational preventive measures to mitigate the causes of psychological distress in the construction industry”. *Construction Management and Economics*.
11. Fordjour, G. A., Chan, A. P. C. and Streicher, B. (2020). “Research trend of occupational psychological health studies in the construction industry”. *Journal of Construction Engineering and Management*.

#### **C. Conference Paper (Published)**

12. Fordjour, G. A., Chan, A. P. C. and Amoah, P. (2019). “Exploring the need for occupational psychological health management and interventions in the construction industry: An empirical study in Ghana”. The International Council for Research and Innovation in Building and Construction (CIB), World Building Congress 2019–Constructing Smart Cities.

### **The candidate's level of contribution to the above papers**

Under the full supervision of her supervisor – Ir. Professor Albert P. C. Chan – the candidate – Fordjour Genevieve Ataa – explored and developed the ideas for and fully drafted the initial drafts of all the above papers. The candidate also revised and improved the quality of the papers based on feedback from her supervisor on the initial drafts. On some of the papers, in order to demonstrate the candidate's ability to work collaboratively with others, other scientists in the field were invited to co-author the papers by generally providing feedback for further improvements of the papers. The candidate further revised and improved the papers based upon the feedback from these experts. It is also worthy to mention that the candidate drafted all of the above papers in English without employing professional English language editing services. Lastly, the candidate was the corresponding author of all of the above papers and carried out all revisions of the papers based on journal reviewer comments and responded to those comments accordingly.

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## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Introduction**

Psychology in the workplace is a new trend and a very important area needed in all aspects of any organization's life (Gardner, 2002). Occupational psychology adopts ideas and research strategies from social psychology and combines with organizational behaviour to address the emotional and motivational part of the work (Landy and Conte, 2016). Psychology in the workplace, therefore, concerns itself with various aspects of the organization such as: how workers perform their job, learning growth patterns of workers, interpersonal relationships at the workplace, as well as effective functionality of the responsibilities of both employees and organization for mutual benefits (Ashleigh and Mansi, 2012; Zickar, 2003). Psychological issues are inevitable and have an integral component in the performance, sequential growth and development of any organization such as the construction industry (Campbell, et. al., 2004). Every employee goes to work with a certain level of predisposition towards psychological health conditions, which could emanate from environmental, situational, or behavioural factors at the construction workplace (O'Donoghue, et. al., 2016; Chan, et. al., 2012). Employees' subjective evaluations of their work situations can influence their psychological health condition (Kivimäki, et. al., 2005). Organizational pressure of keeping cost and expenditure at the minimum level, while maximizing profits, as well as doing more in less time, coupled with numerous personal roles to be fulfilled in ones' relationship and work, could have a toll on the psychological health of a construction worker (Landy and Conte, 2016). Psychological health conditions of construction employees thus emanate from many interpersonal and organizational factors (Richman, et. al., 2001; Bowen, et. al., 2014).

Studies in occupational psychology have revealed that psychological health conditions could have adverse consequences on the individual employee's physical, mental and social

well-being (Landy and Conte, 2016; O'Donoghue, et. al., 2016). Psychological ill-being conditions could have devastating consequences on the construction worker as well as the construction industry. Previous researchers have reported the impact of poor psychological health conditions of employees on their various organizations, with associated direct or indirect costs (Quick and Henderson, 2016; Bowen, et. al., 2014). The consequences could be tangibly measured in terms of days of work absent and loss of work productivity (Hassard, et. al., 2018). Previous studies have also reported the financial consequences of psychological distress or ill-being by tabulating how much companies spend on medical costs for employees' psychological well-being (Schultz, et. al., 2015). The effects of psychological ill-being conditions on construction workers also include poor job performance and low productivity as well as violent or non-violent acts, with the consequences of stakeholders having to pay the price for dysfunctional or unhealthy behaviours at the construction workplace (Griffin, et. al., 2007).

The well-being of workers should be a priority concern for stakeholders and management of all organizations (Avey, et. al., 2010). Human resources form the organization and are the organization, and there is no functionality in the organization without the existence of people (Aryee, et. al., 2012). Construction employees specifically construction professionals and construction trade workers are essential contributors to a construction project's outcome, in terms of time, quality and cost (Chan, et. al., 2012; Leung and Chan, 2012). The employees categorized as construction professionals include architects, engineers, quantity surveyors, and the likes. The construction trade workers group also include carpenters, masons, plumbers, and the likes. However, Gardner (2002) stated that many organizations often ignore how workers conceptualize their daily experiences and concerns to be incorporated into the goals of the organization.

Occupational psychology concentrates on people's reactions to work and adopt action plans to boost workers' job satisfaction for increased job performance (Landy and Conte, 2016).

The theories and basic principles of occupational psychology could be employed in the construction industry to enhance the psychological health and well-being of the construction workers. This study seeks to explore the need for occupational psychological health management of employees in the construction industry, and design preventive psychological health management models to enhance the psychological well-being of construction employees.

## **1.2 Background of the Research**

### **1.2.1 Definitions of Occupational Psychology**

Psychology in the workplace has several names such as “occupational psychology”, “work psychology”, “organizational psychology”, “industrial psychology”, “vocational psychology” and “applied psychology” (Ashleigh and Mansi, 2012). These names could be used interchangeably to describe psychology in the workplace. European psychologists use the term “work psychology”, those in Britain prefer to use “occupational psychology” and American psychologists use both “organizational and industrial psychology (Spector, 2003; Ashleigh and Mansi, 2012). In the mid-1960s, there was a demarcation between “modern” and “classic” thinking, and industrial psychology was changed to organizational and industrial psychology by the Americans (Landy and Conte, 2016). Industrial psychology has its roots from heavy-duty manufacturing industries and was widely used in the 1900 and 1920s but is now irrelevant and outdated (Zickar, 2003).

The exact definition of psychology and what the context should be has created a lot of disputes among psychologists (Cohen, 1977). The definitions of workplace psychology have been changed concurrently over the period of 100 years (Ashleigh and Mansi, 2012). Occupational Psychology can be defined as the application of the principles, theories, and research ideas of the psychological discipline into the workplace (Avey, et. al., 2016).

Workplace psychology is the science of humans in the workplace, with the aim of improving worker's input and organizational responsibility of ensuring worker's well-being (Spector, 2003). Workplace psychology has also been described by Baron and Greenberg, (1990), as the field of organizational behavioural science that looks at human behaviours in all aspects of an organizational setting. Furnham (2005) also describes occupational psychology as the study of all areas which concern people in the workplace, such as recruitment, selection, and socialization.

### **1.2.2 Description of Psychological Health Conditions**

Psychological health condition has been described as a condition in which the indicators are relatively constant; however, the condition itself can be dynamic (Russell, 2003; Hassard and Cox, 2016). Indicators of psychological health condition have been categorized under physical, mental, behavioural and emotional symptoms (Ademola, 2005; Quick, et. al., 2013). The positive psychological health condition, also known as psychological well-being, is usually based on individuals' subjective feelings and experiences (Russell, 2003). The main indicators of psychological well-being conditions of workers are job satisfaction and work engagement (O'Donoghue, et. al., 2016). The adverse psychological health condition, also known as psychological ill-being, has been highlighted as one of the most significant contemporary problems of occupational health; with a significant growth process reaching different working groups globally (Lua, et. al., 2018; Magotra, 2016).

Common forms of psychological ill-being conditions experienced by employees in various workplaces include stress, anxiety, depression, attention deficit hyperactivity disorder (ADHD) and bipolar disorders (Martin, et. al., 2016). The symptoms associated with psychological ill-being conditions include insomnia, fatigue, irritability, forgetfulness, difficulty concentrating, and somatic complaints (Magotra, 2016; WHO, 2005). These

symptoms, however, tend to manifest themselves differently in the workplace than at home or in other settings (Johari and Omar, 2019). It was advocated by the World Health Organisation (WHO) that the psychological health of employees should be assessed by considering all aspects of a person including their complete mental, physical, emotional and social well-being, and not merely on the absence of a particular ailment, disease, condition, or infirmity (WHO, 2005). This study defines psychological health condition as a mental illness or psychiatric disorder with significant impairment on a person's mental, physical, emotional, behavioural and social functioning.

### **1.2.3 Common forms of psychological health conditions among employees**

#### ***Stress***

Stress has been identified globally as one of the most common psychological ill-being conditions among employees (Quick and Henderson, 2016). Prolonged stress can contribute to physical and mental illnesses, with adverse effects on the heart, immune system, brain-acting hormones and metabolic functions (Enshassi, et. al., 2016). Some of the behavioural and emotional indicators of stress overlap with those of other psychological ill-being conditions such as anxiety or depression (Magotra, 2016). Stress can cause behavioural changes that cause guilt, feelings of shame, and irritation (Masood, 2013). Exposure to psychological stressors can lead to post-traumatic stress in the long term, which has been linked to organic brain changes leading to neurocognitive symptoms (Pollak and Miller, 2011). Some symptoms of stress include worn-out, insomnia, physically exhausted or tired, increased palpitations/ perspiration/ sweaty hands and racing heartbeat (Magotra, 2016).

### ***Depression***

Depression is a common psychological ill-being condition that causes people to experience loss of interest or pleasure, feelings of guilt, low self-esteem, poor sleep, loss of appetite, low energy and lack of concentration (Chauvet-Gelinier and Bonin, 2017). Depression is a mental disorder that can affect everything a person does in daily life, and every aspect of one's life (Almeida, et. al., 2015). Depression can thus have a truly stressful and debilitating impact on a person's life and on their physical and mental health (Lua, et. al., 2018; Mäkikangas, et. al., 2015). Persons who are depressed usually magnify issues such as injury and hurt, exaggerate unfairness, brood on previous harm or insults and label or blame others for their problems (Fried, 2017). Depression also arises when the expectations of a person have not been met, the requirements of the job do not match one's capabilities, or there is lack of or limited resources needed by the employee to do a job (Lua, et. al., 2018).

### ***Anxiety***

Anxiety as a psychological disorder is characterised by an emotional response usually to a perceived risk or danger (Fonzo, et. al., 2015). Everyone is occasionally scared, but chronic anxiety reduces a person's effective cognitive functioning and can affect one's quality of life (Chauvet-Gelinier and Bonin, 2017). Although anxiety is best known for behavioural changes, it can also have serious consequences on one's physical health (Kogan, et. al., 2016). People who are anxious usually experience acute fear, tension, discomfort, mood swings, nervous ticks, stage fright, trembling, butterflies in the stomach and frequently urinate (Fonzo, et. al., 2015; Huppert, 2009). Anxiety is, therefore, a negative psychological state which is incongruent with a person's conscious reality (Kogan, et. al., 2016).

#### **1.2.4 Statement of the Problem**

The Chartered Institute of Building (CIOB) revealed in their study conducted in 2016 that about 70% of employees in the construction industry suffer from adverse psychological health conditions such as stress, depression, and anxiety (CIOB, 2016). A study by the Health and Safety Executive, (2015) also revealed that about 10.5 million workdays could be lost yearly to work-related psychological health and physical illness. Other previous studies have revealed that about 450 million persons suffer from psychological distress such as stress, depression and anxiety disorders at a time, which has led to various forms of disability and ill-health globally (World Health Organization, 2001; Schultz, et. al., 2015). The numbers presently are sure to have increased; this is the reason why psychological health issues should be taken more seriously. Psychological ill-being conditions of employees can lead to impaired well-being such as fatigue, chronic tension, sleep problems and manifest diseases (Quick and Henderson, 2016; Pollak and Miller, 2011).

The predominant sign of psychological ill-being conditions of workers at the construction workplace can be frequent absenteeism of the construction worker (Lua, et. al., 2018). The rate of absenteeism or sick leave could be high, especially in cases where construction workers are exposed to poor working and environmental conditions, leading to psychological ill-being conditions of burnout; and the workers may take longer duration to be absent from duties (Peterson et. al., 2008; Schaufeli et. al., 2009). Psychological health of construction workers can thus have severe consequences on the overall job outcomes of the construction firm. The consequences of such occurrences could have negative impact on the construction industry and the nation's economy, as they diminish productivity, affect the overall work performances negatively and lower the population of the workforce (Quartey and Bill, 2012).

It is of essence for construction industries to pay critical attention to the psychological health of their workers and to understand causative factors that lead to workers psychological ill-being and adopt preventive measures. Factors associated with the psychological health conditions of employees stretch beyond the physical boundaries of the workplace (Johari and Omar, 2019). Previous researchers revealed that other exogenous events and factors that cannot be found in the physical setting of the workplace also influence employees' psychological health and associated behaviours (Mäkikangas, et. al., 2015; Bowen, et. al., 2014). These factors may emanate from other sources such as environmental influences, cultural, family background, relationship responsibilities, employment-related demands and non-working events (Martin, et. al., 2016; Mäkikangas, et. al., 2015). Endogenous factors such as employees' personality, core beliefs or perception could also arouse the circumstances which expose individuals to the risks of psychological ill-being conditions (O'Donoghue, et. al., 2016). Thus, intervening factors such as work characteristics or conditions, employees' personal factors, situational and other environmental factors may expose construction employees to various forms of psychological ill-being conditions (Johari and Omar, 2019; Enshassi, et. al., 2016).

Psychological health conditions of construction employees could have both direct and indirect cost with several implications on the interpersonal relationship, task and project performance of the construction industry (Leung, et. al., 2016). Some of the implications for the construction industry include increases in turnover rate, decreases in job satisfaction, a general deterioration in work productivity and poor performance outcomes (Bowen, et. al., 2014; Chan, et. al., 2012). The client's work satisfaction can be directly influenced by the workers' psychological well-being and health conditions (Salanova, et. al., 2005). Psychological ill-being conditions of construction workers, on the other hand, can also negatively impact the financial returns of the construction firm (Xanthopoulou, et. al, 2009).



Poor psychological health conditions of workers can lead to some negative proactive behaviours at the construction workplace such as aggression, hostility and offensive behaviours (Miner and Glomb, 2010; Bakker and Xanthopoulou, 2009).

Previous studies have revealed that the construction industries of developing countries such as Ghana face many problems (Badu, et. al., 2012). These problems result in poor performance in the areas of cost, quality and productivity (Dogbegah, et. al., 2011). For most construction projects undertaken in developing countries, the outcomes fall short of the targets set by the participants in terms of schedules (time), budgets (cost), and specifications (quality) (Ofori-Kuragu, et. al., 2016). The pressure to produce more in less time in high quality can expose the Ghanaian construction employees to various forms of psychological health conditions. In a less resourced and developing country like Ghana, its construction employees are also likely to be faced with high risks of psychological health and ill-being conditions (Laryea, 2010). As a developing country, the atmosphere in Ghana appears to be a breeding ground conducive enough for psychological health problem. Inadequate resources and half-hearted interventions are some of the possible causes.

It has become necessary to conduct an empirical investigation to identify the factors associated with the psychological health conditions of construction employees in Ghana.

#### **1.2.5 Ghanaian construction industry as the geographical context for this study**

The Ghanaian Construction Industry has recently experienced considerable growth in activities, and this could be attributed to the rapid growth in population and urbanization. The Construction industry in Ghana contributes to the development of the nation's social and economic sectors. The construction industry provides employment for approximately 450,000 people, with an estimated 2,600 active building and construction contractors currently operating in the Ghanaian market (Ofori-Kuragu, et. al., 2016). The construction industry is

therefore seen as one of the drivers of the economic growth; as it provides employment to the local people, effectively utilizes the natural resources and significantly contributes to the gross domestic product (GDP) (Anaman and Osei- Amponsah, 2007).

Construction works in Ghana are associated with long working hours, lifting of heavy machinery, dusty and noise exposure. Consequently, construction workers are often subjected to fatalities and ill- health problems (Akintoye and Macleod, 1997), which could affect their psychological well-being. Construction works activities such as: working at height, working at underground areas, working in spaces that are confined and at a proximity close to falling objects or materials, could also expose the Ghanaian construction workers to psychological ill-being conditions (Langford et al., 2000). It was revealed in a study by Adei and Kunfaa (2007) that, the most common occupational health diseases of workers in Ghanaian Construction industry are: musculoskeletal (lower back) pain, respiratory tract infections, asthma, conjunctivitis and hearing problems. These physical health problems can be related to the psychological health conditions of the workers. These health risks can also be attributed to the nature of the construction work, materials and equipments used, conditions of the physical environment, methods employed in executing the construction works, as well as unsafe exposure to dust, fire, live cables, noise and hazardous substances (Akintoye and Macleod, 1997).

The workforce is the most vital resources of every organization. The human resources of organizations such as the Ghanaian construction industry should be at ease while working. Any kind of psychological ill-being conditions such as stress or depression could directly affect the construction workers' job performance, with consequences on the construction industry. Dadzie (2013) advocated that managements of the construction industry in Ghana should be responsible for the well-being of their workers both physically and psychologically. The construction stakeholders also owe a duty to other third parties like visitors, passers-by, who

are likely to be affected adversely by the construction works activities (Kheni, 2008).

It is very important for organizations such as the Ghanaian construction industry to understand the conditions and factors that lead to workers well-being and attempt to eliminate or minimize those factors that lead to workers' psychological ill-being conditions (O'Donoghue, et. al., 2016). Identifying factors that influence the psychological health conditions of construction employees in Ghana is therefore essential.

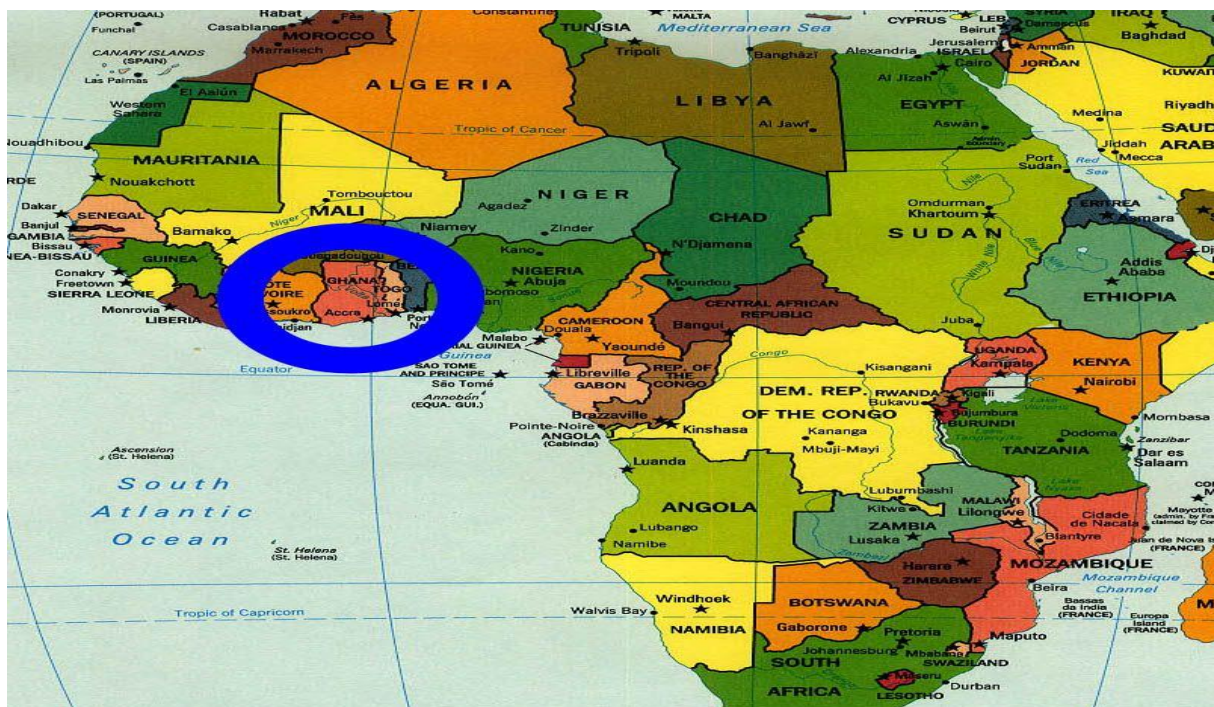


Figure 1.1: Location of Ghana on a Map (Ashley, 2018)

## 1.2.6 Research gap of occupational psychological health studies in the construction industry

Realizing the critical need to improve the health and well-being of construction workers, occupational psychological health research has gained much attention around the world. However, occupational psychology has not been explored expansively in the construction literature. Most of the research on occupation psychology regarding construction

employees have been conducted in fields outside construction management journals, such as health and psychology journals. Most of the research have been conducted in China, Australia, United States of America (USA), South Africa and Gaza Strip- Palestine. Also, only few researchers such as Leung, et. al., (2015) had conducted a study with construction employees from multiple geographic locations, specifically South Africa and HKSAR-China. This may limit the extent to which the results from the studies can be generalizable to other geographic contexts. Few studies were also found that had conducted occupational psychological health studies in developing counties, especially the sub-Saharan regions.

Much of the existing research on occupational psychological health have attempted to portray the experience of psychological health conditions from the perspective of the construction employees. To this end, researchers have investigated (1) the prevalence or level of psychological health conditions among construction employees (Chakraborty, et. al., 2018; Chen, et. al., 2017; Chan, et. al., 2016; Leung, et. al., 2015; Bowen, et. al., 2014a) (2) the characteristics of the construction work that contribute to or exacerbates psychological health conditions (Sommovigo, et. al., 2019; Lian, 2018; Wang, et. al., 2017; Yang, et. al., 2017; Cattell, et. al., 2016; Enshassi, et. al., 2016; Enshassi and Al. Swaitly, 2015; Bowen, et. al., 2014b; Brockman, 2014) (3) the personal factors that make employees vulnerable to psychological health conditions (Kamardeen and Sunindijo, 2017; Shan, et. al., 2017; Cattell, et. al., 2016; Malone and Issa, 2014) (4) the effects or consequences of psychological health conditions on employees' capabilities, job performance and safety (Goulding, et. al., 2018; Leung, et. al., 2017; Senaratne and Rasagopalasingam, 2017; Leung, et. al., 2016a; Enshassi, et. al., 2015) (5) the coping behaviours adopted by the construction employees to deal with the psychological health condition (Enshassi, et. al., 2018; Liang, et. al., 2018; Chan, et. al., 2016; Bowen, et. al., 2014c) and (6) the intervention measures that can be adopted to prevent or alleviate the effects of psychological health conditions as well as the barriers to the

implementation of the interventions (Sommovigo, et. al., 2019; Jepson, et. al., 2017; Leung, et. al., 2016; Leung, et. al., 2015; Bowen, et. al., 2014b).

Given the individualized nature of occupational psychological health, there is the need for such studies in the construction industry to cover other geographical settings and consider other influential factors such as personalized factors, interpersonal factors and community factors. In order to effectively manage and support employees with psychological illness, it is also necessary for construction organizational scholars to apply their understanding of workplace processes to existing interdisciplinary work on occupational psychology as a means to enrich the study of this population.

### **1.2.7 Theoretical limitations**

Even though more than 100 studies have addressed psychological health issues among construction employees, there is still much to do to understand the intrinsic and extrinsic factors associated with the psychological health conditions of individuals. Some existing theoretical and methodological limitations were observed from the systematic review and have been considered in the facilitation of this study. For instance, missing from many of the studies was a strong theoretical rationale to guide the research questions and hypotheses, which restricts the understanding of employees with psychological illness (Chakraborty, et. al., 2018; Al Jassmi, et. al., 2019; Boschman, et. al., 2013; Adei and Kunfaa, 2007). While this may be due, in part, to different normative standards for research across the various fields of study, it is nonetheless a serious omission. Organizational scholars are encouraged to extend existing related theories to psychological health issues in the construction industry. Through improved theoretical foundations, organizational scholars can move beyond surface-level descriptions of psychological health conditions to more robust studies of the processes and boundary conditions surrounding individual and organizational perspectives.

A second limitation of the existing research is related to the methodologies used to study employees with psychological health conditions. For example, among the 44 current construction articles reviewed, no single study was found that had employed the mixed-methods approach of combining both qualitative and quantitative research methods. Approximately 13% of these studies utilized qualitative methods such as interviews and focus groups to examine construction employees' experiences or perceptions on the subject matter. About 7% and 2% of these studies had employed experimental design and case study methods respectively. Most of these studies, about 78% had employed the methods of survey questionnaire (Shan, et. al., 2017; Malone and Issa, 2014; Oude, et. al., 2012), although many of these studies were descriptive in nature employing statistical methods such as means, frequencies. This thereby restricts the ability to draw predictive or explanatory conclusions from the findings of these studies. Of the quantitative studies, 5% conducted longitudinal study designs, while the remaining studies reviewed employed one-off or cross-sectional study designs. Small samples were also used for the qualitative and experimental studies. Using rigorous research methods can aid in capturing the complex and nuanced nature of occupational psychological health of construction employees.

A third limitation was that the research participants of most of the studies were conducted with construction professionals (Leung, et. al., 2017; Chan, et. al., 2016; Bowen, et. al., 2014b). There is less research attention on the construction trade workers. Also, only few studies reviewed had conducted studies with both construction professionals and construction trade workers. Even with these studies no comparative analysis was conducted with these two constructions working groups. A comparative analysis will enable the identification of the differences in the experiences of psychological health conditions among the two construction groups.

Finally, many of these studies have been conducted in developed countries such as China, USA, Australia and South Africa (Yang, et. al., 2017; Sunindijo, et. al., 2017; Panahi, et. al., 2016; Bowen, et. al., 2014a). A large study, which applied multi-methods and multi-stages, concluded that “the future research and action paradigms in relation to psycho-social risk management will need to be broadened to include the larger social, political and economic contexts in developing countries beyond issues focusing solely on the working environment” (Kortum, et. al., 2010). This study, therefore, sought to address these knowledge gaps on the basis of socio-ecological theory by adopting mixed-methods strategy, relatively large sample sizes for both the qualitative and quantitative studies, employing comparative study analysis between construction professionals and construction trade workers, and conducting the study in a developing country, specifically Ghana.

### **1.3 Research Aim and Objectives**

#### **1.3.1 Research Aim**

This study aimed at investigating the factors associated with the psychological health of employees in the construction industry and develop a framework of preventive psychological health management strategies.

#### **1.3.2 General Research Questions**

1. Are there psychological health conditions among the construction employees in Ghana?
2. What are the causes and effects of psychological health conditions in the construction industry, as well as the individual coping mechanisms to manage these issues?
3. Are there differences between the factors that are of major concern to construction professionals and construction trade workers?
4. What is the relationship between the factors and psychological health conditions of the construction employees?

5. What are the organizational strategies that can be adopted to mitigate the causes and effects of psychological health conditions in the construction industry; and the factors associated with the effective implementation of these interventions?

### **1.3.3 Specific Research Objectives**

1. To explore the indicators of psychological health conditions among the construction employees in Ghana.
2. To identify the personal factors that can make construction employees vulnerable to psychological health conditions.
3. To identify the construction work-related factors that can influence the psychological health conditions of construction employees.
4. To identify potential effects of psychological health condition on construction employees and the construction industry.
5. To identify the coping strategies adopted by construction employees as their responses or efforts to deal with the causes and effects of occupational psychological disorders.
6. To identify organizational strategies that can be adopted to mitigate the causes of psychological health conditions in the construction industry.
7. To identify the factors associated with effective implementation of psychological health interventions in the construction industry.

## **1.4 Project Significance and Value**

Occupational psychology has recently attracted some research attention in many professionals. However, there is little research attention on occupational psychological health of workers in the construction industry. Psychological ill-being conditions such as stress, depression and anxiety, could affect the level of productivity and job performance of the



construction worker, with consequential effects on the construction industry. Albeit the number of research works that have been carried out on the management of health in the construction industry, there has been a diminutive look into the psychological health and well-being of construction employees. Psychological ill-being conditions of construction employees are very critical and could have negative impacts on productivity, with consequential cost to the construction company. Most of the research on occupational psychological health of construction employees that have also been conducted are focused mainly on the construction project team members. Thus, there is a less research attention placed on the psychological well-being and ill-being of construction trade workers.

This study bridges this knowledge gap by studying the psychological health and factors that relate to both construction professionals and construction trade workers. This research study therefore aims to enhance the occupational psychological well-being and health of all construction employees. The research approach delivered through appropriate research methods shed contextual insights into the intricacies and dynamics of occupational psychological health management that can be employed in the construction industry. This research study develops innovative preventive psychological health management strategies, which respond to the nature of the construction industry and its activities and can be effectively implemented to enhance construction employees' psychological well-being.

Occupational psychological well-being and ill-being studies also provide an excellent and important area for exploring behavioural issues in the construction industry and one in which an original contribution to research as well as practice can be made. This research work has potential of achieving something impactful for the accomplishment of improved psychological health and well-being of construction employees. The study adds to existing knowledge and provides a form of reference on occupational psychology in the construction industry, for academicians, students, and future researchers. The findings from the study can

also be applied to other countries. There is, therefore, novelty and significance of this research work.

## **1.5 Research Methodology**

The literature review provided evidence for improving construction workplace psychological health through measures such as alternate work schedules (Lingard and Turner, 2017); evidenced-based ideas for improvement (Eaves, et. al., 2016), and ways of early detection of psychological distress (Jebelli, et. al., 2018). Further research studies are however required to build upon this literature in order to advance existing knowledge into how construction psychological health problems can be managed to produce a healthier workforce that ultimately, will also reduce construction costs. The main objective of this study was, therefore, to identify the factors associated with the psychological health of construction employees in Ghana. This research objective falls into the exploration category in a specific context, which is suitable for qualitative methods such as focus group study and interviews, and the descriptive derivation for generalized conclusions, a survey questionnaire is also required (Cooper and Schindler, 2006). This study, therefore, adopted the mixed-method approach, which combines elements of qualitative and quantitative research to ensure breadth and depth of understanding and for confirmation purposes (Easterby-Smith, et. al., 2008).

There are many advantages to using a mixed method over a single method approach. For instance, by using different sources and methods at various points in the assessment process, researchers can build on the strengths and weaknesses of a single approach. Besides, both the validity and reliability of the data evaluated can be assured (Ashleigh and Mansi, 2012). The mixed methods can either be in the sequential form (qualitative followed by quantitative or quantitative followed by qualitative) or in parallel (both qualitative and quantitative studies carried out simultaneously) (Cooper and Schindler,

2006). According to Creswell and Plano, (2007) sequential mixed method is conducted to either confirm/disconfirm the inferences of the first strand of either qualitative or quantitative study. The parallel mixed method on the other hand is conducted with two relatively independent strands/phases; the inferences made on the basis of the results of each strand are pulled together to form meta-inferences at the end of the study (Creswell and Plano, 2007). Based on the exploratory and confirmatory nature of this study, sequential mixed method was adopted. This study therefore adopted the sequential mixed methods design whereby, the qualitative methods of focus group discussions and interviews (exploratory study) were employed before the quantitative method of survey questionnaire (descriptive assessment) were then employed.

The methodology of the research, which is objective led, covers the data collection and data analysis methods. This section provides a brief insight into the strategies and procedures adopted by the study as well as the type of data to be used in the study. The criteria for admissibility of field data and the treatment of the data are also considered.

In achieving the stated objectives, the study will employ the following.

**Observation:** There was a general observation and review of organizational culture in some selected construction industries in Ghana. This helped to identify the philosophy to be used, and the theories/concepts to be tested.

**Approach:** Due to the exploratory nature of research question one (1), qualitative methods adopting the exploratory techniques of focus group study was more appropriate for the first part of the study. For research questions two (2), three (3) and four (4) quantitative methods were more suitable, to confirm the findings from the qualitative study and identify the primary factors associated with construction employees' psychological health. For research question five (5), sequential mixed methods strategy was also adopted by employing the methods of interviews and questionnaire survey to access the level of significance and acceptability of the

proposed strategies, for the development of preventive psychological health management models for the construction employees and the construction industry. The research, therefore, adopted both phenomenological and positivistic approaches, which were delivered using both qualitative and quantitative research methods to provide contextual insights into the psychological health and well-being of employees in the Ghanaian construction industry. Details to justify the choice of these research approaches have been provided in Chapter 2.

### **1.5.1 Sources of Information**

Primary data and secondary data will be used. They will be elaborated as follows:

#### **Primary data**

1. Qualitative methods of focus group discussions and interviews were conducted to delve deep into the psychological health issues of construction employees. This provided a holistic view of the need for occupational psychological health management of employees in the construction industry.
2. Extensive field survey was used to collect primary data to test the level of significance of the preliminary findings from the qualitative studies. Structured questionnaires were designed to gather information from construction workers and managers in the construction industry.

#### **Secondary data**

Secondary data in the form of review of related literature were mainly be obtained from documented written, and non-written materials such as published texts in journals, books, earlier related research, pamphlets, newspapers, organizations' web sites, televisions, tapes, the internet and other relevant publications were used to obtain information on the subject area from which a conceptual model was developed.

The findings from the primary and secondary data sources were put together to achieve the aim of the research study.

### **1.5.2 Data Analysis**

Content analysis was employed for the data analysis of the qualitative data. Statistical formulae were used in the selection of sample sizes, analysis of data and testing of the research hypothesis for the quantitative data.

### **1.5.3 Hypotheses of the study**

The null hypothesis is the hypothesis to be tested, which is usually represented with “H<sub>0</sub>”. The alternative hypothesis is the hypothesis to be considered after the null hypothesis has failed the test and is to be rejected. The alternative hypothesis is also usually represented with “H<sub>1</sub>”. The null hypothesis is usually easy to state. The Alternative hypothesis, on the other hand, could be more difficult to state, but this is usually very important to state (Lo, 2018). The Test statistics for this study was stated, and this was used as the basis for deciding whether the null hypothesis should be rejected or not. The value of the test statistics was 0.05.

The following are the null and alternative hypotheses of this study:

**The null hypothesis, (H<sub>0</sub>):** Assumed there is no statistically significant difference between the mean scores obtained from the group of respondents for all indicators and factors measured.

**The alternative hypothesis, (H<sub>1</sub>):** Assumed there is/ are a statistically significant difference between the mean scores obtained from the group of respondents for all indicators and factors measured.

**Approach 1:** Independent two-sample T-test was used to obtain the significant values for the scores obtained from construction professionals “a” and construction trade workers “b”.

**Approach 2:** Kruskal-Wallis and Mann-Whitney tests were used to obtain the significant

values for the scores obtained from construction professionals “a”, construction trade workers “b” and labour personnel “c”.

**Expected Outcome:** If the  $p\text{-value} \leq 0.05$ , this indicates the difference in the mean scores is statistically significant, and hence the null hypothesis will be rejected, and the alternative hypothesis considered. If the  $p\text{-value} \geq 0.05$ , the null hypothesis will not be rejected.

#### **1.5.4 Ethical consideration**

The guidelines for intellectual property, occupational health and safety and ethics were fully taken into account before and during research activities. This guide researchers in the conduct of research activities professionally and ethically and to ensure the accuracy and validity of data collection and reporting. The data collection methods provide general and technical information from experts in the field of study. The research included no experiments on humans, animals, or other materials. The ethical impact of this study was minimal as there was no significant risk of harm, no endangered subject groups, or sensitive issues. All suitable criteria and procedures of the ethical code guidelines provided by the American Psychological Association (APA) in conducting research in psychology were followed. In the selection of research participants, for instance, under no circumstance was coercion or inducement utilized. Only persons who were willing to participate in the study were utilized for the research.

As directed by the APA guidelines (2005), informed consent, right to decline participation at any point of the research was strictly adhered to. The participants were, therefore, informed at the beginning of their right to drop out of the study at any point they wished. Confidentiality of the responses of the participants was also adhered to at every step of this study. Consent forms were also used to assure the participants of the confidentiality of their responses. Total anonymity of the participants was considered with a focus on the appropriate research design method.

### **1.5.5 The credibility of research and knowledge**

Credibility is an essential criterion for every research. It indicates whether the research results are trustworthy from a scientific point of view (Ashleigh and Mansi, 2012). This can be achieved by applying certain criteria and rules that are generally recognized and practised in science. Various measures were introduced to increase the validity of the data, the reliability of the sources and the generalizability of the results, all of which have contributed to increasing the credibility of the research. These measures included the mixed method elements from qualitative and quantitative research methods employed for this study. The pilot studies carried out before the actual interviews and surveys also increased the credibility and quality assurance of both research instruments. In selecting the respondents, justified criteria were used. For example, the minimum sample was calculated and achieved. To increase the reliability of the sources, the respondents who were directly involved in either the implementation, utilization, or management of psychological health issues in the construction industry such as construction professionals, construction trade workers, regulatory personnel, and occupational health psychologists, were selected for the study. The respondents also had to meet certain criteria, such as have at least one year of relevant work experience in the construction industry or regulatory institution. Inference analysis was also used to validate the results of the descriptive analysis to determine whether the differences between the group of respondents were statistically valid and did not occur randomly.

### **1.5.6 Summary of the Research Approach**

A summary of the research methods employed to achieve the research objectives has been shown in the Table 1.1.

**Table 1.1: Methods adopted to achieve research objectives**

Research Methods	Approach	GENERAL RESEARCH OBJECTIVES				
		1. To explore the presence of psychological health indicators among employees	2. To identify the causes, effects and coping mechanisms	3. To assess the difference in the rankings of the factors by the groups of respondents	4. To determine the relationship between the factors and psychological health conditions	5. To identify the organisational strategies for psychological health interventions in the construction industry.
Data acquisition	Systematic review of existing literature	√	√	√	√	√
	Focus Group Study		√			
	Interviews		√			√
	Questionnaire Survey	√	√	√	√	√
Data analysis	Content Analysis		√			√
	Mean scores, standard deviations and rankings	√	√	√	√	√
	One Sample T-Test		√			
	Independent Two sample T-Test	√	√	√		
	Kruskal-Wallis and Mann-Whitney tests					√
	Correlation Analysis				√	
	Regression Analysis				√	
Target Group for Study	Construction trade workers	√	√	√	√	√
	Construction project team managers	√	√	√	√	√
	Labour Personnel (Regulatory personnel and Occupational health psychologist)					√
Sampling method and size	Purposive sampling	√				√
	Stratified random sampling		√	√	√	√
	16 Focus group discussions with 90 participants	√				



	Individual Interviews with 53 participants					√
	300 target respondents for Quantitative Study		√	√	√	
	264 respondents for Quantitative study					√

### 1.5.7 Structure of the Thesis

The study is organized in ten chapters.

- Chapter ONE gives a general introduction of the subject matter, background of the study, provide definitions of concepts, introduce the problem to be solved, aims and objectives of the study, justification of the study and a brief description of the research methodology.
- Chapter TWO presents the theoretical background of the study, explore the past research; give a brief description of the evolution of occupational psychology, present the key perspectives in psychology research, and the review of the current trend of research on occupational psychology in the construction industry. This chapter culminates into the development of a comprehensive model, which revolves on the aim and objectives of the study.
- Chapter THREE discusses the research methodology, the type of data to be used, how the data was collected and how the data was analyzed.
- Chapter FOUR presents objectives 1, 2 and 3 on determinants of psychological health conditions among construction employees as well as personal and construction work-related factors that influence the psychological health of construction employees.
- Chapter FIVE presents objectives 4 and 5 on potential effects of employees' psychological health condition on the construction industry and the individual coping strategies and organizational measures to mitigate the causes of psychological health conditions.
- Chapter SIX presents objectives 6 and 7 on organizational measures to mitigate the causes

of psychological health conditions and factors associated with effective implementations of preventive psychological health interventions in the construction industry.

- Chapter SEVEN presents the results, discussions, and summary of objectives 1, 2 and 3.
- Chapter EIGHT presents the results, discussions, and summary of objectives 4 and 5.
- Chapter NINE presents the results, discussions, and summary of objectives 6 and 7.
- Chapter TEN presents the final integrated models, conclusions, and recommendations.

## **1.6 Chapter 1 Summary**

This chapter gives a general introduction of the subject matter, the background of the study, provides definitions of concepts, and introduces the problem to be solved, aims and objectives of the study, the research methodology and justification of the study.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

This chapter primarily examines in detail existing literature and research works on occupational Psychology. A brief history of the evolution of workplace psychology and a comprehensive review of pertinent literature was undertaken to understand the scientific concept of occupational psychology, the key psychological perspectives, assist in the identification of the existing work done that are relevant to the study, current research trend in organisational psychology, contributions made, limitations, criticisms, and study applications. The literature review culminated into the development of a comprehensive model, which is revolved around the aim and objectives of the study.

#### 2.2 Historical review of occupational psychology research and philosophy<sup>1</sup>

Beginning in the mid-1990s, there has been a substantial and rapid increase in research in occupational psychology (Ashleigh and Mansi, 2012). The studies usually relate to the emotions workers bring along and the emotions they take from the workplace, as well as focusing on areas such as work-life balance (Landy and Conte, 2016). Research in psychology revealed that working experience is more complex than the simple job task, productivity, and safety issues (Ganster and Rosen, 2013; Harkness, et. al., 2005). However, there is a contrast between the research interest of the past, and current researchers, the past research in workplace psychology was focused on social intelligence, where the present research investigates emotional intelligence (Landy and Conte, 2016; Ashleigh and Mansi, 2012).

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<sup>1</sup> Some contents of section 2.2 of this Chapter have been published in: “Fordjour, G. A. and Chan, A.P.C. (2020). “Historical Review of Occupational Psychological Health Research and Philosophy”. *Journal of Neurology Research Review & Reports*, 2(1), 1-11”.

In the 21<sup>st</sup> century, occupational psychology research and practice continually sort to address issues such as workers' productivity, and efficiency, while exploring issues such as workers' well-being, maintaining family and work balance and the workers' experience and responses to work conditions (Ahuja and Thatcher, 2005; Anderson, et. al., 2001). This trend can be revealed by comparing the articles published in occupational psychology journals in the years 1977 and 2019.

The aim of occupational psychology is, therefore, to enhance workers' well-being and work effectiveness by conducting a systematic study of the processes in the organisation, which affects individuals as well as groups (Baron and Greenberg, 1990; Zickar, 2003). Occupational psychology seeks to know how workers are motivated and rewarded, how leaders behave, and how leaders emerge, as well as the formal and informal structure of the organisation by focusing on groups, teams, and sections (Furnham, 2005). The organizational influences on the feelings, thought, and behaviours of workers are evaluated as a result of the imagined, implied or actual behaviours of management and other persons in the organisation (Furnham, 2005; Griffin, et. al., 2007). This study conduct literature review on earlier research works on the subject area to improve on the current research effort.

### **2.2.1 A brief history of the evolution of research in occupational psychology**

Psychology studies in the workplace have its roots traced back near to the beginning of psychology as a scientific discipline between the years 1876 and 1930 (Landy and Conte, 2016). The concept of occupational psychology evolved in the mid-19<sup>th</sup> century after the industrial revolution (Zickar, 2003). With changes in technology and culture, there was the need for organisations to change their way of working for more effective and efficient methods that meet client's needs at the optimal level (Avey, et. al., 2010). The First psychological laboratories were founded in Leipzig, Germany, by Wilhelm Wundt in 1876 (Spector, 2003). In a period of 10 years, Wilhelm had established an enterprise for research and graduate training

(Ashleigh and Mansi, 2012). In the mid-1880s, Wilhelm trained two influential psychologists who brought about workplace psychology, namely- James McKeen Cattell and Hugo Munsterberg (Sokal, 1982; Landy, 1997). Hugo Munsterberg, who was one of the earliest trained psychologists in the mid-1880<sup>s</sup> and an expert in experimental psychology (Sokal, 1982). Hugo initially rejected the idea that the principles of psychology be applied to the workplace, as he saw no significance of it in the workplace (Landy, 1997). Nevertheless, in the early 20<sup>th</sup> century, Hugo changed his mind-set and recognized the significance and effectiveness of the principles of psychology been applied in the workplace to solve practical problems (Benjamin, 2006; Landy and Conte, 2016).

In the late 19<sup>th</sup> century and the early 20<sup>th</sup> century, researchers had focused mainly on strategies to improve the task performance of workers (Meyer, et. al., 2007). They were not particularly concerned with human factors like workers' well-being, job satisfaction, interpersonal relationships as well as individual differences and attitudes at the workplace (Breen and Darlaston-Jones, 2010; Meyer, et. al., 2007). For instance, researchers like Frederick W. Taylor (1911), outlined scientific methods to be applied to the management of workers that would help improve job performance and increase the profitability of the company. These principles were based on observations and experiments (Ashleigh and Mansi, 2012).

Adopting systematic work approaches that involve continually testing the works done by people was sure to increase work production efficiently (Spector, 2003; Ashleigh and Mansi, 2012). However, there is a need to give workers incentives, pay bonuses, and profit percentages as a means to motivate them to put their best efforts into their work (Littener, 1986). Taylor (1911), also prescribed other methods to promote job performance such as: measuring the time it took each worker to complete a task to gain specialisation; standardizing the working procedures by documenting optimal performances; improving workers' skills; and knowledge

through training and offering rewards to deserving workers through incentive or bonus schemes. There was an increase in performance as many organisations employed Taylor's methods (Breen and Darlaston-Jones, 2010). However, many organisations failed to apply the last principle of establishing reward systems (Ashleigh and Mansi, 2012).

The unfair treatment of workers had severe consequences especially on the level of productivity of the workers, some of the consequences also included: dissatisfied workers, repetitive menial tasks, management distrust, threat of losing jobs with specializations, rebellious behaviour and management resistance (Meyer, et. al., 2007; Breen and Darlaston-Jones, 2010). The scientific principles of management were also applied by Henry Ford in 1920, for the line of production of automated car manufacturing (Spector, 2003). Efficiency in work was gained through the application of this theory; however, human-related factors such as job satisfaction and well-being were also greatly ignored (Miner and Glomb, 2010).

Psychology in the workplace took a dramatic change when Elton Mayo, an Australian psychologist, arrived in the United States of America in the year 1924 (Mahoney and Baker, 2002). Elton began studies on workers' emotions rather than their job efficiency, and he titled his research "Hawthorne" studies (Griffin et. al., 2002; Landy and Conte, 2016). The Hawthorne research studies aimed at increasing productivity by incorporating lighting, relaxation breaks, and minimal working hours per period into the organization's culture (Roethlisberger and Dickson, 1939). Elton Mayo (1924), revealed that a mental condition is known as "revery" obsession, which usually results from the nature of work being repetitive, mind-numbing and difficult, with the effect of workers behaving in pathological ways. The obsession of management to control material and human resources by consistently measuring work performance, intensely supervising and monitoring workers' daily activities, have the resulting effect of high workers' turnover, absenteeism, and dissatisfied workers (Furnham, 2005; Meyer, et. al., 2007). The consequence of these also includes an unhappy workforce,

who are also prone to the resistance of management efforts to improve work productivity; these workers, therefore, seek support from the sympathetic workers' union (Landy and Conte, 2016). It was further revealed Elton Mayo (1924), that most organisations allow their workers to use only their physical effort and not their intellect, this could affect the functionality of minds negatively, as idle minds wander and result in the development of paranoid thoughts.

The human relations movement was developed with the intention of limiting the number of work-related grievances of workers (Mahoney and Baker, 2002; Highhouse, 1999). The realization that people were treated important as their productivity was a great insight to the work psychologists (Highhouse, 1999). The human relations movement brought great understanding and insight into workers' needs and motivation in the workplace (Ashleigh and Mansi, 2012). The Hawthorne study effect revealed that when workers are being given some attention, their work output increases as well as their overall job satisfaction (Landsberger, 1958).

There are professional organizational bodies that are formed to back studies on psychology such as the American Psychological Association (APA), which was formed in 1892 and the Association of Psychological Sciences (APS), which was formed a century after the formation of APA (Briner and Rousseau, 2011). Another organisation is the Society for Industrial and Organisational Psychology, which includes student membership with the aim of promoting the science of workplace psychology (Landy and Conte, 2016). There is also, the British Psychological Society.

**Table 2.1 Important years in the evolution of research in occupational psychology**

<b>Period</b>	<b>Major Achievement/ Event</b>	<b>Key Proponent(s)</b>
1891	Mental Test development	James McKeen Cattell
1892	Formation of American Psychological Association (APA)	Hugo Munsterberg in Harvard
1913	First Publication of Industrial and organisational psychology in English language	American Psychologists
1914 - 1918	World War 1	Psychologists in United States of American
1917	First Publication and issue of Journal of Applied Psychology	American Psychological Association
1930	Hawthorne Studies publication	Elton Mayo
1932	The First Modern text publication of Industrial Psychology	Morris Simon Viteles
1938	First Publication of Dictionary of Occupational Titles (DOT)	United States Department of Labour
1939 - 1945	World War II	United States Psychologists
1945	Industrial and Business Psychology was named after the establishment of Division 14 of APA.	American Psychologists
1950	Commercial Tests explosion	United States of America
1950	Membership of Division 14 exceeded 280	
1953	Publication of a book titled “Motivation and Morale in industry” for additional focus on organisations.	Morris Simon Viteles
1963	Equal Pay Act was passed as law	President John F. Kennedy
1964	Civil Rights Act Title VII was passed as law	President Lyndon B. Johnson
1970	Membership of Division 14 exceeded 1,100	
1982	Division 14 was renamed as Society for Industrial and Organisational Psychology (SIOP)	
1983	First edition of Handbook of Industrial and Organizational Psychology, Volume 1, was published	Marvin Dunnette
1990	Americans with Disability Act was signed into law	President George H. W. Bush
1990	Membership of SIOP exceeded 2,500	
1992	Second edition of Handbook of Industrial and Organizational Psychology, Volume 4, was published	Marvin Dunnette and Leaetta Hough
1995	Publication of Occupational Information Network (O*NET) to replace DOT	US Department of labour /Employment and Training Administration
1997	Annual Conference celebration of SIOP’s golden anniversary in St. Louis	
2008	Emergence of the SIOP new journal “Industrial and Organisational Psychology” with first journal article publication titled “Perspectives on Science and Practice”.	
2010	Publication of the 3 edition of APA Handbook of industrial and organisational psychology, Volume 3	Sheldon Zedeck
2015	Membership of SIOP exceeded 8,600	

(Landy and Conte, 2016; Ashleigh and Mansi, 2012; Briner and Rousseau, 2011)



### 2.2.2 Major Psychological Perspectives employed in Occupational psychology

The five key disciplines of psychology have emerged over the last 120 years and are the perspectives from which occupational psychology research was drawn from (Benjamin, 2006; Ashleigh and Mansi, 2012; Briner and Rousseau, 2011; Carr, 2007; Spector, 2003). Table 2.2 presents these five major occupational psychology theories, the key proponents behind these theories, and their timelines. The school of thought and the key tenets of each of the theories have also been presented in Table 2.2.

**Table 2.2: Theories employed in occupational psychology research**

<b>1. Psychodynamic theory</b>	
<b>Key Proponents and timeline</b>	Sigmund Freud (1856 – 1939); Carl G. Jung (1875 – 1961); Horney K. (1885 -1952); Winnicott D. (1896 – 1971); Erich Fromm (1900 – 1980)
<b>School of Thought</b>	This theory was related to motivation, personality development and dysfunctional behaviours. This theory considered the factors in a person's childhood which could have shaped the personality of the adult.
<b>Key tenets</b>	Freud developed this theory as he treated the psychological problems of people such as anxieties, phobias and unresolved conflicts.
<b>2. Behaviourism theory</b>	
<b>Key Proponents and timeline</b>	John Watson (1878 – 1958); Burrhus Frederick Skinner (1904 – 1990); Ivan Pavlov; Albert Bandura.
<b>School of Thought</b>	John Watson stated that in order to understand people their behaviours should be observed and measured.
<b>Key tenets</b>	This theory focused on the idea that human behaviours are as a result of situational and environmental factors. This began the theory of “Nurture versus Nature”.
<b>3. Humanism theory</b>	
<b>Key Proponents and timeline</b>	Erich Fromm (1900 – 1980); Rogers Carl (1902 – 1987); Abraham Maslow (1909 – 1970); Mihaly Csikszentmihalyi (1934); Martin Seligman (1942).
<b>School of Thought</b>	The researchers believed that people's behaviours are cultivated by their experiences from relating with others. People are unique and have diverse

	qualities with freedom to choose who they are and how they relate to others.
<b>Key tenets</b>	The theory focused on the wholeness of a person which is different from their behaviour and is determined by their individual self-worth and concept.
<b>4. Trait theory</b>	
<b>Key Proponents and timeline</b>	Allport G. G. (1897–1967); Raymond Cattell (1905–1998); Eysenck H. H. (1916 – 1997)
<b>School of Thought</b>	Allport, stated that the heritable and stable traits of a person shape his or her intellectual functionality. This is a typical biological personality theory.
<b>Key tenets</b>	This theory focused on traits measurement, which is defined by habitual behaviour patterns, emotions and thoughts of an individual.
<b>5. Cognitive Psychology theory</b>	
<b>Key Proponents and timeline</b>	Bartlett (1886–1969); Piaget (1896–1980); Bandura (1925); Broadbent (1926–1993); Neisser (1928); Chomsky (1928); Baddeley (1934); Damasio (1944).
<b>School of Thought</b>	The researchers stated that to understand a person fully, one should know what is going on in their minds.
<b>Key tenets</b>	This theory focused on how people perceive things in their thoughts, how they learn information, process and remember information.

(Benjamin, 2006; Ashleigh and Mansi, 2012; Briner and Rousseau, 2011; Carr, 2007; Spector, 2003).

### 2.2.3 Earlier challenges of research in Psychology

The concept of psychology over a long period of time in the past were faced with great opposition before it was recognised as a scientific concept in line with other disciplines in the sciences (Briner and Rousseau, 2011; Ashleigh and Mansi, 2012). There was a need for psychology to be grounded in the scientific method (Spector, 2003). From the early 1990s, legislative bodies like the court systems were more concerned with scientific-based testimonies and evidence (Landy and Conte, 2016). Psychology, as a discipline, has been derided upon by more complex sciences such as mathematics and physics (Briner and Rousseau, 2011). This is because with the study of psychology, it is sometimes impossible to provide tangible evidence

to back psychological claims, and it is also challenging to measure innate processes in a psychological study (Ashleigh and Mansi, 2016).

It was revealed by Fowers and Richardson (1996) that most studies conducted in psychology often ignores authentic and actual differences that define various features of people's identity. The differences in the behaviours of humans resulting from diverse factors are to be considered in psychological research (Furnham, 2005). Behavioural differences make it very complex to conduct a study on humans and their mental processes; thus, it makes psychology a less defined subject as compared to other scientific disciplines (Ashleigh and Mansi, 2012). What cannot be seen, felt, heard, or smelled cannot be proven to exist, and any claim is simply a theoretical assumption which has no validity (Podsakoff, et. al., 2003; Landy and Conte, 2016). There are thus no absolute truths which question the concept of both empiricism and positivism (Spector, 2003). Conversely, social realists and constructionists are concern with the diversity of individuals' perception and thinking and argue that there is relativity in people's reality (Ashleigh and Mansi, 2012).

Over the years, some social critics and observers also questioned the objectivity of occupational psychology, as it relates to only the needs and values of workers rather than managerial objectives (Carr, 2007; Spector, 2003). In contrast to these arguments and suspicions, one of the renowned social observers named Arthur Kornhauser, in the early 1920s and 1950s, gave immense support to the idea that the principles of psychology should be applied in the workplace for the benefits of workers rather than management (Zickar, 2003). Research in occupational psychology was categorized by some researchers under important, unimportant, fascinating, shoddy, or well-designed research (Anderson, et. al., 2001). As can be seen, the discipline of psychology is associated with a diverse perspective, which makes it more complicated as a subject area of study in the organisation.

#### **2.2.4 Scientific considerations in conducting research in psychology**

Psychology as a scientific discipline is the study of human behaviours based on scientific principles (Traindis and Brislin, 1984). Sir Isaac Newton (1643 – 1727), stated that research in psychology should employ scientific methods and be subjected to the principle of reasoning as well as based on observation, empirical evidence and be measurable (Spector, 2003). The interpretation of data collected on psychological research should utilize rationality for constructive arguments to either argue for or against existing knowledge (Briner and Rousseau, 2011; Ashleigh and Mansi, 2012). Scientific methods such as systematic and careful observation, development of “testable” hypothesis, data collection, and analysis with a logical cohesion between data collected and its interpretation, were recommended to be the basis of a psychological research study (Podsakoff, et. al., 2003; Landy and Conte, 2016). There is a need for evidence-based results to support any claim to make psychological research valid and scientific (Briner and Rousseau, 2011).

The study of psychology as science should aim at understanding knowledge as depicts the meaning of scientific, which is derived from the Latin word “Scientia” (Ashleigh and Mansi, 2012). Research in psychology, as stated by Landy and Conte (2016), should be conducted by applying pragmatic principles of science to make the research work more important, and the research should be designed appropriately. Ashleigh and Mansi (2012) also added that the principles of empirical science, with observations made objectively through experiments and the principles of positivism, which is applying logic and reasoning to arguments, should be applied in psychological research to verify or falsify data rationally.

### **2.2.5 Summary of findings on historical review of occupational psychology research and philosophy**

Historical review on earlier research works provides a broader perspective on the subject area to help improve on current research efforts. Santayana, a philosopher in 1905, stated that when one does not remember the past, it is likely the same mistakes will be repeated in the future. Historical perspective also allows for possible right guesses to be made for future outcomes. This study conducts a historical review on occupational psychological health research, its evolution, and key research perspectives. A comprehensive review of pertinent literature was undertaken to understand the scientific concept of occupational psychology and applications. The historical review provides a perspective that occupational psychological health research is an excellent and important area for exploring behavioural issues in organisations and one in which an original contribution to research as well as practice can be made.

### **2.3 Research trends of occupational psychology health research in the construction industry**

Studies on the psychological health of employees have gained some research attention in recent years. The prevalence of psychological illness in the workplace and its associated consequences have made it imperative to conduct research on occupational psychology. Previous researchers have conducted works that account for the experiences of individuals with psychological illness (Chakraborty, et. al., 2018; Wang, et. al., 2017); as well as individuals and organizational strategies that moderate the relationship between having a psychological illness and experiencing those outcomes (Bowers, et. al., 2018; Leung, et. al., 2017; Cattell, et. al., 2016; Bowen, et. al., 2014). It has been estimated that more than 44 million adults are affected each year by psychological illness, many of whom are within the workforce (Follmer and Jones, 2018). The World Health Organization, WHO, (2017) also postulated that 1 in 17

adults experience a psychological illness annually.

Psychological illness or disorders can be described as mental health conditions characterized by altered thoughts, emotions or behaviours with associated impaired functioning and distress (World Health Organization, WHO, 2017). Thus, psychological illness can affect the cognitive abilities, behavior and work functioning of employees irrespective of the organization (Hassard, et. al., 2018). From a business perspective, psychological illness also poses serious challenges for organizations. Despite the corporate cost of psychological illness on organizations, excluding employees with psychological illness from the workforce is neither practical nor legal (Follmer and Jones, 2018). Situating psychological illness as a workplace issue is therefore a timely topic. The challenge that both researchers and practitioners face is to develop an organizational culture and systems that will facilitate the safe inclusion of persons with psychological illness to thrive in their respective organizational roles without jeopardizing the safety of other personnel.

The fields of construction management literature have also seen a rise in research studies geared toward construction workers psychological health. This study conducts a systematic review of the existing empirical research on psychological health in the construction industry, to identify the research trends of themes, yearly publication and countries of study. A systematic review on the research trend of occupational psychology studies in the construction industry will set the research agenda for future research in this field.

### **2.3.1 Theoretical background on Occupational psychology research in the construction industry**

The construction industry is an environment that can be particularly at risk to poor psychological health and losses associated with psychological health problems can have both direct and indirect implications for the construction industry (Leung, et. al., 2017; Wang, et. al., 2017). Previous research works have shown that psychological illness contributes to both

direct costs (example, increased medical cost) and indirect costs (example lost productivity) that exceed billions of dollars per year (Kurtzer, et. al., 2018; Liang, et. al., 2018). This is usually as a result of increased absenteeism, presenteeism and the utilization of health-care resources among employees (Hassard, et. al., 2018). The leading cause of the increased request for disability assistance in recent times around the world is neuropsychiatric disorders (WHO, 2017). The rate of persons experiencing psychological illness is on the rise, which also indicate the economic impact of psychological illness on organizations may continue to escalate in the coming years.

The construction work environment contains many occupational stressors that make construction employees particularly vulnerable to psychological health issues, these work-related factors include high production pressures, complex decision-making, dangerous work, and ‘not feeling tough enough’, all of which can contribute to poor psychological health (Follmer and Jones, 2018; Leung, et. al., 2017; Shan, et. al., 2017). The way work is structured through long supply chains involving transient work, insecure temporary contracts, and long working hours also creates psychological health risks specific to the industry (Wang, et. al., 2017; Yang, et. al., 2017; Cattell, et. al., 2016). Perhaps unsurprisingly, research focusing on construction shows that its workforce is particularly at risk of poor psychological health (Sommovigo, et. al., 2019; Chakraborty, et. al., 2018; Senaratne and Rasagopalasingam, 2017). Workers have also identified that there is a need to create a work environment which is supportive of healthy behaviour (Lingard and Turner, 2017; Jepson, et. al., 2017), yet relatively little research concerning psychological health in construction has been conducted. With the construction industry representing such a large portion of the global workforce, the psychological health of construction employees arguably warrants critical attention.

### **2.3.2 Search strategies and articles selection**

A systematic review was conducted employing the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Guidelines adopted from Moher, et. al. (2009). The search for related literature was conducted via the Social Science Citations Index such as Scopus, Web of Science, and PubMed. To identify the current trend of research on occupational psychology in the construction literature, this study included articles published recently from 2014 to 2019. The focus was on publications related to occupational psychology. Selection of the research articles for the systematic review was conducted in several stages. First, an extensive literature search was conducted using the following keywords: “occupational psychology, psychological health, mental health”. Boolean operators (example; AND, OR) and symbols such as (\*) were used in each database search.

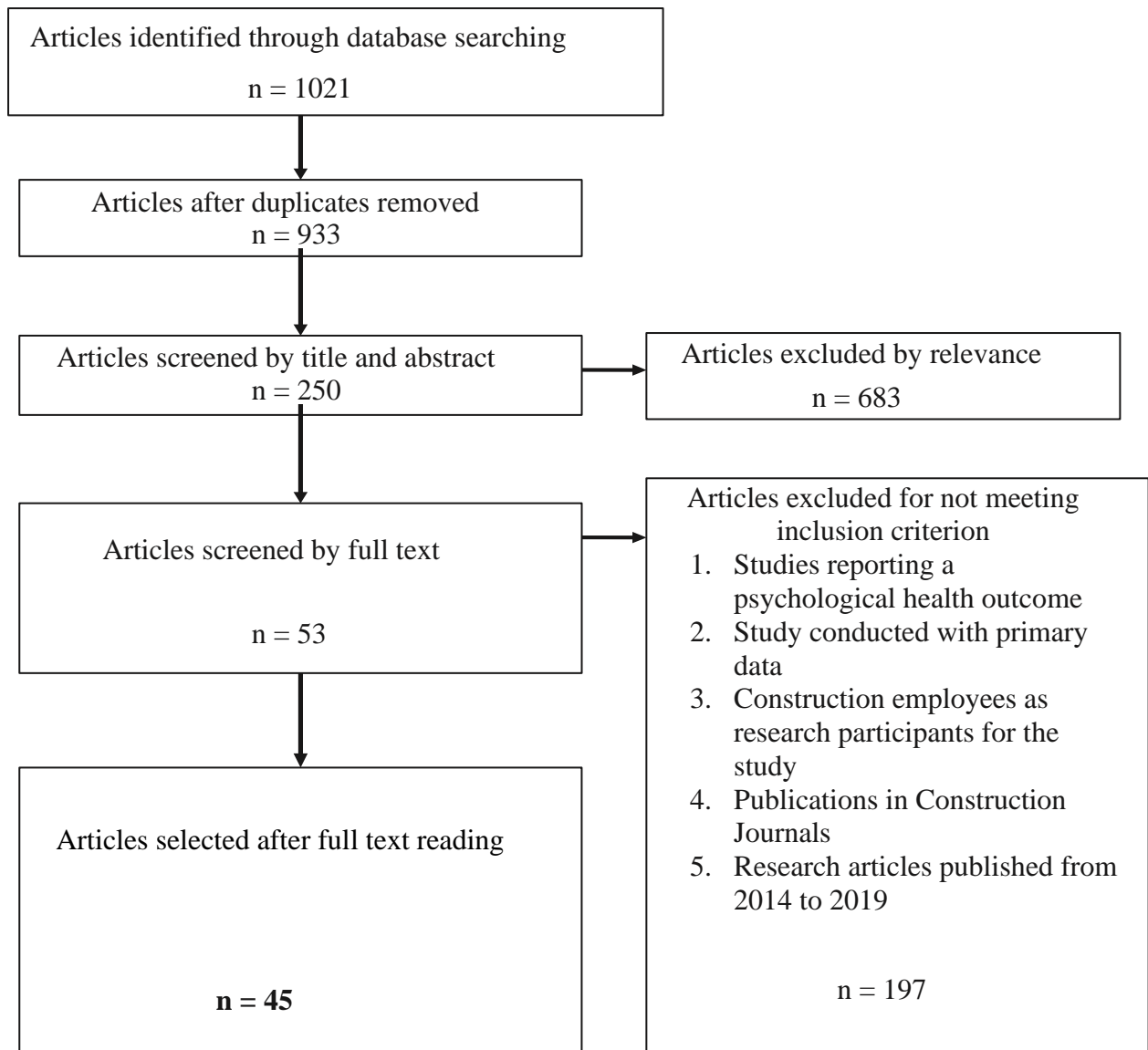
The search resulted in a total of 1,021 papers (Scopus 507, Web of Science 305, PubMed 209 and PsycINFO 195). Secondly, duplicates were eliminated by employing EndNote (X8) “find duplicate” feature, and titles and abstracts were also screened for required content.

### **2.3.2 Inclusion criteria set for this study**

Only research publications that met the following inclusion criteria were retained for the study. In addition to the terms of occupational psychology, the title, abstract or keywords of the articles had to include any of the following to capture the work context: construction industry, construction employee, construction workers, or construction professionals. Given that much of the research works have been conducted outside of the traditional construction management outlets, such as clinical psychology, occupational health, psychiatry, public health, rehabilitation and social work, this study was limited to publications from only construction journals. This search yielded 1,021 published articles.



Articles were reviewed and retained if they were empirical (that is used qualitative, quantitative methods or both), published in peer-reviewed construction journals and available in English. The studies needed to use samples of construction employees or construction workers as the target respondents examine psychological health indicator together with the predictors of work-related experiences. Articles that did not examine any psychological health and well-being as outcomes or any of the associated factors were not selected. This study excluded conference and literature review papers. Articles published in non-construction journals were also excluded from the study. Thirdly, after excluding articles that did not meet the inclusion criteria, the full text of all the remaining research articles was read through. A total of 45 articles were retained and systematically reviewed for this study. The processes employed for the selection of the articles have been presented in Figure 2.1.



**Figure 2.1: Process in the selection of the articles adopted from Moher, et. al. (2009).**

## 2.3.3 Results from literature search

Table 2.3: Studies identified from the systematic review

Ref.	Author	Year	Country	Study Approach	Research Participants	Theme identified	Quality score
1.	Al Jassmi, et. al.	2019	UAE	Experimental	3 Construction workers	a, b	5
2.	Çelik and Oral	2019	Turkey	Survey	922 architects and civil engineers	a, b, c	8
3.	Sommovigo, et. al.	2019	Italy	Survey	96 tunnel construction employees	a, d	6
4.	Chakraborty, et. al.	2018	India	Survey	268 construction workers	a, b	7
5.	Enshassi, et. al.	2018	Gaza Strip, Palestine	Survey	183 construction professionals	e	7
6.	Goulding, et. al.	2018	Turkey	Case Study	30 construction professionals	b, d	5
7.	Jebelli, et. al.	2018	USA	Experimental	11 construction workers	a	5
8.	Kurtzer, et. al.	2018	Australia	Interviews	11 construction professionals	a, c, d	5
9.	Langdon and Sawang	2018	Australia	Survey	91 construction workers	a, c, d, e	6
10.	Lian	2018	Singapore	Survey	56 construction professionals	a, b, c, d	5
11.	Liang, et. al.	2018	HKSAR, China	Focus Group	3 focus group study with 24 construction workers	a, b, e	5
12.	Chen, et. al.	2017	Canada	Survey	837 construction professionals	b, c, d	9
13.	Chih, et. al.	2017	Philippines	Survey	191 construction workers	b, c	6
14.	Chih, et. al.	2017	China	Survey	71 construction professionals and 355 construction trade workers	b, d	7
15.	Jepson, et. al.	2017	Australia	Interviews	25 construction professionals	a, c, d, e	5
16.	Kamardeen and Sunindijo	2017	Australia	Survey	283 construction professionals	a, c	7
17.	Leung, et. al.	2017	HKSAR, China	Survey	137 Hong Kong expatriate construction professionals	a, c, d	7
18.	Lingard and Turner	2017	Australia	Focus groups and interviews	23 interviews and 2 focus groups with 30 construction workers	c, d, e, f	5

					and managers		
19.	Senaratne and Rasagopalasingam	2017	Sri Lanka	Survey	115 construction project managers/professionals	a, b, c, d	6
20.	Shan, et. al.	2017	USA	Survey	202 construction workers	a, b, c, d	6
21.	Sunindijo and Kamardeen,	2017	Australia	Survey	277 construction professionals	a, c, d, e	7
22.	Wang, et. al.	2017	Malaysia	Survey	201 Construction project managers	a, b, c, d	6
23.	Yang, et. al.	2017	China	Survey	256 Construction project managers	a, b, c, d	7
24.	Cattell, et. al.	2016	South Africa	Survey	36 Construction project managers	a, c, d	5
25.	Chan, et. al.	2016	HKSAR, China	Survey	137 Hong Kong expatriate construction professionals	a, c, d, e	6
26.	Enshassi, et. al.	2016	Gaza Strip-Palestine	Survey	183 construction professionals	a, c, d	7
27.	Fung, et. al.	2016	China	Survey	316 construction professionals	b, c, d	7
28.	Leung, et. al.	2016	HKSAR, China	Survey	101 construction professionals	a, b, c, d	7
29.	Leung, et. al.	2016	HKSAR, China	Survey	166 construction workers	a, b, d	7
30.	Leung, et. al.	2016	HKSAR, China	Survey	90 construction workers	a, b, f	6
31.	Panahi, et. al.	2016	Malaysia	Survey	400 construction professionals	a, c	7
32.	Enshassi and Al. Swaity	2015	Gaza Strip-Palestine	Survey	183 construction professionals	c, d	7
33.	Enshassi, et. al.	2015	Gaza Strip-Palestine	Survey	33 construction professionals	a, b, d	5
34.	Leung, et. al.	2015	South Africa and HKSAR, China	Survey	410 and 159 construction professionals in South Africa and Hong Kong respectively	a, d	9
35.	Wentz, B.	2015	USA	Survey	123 construction professionals	a, c	6
36.	Xiong, et. al.	2015	China	Survey	144 construction cost estimators	a, b, d	6.
37.	Bowen, et. al.	2014	South Africa	Survey	676 construction professionals	a, b, c, d	9
38.	Bowen, et. al.	2014	South Africa	Survey	350 construction professionals	a, c, d	8

39.	Bowen, et. al.	2014	South Africa	Survey	676 construction professionals	a, b, e	8
40.	Bowen, et. al.	2014	South Africa	Survey	676 construction professionals	a, c, d, e	9
41.	Brockman	2014	USA	Interviews	74 construction professionals	b, c, d	5
42.	Chan, et. al.	2014	HKSAR, China	Survey	139 construction professionals	c, e	7
43.	Gatti, et. al.	2014	USA	Experimental study	9 construction workers	a, b	5
44.	Malone and Issa	2014	USA	Survey	744 construction professionals	b, c, d	9
45.	Reza, et. al.	2014	Australia	Survey	72 construction professionals	a, b, c, d	5

Note: Theme identified

- a. Psychological health condition
- b. Effects of psychological health conditions
- c. Personal-related factors
- d. Construction work-related causes
- e. Coping behaviours
- f. Interventions for psychological health

### 2.3.4 Appraisal of quality of the studies reviewed

A measurement tool for the assessment of quality of the studies identified from the search was employed to ensure the methodological rigour of the systematic review. The Joanna Briggs Institute Checklist for Prevalence Studies, which enabled assessment of included studies in relation to risk of bias, rigour, and transparency, was employed. The adopted checklist consisted of nine questions with a ‘yes’ response given a one mark and zero marks given for a ‘no’, ‘cannot answer’, and ‘not applicable’ response. The questions sought to examine methodological issues such as: (1) *“Was the sample frame appropriate to address the target population?”* (2) *“Were study participants sampled in an appropriate way?”* (3) *“Was the sample size adequate?”* (4) *“Were the study subjects and the setting described in detail?”* (5) *“Was the data analysis conducted with sufficient coverage of the identified sample?”* (6) *“Were valid methods used for the identification of the condition?”* (7) *“Was the condition measured in a standard, reliable way for all participants?”* (8) *“Was there appropriate*

*statistical analysis?” and (9) “Was the response rate adequate, and if not, was the low response rate managed appropriately?”*

The total quality score was 9 points, a score of 0–4 reflects low-quality research, 5–7, moderate and 8–9 high quality. The author and two persons independently assessed the quality of each included review using the checklist. When overall quality assessment scores differed between the authors, agreement was reached on the basis of discussion. Table 2.3 presents the results of the quality score of each of the 45 studies identified from the search, with the least quality score of 5 and the highest at 9 point.

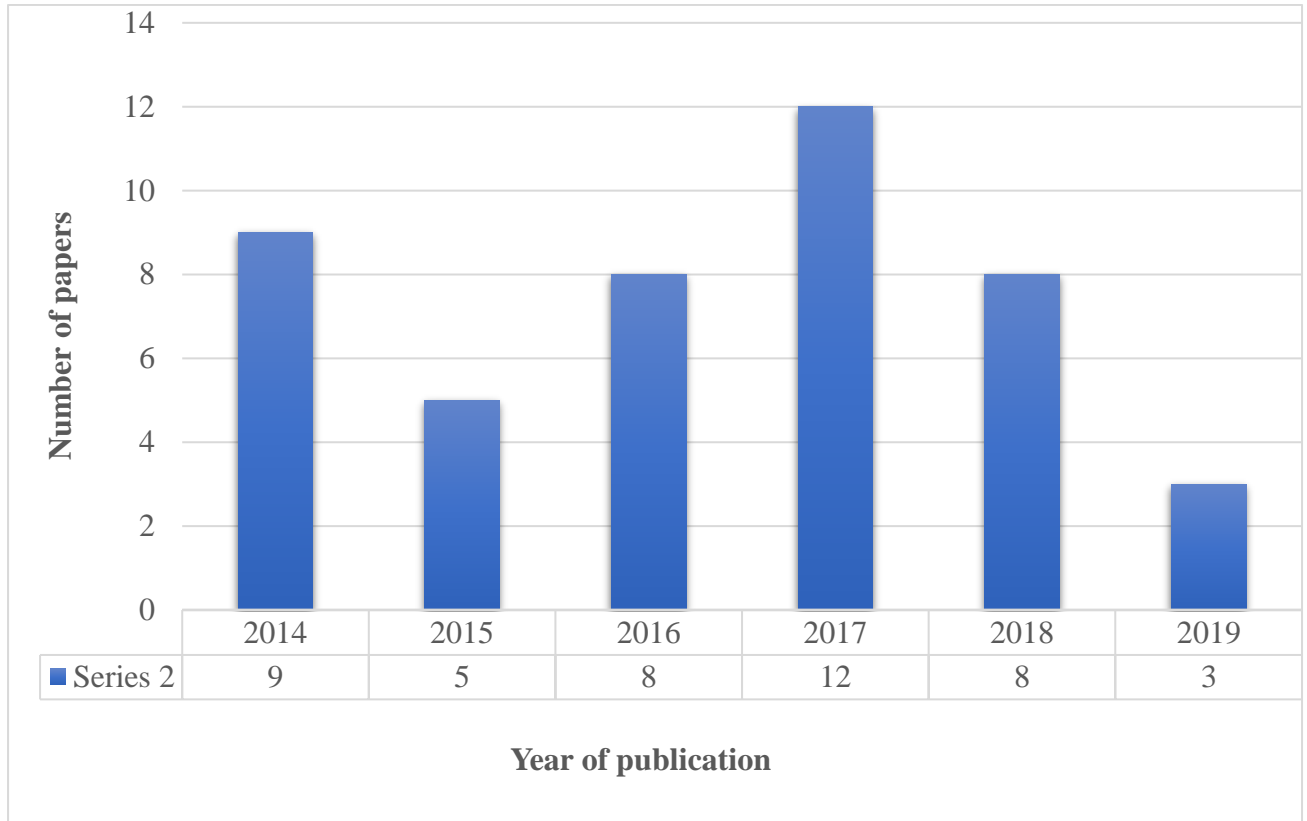
### **2.3.5 Discussion on literature search**

The review of the extant literature yielded several research trends related to the study of occupational psychological health of construction employees. A synthesis of these trends helps to explain how occupational psychological health research has typically been situated as a construction workplace phenomenon. This study presents observations regarding the yearly trend of publications, the construction journals that publish these studies, the country where the data were collected, the major contributors of this research area in the construction literature, how psychological health was measured, the construction working groups that were most represented, how psychological health was conceptualized and the major themes that can be derived from the studies, as a means to provide a summary of the literature reviewed.

#### ***Annual publications on occupational psychological in construction journals from 2014 to 2019***

From the initial search results, a total number of 1021 of publications on occupational psychological health studies in the construction industry were identified with 15 different journals from 2014 to 2019 (years inclusive). This clearly is an indication of the growing research interest of occupational psychological health studies in the construction industry.

Figure 2.2 presents the yearly trend of publications on occupational psychological in construction journals from 2014 to 2019. With 2017 recording the highest number of publications on this subject matter.



**Figure 2.2: Annual number of publications on psychological health from 2014 to 2019**

### ***Journal publication***

This study was limited to articles published only in construction journals to obtain a clear picture of the extant of knowledge on occupational psychological health in the construction literature. The initial search results of occupational psychological health in the construction industry pooled a lot of articles published mostly in non-construction journals such as International Journal of Environmental Research and Public Health and other occupational psychology journals. Table 2.4 presents the number of articles identified from the construction journals.

**Table 2.4: Search results of construction journals publication on psychological health**

<b>Ref.</b>	<b>Journal name</b>	<b>No. of papers identified</b>
1.	Journal of Construction Engineering and Management	17
2.	International Journal of Construction Management	6
3.	Construction Management and Economics	5
4.	Construction Economics and Building	3
5.	Journal of Financial Management of Property and Construction	3
6.	International Journal of Project Management	2
7.	Engineering, Construction, Architectural Management	1
8.	Journal of Management in Engineering	1
9.	International Journal of Construction Project Management	1
10.	International Journal of Construction Education and Research	1
11.	Journal of Construction in Developing Countries	1
12.	Journal of Asian Architecture and Building Engineering	1
13.	Automation in Construction	1
14.	Accident Analysis and Prevention	1
15.	Built Environment Project and Asset Management	1

### ***Study Location***

The obtained articles represented populations from across the globe, with most of the research being conducted in China, Australia, United States of America (USA), South Africa and Gaza Strip- Palestine. Interestingly, the foci of the research studies varied across geographic locations. For example, of the studies conducted in the United States, approximately 70% were focused mainly on identifying the psychological health factors associated with the quality of work life and also quantify the costs associated with psychological health conditions. On the other hand, many of the studies representing the perceptions and experiences of individual employees, by employing qualitative methods of focus groups or interviews were conducted in China.

Only a single study, Leung, et. al., (2015) had examined employees from multiple geographic locations, specifically South Africa and Hong Kong Special Administrative Region of China (HKSAR-China). This may limit the extent to which the results from the studies can



be generalizable to other geographic contexts. Also, few studies were found that had conducted occupational psychological health studies in developing countries, especially the sub-Saharan regions. The extreme weather conditions construction workers are exposed to, coupled with the limited resources of most developing countries are major predictors of high levels of psychological health conditions. More research attention should be given to explore the prevalence of psychological health conditions and measures to mitigate the causes and effects associated with these conditions. Table 2.5 presents the total number of studies identified in the various studies, the number of researchers identified in that country and the name of the researchers.

**Table 2.5: Search results on country of study of the publications**

Ref.	Country of study	No. of papers identified	No. of Researchers	Name of researchers
1.	China	12	7	Leung, et. al.; Liang, et. al.; Chan, et. al.; Chih, et. al.; Fung, et. al.; Yang, et. al.; Xiong, et. al.
2.	Australia	7	7	Kurtzer, et. al.; Langdon and Sawang; Jepson, et. al.; Kamardeen and Sunindijo; Lingard and Turner; Sunindijo and Kamardeen; Reza, et. al.
3.	United States of America (USA)	6	6	Jebelli, et. al.; Shan, et. al.; Wentz, B. Brockman, J. L.; Gatti, et. al.; Malone and Issa
4.	South Africa	6	2	Cattell, et. al.; Bowen, et. al.
5.	Gaza Strip- Palestine	4	1	Enshassi, et. al.
6.	Turkey	2	2	Çelik and Oral; Goulding, et. al.
7.	Malaysia	2	2	Wang, et. al.; Panahi, et. al.
8.	Canada	1	1	Chen, et. al.
9.	Italy	1	1	Sommovigo, et. al.
10.	United Arab Emirates (UAE)	1	1	Al Jassmi, et. al.
11.	India	1	1	Chakraborty, et. al.
12.	Singapore	1	1	Lian, J.
13.	Philippines	1	1	Chih, et. al.
14.	Sri Lanka	1	1	Senaratne and Rasagopalasingam

***Contributors of occupational psychology studies in construction literature***

The formula used to calculate the contribution of all the authors to a multi-authored paper was adopted from Osei-Kyei and Chan, (2015). The formula that was developed assumed that the real contribution of an author to the multi-authored paper varies. That is, the first author's contribution is more than the second author and the second author's contribution is more than the third author and so on. The formula is therefore given as:

$$\frac{1.5^{n-1}}{\sum_{i=1}^n 1.5^{n-1}}$$

Using the above formula, one point was divided into corresponding parts for each author. A detailed score distribution for the authors has been presented in Table 2.6.

**Table 2.6: Score matrix for multi-authored papers.**

Number of Authors	Order of Authors					
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>
1	1.0					
2	0.60	0.40				
3	0.47	0.32	0.21			
4	0.42	0.28	0.18	0.12		
5	0.38	0.26	0.17	0.11	0.08	
6	0.37	0.25	0.16	0.10	0.07	0.05

The results revealed that Leung, M. Y. from HKSAR-China and Bowen, P. from South Africa as the major contributors of occupational psychological health studies in the construction industry, with them scoring 3.26 and 2.33 respectively. Table 2.7 presents the contribution score points of the major contributors as well as their affiliations.

**Table 2.7: Major contributors in the construction industry**

<b>Ref.</b>	<b>Authors</b>	<b>Number of published papers identified</b>	<b>Author's affiliation</b>	<b>Country</b>	<b>Contribution score points</b>
1.	Leung, M. Y.	8	Department of Architecture and Civil Engineering, City University of Hong Kong.	Hong Kong-China	3.26
2.	Bowen, P.	6	Department of Construction Economics and Management, University of Cape Town.	South Africa	2.33
3.	Enshassi, A.	4	Department of Civil Engineering, Islamic University of Gaza.	Gaza, Palestine	1.96
4.	Liang, Q.	5	Department of Architecture and Civil Engineering, City University of Hong Kong.	Hong Kong-China	1.61
5.	Chan, I. Y. S.	3	Department of Real Estate and Construction, University of Hong Kong.	Hong Kong-China	1.15
6.	Lingard, H.	4	School of Property, Project and Construction Management, RMIT University.	Australia	1.14
7.	Cattell, K.	4	Department of Construction Economics and Management, University of Cape Town.	South Africa	0.83
8.	Chih, Y.	2	Research School of Management, ANU College of Business and Economics, Australian National University.	Australia	0.75

### ***Study Design***

The methods by which studies on psychological health conditions were conducted with construction employees in the extant literature varied. Among the 44 articles reviewed, no single study was found that had employed the mixed-methods approach of combining both qualitative and quantitative research methods. Approximately 13% utilized qualitative methods such as interviews and focus groups to examine construction employees' experiences or perceptions on the subject matter. About 78% of the studies had employed the methods of survey questionnaire, although many of these studies were descriptive in nature employing

statistical methods such as means, frequencies. This thereby restrict the ability to draw predictive or explanatory conclusions from the findings from these studies. Table 2.8 presents the distribution of the reviewed studies according to the research design employed.

**Table 2.8: Research Design**

Ref.	Research Design	No. of articles	Percentage
1.	Survey	35	78%
2.	Interviews	4	9%
3.	Experimental Design	3	7%
4.	Focus Group	2	4%
5.	Case Study	1	2%

#### ***Research participants of previous studies***

The research participants of most of the studies reviewed were conducted with construction professionals. There is less research attention on the construction trade workers. Also, only two studies out of the 45 studies reviewed had conducted studies with both construction professionals and construction trade workers, even with these studies no comparative analysis was conducted with these two groups. Table 2.9 presents the results on the target respondents of the studies reviewed.

**Table 2.9: Target Respondents**

Ref.	Research Participants	Frequency	Percentage
1.	Construction professionals	32	71%
2.	Construction workers	11	24%
3.	Both construction professionals and construction trade workers	2	4%

***Findings from the previous studies***

This study reviewed articles that had conducted studies on occupational psychology or psychological health as abroad concept, without given any specificity to a mental illness. Major themes were identified from the articles reviewed as the area of focus of occupational psychological health studies in the construction industry. Table 2.10 presents the six major themes and the number of studies that had been conducted on these topics among the reviewed articles. The following section discusses these findings in more detail.

**Table 2.10: Major themes identified**

<b>Ref.</b>	<b>Theme</b>	<b>No. of papers</b>
a.	Psychological health conditions	35
b.	Effects of psychological health conditions	29
c.	Personal related factors	32
d.	Work-related Causes	32
e.	Coping Behaviours	6
f.	Interventions	4

**2.3.6 Summary of findings on research trend of occupational psychology research in the construction industry**

Occupational psychology is an important research area for exploring behavioural issues and one in which an original contribution to research as well as practice can be made. This study sought to identify the current research trend of studies on occupational psychological health in the construction industry. Out of 1021 articles found from databases such as Scopus, Web of Science, and PubMed, 45 articles met the criterion to be included in this study. Systematic review of the articles was conducted, and six broad focus areas of occupational psychological health were identified, namely: symptoms, personal-related factors, work-related causes, effects, coping mechanisms, and interventions. The search results indicate an increased research interest in occupational psychological health studies in the construction industry. Most of the articles were published in the year 2017, with HKSAR, China producing the highest number of publications in this research field.

## **2.4 Theories of Psychological Health at Workplaces**

Theories related to psychological health were reviewed, in order to find a suitable underpinning for the development of a framework of solutions to improve the psychological health of construction employees – specifically in the construction industry of Ghana. The theories reviewed included Self-Determination Theory, Biopsychosocial Theory, the Health Belief Model, Conservation of Resources Theory and Socio-Ecological Theory.

### **2.4.1 Self-Determination Theory**

Self-Determination Theory (SDT) is a “macro-theory of personality development, human motivation, and well-being” that “focuses especially on self-determined or volitional behaviour and the social or cultural conditions that promote such behaviours” (Ryan and Deci, 2017). This theory postulate that competence, autonomy, and empathy are universal human needs, that should be met to ensure healthy development, regardless of a person’s age or culture (Deci, et. al., 2017). The Self-Determination Theory also assumes that humans are active beings, inherently motivated to pursue psychological growth and development (Ryan and Deci, 2017). Based on this theory several interventions have been generated in the fields of psychotherapy, education, healthcare and religion, as well as contexts that focused on parenting, sustainability, sports and exercise (Deci, et. al., 2017). For example, in a study on the impacts of age, gender, and diabetes’ duration on dietary self-care in adults diagnosed with type 1 diabetes, Austin, et. al. (2011) applied the Self-Determination Theory to provide an explanation for “mechanisms by which non-modifiable factors influence dietary self-care”. It was revealed in their study that “longer diabetes duration and female gender were indicative of poorer dietary self-care” (Austin, et. al., 2011).

In another study, Gagné, et. al., (2018) applied the Self-Determination Theory to work motivation and organizational behavior. Their study revealed that the theory can be used for

motivational differentiation to provide insight into a range of phenomena that have been observed in workplaces and other organizational venues (Gagné, et. al., 2018).

#### **2.4.2 Biopsychosocial Theory**

The concepts of the Biopsychosocial (BPS) Theory has been revealed a major theory in medicine (Sayce, 2019). As a clinical method, the Biopsychosocial Theory was used initially by Dr Engel and Dr John Romano to engage patients in clinical reasoning while communicating with them (Santos, 2018). A new biomedical model which was integrated with psychosocial elements was later proposed by Dr Engel in 1977. This new model was underpinned by six assumptions: (1) “biochemical pathology is a necessary, yet merely partial, cause for disease”; (2) “psychosocial variables affect the perception of patients, through their own eyes and through the eyes of others”; (3) “the model recognize how psychosocial factors affect the beginning and course of the disease”; (4) “the scientific, rational approach is to be applied in the collection and analysis of the patient’s psychological, biological, social and cultural circumstances; (5) “logical treatment should go beyond biochemical abnormality”; and (6) “the relationship between patient and doctor has a significant impact on the overall outcome, and the doctor must occasionally act as both advisor and psychotherapist (Engel, 1977). The study on the Biopsychosocial (BPS) Theory model has been used in a range of fields, from psychiatry to modern health (Santos, 2018).

Dogar (2007) presented this Biopsychosocial (BPS) Theory and recommended that medical students draw on knowledge from a range of fields including biology and medical science, as well as psychology, sociology and anthropology. Sulmasy (2002) also presented a model for research and health practices expanding on this model and including patients’ spiritual concerns. Contending that spiritual matters concern many patients (particularly those close to death), Sulmasy (2002) argues that most patients would prefer health professionals to

address their spiritual needs, without having to “eschew proselytizing in any form” (Sulmasy, 2002). Despite the relative success of the BPS model, it was not widely accepted with medical professionals, and its holistic treatment fell short of their appreciation (Sayce, 2019).

### **2.4.3 The Health Belief Model**

The Health Belief Model (HBM) originally consisted of four interrelated variables – perceived susceptibility, benefits, barriers and seriousness – that “indirectly influence the probability of performing protective health behaviours by influencing the perceived threat of the illness and expectations about outcome” (Champion and Skinner, 2008). The Health Belief Model has been used in many studies. For example, Koch, et. al. (2005) investigated the ways in which social, psychological and physical health risks kept people from becoming interested in, or obtaining, tattoos. In a survey conducted with undergraduate students at a large public university, results revealed that the HBM was a significant predictor of the tattooing behaviour of students (Koch, et. al., 2005).

Amin, et. al. (2018) conducted a study in which an osteoporosis prevention program for female academicians in Malaysia was designed and implemented using the HBM. The program was thus structured with the needed informational and instrumental support, using the HBM and other behaviour theories for a well-designed osteoporosis prevention education intervention (Amin, et. al., 2018). Cyber-victimization preventive behaviour was also developed by Dodel and Mesch (2017) using the the HBM. These studies indicate that the Health Belief Model is appropriate as a conceptual model for prevention of disease behavior.

### **2.4.4 Conservation of Resources Theory**

The Conservation of Resources Theory (COR) indicates that individuals are motivated to acquire and protect their resources such as personal characteristics, objects, conditions, or



energies that they value, in order to meet external demands, protect against potential future resource loss and accomplish goals (Halbesleben, et. al., 2014; Hobfoll 2001). When resources are lost or threatened, people become defensive and discontinue the resource investments (to prevent further loss) or increase their resource investments to acquire more resources (to offset the loss) (Hobfoll, 2001). The COR theory has been increasingly utilized as the theoretical lens to explain employees' affective and behavioural reactions to Psychological Contract Breach in the organizational behavior, example Halbesleben, et. al. (2014), Kiazad, et. al. (2014) and construction literatures Chih, et. al. (2016); Lingard, et. al. (2010).

For example, Chih, et. al. (2016) applied Conservation of Resources Theory to explain the roles of Psychological Contract Breach and age on employee turnover in the construction industry. In addition, COR theory has been applied to offer a complementary perspective to other existing and valid explanations of employees' negative reactions to Psychological Contract Breach, such as equity theory social exchange theory, and the group value model (Chih, et. al., 2017). Specifically, Conservation of Resources Theory resource-based premises provide a viable and parsimonious theoretical lens to understand the processes (job insecurity) and moderators (organizational justice and tenure) that underpin the relationship between Psychological Contract Breach and job performance in the construction industry (Chih, et. al., 2017).

#### **2.4.5 The Socio-Ecological Theory**

The Socio-Ecological Theory is based on the concept of ecology, which “pertains broadly to the relationships between organisms and their environments” (Stokols, 2000). The socio-Ecological theory offers a model to help in understanding the profound influence of personal and environmental factors on human health (Kilanowski, 2017). According to Stokols, (2000) “the field of Socio-Ecological thus focuses on the interactions between humans and

their environments, and places greater emphasis on the social, institutional, and cultural contexts of people-environment relations than did earlier versions of bio-ecology”. Hanson, et. al. (2005) introduced a model based on the Socio-Ecological Theory developed by Stokols, et. al. (1996) to explain the complex phenomena of psychological health and human behaviour at the workplace. This model stems from the traditional misconception that unfavourable conditions and excessive mental stressors at the workplace were the primary triggers of poor psychological health in employees and not other factors.

Hanson, et. al. (2005) proposed a visual metaphor of the injury iceberg to facilitate the understanding of the important characteristics of the socio-ecological model to be applied to the workplace. Emphasis was placed on the dynamic interface between three dimensions, namely: the individual level, the social environment and the physical environment. These dimensions can be analyzed at five levels, namely: intrapersonal, interpersonal, organizational, community and society levels. The socio-ecological model depicts that these levels deeply influence individuals, and if these ecological context levels are “larger and exercise more inertia, they are harder to change, but once changed are more likely to sustain the desired outcome” (Swerissen and Crisp, 2004).

At the intrapersonal level of the injury iceberg proposed by Hanson, et. al. (2005), the characteristics of an individual in the form of behaviours show prominence. These behaviours are influenced by the psychological conditions of the individual, which is also apparent to the outer world. However, several latent causes/factors stem from four different sources, which shape the psychological conditions of an individual. The interpersonal level relates to the individual’s social networks, such as family and colleagues within the physical environment in which they move about. The organizational level deals with organizations, such as commercial organizations that bear structure and regulations pursuing specific objectives, which influence the social and physical environments within the organization. The community-level represents

political or geographic boundaries that may share social, demographic, cultural or religious characteristics with their members. At the final level, society possesses the capacity to “distribute resources and control the lives and development of their constituent communities” (Hanson, et. al., 2005).

## **2.5 The suitability of the Socio-Ecological Theory as a theoretical foundation for this study**

The application of Socio-Ecological theory to solve problems in the areas of public health promotion, injury prevention programs, community safety programs and shaping education and employment transitions has yielded significant benefits (Bogardus, et. al., 2019; Lee, et. al., 2017; Schoon and Lyons-Amos, 2017). For example, Lee, et. al. (2017) employed the socio-ecological theory to frame agricultural safety and health interventions for protecting children from agricultural disease and injury. The researchers developed a modified framework based on the socio-ecological theory, which placed the “child in the farm environment” at the core with five interrelated levels (spheres) of influence over the child. The socio-ecological theory, therefore, provided guidance on how a multifaceted, multilevel intervention can maximize the potential for impact on behaviours and decisions made by parents/adults responsible for the safety of children on farms (Lee, et. al., 2017). Using the Social-Ecological Theory, Aittasalo, et. al. (2017) developed an intervention to promote active commuting to work. The Socio-Ecological Theory has also been applied in developing an intervention for promoting physical activity among employees (Sahranavard, et. al., 2018). The theory has also been applied in developing a behavioural intervention to influence dietary behaviour change among adolescents in schools (Moore, et. al., 2013); and in developing a community-based intervention for the prevention of childhood obesity (Verbestel, et. al., 2011). The aforementioned studies have used a multi-level ecological framework to identify factors posing direct and indirect influences and to design intervention strategies that addressed the matter

under study.

For its pragmatic role in analyzing problems and identifying pertinent interventions, the Socio-Ecological Theory was deemed appropriate as a guiding framework for this study. This selection was reinforced by several other contextual factors. Stokols, (2000) argued that worksites are seen to be made up of complex systems jointly influencing the mental, physical and social well-being of a group or individual; thus the “cumulative influence of multiple environmental conditions on employee well-being should be considered”. The Socio-Ecological Theory sheds light on numerous other factors that exist beyond the workplace, such as residential environment, community systems, and modes of commuting to and from work (Kilanowski, 2017, Jason, et. al., 2017).

This study adopted the Socio-Ecological Theory to develop a framework for understanding the factors associated with the psychological health of construction employees in the Ghanaian construction industry. This theory was also used to discuss suggestions on how to counteract these factors. The multi-level approach allows the people in charge of intervention programs to effectively identify issues affecting construction employees, specifically, how the workplace, and the external environments around them, affect employees’ psychological health. With regards to construction management, the multilevel approach allows stakeholders to implement different interventions for each level or sector (that is country, community and organization), and work towards integrating them to deeply understand and improve construction employees’ psychological health.

## 2.6 Conceptual Framework for Study

The conceptual framework for the study was formed by applying the Socio-Ecological Theory lens to the existing literature. The six major themes identified from the systematically review of existing empirical literature on psychological health of construction employees were integrated into the overarching framework (see Figure 2.3). The conceptual framework provides critical directions for conducting this study. The conceptual framework presented in Figure 2.3 thus provides a research agenda upon which this research was built.

### CONCEPTUAL FRAMEWORK DEVELOPED FROM FINDINGS

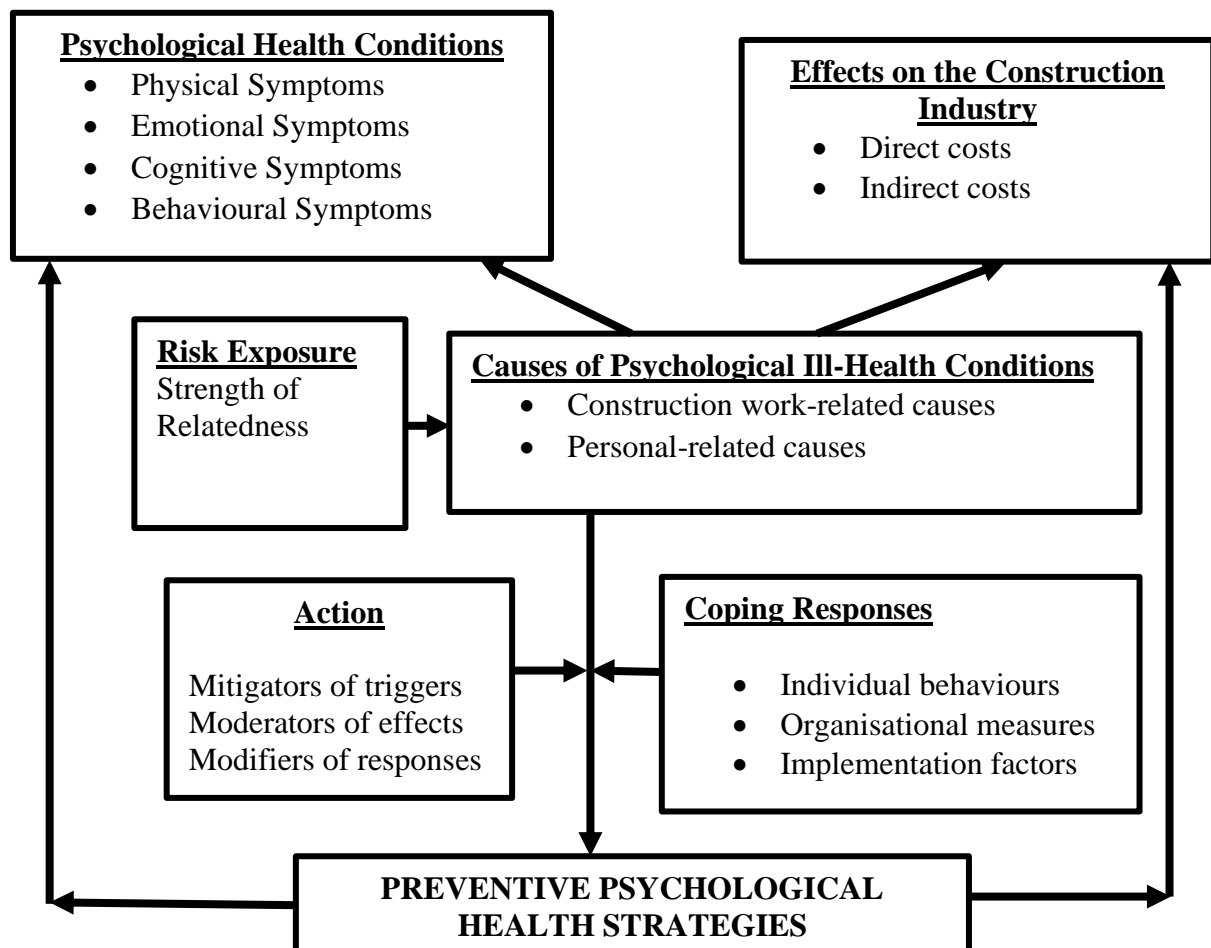


Figure 2.3: Conceptual framework for the study

## **2.7 Chapter 2 Summary**

This chapter explores the past research on occupational psychology. A brief description of the evolution of occupational psychology was given, with the important years, the evolution took place. Earlier challenges in conducting research in occupational psychology were presented with some scientific considerations to be employed in conducting research in occupational psychology. This chapter also presents the key perspectives of psychology that are employed in occupational psychological research. The historical review indicated that research work on occupational psychology has the potential of achieving something impactful for the accomplishment of improved psychological health and wellbeing of workers. This study also presents the current research trend of occupational psychological health research in the construction literature for a better understanding of the research context for this study. This chapter also discusses some theories of psychological health and gives examples of how the theories have been used in different fields. This chapter then highlights how the Socio-Ecological Theory is suitable as a theoretical foundation in relation to the objectives of this study. The conceptual framework developed from the findings from the existing literature through the socio-ecological theory lens have also been presented in this chapter. This study thus provides organizational scholars with current developments regarding occupational psychological health studies of employees, with the ultimate goal of encouraging research toward ways to support and manage these employees.

## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

Chapter two provides information on the procedures, design and methods employed for the research study. The methodology of the research deliberated on the strategies and procedures of the study as well as the type of data to be used in the study. It also provides a detailed description and evaluation of the methodological approach of the study.

#### **3.2 Research Designs and Methods**

Research design denotes the structure and plan of the investigation used purposely for the attainment of the research objectives (Easterby – Smith, et. al., 2008). Various types of methods and designs can be adopted for human behaviour research (Spector, 2003). The research strategy adopted should be based on the nature of research, the study context, and psychological paradigm (Briner and Rousseau, 2011; Breen and Darlaston-Jones, 2010). The strategy of the research is the action plan, which should be informed mainly by the theory of psychology, from which the specific aims of the research study can be structured (Briner and Rousseau, 2011). There is the need to adopt the appropriate research design and methods for the right information to be gathered, to provide answers to the research questions or test the hypothesis (Campbell, et. al., 2004). The research design spells out how the research plan will be operationalized.

Research methods used in psychological studies have been influenced controversially by the originators of psychology in a polarized manner (Easterby – Smith, et. al., 2008). The common philosophical research approaches in the study of occupational psychology, as revealed by Ashleigh and Mansi, (2012) are Phenomenology / Social constructionism, Positivism / Empiricism and the Mixed-Methods.

### **3.3 The concept of Phenomenology**

The phenomenological approach adopts qualitative methods of collecting data such as in-depth interviews, focused group studies, and naturalistic or participant observations (Ashleigh and Mansi, 2012). The methods of phenomenological research seek to penetrate the thoughts and emotions of a person in a personalized way than the quantitative method (Cascio and Aguinis, 2011). Thus, the phenomenological research approach is interpretive and allows meaning to be derived from people's emotions, cognition, and interaction with others (Briner and Rousseau, 2011). The phenomenological research approach states that to understand the behaviour of humans, the subjective and personal experiences of the individual should be appreciated (Campbell, et. al., 2004; Ashleigh and Mansi, 2012). Although the methods of phenomenological research such as interview and focus group discussions produce data that are subjective and bias, they produce a more detailed and rich context (Millward, 2006; Podsakoff, et. al., 2003).

#### **3.3.1 The key determinants of Phenomenology or social constructionist**

**Subjectivity:** the research is designed to adopt strategies that question people who are involved in the problem to be solved directly for their subjective opinions.

**Research Study design:** This is usually a longitudinal study with researchers having long term view of issues as compared to positivists who take a snapshot in a time to conduct a study. This approach adopts Qualitative methods, such as in-depth interviews, focus group discussion, diary studies, or case studies.

**Data Collection:** The researcher interacts with the participants, and this can lead to the researcher influencing the participants' behaviour, which is related to the Hawthorne studies effect and participant-observer effects. These study effects indicate that when time is spent to observe workers, they perceive themselves to be worthwhile, special, and of value to their



organisation (Landy and Conte, 2016).

**Analysis:** Content analysis of the data can be done as themes that are different or similar could be drawn from the data collected. The data collected may seem very different. In order to create a useful taxonomy of categories or themes, there is a need for several iterations.

**Interpretation:** the results of the data collected through observation or interviews are interpreted based on the subjective view of the researcher.

**Conclusions:** Findings from this research approach are open to personal bias as they are from individual respondents and cannot be generalized.

(Ashleigh and Mansi, 2012; Podsakoff, et. al., 2003; Millward, 2006).

### **3.4 The concept of Positivism research approach**

Positivism is a scientifically based approach with an emphasis on the significance of laws and principles to create hypotheses that can be tested, with the aim to understand the reasons of human behaviour for future predictions (Briner and Rousseau, 2011). This approach is characterised by controlled processes of variables for validity and reliability (Ashleigh and Mansi, 2012). A scientific research approach requires a systematic and relevant data collection, observation of people objectively, and validation of adopted techniques (Duncan, 2005). The scientific based methods of this approach are quantification and verification of the causes associated with the behaviours (Spector, 2003). The collection and analysis of objective data are done through processes such as observation, conducting experiments, and transferring the results of the data to other contexts (Breen and Darlaston-Jones, 2010; Cascio and Aguinis, 2011). Positivism necessitates studies that are replicable, and methods within this scope are quantitative (Duncan, 2005).

Easterby-Smith et. al., (2008) stated that from the perspective of positivism, a quality research work must possess these four characteristics.

1. The research findings should possess credibility, reliability, validity, and generalization
2. The measures adopted for the study should produce the same outcomes for different occasions
3. Other researchers should reach similar observations and conclusions
4. Research should be conducted in a replicable and transparent manner.

### **3.4.1 Key determinants of Positivism approach**

**Testing of hypothesis:** to produce systematically one or two statements, which can be tested to establish whether there is a relationship between two or more variables, whether the hypothesis is true or false.

**Measurement of variables:** anything such as attitude, performance, and event that can be observed and/or tested.

**Controlling the variables:** having say two groups with some giving interventions such as training and the other controlled group with no intervention.

**Data Collection and analysis:** adopting the appropriate techniques and correct methods to provide answers to the research questions.

**Repetition and validation of findings:** findings should be replicated and should represent the intended research aims.

(Ashleigh and Mansi, 2012; Landy and Conte, 2016; Podsakoff, et. al., 2003).

### **3.5 Research design and methods adopted for this study**

Based on the exploratory nature of the first research question, which sought to identify the causes, effects and coping mechanisms of psychological health conditions among the construction employees in Ghana, the phenomenology approach was adopted for its suitability. The positivism approach was then adopted for the remaining research questions to confirm the

preliminary findings, to identify the primary factors and to conduct a comparative study with the results obtained from the construction professionals and the construction trade workers. The choice of the research approach for each research question was, therefore, dependent on the exploratory nature of the study and the type of data required for descriptive assessment.

The research study designs and methods adopted for this study were also based on the following critical factors postulated by Ashleigh and Mansi, (2012) and Easterby-Smith et. al., (2008):

1. **Research context:** This study was based on the socio-ecological theory, which depicts spheres of influences on human behaviours and wellness from multiple perspectives such as individual level, interpersonal level, organizational level and country or community level. The perspective from the socio-ecological theory provides an understanding and explanation of the reasons why people have diverse experiences instead of seeking for fundamental laws and external causes to explain people's behaviour (Easterby-Smith et. al., 2008). Qualitative research methods such as focus group study and interviews were, therefore, appropriate for the study.
2. **The research aims and objectives:** This study aims to identify factors associated with the psychological health conditions of construction employees and to develop preventive psychological health management strategies for the construction industry. This study, therefore, adopted the sequential mixed-methods research approach whereby the qualitative methods of focus group discussions and interviews were initially adopted for the exploratory aspect of the study, which were then followed by the quantitative method of survey questionnaire for the confirmatory and descriptive assessment of the findings from the study.
3. **Practical implications such as availability and readiness of respondents to be investigated:** The research methods adopted for this study which includes focus group

study, interviews and questionnaire survey were employed after the consideration of the availability and readiness of the respondents were assured. This study was conducted in Ghana with construction employees from 32 construction companies and some regulatory personnel from the labour department as well as occupational health psychologists in Ghana.

4. **Resources available to conduct the study, which includes time and money:** Time and money were essential factors that were also considered in the formulation of the research design and methods for the study. This study was conducted within the span of 3 years from September 2017 and was fully funded under the Hong Kong PhD fellowship scheme.

### **3.5.1 Research methods of phenomenology research adopted for this study**

#### **The focus group study method**

The focus group method is an exploratory research technique for collecting data from interactive and dynamic group discussions (Chan, et. al., 2012). The focus group study was introduced in 1956 by a sociologist called Merton (Krueger and Casey, 2000). The method of focus group discussion is one of the qualitative research methods, that are widely used for research studies (Bowerman and O'Connell, 2000). It was revealed in the study by Cooper and Schindler (2006) that, a focus group study led by one or two moderators, could comprise of two to three groups to form a dyad and triad. For mini-groups, Cooper and Schindler (2006) suggested four (4) to six (6) groups, seven (7) to ten (10) groups for small groups discussions and eleven (11) to twenty (20) forms super groups. A group size of five (5) to ten (10) participants were revealed to be optimal (Cooper and Schindler, 2006; Chan, et. al., 2012). The focus group method was used to gather respondents within the same construction organization together in an informal group setting to discuss workers' psychological issues.

## **Interviews**

The qualitative interview is the most suitable way to collect data on the experiences of personnel since the research participants had the opportunity to express themselves freely on the topic (Bowerman and O'Connell, 2000). Interview can be described as a method of data collection, information or opinion gathering that involves explicitly asking a series of questions (Ashleigh and Mansi, 2012). Typically, an interview represents a meeting or dialogue between people where personal and social interactions occur". There are three types of interviews: unstructured, structured, and semi-structured interviews (Cooper and Schindler, 2006). In the unstructured interview, the respondent talks freely about a topic, which can produce rich grounded data (Ashleigh and Mansi, 2012). The researcher attempts to get a comprehensive understanding of the interviewee's view or the position, and the interviewee can talk freely with little directional influence from the interviewer (Cooper and Schindler, 2006). Structured interviews, on the other hand, use a set of predetermined questions and highly standardized techniques of recording. They follow a rigid procedure, with the questions in a prescribed form and order (Campbell, et. al., 2004). The interviews can be conducted face-to-face, over the telephone, or through internet video meetings (Campbell, et. al., 2004).

This study made use of semi-structured interviews, which are considered the most common type of interview used in qualitative social research, as they allow the researcher to obtain exact information, which can be compared and contrasted with information gained from other interviewees (Ashleigh and Mansi, 2012).

### **3.5.2 Research methods and materials of positivism research adopted for the study**

#### **Observations**

The researcher can adopt observations as a means of collecting data by observing people's behaviour in the workplace over a period of time and tracking their frequency (Casley and Kumar, 1988). It is essential for the researcher conducting a naturalistic or participant

observation to be unobtrusive, so as not to influence the behaviour of the subject under study (Ashleigh and Nandhakumar, 2007). This method of data provides rich context data; however, the researcher should have clear objectives so as to avoid a lot of unnecessary information, which is difficult to interpret and analyse (Campbell, et. al., 2004; Podsakoff, et. al., 2003). The author had a chance to work with six construction companies for her internship programmes during her graduate and undergraduate courses. Information gathered from observing people's behaviour at the construction workplaces kindled an interest in the quest of investigating into the psychological issues at the construction workplace and formed the initial research questions of this study.

### **Survey research design**

The study will adopt a survey design to conduct research on large samples of individuals for specific research objective. Surveys are carried out in a snapshot of time, adopting various methods, which include the use of questionnaires or interviews or both in a structured or semi-structured form (Campbell, et. al., 2004; Spector, 2003). The researcher should try to avoid sampling bias, which complicates the generalization of results for the whole population (Ashleigh and Mansi, 2012). The questionnaire survey was intended to assess or confirm the findings from the qualitative study and to identify key influential factors.

### **3.6 Justification of the research approach adopted for the study**

The appropriate research approach to use in a study of psychology has attracted a lot of controversies (Cascio and Aguinis, 2011). Psychologist has stated that Positivism does not recognise the subjective explanations of people and personal account of their own behaviour (Johnson and Cassell, 2001). Some research psychologists also argued that the positivism approach has been embraced and has endured in the research field for far too long a period, which is enough (Ashleigh and Mansi, 2012). Also, Breen and Darlaston- Jones (2010) added

that there is a need to oppose the enduring hegemony of positivism to provide a better understanding of psychological antecedents. The phenomenological research approach allows for the provision of solutions that are sustainable and meaningful to complex issues of humans, without any constraints from narrowly focused methods (Cascio and Aguinis, 2011). Quantitative methods are also rigorous and not appropriate to capture the complexities of social human interactions, which includes the belief system, values, and cultural norms that exist presently in the world of work (Podsakoff, et. al., 2003; Richardson and Fowers, 1998).

Practically, both phenomenology and optimism approaches can be included in solving workplace psychological problems (Podsakoff, et. al., 2003). The specific approach to adopt should be determined by the problem to be solved, its context, and practicality concerns of time availability, workload, and funding (Ashleigh and Mansi, 2012; Richardson and Fowers, 1998).

### **3.7 Design of questions for the study**

#### **3.7.1 Design of questions for Qualitative study**

Open-ended questions were suitable for the exploratory nature of the focus group methods and interviews. These types of questions also stimulate discussions of the research topic (Krueger and Casey, 2000). Usually, the questions are repeated in each focus group study and interview, and the researcher has a list of specific questions or topics to be discussed. However, other relevant information or issues could arise in each focus group discussion or interview (Campbell, et. al., 2004). A guideline was developed for both the focus group discussion and interview before conducting each study. The purpose of the guideline was to guide the researcher to ask suitable and relevant questions during the focus group discussion or interviews with experts. The questions were designed to achieve the main research aim of identifying the factors associated with psychological health conditions in the construction industry. The guide included general and specific sets of questions. The general questions for

the interview were on the experts' personal and professional background. They included questions about the nature of present work, specialization, relevant experience in construction management, and years of experience.

***Design of interview questions for objective 2: Personal factors that could make construction employees vulnerable to psychological health conditions***

An interview guideline was developed before conducting the interviews. The purpose of the guideline was to guide the researcher to ask suitable and relevant questions during the interviews. The research questions for the interviews on personal factors were 1) What thoughts do you have about yourself? 2) What are some of the core beliefs you hold? 3) How do you relate with others such as family, friends, colleagues and strangers? 4) How do you manage your time daily? 5) What are your personality traits? 6) How will you evaluate yourself in terms of appearance; how others see you; your performance at job; your role in life and your mental functionality?

***Design of focus group questions for research objective 3: Construction work-related factors that might influence the psychological health conditions of construction employees***

The research questions for the focus group discussions on construction work-related factors were: (1) What are the issues regarding your job that makes you experience psychological disorders such as stress, anxiety or depression? (2) What are the environmental conditions that lead to your psychological ill-being conditions? and (3) What are the working relationship issues that lead to you experiencing psychological ill-being conditions?

***Design of focus group questions for research objective 4: Potential effects of psychological disorders on construction employees and the construction industry***

The research questions for the focus group discussions on potential effects of psychological disorders were: (1) What do you perceive are the effects of psychological ill-



being conditions such as stress, depression, anxiety, burnout and workaholism on construction workers? and (2) What are the perceived effects of construction workers' psychological ill-being conditions on the construction industry?

***Design of interview questions for research objective 5: Coping strategies adopted by construction employees as their responses or efforts to deal with the causes and effects of occupational psychological disorders***

The research questions for the interviews on coping strategies were (1) What are the coping strategies you adopt as efforts to mitigate the causes of psychological health conditions? and (2) What are the coping strategies you adopt as responses to moderate the effects of psychological health conditions?

***Design of interview questions for research objective 6: Organisational strategies to mitigate the causes of psychological health conditions in the construction industry***

The questions were designed to answer the main research question on organisational measures that can be adopted to mitigate the causes and effects of psychological distress among construction employees in Ghana. The questions included (1) what are the organisational measures that can be adopted to eliminate, reduce, or modify the demands, or stressors, to which employees are subjected to in the construction workplace? (2) what are the organisational measures that can be adopted to moderate the impact of psychological distress by responding to the necessary and inevitable demands of work and organizational life? (3) what are the organisational measures to treat the behavioural, psychological, or medical effects of psychological distress that individuals, groups, and organizations may encounter?

***Design of interview questions for research objective 7: Factors associated with effective implementation of psychological health interventions in the construction industry***

The guide included general and specific sets of questions. The general questions for the interview were on the experts' personal and professional background. They included

questions about the nature of present work, specialization, relevant experience in construction management, and years of experience. The questions were designed to answer the main research questions which was “What are the factors that influence the effective implementation of psychological health interventions in the construction industry?”.

### **3.7.2 Design of Questionnaires**

The questionnaires were developed mainly from the preliminary findings of the qualitative studies. The extracted themes from the qualitative studies were used to drive the development of the quantitative instrument for the questionnaire survey. The questionnaire survey was intended to assess or confirm the factors identified from the qualitative study and to identify key influential factors for all the research objectives. Structured questionnaires were developed and administered for the survey. The questionnaire consists of closed-ended questions which focused on the subject matter and aimed to cover the objectives of the research. Questionnaires were formulated with appropriate items which are valid for the achievement of the research objectives. Questions should be clearly stated, with no ambiguity, having a focus on one issue at a time (Ashleigh and Mansi, 2012). To achieve the remaining research objectives, two questionnaires were designed. Each questionnaire has two parts, which is the personal profile part and the main part. The first part of the questionnaire collected the details of the participants, while the remaining section focused on the research objective.

A Likert Scale which is an ordinal psychometric measurement of opinions, attitudes, and beliefs, was adopted for the study. In each question, a statement was presented in which the respondents must indicate their level of agreement or disagreement in a multiple-choice type format. The Likert Scale has both advantages and some limitations or weaknesses (LaMarca, 2011). The advantages of the Likert Scale are that it is the most universal method for survey collection and is easily understood. Likert scale for surveys are also quick, efficient

and inexpensive methods for data collection (Wakita, et. al., 2012). The responses can be easily quantifiable and subjective to computation of some mathematical analysis, as the responses are very easy to code when accumulating data since a single number represents the participant's response (Leung, 2011). It does not require the participant to provide a simple and concrete yes or no answer, and does not force the participant to take a stand on a particular topic, but allows them to respond in a degree of agreement; this makes question answering easier on the respondent. Also, the responses presented accommodate neutral or undecided feelings of participants.

The disadvantages or limitation of Likert scale are that attitudes of the population for one particular item in reality exist on a vast, multi-dimensional continuum. However, the Likert Scale is uni-dimensional and only gives 5-7 options of choice, and the space between each choice cannot possibly be equidistant (Lo, 2018). Frequently, people avoid choosing the “extremes” options on the scale, because of the negative implications involved with “extremists”, even if an extreme choice would be the most accurate (LaMarca, 2011). Therefore, it fails to measure the true attitudes of respondents. Also, it is not unlikely that peoples' answers will be influenced by previous questions or will heavily concentrate on one response side (agree/disagree).

This study adopted Likert scale based on its numerous advantages over the limitations. The use of close-ended responses of (yes) or (no) were restricted, and ranges of possible judgments were available to the respondent by the use of a five-point or 6-point Likert scale. For example, where respondents were requested to indicate their level of agreement on certain factors that might prevent workers from psychological ill-being conditions, the following qualifications were used; ‘*Strongly agree*’ rated as 5 points, ‘*Agree*’ rated as 4 points, ‘*Neutral*’ rated as 3 points, ‘*Disagree*’ rated as 2 points, and ‘*Strongly Disagree*’ rated as 1 point. The respondents were also asked to indicate the level of influence of the factors identified from the

qualitative study on a scale of 1–5, in which 1= not influential, 2= less influential, 3=moderate, 4= highly influential, and 5= very highly influential.

The use of 5-point Likert scale is very common as it has a mid-point of 3-rating, which indicates neutrality or mixed satisfaction. (Wakita, et. al., 2012). A ranking 6-point Likert scale such as never, rarely, occasionally, sometimes, often and always was also adopted for the study. The use of an even number of ratings in the scale such as 6-point Likert scale is to have respondents commit to either the positive or negative end of the scale (Leung, 2011). The instructions on answering questions were clearly stated, for instance, to rank statements on a 5-point or 6-point Likert scale. The respondents were assured of their confidentiality and anonymity in answering the questions and an explanation provided for the reasons of carrying out the research.

***Design of questionnaire for objective 1: Tracing the symptoms of psychological well-being and ill-being status among the construction employees***

To explore the symptoms of psychological health conditions among construction professionals and construction trade workers, this study adopted the methods of survey questionnaires. This research aimed at identifying whether the participants were in a positive or negative state of occupational psychological conditions based on the responses provided. The questionnaire design was based on the 48 validated symptoms identified from the extensive literature reviews. These symptoms were designed 26 from occupational psychological health related measures such as Physiological measures, Behavioural measures, Maslach Burnout Inventory, Daily Log of Stress-Related Symptoms, Cornell Medical Index and Profile of Mood States (Leung, et. al., 2017; Enshassi, et. al, 2016; O'Donoghue, et. al., 2016; Magotra, 2016; Quick and Henderson, 2016; Bowen, et. al., 2014; Ademola, 2005; Mehta and Chaudhary, 2005; Russell, 2003). The psychological health symptoms included physical symptoms, emotional symptoms, cognitive symptoms, and behavioural symptoms. The presence of any of these

symptoms depicted a psychological ill-being state, while the absence of these symptoms depicted a psychological well-being state.

Closed-ended questions were suitable for the quantitative nature of the survey questionnaire. The research questions were developed to suit the measures adopted by this study. The respondents were requested to indicate how often they have experienced each of the symptoms listed by circling the appropriate scale under the 6-point Likert scale. The following frequency qualifications were used ‘Very frequently (that is, more than 2 times a day)’ rated as 6 points, ‘Frequently (that is, 1 to 2 times a day)’ rated as 5 points, ‘Occasionally (that is, 2 to 3 times a week)’ rated as 4 points, ‘Rarely (that is, 2 to 3 times a month)’ rated as 3 points, ‘Very rarely (that is, once a month or less)’ rated as 2 points and ‘Not at all’ rated as 1 point.

The 1 to 6 Likert scale adopted by this study was intended for an equal approximation of the descriptive statistics of the responses to determine where the respondent was in a positive state of psychological well-being or a negative state of psychological ill-being. Using this scale, data transformation was made possible by grouping the scales into two, with 1 to 3 scales assigned with value “7” to indicate a positive state of psychological well-being. Likewise, 4 to 6 scales assigned with value “8” to indicate a negative state of psychological ill-being.

***Design of questionnaire for objective 2: Personal factors that could make construction employees vulnerable to psychological health conditions***

A research questionnaire comprising of 18 closed-ended research statements were developed to suit the six measures adopted by this study. The research participants were requested to rate the level of severity or likelihood of the research statements to their personal characteristics, using a Likert scale ranging from 1 to 5. For instance, a research statement such as “I am not satisfied with the relationship between myself and my colleagues” was rated using the following likelihood qualifications; ‘Very likely’ rated as 5 points, ‘Likely’ rated as 4 points, ‘Neutral’ rated as 3 points, ‘Unlikely’ rated as 2 points and ‘Very unlikely’ rated as 1

point.

***Design of questionnaire on personal predictive factors of psychological health conditions***

Closed-ended questions were suitable for the quantitative nature of the survey questionnaire. A total of 20 research questions were developed to suit the 20 measures adopted by this study from Hassard and Cox (2016). A Likert scale ranging from 1 to 6 was used to determine the level of frequency of the measures in the questionnaire. For positive questions such as how often do you engage in some form of exercise?, the following frequency qualifications were used ‘Very frequently (that is, more than 2 times a day) rated as 6 points, ‘Frequently (that is, 1 to 2 times a day)’ rated as 5 points, ‘Occasionally (that is, 2 to 3 times a week)’ rated as 4 points, ‘Rarely (that is, 2 to 3 times a month)’ rated as 3 points, ‘Very rarely (that is, once a month or less)’ rated as 2 points and ‘Not at all’ rated as 1 point.

On the other hand, for negative questions such as how frequently do you drink alcohol?, the following frequency qualifications were used, ‘Not at all’ rated as 6 points, ‘Very rarely (that is, once a month or less)’ rated as 5 points, ‘Rarely (that is, 2 to 3 times a month)’ rated as 4 points, ‘Occasionally (that is, 2 to 3 times a week)’ rated as 3 points, ‘Frequently (that is, 1 to 2 times a day)’ rated as 2 points and ‘Very frequently (that is, more than 2 times a day) rated as 1 point. Using these scales, lower mean scores obtained by a group depict the participants are more vulnerable to adverse psychological health conditions than the other group.

***Design of questionnaire for research objective 3: Construction work-related factors that might influence the psychological health conditions of construction employees***

The questionnaire on the subject matter of construction work-related factors consisted of closed-ended questions. A Likert scale ranging from 1 to 5 was used to determine the level of significance of the factors presented in the questionnaire. The respondents were requested

to indicate the level of likelihood the factors were to expose them to the risk of psychological ill-being conditions, using the following qualifications: ‘Most likely’ rated as 5 points, ‘Likely’ rated as 4 points, ‘Neutral’ rated as 3 points, ‘Unlikely’ rated as 2 points, and ‘Most unlikely’ rated as 1 point.

***Design of questionnaire for research objective 4: Potential effects of psychological disorders on construction employees and the construction industry***

The closed-ended type of questions was used to design the questionnaire focused on the subject matter of potential effects of psychological disorders on construction employees and the construction industry. The respondents were requested to indicate their perceptions on the level of likelihood of effects of psychological disorders presented in the questionnaire, using a 5-point Likert scale with the following qualifications: ‘Highly Agree’ rated as 5 points, ‘Agree’ rated as 4 points, ‘Neutral’ rated as 3 points, ‘Disagree’ rated as 2 points, and ‘Highly Disagree’ rated as 1 point.

***Design of questionnaire for research objective 5: Coping strategies adopted by construction employees as their responses or efforts to deal with the causes and effects of occupational psychological disorders***

The questionnaire consisted of closed-ended questions which focused on the subject matter and aimed to cover the objective of the research. The respondents were requested to indicate the level of likelihood of adopting the coping strategies presented in the questionnaire, using a 5-point Likert scale with the following qualifications: ‘Most likely’ rated as 5 points, ‘Likely’ rated as 4 points, ‘Neutral’ rated as 3 points, ‘Unlikely’ rated as 2 points, and ‘Most unlikely’ rated as 1 point.

***Design of questionnaire for research objective 6: Organisational strategies to mitigate the causes of psychological health conditions in the construction industry***

The questionnaire survey was intended to assess or confirm the organisational strategies

identified from the qualitative study and to identify key influential factors. The answers of the participants were collected on a 5-point Likert scale. The respondents were asked to indicate the significance of the suggested organizational preventive measures on a scale of 1–5, in which Note: 1=Most insignificant, 2= Insignificant, 3 = Neutral, 4= Significant, 5= Very Significant.

***Design of questionnaire for research objective 7: Factors associated with effective implementation of psychological health interventions in the construction industry***

The questionnaire survey was intended to assess or confirm the 16 factors identified from the qualitative study and to identify key influential factors. The first part of the questionnaire collected the details of the participants, while the remaining section focused on the research objective. The answers of the participants were collected on a 5-point Likert scale. The respondents were asked to indicate the significance of the suggested influential factors. Note: 1=Most insignificant, 2= Insignificant, 3 = Neutral, 4= Significant, 5= Very Significant.

### **3.8 Validation of research questions**

#### **3.8.1 Validation of questions for focus group study and interviews**

Before starting the focus group study and formal interviews, a pilot study was conducted. Two professionals in the construction industry with experience in international construction management were chosen for the pilot interview. The first interviewee was an engineer with seven years of experience in the construction industry. The second interviewee was a project manager with 25 years of experience in Ghana. The purpose of the pilot interview was to test the guideline questions with the experts in order to evaluate issues such as the clarity of the questions, the suitability of the questions for achieving the stage aim, the estimated timeframe required for the interviews and any opportunities to improve the interviews, based on the interviewees' feedback. The pilot interview provided a realistic



preview of how the formal interview and focus group discussions would be conducted. The interviews conducted were recorded in audio, and both interviewees provided positive feedback.

### **3.8.2 Validation of questionnaire**

A pilot study was carried out before the questionnaire survey began. Fifteen experts were selected for the pilot study who had over ten years of experience in the construction industry and occupational health psychology. The purpose of the pilot questionnaire was to review the clarity, suitability of the questions and to test the appropriateness of the questionnaires by reviewing it. The questionnaire was distributed face to face to the participants for the pilot study and 100% response rate was achieved. This initial exercise confirmed the content validity of the questionnaire and its appropriateness to occupational psychological health issues in the construction industry. Besides, an estimate of the time required to answer the questionnaire was made.

### **3.9 Target Research Population**

The target population was the study group that has been selected for the research and whose results would be generalized for the whole population (Hart, 2005). The target population for the study was selected based on the criteria that, they have their construction firms registered with the Kumasi or Accra Metropolitan Assembly and an ongoing construction project. The total population based on these criteria were 32 construction firms. The construction firms belong to either one of the four construction works classifications in Ghana, these are D1K1, D2K2, D3K3 and D4K4 construction industries. The classification from D1 to D4 is done by the Ministry of Water Resource, Works, and Housing; and K1 to K4 classification is done by the Ministry of Roads and Transport (Ayetey and Danso, 2018). The classification of the construction firms is based on their financial standing, technical and

managerial expertise, previous performance, and equipment and plant holding (Ayetey and Danso, 2018). The large-scale construction firms belong to D1K1; the medium scale construction firms belong to D2K2 or D3K3, and the small-scale construction firms belong to D4K4 works classification. The study comprised of 6 number of D1K1 construction firms, 9 number of D2K2 construction firms, 7 number of D3K3 construction firms and 10 number of D4K4 construction firms.

A graphical representation of the target population must be provided (Badu - Nyarko, 2012). Hence, the company's name, address and location have been provided in Table 3.1. The research would be conducted in all the 32 construction firms listed in the table.

**Table 3.1: List of Construction Firms Under Study**

ITEM	COMPANY NAME	ADDRESS/ LOCATION
1.	Dream Side Construction	P.O. Box KS 608 Ghana, Kumasi
2.	Measurematics Consult Ltd.	Kentinkrono, Kumasi
3.	Frederick Williams Construction Ltd.	Near Presby Church, Bohyen-Kumasi, Kumasi
4.	Osfrac Construction Ltd.	New Tafo Airport Rd., Dichemso, Ksi
5.	Ansufa Construction	D 86, NE 617 Link, Airport, Kumasi
6.	Calonsa Construction Ltd.	Plot 6 Block E, Santasi New Site,Ksi
7.	George Newyear Const.	Nsuom Junction, Kwadaso, Kumasi
8.	Adomkop Construct Ltd.	IRS Office Bldg., Ash-Town, Kumasi
9.	A.J. Fanj Construction Ltd	Industrial Area, Asokwa, Kumasi
10.	Casdide Construction Ltd.	No. 47 Kwadaso Estate, Kumasi
11.	Obeng Engineering Complex	Suame Magazine, Kumasi
12.	Potential Eng. Co. Ltd.	Prempeh II Street, Adum, Kumasi
13.	Value Trust Estates	Kumasi
14.	Ankomadu Const. Ltd.	Plot 11, Blk. K, Ayigya, Kumasi
15.	ASIB Const. Ltd.	P.O.BOX KS 77, Kumasi, Ghana
16.	Asofat Construction	Harbour Area, Kumasi
17.	Canash Const Works Ltd.	No. 113, Kwadaso Estate, Kumasi
18.	CECIL BON C <sub>i</sub>	P.O.BOX SE 1930, Kumasi, Ghana
19.	Consar Ltd.	Industrial Area, Asokwa, Kumasi
20.	Fridoug Construction Ltd.	Next to SSNIT Office, Asafo, Ksi.
21.	Jodon's Building & Road Construction	Opp. Ghana Commercial Bank, Asafo Market, Kumasi
22.	Jomallin Enterprise Ltd.	Kumasi
23.	Justmoh Construction Ltd.	Adum, Kumasi

24.	Kayad Co. Ltd.	Mile 3, Old Tafo, Kumasi
25.	Knatto Complex Ltd.	Santasi, Anyinam, Kumasi
26.	Mahphus Construction Ltd	P.O. Box 47 Aboabo Kumasi
27.	M Barbisotti & Sons	P.O.Box 1604, Kumasi, Ghana
28.	Nabbco Building & Trading Co.	201, Chapel Hill, Kumasi
29.	Nuclear Age Const. Ltd.	Ashanti New Town, Kumasi
30.	Nyamaa Bldg. Const.	Manhyia Antoa Rd., Kumasi
31.	Sethi Brothers	P.O.BOX KS 3353, Kumasi, Ghana
32.	Tyla Contract Works Ltd.	SSNIT Annex, Adum, Kumasi

### **3.10 Sampling methods**

There are two main types of sampling: probability and non-probability. Probability sampling involves random selection, while non-probability sampling does not. There are various techniques that suit each type of sampling. For example, quota, purposive, snowball, self-selection, and convince are all suitable for non-probability sampling. Non-probability sampling is common in qualitative research because participant selection is based on meeting pre-established criteria. Probability sampling, on the other hand, is common in quantitative research because it requires randomization (Cooper and Schindler, 2006).

#### **3.10.1 Sampling procedure for the focus group study and interviews**

This study adopted a purposive sampling technique for selecting suitable participants while snowballing was used to reach an adequate number of participants. The purposive sampling method is particularly used in the recruitment of participants for qualitative research. This sampling method uses the judgment of the researcher in selecting the research participants, or the selection is made with a specific purpose in mind (Campbell, et. al., 2004). Respondents were required to meet specific criteria, such as the ability to speak comprehensible English and at least two years' relevant work experience.

When selecting informants to represent the industry experts and workers, a passive snowball sampling method was applied. Industry experts were limited, and few were willing

to participate in the research, as they thought it would require time out from their individual work. The snowball sampling method is particularly useful to recruit participants for qualitative research when they have very specific characteristics or rare experiences (Cooper and Schindler, 2006), as was the case with the industry experts. The experts were therefore named or suggested by experts who were first interviewed by this researcher.

Due to difficulties in gaining access to construction workers directly, the researcher approached construction managers and safety supervisors to ask who among the construction workers could be approached based on the prescribed study criteria. This included the number of years' experience, position or designation in the company, and particular expertise. Some of the construction experts were part of the researcher's network since she previously worked in the construction industry in Ghana. Other experts were sent e-mails or contacted through phone calls. Responses varied, some refused and expressed excuses such as they were busy, while others consented to appointments and even changed their schedules to participate in the study. Some of the experts were enthusiastic about helping the researcher by introducing her to other experts. For instance, one construction manager introduced the researcher to the psychologist, and the psychologist, in turn, introduced the researcher to regulatory personnel from the factory inspectorate department. Altogether, purposive sampling, snowball sampling, were employed to obtain the research participants for the qualitative studies.

### **3.10.2 Sampling procedures for quantitative survey**

The main purpose of this phase was to evaluate the results of the first phase with the key players in the construction industry. The nature of the first phase was exploratory, and a large number of experts were consulted to obtain the information required. However, the nature of the second stage was confirmatory (evaluation). It was, therefore, essential to choose a statistically valid sampling method that is widely accepted and used in similar research. A

stratified random sampling procedure was used for this phase. This probabilistic method is often used when the target sample contains subgroups (Ashleigh and Mansi, 2012). This study had three groups of research participants, such as construction professionals, construction trade workers, and labour personnel (this comprise of regulatory personnel and occupational health psychologist).

### **3.11 Sample size**

#### **3.11.1 Sample size for qualitative studies**

There is no specific required number of qualitative studies to be conducted in a research study; the suitable number is based on the researcher's judgment for collecting the necessary data (Ashleigh and Mansi, 2012). Since the frequency of data is not as important in qualitative research as it is in quantitative research, smaller sample sizes can be used. Rather than aiming to make broad statements regarding the hypothesis, qualitative research is more concerned with understanding the meaning behind the data (Ashleigh and Mansi, 2012). This means that even if a piece of data presents itself only once in a qualitative study, it could still be just as valuable as if it presented itself many times. When a sample of 56 qualitative PhD studies was analyzed based on their sample sizes, the mean sample size was just 31 participants.

A total of 16 focus group discussions were held in Ghana, with 90 construction employees. The research participants were gathered from 32 construction organizations registered under the Kumasi Metropolis of Ghana. Each focus group comprised of a minimum of five (5) and a maximum of seven (7) participants and was led by a moderator. The focus group discussions were used to gather research participants belonging to similar working trade, such that eight focus groups each were formed separately for both construction trade workers and construction professionals. The construction trade workers group consisted of employees such as carpenters, masons, welders, steel benders, painters, and electricians. The construction

professionals group also consisted of architects, contractors, engineers, and quantity surveyors.

There were 53 interviews for this study (which comprised of 21 construction professionals, 15 construction workers, and 17 labour personnel). The plan before conducting the fieldwork was to interview 60 research participants. However, during the data collection period, it was found that participants generally did not report any new or novel information about factors associated with the effective implementation of psychological health interventions in the construction industry. Therefore, it was considered that data saturation had been reached, and the data collection process was stopped.

### 3.11.2 Sample size for the questionnaire survey

To obtain meaningful results from the quantitative analysis for the purpose of the validation, a sufficient sample size had to be determined. This study involves a large and indefinite population. It was, therefore, necessary to use certain formulas to determine the minimum sample size. The most suitable formula depends on a number of factors, including the aspect of the sampling method, the type of data collected (example interval or category); whether the population is large, small or unknown; and the analytical method (Easterby-Smith, et. al., 2008; Cooper and Schindler, 2006). This study used a formula created for the Likert scale. The relevant formula for determining the minimum sample size was one introduced by Cochran (1977) and given below.

$$X = \frac{(W)^2 \times (Y)^2}{(H)^2}$$

Where:

- X = the sample size
- W = the value of the accepted level of risk, which corresponds to the true margin of error for a given acceptable margin of error.

If the acceptable margin of error = 5%, then W = 1.96.

- $Y$  = population standard deviation estimate = population variance estimates for a 5-point scale as 5, which is the inclusive range of the scale divided by 4, This is the number of standard deviations of possible values in the range.
- $H$  = permissible margin of error for the estimated mean = number of points on the primary scale multiplied by the permissible/ acceptable margin of error.

The alpha level for this study was originally set at 0.05, which corresponds to a 5% error rate that is considered an acceptable margin for many studies (Enshassi, et. al., 2016). Using the above formula, the minimum sample size was determined to be 96 calculated as:

$$X = \frac{(1.96)^2 \times (1.25)^2}{(0.25)^2} = \frac{3.8416 \times 1.5625}{0.0625} = 96$$

The minimum sample size of 96 research participants was considered appropriate for the questionnaire survey.

### 3.12 Data Collection Techniques and Tools

This mixed-method approach utilized the interview technique for the qualitative survey and a questionnaire for the quantitative study. The selection of these techniques was grounded on strong rationales, as described below. Ashleigh and Mansi (2012), stated that qualitative interviews help collect data regarding people's perceptions to investigate aspects of their social world; to probe people's assumptions, prejudices, and the like; and to determine their impacts on behaviour and performance. The probing feature in qualitative data gathering was essential and valuable to this study since the responses of the interviewees were integrated within the proposed intervention framework. This was, in turn, the basis for the second stage of the research, namely the quantitative approach via questionnaire.

### **3.12.1 Data Collection Procedure for Focus Group Study**

The data collection procedure for the focus group discussions took place within the period of November 2017 to February 2018 for 16 consecutive days of a weekend. A designated location away from the construction workplace was used to gather the respondents for the focus group discussions. The time frame for each focus group discussion was between 1 to 2 hours. Each focus group discussion began with the moderator describing the aim of the research study to the participants. The participants were then encouraged to share their personal experiences, opinions or perceptions on the subject for discussion.

Ground rules for the focus group were set, with emphasis on the confidentiality of all information provided by participants during the focus group discussion. The research questions were provided to the participants in both English and the local dialect of “twi”. The participants were asked to express themselves in both the English and local dialect, whichever was preferable to them. Possible answers from secondary sources of data were provided to the participants by the moderator for illustration purposes. This also gave further clarifications to the research questions. Individual worksheets were also distributed to each participant to express their own views onto the paper. This initial exercise was intended to allow each participant equal voice in the focus group study. This further enhanced the anonymity and confidentiality of personalized information. The papers submitted with their individual responses were then placed on the ground for further discussion.

Audiotaping and note-taking were used to collect data from the responses during the focus group discussion. To confirm the results from the focus group discussion, the summary of the responses with items identified were read out by the moderator to the research participants. The responses from the 16 focus groups were put together for the further research study.



### **3.12.2 Data Collection Procedure for the Interview**

Individual interview was selected over group interviews to encourage those the respondents to speak freely about their needs (Briner and Rousseau, 2011). Instead of making broad statements about the hypothesis, qualitative research is more about understanding the meaning of the data (Ashleigh and Mansi, 2012). This means that even if a data item presents itself only once in a qualitative study, it can still be as valuable as if it had presented itself several times. The data collection procedure for the interviews took place within the period of May 2018 to June 2018, at an agreed location and time. Each interview lasted for a maximum of 1 hour. The interviews were recorded and transcribed. The researcher used handwritten notes to support the data collected for validity and to ensure the quality of the research. The member check can also be used for the transcripts to ensure the highest level of integrity in the interview process (Bowerman and O'Connell, 2000). When the transcripts are compiled, they can be uploaded to software such as Quirkos and NVivo for coding, categorizing, and thematizing system. These software products for qualitative data analysis are helpful in performing the thematic analysis for this study. Using thematic analysis gives a researcher a flexible but solid methodology with which to develop solid research results (Millward, 2006; Norussi, 2001).

### **3.12.3 Data Collection Procedure for the Questionnaire survey**

A scientific research approach requires a systematic and relevant data collection, observation of people objectively and validation of adopted techniques (Ashleigh and Mansi, 2012). This research sought to confirm the findings from the focus group discussions and interviews. The distribution of the questionnaire was done based on the sampling approach adopted. A representative was assigned to each of the 32 construction firms for the data collection activities. Due to the volume of questions, the questionnaire was distributed to the

respondents in batches.

For the first set of questionnaires for objectives 2, 3 and 4, structured questionnaires of about 15 in number, were sent to each of the 32 construction firms who are registered with the Kumasi Metropolitan Assembly, during the period of June 2018 to August 2018. A total of 480 questionnaires were distributed, before the target number of 300 questionnaires, with equal distribution of 150 construction professionals and 150 construction trade workers were obtained. The response rate for this study was 63%.

For the second quantitative study, a total of 350 questionnaires were distributed in Ghana via online and face-to-face, to construction professionals and regulatory personnel, during the period of July 2018 and September 2018. Out of which 264 questionnaires were retrieved. This gave the response rate at 75%. The sample size of the responses obtained was, therefore, above the 96 number previously calculated as minimum research participants for the questionnaire survey. This comprises of 112 construction professionals, 83 construction trade workers, and 69 regulatory personnel in Ghana. While an internet-based survey was carried out with most of the construction professionals, a paper-based survey was carried out with the construction trade workers and regulatory personnel, to obtain the total number of 264 respondents.

### **3.13 Research Participants**

This study was therefore limited to construction professionals (such as Architects, Engineers, Quantity Surveyors, Construction Managers), construction trade workers (such as Masons, Carpenters, Plumbers, Steel Benders, Electricians) and labour personnel (selected from regulatory institutions such as the Factories Inspectorate Department, Labour Department, and Occupational Psychological Health Sectors).

The background information of the research participants for the focus group study, interviews and the two sets of quantitative study have been presented in the tables below.

**Table 3.2: Background information of the research participants for Focus Group Study**

Information	Categories	Percentage distribution of 90 research participants (45 Participants each)	
		Construction Professionals group	Construction Trade workers group
Age	25 - 35	27%	20%
	36 - 45	40%	40%
	46 - 55	20%	29%
	> 55	13%	11%
Years of working experience	Less than 1 year	16%	4%
	1 - 5yrs	16%	24%
	6 - 10yrs	28%	60%
	Above 10yrs	40%	12%
Level of Education	Ghana Certificate Exams “A” level	13%	4%
	Ghana Certificate Exams “O” level	7%	2%
	Junior High School level	2%	38%
	Secondary School level	7%	9%
	Technical or Vocational level	42%	40%
	Graduate-level or Above	29%	7%
Marital Status	Married	80%	71%
	Single	20%	29%
Gender	Male	76%	91%
	Female	24%	9%

**Table 3.3: Profile of the research participants for the interviews**

Information	Categories	Percentage distribution		
		Construction Professionals group (Total = 21)	Construction Trade workers group (Total = 15)	Labour Personnel (Total = 17)
Age	25 -35	14%	27%	0%
	36 – 45	43%	53%	33%
	46 – 55	24%	13%	50%
	> 55	19%	7%	17%
Years of working experience	1 - 5yrs	19%	33%	17%
	6 - 10yrs	57%	47%	50%
	Above 10yrs	24%	20%	33%
Level of Education	Junior High School level	0%	33%	0%
	Secondary School level	0%	60%	0%
	Technical or Vocational level	14%	7%	0%
	Graduate level or Above	86%	0%	100%
Gender	Male	71%	87%	67%
	Female	29%	13%	33%

**Table 3.4: Profile of the research participants for the first quantitative study.**

Information	Categories	Percentage (150 Participants each)	
		Construction Professionals group	Construction Trade workers group
Age	25 -35	27%	20%
	36 - 45	40%	40%
	46 - 55	20%	29%
	> 55	13%	11%
Years of Working Experience	Less than 1 year	7%	4%
	1 - 5yrs	42%	24%
	6 - 10yrs	31%	60%
	Above 10yrs	20%	11%
Level of Education	Ghana Certificate Exams “A” level	2%	4%
	Ghana Certificate Exams “O” level	0%	2%
	Junior High School level	2%	38%
	Secondary School level	4%	9%
	Technical or Vocational level	40%	40%
	Graduate level or Above	51%	7%
Marital Status	Married	80%	71%
	Single	20%	29%
Gender	Male	87%	96%
	Female	13%	4%

**Table 3.5: Profile of the research participants for the second quantitative study**

Information	Categories	Percentage distribution		
		Construction Professionals group (Total = 112)	Construction Trade workers group (Total = 83)	Labour Personnel (Total = 69)
Age	25 -35	10%	16%	11%
	36 - 45	47%	58%	47%
	46 - 55	22%	15%	23%
	> 55	21%	11%	19%
Years of working experience	1 - 5yrs	11%	25%	17%
	6 - 10yrs	63%	51%	54%
	Above 10yrs	26%	24%	29%
Level of Education	Junior High School level	0%	17%	0%
	Secondary School level	0%	45%	0%
	Technical or Vocational level	13%	33%	0%
	Graduate level or Above	87%	5%	100%
Gender	Male	78%	89%	57%
	Female	22%	11%	43%

### 3.14 Data analysis

The method of data analysis employed in the study depended on the type of data, method and design of data collected, research objectives and strategies (Ashleigh and Mansi, 2012).

#### 3.14.1 Data analysis techniques for qualitative study

There are many techniques to analyse qualitative data, including narrative analysis, the cultural domain method, and thematic analysis (Norusis, 2001). The narrative analysis investigates the relationships between individuals' experiences and social backgrounds by listening to their stories. The cultural domain technique involves the classification of items into groups, for example, countries and animals. This technique explores how elements are perceived to relate to one another, leading to a greater understanding of the cultural domain.

Thematic or content analysis is one of the most widely used methods for qualitative analysis and focuses on identifying patterned meaning through a specific set of data ((Norusis, 2001). It involves a number of tasks: “(1) *discovering themes and subthemes*, (2) *winnowing themes to a manageable few (that is. deciding which themes are important in any project)*, (3) *building hierarchies of themes or codes*, and (4) *linking themes into theoretical models*” (Norusis, 2001).

Because of the multi-level perspective approach adopted as the lens of this study, the classification of the issues into relevant categories was done in accordance with this approach. Hence, a straightforward data analysis technique was required to capture a variety of experiences from several perspectives effectively. Content analysis was, therefore, selected to analyse the data collected from the interviews.

The qualitative content analysis procedure employed for the study are as follows:

- 1) Read transcripts and listened to recordings.
- 2) Developed initial response codes or categories
- 3) Classified all elements of the data obtained
- 4) Organized the elements into the categories
- 5) Reviewed the categories
- 6) Developed meaningful sub-categories
- 7) Conducted a word frequency counts of the categories and sub-categories

Pre-coding of possible answers or responses by the interviewees as participants was done before the interviews were scheduled. The researcher, as the interviewer, coded the responses as the questions were asked. The researcher also formulated questions for clarification to ensure appropriate coding was done. The questions for both the focus group study and interviews with the experts from various fields related to the construction industry took the form of open-ended questions, which were analyzed as open questions. Each of the

recorded audio files and all of the written notes was reviewed. A large portion of the audio files was fully transcribed. The content analysis was employed for the qualitative data collected from the interviews using NVivo software. The text was fed to NVivo software for coding, and categories and themes were created. The factors revealed by the respondents were broken down into a number of themes. Then, in winnowing the themes, phrases that relate were joined as a single concept for simplification purposes. Then the phrases were linked to each other, as concepts may be interrelated to identify the factors associated with psychological health conditions in the construction industry.

### **3.14.2 Questionnaire data analysis techniques**

The data collected were statistically evaluated with SPSS (Statistical Package for Social Scientist) Version 19. The analysis consisted of three different steps, namely, data pre-processing, descriptive analysis, and inference analysis. In the pre-processing step, the completeness of the data was checked before it was entered into the software (SPSS). The number of missing values was very small and was automatically recognized by SPSS as missing and had no influence on the result calculation.

### **Descriptive Statistics**

Descriptive statistics were used to analyze the data by describing and or summarizing the data in a meaningful way. This allows for simpler interpretation, such that patterns could be derived from the data. Descriptive statistics analyze data by employing two forms of statistical methods, namely measures of central tendency and measures of spread. Measures of central tendency were used to describe the central location of frequency distribution using statistical forms such as median, mean and mode. Measures of spread were used to summarize the data by indicating how the results of the data have been spread out. Descriptive statistical forms such as mean and standard deviation were used to depict the frequency distribution of

the results collated. In using descriptive statistics, the data were summarized using a combination of tables and charts.

Frequency and percentage scores were also used to determine the occupational psychological health state of the research participants. The four main constructs were determined, and the scores obtained from the two-construction working group were compared to indicate which of the two construction groups were more prevalent in a positive or negative occupational psychological state.

The following mathematical formulas were used:

**Frequency score for a construct** = summation of the total number of responses for all indicators under the construct.

**Percentage score for a construct** =  $\frac{\text{Frequency score for the category}}{\text{Total number of expected responses}} \times 100\%$

**Total number of expected responses** = number of participants (150)  $\times$  number of indicators under a specific construct

**Average frequency score for all constructs** =  $\frac{\text{Cumulative frequency score}}{\text{Number of constructs}}$

**Average percentage score for all constructs** =  $\frac{\text{Cumulative percentage score}}{\text{Number of constructs}}$

(Source of the formula: Norussi, 2001)

### **Inferential Statistics**

The researcher adopted the use of inferential statistics to interpret data and for conclusions to be drawn that extend beyond the immediate data. Inferential statistics such as one sample T-test was employed to measure the significance level of the test variables as effects of occupational psychological disorders perceived by all the respondents, obtained by comparing the means of the true mean/ variable mean and the midpoint of the test variable,



which is 3.

Part of the research goal was to assess the differences between the perceptions of the groups of respondents. The normal distribution of the first set of questionnaires with 150 construction professionals and 150 construction trade workers, made independent two-sample T-test appropriate for comparing the means of the groups (Norusis, 2001). Independent two-sample T-test was used to assess whether the means of the construction professionals' group statistically differed from the means of the construction trade workers' group.

However, in order to validate the differences statistically for the second set of questionnaires with non-uniform distribution of the number of respondents in each of the three groups, a different process of inference analysis was required. Therefore, the appropriate technique for this validation process is the Kruskal-Wallis and Mann-Whitney tests. Since there is more than one independent sample, the three groups were initially subjected to the Kruskal-Wallis test.

The purpose of these tests was to check whether the differences between the groups were statistically significant and not random (McKight and Najab, 2010). However, the Kruskal-Wallis test does not indicate which group differs significantly from the others. A Mann-Whitney U is designed to perform pair-wise comparisons and identify the disagreement between the groups (Norussi, 2001). The data from the three groups of respondents were then subjected to the Mann Whitney test in pairs of three. The purpose of these tests was to check whether the differences between the groups were statistically significant and not random (McKight and Najab, 2010). The p-value was set at 0.05. If the test statistics are less than 0.05 (the p-value), this means that the difference between the groups is statistically significant and did not occur by chance.

### Ranking of Factors

To identify the key strategic factors relative importance index (RII) was calculated using the method recommended by Enshassi, et. al. (2016), from which the various ranks were determined.

The RII formula is as follows:

$$RII = \frac{\sum x}{W \times N_{\%100}}$$

where:

x = the weighting given by the respondents from the scale of 1 to 5.

W = 5, the highest weighting

N = total number of respondents

### Data Reduction

The Kaiser-Meyer-Olkin (KMO) measure of sampling was used to determine whether or not the sample from the data is acceptable for exploratory factor analysis (Lo, 2018). It is recommended that KMO value should be greater than 0.50 (Enshassi, et. al., 2016). Bartlett's test of the sphericity was also used to test the multivariate normality of the variables (Lo, 2018). Principal component analysis with varimax rotation was then carried out to assess the underlying characteristics of the structure of the interrelationships among the attributes (components). The number of factors extracted was based on the eigenvalues. The criterion given is to retain only factors with eigenvalues greater than one (Enshassi, et. al., 2016).

The internal consistency, which is the degree to which the results of the data are consistent across the variables, should be assessed (Kline, 2005). The Cronbach's alpha test is accepted as an accurate estimate for internal consistency, which illustrates how well the inter-items are correlated in a group (Lo, 2018). The Cronbach alpha values range from zero and one. Cronbach's alpha value above 0.70 is considered to be an acceptable indicator of internal

consistency, and the values of 0.50 to 0.70 are within lower-modest reliability (Kline, 2005).

### Correlation Analysis

A measure of the relationship between two variables, X (Psychological health conditions) and Y (Factors) was analyzed using correlation analysis. Pearson's method was adopted for the correlation analysis. The strength of the linear relation was indicated by the correlation coefficient "r". The value of coefficient of a correlation usually lies between -1 to +1 (Lo, 2018). The outcomes are:

1. A perfect inverse correlation between variables is indicated by -1.
2. A perfect direct correlation between variables is indicated by +1.
3. A no linear correlation between variables is indicated by 0. (Lo, 2018).

Also, Lo (2018) stated that the value of coefficient indicates the magnitude of the correlation between the variables. For instance:

1. where  $r < 0.2$ , this depicts a weak correlation
2. where  $r$  lies between 0.2 and 0.39, this depicts a moderate correlation
3. where  $r$  lies between 0.4 and 0.59, this indicates a strong correlation
4. where  $r \geq 0.6$ , this indicates a very strong correlation

$r^2$ , is the square of the value of coefficient of correlation, which is also known as the coefficient of determination (Lo, 2018).

One- tailed test of the significance of the relationship between the variables was done. The correlation between the two variables is significant, where the p-value is less than or equal to 5%. That is  $p \leq 0.05$ . On the other hand, where the p-value is greater than 5%, that is  $p \geq 0.05$  this indicates no significant correlation between the variables. Hence, the null hypothesis, which assumes a significant correlation between the variables will be rejected and the alternative hypothesis considered.

## Regression Analysis

The relationship between quantitative variables could be predicted using regression analysis (Leung and Chan, 2007). Regression analysis was done to cross check the results from the correlation analysis. Correlation analysis is also limited, as it allows for the measurement between one independent variable and one dependent variable. Multiple linear regression analysis was therefore adopted to predict the relationship between several independent variables of X and the dependent variable of Y.

The regression line is used to represent the predicted value of a dependent variable for each value of independent variables (Lo, 2018). The model is:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \dots + \beta_k x_k + \varepsilon$$

where;

y = dependent variable

$x_i$  = independent variable of i

$\beta_0$  = y-intercept. This is the point on the vertical axis where the regression line crosses.

$\beta_i$  = slope for independent variable of i. The slope is the change in a dependent variable for a one-unit change in the independent variables.

k = the number of independent variables in the equation

$\varepsilon$  = random error component. This study assumed that the mean of the error ( $\varepsilon$ ) is zero. The errors are independent to each other and are normally distributed with the small variance.

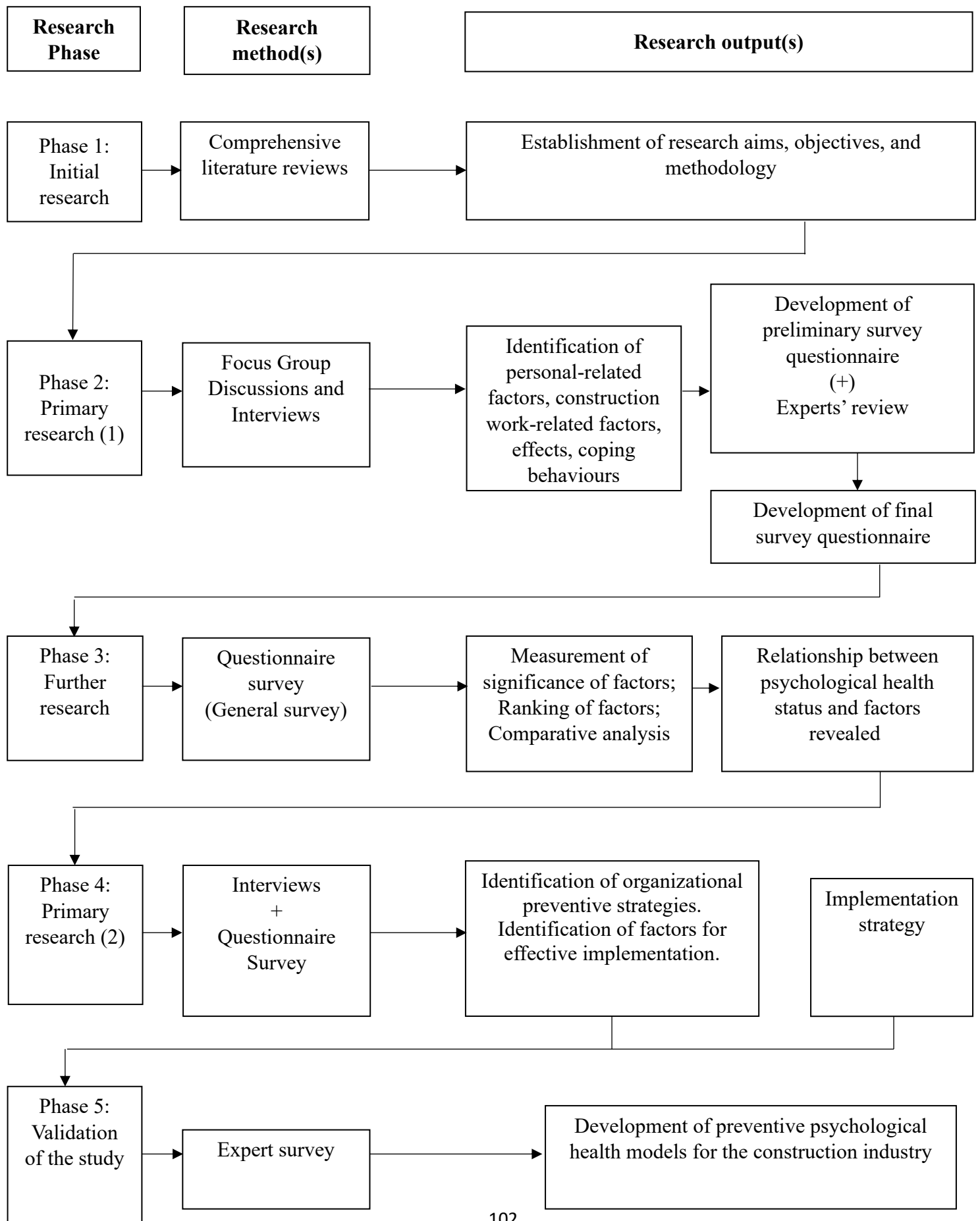
Stepwise estimation method was employed. Statistics was done to determine the covariance matrix, model fit and residuals. A scatterplot of the residuals on the vertical axis by

the predicted values on the horizontal axis was also done. These are important diagnostic tools to determine the relationship between two quantitative variables (Lo, 2018).

### **3.15 Chapter 2 Summary**

This chapter accounts for the research design, target population, study population, sample unit, sample frame, sampling techniques and sample and the required sample size that were considered by the researcher for the research objectives. The chapter also presents methods and instruments that were used to obtain the relevant information for this study. Data handling, as well as ethical considerations were considered. Figure 3.1 on the next page presents the overall research design adopted for this study.

**Figure 3.1: Overall Research Design for this study**



## CHAPTER 4

### DETERMINANTS AND CAUSES OF PSYCHOLOGICAL HEALTH CONDITIONS

#### 4.1 Determinants of Psychological Health Conditions<sup>2</sup>

##### 4.1.1 Introduction

The psychological health of construction workers can have severe consequences on the overall job outcomes of the construction firm (Enshassi, et. al., 2016). It is of essence for construction industries to pay critical attention to the psychological health of their workers and to understand causative factors that lead to workers' psychological ill-being and adopt preventive measures to mitigate its effects (Magotra, 2016). Many types of physical ailments have been linked with adverse psychological health conditions such as high blood pressure, heart attack, heart disease, peptic ulcer, headache, pain in the neck, asthma, and cancer (Mehta and Chaudhary, 2005). Some physical and emotional indicators of adverse occupational psychological health conditions also include: gastrointestinal disorders, migraine, skin problems, diabetes, hypertension, ulcers, infectious diseases, headaches, chest pain, back pain, anxiety, boredom, trembling, low self-esteem, forgetfulness, depression, anger, apathy, worry, and fatigue (Magotra, 2016; Enshassi, et. al., 2016). Construction employees may also show behavioural deviations of adverse psychological health conditions such as overeating, loss of appetite, excessive smoking, alcohol abuse, sleeping disorders, emotional outbursts, violence and aggressive behaviours (Quick, et. al., 2013; Ademola, 2005).

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<sup>2</sup> Some contents of section 4.1 of this Chapter have been published in: Fordjour, G. A., and Chan, A. P. C. (2020), "Tracing Symptoms of Psychological Health Status among Construction Employees". *Journal of Health and Medical Sciences*, 3(1), 104-118. 6.

And in: Fordjour, G. A. and Chan, A. P. C. (2019). "Exploring Occupational Psychological Health Indicators Among Construction Employees: A Study in Ghana". *Journal of Mental Health and Clinical Psychology*, 3(2): 6-18.

These critical issues of occupational psychological disorders made it imperative that the research aimed to explore the indicators of occupational psychological health conditions among construction employees. Research in occupational health investigates mainly physical health, with limited attention on the psychological health of individuals in the construction industry (Chan et. al., 2016). Albeit the number of research works that have been carried out on health, there has been diminutive research attention on assessing the psychological health conditions of employees in the construction industry, especially those in developing countries.

Russell (2003) designed a theoretical model of positive and negative occupational psychological health known as core affect circumplex. The core affect describes a person's neurophysiological state and underlies good or bad feelings. The circumplex of core affect developed by Russell (2003), comprised of four axes of emotions, which range from high activation to low activation and pleasant to unpleasant emotions. This was done to indicate the intensity of psychological well-being and ill-being symptoms and the activation levels of workers having these psychological issues. The occupational psychological conditions of workers were further grouped under broad taxonomies of well-being, namely: job satisfaction and work engagement, and ill-being, namely: burnout and workaholism (O'Donoghue et. al., 2016). This current study sought to explore the main taxonomies of occupational psychological well-being and ill-being indicators among construction workers in Ghana.

#### **4.1.2 Occupational Psychological well-being condition**

Occupational psychological well-being, also known as a positive state of psychological health, is based on individuals' subjective experiences. Psychologists have classified the main components of occupational psychological well-being into eudaimonic and hedonic (Ryan and Deci, 2001). The eudaimonic aspect of psychological well-being focus on the realization and fulfillment of human potential. Occupational research on work engagement and job meaning gives understanding to the eudaimonic element of psychological wellbeing (Ryan and Deci,



2001). This can be identified in terms of workers' feelings of purpose and fulfillment (Wrzesniewski, et. al., 2003). The hedonic element of psychological well-being has to do with the individual's experiences of pleasure and the balance of negative with positive thoughts. Occupational research on job satisfaction provides an understanding of the hedonic element of workers' psychological well-being (Ryan and Deci, 2001). Employees' subjective evaluations of their work situations can influence their psychological well-being (Kivimäki, et. al., 2005).

***Work Engagement as an occupational psychological well-being condition***

Work engagement can be defined in a simultaneous employment, as a person's expression of "preferred self" in working behaviours (Kahn, 1990). The author added that the totality of such a person, including the physical, emotional, and cognitive aspects are present and fully active for their role performances. Work engagement is the optimum state of workers' occupational psychological well-being and is regarded as a positive state of workers' high activation and pleasure in working (O'Donoghue et. al., 2016). Similarly, Xanthopoulou, et. al., (2013) stated that workers who are engaged in work have high energy levels, are immersed fully in their job, they enjoy working and are enthusiastic about work. Work engagement is a fulfilling and positive work-related psychological condition, which is characterized by dedication, vigour, and absorption. Vigour is characterized by high levels of energy and mental resilience during working, and persistence even in the midst of difficulties. Dedication has to do with been intensely involved in one's work and exhibiting a sense of enthusiasm, inspiration, pride, to face challenges. Absorption is characterized by been fully concentrated and happily engrossed in one's work without noticing the passage of time (Schaufeli and Bakker, 2004). Work engagement, therefore, enhances work connections and promotes working relations.

***Job Satisfaction as an occupational psychological well-being condition***

The first definition of Job satisfaction was by Locke (1976), who states that job satisfaction is the positive and pleasurable emotional state of psychological wellness, which results from a person's appraisal of his or her job and/ or job experiences. Job satisfaction is described as a person's evaluative judgment of his or her work and is characterized by positive emotional condition, attitude, and reactions to work (Wright et. al., 2007). The concept of job satisfaction is bi-dimensional and consists of two dimensions, namely: extrinsic and intrinsic satisfaction (Rose, 2001). A person's satisfaction with all aspects of life, including job, indicates subjective psychological well-being. When a person's universal and basic needs are being fulfilled in a present situation, they become happy (Sousa-Poza and Sousa-Poza, 2000). Job satisfaction, however, has been classified as a passive state of workers, with low activation to work. Therefore, workers who have job satisfaction are pleased and content with their work, and as a result, they lack the energy drive to work hard (O'Donoghue et. al., 2016). The differences in workers' activation level during these psychological well-being conditions draw a line between Job satisfaction and work engagement as the latter is associated with high work activation levels (Shimazu, et. al., 2015).

**4.1.3 Occupational Psychological Ill-being**

Occupational psychological ill-being, also known as a negative state of psychological health, emanates from many interpersonal and organizational factors with (Richman, et. al., 2001). Stress, depression, and anxiety are the common psychological health conditions reported among employees (Bowe, et. al., 2014; Hassard, et. al., 2018). Workplace psychology ill-being has been categorized into five subgroups using the Depression, Anxiety, and Stress Scale (DASS); these include normal, mild, moderate, severe, and extremely severe levels of psychological ill-being (Offei and Quansah, 2009). Psychological ill-being conditions such as

stress are not harmful, but high levels could have detrimental effects on behavioural and organizational outcomes in the construction industry (Chan et. al., 2012). For instance, a person experiencing role strain or stress may have negative reactions such as frustration, with the worker failing assignments and eventually leaving the construction organization. The main components of construction work-related factors leading to psychological ill-being in the workplace are categorized under organizational, task, physical, and personal factors (Leung et. al., 2012).

### ***Workaholism as an occupational psychological ill-being condition***

Workaholism is defined as the uncontrollable need or compulsion to work hard incessantly (Oates, 1971). He further stated that workaholism is the strong and irresistible inner drive in a person, forcing him or her to work hard excessively. Van Beek, et. al. (2012) identified two forms of motivation, which result in workaholism, namely: introjected regulation and identified regulation. The authors explained that Introjected regulation is the extrinsic controlled element of motivation in people to work hard, to receive praises, award, or to avoid criticisms. Identified regulation is also the extrinsic autonomous element of motivation in a person to act because he or she has accepted and identifies with the reasons associated with working hard (Van Beek, et. al., 2012). Workaholism has been conceptualized by Spence and Robbins (1992), with the workaholic triad, including the dimensions of job involvement, work drive, and reduced working enjoyment.

Workers having the psychological ill-being of workaholism have high levels of work activation, but they experience displeasure (O'Donoghue et. al., 2016). This makes workaholism a negative state of occupational psychology. Schaufeli, et. al., (2008) also stated that workers who are workaholics are agitated, tensed, and they work compulsively to meet standards set internally by themselves, or externally by their work superiors. The researchers added that workaholics have a great tendency to work hard excessively, and they tend to be

obsessed with their work. Workaholism, therefore, has cognitive and behavioural components. The cognitive component is present when a person thinks persistently about his or her work and work compulsively. The behavioural component, on the other hand, is manifested where a person has a strong inner drive to work hard (McMillan, et. al., 2003).

***Burnout as an occupational psychological ill-being condition***

Burnout is a critical issue in the psychological literature and has been found to correlate with many important organizational constructs such as turnover intentions, job satisfaction, and organizational commitment (Alarcon, 2011). Burnout can be described as a prolonged reaction or response to chronic emotions, interpersonal and work stressors, exhaustion of physical or emotional strength or motivation usually because of prolonged stress or frustration (Maslach et al., 2001). The authors further classified burnout to include the dimensions of inefficacy, cynicism, and exhaustion; these could lead to a lack of interest in the work context. Burnout as a syndrome of occupational psychological ill-being emerges when workers are exposed to working conditions and environments that are stressful. Low work resources and high demands of work are some of the causes of workers' burnout (Demerouti et. al., 2001). Also, Colman (2003) also stated that burnout is an acute stress reaction that is characterized by exhaustion resulting from overwork. The author stated further that symptoms of burnout include anxiety, fatigue, insomnia, depression, and impairment in work performance.

Workers experiencing burnout can also be associated with work displeasure and low levels of work activation or motivation (O'Donoghue et. al., 2016). Emotional exhaustion, which is a characteristic of burnout, is a psychological state with the victims lacking motivation or energy to work (Demerouti, et. al., 2010). Maslach et. al., (2001) also stated that emotional exhaustion is the central element in the process of burnout. Burnout is not a disease, but if it is intense and goes on for some time without proper management, it can lead to mental and physical ill-health. Anxiety and sleep disorders are found to be linked with construction

workers experiencing burnout, and these could indirectly affect the overall success of the construction project (Leung et. al., 2012).

#### 4.1.4 Previous studies on psychological health conditions in the construction industry

The previous researchers had explored various psychological health conditions among construction employees, with occupational stress identified as the predominant condition that have been studied in the construction industry. Table 4.1 presents the psychological conditions that were explored in the studies reviewed.

**Table 4.1: Psychological health conditions studied by previous researchers**

Ref.	Psychological health conditions identified	Sources	No. of studies
1.	Occupational Stress	Chakraborty, et. al., 2018; Jebelli, et. al., 2018; Langdon and Sawang, 2018; Liang, et. al., 2018; Chen, et. al., 2017; Jepson, et. al., 2017; Kamardeen and Sunindijo, 2017; Senaratne and Rasagopalasingam, 2017; Sunindijo and Kamardeen, 2017; Wang, et. al., 2017; Yang, et. al., 2017; Chan, et. al., 2016; Cattell, et. al., 2016; Leung, et. al., 2016a; Leung, et. al., 2016b; Leung, et. al., 2015; Wentz, 2015; Xiong, et. al., 2015; Bowen, et. al., 2014a; Bowen, et. al., 2014b; Bowen, et. al., 2014c; Bowen, et. al., 2014d	22
2.	Psycho-Physical Health (example; fatigue during work, migraines/ headaches, sleep disorder)	Sommovigo, et. al., 2019; Leung, et. al., 2017; Shan, et. al., 2017; Yang, et. al., 2017; Chan, et. al., 2016; Gatti, et. al., 2014; Bowen, et. al., 2014a; Bowen, et. al., 2014b	8
3.	Job satisfaction	Çelik and Oral, 2019; Lian, 2018; Shan, et. al., 2017; Panahi, et. al., 2016; Reza, et. al., 2014; Bowen, et. al., 2014a; Bowen, et. al., 2014b	7
4.	Depression	Langdon and Sawang, 2018; Kamardeen and Sunindijo, 2017; Sunindijo and Kamardeen, 2017; Wang, et. al., 2017; Leung, et. al., 2017; Bowen, et. al., 2014a; Bowen, et. al., 2014b	7
5.	Workers' Emotions (Frustration)	Chih, et. al., 2017; Leung, et. al., 2017; Wang, et. al., 2017; Chan, et. al., 2016; Xiong, et. al., 2015; Bowen, et. al., 2014c	6
6.	Anxiety	Langdon and Sawang, 2018; Kamardeen and Sunindijo, 2017; Sunindijo and Kamardeen, 2017; Wang, et. al., 2017; Leung, et. al., 2017	5
7.	Job Burnout	Yang, et. al., 2017; Enshassi, et. al., 2016; Enshassi, et. al., 2015	3

8.	Physical Conditions; Musculoskeletal Disorders	Chakraborty, et. al., 2018; Senaratne and Rasagopalasingam, 2017	2
9.	Happiness	Al Jassmi, et. al., 2019	1
10.	Health and Wellbeing	Kurtzer, et. al., 2018	1
11.	Obsessive-Compulsive Disorders (OCD),	Wang, et. al., 2017	1
12.	Substance Use Disorders (SUD),	Wang, et. al., 2017	1
13.	Acrophobia,	Wang, et. al., 2017	1
14.	Claustrophobia	Wang, et. al., 2017	1

Chakraborty, et. al., (2018) conducted a study on occupational stress, factors in the prevalence of musculoskeletal disorders and their impact on the quality of life of construction workers. It was revealed in their study that workers in the construction sector work for more hours and as a result, are exposed to stress and musculoskeletal discomfort (Chakraborty, et. al., 2018). In another independent study by Sunindijo and Kamardeen, (2017) on gender disparities in exposure to stressors and the extent of work-related psychological injuries, it was revealed that the level of exposure to anxiety and acute stress symptoms among female professionals exceeds that of the males. This could be attributed to the fact that females suffer from discrimination, bullying and sexual harassment in the construction industry (Sunindijo and Kamardeen, 2017).

Jebelli, et. al., (2018) proposed a procedure to automatically recognize workers' stress in construction sites using EEG signals. Specifically, the researchers collected construction field workers' EEG signals and pre-processed them to capture high-quality signals. Workers' salivary cortisol, a stress hormone, was also collected to label low or high-stress levels when they work at sites. Time and frequency domain features from EEG signals were calculated using fixed and sliding windowing approaches. Finally, the authors applied several supervised learning algorithms to recognize workers' stress while they are working at sites. The results showed that the fixed windowing approach and the Gaussian Support Vector Machine (SVM) are important frameworks in reducing stress among employees. Besides, proposed field stress

recognition procedure remains important for timely identification of employees' stress to improve their safety, health, wellbeing, and productivity (Jebelli, et. al., 2018).

Leung, et. al., (2015) examined and compared the stress levels and the job demand, control, and support experienced by construction professionals (CPs) in South Africa (SA) and Hong Kong (HK). The results showed that job demand significantly affect the stress levels of the construction workers in South Africa and Hong Kong. The study again revealed that whereas job support is significantly associated with stress for construction professionals in Hong Kong, it was otherwise for those in South Africa. Practical recommendations are provided for managers and organizations in both countries to address the problems of stress among CPs, including organizing social gatherings, job reallocation, and the implementation of fair compensation policies (Leung, et. al., (2015). Xiong, et. al., (2015) conducted a study to explore and validate the internal dimensions of occupational stress. In their study psychology perceived stress questionnaire (PSQ) was used to measure occupational stress, resulting in the identification of one stressor, demand, and three sub-dimensional emotional reactions in terms of worry, tension and joy. The main finding was that lack of joy has the sole significant effect on the construction employees (Xiong, et. al., (2015).

Lian, (2018) investigated the job satisfaction level of quantity surveyors and identified the personal characteristics that influence their job satisfaction. It was revealed that quantity surveyors have a greater passion for their job however, factors such as workload, the number of work hours, and poor work-life balance practices significantly reduce their job satisfaction. Other demographic and socio-economic factors such as marital status, age, work experience increase the level of job dissatisfaction among quantity surveyors. Specifically, quantity surveyors who are married, older, and have more work experience are more likely to be dissatisfied with their job (Lian, 2018). Reza, et. al., (2014) sought to ascertain the major aspects of job satisfaction for South Australian construction workers including the main

ramifications of job satisfaction in the working environment. The results revealed that age-related factors (chronological age, organizational age, and length of service) are significantly likely to impact on key dimensions of job satisfaction among construction workers in the South Australian context (Reza et. al., 2014).

Wang, et. al., (2017) conducted a study to identify different types of psychological disorders in construction projects and to develop a fuzzy mapping to determine the impact of psychological disorders in the context of time, cost, and quality in construction management. Through a questionnaire survey assisted by pair-wise comparison among experienced construction personnel, the six most common psychological disorders, including depression, generalized anxiety disorders (GAD), obsessive-compulsive disorders (OCD), substance use disorders (SUD), acrophobia, and claustrophobia, were analyzed using principal component analysis (PCA), partial least-square (PLS) tests, and fuzzy analytic hierarchy process (fuzzy-AHP), and followed by visualization. Their study revealed that although various stressors such as work overload, role ambiguity and conflict, unpaid overtime, restrictive career progression, and the diverse range of personalities were common in construction management, different roles and positions were subjected to different levels of stress. (Wang, et. al., 2017).

#### **4.1.5 Research Materials on Symptoms of psychological health conditions**

The World Health Organization (WHO) (2005), advocated that an individual's psychological health condition should be assessed based on the complete mental, physical and social well-being of the person, and not merely the absence of a particular condition, disease or infirmity. Adverse occupational psychological health conditions such as workaholism and burnout can lead to impaired well-being like fatigue, chronic tension, sleep problems, and other physical diseases (Russell, 2003; O'Donoghue, et. al., 2016). Indicators of adverse psychological health conditions can be grouped under physical, emotional, behavioural, and cognitive symptoms (Ademola, 2005).



Many types of physical ailments have been linked with adverse psychological health conditions such as high blood pressure, heart attack, heart disease, peptic ulcer, headache, pain in the neck, asthma, and cancer (Mehta and Chaudhary, 2005). Some physical and emotional indicators of adverse occupational psychological health conditions also include gastrointestinal disorders, migraine, skin problems, diabetes, hypertension, ulcers, infectious diseases, headaches, chest pain, back pain, anxiety, boredom, trembling, low self-esteem, forgetfulness, depression, anger, apathy, worry, and fatigue (Magotra, 2016; Enshassi, et. al., 2016). Employees may also show behavioural deviations of adverse psychological health conditions such as overeating, loss of appetite, excessive smoking, alcohol abuse, sleeping disorders, emotional outbursts, violence and aggressive behaviours (Quick, et. al., 2013; Ademola, 2005).

A total of 48 items were identified from the extensive literature review of previous studies to assess the psychological health status of the construction professionals and construction trade workers (Leung, et. al., 2017; Enshassi, et. al, 2016; O'Donoghue, et. al., 2016; Magotra, 2016; Quick and Henderson, 2016; Bowen, et. al., 2014; Ademola, 2005; Mehta and Chaudhary, 2005; Russell, 2003). These symptoms were designed from occupational psychological health-related measures such as Physiological measures, Behavioural measures, Maslach Burnout Inventory, Daily Log of Stress-Related Symptoms, Cornell Medical Index and Profile of Mood States. The 48 symptoms identified were grouped under four major constructs of psychological health symptoms, namely: physical symptoms, emotional symptoms, cognitive symptoms, and behavioural symptoms, using thematic analysis. These four major constructs were analysed to determine the inter-item consistency and reliability of the manual grouping. The measures used to assess whether the research participants were experiencing psychological well-being or ill-being condition, as shown in Table 4.2.

**Table 4.2 Measures on symptoms of psychological health condition identified from extensive literature reviews**

Label	Symptoms of psychological health condition
<b><i>Construct 1: Physical Symptoms</i></b>	
S1	Physically exhausted/ Worn-out/ Tired
S2	Muscular tension/aches
S3	Feeling nauseous/ stomachache/ diarrhoea/ indigestion
S4	Chest pain
S5	Increased rate of heartbeat
S6	Shallow or rapid breathing
S7	Lower Back Pain
S8	Chronic Headaches
S9	Skin Problems
S10	Blood in Urine or Urinate frequently
S11	Insomnia/ difficulty sleeping
<b><i>Construct 2: Emotional Symptoms</i></b>	
S12	Tensed/ Stressed
S13	Difficulty relaxing
S14	Worried
S15	Irritable
S16	Sad/ Depressed
S17	Emotionally exhausted
S18	Numbness
S19	Discouraged
S20	Anxious
S21	Frustration
S22	Mood swings
S23	Bitterness
S24	Rage
S25	Resentment
S26	Crying for no particular reason
S27	Palpitations/ perspiration/ sweaty hands
S28	Trembling/ Nervous ticks/ Butterflies in Stomach
<b><i>Construct 3: Cognitive Symptoms</i></b>	
S29	Hard to concentrate
S30	Difficult to think clearly, make decisions or remember things
S31	Addiction to ungodly habits
S32	Increase addiction of smoking, alcohol, and use of drugs
S33	Accident- prone
S34	Problems with speaking
S35	Brood on previous harm or insults
S36	Magnify issues such as injury and hurt
S37	Exaggerate unfairness
<b><i>Construct 4: Behavioural Symptoms</i></b>	
S38	Impulsive behaviour
S39	Poor self-care
S40	Grinding of teeth

S41	Social isolation and withdrawal
S42	Laughing or speaking in high pitch
S43	Label or blame others for our problems
S44	Have conflict with others
S45	Yells at people
S46	Hostile to people
S47	Gives sarcastic comments
S48	Physically aggressive

*Source: Leung, et. al., 2017; Enshassi, et. al, 2016; O'Donoghue, et. al., 2016; Magotra, 2016; Quick and Henderson, 2016; Bowen, et. al., 2014; Ademola, 2005; Mehta and Chaudhary, 2005; Russell, 2003.*

This study sought to conduct an empirical investigation to trace the determinants or symptoms of psychological health conditions among construction employees in a developing country, specifically Ghana. The hypothesis to be tested assumed there is no statistically significant difference between the mean scores of the determinants of psychological health conditions obtained from the construction professionals and construction trade workers.

## **4.2 Exploring personal factors that might influence the vulnerability of construction employees to occupational psychological disorders.<sup>3</sup>**

### **4.2.1 Introduction**

Psychology in the workplace stretches beyond the boundaries of the physical settings of the workplace (Landy and Conte, 2016). Previous researchers revealed that psychological health conditions of employees such as stress, depression, anxiety, and frustration are influenced not only by exogenous events and factors that emanate from the workplace (O'Donoghue, et. al., 2016). Factors that cannot be found in the work setting also influence employees' behaviours and psychological health conditions (Landy and Conte, 2016). These factors may include cultural, environmental influences, personality, family background, relationship responsibilities, employment related requirements and non-working events (Ashkanasy and Daus, 2002; Landy and Conte, 2016). Other endogenous factors such as employees' perception or core beliefs also arouse the circumstances which lead to an individual's experiences of psychological health conditions (O'Donoghue, et. al., 2016; Ashkanasy and Daus, 2002). It was revealed in a study by Mäkikangas et. al. (2015) that, there is a positive relationship between personal factors of employees such as self-esteem and their occupational psychological health, specifically burnout and work engagement. Earlier research by Leung et. al. (2008) also established some link between individual characteristics such as Type A and Type B behaviours of some construction personnel and their occupational psychological health such as stress, with relative effect on their work performance.

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<sup>3</sup> Some contents of section 4.2 of this Chapter have been published in: Fordjour, G. A., Chan, A. P. C. and Amoah, P. (2019). "Exploring Personal Factors That Might Influence the Vulnerability of Construction Employees to Occupational Psychological Disorders". *Health*, 11, 546-566.

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Personal factors of employees such as self-esteem, productive core beliefs, time management skills, and good relationship with other employees could to some extent mitigate the causes and mediate the effects of psychological disorders (O'Donoghue, et. al., 2016; Landy and Conte, 2016). The concept of personal factors fit in occupational psychology and researchers have suggested that for the least circumstances of psychological disorders, there is a need for a balance between personal characteristics and organizational factors (Leung et. al., 2008). Personal factors are, however, remarkable intervening variables in the occupational psychological equation; this is because what may be overtaxing to one person may be exhilarating to another (Quick, et. al., 2013). Typical construction work, for instance, involves several people from different backgrounds with diverse personality, coming together to form a working team. Personal strengths and vulnerabilities of the construction employees are significant to their experiences of psychological health conditions (Leung et. al., 2008). There is little research attention on the influence of personal factors on the psychological health of employees in the construction industry.

#### **4.2.2 Literature review on personal-related factors of psychological health conditions**

Potential causes of psychological health conditions of construction employees which emanates from their construction work could include abusive and overdemanding supervisors, tight deadline pressures, limited time for relaxation and poor working conditions (O'Donoghue, et. al., 2016; Leung et. al., 2008; Leung and Chan, 2012). The psychological risk factors which could emanate from the construction workplace have been categorized into high task demands, high role demands, poor organizational factors and poor working relationships (Leung and Chan, 2012). These work factors could lead to the triggering of psychophysical response or reaction by the construction employees and hence could affect the employees' psychological well-being and health (Landy and Conte, 2016). The effects of these construction work-related psychological health risk factors have both individual and

organizational consequences (Rivkin, et. al., 2015).

The individual consequences of psychological disorders on construction employees could be manifested in various forms of behavioural, physiological and emotional symptoms (Landy and Conte, 2016; Ashkanasy and Daus, 2002). For instance, employees in the construction industry who are extremely competitive and task-burdened would be likely to be subjected to occupational psychological disorders of workaholism and burnout, with associated symptoms such as emotional distress and other physical health problems (Quick, et. al., 2013). Construction employees specifically construction professionals or project team members (such as Architects, Quantity Surveyors, and Engineers) and construction trade workers (such as carpenters, masons and plumbers) are considered generally as vital resources for the success of every construction project (Rivkin, et. al., 2015; Leung and Chan, 2012). The psychological health conditions of construction employees could lead to both direct and indirect cost consequences on the construction industry such as low productivity, poor job performance and increase in medical costs (Leung et. al., 2008; Rivkin, et. al., 2015).

Positive personal factors could serve as modifiers in terms of psychological appraisal, modulators of individual responses to psychological risk exposures and moderators of the consequences of one's reactions to the effects of psychological disorders (Quick, et. al., 2013; Leung et. al., 2008). Personal factors are among the antecedents of psychological issues such as stress, which is typical among employees in the construction industry (Leung and Chan, 2012). Coping with the construction work related factors that are triggers of employees' psychological health conditions would, therefore, necessitate positive individual personal factors of the construction employees such as good attitude, positive perception and lifestyle, as their efforts to deal with or manage the triggers and/or effects of the psychological disorders (Leung and Chan, 2012; O'Donoghue, et. al., 2016).

Individual responses to psychological risk exposures may vary greatly with immediate or long-term consequences of their reactions (Landy and Conte, 2016). The variance in responses to psychological triggers is often influenced by individual personal factors (Leung et. al., 2008). Each construction personnel have a distinctive personal characteristic, which indicates their level of resistance to psychological disorders (Leung and Chan, 2012). The individual employees' characteristics join to further murky the nature of their psychological health condition.

Differences in personal factors put individual employees at a lesser or greater risk of experiencing occupational psychological disorders (Greenberg, 2013). The personal factors of an employee may, therefore, in part affect the frequency of exposure to conditions that are unfavourable to the psychological health condition of that individual, but more importantly, may modify the severity of experience associated with such conditions (Afshar, et. al., 2015; Blaxton and Bergeman, 2017). Individual differences can be seen in the level of a person's desire to succeed and achieve results, a person's ability to cope with his or her need for urgency, how much one feels able to influence and control events, the extent to which one plans and manages his or her time to deal with problems (Glenn, 2001; Greenberg, 2013). Researchers have suggested that a person's degree of vulnerability, extroversion, compulsiveness, and belief in his or her abilities to respond to difficult or novel situations and possible stressors might influence his or her level of psychological health condition (Steinberg, et. al., 2017).

A six-dimensional personal factors model associated with psychological health conditions has been advocated by previous researchers to include: self-acceptance, environmental mastery, autonomy, positive relations with others, personal growth and purpose in life (Horn, et. al., 2004; Plopa, et. al., 2017). In addition, Quick, et. al. (2013) revealed personal factors such as demographic characteristics, internal capabilities, personality traits, attitudes and behaviours as factors influencing employees' psychological health conditions.

Bono and Judge (2003) also indicated in their study that, core personal factors associated with individuals' psychological health conditions are: self-esteem, neuroticism, locus of control and generalized self-efficacy. Notwithstanding, high levels of a psychological risk factor can overwhelm relatively high levels of individual capacity resulting in negative consequences of psychological disorders (Leung, et. al., 2008). Personal factors can also be influenced by several other factors, including the events that took place before the person attained a full-time job (Landy and Conte, 2016). Personal factors could, therefore, predispose employees to either lesser or greater risk of psychological disorders (Greenberg, 2013).

#### **4.2.2.1 Previous findings on personal factors associated with employees' psychological health condition**

A research study by Martinko et. al. (2013) indicated that differences in peoples' characteristics influence their reactions and perceptions to occupational psychological issues. A study conducted by Mäkikangas et. al. (2015) also revealed that personal-related factors such as self-esteem, locus of control and neuroticism, have a relationship with employees' occupational psychological disorders such as burnout and workaholism. In addition, O'Donoghue et. al. (2016) advocated that employees who have positive core self-esteem, positive beliefs, low pessimism, low neuroticism, strong personal worth and sense of control over their own life and events, are less likely to experience occupational psychological disorders. Intrinsic personal factors such self-esteem, personality trait, core beliefs, self-evaluation on performance, and demographic factors such as age, educational level, and marital status were considered as possible predictive variables of the personal intervening factors associated with psychological health (Quick, et. al., 2013). Work attitudes such as relationship with others and time management skills among construction employees.

This research study seeks to add to the study of personal psychology in the workplace by exploring the factors grouped under intrinsic personal factors, lifestyle choices, general health



status, and job attitudes.

### **Construct 1: Intrinsic personal factors**

#### ***Self – esteem***

Self- esteem is characterized by ones' self- acceptance and environmental mastery (O'Donoghue, et. al., 2016). That is, a person with self-esteem has self-acceptance and is exhibited by one's positive evaluation of his or her past (Quick, et. al., 2013). Environmental mastery is also depicted by one's capacity to effectively manage his or her life and events (Horn, et. al., 2004). Tims et. al. (2011) in their study established a relationship between self-esteem and psychological well-being indicators such as work engagement. The researchers stated that to improve work engagement, leaders of an organization should enhance and optimize the employee's personal resources, specifically self-esteem (Tims, et. al., 2011). Burnout, one of the occupational psychological ill-being indicators, has also been seen to be moderately influenced by a person's locus of control, this depicts positive self-esteem (French, 2005).

Previous research works advocated that there is the need for people to see themselves as unique and differing in various aspects from others, as no two persons are the same (Schyns and Day, 2010). Social acceptance is one of the basic needs of all humans, as this could influence a person's psychological well-being. It is worth noting that, individual's attitude, likings, disliking, perceptions, opinions, and mindset, could be different from person to person, even though they might be exposed to similar situations (Masood, 2013). These differences should not affect how people regard themselves as good or bad.

#### ***Personality traits***

The qualities and characteristics of a person can influence how they cope with their life experiences, with effects on their psychological health conditions (O'Donoghue, et. al., 2016).

Employees' individual behaviours form their personality traits, which influences their psychological health. The individual behaviours can be grouped under Type A and Type B behaviours (Glenn, 2001). Evidence shows that Type A persons are more likely to experience psychological disorders than Type B individuals (Sogaard, et. al., 2008). People with Type A behaviours are characterized by impulsiveness, aggressiveness, hostility, time-driven attitudes and difficulty relaxing. The Type B personality, on the other side, is more placid and easy going (Leung and Chan, 2012). Earlier research conducted by Anderzen and Arnetz (1997), however, indicated that Type A behaviour has limited impact on the psychological health conditions of employees. This statement was contradicted by Lee and Sukoco (2008), who reported that personal factors such as Type A behaviours are significant to employee's psychological health and well-being.

A person's level of neuroticism and or self- efficacy have also been revealed to be significant predictors, that predisposes employees to psychological health conditions (Leung, et. al., 2008). Self-efficacy is the belief in one's ability to handle novel and challenging situations (O'Donoghue, et. al., 2016). Neuroticism, on the other hand, is a person's degree of vulnerability or sensitivity to criticism (Bono and Judge, 2003). Persons with high levels of self-efficacy are hypothesized to be more effective in dealing with difficulties and are more persistence in facing challenges (Shoji, et. al., 2016). Individuals who are highly neurotic, on the other hand, often interpret life situations and encounters as damaging or threatening (Vollrath, 2001). According to Abbot, et. al. (2008), personality factors such as extraversion, openness, neuroticism are the significant variable behaviours, accounting for an individual's psychological well-being or ill-being conditions. Personality cognitive traits fall within the boundary of the theory of conservation of resources (COR) and have relevance in workplace issues (Hobfoll, 2002; Avey, et. al., 2010). These personality cognitive traits include optimism, autonomy, efficacy, hope, and resilience (Avey, et. al., 2010). Optimism is a personality trait,

which depicts persons who have a positive outlook of their life events and situations (Vollrath, 2001). An optimistic individual considers the sources of good or positive events as universal and permanent, while a pessimistic individual attribute the source as temporary and situation specific (Luthans, et. al., 2007). Autonomy refers to having the ability to do what one chooses, think and or act in certain ways and ones' ability to resist pressures from external sources (Horn, et. al., 2004). Resilience can be found in individuals who perceive their life to be meaningful (O'Donoghue, et. al., 2016). People who are resilient usually can 'bounce back' from life adversities and have high capacities for adaptation and improvisation (Luthans, et. al., 2007). These personality traits in effect influence the employees' level of job satisfaction and work performance (Bono and Judge, 2003).

### ***Productive core beliefs***

The core beliefs a person hold dearly could influence their psychological ill-being and well-being conditions (O'Donoghue, et. al., 2016). Every employee has different causational factors and breaking points when it comes to life stressors (Xanthopoulou, et. al., 2013). One's conviction about his or her abilities to mobilize cognitive resources or course of action needed to successfully execute a given task, reflects a person's core beliefs (Avey, et. al., 2010). Thus, personal beliefs could lead to psychological ill-being conditions such as burnout (Sheeran, et. al., 2016). A person's belief affects their ability to deal psychologically with problems and cope with environmental conditions (Luthans, et. al., 2007). This personal belief also has effects on a person's level of success in all aspects of life (Horn, et. al., 2004).

### ***Self- concept evaluation on performance***

It is a fundamental requirement to determine the core-self evaluations that individuals regard about themselves, as these subconsciously influence a person's behaviours, perceptions and psychological health (Bono and Judge, 2003). Persons with high good self- concept

evaluation are more resilient to face any challenges been thrown at them (Judge, et. al., 2006). That is, the perceptions employees have about themselves can shape their psychological well-being (Weiss and Rupp, 2011). Positive appraisal of all aspects of one's self and job influences their motivational, cognitive, behavioural, affective and psychosomatic dimensions; these enhance their occupational psychological well-being and health (Horn, et. al., 2004).

A study by Van Beek et. al. (2012) advocated that employees who perceive themselves as not performing well at their jobs could be experiencing psychological ill-being symptoms such as workaholism, burnout, anxiety, and depression. It was also confirmed in a study by Aryee et. al. (2012) that, the performance-related outcomes of employees, can affect their psychological health. Earlier research findings by Spence and Robbins (1992) revealed that people drive themselves hard to achieve the personal goals they set for themselves such as: acquiring status, admiration from peers and approval from people such as work superiors. The researchers stated, however that, if people demonstrate low self-concept evaluation of their perceived performance on these life achievements, this could lead to them experiencing psychological ill-being conditions. Individuals with high positive self- concept evaluation of their mental functionality and creativity, have psychological well-being indicators such as job satisfaction and work engagement (Zhang, et. al., 2014).

### ***Demographic factors***

Many researchers have conducted studies to investigate the relationship between demographic factors (such as age, gender, marital status, education level, and working experience) and the risks of occupational psychological disorders (such as job burnout) (Yang, et. al., 2017). Previous studies by Chaoping and Kan (2003); Erickson and Grove (2007) and Johnson et. al. (2013) revealed that persons younger than 40 years of age are more likely to suffer from the risks of occupational psychological disorders than their older counterparts. However, similar studies conducted by Cheng et. al. (2013) and Ahola et. al. (2008) advocated

that there is no correlation between age and the psychological risk factors. Other researchers like Brewer and Shapard (2004) also revealed that there is a small negative correlation in the relationships adding that persons are able to develop psychological coping skills as they age.

The education level of employees could impact their technical knowledge and management capabilities (Yang, et. al., 2017). Some previous researchers like Du et. al. (2015) and Rashkovits and Livne (2013) have argued that highly educated individuals are more rational when facing occupational psychological conditions. That is the higher one's educational level, the better one's ability to master effective ways of coping with the risks of psychological conditions to reduce its likelihood (Rashkovits and Livne, 2013; Du, et. al., 2015). Also, Mohammadpoorasl et. al. (2012) and Maslach et. al. (2001) revealed that there is a positive relationship between one's personal achievements such as marital status and the risk of psychological disorders. Thus, the expectations and responsibilities of these persons will be more difficult to meet, thereby increasing the likelihood of psychological disorders (Mohammadpoorasl, et. al., 2012; Maslach, et. al., 2001). This study sought to investigate the relationship between the demographic factors of age, educational level and marital status with personal intervening psychological risk factors.

### **Construct 2: Lifestyle Choices**

Lifestyle choices can be directly linked with psychological health conditions such as anxiety, depression, Attention deficit hyperactivity disorder (ADHD), and more (Fried, 2017; Garipey, et. al., 2010). The consequences of a poor lifestyle of employees can have both direct and indirect cost to the organisation, such as sick leave and poor employee morale (Hassard, et. al., 2018). Lifestyle as a construct of potential predictors of psychological disorders was based on seven factors, namely: exercise, sleep pattern, eating habits, weight management, substance abuse, alcohol intake, and changes in behaviour.

### ***Lack of Exercise***

Regular exercise has been proven to have a profound positive impact on psychological health conditions such as depression, anxiety, stress, and the likes (Field, 2012). A 30-minute exercise with moderate intensity, such as walking briskly three days a week is sufficient for ones' psychological well-being (Alhalel, et. al., 2018). Regular exercise can also boost overall mood, improve memory, relieve stress and help a person sleep better (Den Heijer, et. al., 2017). Physical exercise, therefore, has both psychological and cognitive effects with associated benefits such as a decrease in stress hormones and increase in anti-depression and anti-pain neurotransmitters (Field, 2012; Den Heijer, et. al., 2017). Employees who hardly exercise can be predicted to be in a negative state of occupational psychology, as they could be more prone to the conditions of stress, depression and anxiety (Knapen, et. al., 2015; Alhalel, et. al., 2018).

### ***Poor Eating Habits***

Previous studies have revealed that good eating habit is as essential to ones' psychological well-being as it is to one's general health (El Ansari, et. al., 2014; Lorem, et. al., 2017). A healthy, balanced diet includes healthy amounts of protein, essential fats, complex carbohydrates, vitamins, minerals, and water (Huppert, 2009). The foods we eat can influence the development, management, and prevention of many psychological conditions such as depression, anxiety and Alzheimer's disease (El Ansari, et. al., 2014). Poor eating habits can be a risk factor for psychological conditions, as nutrition is a crucial factor in influencing one's feelings (Huppert, 2009). A study by Oellingrath, et. al., (2014) also revealed that a diverse diet rich in unrefined plant foods, fish and regular meals were associated with better psychological health, while high-energy, low-nutrient diets and irregular meals were associated with poorer psychological health. A nutritious meal, therefore, is not only beneficial for the body but the psychological health (El Ansari, et. al., 2014).

### ***Underweight or Overweight***

Excess or lower body weight can be linked with psychological disorders which can further lead to higher risks of the development of a variety of chronic diseases (Knapen, et. al., 2015). Numerous researches have shown that common mental health problems, such as depression, anxiety, and stress, are associated with obesity or underweight (Alhalel, et. al., 2018; Lorem, et. al., 2017). Aside the negative effects of obesity or lower body weight on health and quality of life, obese and underweight individuals are often prevalent to stigma and weight-related discrimination which can be deeply distressing (Garipey, et. al., 2010; Alhalel, et. al., 2018). Obesity or underweight is, therefore, a major health risk with psychological implications that should not be overlooked (Lorem, et. al., 2017).

A study by Zhao, et. al. (2009) revealed that the prevalence of psychological disorders such as stress, depression and anxiety were significantly lower in both men and women with a normal Body Mass Index (BMI) between the range of 18.5 to 25 kg/m<sup>2</sup> as compared to persons who were either obese with BMI over 30 kg/m<sup>2</sup>, overweight with BMI of 25 to 30 kg/m<sup>2</sup> or underweight with BMI less than 18.5 kg/m<sup>2</sup>. Persons with higher BMI of more than 30 kg/m<sup>2</sup> or lower BMI of less than 18.5 kg/m<sup>2</sup> are, therefore, significantly more likely to have current depression or lifetime diagnosed anxiety and depression (Zhao, et. al., 2009).

### ***Alcohol Intake***

Alcohol consumption undoubtedly has an effect on the key biological systems of the physical and mental health of the consumer (Sterling, et. al., 2011). Alcohol is known to interfere with the communication channels of the brain and act as a depressant of the central nervous system (Wang, et. al., 2010). Some of the effects people who drink alcohol experience are: altered language, dull thinking, slowed reaction time, muted hearing, impaired vision, weakened muscles, and misty memory (Sterling, et. al., 2011; Lewis, 2017). In the long term, the effect of alcohol can lead to damage of the brain tissue (Wang, et. al., 2010). Persons who

drink alcohol are likely to be exposed to psychological disorders as their mood and behaviour changes, making it harder for them to think clearly and to coordinate (Hjorthøj, et. al., 2015).

The extent to which a person is affected by alcohol usually depends on how much and how quickly a person drinks (Sterling, et. al., 2011). Persons who drink a lot are particularly vulnerable, and alcohol is influential in a number of ailments, including anxiety, depression, psychotic disorders and suicide (Hjorthøj, et. al., 2015). Alcohol addiction also delays recovery from critical medical conditions (Lewis, 2017).

### ***Substance Abuse***

When any form of substance such as drugs or pills enter the brain, they change how the brain does its work, and these changes can lead to dependency (Barnett, et. al., 2018). Abusing drugs or other substance can affect the functionality of brain circuits, as it impedes the brain circuits and interferes with other bodily functions (Heinbockel and Csoka, 2018). People usually take a certain substance because they like the way they feel afterwards (Lewis, 2017). An employee who is addicted to drugs or other forms of substance usually cannot resist the urge to use them, no matter how much harm the substance can do (Koob and Volkow, 2016). The person loses self-control on how often to use the substance, and this can lead to harmful behaviours (Bender, et. al., 2015; Barnett, et. al., 2018). Over time, the drugs or substance change the way the brain works, as chemicals invade the brain and begin to alter the chemical composition of the brain (Heinbockel and Csoka, 2018; Lewis, 2017). Addiction is thus a disease that affects one's brain and behaviour, leading to psychological disorders such as anxiety, depression, dysphoria and irritability (Bender, et. al., 2015; Koob and Volkow, 2016).

### ***Poor Sleep Pattern***

Sleep deprivation affects a person's physical and mental health (Eugene and Masiak, 2015). Poor sleep is proven to be linked with physical conditions such as a weakened immune



system and mental health conditions such as stress and depression (Scott, et. al., 2017; Eugene and Masiak, 2015). People who have insomnia or other sleep disorders are usually vulnerable to psychological ill-being conditions (Kecklund and Axelsson, 2016). Sleep disorders are, therefore, common in patients with anxiety, depression, bipolar disorder, and attention deficit hyperactivity disorder (ADHD) (Scott, et. al., 2017). Some effects of insufficient sleep on employees can be difficulty relaxing, accident-prone, poor self-care, and difficult to think clearly, make decisions or remember things (Kecklund and Axelsson, 2016; Eugene and Masiak, 2015).

### ***Changes in Behaviour***

Attitude or behaviour is considered by psychologists as a person's mental tendency to react in a certain manner, be it favourable or unfavourable, towards a certain aspect of reality (Faghhi and Allameh, 2012). Psychological distress can result in sudden changes in employees' behaviour, leading to unhealthy habits such as isolation, increase addiction to smoking and alcohol intake (Hjorthøj, et. al., 2015). Behaviour changes can also result from depersonalization or dehumanization (Sydney-Agbor, et. al., 2014). Antisocial or withdrawal from social activities is usually the common behaviour indicator of psychological distress, which can destroy the person's relationships with co-workers, friends, family, or even strangers (Faghhi and Allameh, 2012; Fonzo, et. al, 2015). Diminished personal accomplishment or excessive negative evaluations of oneself can give rise to insensitive behaviours of the person toward others (Sydney-Agbor, et. al., 2014). Some of the behaviour changes depicting an employee is experiencing psychological health conditions also include neglecting or procrastinating responsibilities, workplace or domestic violence, overreaction, increased arguments, impulsive behaviours, sleeping too little or too much and eating disorders (Fonzo, et. al, 2015; Faghhi and Allameh, 2012).

### **Construct 3: General Health Status**

Previous researchers revealed that psychological distress can be manifested in the physical health of the employee, with associated symptoms such as chest pain, chronic fatigue, weakness, aches or pains, muscular tension, dizziness, diarrhoea or constipation, nausea, breathlessness, rapid heartbeats, weight gain or loss, frequent colds, sweaty palms, tiredness, loss of sex drive, jaw clenching or teeth grinding (Magotra, 2016; Enshassi, et. al., 2016; Fried, 2017). Physiological health conditions as a construct of potential predictors of psychological distress of employees were based on four factors, namely: cardiovascular diseases, musculoskeletal disorders, general health, and medical history.

#### ***Cardiovascular diseases***

A heart problem could lead to psychological distress such as anxiety and depression (Chauvet-Gelinier and Bonin, 2017). Some symptoms of cardiovascular diseases include chest tightness, increased rate of heartbeat, palpitations, shortness of breath, shallow and rapid breathing, these can also be linked to psychological distress (Chaddha, et. al., 2016; Chauvet-Gelinier and Bonin, 2017). The relationship between cardiovascular disease and depression or anxiety is bidirectional, that is depression, and anxiety can increase the risk of cardiovascular diseases (Bai, et. al., 2016). Cardiovascular diseases can also increase the patient's risk of developing depression and anxiety disorders, and both can lead to a worse outcome (Chauvet-Gelinier and Bonin, 2017). Other studies also revealed that the prevalence of depression in persons with cardiovascular diseases is three times higher than in the general population (Moran, et. al., 2014; Chaddha, et. al., 2016).

Other studies also advocated that the risks of developing new or worsening cardiovascular diseases, that is increased complications or hospitalization and death from cardiovascular disease is increased by approximately 80% in adults with depression with or without a previous cardiovascular disease (Sutcliffe, et. al., 2013). The most common fears of

persons with cardiovascular diseases are heart attacks, strokes or cardiac arrest, especially in people who already experienced one and fear of dying (Chauvet-Gelinier and Bonin, 2017). The feelings and emotions of the patient can be greatly affected; there is, therefore, a direct link between psychological distress and cardiovascular disease (Sutcliffe, et. al., 2013).

### ***Musculoskeletal disorders***

Musculoskeletal disorder or back pain is among the major causes of disability in the working population (Vargas-Prada and Coggon, 2015). Back pain, chronic complaints, back problems, muscle aches, and joint complaints are very common musculoskeletal disorders among the workforce (Jacobsen, et. al., 2013; Antwi-Afari, et. al., 2017). Physical work requirements such as compulsory posture, lifting, repetitive movements and psychosocial working conditions such as the fast pace of work, limited time for relaxation and role conflicts have all been linked with musculoskeletal disorders (Shazzad, et. al., 2018; Antwi-Afari, et. al., 2017). Some of the effects employees with musculoskeletal disorders experience include poor performance at work, increased sick leave, lower productivity, and concerns about the potential of losing the job (Vargas-Prada and Coggon, 2015; Shazzad, et. al., 2018). Temporary incapacity to work and the inability to fully realise one's potential due to a musculoskeletal disorder also increase the risk of leaving work, which leads to a partial or total loss of earnings (Jacobsen, et. al., 2013; Antwi-Afari, et. al., 2017). Employees with musculoskeletal disorders are, therefore predicted to be suffering from some form of psychological distress (Fordjour and Chan, 2019).

### ***Physical Health***

Poor physical or general health can increase the risk of mental health problems (Magotra, 2016). Similarly, poor mental health can harm a person's physical health, leading to an increased risk of certain diseases (Kecklund and Axelsson, 2016). Physical health also

affects the continuing mental health and well-being of people suffering from some form of psychological distress (Hassard, et. al., 2018). People with psychological distress or poor mental health may have impaired physical health for a variety of reasons (Pollak and Miller, 2011). For instance, persons experiencing psychological distress can be vulnerable to negative behavioural factors such as excess smoking, poor nutrition, lack of self-sufficiency, excess alcohol intake, use of harmful drugs and obesity (Hjorthøj, et. al., 2015; Lewis, 2017). The effect of these factors can make persons in the negative psychological state susceptible to physical disorders or general health problems (Hassard, et. al., 2018).

Many forms of general health problems or ailments have been linked with psychological distress (Magotra, 2016). Some common health problems associated with psychological distress which are usually reported by employees include chronic headaches and stomach problems such as feeling nauseous, stomach ache, diarrhoea, and indigestion (Enshassi, et. al., 2016; Magotra, 2016). Persons with poor health are, therefore, predicted to be experiencing some form of psychological distress.

### ***Medical History***

Personal medical history can be a sufficient cause of an employees' psychological ill-being conditions (Carson, et. al., 2010). Depression and anxiety are known to be major risk factors for medical conditions such as diabetes, hypertension, asthma and coronary heart diseases such as hyperlipidemia (Chauvet-Gelinier and Bonin, 2017; Chaddha, et. al., 2016). Medical conditions that are severe and persistent can negatively affect the patient's mental health (Pollak and Miller, 2011). Chronic pain and epilepsy have been revealed to increase the risk of suicide among patients (Carson, et. al., 2010). Persons with past or present medical condition may experience a broad spectrum of apathy, irritability, fatigue, poor cognitive abilities, pain and other somatic complaints, reflecting the effects of one or more illnesses (Pollak and Miller, 2011; Carson, et. al., 2010; Magotra, 2016). For example, a history of the

life-threatening medical condition is often considered to be responsive to the traumatic circumstances of the medical condition and its treatment (Carson, et. al., 2010).

#### **Construct 4: Job Attitudes**

Job attitudes of employees can depict their psychological health state (Kabir, et. al., 2019). Employees who are committed, happy, and advocate are usually intrinsically driven to work hard and are likely to enjoy their work (Johari and Omar, 2019; Lin and Lin, 2011). Poor job attitude has a direct link with various employees' emotional psychological health conditions, including low self-esteem, feelings of helplessness, anxiety, depression, and irritability (Aazami, et. al., 2015; O'Donoghue, et. al., 2016). Employees who have poor job attitudes can be vulnerable to the psychological distress, which can further deplete the emotional resources needed for the employee's work (Hassard, et. al., 2018). Employees job attitudes of happiness, commitment, and dedication are essential for every organisation (Chordiya, et. al., 2017; Wersebe, et. al., 2018).

#### ***Work Happiness***

Work dissatisfaction or unhappiness can act as a determinant of an employee's psychological health and well-being (Aazami, et. al., 2015). Employees' happiness can positively affect their level of productivity and lead to good company outcomes (Froese, et. al., 2019). Previous studies have shown that happiness of employees can have an influence on their mental health conditions and social interactions (Nadinloyi, et. al., 2013; Tabaj, et. al., 2015). Happiness can be lower among employees with severe psychological health conditions of stress (Kabir, et. al., 2019). Previous studies have revealed a direct relationship between job satisfaction or happiness and various psychosomatic complaints such as back pain, headache, sleep disorders, fatigue, and gastrointestinal problems (Tabaj, et. al., 2015; Froese, et. al., 2019).

Employees who are happy with their work often feel content, tranquil, relaxed, fulfilled and gratified (Wesarat, et. al., 2015; Aazami, et. al., 2015). These positive feelings can enhance the psychological well-being of the individual employee. On the other hand, negative feelings of agitation, irritation, and being upset as associated with employees who are unhappy with their work (Nadinloyi, et. al., 2013). Unhappiness at the workplace can, therefore, jeopardize an employee's mental health, well-being and can seriously affect the quality of life of the employee (Wesarat, et. al., 2015).

### ***Lack of Job Commitment***

Employees' level of commitment to their work can have a direct link to their psychological well-being and general health (Wersebe, et. al., 2018). A strong commitment can give employees a sense of their work and is a resource that buffers the harmful effects of stressors at the workplace (Yavas, et. al., 2018). Previous researchers like Lazarus and Folkman, however, recognised the "double-edged" nature of job commitment, pointing out that strong engagement may, in certain circumstances, motivate active coping, but may also lead to a person being particularly vulnerable to psychological ill-being conditions (Azeez, et. al., 2016). In other words, high work engagement due to increased commitment can also increase the vulnerability of employees on the experiences of the adverse effects of work stressors (Chordiya, et. al., 2017; Wersebe, et. al., 2018).

The moderating effects of commitment are usually demonstrated with the use of moderated multiple regression (Meyer and Maltin, 2010). If commitment acts as a buffer, the positive relationship between stress and strain diminishes as the commitment to the organisation increases (Yavas, et. al., 2018). In contrast, if the commitment worsens the stressor's effect on the stress, the results will be the opposite (Meyer and Maltin, 2010). Commitment is however essential to employees' psychological well-being, as persons who are committed to their work are often in the positive state of excitement, happiness and feel

energised to work hard (Wersebe, et. al., 2018). Employees who are low in job commitment are more vulnerable to psychological conditions of emotional distress, fatigue, and in some sort of pain due to work (Chordiya, et. al., 2017).

### ***Poor interpersonal working relationship***

Interpersonal relationship with people, especially supervisors and co-workers at the workplace could be a significant predictor of the psychological well-being of the employee (O'Donoghue, et. al., 2016). Poor interpersonal working relationship has been regarded as a significant predictor of psychological ill-being, as it threatens one's personal goals and sense of value (Landry and Mercurio, 2009). Poor relationships at the workplace emanate from diverse beliefs and interest among individuals, with associated mistrust, and lack of support among workgroups (Abbe, et. al., 2011). Poor relationship with people at the workplace is usually characterized by discrimination, aggression, hostility, offensive behaviours, and violence at the workplace (Landy and Conte, 2016; Quick, et. al., 2013). An employee who has a poor relationship with others could, therefore, be vulnerable to psychological disorders such as helplessness, low self-worth, fear, paranoia, anxiety, depression, insecurity, and even narcissism (Ashkanasy and Daus, 2002; Leung and Chan, 2012). The consequences of poor working relationship could lead to severe psychological health conditions (Hoobler, et. al., 2010) and job satisfaction (Ensher, et. al., 2001).

### ***Poor Time management Skills***

Time management skills can have an impact on an employee's work and life balance (Grissom, et. al., 2015). The skills adopted by employees to self-manage their time daily is a major area of concern for the occupational psychologist, as the effect of work and family life imbalance could be tremendous on the employee's life (Zheng, et. al., 2015). Studies have revealed that work and life imbalance due to poor time management can expose employees to

psychological health conditions such as stress, and anxiety (Sirgy and Lee, 2018). Effective time management skills can, on the other hand, help to reduce stress and other psychological health conditions significantly (Zheng, et. al., 2015). Harris, et. al., (2009) also advocated that employees with effective time management skills mitigate all kinds of workplace stressors, thereby enhancing the employees' psychological health and well-being.

### ***Lack of Advocacy***

Advocacy can be described as attitude or action of an individual or group with the aim to influence decisions regarding political, economic and social issues within the institution (Obar, et. al., 2012). Some activities undertaken by persons who are advocates may include media campaign, public speaking, conducting polls, commissioning and seeking judicial justice (Clear, et. al., 2018; Shier and Handy, 2015). Advocacy is, therefore characterized by a series of actions taken with issues highlighted that could bring about certain changes (Clear, et. al., 2018). Employees who exhibit some level of advocacy are usually mentally alert, engaging, inclusive, and enthusiastic about everything regarding their work (Obar, et. al., 2012; Hassard, et. al., 2018). On the contrast, employees who are low in advocacy usually experience psychological ill-being conditions such as lethargic, gloomy, tension and hostility (Shier and Handy, 2015). As persons who lack advocacy usually do not express their views and concerns on issues important to them and thus do not defend and safeguard their personal rights (Obar, et. al., 2012). Advocacy can, therefore, predict an employees' psychological state.

### ***Lack of Resilience***

Resilience can be described as a coping strategy that has an influence on a person's psychological health conditions and is paramount in adverse circumstances (Tabibnia and Radecki, 2018). Employees who are resilient can be less prone to psychological ill-being conditions, as they have a positive attitude to adversity (Gao, et. al., 2017). On the contrary,



persons who are not resilient are usually frustrated, discouraged and depressed, when faced with challenging circumstances (Tabibnia and Radecki, 2018). Resilience serves as a buffer to mitigate the relationship between overall well-being and mental health (Srivastava, 2011). Resilience is, therefore, a positive mental health condition and ability necessary to adaptively withstand and manage stressful situations (Gao, et. al., 2017).

#### 4.2.3 Previous studies on personal related factors conducted in the construction industry

Personal-related factors were explored by the previous researchers as potential sources or influences that make persons vulnerable to the experience of psychological health conditions. Table 4.3 presents the personal-relate factors extracted from the previous studies.

**Table 4.3: Personal-related factors extracted from the previous studies**

Ref.	Personal-related factors identified	Sources	No. of studies
1.	Work-Home Conflict; Work-Life Imbalance	Lian, 2018; Leung, et. al., 2017; Yang, et. al., 2017; Cattell, et. al., 2016; Enshassi, et. al., 2016; Enshassi and Al. Swaity, 2015; Bowen, et. al., 2014a; Bowen, et. al., 2014b; Bowen, et. al., 2014d; Brockman, 2014; Malone and Issa, 2014;	11
2.	Age	Lian, 2018; Kamardeen and Sunindijo, 2017; Yang, et. al., 2017; Bowen, et. al., 2014a; Reza, et. al., 2014	5
3.	Gender	Kamardeen and Sunindijo, 2017; Sunindijo and Kamardeen, 2017; Cattell, et. al., 2016; Bowen, et. al., 2014a; Malone and Issa, 2014	5
4.	Years of Working Experience/ Job Tenure	Lian, 2018; Shan, et. al., 2017; Chih, et. al., 2017b; Reza, et. al., 2014	4
5.	Personal Finance/ Increases in the Cost of Living	Langdon and Sawang, 2018; Lian, 2018; Kamardeen and Sunindijo, 2017	3
6.	Married/Attached	Lian, 2018; Kamardeen and Sunindijo, 2017; Malone and Issa, 2014	3
7.	Interpersonal Conflicts at Work/ Conflicts Between Personal and Organizational Values	Chen, et. al., 2017; Senaratne and Rasagopalasingam, 2017; Panahi, et. al., 2016	3
8.	Relationship with others	Chih, et. al., 2017; Chan, et. al., 2016; Enshassi and Al. Swaity, 2015	3
9.	Perceptions/ Perceptions of job control and organizational climate"	Çelik and Oral, 2019; Bowen, et. al., 2014a; Brockman, 2014	3
10.	Personality Traits	Kamardeen and Sunindijo, 2017; Wang, et. al., 2017	2

11.	Lack of Personal and Family Time	Langdon and Sawang, 2018; Lingard and Turner, 2017	2
12.	Work-Related Attitudes	Çelik and Oral, 2019; Leung, et. al., 2016	2
13.	Workers' Job Insecurity/ Fears about Job Security	Langdon and Sawang, 2018; Chih, et. al., 2017b	2
14.	Reduced Personal Achievement	Enshassi, et. al., 2016; Malone and Issa, 2014	2
15.	Personal Situations, example Poor Transportation.	Senaratne and Rasagopalasingam, 2017; Leung, et. al., 2017	2
16.	Children	Wentz, 2015; Malone and Issa, 2014	2
17.	Education	Malone and Issa, 2014	1
18.	Lifestyle: Smoking and Higher Alcohol Consumption	Kurtzer, et. al., 2018	1
19.	Obesity	Kurtzer, et. al., 2018	1
20.	Individual Resilience	Chen, et. al., 2017	1
21.	Language Fluency	Leung, et. al., 2017	1
22.	Depersonalization	Enshassi, et. al., 2016	1
23.	Negative Affectivity	Fung, et. al., 2016	1
24.	Risk-Taking Tendency	Fung, et. al., 2016	1
25.	Perceived Utility of Safety Measures	Fung, et. al., 2016	1
26.	The Need to 'Prove' oneself,	Bowen, et. al., 2014d	1
27.	Cultural Values	Chan, et. al., 2014	1

Çelik and Oral, (2019) sought to uncover the concepts forming and affecting the work-related attitudes and perceptions of the construction industry workers and investigate the relationships among them. A multivariate model through which the effects of the personality traits, job satisfaction, professional commitment and organizational commitment of the employees were investigated. It was revealed that all of the variables of personality, professional commitment and job satisfaction affect employees' commitment both directly and indirectly (Çelik and Oral, 2019). Chen, et. al., (2017) examined the occurrences of interpersonal conflicts with supervisors and co-workers on construction sites and investigated the relationship among interpersonal conflicts and physical safety outcomes together with job stress. Their results revealed that interpersonal conflict results in physical safety outcomes such as physical injuries, unsafe events as well as job stress. The contributions of this study are that safety professionals may consider adding coping skill training safety programs to improve the individual resilience of their workforce and reduce conflict-related safety outcomes (Chen, et.

al., 2017).

Kurtzer, et. al. (2018) aimed at analysing the perceptions of South Australian construction site-based blue-collared workers on the enablers and inhibiting health and wellbeing practices, and establish their impact on the physical abilities, safety performance and overall productivity of older workers. The findings showed some consensus on the factors affecting the health and wellbeing practices with obesity, smoking and higher alcohol consumption among the risk factors and prevalent lifestyles among the workers. The ‘weather’ was identified among the highly ranked physical factors affecting productivity. The study also established the higher prevalence of health and, mental issues, injuries and recreational usage of drugs among the workers (Kurtzer, et. al., 2018). Langdon and Sawang, (2018) explored the primary stressors in the construction workplace and the relationships between the strain effect of psychological distress and the countermeasures and coping mechanisms used by construction workers. The results showed that that family time, rise in the cost of living and fears concerning job security serve as effective stressors. Langdon and Sawang (2018) further indicated that factors such as acceptance, self-blame, and disengagement to a greater extent determine psychological distress among construction workers.

Kamardeen and Sunindijo, (2017) investigated the simultaneous influence of six personal characteristics of construction professionals, such as gender, age, occupation, income, marital status, and personality traits, on work-related psychological illnesses. The results revealed that age, job demands, discrimination, and psychological strain impact sociological strain. Besides, age, sociological and psychological strains are strong predictors of physiological stress. Other demographic factors such as marital status and gender influence work stress, anxiety, and depression among workers in the construction industry. Specifically, workers who have a marital status of separated, widowed, or divorced are more likely to be exposed to occupational stress, anxiety, and depression (Kamardeen and Sunindijo, 2017).

Fung, et. al., (2016) examined external factors with psychological climate that the workers possess on their safety awareness. Their results revealed that personal traits including negative affectivity, risk-taking tendency, and perceived utility of safety measures influence the safety awareness of employees. Also, while the physical working environment has a powerful influence on negative affectivity, the perceived importance of safety interventions was revealed to be the most influential factor of safety awareness (Fung et al., 2016).

Panahi, et. al., (2016) explored organizational behaviour in the construction industry in terms of the possible effects of conflicts on the job satisfaction of internal construction stakeholders. The results generated by the analyses indicated a high level of value conflicts in the construction industry significantly and inversely affects the satisfaction of job among internal stakeholders. Therefore, this research, through investigating the potential effect of value conflicts on the stakeholders' job satisfaction, reveals the importance of the interaction between personal and organizational values in construction organizations which contributes to the extant literature of organizational behaviour in construction (Panahi, et. al., 2016). Bowen, et. al., (2014d) assessed the relationship between job demands, job control, workplace support, and experiences of stress in the South African construction context, using hierarchical regression, factor analysis and structural equation modelling to explore the strength of thirteen factor relationships with perceived stress. The results revealed that the predictors displaying a significant relationship with occupational stress were the presence of work–life imbalance, the need to ‘prove’ oneself, hours worked per week, working to tight deadlines, and support from line managers in difficult situations at work (Bowen, et. al., 2014d).

Malone and Issa, (2014) investigated elements that lead to enhanced organizational commitment and increase the likelihood that a female employee will stay with her employer in the U.S. construction industry. The factor with the most pronounced influence on satisfaction with employer was whether the respondent had earned a college degree or trade certificate.

Respondents with a college degree or a trade certification were more than four and a half times more likely to respond as satisfied with their current employer than those who did not have a degree or certification. Having children in the household also was a predictor of short-term (6-month) employee commitment, but not for long-term (5-year) commitment. Predictors of long-term commitment were also revealed to include marital status and access to retirement packages (Malone and Issa, 2014).

This research seeks to explore among construction employees, the personal factors that could make them vulnerable to the potential sources and effects of occupational psychological disorders. In addition, this study sought to investigate the relationship between the personal intervening factors and some demographic factors. The hypothesis to be tested assumed there is no statistically significant difference between the mean scores on the personal-related causes of psychological health conditions obtained from the construction professionals and construction trade workers.

### **4.3 Construction work-related factors that could expose construction employees to psychological distress**

#### **4.3.1 Introduction**

The construction industry is generally project-driven, and stakeholders usually place a high emphasis on the project being delivered on time, to a required quality standard and within budget (Dallasega, et. al., 2018; Bowen, et. al., 2014). Construction work is thus, usually associated with rapid working pace, dynamic tasks, crisis-prone works, and complicated interpersonal working relationships, which could expose construction employees to high levels of psychological disorders (CIOB, 2006; Chan, et. al., 2012). The nature of the construction work and working environment also could expose employees of the construction industry to the risks of psychological disorders or poor health conditions, with effects on their level of efficiency (Chakraborty, et. al., 2018; Marmot and Wilkinson, 2006). A previous study conducted by Leung, et. al., (2017) advocated that various risk factors that emanate from construction work can induce psychological disorders for construction employees, which could even lead to accidents at the workplace.

The construction industry in Ghana and many other developing countries could be stressful due to the fact that the nature of the industry is dynamic, uncertain, and coupled with transient workers (Fordjour and Chan, 2019; Ibem, et. al., 2011; Enshassi and Al.Swaity, 2015). It was revealed in a study conducted by Fordjour and Chan (2019) that psychological health indicators such as stress, anxiety, depression, cardiovascular diseases were prevalent among the Ghanaian construction employees. Previous studies have revealed that the level of productivity and job performance of construction employees could be affected by these psychological disorders (Leung and Chan, 2012; Chan, et. al., 2012). Other effects of psychological disorders on employees also include ineffectiveness, poor communication, absenteeism, low morale, high job turnover, poor work relations, poor organizational climate

and accidents in the construction workplace (Leung, et. al., 2017; O'Donoghue, et. al., 2016). The impact of construction employees' psychological disorders could, therefore, have both direct and indirect costs to the construction industry (Bowen, et. al., 2014).

It is imperative to conduct a study to investigate the critical construction work-related risk factors that are likely to influence the psychological health conditions of construction employees. The research on occupational psychology in the construction literature is still underexplored and limited, with a lot of research gaps to fill. Much of the study focuses on a single psychological health condition such as stress and explore factors from mainly the perspective of the construction project team members (Bowen, et. al., 2014; Leung, et. al., 2017). Little research attention is given to the construction trade workers who are likely to be more vulnerable to psychological health conditions as a result of their work (Chan, et. al., 2016). Exploring the perceptions of both construction professionals and construction trade workers would provide valuable insights on how such perceptions tie with their opinions on the responsibility for their psychological health conditions (Ashleigh and Mansi, 2012). No study was found that had conducted a comparative study between construction professionals (such as Architects, Engineers, Quantity Surveyors, and Construction Managers) and construction trade workers (such as Masons, Plumbers, Carpenters, Electricians, and Welders). This research study, therefore, sought to address these knowledge gaps by exploring the construction work-related factors associated with the psychological health of both construction professionals and construction trade workers. A comparative analysis of the results obtained from these two construction groups will also provide some insight into the factors that are critical to each working group.

Few studies of this nature have also been conducted in the developing countries, with many of these studies been conducted in the UK, China, Australia, Canada and others (Enshassi, et. al., 2016; Leung, et. al., 2017; Wang, et. al., 2017; Liang, et. al., 2018). No studies

of this nature have been conducted in the construction industry of Ghana, which warranted Ghana to be selected as the geographical setting for this study. The validity and credibility of the findings from the study were assured by adopting a mixed-methods approach, employing first qualitative research approach then confirming the findings with a quantitative research strategy (Ashleigh and Mansi, 2012).

#### **4.3.2 Literature Review on construction work-related psychological risk factors**

Psychological health conditions such as stress, burnout, workaholism, depression, and anxiety, generally occur when construction employees encounter disparities between their job requirements and their ability to cope with these requirements (O'Donoghue, et. al., 2016). High job demands have been recognized widely to lead to the psychological disorders of employees (Wang, et. al., 2017; Bowen, et. al., 2014). Construction employees who are unable to control their work environment and job demands are likely to experience psychological disorders (European Agency for Safety and Health at Work, 2009). Work-related psychological health risks such as role stress or role strain often trigger responses from individuals, as efforts to cope with or manage the work factors (Harkness, et. al., 2005). Maladaptive coping strategies such as drinking alcohol, use of drugs, and poor sleeping habits adopted by the construction employees to self-manage their psychological health could have detrimental effects on the behavioural and organizational outcomes of the construction industry (Fordjour, et. al., 2019a; Chan, et. al., 2012). Work-related psychological risk factors could, therefore, impact the performance of construction employees and deteriorate their health, especially when they are unable to develop appropriate measures to moderate the effects of the symptoms of psychological disorders (McTernan, et. al., 2013). The adverse work factors could also cause psychological and physiological health problems for construction employees if not managed well (Duncan, 2005).



Work-related factors associated with construction employees' psychological disorders could also include: job insecurity, high working pace, quantitative work overload, qualitative work overload, unclear roles in the organization, inflexible working schedules, unpredictable or irregular working hours, poor communication, lack of team participation, poor interpersonal working relationships, home and work conflicting demands and poor career development (Bowers, et. al., 2018; Leung, et. al., 2017; Cattell, et. al., 2016; Bowen, et. al., 2014a).

***Previous studies on construction work-related in the construction industry***

Construction work-related factors that can affect the psychological health and well-being of the construction employees were assessed by the previous researchers. Table 4.4 presents the findings of work-related factors from the studies reviewed.

**Table 4.4: Work-related factors identified from the studies reviewed**

<b>Ref.</b>	<b>Work-related causes identified</b>	<b>Sources</b>	<b>No. of studies</b>
1.	Workload	Sommovigo, et. al., 2019; Lian, 2018; Leung, et. al., 2017; Wang, et. al., 2017; Yang, et. al., 2017; Cattell, et. al., 2016; Enshassi, et. al., 2016; Enshassi and Al. Swaity, 2015; Brockman, 2014; Bowen, et. al., 2014a; Bowen, et. al., 2014b; Bowen, et. al., 2014d	12
2.	Unpleasant or adverse work environment	Sunindijo and Kamardeen, 2017; Cattell, et. al., 2016; Kurtzer, et. al., 2018; Chan, et. al., 2016; Fung, et. al., 2016; Enshassi and Al. Swaity, 2015; Brockman, 2014; Bowen, et. al., 2014a; Bowen, et. al., 2014b; Bowen, et. al., 2014d	10
3.	Employee–stakeholder engagement	Goulding, et. al., 2018; Yang, et. al., 2017; Leung, et. al., 2017; Chan, et. al., 2016; Cattell, et. al., 2016; Leung, et. al., 2016a; Fung, et. al., 2016; Bowen, et. al., 2014a; Bowen, et. al., 2014b	9
4.	Unfair treatment and reward	Shan, et. al., 2017; Chan, et. al., 2016; Cattell, et. al., 2016; Enshassi, et. al., 2016; Enshassi, et. al., 2015; Bowen, et. al., 2014a; Malone and Issa, 2014	7
5.	Role ambiguity and conflict	Wang, et. al., 2017; Enshassi, et. al., 2016; Leung, et. al., 2016a; Cattell, et. al., 2016, Enshassi and Al. Swaity, 2015; Bowen, et. al., 2014a; Bowen, et. al., 2014b	7
6.	Lack of organizational support	Yang, et. al., 2017; Chan, et. al., 2016; Cattell, et. al., 2016; Leung, et. al., 2016; Bowen, et. al., 2014a; Bowen, et. al., 2014b; Bowen, et. al., 2014d	7

7.	Critical time constraints/ urgent tasks	Leung, et. al., 2017; Sunindijo and Kamardeen, 2017; Cattell, et. al., 2016; Bowen, et. al., 2014a; Bowen, et. al., 2014b; Bowen, et. al., 2014d	6
8.	Nature of Tasks	Langdon and Sawang, 2018; Senaratne and Rasagopalasingam, 2017; Cattell, et. al., 2016; Chan, et. al., 2016; Malone and Issa, 2014	5
9.	Job demand	Cattell, et. al., 2016; Leung, et. al., 2015; Xiong, et. al., 2015; Bowen, et. al., 2014a; Bowen, et. al., 2014b	5
10.	Poor communication	Leung, et. al., 2017; Cattell, et. al., 2016; Enshassi, et. al., 2015; Brockman, 2014; Bowen, et. al., 2014d	5
11.	Lack of autonomy	Leung, et. al., 2016; Bowen, et. al., 2014a; Bowen, et. al., 2014b; Bowen, et. al., 2014d	4
12.	Insecure job	Enshassi, et. al., 2016; Cattell, et. al., 2016; Leung, et. al., 2016; Enshassi, et. al., 2015	4
13.	Hours worked	Lian, 2018; Chen, et. al., 2017; Bowen, et. al., 2014d	3
14.	Lack of resources; resource adequacy	Jepson, et. al., 2017; Shan, et. al., 2017; Cattell, et. al., 2016	3
15.	Pay differential	Leung, et. al., 2017; Bowen, et. al., 2014a; Bowen, et. al., 2014b	3
16.	Lack of supervisors and/ or co-worker support	Sommovigo, et. al., 2019; Leung, et. al., 2016a	2
17.	Emotional demands	Sommovigo, et. al., 2019	1
18.	Work pace	Sommovigo, et. al., 2019	1
19.	Mobility	Chen, et. al., 2017	1
20.	Psychological contract breach	Chih, et. al., 2017b	1
21.	Organizational justice	Chih, et. al., 2017b	1
22.	Structural, technical and directional complexity of project	Jepson, et. al., 2017	1
23.	Increasing accountability	Jepson, et. al., 2017	1
24.	Organizational centralization	Leung, et. al., 2017	1
25.	Organizational settings	Senaratne and Rasagopalasingam, 2017	1
26.	Safety priority	Shan, et. al., 2017	1
27.	Organizational effectiveness	Shan, et. al., 2017	1
28.	Workplace and industry influential levels	Lingard and Turner, 2017	1
29.	Discrimination, bullying, and sexual harassment	Sunindijo and Kamardeen, 2017	1
30.	Unpaid overtime	Wang, et. al., 2017	1
31.	Restrictive career progression	Wang, et. al., 2017	1
32.	Different roles and positions	Wang, et. al., 2017	1
33.	Inadequate compensation	Cattell, et. al., 2016	1
34.	Organisational age	Reza, et. al., 2014	1

Senaratne and Rasagopalasingam, (2017) sought to identify the critical stressors causing work stress with their effects on the performance of construction project managers (CPMs). The findings reveal key sources of stress related to tasks, organizational settings, physical conditions and personal situations. Although general studies show that stress at a certain level is favourable and positively affects performance, in their studied context, a negative impact on task, interpersonal and organizational performance was found due to the high level of stress encountered by CPMs (Senaratne and Rasagopalasingam, 2017). Chih, et. al., (2017) investigated the impact of working relationship on workers' psychological, behavioural, and performance outcomes. The results revealed that good quality working relationship between employees and their supervisor is important in building positive emotions to enhance performance. As such, organizations are recommended to equip supervisors with the awareness, knowledge, and skills to facilitate high-quality relationships with their workers (Chih, et. al., 2017).

Cattell, et. al., (2016) conducted a study to identify and rank job demand, job control and job support factors and to analyse these by gender and professional grouping, both in terms of how respondents perceived them, as well as in terms of how frequently they had experienced them. The main finding was that respondents' perceptions about the importance of job demand, job control and job support factors were largely consistent with their own experience of these factors. The highest ranked factors were, respectively, 'critical time constraints', 'volume of work' and 'adequate compensation (salary)'. Factors such as control over the type, flow, and volume of work moderate stress whereas salary and career path avenues are seen to be the principal work support moderators of stress. Further, it was revealed in their study that the nature of the construction environment is not favourable for women because of their perceived poor work-life balance practices (Cattell, et. al., 2016).

Enshassi, et. al., (2016) identified the common causes of burnout as perceived by professionals working in construction projects in the Gaza Strip. The results indicated that the causes of stress among construction workers include emotional exhaustion symptoms, unfair reward, and treatment, ambiguity, insecure work, the volume of work and conflict work, and family issues (Enshassi, et. al., 2016). Shan, et. al., (2017) examined the relationship between job satisfaction and quality of work-life (QWL) factors from the perspective of construction craft workers. From their study, they reported that safety priority and organizational effectiveness, fair rewards system, resource adequacy, physical and mental health, and job tenure influence job satisfaction of construction craft employees (Shan, et. al., 2017).

Enshassi, et. al., (2015) identified the most significant job-related stressors that influence construction project professionals' safety, identify the form of stresses and job burnout experienced by construction professionals and investigate the impact of stress and job burnout on safety performance from the perception of construction project professionals. Findings revealed that an organizational stressor has been classified as a key factor contributing to physical, behavioural, and job stress among construction workers. In addition, Enshassi et al. (2015) pointed out that emotional stress and invisible burnout represent some of the stress construction workers experience at the workplace.

#### **4.3.4 Previous findings on construction work-related factors associated with psychology health conditions**

Work factors associated with employees' psychological health can also include job insecurity, high working pace, quantitative work overload, qualitative work overload, unclear roles in the organization, inflexible working schedules, unpredictable or irregular working hours, poor communication and lack of team participation (Huppert, 2009; Bowen, et. al., 2014 Enshassi, et. al., 2016). Aside from these factors, other work factors may be significant

predictors of psychological ill-being of employees. The adverse work factors can cause psychological and physiological health problems for employees if not managed well (Sirgy and Lee, 2018; Johari and Omar, 2019).

### **Construct 1: Task factors**

Major tasks of most employees involve high-speed, some level of complications and are usually crisis-ridden (Leung, et. al., 2016; Chan, et. al., 2012). Task factors are the quantifiable aspects of the employees' work and include excess workload and time pressures, which can affect the psychological well-being and health of employees (Sirgy and Lee, 2018; Bowen, et. al., 2014). Psychological risk factors considered under tasks factors include quantitative work overload (Senaratne and Rasagopalasingam, 2017), qualitative work overload (Bowen, et. al., 2014), urgent tasks (Bowen, et. al., 2014), role conflict (Bowen, et. al., 2014), Role ambiguity (Enshassi and Al.Swaity, 2015), and Work underload (Abbe, et. al., 2011). Task factors that lead to construction workers' psychological ill-being also include vague task requirements, lack of relevant information and difficult tasks beyond workers abilities or experience (Leung, et. al., 2005a).

### ***High Workload***

Excessive workload can cause employees psychological distress such as stress, depression and anxiety; these are aggravated when required to work within a limited time frame (Abbe, et. al., 2011; Leung and Chan, 2012). The consequences of quantitative or excessive work overload could include direct cost of poor job performance (Yang, et. al., 2017) and low productivity (Leung, et. al., 2016) to the construction industry. Work underload, however, could also lead to psychological ill-being conditions such as boredom, depression and job dissatisfaction (Hassard, et. al., 2018; Buller and Schuler, 2000). Qualitative work overload as a factor could cause construction workers emotional distress (Boschman, et. al., 2013), with

direct cost of high turnover (Leung, et. al., 2017) to the construction industry. Urgent tasks could also cause workers fatigue (Chan, et. al., 2012), with direct cost of injury incidents (Boschman, et. al., 2013) to the construction industry.

### **Construct 2: Organisational factors**

The transient nature of most organisations and the ‘hire and fire’ work culture, can affect the psychological health of employees (Leung, et. al., 2016). Psychological health risk factors emanating from organisations include factors such as lack of organisational support, organisational formalisation, organisational complexity and organisational centralisation (Andrews, et. al., 2009; Leung and Chan, 2012). Organisational support including task and financial support are essential for employees’ psychological well-being (Johari and Omar, 2019) with benefits such as work engagement, total commitment and job satisfaction (Chordiya, et. al., 2017).

Other organisational factors that lead to employees’ psychological health conditions include low recognition of workers effort, lack of job security, job redundancy, non-commensurate wages and under participation in decision making (Enshassi, et. al., 2016; Bowen, et. al., 2014). Organisational policies that do not consider the opinions and feelings of employees could also lead to the psychological health conditions of the employees (Chordiya, et. al., 2017). For instance, the level of autonomy given to employees over their work can have a direct influence on their psychological well-being (Andrews, et. al., 2009).

### ***Poor Working Conditions***

Managers of various organisations are responsible for controlling the project costs and time and often adopts complicated working procedures, leaving the employees s limited time for relaxation (Jacobsen, et. al., 2013; Johari and Omar, 2019). Where the resources needed to work efficiently are inadequate, these can affect the psychological health of employees (Leung

and Chan, 2012). Physical factors are significant predictors of the occupational psychological health and well-being of the employees and relate to the workplace setting and design as well as the environmental conditions of the work (Jacobsen, et. al., 2013; Abbe, et. al., 2011). Employees whose works are usually done in extreme temperatures and environmental conditions can be subsequently to psychological or physiological health problems (Kabir, et. al., 2019; Bowen, et. al., 2014). Other previous studies also revealed work factors that relate to environmental conditions, including poor general living and poor site environment (Enshassi, et. al., 2016). Poor environmental working conditions can lead to employees' low productivity and unsatisfactory job performance, which can also lead to project failure and delays, with additional costs to the organisation (Bowen, et. al., 2014; Kabir, et. al., 2019; Leung and Chan, 2012).

Physical factors are significant predictors of the occupational psychological health and well-being of the workers and relate to the workplace setting and design as well as the environmental conditions of the work (Abbe, et. al., 2011). Construction works are usually done in extreme temperatures and environmental conditions, which could subsequently lead to psychological or physiological health problems for the construction workers (Harkness, et. al., 2005).

### **Construct 3: Psychosocial factors**

Psychosocial factors such as resilience, harassment or violent and abusiveness can influence the occupational psychological state of employees (Martin, et. al., 2016). Emotional indicators of psychological health conditions such as mood swings, discouragement and rage are usually associated with the psychosocial factors such as poor working relationship (Masood, 2013; Magotra, 2016). Emotional problems are also seen as the major indicators of psychosocial conditions (O' Donoghue, et. al., 2016).

### ***Poor Working Relationship***

Most organisations rely heavily on teamwork for its outputs and therefore requires good interpersonal working relationship for successful outcomes (Lin and Lin, 2011). The poor interpersonal working relationship has been regarded as a significant predictor of psychological distress, as it threatens one's personal goals and sense of value (Landry and Mercurio, 2009). Poor relationships at the workplace can emanate from diverse beliefs and interest among individuals, with associated mistrust, discrimination and lack of support among workgroups (Masood, 2013; Azeez, et. al., 2016). The consequences of a poor working relationship can lead to severe psychological health conditions affecting the employees' physical and mental well-being (Martin, et. al., 2016; Masood, 2013). The effects of poor working relationship can also lead to both direct and indirect cost to the organisation, with consequences such as poor job performance, poor communication, errors in work, low employee morale, job dissatisfaction and high employee turnover (Lin and Lin, 2011).

### ***Harassment / Violent***

Negative actions such as yelling at people and being physically aggressive can cause the victim to experience psychological ill-being conditions (Pompeii, et. al., 2015). Negative actions of harassment or violence can have physical and emotional consequences (Foshee, et. al., 2016). Harassment, whether physical or not, can lead to psychological harm, with associated symptoms such as bitterness, rage, resentment and physical aggression (Kelly, et. al., 2016; Hamburger, 2017). Some victims of violence have reported problems with attention, concentration, thinking, and daily memory (Foshee, et. al., 2016; Pollak and Miller, 2011). These psychological health indicators can easily be traced back to the emotionally traumatic influence of the violence (Hamburger, 2017). Such complaints or symptoms may also reflect the effects of subtle cognitive changes related to repeated lash and minor head trauma (Pollak and Miller, 2011). Harassment or violent in the workplace, thus affects the victim's mental



health and emotional well-being (Pompeii, et. al., 2015).

### ***Abusiveness***

Abuse can take many forms. Screaming, calling names, spitting, insulting or otherwise ridiculing names are some of the means of abusing (Meinck, et. al., 2016). Invading others privacy, given subtle or obvious threats, being hostile to people and given sarcastic comments are also considered as abusive (O' Donoghue, et. al., 2016). Studies have shown that emotional abuse is as severe as physical abuse and often precedes it (Lachs and Pillemer, 2015). Abuse does not automatically lead to psychological or medical illness. However, abuse makes it much more likely for the victim to experience one or more mental or medical illnesses occur (Pompeii, et. al., 2015). The victim often develops emotional or psychological problems as a result of the abuse, such as low self-esteem, anxiety disorders and other forms of depression (O' Donoghue, et. al., 2016; Meinck, et. al., 2016).

If the abuse was severe, the abused victim can be traumatised leading to post-traumatic stress disorder such as post-traumatic stress disorder (PTSD) or acute stress disorder (Bender, et. al., 2015). A disorder in one's personality can also occur such as narcissistic, marginal or histrionic personality disorders and for some a severe dissociative disorder such as multiple personality disorder which is also known as dissociative identity disorder (Penfold, et. al., 2016, Pompeii, et. al., 2015). Some researchers suggest that abuse may contribute to the development of conditions such as chronic fatigue syndrome and fibromyalgia (Penfold, et. al., 2016). Effects of emotional or physical abuse can be short-term or long-term. Some of the short-term effects include confusion, fear, hopelessness and shame (Lachs and Pillemer, 2015; Meinck, et. al., 2016). Some of the long-term effects include chronic pain, feelings of guilt, insomnia and social withdrawal or loneliness (Bender, et. al., 2015; Pompeii, et. al., 2015). Abuse can, therefore, lead to behavioural and physical side effects (Meinck, et. al., 2016).

Aside from these factors, other construction work-related factors may be significant predictors of the psychological disorders of construction employees. This study seeks to determine the critical construction work-related risks factors that are likely to expose the construction employees to the various forms of occupational psychological disorders. The hypothesis to be tested assumed there is no statistically significant difference between the mean scores on the construction work-related causes of psychological health conditions obtained from the construction professionals and construction trade workers.

#### **4.4 Chapter 4 Summary**

This chapter presents the background of study for research objectives 1, 2, and 3 on determinants of psychological health conditions, personal-related factors that influence the vulnerability of employees to the experience of psychological health conditions, and the construction work-related factors that might influence the psychological health of construction employees. The hypothesis to be tested assumed there is no statistically significant difference between the mean scores of the determinants and causes of psychological health conditions obtained from the construction professionals and construction trade workers.

## **CHAPTER 5**

### **EFFECTS AND COPING MECHANISMS OF PSYCHOLOGICAL HEALTH CONDITIONS**

#### **5.1 Effects of employees' psychological health condition on the construction industry<sup>4</sup>**

##### **5.1.1 Introduction**

Construction employees specifically construction project team members and trade workers are the most significant project resources as they have a direct impact on a construction project's outcome in terms of time, quality and cost (Çelik and Oral, 2019; Leung, et. al., 2016; Boschman, et. al., 2013). Given that the nature of the construction work is complicated, crisis-ridden, dynamic and involves high speed, construction employees could be vulnerable to the experience of occupational psychological disorders with effects on themselves and the construction industry (Sommovigo, et. al., 2019; Bowen, et. al., 2014a; Leung and Chan, 2012). Occupational psychological disorders such as workaholism, burnout, depression, and anxiety are conditions which are characterized by negative emotions, altered thoughts and behaviours with associated distress and impaired functioning of one's abilities (WHO, 2005). Symptoms of occupational psychological disorders such as sleep problems, fatigue, worry, and irritability are common among the working group, and these conditions could have a significant impact on employees' quality of life and ability to function adequately in their respective fields (Hassard and Cox, 2016; Wang, et. al., 2017).

The disparity between what is expected and demanded from the employees and their ability to handle the circumstances often leads to the experience of occupational psychological

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<sup>4</sup> Some contents of section 5.1 of this Chapter have been published in: Fordjour, G. A. and Chan, A. P. (2020). "Exploring the effects of occupational psychological disorders on construction employees and the construction industry". *Occupational diseases and environmental medicine*, 8(1), 1-25.

disorders (Lazarus and Folkman, 1984; O'Donoghue, et. al., 2016). Construction work-related factors such as tight time schedules, poor working conditions, complex methods, and complicated working relations also expose construction employees to the risks of occupational psychological disorders (Sommovigo, et. al, 2019; Boschman, et. al., 2013; Chan, et. al., 2016). The risk factors that could lead to occupational psychological disorders in the construction workplace have been categorized under organizational, task, physical and personal factors (Leung, et. al., 2012). Previous studies have revealed that psychological disorders such as stress have significant effects on individuals and the construction organisation (Bowen, et. al., 2014b, Boschman, et. al., 2013; Yang, et. al., 2017). These effects include reduced productivity, high absenteeism, increased health problems and high compensation costs (Leung, et. al., 2017; Finney, et. al., 2013). Most of the previous studies investigate mainly the effects of a single form of psychological disorder specifically stress effect on individuals and the construction organisation (Chan, et. al., 2016; Bowen, et. al., 2014a; Leung, et. al., 2017).

### **5.1.2 Literature review on potential effects of psychological health conditions**

The occupational psychological conditions of employees have been grouped under broad taxonomies, namely burnout and workaholism (Russell, 2003; O'Donoghue, et. al., 2016). Previous studies revealed that occupational psychological disorders of burnout and workaholism are not harmful, but high levels of these conditions could have detrimental effects on the behavioural and organizational outcomes of the construction industry (Leung, et. al., 2016; Boschman, et. al., 2013).

The effects of burnout on individuals have been classified to include the dimensions of inefficacy, cynicism, and exhaustion, which could lead to lack of interest in the work context (Maslach, et. al., 2001). The effects of burnout could also be manifested in the form of anxiety, fatigue, insomnia, depression, and impairment in work performance (Colman, 2003). Workers

experiencing burnout can also be associated with work displeasure and low levels of work activation or motivation (O'Donoghue, et. al., 2016; Fordjour and Chan, 2019). Emotional exhaustion which is a characteristic of burnout is a psychological state with the victims lacking motivation or energy to work (Demerouti, et. al., 2010). Also, Maslach et. al., (2001) stated that emotional exhaustion is the central element in the effect of burnout. Anxiety and sleep disorders have also been found to be linked with construction workers experiencing burnout, and these could indirectly affect the overall success of the construction project (Leung, et. al., 2012).

A study by Schaufeli, et. al. (2008) also revealed that employees who are workaholics are agitated, tensed and they work compulsively to meet standards set internally by themselves, or externally by their work superiors. Workaholics have high tendency to work hard excessively, but they tend to be obsessed with their work (O'Donoghue, et. al., 2016). Though employees experiencing workaholism have high levels of activation or energy towards their work, they experience displeasure (Russell, 2003). Workaholism could also cause impairment of a person's well-being, with symptoms such as fatigue, chronic tension and sleep disorders (Pennonen, 2011). This makes workaholism a negative state of the occupational psychological condition of employees, with possible adverse effects on the construction industry such as increased rate of accidents and injuries at the construction workplace (Bowen, et. al., 2014A; Leung, et. al., 2017).

The negative state of occupational psychological conditions such as burnout and workaholism are not diseases, but if they become intense and goes on for some time without proper management, they can lead to a mental and physical ill-health of the employees (Demerouti, et. al., 2010; Yang, et. al., 2017). Construction employees experiencing occupational psychological conditions of workaholism and burnout could be associated with anxiety and sleep disorders; and these could, directly and indirectly, affect the overall success

of the construction project (Wang, et. al., 2017; Leung, et. al., 2012; Chan, et. al., 2016). Some researchers have also argued about the positive effects of some level of psychological health conditions on employees' productivity and performance (Russell, 2003; Kahya, 2007; Gruman and Saks, 2011).

It is essential to assess the perceived effects of occupational psychological disorders on construction employees and the construction company (Loosemore, 2009). This will enable appropriate measures to be taken to eliminate those factors that lead to the adverse consequences of psychological conditions and promote the factors that lead to positive effects.

***Previous studies on potential effects of psychological health conditions in the construction industry***

The effects or impact of psychological health conditions on the construction industry have been explored by the previous researchers, with most of the studies conducted on organisational performance and productivity. Table 5.1 presents the effects of psychological health identified in the studies reviewed.

**Table 5.1: Effects of psychological health identified from previous studies**

<b>Ref.</b>	<b>Effects of psychological health identified from previous studies</b>	<b>Sources</b>	<b>No. of studies</b>
1.	Organisational performance	Goulding, et. al., 2018; Liang, et. al., 2018; Chih, et. al., 2017a; Chih, et. al., 2017b; Leung, et. al., 2017; Senaratne and Rasagopalasingam, 2017; Wang, et. al., 2017; Yang, et. al., 2017; Leung, et. al., 2016a; Leung, et. al., 2016c; Enshassi, et. al., 2015	11
2.	Productivity	Al Jassmi, et. al., 2019; Kurtzer, et. al., 2018; Leung, et. al., 2017; Wang, et. al., 2017; Yang, et. al., 2017; Chan, et. al., 2016; Leung, et. al., 2016a; Enshassi, et. al., 2015; Gatti, et. al., 2014; Bowen, et. al., 2014c	10
3.	Physical safety outcomes; Injury incidents	Kurtzer, et. al., 2018; Liang, et. al., 2018; Chen, et. al., 2017; Fung, et. al., 2016; Leung, et. al., 2016b; Leung, et. al., 2016c; Enshassi, et. al., 2015	7
4.	Sociological strain effects	Leung, et. al., 2017; Wang, et. al., 2017; Leung, et. al., 2016a; Bowen, et. al., 2014a; Bowen, et. al., 2014c	5

5.	Quality effect of job outcome; mistakes in work	Leung, et. al., 2017; Wang, et. al., 2017; Chan, et. al., 2016; Leung, et. al., 2016a	4
6.	Intention to leave work	Leung, et. al., 2017; Yang, et. al., 2017; Chan, et. al., 2016; Leung, et. al., 2016a	4
7.	Poor health conditions; physiological effects	Yang, et. al., 2017; Bowen, et. al., 2014a; Bowen, et. al., 2014c; Reza, et. al., 2014	4
8.	Psychological or behavioural effects	Chih, et. al., 2017a; Wang, et. al., 2017; Bowen, et. al., 2014a; Bowen, et. al., 2014c	4
9.	Organizational commitment	Çelik and Oral, 2019; Xiong, et. al., 2015; Malone and Issa, 2014	3
10.	Quality of life	Chakraborty, et. al., 2018; Shan, et. al., 2017; Reza, et. al., 2014	3
11.	Time effects	Wang, et. al., 2017; Brockman, 2014	2
12.	Cost effects	Wang, et. al., 2017; Brockman, 2014	2
13.	Job engagement	Chih, et. al., 2017a	1
14.	Increases turnover intention.	Yang, et. al., 2017	1

Al Jassmi, et. al., (2019) assessed the ability of capturing the effect of construction workers' happiness on their productivity using physiological signals collected via wearable sensors. The study revealed that a moderate direct correlation between employees' emotional status and productivity (Al Jassmi, et. al., 2019). Leung, et. al., (2016a) conducted a study to investigate the relationships between job stressors, stress, safety behaviour, and accidents. The results indicate that job certainty, co-worker support, and safety equipment influence physical stress while supervisor assistance and job certainty determine psychological stress. Also, supervisor support and physical stress affects safety behaviour. Moreover, safety behaviour decreases exposure to accidents and that of job control highly influences the risk of accidents (Leung, et. al., 2016a).

Goulding, et. al., (2018) also investigated the employee–stakeholder engagement on business performance. The findings revealed psychosocial diffusion indicators impact organizational performance (Goulding, et. al., 2018). Leung, et. al., (2017) investigated the interactions among stressors, stress, performance, and intention to stay for Expatriate Construction Professionals (EXCPs) through the development of a stressors–stress–

performance–outcome model. The research established that work-home conflict, organizational centralization, and heavy workload impact Expatriate Construction Professionals' total performance and the decision to stay indirectly via the vicious cycle between emotional and physical stress (Leung, et al., 2017).

Chih, et. al., (2017) in his research investigated the interactive effects of psychological contract breach (PCB), organizational justice, and tenure on workers' job insecurity and job performance. The results from their study indicated that psychological contract breach escalates employees' perceived job insecurity, and this consequently decreases their job performance. (Chih, et. al., 2017). Leung, et. al., (2016b) investigated the complicated relationships between stress, commitment, and performance. The results indicate the impact of stress on both commitment and performance: in three ways; i) stress determines career commitment through reversed U-shaped relationship ii) subjective stress positively affects career and continuance commitment iii) subjective stress also positively affects impacts ineffective working processes via a U-Shaped relationship. Leung et al. (2016b) further found three important findings such as commitment decreases the ineffective working process, continuance commitment places a direct impact on organizational non-belongingness and career commitment enhances estimation accuracy (Leung, et. al., 2016b).

Bowen, et. al., (2014a) also developed a model to establish the relationship between demographic factors, job demand, control and support factors, harassment and discrimination at work, organizational climate, and psychological, physiological, and sociological strain effects, initially proposed substance use as the terminal consequence of job stress. The results indicate that (1) “the terminal consequence of occupational stress is not substance use but rather psychological, physiological, and sociological strain effects”; (2) “organizational climate is largely determined by gender, job demand, and control and support factors”; (3) “age, gender, level of job control, and organizational climate are significant predictors of discrimination”;



(4) “psychological strain is significantly predicted by age, job demand, and job control factors, and by organizational climate”; (5) “sociological strain is determined by age, job demands, discrimination, and psychological strain”; and (6) “age, and sociological and psychological strain effects, behave as significant predictors of physiological stress effects” (Bowen, et. al., 2014a)

Gatti, et. al., (2014) conducted an investigation of the relationship between task level productivity, and physical strain. The research participants performed a four-hour simulated construction task while a wearable physiological status monitors continuously assessed their physiological condition. Heart rate, relative heart rate, and breathing rate were utilized as predictors of physical strain, and task level–single factor productivity was used as an index of productivity. This investigation initially was unsuccessful in the attempt to establish a relationship between physiological condition and productivity at the individual worker level. However, an analysis of the regression models showed that there is a relationship between productivity and either heart rate or relative heart rate at the group level, and that this relationship is parabolic. Breathing rate was proved not be a significant predictor of productivity. This research significantly provides understanding of the relationship between work physiology and task productivity (Gatti, et. al., 2014).

Brockman, (2014) investigated the triggers and consequences of interpersonal conflict on a construction site and at what financial cost. The results revealed that construction jobsite personnel have witnessed or experienced interpersonal conflict while working on a construction jobsite. The primary trigger events attributed to interpersonal conflict that occurs on a construction jobsite were most often tied to the process of construction versus construction personnel (Brockman, 2014). Bowen, et. al., (2014c) conducted a study to investigate workplace stress, stress effects, and coping mechanisms in the construction industry. The study revealed work-related stress effect manifests in a form of psychological (feeling of not being

appreciated, dissatisfied with work, feeling tense at work), physiological (disturbances to usual sleep patterns, trouble in resting after hours, and the problem of concentrating) and sociological (strain on family life, social activities, and social relationships) (Bowen, et. al., 2014c).

### **5.1.3 Previous findings on the effects of occupational psychological ill-being in the construction industry**

#### ***Effects of psychological ill-being conditions on construction workers***

Psychological ill-being could affect the physical and emotional health of a person (Leung, et. al., 2017). The effects of psychological ill-being on a person's physical health could be identified from various indicators such as headaches, loss of sleep and gastrointestinal disorders (Ganster and Rosen, 2013). The effects on the emotional health can also be manifested in various forms such as frustration, anxiety and quick temperament (Baba, et. al., 2009). The Chartered Institute of Building (CIOB) revealed in their study, conducted in 2006 that, about 70% of workers in the construction industry suffer from psychological ill-being symptoms such as: stress, depression and anxiety (CIOB, 2006).

The effects of burnout as psychological ill-being condition on individuals have been classified to include the dimensions of inefficacy, cynicism and exhaustion, which could lead to lack of interest in the work context (Maslach, et. al., 2001). The effects of burnout could also be manifested in the form of anxiety, fatigue, insomnia, depression, and impairment in work performance (Colman, 2003). Workers experiencing burnout can also be associated with work displeasure and low levels of work activation or motivation (O'Donoghue et. al., 2016). Emotional exhaustion, which is a characteristic of burnout, is a psychological state with the victims lacking motivation or energy to work (Demerouti, et. al., 2010). Also, Maslach et. al., (2001) stated that emotional exhaustion is the central element in the effect of burnout. Anxiety and sleep disorders have also been found to be linked with construction workers experiencing

burnout, and these could indirectly affect the overall success of the construction project (Leung, et. al., 2012).

Schaufeli, et. al., (2008) stated that workers who are experiencing psychological ill-being condition of workaholism are agitated and tensed, as they work compulsively to meet standards set internally by themselves, or externally by their work superiors. The researchers added that workaholics have great tendency to work hard excessively, and they tend to be obsessed with their work. Workaholism, therefore, has cognitive and behavioural components. The cognitive component is present when a person thinks persistently about his or her work and work compulsively. The behavioural component, on the other hand, is manifested where a person has a strong inner drive to work hard (McMillan, et. al., 2003). These are likely to have negative consequences on the health of the individual construction worker.

#### ***Effects of workers' psychological ill-being on the construction industry***

Psychological ill-being of construction workers could have several implications on interpersonal relationship, task and project performance of the construction industry (Chan, et. al., 2012). A study by the Health and Safety Executive (2007) revealed that about 10.5 million of workdays are lost yearly to work-related psychological health conditions and physical illness. The effects of construction workers' psychological ill-being also include ineffectiveness, low productivity, poor communication, absenteeism, low morale, high job turnover, poor work relations, poor organizational climate, and accidents in the workplace (Leung and Chan, 2012; Chan, et. al., 2012).

Burnout is a critical issue in the psychological literature and has been found to correlate with many important organizational constructs such as turnover intentions, job satisfaction and organizational commitment (Alarcon, 2011). Workers experiencing psychological ill-being condition of workaholism have high levels of work activation, but they experience displeasure

(O'Donoghue et. al., 2016). This makes workaholism a negative state of occupational psychology.

This study sought to explore the effects of the broader taxonomies of psychological disorders such as workaholism and burnout on construction employees and the construction industry, based on the research participants' personal experiences, opinions and or perceptions. The hypothesis to be tested assumed there is no statistically significant difference between the mean scores of effects of psychological health conditions obtained from the construction professionals and construction trade workers.

## **5.2 Coping strategies adopted by construction employees as their responses or efforts to deal with the causes and effects of occupational psychological disorders.<sup>5</sup>**

### **5.2.1 Introduction**

Previous studies have shown that construction personnel could be exposed to various forms of psychological health risk factors, which lead to various psychological health conditions such as burnout, workaholism, stress, anxiety or depression (Chan, et.al., 2016; Leung, et. al., 2014). For instance, the demanding, uncertain and dynamic nature of the construction industry could expose construction employees to occupational psychological disorders (Xiong, et. al., 2015; Jacobsen, et. al., 2013). Psychological disorders or health conditions of construction personnel usually emanates from construction work-related factors, personality characterizes, and individual lifestyles (Alavina, et. al., 2007; Meerding, et. al., 2005). Both construction professionals and construction trade workers contribute significantly in their unique way to the outcomes of every construction project, in terms of cost, time and quality (Boschman, et. al., 2013; Chan, et. al., 2016). Psychological health conditions of construction employees could lead to poor task performance (Leung, et. al., 2016), low productivity (Gatti, et. al., 2014), high turnover (Cooper and Dewe, 2008), high absenteeism (Finney, et. al., 2013), high work-place accidents (Leung, et. al., 2012), increased physical health problems (Boschman, et. al., 2013) and poor working relationships (Health and Safety Executive, 2007) at the construction industry.

The causes and effects of psychological disorders lead to the triggering of various coping strategies by individuals (Akanbe and Tetteh, 2015; Vernarec and Phillips, 2001). Coping strategies involve cognitive and behavioural efforts or responses to modify the causes and moderate the effects of psychological disorders (Yip, et. al., 2008; Tillmann and Beard,

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<sup>5</sup> Some contents of section 5.2 of this Chapter have been published in: Fordjour, G. A., Chan, A.P.C., Amoah, P. and Tuffour-Kwarteng, L. (2019). "Coping Strategies Adopted by Construction Employees to Deal with the Causes and Effects of Occupational Psychological Disorders: A Study in Ghana". *Health*, 11, 755-782.

2001). Individuals may exhibit different coping strategies, even though they are exposed to similar triggers of psychological disorders (Chan, et. al., 2014; Quick, et. al., 2013). Employees individual vulnerabilities, level of strength and coping strategies are significant factors in the experience of psychological disorders (Quick, et. al., 2013). The factors leading to psychological disorders account for only one-third of the experience, the other two-third results from inappropriate coping strategies adopted as reactions to the psychological risk factors (Vernarec and Phillips, 2001). Experience of psychological disorders is thus dependent on the individual's subjective judgment and reflects individuals' capability to cope with external demands, which are often inevitable (Bowen, et. al., 2014). Several factors account directly or indirectly to the selection of coping strategies, such as perceived cause, symptom, past experiences and individual personality (Tillmann and Beard, 2001). Coping strategies adopted by construction personnel could have immediate or long-term consequences on the individual and the organization (Bowen, et. al., 2014; Leung, et. al., 2014).

This study forms part of a research project that aims to develop an occupational psychological health management model for construction employees. The complexity of the management of employee's psychological health necessitates an understanding of how the individual employees behave (Ashleigh and Mansi, 2012; Leung, et. al., 2016). The acquisition of such information will facilitate improvement in the management of construction workers psychological health (Leung, et. al., 2014). This has led to the following research questions for this study: what are the coping strategies adopted as efforts to mitigate the causes of psychological disorders such as high task demands, poor working conditions, abusive and overdemanding supervisors and the likes?; and what are the coping strategies adopted as their responses to moderate the effects of psychological disorders such as headache, fatigue, chronic pains, insomnia, and the likes?

### **5.2.2 Literature review on coping strategies**

Coping strategies emanate from individuals as their psychophysical responses or reactions to the triggers of psychological ill-being (Quick, et. al., 2013). Appropriate coping strategies adopted could help alleviate the effects of psychological disorders (Jassawalla, et. al., 2006) and enhance employees work performance (Wang and Nayir, 2006). However, ineffective coping strategies could aggravate the effects of psychological disorders, with negative influences on the health, interpersonal relationships and the task performance of the construction personnel (Leung, et. al., 2006). A study conducted on aircraft maintenance personnel by Lin, (2007) advocated that, the personnel who adopted appropriate control and supportive coping strategies reported low levels of occupational psychological disorders such as stress and work injuries.

The experience of various levels of psychological disorders among construction personnel could predict the adoption of ineffective and maladaptive coping strategies (Leung, et. al., 2012). A study conducted on Nurses by Akangbe and Tetteh, (2015) also advocated that employees with more experience and a higher level of professional skills are more willing and likely to adopt healthy and appropriate coping strategies. Individual's cognition of the influences of their coping strategies on their health, task performances and the construction industry's outcomes, will lead to the adoption of appropriate coping strategies (Chan, et. al., 2016).

### **5.2.3 Theoretical concepts of Coping Strategies**

Coping strategies are the major components to the process of experiencing psychological disorders, such as stress (Sinha, et. al., 2016). Coping strategies involve behavioural and cognitive efforts of individuals to manage specific internal or external demands that are perceived as exceeding the individual's capabilities or resources (Linehan, 2018). In other words, individual coping strategies are process-oriented behaviours, which

involves mastering, tolerance or reduction, as efforts to manage demands that exceed or conflicts with a person's resources or capabilities (Yip and Rowlinson, 2006).

Coping strategies involves personality style or trait, psychoanalytic approaches (involving realistic thinking and actions for successful adjustment), sequential stages of discrete responses and specific approaches to specific problems or events (Kwasnicka, et. al., 2016; Yeung, et. al., 2016). Appropriate coping mechanisms focus on personality characteristics, successful adjustments, sequential stages or specific events (Bowen, et. al., 2014). Coping strategies can also be determined by the quality and amount of resources available when the specific problem arose (Sears and Kraus, 2009). Individuals usually focus on either the problem encountered, or the emotions experienced, which results in different coping behaviours and cognitive efforts (Akangbe and Tetteh, 2015; Haynes and Love, 2004).

The literature search revealed several sub-dimensions of the problems or causes focused, and effects or emotions focused coping strategies. The coping strategies are usually limited to the causes or problems faced, but appropriate coping strategies should incorporate both effects-focused and causes-focused efforts (Grant and Langan-Fox, 2006). Effective coping strategies should, therefore, not only resolve the problems faced but mitigate the negative consequences and impacts of psychological disorders (Wood and Ogonnaya, 2018; Jacobs and Blustein, 2008).

### ***Causes- focused coping strategies***

Causes- focused strategies are the cognitive strategies that individuals adopt to ensure their well-being, by modifying the sources of psychological disorders such as environmental conditions (Leung, et. al., 2006). The causes-focused coping strategies include playful problem-solving, confrontive coping, instrumental support seeking and positive reappraisal (Greenberg, 2001). Coping strategies that focus on addressing the problem or the cause depicts an individuals' rationality and their thought processes (Yip and Rowlinson, 2006). Causes-



focused coping strategies are usually influenced by the dimensions of intensity, predictability, controllability, adaptability, and mastery of the psychological health factor, which might increase the risk of maladaptive coping strategies such as drug addiction (Singh, 2008; Linehan, 2018).

### ***Effects-focused coping strategies***

Effects-focused coping strategies aim at managing the consequences of psychological disorders through various coping strategies (Lambert, et. al., 2004). The effects-focused coping strategies for psychological disorders are the efforts of individuals to adjust their psychological health state while moderating their levels of emotional arousal (Lin, 2007; Jassawalla, et. al., 2006). Responses to emotions such as anger, fear, and guilt are examples of effects-focused coping strategies (Penley, et. al., 2002). There are several sub-dimensions of coping strategies relating to one's emotions. These are emotional discharge, escapism or avoidance, acceptance of responsibility, distancing, social support-seeking and self-control or adjustment (Leung, et. al., 2003, Greenberg, 2001).

#### **5.2.4 Previous studies on psychological health coping strategies in the construction industry.**

Coping behaviours emanates from individuals as their psychophysical responses or reactions to the triggers of psychological ill-being (Quick, et. al., 2013). The coping behaviours adopted by individuals to manage the causes and effects of psychological health problems have attracted prodigious research attention over several decades (Yip and Rowlinson, 2006).

Coping behaviours or mechanisms to manage the causes and effects of psychological health in the construction industry were revealed in the studies reviewed and the findings presented in Table 5.2.

**Table 5.2: Coping strategies identified from the studies reviewed**

S/N	COPING STRATEGIES	SOURCES	No. of studies
<b>PROBLEM-FOCUSED COPING STRATEGIES</b>			
<i>Planful problem solving</i>			
1.	Deal directly with problems	Enshassi, et. al., 2018; Liang, et. al., 2018; Chan, et. al., 2016	3
2.	Improve on time management	Enshassi, et. al., 2018; Chan, et. al., 2016	2
3.	Enhance skills of management	Enshassi, et. al., 2018; Chan, et. al., 2016	2
4.	Make self-adjustments	Enshassi, et. al., 2018; Liang, et. al., 2018	2
5.	Compromise	Enshassi, et. al., 2018; Liang, et. al., 2018; Chan, et. al., 2016	3
6.	Plan and initiate actions	Langdon and Sawang, 2018; Enshassi, et. al., 2018; Liang, et. al., 2018; Sunindijo and Kamardeen, 2017; Chan, et. al., 2016	5
7.	Try alternative approaches	Enshassi, et. al., 2018; Liang, et. al., 2018	2
8.	Plan ahead for emergency situations	Enshassi, et. al., 2018; Liang, et. al., 2018	2
<i>Cognitive reappraisal</i>			
9.	Reappraise and find controllable variables	Enshassi, et. al., 2018; Liang, et. al., 2018; Chan, et. al., 2016	3
10.	Enquire more about problem	Enshassi, et. al., 2018; Liang, et. al., 2018	2
11.	Accept and learn from mistake	Langdon and Sawang, 2018; Enshassi, et. al., 2018; Liang, et. al., 2018; Sunindijo and Kamardeen, 2017	4
12.	Positive perspective of situations	Langdon and Sawang, 2018; Enshassi, et. al., 2018; Liang, et. al., 2018; Sunindijo and Kamardeen, 2017	4
<i>Instrumental-support seeking</i>			
13.	Consult senior or experienced colleagues	Langdon and Sawang, 2018; Enshassi, et. al., 2018; Liang, et. al., 2018; Chan, et. al., 2016; Bowen, et. al., 2014c	5
<b>EMOTIONAL-FOCUSED COPING STRATEGIES</b>			
<i>Emotional discharge</i>			
14.	Physical exercise	Enshassi, et. al., 2018; Liang, et. al., 2018; Chan, et. al., 2016; Bowen, et. al., 2014c	4
15.	Read books or watch DVDs	Enshassi, et. al., 2018; Liang, et. al., 2018; Chan, et. al., 2016; Bowen, et. al., 2014c	4
16.	Listen to music	Enshassi, et. al., 2018; Liang, et. al., 2018; Chan, et. al., 2016; Bowen, et. al., 2014c	4
17.	Talk	Langdon and Sawang, 2018; Enshassi, et. al., 2018; Liang, et. al., 2018; Sunindijo and Kamardeen, 2017; Chan, et. al., 2016	5
18.	Cry	Enshassi, et. al., 2018; Liang, et. al., 2018; Chan, et. al., 2016	3

19.	Eat a lot	Enshassi, et. al., 2018; Liang, et. al., 2018; Chan, et. al., 2016	3
20.	Excess Smoking	Enshassi, et. al., 2018; Liang, et. al., 2018; Chan, et. al., 2016; Bowen, et. al., 2014b; Bowen, et. al., 2014c	5
21.	Sleep or take rests	Enshassi, et. al., 2018; Liang, et. al., 2018; Chan, et. al., 2016	3
22.	Go for walks	Enshassi, et. al., 2018; Liang, et. al., 2018; Chan, et. al., 2016	3
23.	Scold or take it out on others	Langdon and Sawang, 2018; Enshassi, et. al., 2018; Liang, et. al., 2018; Chan, et. al., 2016	4
24.	Drink excess alcohol	Enshassi, et. al., 2018; Liang, et. al., 2018; ; Sunindijo and Kamardeen, 2017; Bowen, et. al., 2014b; Bowen, et. al., 2014c	5
25.	Use of narcotics	Enshassi, et. al., 2018; Liang, et. al., 2018; Bowen, et. al., 2014b; Bowen, et. al., 2014c	4
26.	Excess intake of nicotine or coffee	Enshassi, et. al., 2018; Liang, et. al., 2018; Bowen, et. al., 2014c	3
27.	Engage in spiritual activities	Langdon and Sawang, 2018; Enshassi, et. al., 2018; Liang, et. al., 2018; Sunindijo and Kamardeen, 2017	4
<b><i>Escapism-avoidance</i></b>			
28.	Do or think of unrelated things	Enshassi, et. al., 2018; Liang, et. al., 2018; Chan, et. al., 2016	3
29.	Avoid phone calls	Enshassi, et. al., 2018; Liang, et. al., 2018; Chan, et. al., 2016	3
30.	Refuse stressful tasks	Enshassi, et. al., 2018; Liang, et. al., 2018; Chan, et. al., 2016	3
<b><i>Distancing</i></b>			
31.	Absenteeism	Langdon and Sawang, 2018; Enshassi, et. al., 2018; Liang, et. al., 2018; Chan, et. al., 2016	4
32.	Social isolation	Enshassi, et. al., 2018; Liang, et. al., 2018; Sunindijo and Kamardeen, 2017	3
<b><i>Social-support seeking</i></b>			
33.	Attend social gatherings with friends	Enshassi, et. al., 2018; Liang, et. al., 2018; Chan, et. al., 2016; Bowen, et. al., 2014c	4
34.	Seek emotional support by talking with friends or family for advice	Enshassi, et. al., 2018; Liang, et. al., 2018; Sunindijo and Kamardeen, 2017; Chan, et. al., 2016	4

The study conducted by Bowen, et. al., (2014c) to investigate workplace stress, stress effects, and coping mechanisms in the construction industry, also revealed a wide range of positive coping mechanisms (or countermeasures). As mitigation strategies for occupational stress, Bowen, et. al., (2014a) recommended that employers should first target primary

prevention measures by conducting regular reviews of work scheduling requirements and workload allocations. They should empower employees with greater job control and foster a more supportive work environment. Secondary measures were suggested to address organizational impacts would include undertaking employee stress appraisals and holding stress management workshops. (Bowen, et. al., 2014a). Enshassi, et. al., (2018) conducted a study to investigate the dominant coping behaviours to overcome stress among construction professionals at the Gaza Strip. Liang, et. al., (2018) explored 15 coping behaviours (categorized as either problem based, or emotion based), 5 emotional and 11 physical stress symptoms, and 5 indicators of Construction workers' performance and safety. Chan, et. al., (2014) explored the structural relationships between cultural values and coping behaviours of professionals in the stressful construction industry.

Most of these researchers adopt the Ways of Coping Questionnaire (WCQ) designed by previous researchers like Folkman and Lazarus (1988) for their study. The coping behaviours were grouped under problem-focused and emotional-focused coping behaviours. The problem-focused coping behaviours were divided further into planful problem-solving, instrumental-support seeking and cognitive reappraisal, whereas, emotional-focused coping behaviours were grouped under escapism-avoidance, emotional discharge, social-support seeking and distancing. These WCQ coping behaviours measurement instrument are widely used, however, their psychometric properties and conceptualisation should be reviewed critically (Chan, 1994; Yip and Rowlinson, 2006). The concept of psychological health management has also been revealed by researchers to be complex in nature (Lingard and Rowlinson, 2005). However, these quantitative models appear to be simple and ignore the importance of individual diversity.

This study seeks to develop a new structure of coping behaviours from the focus group study of construction workers in Ghana. The hypothesis to be tested assumed there is no

statistically significant difference between the mean scores of the coping strategies obtained from the construction professionals and construction trade workers.

### **5.3 Chapter 5 Summary**

This chapter presents the background of the study for research objectives 4 and 5 on potential effects of psychological health condition on construction employees and the construction industry and the coping strategies adopted by construction employees as their responses or efforts to deal with the causes and effects of occupational psychological disorders. The hypothesis to be tested assumed there is no statistically significant difference between the mean scores of the effects and coping strategies obtained from the construction professionals and construction trade workers.

## **CHAPTER 6**

### **ORGANISATIONAL PREVENTIVE STRATEGIES AND FACTORS FOR EFFECTIVE IMPLEMENTATION FOR PSYCHOLOGICAL HEALTH INTERVENTIONS**

#### **6.1 Organizational preventive measures to mitigate the causes of psychological distress in the construction industry**

##### **6.1.1 Introduction**

The construction industry has been revealed to be both physically and psychologically demanding, which has led to various forms of psychological distress among the construction employees (Oswald, et. al., 2019; Jacobsen, et. al., 2013). Psychological distress in the workplace is, however, often dismissed or ignored as many people perceive the condition as a sign of weakness (Follmer and Jones, 2018; Ganster and Rosen, 2013). Thus, many employees suffer in silence, leading to adverse consequences on their behavioural and physiological health, with further effects on the outcomes of the construction industry (Follmer and Jones, 2018). There is, therefore, a need to identify preventive measures that both organizations and individuals can adopt to mitigate the causes of psychological distress in the construction industry. The critical need to improve the psychological health and well-being of construction employees have gained some attention globally (Lingard and Turner, 2017; Oude, et. al., 2012). Many researchers have reported that a significant number of construction employees have some form of psychological distress such as stress, anxiety, and depression, which affect their mood, social and work functioning (Leung, et. al., 2016; Bowen, et. al., 2014; Jacobsen, et. al., 2013; Abbe, et. al., 2011). Common symptoms of psychological distress reported among the construction employees include chronic fatigue, suicidal thoughts, headaches, and insomnia (Jacobsen, et. al., 2013; Leung, et. al., 2016; Abbe, et. al., 2011).

The uncertain, dynamic, complex nature of the construction industry, with staff being hired and fired periodically and the pressure of meeting time, cost and quality standards are

potential sources of psychological distress among construction employees, especially those in the developing countries (Bowen, et. al., 2014; Ibem, et. al., 2011). Other construction work characteristics such as the work environment, workload, role demands, social relations, financial matters, organizational culture are some other factors that are likely to expose construction employees to psychological distress (Leung, et. al., 2016; Boschman, et. al., 2013). Poor psychological health of construction employees has been revealed to have both direct and indirect consequences to the construction industry (Bowen, et. al., 2014; Pescud, et. al., 2015).

The magnitude of the impact of psychological distress requires the need to implement workplace psychological health preventive measures in the construction industry (Oude, et. al., 2012; Leung, et. al., 2016). The implementation strategies to be adopted must consider both organizational and individual factors for preventive organizational strategies (Quick and Henderson, 2016). This study, therefore, draws on the multi-level perspective of the socio-ecological theory to identify measures that can impact construction employees' psychological health, considering factors such as the area of context, environmental factors, and behavioural issues. A mixed-methods approach in the sequential form of employing first qualitative methods of interviews, then followed by a questionnaire survey, was adopted for the study. The choice of sequential blending methods was made with the aim to understand the problem, to refine the scope of the interventions reviewed by previous studies, and to evaluate the suggestions identified from the qualitative study. Both the qualitative and quantitative studies targeted participants who would be involved in the development, implementation, maintenance, and utilization of the strategic measures in the workplace or who would be involved in removing obstacles to any of these issues.

Various stakeholders share an interest in the health and well-being of employees in the construction industry. These include the construction professionals or project team members,

construction trade workers, insurance companies, regulatory institutions, occupational physicians and psychologist, labour unions, and other government departments (Lingard and Turner, 2017; Pescud, et. al., 2015; Boschman, et. al., 2013; Leung, et. al., 2016). Enquiring directly from the person concern about factors that influence their health outcomes and behaviours provides a new essential perspective (Pescud, et. al., 2015). This study was therefore limited to construction professionals (such as Architects, Engineers, Quantity Surveyors, Construction Managers), construction trade workers (such as Masons, Carpenters, Plumbers, Steel Benders, Electricians) and labour personnel (selected from regulatory institutions such as the Factories Inspectorate Department, Labour Department, and Occupational Psychological Health Sectors). Based on the multiple perspectives of the socio-ecological theory, a comparative study was conducted to identify the key organizational preventive measures revealed among the groups and within the groups of respondents.

### **6.1.2 Literature review on organisational preventives strategies**

The construction industry in developing countries such as Ghana is particularly vulnerable to psychological health issues, which emanates from various factors such as daily hassles, individual lifestyle, environmental and organizational factors all of which can contribute to poor psychological health (Fordjour, et. al., 2020b; Ibem, et. al., 2011). In a less-resourced developing country such as the Ghanaian construction industry, the psychological health of the labour force is often ignored and not addressed to the required extent (Fordjour, et. al., 2019b). A research study conducted with 300 construction employees in Ghana revealed that about 53% of the respondents were suffering from some form of psychological distress (Fordjour and Chan, 2019). A follow-up study also revealed 42 construction work-related factors that expose the Ghanaian construction employees to the risk of psychological distress. These factors were further grouped under seven main constructs namely: high task demands,



high role demands, poor interpersonal working relationships, poor work conditions, unfair rewards and treatments, lack of autonomy and lack of feedback (Fordjour, et. al., 2019d).

The direct cost consequences associated with the psychological health of construction employees included low productivity, poor work performance, work stoppage, absenteeism or sick leave, increased medical costs, and high turnover (Fordjour, et. al., 2020a). The indirect costs that have been revealed as consequences of employees' psychological health conditions also included job dissatisfaction, low motivation, breakdown in communication, errors in work decisions, and violence at work (Fordjour and Chan, 2019). The effects of employees' psychological distress can be gravely significant on the construction industry, especially those in the developing countries, affecting the organization's outcome in terms of time, cost and quality outputs (Abbe, et. al., 2011; Leung, et. al., 2016). It was, therefore, expedient to conduct a study on organizational preventive measures that can be adopted to mitigate the causes and effects of psychological distress in the construction industry of Ghana.

### **6.1.3 Theoretical concepts on organizational preventive psychological health interventions**

This study stems from the field of occupational health psychology, which is distinguished by its focus on work environments and various occupational settings aim at having healthy employees in a healthy work environment as well as ensuring a healthy balance between work and family-home interactions (Quick, et. al., 2013; Shan, et. al. 2017). Occupational health psychology incorporates the therapeutic and preventive interventions, which are designed to ensure healthy employees in a healthy work environment (Quick, et. al., 2013). This discipline, therefore, has a threefold focus, that is on the work environment, the individual, and the work-home interface; with the intent is to achieve a healthy fit of people in their work environment by modifying one, another, or a combination of these three dimensions (Quick and Henderson, 2016; Beehr, 2019).

Occupational health psychologists such as Chaparral advocated that the culture of every organization should emphasize its employees as human resources, not labour costs (Quick, et. al., 2013). The psychological and intellectual contributions of the employees to the organization's outcome should also be emphasized, as opposed to the focus on only the manual and physical contributions (Di Fabio, 2017; Masterson, et. al., 2017). The concept of "mentofactoring", which means made by the mind, is borrowed word from the manufacturing industry and embodies the notion of regarding the intellectual contributions of employees in the production process (Hargrove, et. al., 2011). It has been revealed that even in a challenging industry such as the manufacturing industry, job performance, and the psychological health of employees are mutually reinforcing objectives (Quick, et. al., 2013). Hence, every company should provide a psychologically safe and healthy work environment for all of its persons employed, with the belief that the company grows with excellence in direct proportion to the psychological well-being of its employees. Companies need to adopt organizational preventive management strategies to mitigate the causes of employees' psychological distress and thereby enhance their psychological well-being (Forastieri, 2016).

#### ***Previous studies on psychological health interventions in the construction industry***

Psychological health interventions to mitigate the causes and effects of psychological health conditions among construction employees were explored by the previous researchers. Table 6.1 presents the interventions identified from the studies reviewed.

**Table 6.1: Psychological health interventions identified from the studies reviewed**

<b>Ref.</b>	<b>Interventions for psychological health identified</b>	<b>Sources</b>	<b>No. of studies</b>
1.	Job control	Sommovigo, et. al., 2019; Jepson, et. al., 2017; Leung, et. al., 2016; Leung, et. al., 2015; Bowen, et. al., 2014a; Bowen, et. al., 2014b	6
2.	Job support	Cattell, et. al., 2016; Leung, et. al., 2015; Bowen, et. al., 2014b; Bowen, et. al., 2014d	4
3.	Applying emotional intelligence	Jepson, et. al., 2017; Bowen, et. al., 2014c	2
4.	Behavioural health promotion programmes	Lingard and Turner, 2017	1
5.	Mindfulness	Leung, et. al., 2016c	1
6.	Optimism,	Jepson, et. al., 2017	1
7.	Active planning strategies	Jepson, et. al., 2017	1
8.	Working with good teams	Jepson, et. al., 2017	1
9.	Using theirs and their team's experience	Jepson, et. al., 2017	1
10.	Implementing sound systems and processes	Jepson, et. al., 2017	1
11.	Effectively researching and gathering information	Jepson, et. al., 2017	1
12.	Physical exercise	Bowen, et. al., 2014c	1
13.	Cultural activities	Bowen, et. al., 2014c	1

Lingard and Turner, (2017) explored the factors impacting the effectiveness of a health promotion programme implemented. The findings suggest that the adoption of healthy behaviours is influenced by factors operating at and between individual, family, workplace and industry levels. These factors suggest key leverage points that can be addressed in the design of future health promotion interventions for the construction industry (Lingard and Turner, 2017). Jepson, et. al., (2017) explored the views of project managers on what their key stressors were and the mechanisms they use to manage effectively their stress. The results showed that structural, technical and directional complexity of projects was high, but this did not always convert into more stress for the project managers. The results indicate that stressors like the lack of resources; lack of control and increasing accountability were project managers' primary concerns. Coping strategies such as the use of emotional intelligence, active planning measures,

optimism, teamwork, effective researching and gathering information, and implementation of sound systems and processes were revealed to be employed to deal with occupational stress (Jepson, et. al., 2017).

Sommovigo, et. al., (2019) investigated whether job resources (that is job control and supervisor support) could independently buffer the relationship between job demands (that is workload, emotional demands and work pace) and psycho-physical health among alpine transit tunnel construction employees. Their results indicate that workers who perceived higher job control and supervisor support were less likely to experience psycho-physical malaise, even in presence of high workload and work pace (Sommovigo, et. al., 2019). Leung, et. al., (2016b) explored the characteristics that mindfulness consists of, and the effects of each mindfulness characteristic on the stress and performance of construction workers remain unknown. In view of this, the study set out to frame the mindfulness characteristics into theoretical categories, and investigate the complicated relationships among mindfulness characteristics, stress, and performance. The results show that mindfulness characteristics indirectly improve construction workers' performance by relieving their physical and emotional stress through observation and awareness and impairs construction workers' organizational performance. However, the study interestingly revealed that the mindfulness attitude group has no effect on construction workers' stress and performance, while decentering even harms their safety performance (Leung, et. al., 2016b).

#### **6.1.4 Previous findings on organizational strategies for preventive psychological health intervention**

Organizational preventive management strategies for psychological ill-health conditions are usually aimed primarily at the job factors such as the task demands, role demands, physical demands and interpersonal demands expected of the workers (Pescud, et. al., 2015; Oude, et. al., 2012). Many of the organizational preventive methods against

psychological distress are aimed at altering the organization's structure and practices by changing the nature of the different work demands (Briner and Rousseau, 2011; Forastieri, 2016). This statement indicates that organizational preventive management strategies for improving psychological health are focused on eliminating unnecessary work demands while refining the necessary demands and assisting employees in managing the work demands in a healthy way. The common organizational preventive methods that are concerned with the work demands include flexible working schedules, task redesign, and employee career development (Quick and Henderson, 2016; Martin, et. al., 2016; Daniels, et. al., 2017; Schaufeli, 2017).

Flexible work schedule as a strategy is usually employed on specific dimensions of the employee's job and affords the individual an increased discretion in the management of both their personal and professional demands (Quick, et. al., 2013). Job redesign is, however, concerned with how a person-job fit can be improved and explicitly emphasize the processes and core characteristics of an individual's job (Hargrove, et. al., 2011). Career development also focuses on the knowledge and skills required of employees to grow in the various job positions and the sequence of job opportunity an individual might have over time (Quick and Henderson, 2016; Schaufeli, 2017). These organizational preventive methods are, therefore, concerned with the structure and design of the work, as well as the sequence of the individual's work performance.

Sauter and Hurrell (2017) also proposed preventive management strategies for the prevention of work-related psychological distress, which embodied the concepts of public health and preventive medicine. The four major components of the proposed strategy are (a) job and work redesign, (b) surveillance of causes and symptoms of psychological distress in the workplace, (c) training and educative programs, and (d) psychological health service delivery for distressed employees. The main intent of this proposed strategy is to enhance the development of psychologically safe and healthy occupational settings and work environments

(Sauter and Hurrell, 2017).

Previous studies also revealed workplace interventions for psychological disorders which include: increased employee control, physical activity, workplace health promotion, counselling, screening, medication, Cognitive behavioural therapy (CBT)-based stress management interventions (SMI), Exposure therapy for established anxiety disorders and post-traumatic stress disorder (PTSD), and Psychological debriefing following a potentially traumatic event in the workplace (Joyce, et. al., 2016; Schaufeli, 2017; Daniels, et. al., 2017).

Some construction workplaces around the world have already implemented preventive measures which usually include health promotional programmes targeted at improving the overall health and well-being of the construction employees (Lingard and Turner, 2017). Examples of these are exercise to reduce shoulder and back pain, smoking cessation campaign, weight reduction activities and consumption of healthy meals (Pescud, et. al., 2015; Lingard and Turner, 2017; Oude, et. al., 2012). However, many of these preventive interventions only focus on addressing the employees' behaviour relative to the psychological health outcome. Several factors, such as socio-economic, organizational, and environmental factors that also influence the psychological health and well-being of the construction employees are usually ignored when addressing preventive strategies and must be assessed holistically incorporating employee behavioural factors (Quick and Henderson, 2016; Furnham, 2005).

Quick, et. al. (2013) also stated that the implementation strategy and specific techniques of preventive organizational measures should be suitable for a particular organization, considering the culture and nature of the organization, even though the basic guidelines should be the same for all organizations.

### **6.1.5 Guiding principles for organizational psychological health prevention**

Preventive psychological health management strategies can be described as a set of principles and organizational philosophies that employ specific methods for the promotion of psychological health of individuals in the organization while preventing the work-related causes of psychological distress (Quick and Henderson, 2016; Hargrove, et. al., 2011). The two aims of preventive psychological health management strategies as captured by the preceding definition are (a) to promote psychological health of individuals in the organization and (b) to minimize the work-related causes of psychological distress, as manifested in a various form of symptomatic and asymptomatic diseases (Quick, et. al., 2013; Hargrove, et. al., 2011). Achieving the first objective requires will require organizational measures directed toward improving the levels of productivity, flexibility, and adaptability. The second aim seeks to minimize and, if possible, avert the causes of psychological distress from the organization (Hargrove, et. al., 2011).

Quick, et. al., (2013) outlined some guiding principles for organizational psychological health prevention, which embodies the central concept of the philosophy of occupational health psychology, as follows:

1. Individual psychological health and the organizational outcome are interdependent.
2. Managers have a responsibility for workers' psychological health and well-being.
3. Work-related causes of psychological distress are not inevitable.
4. Each individual and organization reacts uniquely to the effects of psychological distress.
5. Organizations are dynamic and ever-changing entities.

Preventive psychological health management strategies take the public health notion of preventive medicines and translate them for application to occupational psychological health practices in the work organizations (Hargrove, et. al., 2011). The major foci within preventive

medicine for psychological distress are psychological health risks, symptomatic disease, and asymptomatic disease (Quick, et. al., 2013). Psychological health risks predispose an individual to develop some condition, either with or without symptoms, such as pain or discomfort, or recognizable clinical signs (Boschman, et. al. 2013; Abbe, et. al., 2011). The power of preventive medicine is also employed for the development of preventive strategies to address psychological health risks (primary prevention), asymptomatic diseases (secondary prevention), and symptomatic diseases (tertiary prevention) (Quick and Henderson, 2016). There are, therefore, three stages of organizational psychological health prevention, which are directed towards the cause or stressor, the response, or the resulting symptoms of psychological stress (Quick, et. al., 2013). The translation of these notions of prevention leads to these three foci of prevention, namely the primary, secondary, and tertiary stages of prevention (Quick, et. al., 2013; Quick and Henderson, 2016).

### ***Primary preventive management strategies***

Primary preventive management strategies seek to prevent the work-related causes of psychological distress from happening, by focusing on the job, the employee, or the interface between the employee and the workplace (Schaufeli, 2017; Daniels, et. al., 2017). The main intent of the primary preventive strategy is to shift the source of psychological distress and prevent the condition from arising in the first place (Quick, et. al., 2013). The primary preventive strategies are classified into two types, namely, reactive and proactive approaches (Quick and Henderson, 2016; Hargrove, et. al., 2011). The reactive approach aims to identify and alter those aspects of the job or work environment that are likely to expose the employees to the conditions of psychological distress (Forastieri, 2016). Proactive approaches, on the other hand, focus on providing a stress-free working environment by focusing on the workplace itself (Hargrove, et. al., 2011).



According to Jordan, et. al. (2003), a primary intervention strategy called “Work-Life Solutions was an example of a successful primary management strategy employed at London Electricity as a health promotion programme designed to obtain healthy work-life balance for employees. This strategy increased employees’ flexibility at work and targeted the employees whose lifestyle makes working the traditional working hours a day difficult (Jordan, et. al., 2003). Primary preventive measures such as work-life solutions are beneficial for the employees to be able to balance their work with their other personal demands and also benefit the organization, as trained employees who might otherwise stop work are retained (Lowe, 2004). Examples of the primary preventive strategies include job sharing, part-time work, term-time only work, working from home, and several other flexible work provisions (Giga, et. al., 2003; Harkness, et. al., 2005). The suitability of the measures in the specific case based on the employee work schedules, as well as the organization’s policy is considered before these measures are implemented in the organization (Lingard and Turner, 2017; Quick, et. al., 2013).

### ***Secondary preventive management strategies***

Secondary preventive management strategies attempt to minimize the impact of the causes of psychological stress and reduce the seriousness of its effects on the individual employee (Hargrove, et. al., 2011). The secondary preventive strategies aim to treat the effects of a problem or dysfunction experienced by the individual employee (Martin, et. al., 2016). Usually, such strategies involve interventions by psychologists, counsellors or doctors, however dealing with work-related psychological health issues can be challenging for the various providers (Quick and Henderson, 2016; Pescud, et. al., 2015). Some specialist expertise or knowledge on occupational health psychology is essential to provide better treatment for an employee suffering from the ill effects of psychological distress, without causing long term harmful effects to the employee’s recovery and delay their return to work (Briner and Rousseau, 2011). General practitioners are usually the main focal point of treatment;

unfortunately, most general practitioners do not have any specialist expertise in the area of occupational health psychology (Sterling, et. al., 2011). This buttresses earlier researchers who argues that the 'medicalization' of psychological distress can delay recovery and the return to work by shifting power from the employee and the employer to the medical practitioner, who is given control over the timescale and method by which the employee will return to health (Campbell, et. al., 2004; Sterling, et. al., 2011). Also, drugs or medication prescribed by doctors as a form of psychological health management strategy may improve the crisis in the short term but can have adverse effects if the medication is habit or dependency forming (Singh, 2008).

Research by Heron (2002) revealed an effective secondary preventive management strategy of various organizations called "counselling and life management", or the CALM programme, which was developed by AstraZeneca. Information was made available to employees on a wide range of emotional topics, such as tackling stress, managing anxiety, coping with depression, dealing with harassment at work, coping with bereavement, maintaining close relationships, and dealing with family problems (Heron, 2002). The CALM programme as a secondary preventive management strategy, therefore, provided employees with health and lifestyle education as well as confidential support to assist them in resolving problems that occur both in and outside of work.

### ***Tertiary preventive management strategies***

Tertiary preventive management strategies entail recognizing and treating the ill effects of psychological distress once they have taken place and rehabilitating the person under psychological distress to enable them to return to work as quickly as possible (Oude, et. al., 2012; Pescud, et. al., 2015). Tertiary strategies are used after the employee has been diagnosed as suffering from the ill effects of psychological distress and aim to restore the individual and aid their return to work (Daniels, et. al., 2017). The most common tertiary preventive management strategy is the case management approach, which provided a return to work plan

for the employees with a well-coordinated approach between the various treatment providers, which is also cost-effective as possible (Quick, et. al., 2013). The case management approach, therefore, ensures that the strategies employed for the employee's treatment and rehabilitation are well planned, coordinated, and monitored by professionals such as a medical practitioner in conjunction with both the employee and the employer (Hargrove, et. al., 2011). This tertiary strategy, therefore, aims to achieve mutually agreed decisions by a combination of the services and treatment to assist the employee in returning to work (Quick and Henderson, 2016).

Another study by Jordan, et. al., (2003) revealed a tertiary preventive management strategy known as Employee Support Programme, which was employed at London Electricity for the rehabilitation of employees who have been absent from work due to the effects of psychological distress. The employee support programme was run by an external network of professional counsellors and also managed by a clinical psychologist. The employee referred to the counselling services is provided with several sessions with a clinical psychologist, who then has to decide after gathering enough evidence, whether the source of the psychological distress is work-related. If this is the case, a series of meetings are organized with the employee, the management, the counsellors, and representatives from occupational health psychology and the labour department to address the concern. Based on these meetings, a plan of action is agreed upon to assist the employee in returning to work after full recovery (Jordan, et. al., 2003). It is only when management and the employees themselves will control the sources of psychological distress at the workplace that optimum psychological health and well-being of employees can be obtained (Quick, et. al., 2013).

The principles of preventive psychological health management strategies and the organizational specific strategies for implementing these principles should be a guide for both the selection and the use of specific organizational preventive methods (Quick, et. al., 2013). Organizational preventive methods should aim at altering the work-related causes of

psychological distress (Forastieri, 2016). This study, therefore, sought to identify organizational preventive strategies that are comprehensive and address aspects of the construction organization in Ghana as points of interventions for employees' psychological health and well-being. The hypothesis to be tested assumed there is no statistically significant difference between the mean scores of the organisational preventive strategies obtained from the construction professionals and construction trade workers.

## **6.2 Factors associated with effective implementation of psychological health interventions in the construction industry<sup>6</sup>**

### **6.2.1 Introduction**

Prevention of psychological ill-being conditions such as burnout, stress, depression, and anxiety among employees has become an important global concern (Bowers, et. al., 2018; Jacobsen, et. al., 2013). The workplace provides a social context where a psychologically safe and healthy environment can be developed to support workers' psychological well-being (Furnham, 2005). Contemporary intervention frameworks have been developed for employees' psychological health and well-being. These interventions no longer focus exclusively on preventing and managing psychological ill-health, but instead, follow holistic approaches such as promoting well-being and improving functioning associated with preventive measures (Lingard and Turner, 2017; Oude, et. al., 2012). In general, the objective of psychological health intervention is not limited to solely preventing psychological health problems; but also aim to provide a wider range of health, social, and economic benefits (Giga, et. al., 2003).

Psychological health interventions can, therefore, be described as a process that supports and contribute to good psychological health by providing protective factors as well as identifying and addressing key risk factors (Goetzel, et. al., 2018; Jacobsen, et. al., 2013; Greenberg, 2013). Effective implementation of psychological health interventions in the workplace is an essential component of an overall strategy to enhance well-being at work (Hassard and Cox, 2016). An overarching framework for psychological health intervention and workplace wellness promotion should fully incorporate measures to promote better psychological well-being by mitigating risk factors to prevent psychological ill health and

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<sup>6</sup> Some contents of section 6.2 of this Chapter have been published in: Fordjour, G. A., Chan, A. P. C. and Tuffour-Kwarteng, L. (2020). "Factors Associated with Effective Implementation of Psychological Health Interventions in the Construction Industry". *Journal of Civil Engineering Research & Technology*, 2(1), 1-17.

undue work-related stressors (Lingard and Turner, 2017; Hassard and Cox, 2016; Giga, et. al., 2003). Psychological health intervention efforts are usually geared towards enhancing the health of workers through initiatives such as the provision of vaccinations, health risk assessments, and wellness awareness programs targeted at healthy eating, physical activities, alcohol consumption, cigarette use, and psychological health outcomes (Oude, et. al., 2012; Pescud, et. al., 2015). A sustainable approach to ensuring workers' psychological well-being should adopt measures targeted at enhancing four key areas, namely: employees' lifestyle, work attitudes, physical health, and emotional health (Lingard and Turner, 2017).

Psychological health and well-being in the workplace can be described as a broad concept that incorporates personal satisfaction, satisfaction at work and in their own life, and general health, which is a combination of physiological health and psychological health (Quick and Henderson, 2016; Furnham, 2005). A lot of evidence surrounds the value of workplace health promotion as a positive influence on employees' psychological health and well-being with improvement to their health behaviours (Pescud, et. al., 2015; Lingard and Turner, 2017; Oude, et. al., 2012). Several factors influence the implementation of workplace health promotional programs (Lingard and Turner, 2017). The factors as effective implementation determinants can have multiple levels of influence and include characteristics of the socio-political context, the intervention program, the implementer, the organization, and the individual (Lingard and Turner, 2017; Quick and Henderson, 2016). The present study employed the mixed-method approach to explore the factors associated with the effective implementation of psychological health interventions in the construction industry. Mixed methods approach employing first qualitative study, then quantitative methods to confirm the findings of the qualitative study was deemed ideal for the study, given the paucity of literature in this area and the need to know construction stakeholders' perceptions on this subject matter.

### **6.2.2 Literature review on factors for effective psychological health intervention**

Psychological health problems in the workplace have adverse consequences not only for the individual employee but also for the organization's outcome (Senaratne and Rasagopalasingam, 2017). Employees' performance, rate of illness, absenteeism, workplace accidents or injuries, and staff turnover can all be affected by employee's psychological health status (Hassard and Cox, 2016). Unemployment absenteeism, and long-term disability claims as a result of work-related stressors and psychological health problems are increasing all over the world (Quick and Henderson, 2016). For example, in 2014, 40% of all payment claims for long term disability and sickness benefits in the UK were due to psychological or behavioural disorders (Viola and Moncrieff, 2016). In European countries such as Austria and Netherlands, most of the absenteeism recorded in the various workplaces were due to psychological ill-health (Quick, et. al., 2013). Psychological disorders were the main cause of employees' incapacity, and the cost associated with psychological ill-health has been estimated to be 2.26 million euros per year (Hargrove, et. al., 2011).

Psychological health problems can often cause health complications with associated symptoms such as fatigue, impaired concentration, and memory loss (Quick and Henderson, 2016; Furnham, 2005). A longitudinal study conducted by Innstrand, et. al. (2012) revealed a positive relationship between psychological health conditions and work engagement. More specifically, as psychological health improved, work engagement also increased; conversely, as psychological health declined, work engagement also decreased (Innstrand, et. al., 2012). High levels of work engagement were found to be associated with increased levels of positive emotions, such as work and life satisfaction (Huppert, 2009; Meyer and Maltin, 2010). Also, the longitudinal study revealed that high levels of work engagement predict lower levels of psychological health conditions such as anxiety and depression (Innstrand, et. al., 2012). It was revealed in another study that depression has a more significant negative impact on productivity

and time management than any other health condition (Quick, et. al., 2013).

Psychological health condition is also associated with a condition referred to as sickness presenteeism, which means being mentally or cognitively absent but physically present at work (Hassard and Cox, 2016). Previous studies have also revealed that presenteeism was linked to conditions such as chronic fatigue, musculoskeletal pain, and depression (Bowers, et. al., 2018; Senaratne and Rasagopalasingam, 2017). It was estimated by Sainsbury Centre for Mental Health in 2007 that deteriorating work efficiency due to poor psychological health costs £15.1 billion or £605 for every employee in the UK, which is almost twice the annual costs of £8.1 million estimated for absenteeism (Hassard and Cox, 2016). Some previous studies estimated that the costs of impaired presenteeism due to psychological health problems are almost four to five times higher than the costs of absenteeism (Hassard, et. al., 2018; Boschman, et. al., 2013). Besides, according to the Organization for Economic Co-operation and Development (OECD), the cost of psychological health problems for businesses is estimated at £ 1,035 for each employee in the labour market (Hassard and Cox, 2016).

### **6.2.3 Previous findings on factors associated with implementation of interventions**

Factors associated with the implementation of interventions are barriers and facilitators that impede or facilitate behavioural change for successful implementation (Briner and Rousseau, 2011; Quick and Henderson, 2016). Various theories and models have been developed that show several factors that influence the implementation of clinical guidelines. These theories and models are usually developed for a specific organization. For instance, a comprehensive framework developed by Fleuren, et. al. (2004) focuses on implementation factors that relate to the health care organizations. The general outline of this framework by Fleuren, et. al., (2004) was derived from the Social Cognitive Theory, the Theory of Planned Behaviour, and from previous findings on factors associated with the implementation of



HIV/AIDS education in Dutch secondary schools. The framework describes that at each stage of an intervention process (that is dissemination, adoption, application, and continuation) the desired adoption may or may not occur due to various factors acting as barriers or facilitators of change. Fleuren, et. al. (2004) identified 49 factors that may impede or facilitate the implementation process of an intervention based on findings from the literature review and a Delphi study among implementation experts. The influential factors were classified into five major constructs, and these were: characteristics of the socio-political context (such as policy, laws, regulations, and social network), the characteristics of the organization (such as management support and resources), characteristics of the user (such as knowledge and skills of the occupational health psychology), characteristics of the intervention (such as ethical considerations, observability, and advantages in practice of the guideline), and characteristics of the innovation strategy (such as materials, training, and feedback). The framework of barriers and facilitators designed by Fleuren, et. al. (2004) as factors associated with an intervention process may be limited to the health sector and might not be suitable for the construction industry. The literature on the subject area is limited in the construction industry, with few studies exploring mainly barriers to stress management programmes.

This study attempts to address the knowledge gap by identifying factors associated with the implementation of psychological health interventions. The hypothesis to be tested assumed there is no statistically significant difference between the mean scores of the influential factors obtained from the construction professionals and construction trade workers.

### **6.3 Chapter 6 Summary**

This chapter presents the background of study on objectives 6 and 7 on organisational measures to mitigate the causes of psychological health conditions and the factors associated with effective implementation of psychological health interventions in the construction industry. The hypothesis to be tested assumed there is no statistically significant difference between the mean scores of the organisational preventive strategies and influential factors obtained from the construction professionals and construction trade workers.

## **CHAPTER 7**

### **RESULTS AND DISCUSSIONS FOR DETERMINANTS AND CAUSES OF PSYCHOLOGICAL HEALTH CONDITIONS**

#### **7.1 Tracing the determinants of psychological well-being and ill-being conditions among the construction employees<sup>7</sup>**

This research aimed at identifying whether the participants were in a positive or negative state of occupational psychological conditions based on the responses provided. The psychological health symptoms were grouped under four main constructs physical symptoms, emotional symptoms, cognitive symptoms, and behavioural symptoms, using thematic analysis. The presence of any of these symptoms depicted a psychological ill-being state, while the absence of these symptoms depicted a psychological well-being state.

##### **7.1.1 Results on psychological health status of construction employees in Ghana**

The responses provided by the participants were used to determine whether a participant based on a measure was in a state of psychological well-being or ill-being. The respondents who chose from 1 to 3 scale (1= Very Frequently, 2= Frequently and 3= Occasionally) for any of the measures were indicated to be in a negative state of psychological ill-being for that measure. Likewise, the respondents who chose from 4 to 6 scale (4= Rarely, 5= Rarely and 6= Not at all) for any of the measures were indicated to be in a positive state of psychological well-being for that measure. Using the Statistical Package for Social Scientists (SPSS) version 19, the data obtained was transformed and recoded into different variables for the purpose of interpretation (Lo, 2018). The values of 1, 2, and 3 were changed to the value of 7 to indicate the positive state of psychological well-being. The values of 4, 5, and 6 were

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<sup>7</sup> Some contents of section 7.1 of this Chapter have been published in: Fordjour, G. A., and Chan, A. P. C. (2020), "Tracing Symptoms of Psychological Health Status among Construction Employees". *Journal of Health and Medical Sciences*, 3(1), 104-118.

also changed to the value of 8, to indicate the negative state of psychological ill-being.

The data were analysed using descriptive statistics, with the frequency and percentage scores of the positive state and negative state of the two construction working groups compared. The results of the frequency distribution and percentage distribution are presented in Table 7.1. Values marked with <sup>(a)</sup> represent scores from the construction professionals' group and values marked with <sup>(b)</sup> represent scores from the construction trade workers' group.

**Table 7.1: Results of the psychological state of construction professionals<sup>(a)</sup> and construction trade workers <sup>(b)</sup>**

Construct	No.	Measure for Symptoms	Frequency values (150 participants each)		Percentage values	
			Well-being State	Ill-being State	Well-being State	Ill-being State
Physical Symptoms	S1	Physically exhausted/ Worn-out/ Tired	56 <sup>a</sup> , 33 <sup>b</sup>	94 <sup>a</sup> , 117 <sup>b</sup>	37% <sup>a</sup> , 22% <sup>b</sup>	63% <sup>a</sup> , 78% <sup>b</sup>
	S2	Muscular tension / aches	64 <sup>a</sup> , 49 <sup>b</sup>	86 <sup>a</sup> , 101 <sup>b</sup>	43% <sup>a</sup> , 33% <sup>b</sup>	57% <sup>a</sup> , 67% <sup>b</sup>
	S3	Feeling nauseous/ stomachache/ diarrhoea/ indigestion	66 <sup>a</sup> , 68 <sup>b</sup>	84 <sup>a</sup> , 82 <sup>b</sup>	44% <sup>a</sup> , 45% <sup>b</sup>	56% <sup>a</sup> , 55% <sup>b</sup>
	S4	Chest pain	106 <sup>a</sup> , 101 <sup>b</sup>	44 <sup>a</sup> , 49 <sup>b</sup>	71% <sup>a</sup> , 67% <sup>b</sup>	29% <sup>a</sup> , 33% <sup>b</sup>
	S5	Increased rate of heartbeat	117 <sup>a</sup> , 46 <sup>b</sup>	33 <sup>a</sup> , 104 <sup>b</sup>	78% <sup>a</sup> , 31% <sup>b</sup>	22% <sup>a</sup> , 69% <sup>b</sup>
	S6	Shallow or rapid breathing	97 <sup>a</sup> , 79 <sup>b</sup>	53 <sup>a</sup> , 71 <sup>b</sup>	65% <sup>a</sup> , 53% <sup>b</sup>	35% <sup>a</sup> , 47% <sup>b</sup>
	S7	Lower Back Pain	60 <sup>a</sup> , 47 <sup>b</sup>	90 <sup>a</sup> , 103 <sup>b</sup>	40% <sup>a</sup> , 31% <sup>b</sup>	60% <sup>a</sup> , 69% <sup>b</sup>
	S8	Chronic Headaches	53 <sup>a</sup> , 50 <sup>b</sup>	97 <sup>a</sup> , 100 <sup>b</sup>	35% <sup>a</sup> , 33% <sup>b</sup>	65% <sup>a</sup> , 67% <sup>b</sup>
	S9	Skin Problems	101 <sup>a</sup> , 81 <sup>b</sup>	49 <sup>a</sup> , 69 <sup>b</sup>	67% <sup>a</sup> , 54% <sup>b</sup>	33% <sup>a</sup> , 46% <sup>b</sup>
	S10	Blood in Urine or Urinate frequently	93 <sup>a</sup> , 77 <sup>b</sup>	57 <sup>a</sup> , 73 <sup>b</sup>	62% <sup>a</sup> , 51% <sup>b</sup>	38% <sup>a</sup> , 49% <sup>b</sup>
	S11	Insomnia/ difficulty sleeping	49 <sup>a</sup> , 44 <sup>b</sup>	101 <sup>a</sup> , 106 <sup>b</sup>	33% <sup>a</sup> , 29% <sup>b</sup>	67% <sup>a</sup> , 71% <sup>b</sup>
Emotional Symptoms	S12	Tensed/ Stressed	62 <sup>a</sup> , 54 <sup>b</sup>	88 <sup>a</sup> , 96 <sup>b</sup>	42% <sup>a</sup> , 36% <sup>b</sup>	58% <sup>a</sup> , 64% <sup>b</sup>
	S13	Difficulty relaxing	48 <sup>a</sup> , 41 <sup>b</sup>	102 <sup>a</sup> , 109 <sup>b</sup>	32% <sup>a</sup> , 27% <sup>b</sup>	68% <sup>a</sup> , 73% <sup>b</sup>
	S14	Worried	74 <sup>a</sup> , 66 <sup>b</sup>	76 <sup>a</sup> , 84 <sup>b</sup>	49% <sup>a</sup> , 44% <sup>b</sup>	51% <sup>a</sup> , 56% <sup>b</sup>
	S15	Irritable	96 <sup>a</sup> , 81 <sup>b</sup>	54 <sup>a</sup> , 69 <sup>b</sup>	64% <sup>a</sup> , 54% <sup>b</sup>	36% <sup>a</sup> , 46% <sup>b</sup>
	S16	Sad/ Depressed	80 <sup>a</sup> , 69 <sup>b</sup>	70 <sup>a</sup> , 81 <sup>b</sup>	53% <sup>a</sup> , 46% <sup>b</sup>	47% <sup>a</sup> , 54% <sup>b</sup>
	S17	Emotionally exhausted	102 <sup>a</sup> , 79 <sup>b</sup>	48 <sup>a</sup> , 71 <sup>b</sup>	68% <sup>a</sup> , 53% <sup>b</sup>	32% <sup>a</sup> , 47% <sup>b</sup>
	S18	Numbness	119 <sup>a</sup> , 82 <sup>b</sup>	31 <sup>a</sup> , 68 <sup>b</sup>	79% <sup>a</sup> , 55% <sup>b</sup>	21% <sup>a</sup> , 45% <sup>b</sup>
	S19	Discouraged	62 <sup>a</sup> , 60 <sup>b</sup>	88 <sup>a</sup> , 90 <sup>b</sup>	41% <sup>a</sup> , 40% <sup>b</sup>	59% <sup>a</sup> , 60% <sup>b</sup>

*Chapter 7: Results and Discussions for Determinants and Causes of Psychological Health Conditions*

	S20	Anxious	70 <sup>a</sup> , 74 <sup>b</sup>	80 <sup>a</sup> , 76 <sup>b</sup>	47% <sup>a</sup> , 49% <sup>b</sup>	53% <sup>a</sup> , 51% <sup>b</sup>
	S21	Frustration	61 <sup>a</sup> , 59 <sup>b</sup>	89 <sup>a</sup> , 91 <sup>b</sup>	41% <sup>a</sup> , 39% <sup>b</sup>	59% <sup>a</sup> , 61% <sup>b</sup>
	S22	Mood swings	98 <sup>a</sup> , 84 <sup>b</sup>	52 <sup>a</sup> , 66 <sup>b</sup>	65% <sup>a</sup> , 56% <sup>b</sup>	35% <sup>a</sup> , 44% <sup>b</sup>
	S23	Bitterness	66 <sup>a</sup> , 58 <sup>b</sup>	84 <sup>a</sup> , 92 <sup>b</sup>	44% <sup>a</sup> , 39% <sup>b</sup>	56% <sup>a</sup> , 61% <sup>b</sup>
	S24	Rage	91 <sup>a</sup> , 89 <sup>b</sup>	59 <sup>a</sup> , 61 <sup>b</sup>	61% <sup>a</sup> , 59% <sup>b</sup>	39% <sup>a</sup> , 41% <sup>b</sup>
	S25	Resentment	90 <sup>a</sup> , 83 <sup>b</sup>	60 <sup>a</sup> , 67 <sup>b</sup>	60% <sup>a</sup> , 55% <sup>b</sup>	40% <sup>a</sup> , 45% <sup>b</sup>
	S26	Crying for no particular reason	118 <sup>a</sup> , 97 <sup>b</sup>	32 <sup>a</sup> , 53 <sup>b</sup>	79% <sup>a</sup> , 65% <sup>b</sup>	21% <sup>a</sup> , 35% <sup>b</sup>
	S27	Palpitations/ perspiration/ sweaty hands	72 <sup>a</sup> , 71 <sup>b</sup>	78 <sup>a</sup> , 79 <sup>b</sup>	48% <sup>a</sup> , 47% <sup>b</sup>	52% <sup>a</sup> , 53% <sup>b</sup>
	S28	Trembling/ Nervous ticks/ Butterflies in Stomach	70 <sup>a</sup> , 57 <sup>b</sup>	80 <sup>a</sup> , 93 <sup>b</sup>	47% <sup>a</sup> , 38% <sup>b</sup>	53% <sup>a</sup> , 62% <sup>b</sup>
<b>Cognitive Symptoms</b>	S29	Hard to concentrate	74 <sup>a</sup> , 67 <sup>b</sup>	76 <sup>a</sup> , 83 <sup>b</sup>	49% <sup>a</sup> , 45% <sup>b</sup>	51% <sup>a</sup> , 55% <sup>b</sup>
	S30	Difficult to think clearly, make decisions or remember things	52 <sup>a</sup> , 51 <sup>b</sup>	98 <sup>a</sup> , 99 <sup>b</sup>	35% <sup>a</sup> , 34% <sup>b</sup>	65% <sup>a</sup> , 66% <sup>b</sup>
	S31	Addiction to ungodly habits	122 <sup>a</sup> , 99 <sup>b</sup>	28 <sup>a</sup> , 51 <sup>b</sup>	81% <sup>a</sup> , 66% <sup>b</sup>	19% <sup>a</sup> , 34% <sup>b</sup>
	S32	Increase addiction of smoking, alcohol and use of drugs	107 <sup>a</sup> , 91 <sup>b</sup>	43 <sup>a</sup> , 59 <sup>b</sup>	71% <sup>a</sup> , 61% <sup>b</sup>	29% <sup>a</sup> , 39% <sup>b</sup>
	S33	Accident- prone	60 <sup>a</sup> , 42 <sup>b</sup>	90 <sup>a</sup> , 108 <sup>b</sup>	40% <sup>a</sup> , 28% <sup>b</sup>	60% <sup>a</sup> , 72% <sup>b</sup>
	S34	Problems with speaking	79 <sup>a</sup> , 109 <sup>b</sup>	71 <sup>a</sup> , 41 <sup>b</sup>	53% <sup>a</sup> , 73% <sup>b</sup>	47% <sup>a</sup> , 27% <sup>b</sup>
	S35	Brood on previous harm or insults	110 <sup>a</sup> , 96 <sup>b</sup>	40 <sup>a</sup> , 54 <sup>b</sup>	73% <sup>a</sup> , 64% <sup>b</sup>	27% <sup>a</sup> , 36% <sup>b</sup>
	S36	Magnify issues such as injury and hurt	114 <sup>a</sup> , 82 <sup>b</sup>	36 <sup>a</sup> , 68 <sup>b</sup>	76% <sup>a</sup> , 55% <sup>b</sup>	24% <sup>a</sup> , 45% <sup>b</sup>
	S37	Exaggerate unfairness	109 <sup>a</sup> , 100 <sup>b</sup>	41 <sup>a</sup> , 50 <sup>b</sup>	73% <sup>a</sup> , 67% <sup>b</sup>	27% <sup>a</sup> , 33% <sup>b</sup>
<b>Behavioural Symptoms</b>	S38	Impulsive behaviour	101 <sup>a</sup> , 91 <sup>b</sup>	49 <sup>a</sup> , 59 <sup>b</sup>	67% <sup>a</sup> , 61% <sup>b</sup>	33% <sup>a</sup> , 39% <sup>b</sup>
	S39	Poor self-care	131 <sup>a</sup> , 53 <sup>b</sup>	19 <sup>a</sup> , 97 <sup>b</sup>	87% <sup>a</sup> , 35% <sup>b</sup>	13% <sup>a</sup> , 65% <sup>b</sup>
	S40	Grinding of teeth	112 <sup>a</sup> , 107 <sup>b</sup>	38 <sup>a</sup> , 43 <sup>b</sup>	71% <sup>a</sup> , 72% <sup>b</sup>	25% <sup>a</sup> , 29% <sup>b</sup>
	S41	Social isolation and withdrawal	67 <sup>a</sup> , 55 <sup>b</sup>	83 <sup>a</sup> , 95 <sup>b</sup>	45% <sup>a</sup> , 37% <sup>b</sup>	55% <sup>a</sup> , 63% <sup>b</sup>
	S42	Laughing or speaking in high pitch	110 <sup>a</sup> , 105 <sup>b</sup>	40 <sup>a</sup> , 45 <sup>b</sup>	70% <sup>a</sup> , 71% <sup>b</sup>	27% <sup>a</sup> , 30% <sup>b</sup>
	S43	Label or blame others for our problems	65 <sup>a</sup> , 72 <sup>b</sup>	85 <sup>a</sup> , 78 <sup>b</sup>	43% <sup>a</sup> , 48% <sup>b</sup>	57% <sup>a</sup> , 53% <sup>b</sup>
	S44	Have conflict with others	64 <sup>a</sup> , 69 <sup>b</sup>	86 <sup>a</sup> , 81 <sup>b</sup>	43% <sup>a</sup> , 46% <sup>b</sup>	57% <sup>a</sup> , 54% <sup>b</sup>
	S45	Yells at people	95 <sup>a</sup> , 88 <sup>b</sup>	55 <sup>a</sup> , 62 <sup>b</sup>	63% <sup>a</sup> , 59% <sup>b</sup>	37% <sup>a</sup> , 41% <sup>b</sup>
	S46	Hostile to people	96 <sup>a</sup> , 83 <sup>b</sup>	54 <sup>a</sup> , 67 <sup>b</sup>	64% <sup>a</sup> , 55% <sup>b</sup>	36% <sup>a</sup> , 45% <sup>b</sup>
	S47	Gives sarcastic comments	84 <sup>a</sup> , 104 <sup>b</sup>	66 <sup>a</sup> , 46 <sup>b</sup>	56% <sup>a</sup> , 69% <sup>b</sup>	44% <sup>a</sup> , 31% <sup>b</sup>
	S48	Physically aggressive	114 <sup>a</sup> , 102 <sup>b</sup>	36 <sup>a</sup> , 48 <sup>b</sup>	76% <sup>a</sup> , 68% <sup>b</sup>	24% <sup>a</sup> , 32% <sup>b</sup>

Ranking of the symptoms, according to the most prevalent, was assessed among the two construction groups and within each group of construction professionals and construction trade workers. The results of the ranking have been presented in Table 7.2.

**Table 7.2. Ranking of the prevalence of the symptoms among the construction professionals' (Group A) and construction trade workers (Group B)**

Construct	No.	Measure for Symptoms	Mean	Ranks		
				Between Groups	Within Group A	Within Group B
Physical Symptoms	S1	Physically exhausted/ Worn-out/ Tired	3.58*	1 <sup>st</sup>	5 <sup>th</sup>	1 <sup>st</sup>
	S2	Muscular tension / aches	3.34	8 <sup>th</sup>	12 <sup>th</sup>	7 <sup>th</sup>
	S3	Feeling nauseous/ stomachache/ diarrhoea/ indigestion	3.23	15 <sup>th</sup>	15 <sup>th</sup>	18 <sup>th</sup>
	S4	Chest pain	2.78	42 <sup>nd</sup>	36 <sup>th</sup>	43 <sup>rd</sup>
	S5	Increased rate of heartbeat	3.09	23 <sup>rd</sup>	44 <sup>th</sup>	5 <sup>th</sup>
	S6	Shallow or rapid breathing	3.04	26 <sup>th</sup>	31 <sup>st</sup>	26 <sup>th</sup>
	S7	Lower Back Pain	3.57*	7 <sup>th</sup>	7 <sup>th</sup>	6 <sup>th</sup>
	S8	Chronic Headaches	3.39	5 <sup>th</sup>	4 <sup>th</sup>	8 <sup>th</sup>
	S9	Skin Problems	2.96	31 <sup>st</sup>	33 <sup>rd</sup>	29 <sup>th</sup>
	S10	Blood in Urine or Urinate frequently	3.07	24 <sup>th</sup>	27 <sup>th</sup>	25 <sup>th</sup>
	S11	Insomnia/ difficulty sleeping	3.53*	3 <sup>rd</sup>	2 <sup>nd</sup>	4 <sup>th</sup>
Emotional Symptoms	S12	Tensed/ Stressed	3.32	9 <sup>th</sup>	9 <sup>th</sup>	11 <sup>th</sup>
	S13	Difficulty relaxing	3.55*	2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>
	S14	Worried	3.16	19 <sup>th</sup>	21 <sup>st</sup>	16 <sup>th</sup>
	S15	Irritable	3.13	27 <sup>th</sup>	30 <sup>th</sup>	28 <sup>th</sup>
	S16	Sad/ Depressed	3.11	22 <sup>nd</sup>	23 <sup>rd</sup>	19 <sup>th</sup>
	S17	Emotionally exhausted	2.97	30 <sup>th</sup>	35 <sup>th</sup>	27 <sup>th</sup>
	S18	Numbness	2.81	40 <sup>th</sup>	46 <sup>th</sup>	31 <sup>st</sup>
	S19	Discouraged	3.27	12 <sup>th</sup>	10 <sup>th</sup>	15 <sup>th</sup>
	S20	Anxious	3.13	21 <sup>st</sup>	18 <sup>th</sup>	24 <sup>th</sup>
	S21	Frustration	3.31	10 <sup>th</sup>	8 <sup>th</sup>	14 <sup>th</sup>
	S22	Mood swings	2.93	33 <sup>rd</sup>	32 <sup>nd</sup>	34 <sup>th</sup>
	S23	Bitterness	2.99	16 <sup>th</sup>	14 <sup>th</sup>	21 <sup>st</sup>
	S24	Rage	3.21	29 <sup>th</sup>	26 <sup>th</sup>	36 <sup>th</sup>
	S25	Resentment	3.06	25 <sup>th</sup>	25 <sup>th</sup>	33 <sup>rd</sup>
	S26	Crying for no particular reason	2.74	44 <sup>th</sup>	45 <sup>th</sup>	40 <sup>th</sup>

	S27	Palpitations/ perspiration/ sweaty hands	3.14	20 <sup>th</sup>	19 <sup>th</sup>	22 <sup>nd</sup>
	S28	Trembling/ Nervous ticks/ Butterflies in Stomach	3.26	13 <sup>th</sup>	17 <sup>th</sup>	13 <sup>th</sup>
<b>Cognitive Symptoms</b>	S29	Hard to concentrate	3.18	18 <sup>th</sup>	20 <sup>th</sup>	17 <sup>th</sup>
	S30	Difficult to think clearly, make decisions or remember things	3.37	6 <sup>th</sup>	3 <sup>rd</sup>	9 <sup>th</sup>
	S31	Addiction to ungodly habits	2.68	48 <sup>th</sup>	47 <sup>th</sup>	41 <sup>st</sup>
	S32	Increase addiction of smoking, alcohol, and use of drugs	2.82	39 <sup>th</sup>	37 <sup>th</sup>	38 <sup>th</sup>
	S33	Accident- prone	3.52*	4 <sup>th</sup>	6 <sup>th</sup>	3 <sup>rd</sup>
	S34	Problems with speaking	2.86	37 <sup>th</sup>	22 <sup>nd</sup>	48 <sup>th</sup>
	S35	Brood on previous harm or insults	2.79	41 <sup>st</sup>	39 <sup>th</sup>	39 <sup>th</sup>
	S36	Magnify issues such as injury and hurt	2.84	38 <sup>th</sup>	43 <sup>rd</sup>	30 <sup>th</sup>
	S37	Exaggerate unfairness	2.76	43 <sup>rd</sup>	38 <sup>th</sup>	42 <sup>nd</sup>
<b>Behavioural Symptoms</b>	S38	Impulsive behaviour	2.87	36 <sup>th</sup>	34 <sup>th</sup>	37 <sup>th</sup>
	S39	Poor self-care	2.91	34 <sup>th</sup>	48 <sup>th</sup>	10 <sup>th</sup>
	S40	Grinding of teeth	2.69	47 <sup>th</sup>	41 <sup>st</sup>	47 <sup>th</sup>
	S41	Social isolation and withdrawal	3.51*	11 <sup>th</sup>	16 <sup>th</sup>	12 <sup>th</sup>
	S42	Laughing or speaking in high pitch	2.71	46 <sup>th</sup>	40 <sup>th</sup>	46 <sup>th</sup>
	S43	Label or blame others for our problems	3.19	17 <sup>th</sup>	13 <sup>th</sup>	23 <sup>rd</sup>
	S44	Have conflict with others	3.21	14 <sup>th</sup>	11 <sup>th</sup>	20 <sup>th</sup>
	S45	Yells at people	3.01	32 <sup>nd</sup>	28 <sup>th</sup>	35 <sup>th</sup>
	S46	Hostile to people	2.94	28 <sup>th</sup>	29 <sup>th</sup>	32 <sup>nd</sup>
	S47	Gives sarcastic comments	2.72	35 <sup>th</sup>	24 <sup>th</sup>	45 <sup>th</sup>
	S48	Physically aggressive	2.89	45 <sup>th</sup>	42 <sup>nd</sup>	44 <sup>th</sup>

Blom's fractional rank estimation test was used to assess whether the data obtained from the two construction working groups were normally distributed for all variables. The test revealed the data were normally distributed, and hence the results of the two groups could be compared for all the variables (Lo, 2018, Norussi, 2001). Independent two-sample T-test analysis was also done to test the significance of the difference between the scores obtained from the construction professionals' group and the scores obtained from the construction trade workers group. Levene's test for equality of variances was used for this test. The test statistics

value of 0.05 was used to determine whether the difference between the scores obtained from the two construction groups was statistically significant. The F values and Significant or P values obtained for each indicator measured have been presented in Table 7.3. Values that indicate a statistically significant difference between the scores of the two groups are marked with (\*). The internal consistency and reliability of the indicators under each construct were measured. The results are presented in Table 7.3 with the Cronbach alpha values. The internal consistency and reliability test using Cronbach alpha values indicate that the inter-item consistency of all the four constructs was good. As reliability or internal consistency is considered unacceptable unless it is 0.7 or above (Enshassi, et. al., 2016). The Cronbach alpha values for the constructs, as shown in Table 7.3 ranges from 0.911 to 0.821.

**Table 7.3: Results of the significance of the differences between the scores from construction professionals and construction trade workers group**

Label	Symptoms of psychological health condition	Levene's Test		Cronbach Alpha
		F- value	P- value	
<b>Construct 1: Physical Symptoms</b>				<b>0.857</b>
S1	Physically exhausted/ Worn-out/ Tired	33.669	0.000*	
S2	Muscular tension / aches	13.005	0.000*	
S3	Feeling nauseous/ stomachache/ diarrhoea/ indigestion	0.211	0.646	
S4	Chest pain	0.564	0.453	
S5	Increased rate of heartbeat	11.716	0.001*	
S6	Shallow or rapid breathing	12.659	0.000*	
S7	Lower Back Pain	9.293	0.003*	
S8	Chronic Headaches	11.931	0.001*	
S9	Skin Problems	1.546	0.215	
S10	Blood in Urine or Urinate frequently	8.769	0.003*	
S11	Insomnia/ difficulty sleeping	2.269	0.133	<b>0.911</b>
<b>Construct 2: Emotional Symptoms</b>				
S12	Tensed/ Stressed	0.219	0.640	
S13	Difficulty relaxing	17.208	0.000*	
S14	Worried	1.418	0.235	
S15	Irritable	9.826	0.002*	
S16	Sad/ Depressed	0.053	0.818	
S17	Emotionally exhausted	19.909	0.000*	
S18	Numbness	18.072	0.000*	
S19	Discouraged	0.842	0.360	
S20	Anxious	0.589	0.443	
S21	Frustration	0.484	0.487	
S22	Mood swings	6.337	0.012*	



S23	Bitterness	0.793	0.374	
S24	Rage	0.494	0.482	
S25	Resentment	2.459	0.118	
S26	Crying for no particular reason	24.414	0.000*	
S27	Palpitations/ perspiration/ sweaty hands	0.352	0.554	
S28	Trembling/ Nervous ticks/ Butterflies in Stomach	2.909	0.089	
<b>Construct 3: Cognitive Symptoms</b>				<b>0.821</b>
S29	Hard to concentrate	1.636	0.202	
S30	Difficult to think clearly, make decisions or remember things	0.059	0.809	
S31	Addiction to ungodly habits	38.007	0.000*	
S32	Increase addiction of smoking, alcohol and use of drugs	14.441	0.000*	
S33	Accident- prone	76.922	0.000*	
S34	Problems with speaking	61.471	0.000*	
S35	Brood on previous harm or insults	0.528	0.468	
S36	Magnify issues such as injury and hurt	49.552	0.000*	
S37	Exaggerate unfairness	2.301	0.130	
<b>Construct 4: Behavioural Symptoms</b>				<b>0.846</b>
S38	Impulsive behaviour	5.569	0.019*	
S39	Poor self-care	118.217	0.000*	
S40	Grinding of teeth	1.085	0.298	
S41	Social isolation and withdrawal	2.459	0.118	
S42	Laughing or speaking in high pitch	0.267	0.606	
S43	Label or blame others for our problems	1.873	0.172	
S44	Have conflict with others	1.241	0.266	
S45	Yells at people	2.64	0.105	
S46	Hostile to people	8.015	0.005*	
S47	Gives sarcastic comments	23.399	0.000*	
S48	Physically aggressive	6.712	0.010*	

*Significance values < 0.05 are marked with \**

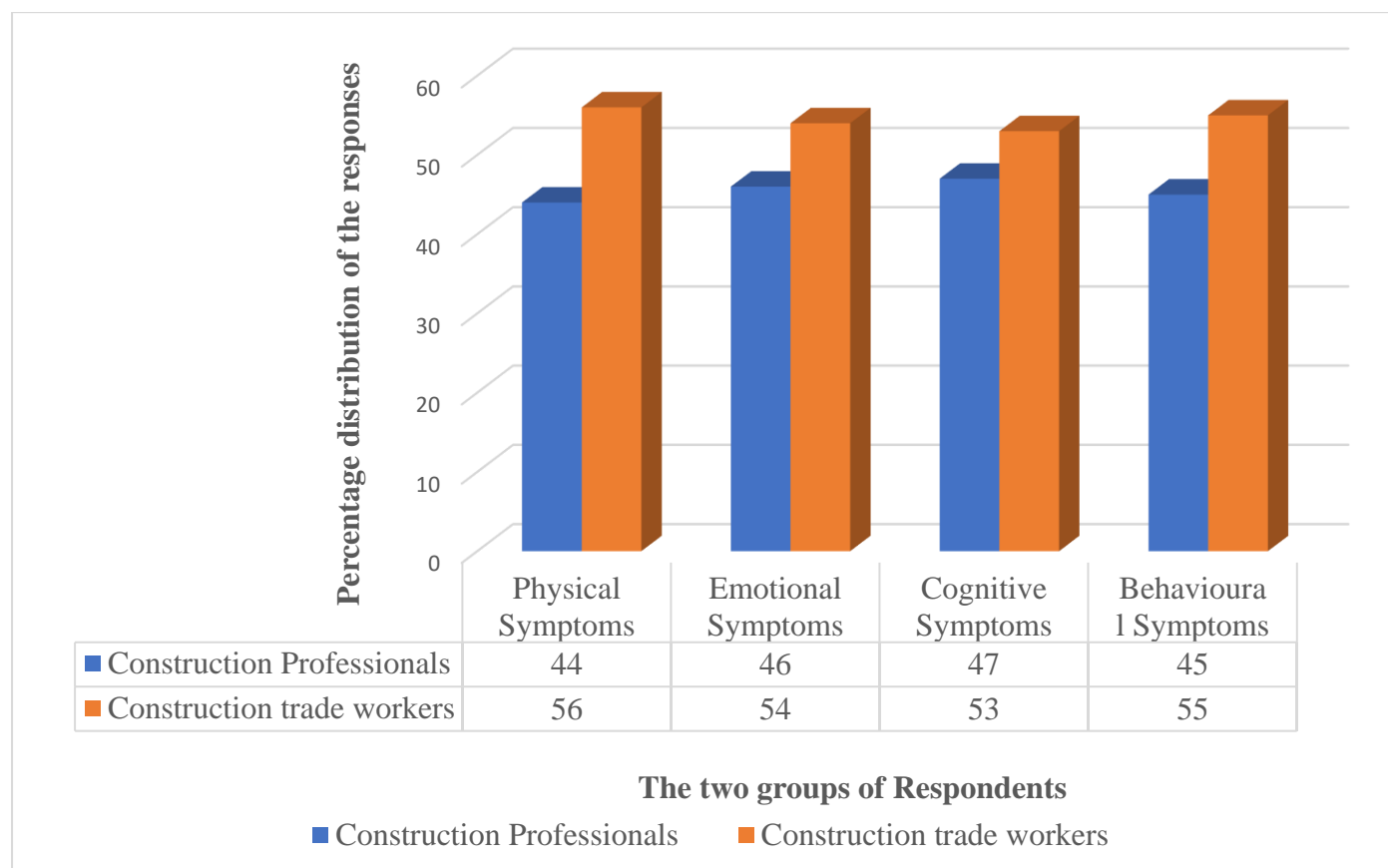
The detailed descriptions of the results of the indicators have been provided under their main constructs. The frequency and percentage scores of the four main constructs calculated by putting together the indicators have been presented in Table 7.4.

**Table 7.4: Summary of results of the psychological state of construction professionals (a) and construction trade workers (b)**

Constructs	Expected outcome	Total Frequency score		Percentage values	
		Positive State	Negative State	Positive State	Negative State
Physical Symptoms	1500	817 <sup>a</sup> , 640 <sup>b</sup>	683 <sup>a</sup> , 860 <sup>b</sup>	54% <sup>a</sup> , 43% <sup>b</sup>	46% <sup>a</sup> , 57% <sup>b</sup>
Emotional symptoms	2400	1331 <sup>a</sup> , 1163 <sup>b</sup>	1069 <sup>a</sup> , 1237 <sup>b</sup>	55% <sup>a</sup> , 48% <sup>b</sup>	45% <sup>a</sup> , 52% <sup>b</sup>
Cognitive Symptoms	1650	920 <sup>a</sup> , 813 <sup>b</sup>	730 <sup>a</sup> , 837 <sup>b</sup>	56% <sup>a</sup> , 49% <sup>b</sup>	44% <sup>a</sup> , 51% <sup>b</sup>
Behavioural Symptoms	1650	1039 <sup>a</sup> , 929 <sup>b</sup>	611 <sup>a</sup> , 721 <sup>b</sup>	63% <sup>a</sup> , 56% <sup>b</sup>	37% <sup>a</sup> , 44% <sup>b</sup>
All variables	7200	4107 <sup>a</sup> , 3545 <sup>b</sup>	3093 <sup>a</sup> , 3655 <sup>b</sup>	57% <sup>a</sup> , 49% <sup>b</sup>	43% <sup>a</sup> , 51% <sup>b</sup>

*Note: The expected outcome is the number of items in a construct  $\times$  the number of respondents*

Comparative assessment of the major constructs of psychological health determinants among the construction professionals and construction trade workers have been presented in Figure 7.1.



**Figure 7.1: Comparative summary of the responses from the two construction working groups on their psychological health status**

The comparative analysis shown in Figure 7.1 indicate that cognitive symptoms were more prevalent among the construction professionals, whilst physical symptoms were dominant among the construction trade workers.

### **7.1.2 Discussion on psychological health status of construction employees**

#### **Occupational psychological well-being and ill-being**

The findings from the study revealed the absence and presence of the negative symptoms of psychological health conditions among both the construction professionals and construction trade workers. Psychological health conditions can manifest as physical symptoms, emotional symptoms, cognitive symptoms, and behavioural symptoms. The responses of the level of frequency of experiencing the negative symptoms were used to determine whether the respondents were in the positive state of occupational psychological well-being condition or the negative state of occupational psychological ill-being condition.

The hypothesis to be tested assumed that there is no statistically significant difference between the mean scores obtained from the construction professionals' group "a" and construction trade workers group "b". The p-value of most of the symptoms measured were less than 0.05, and this means the difference in the scores of the two groups were statistically significant. Hence the null hypothesis will be rejected, and the alternative hypothesis considered for those indicators. The psychological health symptoms from each of the main construct that revealed statistically significant differences between the two construction groups from each of the main constructs included physically exhausted, emotionally exhausted, difficulty relaxing, and poor self-care. The differences in the outcome of the results of the construction professionals and construction trade workers could be due to the differences in these characteristics: individual personality, age, marital status, gender, level of education, years of working experience, task level, role demands and income level.

On the other hand, symptoms such as stomachache, tensed, hard to concentrate, and social isolation had their p-values greater than 0.05. This indicates that the difference in the scores of the two groups was not statistically significant; hence the null hypothesis will not be rejected for these other indicators. The similarities in the scores obtained from the construction professionals and construction trade workers indicate that these psychological indicators can affect any person regardless of their individual differences in various aspects.

The overall results as presented in Table 7.4 revealed that 57% of the construction professionals were in a positive state of occupational psychological well-being as against 49% of the construction trade workers in a similar state. The remaining 43% of the construction professionals were revealed to be in the negative state of occupational psychological ill-being conditions as against 51% of the construction trade workers in that state. These results indicate that construction trade workers were found to be more prevalent in the negative state of occupational psychological ill-being condition than the construction professionals. The results may be due to the stressful nature of the construction works, which are mainly executed by the construction trade workers. Also, the construction trade workers usually undertake their works in the open under extreme weather conditions amidst the noise, chemical, and dust exposure. In contrast, the major works of the construction professionals are carried out in office under comfortable temperature and lights. Construction trade workers such as masons, carpenters, steel benders and plumbers are therefore more likely to experience psychological ill-being conditions than the construction professionals such as architects, engineers and quantity surveyors. Occupational psychological ill-being conditions such as workaholism and burnout can lead to impaired wellbeing like fatigue, chronic tension, sleep problems and manifest diseases.

The key symptoms that were revealed among the two construction working groups included physically exhausted, difficulty relaxing, insomnia, accident-prone, and chronic

headaches. Within the construction professionals' group, the most prevalent symptoms identified in the order of prevalence were difficulty relaxing, insomnia, difficulty to think clearly, make decisions or remember things, chronic headaches, and accident-prone. The most prevalent symptoms identified among the construction trade workers group in the order of prevalence also included accident-prone, difficulty relaxing, physically exhausted, insomnia, and increased rate of heartbeat.

The findings from this study confirm the statement of the World Health Organization that one (1) out of four (4) persons will suffer from one form of psychological or mental disorder in some point of their life. As the ecclesia goes, "many are crazy, but only a few are roaming". A mentally or psychologically ill person is not only the very dirty and unkempt ones who are seen on the street. The findings were also in conformity with other previous studies, which revealed that about 60 to 70 percent of organizations visited in Ghana, had their workers having some form of psychological health problems with stress as the common one. Stress and other psychological ill-being diseases are gradually becoming the main source of mortality among Ghanaians.

### ***Physical Health symptoms***

The findings from this study revealed physical health indicators of psychological ill-being among the two construction working groups, with the highest recorded ones as physically exhausted, chronic headaches, lower back pain, and muscular aches. Based on the responses to the questions for these indicators under physical symptoms, the participants were categorized under a positive or negative state of occupational psychological health. The results of the study as presented in Table 7.4 revealed that the construction professionals had 54% of their participants in a positive state of occupational psychological well-being condition and the remaining 46% in the negative state of occupational psychological ill-being condition. The

construction trade workers also had 43% of their participants in the positive state of occupational psychological well-being condition, and 57% were found to be in a negative state of occupational psychological ill-being condition. The results indicate that construction trade workers, when assessed on the basis of physical symptoms, were more in the negative state of occupational psychological ill-being condition than the construction professionals.

Similar to the findings, previous studies have also revealed that the workers' psychological ill-being can be manifested in the physical health of the person, with the person experiencing symptoms such as chronic fatigue, chest pain, rapid heartbeats, aches and pains, weakness, nausea, dizziness, diarrhoea or constipation, weight gain or loss, breathlessness, frequent colds, loss of sex drive, sweaty palms, hyperactivity, muscular tension, tiredness, jaw clenching or teeth grinding. Workers' physiological problems such as fatigue, headaches, insomnia, and gastrointestinal disturbances have been linked with psychological ill-being such as burnout.

### ***Emotional Health symptoms***

The findings from this study revealed that a significant number of both construction professionals and construction trade workers had experienced the emotional symptoms of psychological health conditions. The common emotional symptoms identified among the two construction working groups included tension, frustration, discouraged, trembling, and bitterness. The emotional aspect of personality could reflect a person's psychological ill-being, with negative emotions leading to mental health disorders such as anxiety and depression. Emotional psychological health indicators are revealed to include feeling of being overwhelmed, irritability, mood swings, agitation, feeling tensed, inability to relax, frustration, depression, isolation, sense of loneliness, resentment and anger, substance abuse and on edge. Emotional problems are seen as the major indicators of burnout. Based on the responses to the questions on these various indicators under emotional symptoms, the participants were

categorized under a positive or negative state of occupational psychological health. The results of the study also revealed that the construction professionals, when assessed on the basis of emotional symptoms were more in the positive state of occupational psychology than the construction trade workers. The construction professionals group had 55% of their participants in a positive state of occupational psychological well-being condition and the remaining 45% in the negative state of psychological ill-being condition. The construction trade workers group also had 48% of their participants in the positive state of occupational psychological well-being condition and 52% in the negative state of occupational psychological ill-being condition.

Psychological ill-being conditions such as burnout have been found to have a significant relationship with various workers' emotional indicators of psychological ill-being conditions including decreases in self-esteem, depression, anxiety, feelings of helplessness, and irritability. Negative emotions, such as emotional exhaustion, can make workers feel very uncomfortable, which can negatively affect job performance at the workplace. The simplest definition of the concept of emotional exhaustion is given as depletion of emotional resources. Emotional exhaustion describes a feeling of being emotionally overextended and exhausted by one's work.

### ***Cognitive Symptoms***

The findings from this study revealed that both construction professionals and construction trade workers who participated in the study had experienced cognitive symptoms of psychological health conditions. The most prevalent cognitive symptoms identified included accident-prone, difficulty relaxing, insomnia, difficulty to think clearly, make decisions, or remember things. Based on the responses to the questions on these indicators under cognitive symptoms, the participants were categorized under a positive or negative state of occupational psychological health. The results of the study as presented in Table 7.4 revealed that the construction professionals group had 56% of their participants in a positive state of

occupational psychological well-being condition and the remaining 44% in the negative state of occupational psychological ill-being condition. The construction trade workers group also had 49% of their participants in a positive state of occupational psychological well-being condition, and 51% were found to be in a negative state of occupational psychological ill-being condition. These results, therefore, indicate that the construction professionals when assessed on the basis of cognitive symptoms, were more in the positive state of occupational psychological well-being condition than the construction trade workers.

The mental scope and functionality of the workers are affected in various ways when cognitive psychological ill-being is present, with indicators such as inability to concentrate, memory problems, seeing only the pessimistic, poor judgment, constant worry, anxiety, loss of objectivity and fearful anticipation. Positive thought patterns evoke stronger emotions in workers enabling them to have greater involvement and engagement in work.

### ***Behavioural Symptoms***

The findings from this study revealed behavioural symptoms among the two construction working groups, with the common ones being social isolation, have a conflict with others, and labelling or blaming others for one's problems. Occupational psychological ill-being can result in sudden changes in behaviour, leading to unhealthy habits, including increase addiction to smoking and alcohol intake, weight loss or gain and poor lifestyle. Behaviour changes can result from depersonalization or dehumanization. The diminished personal accomplishment or excessive negative evaluations of oneself can give rise to the insensitive behaviours of the worker toward others. Based on the responses to the questions on the various indicators under behavioural symptoms, the participants were categorized under a positive or negative state of occupational psychological health. The results of the study as presented in Table 7.4 revealed that the construction professionals group had 63% of their participants in the positive state of occupational psychological well-being condition and 37% of the



participants in the negative state of occupational psychological ill-being condition. The construction trade workers group also had 56% of their participants in a positive state of occupational psychological well-being condition, and 44% were found to be in a negative state of occupational psychological ill-being condition. These results indicate that construction trade workers, when assessed on the basis of behavioural symptoms, were more in the negative state of occupational psychology than the construction professionals.

Attitude is considered by psychologists as a person's mental tendency to react in a certain manner, be it favourable or unfavourable, towards a certain aspect of reality. The negative actions of a worker could be due to stress, which is a physical and emotional response. The behaviour indicators of psychological ill-being of workers are mainly antisocial, which can destroy the person's relationships with co-workers, friends, family, or even strangers. The negative actions arise when the expectations of one have not been met, the requirements of the job do not match one's capabilities, or there is a lack of or limited resources needed by the worker to do a job. Some of the behaviour changes depicting workers' psychological ill-being include neglecting or procrastinating responsibilities, workplace or domestic violence, overreaction, increased arguments, sleeping too little or too much, eating disorder.

### **7.1.3 Summary of findings for tracing the determinants of psychological health conditions among the construction employees in Ghana.**

Psychological health condition is known to be complex and multidimensional, with several scales developed as measures of its symptoms. The absence or presence of negative symptoms has been used to describe the state of psychological well-being and psychological ill-being, respectively. This study gathered 48 validated items from previous studies as symptoms of psychological health conditions. The 48 symptoms identified were explored among 300 construction employees in Ghana to determine their psychological health status. Thematic analysis was used to group the 48 symptoms into four main constructs, namely:

physical symptoms, emotional symptoms, cognitive symptoms, and behavioural symptoms. A comparative analysis was conducted with the two groups of respondents, namely construction professionals and construction trade workers, to identify the group that is more prevalent with psychological well-being or ill-being conditions. The findings revealed that a significant number of the respondents had experienced the negative symptoms of psychological health conditions. The study also revealed statistically significant differences in the level of experience of psychological health conditions among the two construction employees, with psychological ill-being conditions found to be more prevalent in construction trade workers than the construction professionals. The findings from the study confirm the need to develop preventive psychological health management models for construction employees. The 48 symptoms put together as a measure for psychological health status had an acceptable internal consistency and reliability, and hence can be adopted by researchers and stakeholders to determine psychological health status. This study, therefore, makes an impactful contribution to the field of occupational health psychology.

## 7.2 Personal factors that could make construction employees vulnerable to psychological health conditions<sup>8</sup>

The data collected from the qualitative study conducted were gathered for analysis. Contextual analysis of the data collected were done to draw similarities from the findings across all the individual interviews conducted. The study identified both positive and negative personal factors from the responses to the questions. However, the positive personal factors were insignificant to the study, as each of the participant reported some form of negative personal factor, which might influence their psychological health.

### 7.2.1 Results from qualitative study on personal intervening factors

The results from the interviews on personal-related factors with some excerpts from the respondents are presented herein in Table 7.5. The number of respondents that indicated the item as a personal factor that can influence psychological health condition as also been provided in the table.

Table 7.5: Findings from the qualitative study on Personal factors that can influence psychological health			
S/N	Personal Factors	Some excerpts from the interviews	No. of respondents
P1.	Low self-esteem	<i>“I often ask myself this question that, why am I not successful and acknowledged by others after all the hard work I put into my works, I feel I am more deserving than others and become very bitter when other colleagues are promoted or are being praised for their work done; When others are too nice to me I become suspicious of their act as I am not use to that; When things in my life are going very well, I do not rejoice a lot knowing that the season of joy in my life will not last long until a bad thing happen immediately afterwards; I find it difficult to show sound judgement in work and in relationship as I don’t believe peoples attitude can be changed”</i> (Responds from construction professionals’ group).	10

<sup>8</sup> Some contents of section 7.2 of this Chapter have been published in: Fordjour, G. A., Chan, A. P. C. and Amoah, P. (2019). “Exploring Personal Factors That Might Influence the Vulnerability of Construction Employees to Occupational Psychological Disorders”. *Health*, 11, 546-566.

		<p><i>"I feel I have made progress in life because of my luck not because I deserved it; If I don't accomplish the goals I set for myself, I regard myself as a failure; I feel very uncomfortable to give people compliments about their success and strengths; I have lots of fear and takes time to accept changes in my life, and I don't even try when I think of myself that I won't be able to make it; I often criticise my own behaviour and at times questions my worth as a person; I think my parents are to be blamed for how my life has turned out; I was often being criticised and got punished always by my teachers, and this has made it difficult for me to see the good in others; I avoid people whom I perceive to not like me; I often compare myself to other people"</i> (Responds from construction trade workers).</p>	
P2.	<b>Poor time management skills</b>	<p><i>"As the frontline worker of the project works I do a lot of paperwork, and often I find it difficult to handle pieces of paperwork only once, I have to cancel, make corrections and rewrite everything again; I find it difficult to find items in my closets and spend lots of time searching for things; I am getting weak and have been going to work and meetings late</i> (Responds from construction professionals' group).</p> <p><i>"I easily get distracted and when I am interrupted by others, I find it difficult to return to what I was doing previously as I lose my momentum, it takes me a while before I get my zeal back; I do not know how to deal effectively with long-winded calls from people; I hardly achieve the personal goals I set for myself yearly"</i> (Responds from construction trade workers).</p>	7
P3.	<b>Poor relationship with others</b>	<p><i>"Honestly, I like to always put myself first before others; I hate being alone and always want to have a partner around; I tend to be phony with friends, am also the controlling type and feels sulky when I don't get my way in relationships"</i> (Responds from construction professionals' group).</p> <p><i>I always try too hard to please people, even though I personally find it difficult to ask people for what I want; I get distracted easily, can not set personal limits in relationships or say no to people; I am too accepting and at times becomes resentful when I feel overwhelmed by people"</i> (Responds from construction trade workers).</p>	6
P4.	<b>Negative personality traits</b>	<p><b>(i) Neuroticism</b></p> <p><i>"I am critical of myself for my weaknesses or mistakes; I have anxiety issues, especially when I am expecting an outcome; I get frustrated easily when people do not go along with my motives and cause delays in my work progress; I worry a lot and gets nervous easily; I am very shy in front of strangers"</i> (Responds from construction professionals' group).</p> <p><i>"My work has given me depression, as my expectations were not met; I have become very Irritable to my friends; I feel emotionally exhausted; I feel discouraged to put in my best efforts to work as I get no recognition in return; only blames and criticisms"</i> (Responds from construction trade workers).</p> <p><b>(ii) Hostility</b></p> <p><i>"I get mood swings at times I can be very happy and friendly, but other times I become resentful; I have a lot of bitterness because of my past and family upbringing"</i> (Responds from construction</p>	<p>7</p> <p>5</p>

		professionals' group). <i>"When I think of the past I become very angry, full of rage and I have adopted this emotional attitude of numbness, deciding to feel nothing at all for people; I feel resentment to people especially those who do not support my decisions and do not like me; I like to keep myself busy at all times, and tends to be selfish"</i> (Responds from construction trade workers).	
		<b>(iii) Pessimism</b> <i>"I tend to also get worried about my distant family, anytime my wife calls me on phone, I get scared and worried she is going to tell me bad news about any of my children, as my children are very active and are sometimes troublesome at school"</i> (Responds from construction trade workers).	1
		<b>(iv) Lack of autonomy</b> <i>"I do not have control over my life, there is always a gap between what I would like to do and what I end up doing". "I do not have a particular sense of meaning and purpose in life, and this confuses me a lot"</i> (Responds from construction professionals' group).	2
P5.	<b>Poor self-concept evaluation on performance</b>	<b>Poor Self-concept on physical appearance</b> <i>"I do not feel particularly pleased with the way I am; I am very fat and weigh about 130 pounds, I have a very fat belly"</i> (Responds from construction professionals' group). <i>"I see myself to be short, less than 5 feet tall". "I am slim with long neck, and I have a flat nose but despite these girls like me"</i> (Responds from construction trade workers).	3
		<b>Poor Self-concept on how others see them</b> <i>"My wife often complains I am a forgetful person, she has to keep on reminding me before I get things down, this seems tiring for her, and I irritate her a lot when I feel lazy"</i> (Responds from construction professionals' group). <i>"My friends say I am a wishy-washy, as I like to day-dream a lot, some describe me as know-nothing of life truths and unrealistic person"</i> (Responds from construction trade workers).	2
		<b>Poor Self-concept on their perceived Performance at job</b> <i>"I do not really know why but these days, I am not performing very well at the workplace, I make a lot of mistakes at works; I spend a lot of time to complete a simple task of the day". I tend to be lazy and feel helplessness at work"</i> (Responds from construction professionals' group). <i>"Previously I use to do a lot of work to win the recognition of my superiors, but I had no recognition, mostly criticisms when I make a single mistake, honestly, I have lost my motivation to work hard for the company, I lack enthusiasm to work and do menial works these days". "I have not been doing very good at work as required of me because I am doing my further studies in a private university, which is very demanding, and I feel restless when I get to work"</i> (Responds from construction trade workers).	5
		<b>Poor Self-concept on their performance on personal responsibilities / role of life</b> <i>"My major challenge is I tend to forget duties and appointments"</i>	2

		<p>often, which makes me fail at times to take care of family and personal needs especially when there is a deadline to the duties” (Responds from construction professionals’ group).</p> <p>“I like to procrastinate, always putting things off to do them later, as a result at times I miss important and urgent things and I have no second chance to fulfil my duties” (Responds from construction trade workers).</p>	
		<p><b>Poor Self- concept on Mental functionality</b></p> <p>“As old as I am, I have become mentally lazy, I am not interested in learning new modern things and the world is becoming very complex because of all these technologies making it quite difficult to cope and solve problems especially relating to the use of computers and phone”. “I am not as curious as I use to be when I was young” (Responds from construction professionals’ group).</p> <p>“I am not a very creative person, but I admire the creativity in others a lot”. “One thing I like to do is debating as I see myself to be more logical, however at times it leads to lousy arguments with people, especially colleagues at the workplace” (Responds from construction trade workers).</p>	4
P6.	<b>Unproductive core beliefs</b>	<p>“I believe I have to try hard enough so life will be easy and trouble-free so I can enjoy it and be happy”. “When supervisors or co-workers reject, mistreat, criticize or disapprove of me, it makes me perceive myself to be inadequate, wrong, inferior and not good and this makes me try hard always to make people like and give me praises” (Responds from construction professionals’ group).</p> <p>“I believe construction workers are the least significant in the construction organization, so no matter the work input, we will still be placed at the lowest rank of the organization and get the minimal benefit that accrue from a construction project”. “I am always looking for a perfect solution to problems”; “I believe I can’t find happiness or feel worthwhile when I do not achieve personal things like money, success, love, recognition or approval”. “I believe when I make it in life, I will have a lot of friends and I will be able to enjoy myself the way I want to; I believe life is not fair to all people” (Responds from construction trade workers).</p>	6
Additional information from occupational health psychologists			
P7.	<b>Older Age</b>	<p>“Age is also a personal factor that can influence a person’s degree of vulnerability to the experiences of psychological health conditions”. “The older workforce is more likely to suffer from occupational stressors than the younger ones”. “The older a person the lesser the strength and capabilities to withstand excessive work demands”.</p>	3
P8.	<b>Family Status</b>	<p>“The extent of family responsibilities which is proportional to the number of family dependents a worker has can predict a person’s level of stress or strain”. “Work and family life imbalance can affect a person’s psychological health and well-being”. “Family responsibilities have a toll on a workers’ time and financial resources, which if not managed well can lead to all sort of psychological health conditions”.</p>	3

P9.	<b>Less educated</b>	<i>“The level of education of an employee is an essential personal resource to self-manage one’s responsibilities and reactions to workplace stressors”. “Less educated persons lack the know-how and capabilities to meet work demands efficiently and can be overwhelmed or frustrated by the work, as compared to the highly educated workers”.</i>	2
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## 7.2.2 Results from Quantitative Study on Personal Intervening Factors

The 18 items were grouped under 6 main constructs using thematic analysis. Cronbach alpha values were used to determine whether the variables grouped under each of the six constructs were internally consistent and reliable. The results have been presented in Table 7.6.

**Table 7.6: Coefficient reliabilities of the personal-related factors**

<b>Personal Factors</b>	<b>No.</b>	<b>Research Statement</b>	<b>Cronbach Alpha values (Group)</b>
<b>Low self-esteem</b>	1	I regard myself as a failure when I do not accomplish the goals I set for myself.	<b>0.717*</b>
	2	I feel I have made progress in life because of my luck not because I deserved it.	
	3	I am not successful and have not been acknowledged by others after all the hard work I put into my works.	
<b>Negative personality traits</b>	4	I am sensitive to criticisms and become discouraged to put in my best efforts to work after been blamed or criticized.	<b>0.703*</b>
	5	I feel resentment to people especially those who do not support my decisions and tends to be hostile towards them.	
	6	I worry a lot and tend to be pessimistic about the future.	
<b>Unproductive core beliefs</b>	7	I believe no matter my work input, I will still be treated unfairly.	<b>0.727*</b>
	8	I believe I have to try hard enough so life will be easy and trouble-free.	
	9	I believe I have to always find the perfect solution to problems.	
<b>Poor self-concept evaluation on performance</b>	10	I am not performing very well at the workplace.	<b>0.707*</b>
	11	I make a lot of mistakes at work.	
	12	I spend a lot of time to complete a simple task of the day.	
<b>Poor relationship with others</b>	13	I am not satisfied with the relationship between myself and my colleagues.	<b>0.743*</b>
	14	I do not trust for my superiors and co-workers.	
	15	I often have less respect for other employees.	
<b>Poor time management skills</b>	16	I find it difficult to complete my assignments on time.	<b>0.725*</b>
	17	I am often late for work and meetings.	
	18	I hardly achieve the personal goals I set for myself periodically.	

Note: Cronbach alpha values greater than 0.70 were maintained and used for further analysis; these values have been marked with \*.

The descriptive assessment of the personal -related factors have also been presented in Table 7.7, with the means, standard deviations, correlations, and regression results been provided.

**Table 7.7: Means, standard deviations and correlations between personal intervening factors and demographic variables**

Ranks	Personal Factors	Scaled Mean	Std. Dev.	Correlation Co-efficient			Regression (Sig. value)		
				Age	Edu.	Marital	Age	Edu.	Marital
1 <sup>st</sup>	Low self-esteem	11.08	3.316	0.082	0.370**	0.066	0.157	0.000***	0.255
2 <sup>nd</sup>	Poor time management skills	11.07	3.179	0.091	0.276**	0.075	0.116	0.000***	0.194
3 <sup>rd</sup>	Poor relationship with others	9.97	3.251	0.004	0.014	0.069	0.950	0.815	0.234
4 <sup>th</sup>	Negative personality traits	9.75	3.327	0.002	0.030	0.059	0.979	0.660	0.307
5 <sup>th</sup>	Poor self-concept evaluation on performance	9.53	2.938	0.017	0.214**	0.054	0.772	0.000***	0.349
6 <sup>th</sup>	Unproductive core beliefs	8.96	2.978	0.023	0.143*	0.081	0.695	0.013***	0.164

Note: - Values marked with \* indicate correlation is significant at 0.05 level (2-tailed); values marked with \*\* indicate correlation is significant at 0.01 level (2-tailed) and values marked with \*\*\* indicate regression analysis of relationship is significant  $\leq 0.05$ .

The mean and standard deviations of the six main constructs of personal intervening factors, considering all variables under each construct were presented in Table 7.7. The mean scores obtained were used to rank the six constructs in the order of most prevalent personal intervening psychological risk factor identified among the research participants. The results indicate that the most prevalent factor was low self-esteem, followed by poor time management skills and poor relationship with others. Correlation analysis and regression analysis were used to determine the relationships between the personal intervening factors and demographic factors such as the age, educational levels and marital status of the research participants. The



results of the study indicate that the age and marital status of the respondents had no significant relationship with any of the personal intervening factors. Personal factors such as personality trait and relationship with others also had no relation with any of the demographic factors analysed. The educational level of the respondents, however, had a significant relationship with the factors of self-esteem, productive core beliefs, self-evaluation on performance and time management skills.

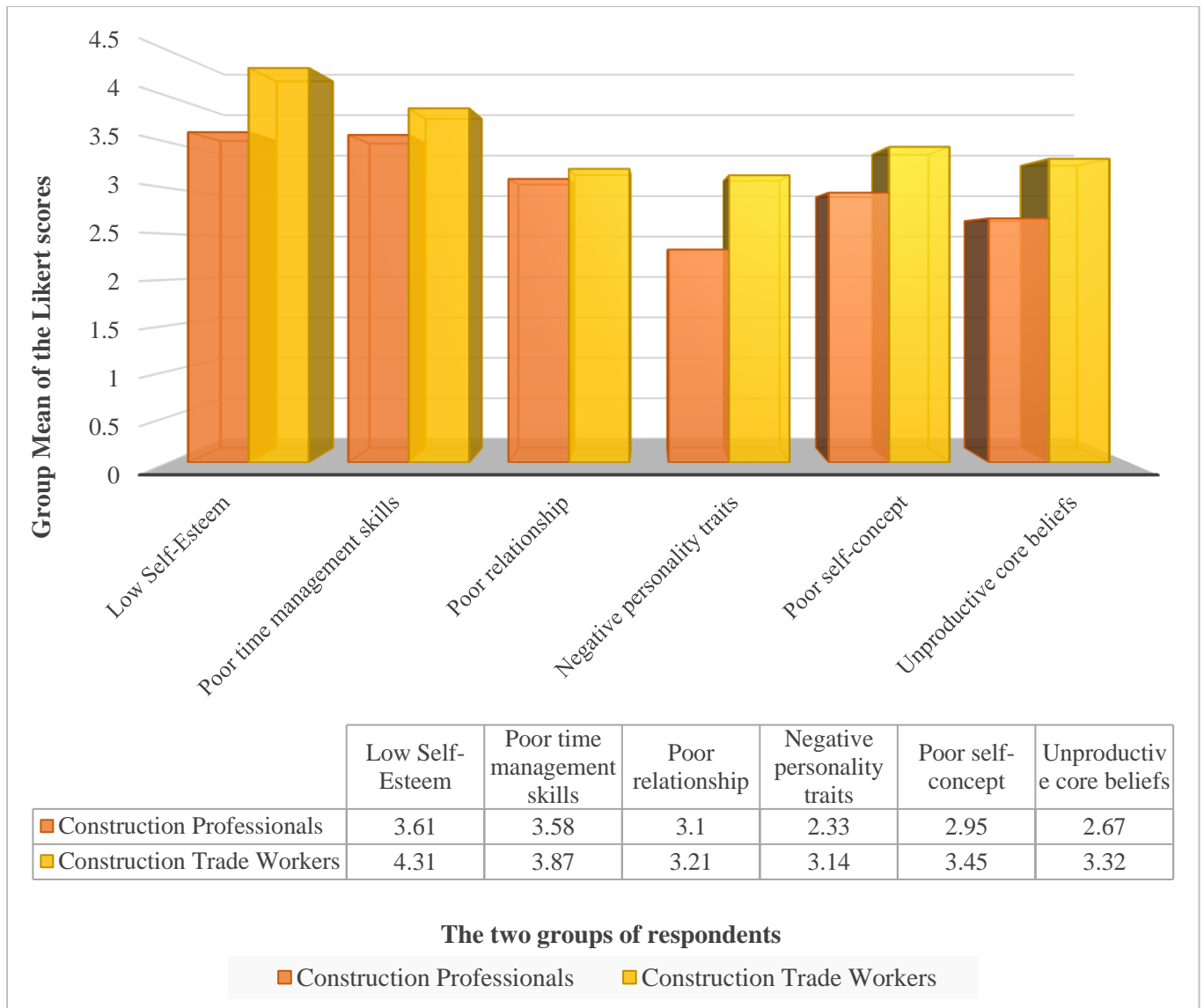
Independent two-sample T-test was used to compare the means of the factors with significant relations and the results have been presented in Table 7.8.

<b>Table 7.8: Comparison of results between highly educated<sup>(a)</sup> and less educated<sup>(b)</sup> construction employees</b>					
<b>No.</b>	<b>Personal Factors</b>	<b>Groups Mean</b>	<b>Groups Standard deviation</b>	<b>Levene's test for equality of variance</b>	
				<b>F- value</b>	<b>P- value</b>
1	Low self-esteem	3.61 <sup>a</sup> , 4.31 <sup>b</sup>	1.597 <sup>a</sup> , 1.213 <sup>b</sup>	26.870	0.000
2	Poor time management skills	3.58 <sup>a</sup> , 3.87 <sup>b</sup>	1.674 <sup>a</sup> , 1.437 <sup>b</sup>	12.657	0.000
3	Poor self-concept evaluation on performance	2.95 <sup>a</sup> , 3.45 <sup>b</sup>	1.454 <sup>a</sup> , 1.484 <sup>b</sup>	10.642	0.001
4	Unproductive core beliefs	2.67 <sup>a</sup> , 3.32 <sup>b</sup>	0.996 <sup>a</sup> , 1.412 <sup>b</sup>	18.512	0.000

*Note: Values marked with (a) represent scores from the highly educated construction employees' group and values marked with (b) represent scores from the less educated construction employees' group.*

The results in Table 7.8 indicate that construction employees who are highly educated had better self-esteem and time management skills than those who are less educated. The findings from this study broaden the view of moderators on influential sources of psychological health conditions of employees.

Comparative assessment of the major constructs of personal intervening factors among the construction professionals and construction trade workers have been presented in Figure 7.2.



**Figure 7.2: Comparative summary of the responses on personal intervening factors likely to influence the vulnerability of the construction employees to psychological disorders**

The results of the comparative analysis as shown in Figure 7.2, indicate that low self-esteem is the personal factor that is most likely to make both construction professionals and construction trade workers in Ghana vulnerable to psychological health conditions.

### **7.2.3 Discussion on personal intervening factors**

The 18 variables were therefore grouped under six main constructs using thematic analysis. The Cronbach alpha test revealed that the inter-item consistency and reliability among the main constructs is acceptable. The mean scores obtained were used to rank the six constructs in the order of most prevalent personal intervening psychological risk factor identified among the research participants. The results indicate that low self-esteem has been identified as a personal factor that could make a construction employee vulnerable to the triggers of psychological ill-being conditions of workaholism and burnout. A person with low self-esteem would likely be exposed to abusive and overdemanding supervisors in the construction industry. Low self-esteem is, therefore, a personal factor that affects one's psychological well-being and general health. To enhance construction employees' psychological health, there is the need for positive core self-esteem, as this is an individual's personal resource in the management of their occupational psychological health.

Construction employees with poor time management skills would likely be exposed to tight deadline pressures, which could lead to the employees experiencing psychological ill-being condition such as stress or burnout. Individuals with good time management skills mitigate all kinds of stressors at the workplace, enhancing the employees' psychological health and well-being. Poor relationship with people especially supervisors and co-workers could also arouse the circumstances that lead to psychological ill-being conditions of the construction employees. There is the need for construction employees to develop positive relations with others especially coworkers, as this could influence their psychological health, leading to satisfaction and fulfillment in life. Evidently, individuals who have high-quality relationship with people, including their immediate supervisors and colleagues and are seen to be more accepting, have high occupational psychological well-being symptoms such as work engagement and job satisfaction. Positive relations with others could be expressed, for instance

by being genuinely concerned about the welfare of others. Positive personal factors such as higher self-esteem, good time management skills and good relationship with others could help promote a psychologically safe and healthy construction industry.

The other personal intervening psychological risk factors specifically unproductive core beliefs, negative personality traits and poor self-concept evaluation on performance were also revealed to be significant among the research participants. A person's productive belief such as their life is meaningful and purposeful, give them a purpose to live for something in their lifetime. This can bring forth a sense of personal growth and continual development in that person, as he or she opens up to new experiences in life. Unproductive core beliefs are personal factors that could expose construction employees to the triggers of psychological ill-being conditions such as perceived poor working conditions, resulting in conditions such as anxiety and depression. Earlier researchers provided evidence that individuals who have positive core self-beliefs usually buffer any adverse emotional and social effects emanated from external sources, thus enhancing the psychological well-being of the individual. There is the need for positive productive core beliefs to counteract the unproductive core beliefs the construction employees hold, and this will lead to psychological well-being and health.

Negative personality traits such as neuroticism, hostility, pessimism and lack of autonomy, are significant factors that could also expose the construction employees to the risk factors associated with psychological health conditions. Neuroticism depicts a person's sensitive to criticisms, and evidence shows this personality trait is positively related to psychological ill-being indicators, affecting one's physical, emotional and mental health. Earlier researchers revealed that persons with high levels of neuroticism are likely to experience psychological ill-being with signs of emotional exhaustion, anger, depression, anxiety, and vulnerabilities. Hostility as a personality trait has also been proved to be one of the most potent causes of cardiovascular diseases, which positively relates to other environmental risk factors.

There is the need for the development of positive personality trait such as friendliness, to help enhance and prevent critical psychological health conditions among the construction employees in Ghana. People who are pessimistic also tend to focus on only the negative aspects of life, which predisposes them to psychological ill-being conditions such as distress and dissatisfaction of most aspects of life. Pessimistic personality tends to worry a lot, and this can be seen in the responses presented by some of the construction workers interviewed. Previous studies have also established a relationship between occupational psychological well-being determinants such as job satisfaction and engagement with the positive personality traits of the individuals such as autonomy and resilience. Persons who have poor self-concept evaluations are likely to have negative emotional reactions affecting their psychological well-being, general behaviours and attitudes to work. Poor self-evaluation concept on one's job performance could expose them to the triggers of occupational psychological ill-being conditions of workaholism and burnout such as abusive and overdemanding supervisors, limited time for relaxation and poor working conditions. These could affect their occupational psychological well-being such as work engagement and job satisfaction.

Some studies have also revealed that individuals with high positive self-concept evaluation of their mental functioning and creativity, were positively related with occupational psychological well-being indicators such as job satisfaction and work engagement. Poor self-concept evaluation could, therefore, make the individual construction employee vulnerable to the experiences of psychological ill-being conditions, with symptoms manifested as frustration, anxiety, worry, depression, anger and the likes. As a person's attitude, which is a psychological indicator is, therefore, likely to change when they perceive successful work performance and contribution to the productivity of the organization. Previous studies advocated that demographic factors such as age, educational level, and marital status could predict a person's vulnerability to the risks of psychological disorders. This study employed correlation analysis

to determine the relationship between the six personal intervening factors and the demographic factors. The results obtained from the correlation analysis was further checked by employing regression analysis as shown in Table 7.9. The results indicate that demographic factors of age and marital status have no significant correlation with any of the six personal intervening psychological risk factors. These findings conform with previous studies who advocated that the age or marital status of a person has no significant relation with psychological risk factors such as one's personal factors. Negative personality and poor relationship with others as personal intervening factors also had no significant correlation with any of the demographic factors. The findings from this study, therefore, indicate that the age, marital status or educational level has no correlation and thus cannot predict personal intervening psychological risk factors of negative personality trait and poor relationship with others. Educational level as a demographic factor, however, revealed significant correlation with four of the six personal intervening factors, specifically self-esteem, time management skills, productive core beliefs and self-concept evaluation on performance.

Independent two-sample T-test was used to compare the means of the respondents based on their educational level with the four personal intervening factors that have significant relations. The respondents were grouped into two, namely highly educated group and less educated group. The highly educated group consisted of respondents with graduate educational level or above. The less educated group consisted of respondents with the following educational level; Ghana Certificate Exams "A" level or "O" level, Junior High School level, Secondary School level and Technical or Vocational level. The results based on the group's mean score indicate that the highly educated construction employees had better self-esteem, time management skills, productive core beliefs and self-concept evaluation on performance. Educational level could therefore impact positively a person's thinking, behaviour and coping capabilities, with effects on a person's psychological health and well-being.

**7.2.4 Summary of findings: Personal intervening factors that might influence the vulnerability of construction employees to occupational psychological disorders.**

Personal factors could act as intervening variables between the causes and effects of psychological health conditions of employees. This study focused on six personal intervening factors that are associated with the risks of occupational psychological disorders namely: low self-esteem, negative personality trait, unproductive core beliefs, poor self-concept evaluation on performance, poor relationship with others and poor time management skills. An investigation on the level of severity of these personal intervening factors was conducted involving 150 construction professionals and 150 construction trade workers, who were purposively selected in Ghana. The personal factors that were found to be prevalent among the construction employees were low self-esteem and poor time management skills. Correlation analysis and regression analysis were used to determine the relationships between the personal intervening factors and demographic factors such as the age, educational levels and marital status of the research participants. The results of the study indicate that the age and marital status of the respondents had no significant relationship with any of the personal intervening factors.

Personal factors such as personality trait and relationship with others also had no relation with any of the demographic factors analyzed. The educational level of the respondents, however, had a significant relationship with the factors of self-esteem, productive core beliefs, self-evaluation on performance and time management skills. Independent two-sample T-test was used to compare the means of the factors with significant relations. This study revealed that construction employees who are highly educated had better self-esteem and time management skills than those who are less educated. The findings from this study broaden the view of moderators on influential sources of psychological health conditions of employees.

### 7.3 Personal predictive factors of psychological health conditions <sup>9</sup>

This research aimed at identifying the personal predictive factors that makes construction employees vulnerable to psychological health conditions, among the construction professionals and construction trade workers. Personal predictive factors of occupational psychological health conditions were adopted from occupational safety and health report written by Hassard and Cox (2016) and modified for this study to suit the Ghana culture. A total of twenty (20) personal predictive factors that relates to the lifestyle, attitudes and issues of the Ghanaian people were identified. Personal factors that do not relate to Ghanaian culture such as Yoga practices, Heavy smoking were not considered as personal predictive factors. Using contextual analysis, the twenty (20) personal predictive factors that were identified were further grouped into four major constructs namely individual lifestyle, psychosocial indicators, general health status, and work attitudes. These measures as shown in Table 7.9 were used to assess whether the research participants were vulnerable to psychological health conditions.

**Table 7.9: Measures of personal predictive factors of occupational psychological health conditions**

<b>Constructs</b>	<b>Indicators of occupational psychological health</b>
<b>Individual Lifestyle</b>	Exercise, Eating habit, Weight management, Alcohol intake, Use of drugs or pills, Sleep pattern and Changes in behavior.
<b>Psychosocial Indicators</b>	Unfriendliness, Irritability, Lack of trust, Resilience, Harassment / Violent and Abusiveness.
<b>Physiological Conditions</b>	Cardiovascular diseases, Musculoskeletal disorders, General health and Medical history.
<b>Work Attitudes</b>	Work happiness, Job commitment, and Advocacy.

Source: Hassard and Cox (2016) in *Occupational Safety and Health Report*.

<sup>9</sup> Some contents of section 7.3 of this Chapter have been published in: Fordjour, G. A. and Chan, A. P. C. (2019). "Exploring Occupational Psychological Health Indicators Among Construction Employees: A Study in Ghana". *Journal of Mental Health and Clinical Psychology*, 3(2): 6-18.



### 7.3.1 Results on personal predictive factors

The quantitative assessment of the personal predictive factors of psychological health conditions among the construction professionals and construction trade workers have been presented in Table 7.10.

**Table 7.10. Results of the personal predictive psychological health indicators among construction professionals<sup>(a)</sup> and construction trade workers <sup>(b)</sup>.**

No.	Indicators	Groups Mean	Groups Standard deviation	Levene's test for equality of variance		Cronbach Alpha values
				F- value	P- value	
<b>Construct 1: Individual Lifestyle</b>						<b>0.837</b>
1	Exercise	4.16 <sup>a</sup> , 4.01 <sup>b</sup>	1.316 <sup>a</sup> , 1.378 <sup>b</sup>	6.299	0.013*	
2	Eating Habit	4.33 <sup>a</sup> , 3.66 <sup>b</sup>	1.224 <sup>a</sup> , 1.442 <sup>b</sup>	67.893	0.000*	
3	Weight Management	4.12 <sup>a</sup> , 3.91 <sup>b</sup>	1.331 <sup>a</sup> , 1.406 <sup>b</sup>	9.906	0.002*	
4	Alcohol Intake	4.41 <sup>a</sup> , 4.05 <sup>b</sup>	1.176 <sup>a</sup> , 1.368 <sup>b</sup>	26.678	0.000*	
5	Use of Drugs or Pills	3.66 <sup>a</sup> , 3.49 <sup>b</sup>	1.442 <sup>a</sup> , 1.446 <sup>b</sup>	0.200	0.655	
6	Sleep Pattern	3.49 <sup>a</sup> , 3.29 <sup>b</sup>	1.304 <sup>a</sup> , 1.411 <sup>b</sup>	0.882	0.348	
7	Changes in Behaviour	3.92 <sup>a</sup> , 3.61 <sup>b</sup>	1.293 <sup>a</sup> , 1.442 <sup>b</sup>	12.682	0.000*	
<b>Construct 2: Psychosocial indicators</b>						<b>0.846</b>
8	Unfriendliness	3.06 <sup>a</sup> , 2.98 <sup>b</sup>	1.183 <sup>a</sup> , 1.303 <sup>b</sup>	0.243	0.622	
9	irritability	3.45 <sup>a</sup> , 3.22 <sup>b</sup>	1.319 <sup>a</sup> , 1.399 <sup>b</sup>	0.833	0.362	
10	Lack of trust	3.05 <sup>a</sup> , 3.03 <sup>b</sup>	1.353 <sup>a</sup> , 1.195 <sup>b</sup> ,	0.557	0.456	
11	Resilience	3.76 <sup>a</sup> , 3.43 <sup>b</sup>	1.432 <sup>a</sup> , 1.440 <sup>b</sup>	0.793	0.374	
12	Harassment / Violent	4.36 <sup>a</sup> , 3.76 <sup>b</sup>	1.082 <sup>a</sup> , 1.432 <sup>b</sup>	5.168	0.024*	
13	Abusiveness	4.23 <sup>a</sup> , 3.91 <sup>b</sup>	1.282 <sup>a</sup> , 1.406 <sup>b</sup>	7.171	0.008*	
<b>Construct 3:General Health Status</b>						<b>0.713</b>
14	Cardiovascular diseases	4.43 <sup>a</sup> , 4.16 <sup>b</sup>	1.095 <sup>a</sup> , 1.316 <sup>b</sup>	42.675	0.000*	
15	Musculoskeletal disorders	3.76 <sup>a</sup> , 2.93 <sup>b</sup>	1.432 <sup>a</sup> , 1.299 <sup>b</sup>	24.623	0.000*	
16	Physical Health	3.42 <sup>a</sup> , 3.05 <sup>b</sup>	1.439 <sup>a</sup> , 1.353 <sup>b</sup>	1.873	0.172	
17	Medical History	3.51 <sup>a</sup> , 3.31 <sup>b</sup>	1.446 <sup>a</sup> , 1.205 <sup>b</sup>	2.608	0.107	
<b>Construct 4: Work attitudes</b>						<b>0.714</b>
18	Work happiness	4.01 <sup>a</sup> , 3.73 <sup>b</sup>	1.378 <sup>a</sup> , 1.436 <sup>b</sup>	15.57	0.000*	
19	Job commitment	4.23 <sup>a</sup> , 4.12 <sup>b</sup>	1.282 <sup>a</sup> , 1.331 <sup>b</sup>	2.487	0.116	
20	Advocacy	4.53 <sup>a</sup> , 3.33 <sup>b</sup>	1.085 <sup>a</sup> , 1.427 <sup>b</sup>	139.972	0.000*	

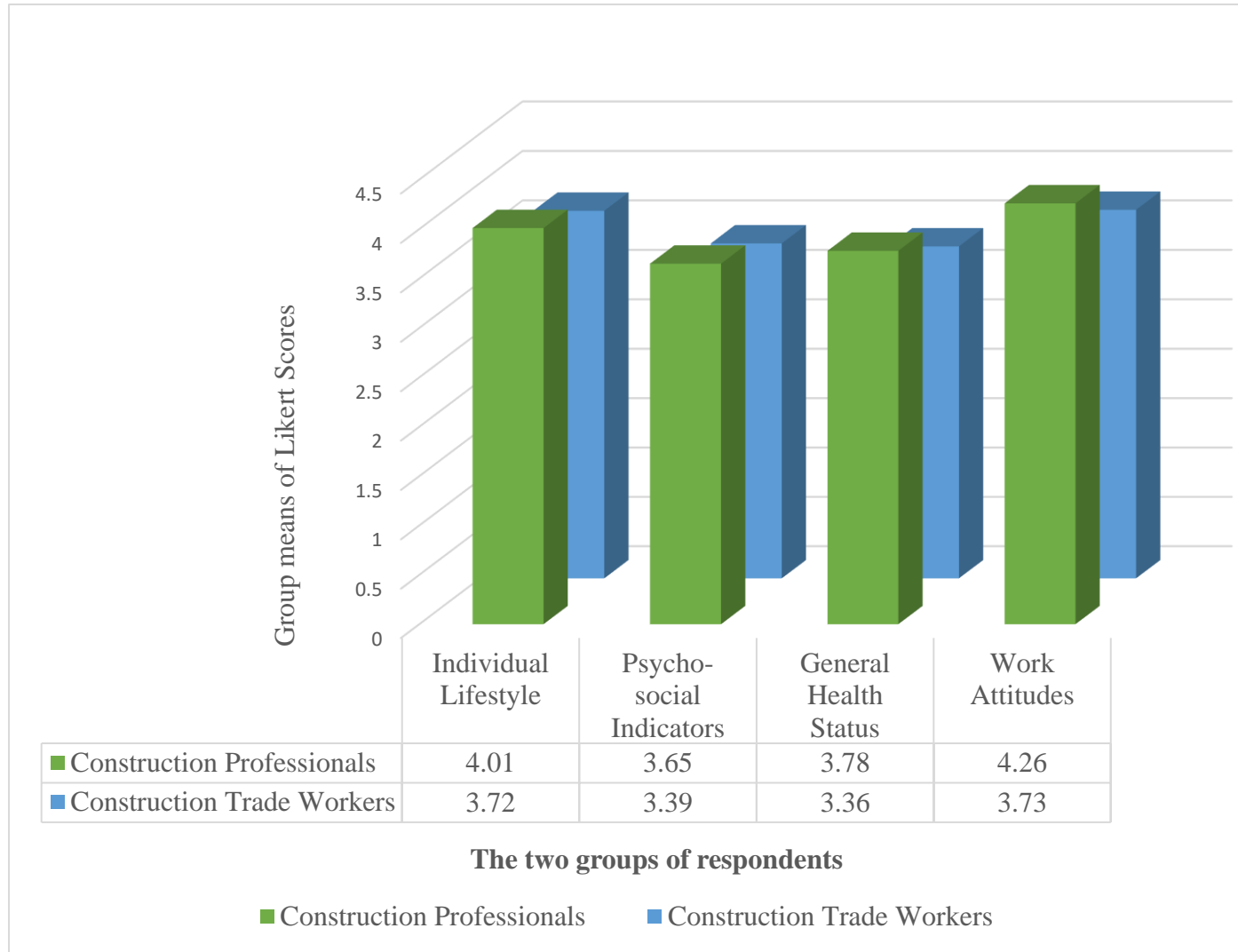
The results from the data analysis as presented in Table 7.10 depict that the mean scores obtained by the construction trade workers were different from the mean scores obtained by the construction professionals for all indicators measured. The internal consistency and reliability test using the Cronbach alpha values indicate that the inter-item consistency of all

the four constructs was good, as the Cronbach alpha values for the constructs as shown in Table 7.10 ranges from 0.837 to 0.713. These results indicate that the construction trade workers were found to be more prevalent in adverse occupational psychological health conditions than the construction professionals. The null hypothesis of the study assumed there is no statistically significant difference between the mean scores obtained from the two construction groups. The alternative hypothesis assumed there is/ are a statistically significant difference between the mean scores obtained from the two construction groups. The p-value of most of the indicators measured were less than 0.05 as shown in Table 7.10, the null hypothesis will therefore be rejected, and the alternative hypothesis considered for those indicators.

The psychological health indicators that revealed statistically significant differences between the two construction groups were: exercise, eating habit, weight management, alcohol intake, changes in behaviour, harassment/violent, abusiveness, cardiovascular, musculoskeletal, work happiness and advocacy. The differences in the outcome of the results of the construction professionals and construction trade workers could be due to the differences in these characteristics: individual personality, age, marital status, gender, level of education, years of working experience, task level, role demands, and income level (Quick, et. al., 2013; Bowen, et. al., 2014b; Leung, et. al., 2016; Leung and Chan, 2012).

On the other hand, indicators such as the use of drugs/pills, sleep pattern, distancing, unfriendliness, anti-social tendencies, resilience, general health, medical history, and commitment, had their p-values greater than 0.05. These results indicate that the differences in the mean scores of the two groups were not statistically significant; hence the null hypothesis will not be rejected for these other indicators. The similarities in the mean scores obtained from the construction professionals and construction trade workers indicate that these psychological indicators can affect any person regardless of their differences in various aspects (Landy and Conte, 2016; Enshassi, et. al., 2016).

Comparative assessment of the major constructs of personal predictive factors among the construction professionals and construction trade workers have been presented in Figure 7.3.



**Figure 7.3: Comparative Summary of the responses on positive level of personal predictive factors among the two construction groups of respondents**

The results of the comparative analysis as shown in Figure 7.3, indicate that work attitude is the personal predictive factor that is most likely to make both construction professionals and construction trade workers in Ghana vulnerable to psychological health conditions.

### **7.3.2 Discussion of results on personal predictive factors**

It has been revealed by previous studies that about 450 million persons worldwide suffer from psychological conditions such as stress, depression, and anxiety disorders, which has led to various forms of disability and ill-health globally. The World Health report in 2001 also indicated that one in four persons in the world would be affected by psychological disorders at some point in their lives. Psychological issues should, therefore, be taken much seriously. The detailed descriptions of the results of the indicators have been provided under their main constructs.

#### ***Construct 1: Individual Lifestyle***

Many studies have linked psychological well-being and ill-being conditions to individual lifestyle. Lifestyle as a major construct of occupational psychological health conditions among construction employees in Ghana was analyzed based on seven indicators, namely; exercise, eating habits, weight management, alcohol intake, use of drugs or pills, sleep pattern and changes in behaviour. Based on the responses to the questions for these indicators under lifestyle, the construction trade workers were found to be more prevalent in the adverse occupational psychological health conditions than the construction professionals. Tight deadline pressures and limited time for relaxation associated with construction work, could expose construction trade workers to poor lifestyle choices such as poor eating habits and lack of sleep.

Lifestyle choices can be directly linked with symptoms of anxiety, depression, Attention deficit hyperactivity disorder (ADHD), and more. The lifestyle of an individual could, therefore, have a profound impact on their mental health. Even though the mean scores differ, it could be stated that based on the lifestyle measures, both construction professionals and construction trade workers were likely to experience some form of occupational psychological health conditions. The consequences of a poor lifestyle of construction employees could have

both direct and indirect cost such as errors in decision making and violence at the construction workplace. All construction employees are encouraged to adopt a positive lifestyle to improve their quality of life. Positive lifestyle choices such as regular exercise, healthy eating habits, and good sleeping patterns improve psychological conditions by reducing negative moods, anxiety, and depression, as well as improve cognitive functions and self-esteem.

***Construct 2: Psychosocial indicators***

Psychosocial symptoms as a major construct of occupational psychological health conditions among construction employees in Ghana were analyzed based on six indicators, namely, unfriendliness, irritability, lack of trust, resilience, harassment or violent and abusiveness. The results indicate that each construction group had their participants experiencing some form of adverse occupational psychological health conditions. The dynamic, complex and uncertain nature of the construction industry could expose both construction professionals and construction trade workers to various forms of psychosocial conditions.

The findings of the study are in conformity with previous studies that also revealed that about 60 to 70 percent of organizations visited in Ghana, had their workers having some form of psychological health problems with stress as the common one. Though some researchers have argued that there are benefits associated with some amount of psychosocial conditions such as feelings of pressure, stress and workaholism. These adverse occupational psychological conditions could have consequences undoubtedly on the ability of construction employees to carry out their construction works efficiently; with other implications on the construction industry such as increased injury/accident rates and errors in decision making. Emotional symptoms such as rage, discouragement and mood swings are commonly reported, and these are associated with the psychosocial conditions of stress, anxiety, depression, harassment and abuse. Emotional problems are seen as the primary indicators of psychosocial conditions. Other symptoms include the feeling of being overwhelmed, irritability, mood swings, agitation,

feeling tensed, inability to relax, frustration, depression, isolation, sense of loneliness, resentment, anger and substance abuse. Stress and other psychological ill-being conditions are gradually becoming the primary source of mortality among employees.

### ***Construct 3: Physiological conditions***

Physiological conditions as a major construct of occupational psychological health conditions among construction employees in Ghana was analyzed based on four indicators, namely, cardiovascular diseases, musculoskeletal disorders, general health, and medical history. The results also indicate that the construction trade workers when assessed on the basis of physiological health were more prevalent in the adverse occupational psychological health conditions than the construction professionals. The outcome of these results could be due to factors such as differences in task levels as high levels of tasks associated with construction trade workers' job could expose them to physiological conditions.

Employees' physiological problems such as fatigue, headaches, insomnia, and gastrointestinal disturbances are usually reported, and these have been linked with psychological ill-being conditions such as burnout. Similar to the findings, previous researchers also revealed that the employees' psychological ill-being conditions can be manifested in the physical health of the person, with the person experiencing symptoms such as chronic fatigue, chest pain, rapid heartbeats, aches or pains, weakness, nausea, dizziness, diarrhoea or constipation, weight gain or loss, breathlessness, frequent colds, loss of sex drive, sweaty palms, hyperactivity, muscular tension, tiredness, jaw clenching or teeth grinding.

### ***Construct 4: Work attitudes***

Work attitude as a major construct of occupational psychological health conditions among construction employees in Ghana was analyzed based on three indicators, namely: work happiness, job commitment, and advocacy. Based on the responses to the questions on the

various indicators under work attitudes, the construction trade workers were more in the adverse occupational psychological health conditions than the construction professionals. The result could be due to the fact that construction trade workers are usually placed at the lowest rank of the construction industry and are usually paid lesser than the construction professionals. The imbalance between construction trade workers efforts and the rewards received could trigger poor work attitudes.

Work attitudes of employees have been proven to have a direct relationship with their occupational psychological health. Employees who are happy, committed and advocate are intrinsically driven to work hard and are likely to enjoy their work. Poor work attitude could have a significant relationship with various employees' emotional psychological ill-being conditions, including low self-esteem, depression, anxiety, feelings of helplessness and irritability. Employees who have poor work attitudes could be vulnerable to the adverse psychological health condition of emotional exhaustion, which is described as the depletion of emotional resources. Emotional exhaustion can also be described as a feeling of being emotionally overextended and exhausted by one's work. The negative emotions of emotional exhaustion can make employees feel very uncomfortable, which can negatively affect their job performance at the workplace.

The mental scope and functionality of the employees with poor work attitudes can also be affected in various ways when cognitive psychological ill-being is present, with indicators such as the inability to concentrate, memory problems, seeing only the pessimistic, poor judgment, constant worry, anxiety, loss of objectivity and fearful anticipation. Positive thoughts patterns are also associated with employees with positive work attitudes, and these evoke stronger emotions in employees enabling them to have greater involvement and engagement in work. To promote more positive work attitudes of commitment and dedication in construction trade workers, it is essential for stakeholders to pay attention to their happiness,

to make them feel valued, cared for and appreciated for their work efforts. The average happiness index calculated globally in the year 2018 was 5.39 out of 10 points. Ghana as a country, for instance, achieved a happy index score of 4.66 and ranked 106th of all the countries analyzed globally. There is the need to promote work factors that lead to positive attitudes of work happiness, job commitment and advocacy among all construction employees in Ghana and globally.

### **7.3.3 Summary of findings: Personal predictive factors that makes employees vulnerable to psychological health conditions**

This study aims to explore personal predictive factors that make employees vulnerable to psychological health conditions. To achieve this aim, 300 questionnaires were equally distributed to purposively selected construction professionals and construction trade workers in Ghana. Four main constructs namely, individual lifestyle, psychosocial symptoms, physiological conditions, and work attitudes, were assessed to identify occupational psychological health conditions among the two construction working groups. These four main constructs were further divided into 20 occupational psychological health indicators. Quantitative analysis of the data was done, and a comparison made between the scores obtained from the two construction groups. Using the measures of individual lifestyle and work attitudes, the construction trade workers were found to be more prevalent in adverse occupational psychological health conditions than the construction professionals. The measures of psychosocial symptoms and physiological conditions, however, revealed no much statistically significant differences between the mean scores obtained from the two construction groups. Each of the two-construction group had their participants experiencing some form of adverse occupational psychological health conditions. Differences between the two groups in terms of factors such as task levels, role demands and income levels, are likely to influence their different level of vulnerability to psychological disorders. This study recommends some



psychological health interventions to enhance the well-being of all construction employees. The findings from this study form the basic step in designing a preventive occupational psychological health model, with the aim to promote a psychologically safe and healthy construction workplace.

#### 7.4. Construction work-related factors that might influence the psychological health conditions of construction employees

This study sought to identify construction work-related factors that might expose both construction professionals and construction trade workers to psychological health conditions. Sequential mixed methods were adopted by first employing qualitative method of focus group study, which was followed by a questionnaire survey.

##### 7.4.1 Results from qualitative study on construction work-related factors

The sixteen (16) focus group discussion generated huge data. The individual responses, audio tapping, and group discussion were put together and summarised as the responses from the unit focus group. The items revealed by all participants in a group were read by the moderator to all group members. This exercise was to ensure that all persons in the group agree to the factors raised by other participants. The research participants revealed forty-two (42) items as construction work-related factors likely to expose construction employees (that is both construction professionals and construction trade-workers) to psychological health conditions. Table 7.11 presents the construction work-related psychological risks factors that were mentioned by the respondents from the focus group discussions. Some of the responses obtained from particular groups among the 16 focus groups have been provided as excerpts from the discussion in Table 7.11.

<b>Table 7.11: Construction work-related psychological risks factors mentioned by the respondents of the focus group discussions</b>		
<b>S/N</b>	<b>Construction work-related psychological risks factors</b>	<b>Some excerpts from focus group discussions</b>
C1.	Complex work methods	<i>Complex work methods that I am unfamiliar with often put me under stress and frustration. (Response from Group 1)</i>
C2.	Unfinished work	<i>Where there are unfinished works to be done, while the contract period is almost ending, there are a lot of tensions at the construction workplace. (Response from Group 1)</i>
C3.	Unclear roles and expectations	<i>Due to my multi-skilled nature, the contractor calls me to take part in the construction project without any clear roles and expectations,</i>

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		<i>and this can be overwhelming for me. (Response from Group 1)</i>
C4.	Poor management and autocratic leadership style	<i>Poor management and autocratic leadership style affect my mood in the workplace a lot. (Response from Group 2)</i>
C5.	Abusive and overdemanding supervisors	<i>Abusive and overdemanding supervisors make me feel very stressful. (Response from Group 2)</i>
C6.	High volume of work	<i>High volume of works to do in a particular time is difficult to handle with no time for relaxation, even though it comes with more financial benefits. (Response from Group 3)</i>
C7.	Fast working pace	<i>The construction company requires that the construction workers adopt fast working pace so that the company can earn money earlier, the pressure is more on the trade workers. (Response from Group 3)</i>
C8.	Limited time for relaxation	<i>There is too much pressure at the construction site that there is limited time for relaxation. (Response from Group 3)</i>
C9.	Skill underutilization	<i>I am assigned to limited tasks, and my skills are underutilized as compared to my former construction company. (Response from Group 4)</i>
C10.	Conflicting demands from superiors and colleagues	<i>As a frontline worker I usually have conflicting demands from superiors and workers, for instance, I am required to report certain negative acts of my colleagues to the supervisors and on the other hand I am required to protect the interest of my colleagues, this confuses me a lot. (Response from Group 4)</i>
C11.	Lack of influence on work decisions	<i>Lack of influence on work and major decisions at the construction workplace is very frustrating. (Response from Group 5)</i>
C12.	Matters being referred to supervisors even when capable of handling them	<i>Work matters are referred to supervisors, even when capable of handling them. (Response from Group 5)</i>
C13.	Pay is relatively low	<i>Pay is relatively low as compared to construction workers in the capital city of Ghana. (Response from Group 6)</i>
C14.	Employees treated unfairly with no job security	<i>Workers are treated unfairly as the project managers get the majority of the benefits that accrue from the project with their little efforts. (Response from Group 6)</i>
C15.	Too much supervision	<i>Too much supervision of work, makes me feel as if I am incapable of doing the work or I lack the abilities in meeting the job requirements. (Response from Group 6)</i>
C16.	Tight deadline pressures	<i>Most construction projects, especially the private commercial projects, are required to be completed urgently with tight deadlines, putting we the construction workers at higher health risks. (Response from Group 7)</i>
C17.	Poor working space	<i>Poor working space causes a lot of accident and injuries at the construction site. (Response from Group 7)</i>
C18.	Lack of teamwork and cooperation	<i>Lack of teamwork and cooperation among co-workers is a critical problem and source of psychological ill-being. (Response from Group 8)</i>
C19.	Inadequate staffing levels	<i>More hands on a construction project come with financial costs, so most contractors usually employ few workers; however, inadequate staffing levels have consequences on our health and the job. (Response from Group 8)</i>
C20.	Personal beliefs conflict with organizations' requirements	<i>My personal beliefs do conflict with organizations' requirements, for instance, some materials that are used for the job are of a low quality</i>

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		<i>than those specified in the contract, thus cheating the client and I do not agree with such acts. (Response from Group 9)</i>
C21.	Incapable of meeting quality demands	<i>Construction projects with high work specifications and quality demands make me anxious and worried as I perceive I am incapable of meeting the quality demands. (Response from Group 9)</i>
C22.	Aggression and offensive behaviours	<i>Aggression and offensive behaviours at the construction workplace lead to violence and unfriendly atmosphere at work. (Response from Group 10)</i>
C23.	High good performance expectation	<i>A lot of expectation to deliver high good performance job, while minimizing potential mistakes, put me under a lot of pressure. (Response from Group 10)</i>
C24.	Skills and abilities not fully employed	<i>My Skills and abilities are not employed as I am trained plumber, but I am currently working as a mason, and this makes me unhappy. (Response from Group 11)</i>
C25.	Incompetence	<i>Some colleagues are incompetent for the job, and it is very difficult to work with them. (Response from Group 11)</i>
C26.	Poor communication	<i>Poor communication by my superiors affects my understanding of the job requirements. (Response from Group 11)</i>
C27.	Insufficient authority overwork	<i>Even as a frontline worker, I have insufficient authority over the work, as the managers usually have a bad impression of we the workers and suspect us for bad acts such as stealing work materials. (Response from Group 12)</i>
C28.	Imbalance between work effort and reward	<i>Imbalance between work effort done by construction workers and the payment rewards we receive and that is the norm in most construction companies. (Response from Group 12)</i>
C29.	No recognition for work done	<i>I usually get no recognition for work done, and I doubt if the managers value my contributions to the project. (Response from Group 12)</i>
C30.	Supervisors not commenting on job performance	<i>Supervisors do not comment on job performance, whether good or bad, without their comments, you do not know if you should improve on your work or remain the same, this makes me worried and anxious. (Response from Group 13)</i>
C31.	Poor design	<i>Poor design of the construction project exposes construction workers to a lot of health and safety risks. (Response from Group 13)</i>
C32.	Poor lighting system	<i>I get headaches whenever I work under poor lighting system, especially at night. (Response from Group 13)</i>
C33.	Exposure to Physical dangers	<i>Construction works expose us to a lot of physical dangers, especially when working in very confined areas. (Response from Group 14)</i>
C34.	Work being repetitive and boring	<i>Work is repetitive and boring; most of the projects have similar features; I prefer more innovative and complicated works to enhance my skills. (Response from Group 14)</i>
C35.	Hostility and discrimination	<i>Hostility and discrimination are prevalent at my construction workplace; people who are from a particular tribe in Ghana look down on people from other tribes. (Response from Group 14)</i>
C36.	High scope and job responsibilities	<i>Construction projects that are high in scope come with high job responsibilities, that causes us to experience a lot of stress. (Response from Group 15)</i>
C37.	Inadequate resources	<i>Inadequate resources required to complete a task makes me angry. (Response from Group 15)</i>

C38.	Noise exposure	<i>Noise exposure from huge plants and equipment is a critical health problem for me. (Response from Group 15)</i>
C39.	Dust exposure	<i>The health of us, construction workers are also affected by the dust we are exposed to. (Response from Group 16)</i>
C40.	Lack of medical insurance	<i>Most of us seasonal workers employed to take part in a particular project, do not have any medical insurance and this can make us worry a lot and fearful. (Response from Group 16)</i>
C41.	No recommendation to improve the situation	<i>I recently made a mistake at work, and no recommendation was given as to how to improve the situation. This was very depressing and frustrating to me. (Response from Group 16)</i>
C42.	Poor organizational support	<i>Support from the stakeholders of the organization to construction employees can be very challenging and exhausting on both sides. This is mainly due to the unpredictable and transient nature of construction work, making any such attempts to provide organisational supports poor. (Response from Group 16)</i>

The respondents from the focus group discussions revealed forty-two (42) construction work-related factors that are likely to expose both construction professionals and construction trade workers to psychological ill-being conditions. The results from the focus group study have been presented in Table 7.11. Studies conducted in other developing countries also revealed similar factors identified in the study. For instance, a study conducted by Ibem, et. al., (2011) in Nigeria and a study conducted by Enshassi and Al.Swaity, (2015) in Gaza – Strip Palestine also revealed similar construction work psychological risk factors such as high volume of work, fast working pace and tight deadlines. Similar factors revealed in a study conducted in South Africa by Bowen, et. al., (2013) were poor working space and insufficient authority over work. Pay being relatively low and lack of feedback as psychological risk factors were also identified in a study conducted in China by Leung and Chan, (2012). Unclear roles and expectations and conflicting demands from superiors and workers were also mentioned in Sri Lanka by Senaratne and Rasagopal-asingam, (2017). However, the key factors, including unfinished work and abusive supervision, that were identified by this study were not revealed or measured by the previous researchers.

#### 7.4.2 Results from Quantitative study on Construction work-related factors

The construction work-related psychological risk factors for the quantitative study were sourced from the preliminary study of focus group discussion and not from the literature review. This was done to identify factors that pertain to the Ghanaian construction industry. Quantitative study was employed to confirm the findings from the qualitative study as statistically significant factors that can influence the psychological health of construction employees. The results from the descriptive analysis, one-sample T-test analysis and ranking of the factors have been shown in Table 7.12.

**Table 7.12: Statistical results of findings on construction work-related psychological risk factors**

S/N	Construction work-related psychological risk factors	Mean	Std. Dev.	Test Value: 3	P - value (Sig. < 0.05)	Rank
C16.	Tight deadline pressures	4.10*	0.731	26.141	0.021	1 <sup>st</sup>
C17.	Poor working space	4.08*	0.734	25.395	0.003	2 <sup>nd</sup>
C5.	Abusive and over-demanding supervisors	4.07*	0.752	23.428	0.000	3 <sup>rd</sup>
C8.	Limited time for relaxation	4.05*	0.754	22.971	0.005	4 <sup>th</sup>
C13.	Pay is relatively low	4.04*	0.752	23.428	0.016	5 <sup>th</sup>
C2.	Unfinished work	4.02*	0.758	22.837	0.001	6 <sup>th</sup>
C33.	Exposure to Physical dangers	4.01*	0.754	22.971	0.024	7 <sup>th</sup>
C26.	Poor communication	4.00*	0.758	22.837	0.006	8 <sup>th</sup>
C28.	Imbalance between work effort and reward	3.95	0.770	20.772	0.000	9 <sup>th</sup>
C23.	High good performance expectation	3.92	0.767	20.765	0.000	10 <sup>th</sup>
C7.	Fast working pace	3.91	0.772	19.896	0.000	11 <sup>th</sup>
C38.	Noise exposure	3.89	0.773	20.021	0.000	12 <sup>th</sup>
C36.	High scope and job responsibilities	3.87	0.770	19.650	0.000	13 <sup>th</sup>
C1.	Complex work methods	3.85	0.773	19.419	0.014	14 <sup>th</sup>
C37.	Inadequate resources	3.83	0.777	19.311	0.005	15 <sup>th</sup>
C39.	Dust exposure	3.81	0.778	17.968	0.000	16 <sup>th</sup>
C6.	High volume of work	3.80	0.773	17.854	0.000	17 <sup>th</sup>
C18.	Lack of teamwork and cooperation	3.78	0.773	16.726	0.009	18 <sup>th</sup>
C19.	Inadequate staffing levels	3.75	0.772	16.825	0.000	19 <sup>th</sup>
C31.	Poor accommodation and catering facilities	3.73	0.771	16.923	0.036	20 <sup>th</sup>
C10.	Conflicting demands from superiors and colleagues	3.71	0.767	16.039	0.042	21 <sup>st</sup>

C11.	Lack of influence on work decisions	3.70	0.766	16.134	0.000	22 <sup>nd</sup>
C21.	Incapable of meeting quality demands	3.68	0.761	15.471	0.000	23 <sup>rd</sup>
C15.	Too much supervision	3.66	0.753	15.100	0.037	24 <sup>th</sup>
C25.	Incompetence	3.65	0.755	14.920	0.000	25 <sup>th</sup>
C14.	Employees treated unfairly with no job security	3.63	0.737	13.945	0.033	26 <sup>th</sup>
C29.	No recognition for work done	3.61	0.737	13.945	0.000	27 <sup>th</sup>
C3.	Unclear roles and expectations	3.59	0.734	13.772	0.003	28 <sup>th</sup>
C22.	Aggression and offensive behaviours	3.58	0.729	13.859	0.031	29 <sup>th</sup>
C20.	Personal beliefs conflict with organizations' requirements	3.57	0.730	13.516	0.008	30 <sup>th</sup>
C35.	Hostility and discrimination	3.56	0.730	13.516	0.017	31 <sup>st</sup>
C4.	Poor management and autocratic leadership style	3.55	0.726	13.431	0.000	32 <sup>nd</sup>
C27.	Insufficient authority over work	3.53	0.715	12.928	0.000	33 <sup>rd</sup>
C30.	Supervisors not commenting on job performance	3.51	0.715	12.844	0.000	34 <sup>th</sup>
C9.	Skill underutilization	3.49	0.696	12.271	0.011	35 <sup>th</sup>
C40.	Lack of medical insurance	3.48	0.715	11.706	0.000	36 <sup>th</sup>
C12.	Matters being referred to supervisors even when capable of handling them	3.46	0.705	11.384	0.001	37 <sup>th</sup>
C32.	Poor lighting system	3.43	0.663	11.229	0.008	38 <sup>th</sup>
C42.	Poor organizational support	3.45	0.741	10.442	0.029	39 <sup>th</sup>
C34.	Work being repetitive and boring	3.41	0.640	11.091	0.000	40 <sup>th</sup>
C41.	No recommendation to improve situation	3.42	0.711	10.310	0.043	41 <sup>st</sup>
C24.	Skills and abilities are not employed	3.38	0.631	10.528	0.014	42 <sup>nd</sup>

*Note: Highly scored mean values are marked with (\*).*

All the factors analysed in this study had their mean scores above 3.0 and a significant value less than 0.05 as shown in Table 7.12. The null hypothesis stating that the individual factors were not statistically significant to be construction work-related psychological risk factor(s) will be rejected, and the alternative hypothesis accepted. Tight deadline pressure was the highest scored factor and skills and abilities not fully employed as a factor recorded the least score by all the respondents. The results could be because time is a critical factor in every project's outcome (Gunduz and Yahya, 2018). In descending order, the highly scored mean factors were tight deadline pressures, high volume of work, high scope and job responsibilities,

limited time for relaxation, pay is relatively low, unfinished work, exposure to physical dangers, and poor communication.

The Blom's fractional rank estimation test was done, which revealed the data were normally distributed, and hence, the results of the two groups could be compared for all the variables. The comparison of the results of the two construction groups has been presented in Table 7.13. Independent two-sample T-test was used to determine whether the difference in the ratings by the two respondents' groups were statistically significant. The f-value and significance value of the Levene's Test for equality of variances have been presented. The group mean together with the values of the relative importance index (RII), were used to rank the factors as identified in each group of respondents and presented in Table 7.13.

**Table 7.13: Comparison of the statistical results obtained from the construction professionals' group <sup>(a)</sup> and construction trade workers group <sup>(b)</sup>**

Overall Ranks	Construction work-related psychological factors	Group Mean	Group RII %	Levene's Test for Equality of Variances		Group Rank
				F -value	Sig.	
1 <sup>st</sup>	Tight deadline pressures	4.03 <sup>a</sup> , 4.18 <sup>b</sup>	81 <sup>a</sup> , 84 <sup>b</sup>	1.195	0.275	1 <sup>st</sup> <sup>a</sup> , 5 <sup>th</sup> <sup>b</sup>
2 <sup>nd</sup>	Poor working space	3.92 <sup>a</sup> , 4.23 <sup>b</sup>	78 <sup>a</sup> , 85 <sup>b</sup>	0.117	0.733	5 <sup>th</sup> <sup>a</sup> , 2 <sup>nd</sup> <sup>b</sup>
3 <sup>rd</sup>	Abusive and over-demanding supervisors	3.93 <sup>a</sup> , 4.25 <sup>b</sup>	79 <sup>a</sup> , 85 <sup>b</sup>	0.569	0.451	4 <sup>th</sup> <sup>a</sup> , 1 <sup>st</sup> <sup>b</sup>
4 <sup>th</sup>	Limited time for relaxation	3.80 <sup>a</sup> , 4.20 <sup>b</sup>	76 <sup>a</sup> , 84 <sup>b</sup>	0.508	0.477	11 <sup>th</sup> <sup>a</sup> , 4 <sup>th</sup> <sup>b</sup>
5 <sup>th</sup>	Pay is relatively low	3.82 <sup>a</sup> , 4.21 <sup>b</sup>	76 <sup>a</sup> , 84 <sup>b</sup>	0.316	0.575	10 <sup>th</sup> <sup>a</sup> , 3 <sup>rd</sup> <sup>b</sup>
6 <sup>th</sup>	Unfinished work	3.97 <sup>a</sup> , 4.03 <sup>b</sup>	79 <sup>a</sup> , 81 <sup>b</sup>	1.964	0.162	2 <sup>nd</sup> <sup>a</sup> , 12 <sup>th</sup> <sup>b</sup>
7 <sup>th</sup>	Exposure to Physical dangers	3.87 <sup>a</sup> , 4.13 <sup>b</sup>	77 <sup>a</sup> , 83 <sup>b</sup>	0.055	0.815	8 <sup>th</sup> <sup>a</sup> , 7 <sup>th</sup> <sup>b</sup>
8 <sup>th</sup>	Poor communication	3.95 <sup>a</sup> , 4.05 <sup>b</sup>	79 <sup>a</sup> , 81 <sup>b</sup>	1.363	0.244	3 <sup>rd</sup> <sup>a</sup> , 11 <sup>th</sup> <sup>b</sup>
9 <sup>th</sup>	Imbalance between work effort and reward	3.77 <sup>a</sup> , 4.07 <sup>b</sup>	75 <sup>a</sup> , 81 <sup>b</sup>	0.199	0.656	12 <sup>th</sup> <sup>a</sup> , 10 <sup>th</sup> <sup>b</sup>
10 <sup>th</sup>	High good performance expectation	3.68 <sup>a</sup> , 4.16 <sup>b</sup>	74 <sup>a</sup> , 83 <sup>b</sup>	0.811	0.369	17 <sup>th</sup> <sup>a</sup> , 6 <sup>th</sup> <sup>b</sup>
11 <sup>th</sup>	Fast working pace	3.66 <sup>a</sup> , 4.11 <sup>b</sup>	73 <sup>a</sup> , 82 <sup>b</sup>	0.387	0.534	18 <sup>th</sup> <sup>a</sup> , 8 <sup>th</sup> <sup>b</sup>
12 <sup>th</sup>	Noise exposure	3.85 <sup>a</sup> , 3.94 <sup>b</sup>	77 <sup>a</sup> , 79 <sup>b</sup>	1.193	0.276	9 <sup>th</sup> <sup>a</sup> , 16 <sup>th</sup> <sup>b</sup>
13 <sup>th</sup>	High scope and job responsibilities	3.49 <sup>a</sup> , 4.10 <sup>b</sup>	70 <sup>a</sup> , 82 <sup>b</sup>	0.003	0.958	27 <sup>th</sup> <sup>a</sup> , 9 <sup>th</sup> <sup>b</sup>
14 <sup>th</sup>	Complex work methods	3.72 <sup>a</sup> , 4.01 <sup>b</sup>	74 <sup>a</sup> , 80 <sup>b</sup>	0.262	0.609	15 <sup>th</sup> <sup>a</sup> , 13 <sup>th</sup> <sup>b</sup>
15 <sup>th</sup>	Inadequate resources	3.89 <sup>a</sup> , 3.85 <sup>b</sup>	78 <sup>a</sup> , 77 <sup>b</sup>	6.167	0.014*	7 <sup>th</sup> <sup>a</sup> , 20 <sup>th</sup> <sup>b</sup>
16 <sup>th</sup>	Dust exposure	3.74 <sup>a</sup> , 3.87 <sup>b</sup>	75 <sup>a</sup> , 77 <sup>b</sup>	1.65	0.200	14 <sup>th</sup> <sup>a</sup> , 19 <sup>th</sup> <sup>b</sup>



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17 <sup>th</sup>	High volume of work	3.63 <sup>a</sup> , 3.97 <sup>b</sup>	73 <sup>a</sup> , 79 <sup>b</sup>	0.042	0.838	20 <sup>th</sup> <sup>a</sup> , 15 <sup>th</sup> <sup>b</sup>
18 <sup>th</sup>	Lack of teamwork and cooperation	3.70 <sup>a</sup> , 3.79 <sup>b</sup>	74 <sup>a</sup> , 76 <sup>b</sup>	3.31	0.070	16 <sup>th</sup> <sup>a</sup> , 23 <sup>rd</sup> <sup>b</sup>
19 <sup>th</sup>	Inadequate staffing levels	3.90 <sup>a</sup> , 3.60 <sup>b</sup>	78 <sup>a</sup> , 72 <sup>b</sup>	5.549	0.019*	6 <sup>th</sup> <sup>a</sup> , 36 <sup>th</sup> <sup>b</sup>
20 <sup>th</sup>	Poor accommodation and catering facilities	3.59 <sup>a</sup> , 3.91 <sup>b</sup>	72 <sup>a</sup> , 78 <sup>b</sup>	1.739	0.188	22 <sup>nd</sup> <sup>a</sup> , 17 <sup>th</sup> <sup>b</sup>
21 <sup>st</sup>	Conflicting demands from superiors and colleagues	3.76 <sup>a</sup> , 3.66 <sup>b</sup>	75 <sup>a</sup> , 73 <sup>b</sup>	3.284	0.071	13 <sup>th</sup> <sup>a</sup> , 33 <sup>rd</sup> <sup>b</sup>
22 <sup>nd</sup>	Lack of influence on work decisions	3.53 <sup>a</sup> , 3.90 <sup>b</sup>	71 <sup>a</sup> , 78 <sup>b</sup>	3.583	0.059	25 <sup>th</sup> <sup>a</sup> , 18 <sup>th</sup> <sup>b</sup>
23 <sup>rd</sup>	Incapable of meeting quality demands	3.65 <sup>a</sup> , 3.71 <sup>b</sup>	73 <sup>a</sup> , 74 <sup>b</sup>	4.797	0.029*	19 <sup>th</sup> <sup>a</sup> , 29 <sup>th</sup> <sup>b</sup>
24 <sup>th</sup>	Too much supervision	3.33 <sup>a</sup> , 3.98 <sup>b</sup>	67 <sup>a</sup> , 80 <sup>b</sup>	15.268	0.000*	35 <sup>th</sup> <sup>a</sup> , 14 <sup>th</sup> <sup>b</sup>
25 <sup>th</sup>	Incompetence	3.52 <sup>a</sup> , 3.78 <sup>b</sup>	70 <sup>a</sup> , 76 <sup>b</sup>	8.768	0.003*	26 <sup>th</sup> <sup>a</sup> , 24 <sup>th</sup> <sup>b</sup>
26 <sup>th</sup>	Employees treated unfairly with no job security	3.35 <sup>a</sup> , 3.83 <sup>b</sup>	67 <sup>a</sup> , 77 <sup>b</sup>	33.599	0.000*	34 <sup>th</sup> <sup>a</sup> , 21 <sup>st</sup> <sup>b</sup>
27 <sup>th</sup>	No recognition for work done	3.37 <sup>a</sup> , 3.81 <sup>b</sup>	67 <sup>a</sup> , 76 <sup>b</sup>	30.618	0.000*	33 <sup>rd</sup> <sup>a</sup> , 22 <sup>nd</sup> <sup>b</sup>
28 <sup>th</sup>	Unclear roles and expectations	3.55 <sup>a</sup> , 3.61 <sup>b</sup>	71 <sup>a</sup> , 72 <sup>b</sup>	6.118	0.014*	24 <sup>th</sup> <sup>a</sup> , 35 <sup>th</sup> <sup>b</sup>
29 <sup>th</sup>	Aggression and offensive behaviours	3.44 <sup>a</sup> , 3.73 <sup>b</sup>	69 <sup>a</sup> , 75 <sup>b</sup>	25.359	0.000*	29 <sup>th</sup> <sup>a</sup> , 28 <sup>th</sup> <sup>b</sup>
30 <sup>th</sup>	Personal beliefs conflict with organizations' requirements	3.61 <sup>a</sup> , 3.53 <sup>b</sup>	72 <sup>a</sup> , 71 <sup>b</sup>	0.956	0.329	21 <sup>st</sup> <sup>a</sup> , 39 <sup>th</sup> <sup>b</sup>
31 <sup>st</sup>	Hostility and discrimination	3.47 <sup>a</sup> , 3.67 <sup>b</sup>	69 <sup>a</sup> , 73 <sup>b</sup>	15.94	0.000*	28 <sup>th</sup> <sup>a</sup> , 32 <sup>nd</sup> <sup>b</sup>
32 <sup>nd</sup>	Poor management and autocratic leadership style	3.43 <sup>a</sup> , 3.69 <sup>b</sup>	69 <sup>a</sup> , 74 <sup>b</sup>	22.426	0.000*	30 <sup>th</sup> <sup>a</sup> , 30 <sup>th</sup> <sup>b</sup>
33 <sup>rd</sup>	Insufficient authority over work	3.57 <sup>a</sup> , 3.49 <sup>b</sup>	71 <sup>a</sup> , 70 <sup>b</sup>	0.447	0.504	23 <sup>rd</sup> <sup>a</sup> , 41 <sup>st</sup> <sup>b</sup>
34 <sup>th</sup>	Supervisors not commenting on job performance	3.31 <sup>a</sup> , 3.75 <sup>b</sup>	66 <sup>a</sup> , 75 <sup>b</sup>	58.955	0.000*	36 <sup>th</sup> <sup>a</sup> , 27 <sup>th</sup> <sup>b</sup>
35 <sup>th</sup>	Skill underutilization	3.41 <sup>a</sup> , 3.57 <sup>b</sup>	68 <sup>a</sup> , 71 <sup>b</sup>	18.017	0.000*	31 <sup>st</sup> <sup>a</sup> , 37 <sup>th</sup> <sup>b</sup>
36 <sup>th</sup>	Lack of medical insurance	3.19 <sup>a</sup> , 3.77 <sup>b</sup>	64 <sup>a</sup> , 76 <sup>b</sup>	93.583	0.000*	40 <sup>th</sup> <sup>a</sup> , 25 <sup>th</sup> <sup>b</sup>
37 <sup>th</sup>	Matters being referred to supervisors even when capable of handling them	3.29 <sup>a</sup> , 3.63 <sup>b</sup>	66 <sup>a</sup> , 73 <sup>b</sup>	84.619	0.000*	37 <sup>th</sup> <sup>a</sup> , 34 <sup>th</sup> <sup>b</sup>
38 <sup>th</sup>	Poor lighting system	3.39 <sup>a</sup> , 3.47 <sup>b</sup>	68 <sup>a</sup> , 69 <sup>b</sup>	8.481	0.004*	32 <sup>nd</sup> <sup>a</sup> , 42 <sup>nd</sup> <sup>b</sup>
39 <sup>th</sup>	Poor organizational support	3.13 <sup>a</sup> , 3.76 <sup>b</sup>	62 <sup>a</sup> , 75 <sup>b</sup>	88.478	0.000*	42 <sup>nd</sup> <sup>a</sup> , 26 <sup>th</sup> <sup>b</sup>
40 <sup>th</sup>	Work being repetitive and boring	3.27 <sup>a</sup> , 3.55 <sup>b</sup>	65 <sup>a</sup> , 71 <sup>b</sup>	59.609	0.000*	38 <sup>th</sup> <sup>a</sup> , 38 <sup>th</sup> <sup>b</sup>
41 <sup>st</sup>	No recommendation to improve situation	3.15 <sup>a</sup> , 3.68 <sup>b</sup>	63 <sup>a</sup> , 74 <sup>b</sup>	149.859	0.000*	41 <sup>st</sup> <sup>a</sup> , 31 <sup>st</sup> <sup>b</sup>
42 <sup>nd</sup>	Skills and abilities are not employed	3.25 <sup>a</sup> , 3.51 <sup>b</sup>	65 <sup>a</sup> , 70 <sup>b</sup>	62.235	0.000*	39 <sup>th</sup> <sup>a</sup> , 40 <sup>th</sup> <sup>b</sup>

Levene's Test for equality of variances among the two construction working groups indicated that equal variances were assumed for twenty-two (22) of the factors analyzed, as their p- values were greater than 0.05. On the other hand, the factors that showed a statistically significant difference between the mean scores of the two groups were also twenty (20) in number. These 20 factors had their p- values less than 0.05 and marked with (\*), as shown in Table 7.13. The null hypothesis that assumes no statistically significant differences between the mean scores of the two construction groups will be rejected, and the alternative hypothesis that states otherwise will be accepted for these 20 factors. However, the null hypothesis will not be rejected for the 22 other factors that revealed no statistically significant differences and assumed equal variances for the two construction groups. The similarities in the significance of the factors rated by the two construction working groups indicate that those factors are likely to expose all construction employees to the risk of psychological disorders such as stress, anxiety, depression and the likes, irrespective of the underlining factors listed previously (Wang, et. al., 2017). Construction employees may experience mental and emotional indicators of psychological disorders such as anxiety, boredom, trembling, low self-esteem, forgetfulness, depression, anger, apathy, worry, fatigue (Goetzel, et. al., 2018).

**Table 7.14: Identification of critical construction work-related psychological risk factors ranked by the two construction groups of respondents.**

Ranks	Overall Ranks	Construction Professionals Group	Construction Trade Workers' Group
		Ranks	
1st	Tight deadline pressures	Tight deadline pressures	Abusive and over-demanding supervisors
2 <sup>nd</sup>	Poor working space	Unfinished work	Poor working space
3 <sup>rd</sup>	Abusive and over-demanding supervisors	Poor communication	Pay is relatively low
4 <sup>th</sup>	Limited time for relaxation	Abusive and over-demanding supervisors	Limited time for relaxation
5 <sup>th</sup>	Pay is relatively low	Poor working conditions	Tight deadline pressures
6 <sup>th</sup>	Unfinished work	Inadequate staffing levels	High good performance expectation
7 <sup>th</sup>	Exposure to Physical dangers	Inadequate resources	Exposure to Physical dangers

8 <sup>th</sup>	Poor communication	Exposure to Physical dangers	Fast working pace
9 <sup>th</sup>	Imbalance between work effort and reward	Noise exposure	High scope and job responsibilities
10 <sup>th</sup>	High good performance expectation	Pay is relatively low	Imbalance between work effort and reward

The results from the quantitative study indicate that the most critical construction work-related factors revealed under high task demands are tight deadline pressures and high volume of work. These factors could cause construction employees psychological ill-being conditions of stress, anxiety, emotional distress, fatigue, frustration, irritation, upset, agitation, tension, emotional exhaustion, and numbness. These could lead to direct costs (such as poor job performance, low productivity, high turnover, work stoppage, and increased rate of accidents) and indirect costs (such as errors in work, low motivation, hostile working environment) as consequences to the construction industry.

A comparison of the statistical results obtained from the construction professionals' group and construction trade workers group showed some significant differences in the rankings of the factors, as shown in Table 7.13. For instance: tight deadline pressure as a psychological risk factor was ranked 1<sup>st</sup> by the construction professionals but 5<sup>th</sup> by the construction trade workers. Abusive and over-demanding supervisors as a factor was rather ranked 1<sup>st</sup> by the construction trade workers but 4<sup>th</sup> by the construction professionals. The differences in the opinions of the two construction groups indicate that these construction work-related psychological factors could affect a construction employee at different degrees of severity based on underlining factors such as work trade, task level, type of role, pay differential, working experience and other demographic characteristics such as age, gender, and educational background (Quick, et. al., 2013; Kollmann, et. al., 2019). Construction trade workers unlike the construction project team members are usually at the lowest rank of most construction organizations and therefore have little or no influence on their jobs, leading to them experiencing psychological ill-being conditions or disorders (Leung, et. al., 2017; Bowen,

et. al., 2014). A study conducted by Fordjour and Chan (2019) revealed that psychological disorders such as stress, anxiety, and depression were more prevalent among construction trade workers than construction professionals.

The 42 identified construction work-related psychological risk factors were to be grouped into major constructs. For the grouping of large items, it is recommended that the Kaiser-Meyer-Olkin (KMO) value should be greater than 0.50 (Enshassi, et. al., 2016). The Chi-Square value using Bartlett's Test of Sphericity should also have a significant value of 0.05 or less (Norusis, 2001). Table 7.15 presents the results of the measure of sampling adequacy using Kaiser-Meyer-Olkin (KMO), the results of sphericity using Bartlett's test and the approximate Chi-Square value. The test results confirm that the data was appropriate and can be relied on.

**Table 7.15: KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.913
Bartlett's Test of Sphericity	Approx. Chi-Square	15998.770
	df	741
	Sig.	.000

Total variance analysis revealed that seven constructs existed among all the 42-construction work-related psychological risk factors. The total number of constructs extracted was based on Eigenvalues greater than 1. The cumulative total variance of the seven constructs extracted was about 79%. Table 7.16 presents the results from the total variance analysis derived from the principal component method.

**Table 7.16: Total Variance Explained**

Component	Total	Initial Eigenvalues		Total	Extraction Sums of Squared Loadings	
		% of Variance	Cumulative %		% of Variance	Cumulative %
1	19.743	47.008	47.008	19.743	47.008	47.008
2	4.314	10.272	57.28	4.314	10.272	57.28
3	3.753	8.935	66.215	3.753	8.935	66.215
4	2.632	6.267	72.482	2.632	6.267	72.482
5	1.868	4.448	76.93	1.868	4.448	76.93
6	1.303	3.103	80.032	1.303	3.103	80.032
7	1.14	2.714	82.746	1.14	2.714	82.746
8	0.925	2.204	84.95			
9	0.687	1.635	86.585			
10	0.616	1.468	88.053			
11	0.553	1.316	89.369			
12	0.509	1.213	90.582			
13	0.388	0.925	91.507			
14	0.364	0.866	92.373			
15	0.315	0.751	93.123			
16	0.273	0.649	93.772			
17	0.256	0.609	94.381			
18	0.232	0.551	94.933			
19	0.222	0.528	95.461			
20	0.196	0.468	95.928			
21	0.183	0.435	96.363			
22	0.159	0.379	96.742			
23	0.14	0.334	97.077			
24	0.121	0.287	97.364			
25	0.111	0.265	97.629			
26	0.106	0.252	97.882			
27	0.104	0.247	98.129			
28	0.087	0.207	98.336			
29	0.083	0.198	98.534			
30	0.078	0.186	98.72			
31	0.07	0.166	98.886			
32	0.069	0.164	99.051			
33	0.062	0.148	99.199			
34	0.05	0.12	99.319			
35	0.049	0.116	99.434			
36	0.046	0.109	99.544			
37	0.043	0.102	99.645			
38	0.036	0.085	99.73			

39	0.034	0.081	99.811	
40	0.034	0.08	99.892	
41	0.028	0.067	99.958	
42	0.018	0.042	100	

The grouping of the forty-two (42) items into seven major constructs was done manually using thematic analysis. The seven constructs were named by drawing similarities in meaning among the various related factors. The constructs were therefore named as follows; high task demands, high role demands, poor interpersonal work relationships, poor work conditions, lack of autonomy, lack of feedback, and unfair rewards/ treatment. The internal consistency and reliability of the construct were good, as the Cronbach alpha value for all the constructs were above 0.7. Table 7.17 presents the reliability analysis of the extracted constructs. The values of the Cronbach alpha of each item if it is deleted from a construct have been presented.

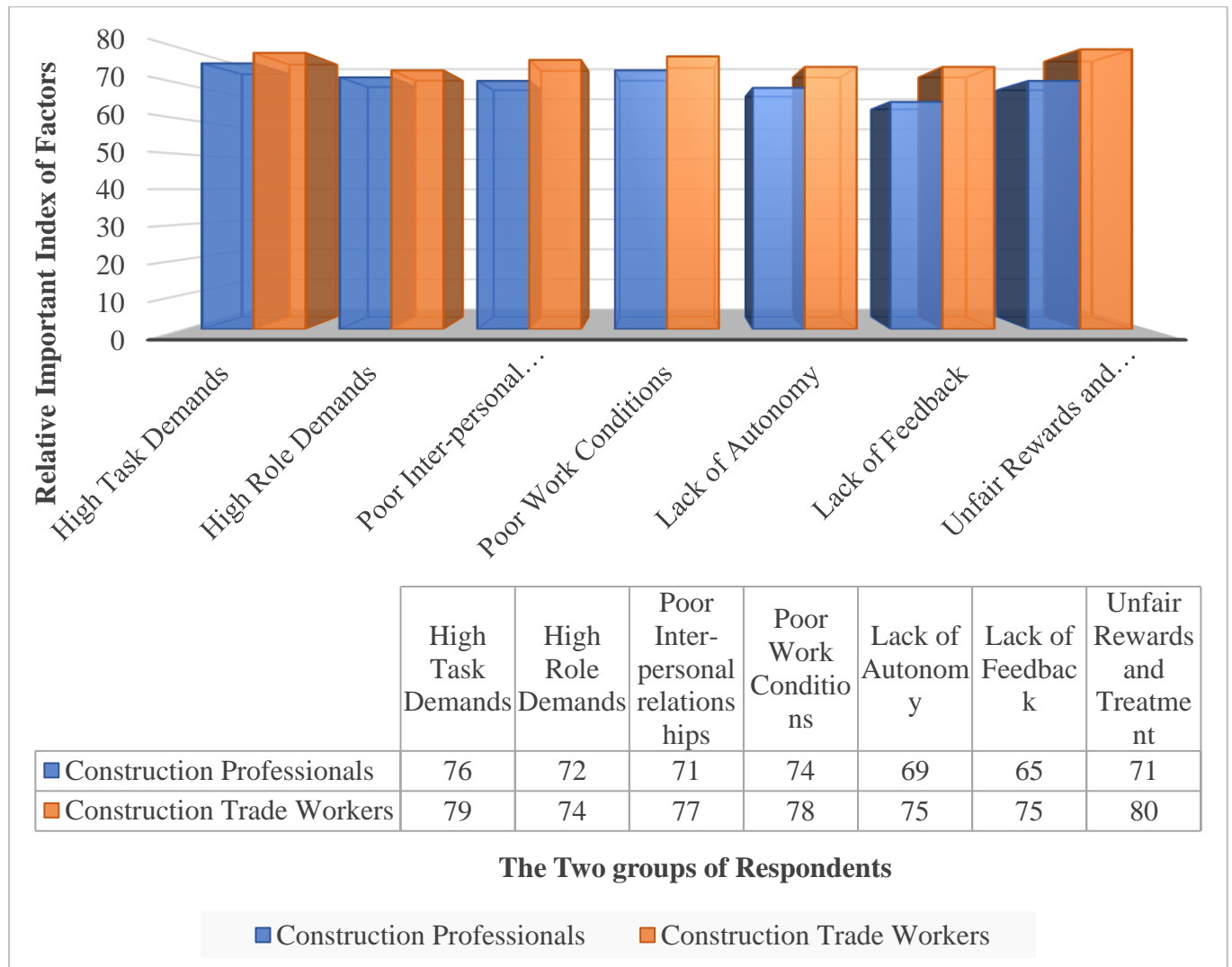
**Table 7.17: Reliability analysis of extracted constructs**

S/N	Construction work-related psychological factors	Cronbach's Alpha	Grand Mean	Cochran's Q	Sig.
<b>Construct 1: High task demands</b>		<b>0.909</b>	3.88	310.476	0.000*
C1.	Complex work methods	0.897			
C2.	Unfinished work	0.891			
C6.	High volume of work	0.890			
C7.	Fast working pace	0.896			
C16.	Tight deadline pressures	0.893			
C19.	Inadequate staffing levels	0.908			
C23.	High good performance expectation	0.902			
C34.	Work being repetitive and boring	0.925			
C37.	Inadequate resources	0.901			
<b>Construct 2: High role demands</b>		<b>0.825</b>	3.64	198.602	0.000*
C3.	Unclear roles and expectations	0.785			
C9.	Skill underutilization	0.826			
C10.	Conflicting demands from superiors and colleagues	0.789			
C20.	Personal beliefs conflict with organizations' requirements	0.808			

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C21.	Incapable of meeting quality demands	0.783			
C24.	Skills and abilities are not employed	0.825			
C25.	Incompetence	0.831			
C36.	High scope and job responsibilities	0.784			
<b>Construct 3: Poor interpersonal working relationships</b>		<b>0.786</b>	3.72	133.061	0.000*
C4.	Poor management and autocratic leadership style	0.849			
C5.	Abusive and over-demanding supervisors	0.728			
C18.	Lack of teamwork and cooperation	0.735			
C22.	Aggression and offensive behaviours	0.721			
C26.	Poor communication	0.734			
C35.	Hostility and discrimination	0.728			
<b>Construct 4: Poor work conditions</b>		<b>0.898</b>	3.81	249.650	0.000*
C8.	Limited time for relaxation	0.898			
C31.	Poor accommodation and catering facilities	0.882			
C17.	Poor working space	0.885			
C32.	Poor lighting system	0.924			
C33.	Exposure to Physical dangers	0.898			
C38.	Noise exposure	0.878			
C39.	Dust exposure	0.887			
<b>Construct 5: Lack of autonomy</b>		<b>0.731</b>	3.59	34.952	0.000*
C11.	Lack of influence on work decisions	0.773			
C12.	Matters being referred to supervisors even when capable of handling them	0.562			
C15.	Too much supervision	0.590			
C27.	Insufficient authority over work	0.722			
<b>Construct 6: Lack of feedback</b>		<b>0.706</b>	3.55	21.022	0.004*
C30.	Supervisors not commenting on job performance	0.512			
C29.	No recognition for work done	0.680			
C41.	No recommendation to improve situation	0.736			
<b>Construct 7: Unfair rewards and treatment</b>		<b>0.792</b>	3.72	184.113	0.000*
C13.	Pay is relatively low	0.752			
C14.	Employees treated unfairly with no job security	0.754			
C28.	Imbalance between work effort and reward	0.780			
C40.	Lack of medical insurance	0.735			
C42.	Poor organizational support	0.731			

Comparative assessment of the major constructs of construction work-related factors among the construction professionals and construction trade workers have been presented in Figure 7.4.



**Figure 7.4: Comparative summary of the relative importance index of the construction work-related factors among the two construction working groups.**

The results of the comparative analysis as shown in Figure 7.4, indicate that high task demands are the construction work-related factors that are most likely to expose construction professionals in Ghana to psychological disorders. Whilst, unfair rewards and treatment are the



construction work-related factors that are most likely to expose construction trade workers in Ghana to psychological disorders.

#### **7.4.3 Discussion of results on construction work-related factors**

The sixteen (16) focus group discussion generated a huge data. The respondents from the focus group discussion revealed forty-two (42) construction work-related factors that are likely to expose both construction professionals and construction trade workers to psychological ill-being conditions. The preliminary findings from the focus group discussion were used to design the questionnaire for the quantitative study. The confirmatory study using questionnaire survey was done to determine whether the construction work-related factors are statistically significant and for the purpose of descriptive assessment. The forty-two (42) construction work-related psychological risk factors were further grouped under seven main constructs using total variance analysis and name developed from content analysis. A detailed discussion of each of the seven constructs have been provided with a comparison of the findings with literature.

##### ***Construct 1: High task demand***

Where construction employees are required to undertake many tasks and engagements within a limited time frame. Insufficient time required to complete an assigned task could expose both construction trade workers and project team members to psychological ill-being conditions such as stress and anxiety. Psychological disorders of construction employees hence result from multitasking, particularly where the quantitative workload demands exceeds their individual abilities to meet the job demands.

Complex work methods as revealed to be construction work-related factor could expose construction workers to psychological ill-being condition of emotional distress, which could have a direct cost of high turnover to the construction industry. Unfinished work as a factor

could also cause construction workers psychological ill-being condition of frustration, with a direct cost of work stoppage to the construction industry. High volume of work as a factor could cause construction workers psychological ill-being condition of irritation, with a direct cost of poor job performance to the construction industry. Fast working pace as a factor could cause construction workers psychological ill-being condition of upset, with a direct cost of increased rate of accidents to the construction industry. Tight deadlines as a factor could cause construction workers psychological ill-being condition of fatigue, with the indirect cost of errors in work to the construction industry. Inadequate staffing levels as a factor could cause construction workers psychological ill-being condition of agitation, with a direct cost of work stoppage to the construction industry. High good performance expectation as a factor could cause construction workers psychological ill-being condition of tension, with a direct cost of low productivity to the construction industry.

Limited time for relaxation as a factor could cause construction workers psychological ill-being condition of emotional exhaustion, with the indirect cost of errors in work to the construction industry. Work is repetitive and boring as a factor could cause construction workers psychological ill-being condition of numbness, with the indirect cost of low motivation to the construction industry. Inadequate resources as a factor could cause construction workers psychological ill-being condition of stress, with a direct cost of work stoppage to the construction industry.

A comparison of the findings from this study conducted in Ghana with studies conducted in other developing countries also revealed similar factors identified in the study. For instance, a study conducted by Ibem, et. al., (2011) in Nigeria and a study conducted by Enshassi and Al.Swaity, (2015) in Gaza – Strip Palestine also revealed similar construction work psychological risk factors categorized under high task demands such as high volume of work, fast working pace and tight deadlines. Similar factors revealed in a study conducted in

South Africa by Bowen, et. al., (2013) were fast working pace and tight deadline. These factors were also revealed by a study conducted in China by Leung and Chan, (2012). Tight deadline was revealed by all the researchers whose work are been compared with the findings of this study (Leung and Chan, 2012; Ibem, et. al., 2011; Senaratne and Rasagopal-asingam, 2017; Bowen, et. al., 2013; Enshassi and Al.Swaity, 2015). This could be because time is a critical factor in every project's outcome.

However, key factors such as unfinished work, inadequate staffing levels and high good performance expectation, revealed in this study were not mentioned in any of the studies compared. Complex work methods were also not mentioned by all the other studies except the study conducted in China by Leung and Chan, (2012). Work that is repetitive and boring as a construction work related psychological risk factor was also revealed in a study conducted by Enshassi and Al.Swaity, (2015) in Gaza- Strip, Palestine. A study conducted by Ibem, et. al., (2011) in Nigeria also revealed lack of or inadequate resources as a work-related factor that is likely to expose workers to psychological ill-being conditions such as stress. However, limited time for relaxation, which was reported in this study as one of the psychological risk factors, was not mentioned in all the five studies conducted in the other developing countries.

Other previous studies also revealed work factors that relate to task demands including quantitative work overload (Bowen, et. al., 2014), qualitative work overload (Bowen, et. al., 2013), urgent tasks (Leung, et. al., 2017). Construction project managers are responsible for controlling the project costs and time and often adopts complicated working procedures, leaving construction workers limited time for relaxation. Where construction workers are required to undertake many tasks and engagements within a limited time frame, this exposes them to psychological ill-being effects. Psychological ill-being of construction workers hence results from multitasking, particularly where the quantitative workload demands exceeds their individual abilities to meet the demands. Insufficient time required to complete an assigned

task also exposes construction workers to psychological ill-being conditions. Where the resources needed to work efficiently are inadequate, these could affect the psychological health of construction workers. Hence, the construction works related factors revealed and categorized under task demands are likely to have behavioural and physiological effects of psychological ill-being conditions on the construction workers, which could lead to consequences of direct and indirect cost to the construction industry.

The construction works related factors identified uniquely by this study are very significant and could easily expose construction workers to psychological health conditions such as stress, depression and anxiety. The differences in the outcome of the comparison could be due to several factors, including the quantitative research approach adopted by the other authors. This could also be due to differences in culture, location and individual perceptions. All the factors revealed under this category are therefore likely to have behavioural and physiological effects of psychological ill-being conditions on the construction employees, with effects on the construction industry. These construction work-related factors revealed and measured in this study could lead to consequences of direct and indirect costs to the construction industry. Organisational measures such as task redesign with the provision of alternative roles and additional manpower can help mitigate the effects of high task demands on the construction employees.

### ***Construct 2: High role demands***

The most critical construction work-related factors revealed and categorized under role demands, in descending order are high scope and job responsibilities, and conflicting demands from superiors and colleagues. These factors could cause construction employees psychological ill-being conditions such as stress and rage, with a direct cost of low productivity and poor job performance, and indirect cost of breakdown in communication to the construction industry. Construction industries that lack standardized working procedures are

usually associated with unclear working roles, duplicated works, role conflicts, with effects on the construction employees' psychological disorders. When employees are also torn between conflicting roles and work demands, it leads them to experience various forms of psychological ill-being conditions. Where a construction employees' role is not clearly defined or ambiguous due to multiple functions, this also predicts psychological ill-being conditions such as workaholism and burnout. Likewise, when employees perceive they lack the skills and knowledge to handle difficult tasks or qualitative work demands, this could lead to the employees experiencing various forms of psychological disorders.

Unclear roles and expectations as revealed to be construction work-related factor could expose construction workers to psychological ill-being condition of lethargic, with the indirect cost of low motivation to the construction industry. Skill underutilization as a factor could cause construction workers psychological ill-being condition of gloomy, with the indirect cost of job dissatisfaction to the construction industry. Conflicting demands from superiors and workers as a factor could cause construction workers psychological ill-being condition of stress, with the indirect cost of breakdown in comm to the construction industry. Personal beliefs conflict with organizations' requirements as a factor could cause construction workers psychological ill-being condition of depression, with the indirect cost of low morale to the construction industry. Incapable of meeting quality demands as a factor could cause construction workers psychological ill-being condition of anxiety, with the indirect cost of job dissatisfaction to the construction industry. Skills and abilities are not employed as a factor could cause construction workers psychological ill-being condition of numbness, with a direct cost of high turnover to the construction industry. Incompetence as a factor could cause construction workers psychological ill-being condition of worry, with a direct cost of poor job performance to the construction industry. High scope and job responsibilities as a factor could cause construction workers psychological ill-being condition of rage, with a direct cost of low

productivity and poor job performance to the construction industry.

A comparison of the study with related studies conducted in other developing countries revealed similar factors identified by this study, which have been categorized under role demands. A study conducted by Enshassi and Al.Swaity, (2015) in Gaza- Strip, Palestine also revealed similar work psychological risk factors such as unclear roles and expectations, skill underutilization and conflicting demands from superiors and workers. Similar factors were also revealed in a study conducted by Ibem, et. al., (2011) in Nigeria, in addition with incompetence. Unclear roles and expectations and conflicting demands from superiors and workers were also mentioned in a study conducted in China by Leung and Chan, (2012) and a study conducted in Sri Lanka by Senaratne and Rasagopal-asingam, (2017). Incapable of meeting quality demands and high scope and job responsibilities were mentioned in the study conducted by Senaratne and Rasagopal-asingam, (2017). However, construction work-related psychological risk factors such as Personal beliefs conflict with organizations' requirements and skills or abilities are not fully employed revealed in this study were not revealed by the other studies compared. Also, none of the factors identified by this study under role demands were revealed in a study conducted in South Africa by Bowen, et. al., (2013).

Other previous studies also revealed work factors that relate to role demands including role conflict (Bowen, et. al., 2014d), role ambiguity (Leung, et. al., 2008b), home- work conflict (Yang, et. al., 2017) and work underload (Leung, et. al., 2012). Construction industries that lack standardized working procedures lead to unclear working roles, duplicated works, role conflicts, with effects on construction workers psychological health. When workers are torn between conflicting roles and work demands, it leads to them experiencing various forms of psychological ill-being. Where a construction worker's role is not clearly defined or ambiguous due to multiple roles, this predicts psychological ill-being conditions such as workaholism and burnout. When workers perceive that they lack the skills and knowledge to

handle difficult tasks or qualitative work demands, this could lead to workers experiencing various forms of psychological ill-being.

Most construction workers in Ghana are uneducated and lack the necessary skills and knowledge for quality works. Hence, the construction works related factors revealed and categorized under role demands are likely to have behavioural and physiological effects of psychological ill-being conditions on the construction workers, which could lead to consequences of direct and indirect cost to the construction industry. Organisational measures such as proper planning of project activities and support from other staff can also alleviate the effects of high role demands on the psychological well-being of the construction employees.

***Construct 3: Poor Interpersonal working relationships***

Poor working relations could lead to high levels of psychological ill-being conditions, with an effect on project performance. Good relationships among colleague workers and superiors are, therefore, essential for every project's success. Where the superiors are abusive and over-demanding, this could affect the psychological health of the construction employee. The most critical construction work-related factors categorized under poor interpersonal working relationships are poor communication, abusive and over-demanding supervisors. These factors could also cause construction employees psychological conditions such as depression and irritation, with the direct cost of poor job performance and indirect cost of job dissatisfaction to the construction industry.

Negative personality traits of superiors and co-workers, such as aggression and offensive behaviours, could cause construction employees to experience psychological ill-being conditions. Lack of teamwork and cooperation also affects the psychological disorders of construction employees. Poor communication skills lead to misunderstanding, which affects project outcomes. Poor communication thus could have a negative impact on the job performance of construction employees with an effect on their psychological health. Hostility

and discrimination experienced by the construction employees from their superiors or colleagues, with perceived lack of work support, influence the psychological ill-being and well-being conditions of the construction employee.

Poor management and autocratic leadership style as revealed to be construction work-related factor could expose construction workers to psychological ill-being condition of frustration, with a direct cost of high turnover to the construction industry. Abusive and overdemanding supervisors as a factor could cause construction workers psychological ill-being condition of depression, with the indirect cost of job dissatisfaction to the construction industry. Lack of teamwork and cooperation as a factor could cause construction workers psychological ill-being condition of resentment, with the indirect cost of breakdown in communication to the construction industry. Aggression and offensive behaviours as a factor could cause construction workers psychological ill-being condition of bitterness, with the indirect cost of violence at work to the construction industry. Poor communication as a factor could cause construction workers psychological ill-being condition of irritation, with a direct cost of poor job performance to the construction industry. Hostility and discrimination as a factor could cause construction workers psychological ill-being condition of resentment, with a direct cost of high turnover to the construction industry.

A comparison of the findings from the study with related studies conducted in other developing countries was done to identify similar factors identified by this study, which have been categorized under interpersonal work relationships. Lack of teamwork and cooperation as a construction work-related factor was identified in all the studies under comparison except the study conducted by Bowen, et. al., (2013) in South Africa. Poor communication was also revealed in the study conducted by Ibem, et. al., (2011) in Nigeria. Hostility and discrimination were also identified in the study conducted in Sri Lanka by Senaratne and Rasagopal-asingam, (2017). However, key construction work-related psychological risk factors revealed by this



study conducted in Ghana such as poor management and autocratic leadership style, abusive and overdemanding supervisors and aggression and offensive behaviours were not indicated in any of the studies under comparison. The reason for the difference in research outcome could be that the previous research works focus on construction work factors that are likely to expose construction personnel to only a single aspect of occupational psychology, mainly stress. Whereas, this study considers all other aspects of occupational psychology, including depression, anxiety and frustration.

Other previous studies also revealed work factors that relate to interpersonal work relationships including poor working relationship (Leung, et. al., 2016) and poor communication (Leung, et. al., 2008a). The skills adopted by construction project team members to manage the construction projects are essential for the expected project outcome and profitability of the firm (Han and Diekmann, 2001). Even though construction workers are familiar with the basic work practices, they need to be supervised at every stage of the work. However, where the construction managers are abusive and overdemanding, this could affect the psychological ill-being of the construction workers. Hence, the construction works related factors revealed and categorized under poor interpersonal work relationships are likely to have behavioural and physiological effects of psychological ill-being conditions on the construction workers, which could lead to consequences of direct and indirect cost to the construction industry. Measures such as improved supervisory and good working relations can promote a psychologically safe and healthy construction workplace.

#### ***Construct 4: Poor work conditions***

Poor work conditions could lead to low productivity and unsatisfactory job performance by the construction employees, this can cause project failure and delays, with additional costs to the construction industry. Limited time for relaxation, exposure to physical dangers were the most critical construction work-related factors categorized under poor

working conditions. These factors could cause construction employees psychological ill-being conditions such as emotional exhaustion and tremble, with the indirect cost of errors in work and direct costs of accidents and sick leave to the construction industry.

Construction works are usually done in extreme temperatures and environmental conditions, which could subsequently lead to psychological or physiological health hazards for the construction employees. For instance, noise exposure as revealed to be construction work-related factor could expose construction employees to psychological ill-being condition of deafness, with a direct cost of increased medical costs to the construction industry. Dust exposure as a factor could also cause construction employee psychological ill-being conditions of poor breathing, with a direct cost of increased medical costs to the construction industry.

This study revealed work-related factors categorized under work conditions such as poor working space, poor accommodation and catering facilities, poor lighting system and exposure to physical dangers. Poor working space as revealed to be construction work-related factor could expose construction workers to psychological ill-being condition of physical exhaustion, with a direct cost of incidence of accidents to the construction industry. Poor accommodation and catering facilities as a factor could cause construction workers psychological ill-being condition of stress, with a direct cost of a work stoppage to the construction industry. Poor lighting system as a factor could cause construction workers psychological ill-being condition of headache, with a direct cost of increased medical costs to the construction industry. Exposure to physical dangers as a factor could cause construction workers psychological ill-being condition of trembling, with direct costs of accidents and sick leave to the construction industry. Noise exposure as revealed to be construction work-related factor could expose construction workers to psychological ill-being condition of deafness, with a direct cost of increased medical costs to the construction industry. Dust exposure as a factor could also cause construction workers psychological ill-being condition of poor breathing, with

a direct cost of increased medical costs to the construction industry.

A comparison of the findings from the study with related studies conducted in other developing countries were done to identify similar factors identified by this study, which have been categorized under poor working conditions. Similar factors revealed in this study were also identified in a study conducted by Enshassi and Al. Swaity, (2015) in Gaza- Strip, Palestine such as poor working space, poor lighting system and exposure to physical dangers. Poor lighting system as a psychological risk factor was also revealed in a study conducted in Nigeria by Ibem, et. al., (2011). Poor working space was also revealed in a study conducted in South Africa by Bowen, et. al., (2013). A study conducted in Sri Lanka by Senaratne and Rasagopal-asingam, (2017) also revealed poor working space as a factor that is likely to expose workers to psychological ill-being conditions such as stress. Poor work design revealed in this study as psychological risk factors was not mentioned in any of the studies under comparison. Noise exposure revealed in this study as a factor that exposes workers to psychological ill-being conditions such as stress was also identified in the study conducted by Enshassi and Al. Swaity, (2015) in Gaza- Strip, Palestine and the study conducted in Sri Lanka by Senaratne and Rasagopal-asingam, (2017). Dust exposure revealed in this study as psychological risk factors was not mentioned in any of the studies under comparison. The differences in the research outcome could be due to the reason that the qualitative research approach adopted by this study allowed for in-depth information to be obtained on this subject matter.

Other previous studies also revealed work factors that relate to work conditions including poor general living at work (Leung and Chan, 2012), job insecurity (Bowen, et. al., 2013) and staff unavailability (Cattell, et. al., 2016). Work factors that relate to environmental conditions, including poor site environment (Leung, et. al., 2005a). Poor environmental working conditions could lead to low productivity and unsatisfactory job performance by the construction workers, this can lead to project failure and delays, with additional costs to the

construction industry (Leung and Chan, 2012). Hence, the construction works related factors revealed and categorized under poor working conditions are likely to have behavioural and physiological effects of psychological ill-being conditions on the construction workers, which could lead to consequences of direct and indirect cost to the construction industry. Organisational measures such as improved working conditions, provision of adequate salary and resources for work, encouraging workers to take leave and enforcing break hours will also moderate the impact of poor working conditions on the general health and well-being of the construction employees.

***Construct 5: Lack of autonomy***

Organizational factors such as organizational complexity and bureaucratic working culture of a construction company could expose construction employees to psychological ill-being conditions. Construction employees could be deprived of their interest in other aspects of the work, while struggling to perform at other areas, with consequences on their psychological health condition and the outcome of the job. The most critical construction work-related factors categorized under lack of autonomy are lack of influence on work decisions and too much supervision. These factors could expose construction employees to psychological ill-being conditions of irritation and worn-out, with the direct cost of poor performance and indirect cost of job dissatisfaction to the construction industry.

The level of autonomy given to construction employees over their work could have a direct influence on their psychological well-being. Organizational policies that do not consider the opinions and feelings of employees could also lead to the psychological disorders of the construction employees. This study revealed work-related factors categorized under lack of autonomy such as lack of influence on work, matters are referred to supervisors even when capable of handling them, too much supervision, insufficient authority over work. Lack of influence on work as revealed to be construction work-related factor could expose construction

workers to psychological ill-being condition of irritation, with the indirect cost of job dissatisfaction to the construction industry. Matters are referred to supervisors even when capable of handling them as a factor could cause construction workers psychological ill-being condition of bitterness, with the indirect cost of low motivation to the construction industry. Too much supervision as a factor could cause construction workers psychological ill-being condition of worn-out, with the indirect cost of job dissatisfaction to the construction industry. Insufficient authority over work as a factor could cause construction workers psychological ill-being condition of frustration, with the indirect cost of low morale to the construction industry.

The findings of this study were compared with related studies conducted in other developing countries to identify similar factors categorized under lack of autonomy. A study conducted by Enshassi and Al. Swaitly, (2015) in Gaza- Strip, Palestine also revealed similar psychological risk factors identified by this study, such as lack of influence on work, too much supervision and insufficient authority over work. Insufficient authority over work as a psychological risk factor was also revealed in a study conducted in South Africa by Bowen, et. al., (2013). However, a very significant psychological risk factor revealed in this study, which is matters being referred to supervisors even when capable of handling them, was not mentioned in any of the studies under comparison. This could also be due to the reason that the qualitative research approach adopted by this study allowed for in-depth information to be obtained on this subject matter.

Other previous studies also revealed a lack of autonomy as a psychological health risk factor (Boschman, et. al., 2013). Organizational factors such as organizational centralization (Leung and Chan, 2012), organizational formalization (Leung, et. al., 2017), organizational complexity and bureaucratic working culture of a construction company (Leung and Chan, 2012) could expose construction workers to psychological ill-being. Hence, the construction works related factors revealed and categorized under lack of autonomy are likely to have

behavioural and physiological effects of psychological ill-being conditions on the construction workers, which could lead to consequences of direct and indirect cost to the construction industry. Organisational preventive measures such as the provision of flexible work schedules for workers has the potential of mitigating the effects of lack of autonomy on the construction employees.

***Construct 6: Lack of feedback***

The study revealed work-related factors categorized under lack of feedback such as no recognition for work done, and supervisors do not comment on job performance. These factors could expose construction employees to psychological ill-being conditions of worry and discouragement, with the direct cost of high turnover and indirect costs of job dissatisfaction to the construction industry. Supervisors do not comment on job performance as revealed to be construction work-related factor could expose construction workers to psychological ill-being condition of worry, with the indirect cost of low motivation to the construction industry. No recognition for work done as a factor could also cause construction workers psychological ill-being condition of discouragement, with the indirect cost of job dissatisfaction to the construction industry.

A comparison of the findings from the study with related studies conducted in other developing countries was done to identify similar factors identified by this study, which have been categorized under lack of feedback. Supervisors do not comment on job performance as a construction work-related psychological risk factor revealed in this study was identified by only a study conducted by Enshassi and Al.Swaity, (2015) in Gaza- Strip, Palestine. No recognition for work done as a factor was also revealed by only a study conducted in Sri Lanka by Senaratne and Rasagopal-asingam, (2017). The difference in research outcome could also be due to cultural diversity and how individuals perceive their encounters differently.

Other previous studies also revealed that a lack of feedback (Hsu and Liao, 2016) and

lack of organizational support (Chan, et. al., 2016) as work-related psychological health factors. Construction employees need to know the mindset of their superiors regarding their job performance, and this is an appropriate means of emphasizing the job requirements clearly to the workers (Javernick-Will and Scott, 2010). Hence, the construction works related factors revealed and categorized under lack of feedback are likely to have behavioural and physiological effects of psychological ill-being conditions on the construction workers, which could lead to consequences of direct and indirect cost to the construction industry. The provision of psychological health systems and counselling services such as scheduling 1-1 meetings, helplines, and mental health first aiders can be provided to mitigate causes of psychological distress among construction employees.

#### ***Construct 7: Unfair rewards and treatment***

The most critical construction work-related factors revealed under unfair rewards and treatments are pay is relatively low and imbalance between work effort and reward. These factors could also expose construction employees to psychological ill-being condition of rage and depression, with the direct cost of poor job performance and indirect cost of a hostile working environment as consequences to the construction industry.

Where construction employees perceive they are treated unfairly and lack support from their superiors, they tend to distrust their superiors, and this could lead to behavioural effects of psychological disorders on the employees. Fear of losing one's job has also been revealed to be among the powerful factors that lead to construction employees' psychological disorders. Organizational factors that lead to construction employees' psychological disorders include low recognition of workers' effort, lack of job security, job redundancy, non-commensurate wages and under participation in decision making.

This study revealed work-related factors categorized under unfair rewards and treatment such as pay is relatively low, workers are treated unfairly, imbalance between work

effort and reward. Pay is relatively low as revealed to be construction work-related factor could expose construction workers to psychological ill-being condition of rage, with a direct cost of high turnover to the construction industry. Workers are treated unfairly as a factor could cause construction workers psychological ill-being condition of gloomy, with the indirect cost of violence at work to the construction industry. Imbalance between work effort and reward as a factor could cause construction workers psychological ill-being condition of depression, with a direct cost of poor job performance to the construction industry.

A comparison of the findings from the study with related studies conducted in other developing countries was done to identify similar factors identified by this study, which have been categorized under unfair rewards and treatment. A study conducted by Enshassi and Al. Swaity, (2015) in Gaza- Strip, Palestine also revealed similar psychological risk factors identified by this study such as pay is relatively low, workers being treated unfairly and imbalance between work effort and reward. Pay is relatively low as a psychological risk factor was also identified in a study conducted by Leung and Chan, (2012) in China. Workers being treated unfairly was also revealed by a study conducted in Nigeria by Ibem, et. al., (2011). None of the factors mentioned in this study under unfair rewards and treatment was found in studies conducted in South Africa by Bowen, et. al., (2013) and in the study conducted in Sri Lanka by Senaratne and Rasagopal-asingam, (2017). The reason for the differences in the research outcomes could also be that the previous research works focused on construction work factors that are likely to expose construction personnel to only stress, without any consideration for the other psychological ill-being conditions such as depression and anxiety.

Other previous studies also revealed unfair treatment and reward (Abbe, et. al., 2011) and pay differential (Leung, et. al., 2007) as work-related psychological health factors. Where construction workers perceive they are treated unfairly and lack support from their superiors, they tend to distrust their superiors, and these could lead to behavioural psychological ill-being



effects on the workers (Erikssona, et. al., 2009). Hence, the construction works related factors revealed and categorized under unfair rewards and treatment are likely to have behavioural and physiological effects of psychological ill-being conditions on the construction workers, which could lead to consequences of direct and indirect cost to the construction industry. Organisational measures such as acknowledging or rewarding good work done and establishing a welfare committee for employees at the workplace can help moderate the effects of unfair rewards and treatments on the psychological well-being of the construction employees.

#### **7.4.4 Summary of Findings: Construction work-related factors that could expose construction employees to psychological distress**

The demanding and dynamic nature of the construction industry could affect the psychological well-being of construction employees. This study aims to determine construction work-related factors that are likely to expose construction employees to psychological health conditions such as burnout, workaholism, stress, anxiety, and depression. To achieve this aim, methods of qualitative research were first employed to derive unique findings from the experiences, perceptions, and opinions of the research participants. A 42-inventory scale on construction work-related psychological risks factors was developed from the 16 focus group discussions held in Ghana. Quantitative study was then employed to determine the critical risks factors. A target of 300 questionnaires were distributed equally to construction professionals and construction trade workers in Ghana. Tight deadline pressures and abusive/overdemanding supervision were the most critical factors ranked by the construction professionals and construction trade workers respectively. Exploratory factor analysis employed revealed seven constructs of the 42 construction work-related risk factors, namely: high task demands, high role demands, poor relationships, poor work conditions, lack of autonomy, lack of feedback, and unfair treatments. The findings from this study could be used to develop preventive psychological health management models that can be employed in the Ghanaian construction

industry and to some extent globally.

### **7.5 Chapter 7 Summary**

This chapter presents the research design, results on both the qualitative and quantitative studies as well as the discussions and summary of findings for objectives 1, 2 and 3. The major findings of objective 1 on the current psychological health status of the construction employees in Ghana, revealed the absence and presence of the negative symptoms of psychological health conditions among both the construction professionals and construction trade workers. The overall results revealed that 57% of the construction professionals were in a positive state of occupational psychological well-being, while 51% of the construction trade workers were revealed to be in the negative state of occupational psychological ill-being conditions. For objective 2, personal intervening factors were explored to indicate the factors that are more intrinsic like personality traits. Whilst personal predictive factors indicate the factors that are somewhat extrinsic such as lack of exercise. The major findings of objective 2 on personal factors that could make construction employees vulnerable to psychological health conditions included low self-esteem, poor time management skills, poor relationship with others and individual lifestyle. The major findings of objective 3 on the construction work-related factors that can influence the psychological health conditions of construction employees also included Tight deadline pressures, Poor working space, abusive and overdemanding supervisors, Limited time for relaxation, Pay being relatively low and Unfinished work.

## CHAPTER 8

### RESULTS AND DISCUSSIONS FOR EFFECTS AND COPING STRATEGIES

#### 8.1 Potential effects of psychological disorders on construction employees and the construction industry.<sup>10</sup>

The data collected from all 16 focus group discussions held were gathered and summarized using content analysis. The participants revealed seventeen (17) items as perceived effects of psychological disorders on construction employees. The study also identified twelve (12) items as perceived effects of construction employees' psychological health conditions on the construction industry. Quantitative study was then employed to confirm the findings of the qualitative study as statistically significant and also for descriptive assessment.

##### 8.1.1 Results from Qualitative Study on the potential effects

The respondents from the focus group discussion, which comprise of both construction professionals and construction trade workers, revealed potential effects of psychological disorders on construction employees and the construction industry. Themes were derived from each of the responses using thematic analysis. A total of 17 potential effects of psychological disorders on construction employees and 12 potential effects of psychological disorders on the construction industry were identified.

The results from the focus group study on the potential effects of psychological disorders on construction employees, with some excerpts from the various groups among the 16 focus groups have been presented in Table 8.1.

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<sup>10</sup> Some contents of section 8.1 of this Chapter have been published in: Fordjour, G. A. and Chan, A. P. (2020). "Exploring the effects of occupational psychological disorders on construction employees and the construction industry". *Occupational diseases and environmental medicine*, 8(1), 1-25.

<b>Table 8.1: Summary of responses on the potential effects of psychological disorders on construction employees</b>		
<b>Code</b>	<b>Effects on construction employees</b>	<b>Excerpts from focus group discussion</b>
E1	Chronic pain	<i>I get chronic pain all over my body after working so hard for long hours at the construction workplace. (Response from Group 1)</i>
E2	Coronary heart disease	<i>I know of a construction worker who suffered from coronary heart disease and was hospitalized for long periods due to excessive work demands. (Response from Group 1)</i>
E3	Lose valuable things like job, status and relationships	<i>The demanding nature of my work has placed me at the point that I have lost valuable things like extra jobs, relationships and some social status. (Response from Group 2)</i>
E4	Loss memory/ forgetfulness	<i>Anytime I overwork myself I experience loss of memory or forgetfulness. (Response from Group 3)</i>
E5	Accident-prone	<i>I get injured a lot during work because when my attention is fully on the demanding task, I tend to ignore safety rules and become prone to accident. (Response from Group 4)</i>
E6	High blood pressure	<i>There was a time I was threatened to work excessively hard and the impulse or fear resulted in me having high blood pressure. (Response from Group 4)</i>
E7	Insomnia or sleep disturbances	<i>The project I am working on has delayed, so workers are supposed to work for long hours throughout the night with little time for sleeping, this has given me insomnia, as my regular sleep pattern has been disturbed. (Response from Group 6)</i>
E8	Stroke or Cancer	<i>Some construction employees have suffered stroke or cancer due to the poor working conditions with no time for regular exercise and other unhealthy habits. (Response from Group 8)</i>
E9	Headache	<i>When I work continuously for long hours, I get a headache. (Response from Group 9)</i>
E10	Musculoskeletal injuries	<i>Musculoskeletal injuries are very common with construction employees due to the nature of our work. (Response from Group 11)</i>
E11	Family problems	<i>I am having family problems because of my work, as my wife complains I do not have time for the family since I have become so engaged at work lately. (Response from Group 12)</i>
E12	Sexual dysfunction	<i>When there is a heavy workload at the construction site, I become anxious and worry about my work, this makes me sexually dysfunctional at times. (Response from Group 14)</i>
E13	Diabetes mellitus	<i>I have been diagnosed with diabetes mellitus, which I believe resulted from the poor working conditions that made me adopt certain lifestyle affecting my health. (Response from Group 14)</i>
E14	Feeling faint or dizzy	<i>Working under stressful working conditions makes me feel like fainting or becomes dizzy. (Response from Group 15)</i>
E15	Loss of motivation, energy or interest	<i>After putting all my energy into work with the expectation of getting some recognition from the superiors, I did not get any such as I expected, from that time I have lost my motivation, energy and interest in working hard for the company. (Response from Group 15)</i>

E16	Tightness in the chest	<i>Anytime I am overwhelmed with work I feel some tightness in the chest. (Response from Group 16)</i>
E17	Dietary extremes	<i>When there is work pressure on me, I tend to eat very little as compared to my usual days when I eat a lot, thus, moving from one dietary extreme to another. (Response from Group 16)</i>

As shown in Table 8.1, seventeen (17) potential effects of psychological disorders on both construction professionals and construction trade workers were revealed by the respondents of the focus group discussion. The Chartered Institute of Building (CIOB) has also revealed in their 2016 report revealed that about 70% of employees in the construction industry suffer from psychological disorders such as stress, depression, and anxiety. Occupational psychological disorders can affect the physical and emotional health of a person. The effects of psychological disorders on a person's physical health could be identified from various indicators such as headaches, loss of sleep and gastrointestinal disorders. The effects on emotional health can also be manifested in various forms such as frustration, anxiety and quick temperament.

The results from the focus group study on the potential effects of psychological disorders on the construction industry, with some excerpts from the various groups among the 16 focus groups have also been presented in Table 8.2.

<b>Table 8.2: Summary of responses on the potential effects of occupational psychological disorders on the construction industry</b>		
<b>Code</b>	<b>Theme identified</b>	<b>Excerpts from focus group discussion</b>
F1	Poor work performance	<i>Psychological ill-being leads to poor work performance as workers are not in their full capacity to work well. (Response from Group 2)</i>
F2	Low motivation	<i>Most of my colleague workers have low motivation to work extra hard these days, because of depression which results from the unfair rewards given to workers as compared to the efforts we put into the job. (Response from Group 3)</i>
F3	Low productivity	<i>The productivity of construction employees become low when they have a poor health condition. (Response from Group 5)</i>
F4	High turnover	<i>When construction employees are not feeling well, they leave the construction industry and high turnover could affect the company. (Response from Group 6)</i>
F5	Low morale	<i>When I reach a certain limit, I have low morale to continue</i>

		<i>working. (Response from Group 7)</i>
F6	Job dissatisfaction	<i>Job dissatisfaction is a consequence of too much pressure at the workplace. (Response from Group 9)</i>
F7	Absenteeism/ Sick leave	<i>Construction employees who are having some health problems usually absent themselves from work or take long sick leave. (Response from Group 10)</i>
F8	Breakdown in communication	<i>Construction employees do not relate well with each other when there is a lot of tension at the construction workplace and this leads to a breakdown in communication. (Response from Group 11)</i>
F9	Work stoppage	<i>The construction work can be stopped if more employees are not having good health to work. (Response from Group 13)</i>
F10	Violence at work	<i>Violence at work usually occurs when some construction employees are experiencing psychological health conditions such as stress, tension or frustration. (Response from Group 14)</i>
F11	Medical costs	<i>Medical costs for the construction industry increase when construction employees are hospitalized because of their work. (Response from Group 15)</i>
F12	Errors in work	<i>When construction employees are over-exhausted, there can be errors in their decisions, leading to so many mistakes at work. (Response from Group 16)</i>

As shown in Table 8.2, twelve (12) potential effects of psychological disorders on the construction industry were revealed by the respondents of the focus group discussion. Psychological ill-being of employees can have several implications on interpersonal relationship, task and project performance of the construction industry of Ghana and to some extent the construction industries globally. A study by the Health and Safety Executive (2007) revealed that about 10.5 million workdays are lost yearly to work-related psychological health conditions and physical illness. The effects of construction workers' psychological ill-being can lead to ineffectiveness, poor communication, low morale, low productivity, absenteeism, high job turnover, poor work relations, poor organizational climate, and accidents in the workplace. These effects can further lead to devastating consequences affecting the time, cost and quality outcomes of the construction industry.

### 8.1.2 Results of the quantitative study on effects of psychological disorders

The sixteen (16) focus group discussion generated a considerable data. The respondents from the focus group discussion revealed seventeen (17) items as perceived effects of psychological disorders on construction employees and twelve (12) items as perceived effects of construction employees' psychological health conditions on the construction industry. The preliminary findings from the focus group discussion were used to design the questionnaire for the quantitative study. The confirmatory study using questionnaire survey was done to determine whether the perceived effects of psychological disorders are statistically significant and for the purpose of descriptive assessment. Content analysis of the data collected were done to draw similarities from the findings across all the focus groups and the findings were categorized under major sub-headings. The perceived effects of psychological ill-being on construction workers, identified from the study were categorized under behavioural effects and physiological effects. The perceived effects of construction workers' psychological ill-being on the construction industry were also categorized under direct costs and indirect costs.

The statistical results of the perceived effects of psychological disorders on construction employees, have been presented in Table 8.3.

<b>Table 8.3: Statistical results of perceived effects of psychological disorders on the construction employees</b>						
<b>Code</b>	<b>Effects on the construction employees</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>P-value (Sig.)</b>	<b>Factor loadings</b>	<b>Cronbach alpha</b>
	<b><i>Construct 1: Behavioural effects</i></b>					<b>0.827</b>
E3	Lose valuable things like job, relationships and status	3.78	0.770	0.000	0.822	0.794
E4	Loss memory/ forgetfulness	4.08*	0.741	0.000	0.740	0.787
E5	Accident-prone	4.18*	0.672	0.000	0.595	0.819
E7	Insomnia or sleep disturbances	4.11*	0.727	0.000	0.753	0.786
E11	Family problems	3.84	0.769	0.000	0.717	0.794
E12	Sexual dysfunction	3.64	0.744	0.000	0.731	0.859
E15	Loss of motivation, energy or interest	3.75	0.764	0.000	0.815	0.795
E17	Dietary extremes	4.06*	0.738	0.000	0.709	0.813

	<b>Construct 2: Physiological effects</b>					<b>0.822</b>
E1	Chronic pain	4.14*	0.715	0.000	0.720	0.784
E2	Coronary heart disease	3.60	0.732	0.000	0.754	0.808
E6	High blood pressure	3.73	0.758	0.000	0.734	0.795
E8	Stroke or Cancer	3.67	0.741	0.000	0.676	0.798
E9	Headache	3.95	0.774	0.000	0.634	0.813
E10	Musculoskeletal injuries	4.09*	0.722	0.000	0.703	0.807
E13	Diabetes mellitus	3.47	0.691	0.000	0.617	0.809
E14	Feeling faint or dizzy	3.80	0.773	0.000	0.602	0.817
E16	Tightness in the chest	3.96	0.775	0.000	0.630	0.797

Note: Variables with the highest mean scores of above 4.0 have their values marked with “\*”.

The statistical results of the perceived effects of construction employees' psychological disorders on the construction industry, have also been presented in Table 8.4.

<b>Table 8.4: Statistical results of the effects of construction employees' psychological disorders on the construction industry</b>						
<b>Code</b>	<b>Effects on the construction industry</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>P-value (Sig.)</b>	<b>Factor loadings</b>	<b>Cronbach alpha</b>
	<b>Construct 1: Direct costs</b>					<b>0.848</b>
F1	Poor work performance	3.90	0.774	0.000	0.553	0.828
F3	Low productivity	3.94	0.745	0.000	0.685	0.805
F4	High turnover	3.85	0.781	0.000	0.714	0.829
F7	Absenteeism/ Sick leave	4.14*	0.704	0.000	0.681	0.837
F9	Work stoppage	3.68	0.762	0.000	0.538	0.845
F11	Medical costs	4.00*	0.761	0.000	0.734	0.790
	<b>Construct 2: Indirect costs</b>					<b>0.763</b>
F2	Low motivation	3.99	0.758	0.000	0.588	0.725
F5	Low morale	3.70	0.764	0.000	0.578	0.790
F6	Job dissatisfaction	4.03*	0.698	0.000	0.762	0.717
F8	Breakdown in communication	3.57	0.683	0.000	0.640	0.743
F10	Violence at work	3.65	0.763	0.000	0.763	0.724
F12	Errors in work	4.05*	0.739	0.000	0.719	0.708

Note: Variables with the highest mean scores of above 4.0 have their values marked with “\*”.



The perceived effects of psychological disorders on employees were categorized under two main constructs, namely: behavioural effects and physiological effects. The perceived effects of psychological disorders on the construction industry were also categorized under two main constructs namely: direct costs and indirect costs. The reliability and internal consistency of the constructs had Cronbach alpha value above 0.70, which is acceptable. The values of the Cronbach alpha of each item have been presented. All the perceived effects of psychological disorders analysed had mean values above 3.0. With the test value set at 3, one sample T-test analysis also revealed that all perceived effects revealed in this study had p -values less than 0.05 as shown in Tables 8.3 and 8.4, and therefore are deemed significant. The null hypothesis which state that the perceived effects of psychological disorders are not statistically significant will be rejected.

The data were revealed to be normally distributed by the Blom's fractional rank estimation test and hence the results obtained from the two construction groups could be compared for all the variables. Independent two-sample T-test was employed for the comparison of the mean scores of effects of psychological disorders on the construction employees and the construction industry as determined by the two construction groups, and the results presented in Tables 8.5 and 8.6. The comparison was intended to determine whether the differences between the two construction working groups could influence their perceptions on the effects of psychological disorders.

**Table 8.5: Comparison of the statistical results obtained from the construction professionals' group <sup>(a)</sup> and construction trade workers group <sup>(b)</sup>**

Code	Effects on the construction employees	Group Mean	Group RII %	Levene's Test for Equality of Variances		Group Rank
				F -value	Sig. (Equal)	
	<i>Construct 1: Behavioural effects</i>					
E3	Lose valuable things like job, relationships and status	3.77 <sup>a</sup> , 3.79 <sup>b</sup>	75.3 <sup>a</sup> , 75.9 <sup>b</sup>	13.939	0.000*	9th <sup>a</sup> , 11th <sup>b</sup>
E4	Loss memory/ forgetfulness	4.01 <sup>a</sup> , 4.15 <sup>b</sup>	80.3 <sup>a</sup> , 82.9 <sup>b</sup>	7.941	0.005*	4th <sup>a</sup> , 7th <sup>b</sup>
E5	Accident-prone	4.07 <sup>a</sup> , 4.29 <sup>b</sup>	81.5 <sup>a</sup> , 85.9 <sup>b</sup>	11.888	0.001*	1st <sup>a</sup> , 4th <sup>b</sup>
E7	Insomnia or sleep disturbances	4.04 <sup>a</sup> , 4.19 <sup>b</sup>	80.8 <sup>a</sup> , 83.7 <sup>b</sup>	10.481	0.001*	3rd <sup>a</sup> , 6th <sup>b</sup>
E11	Family problems	3.76 <sup>a</sup> , 3.91 <sup>b</sup>	75.2 <sup>a</sup> , 78.3 <sup>b</sup>	8.310	0.004*	10th <sup>a</sup> , 9th <sup>b</sup>
E12	Sexual dysfunction	3.63 <sup>a</sup> , 3.65 <sup>b</sup>	72.5 <sup>a</sup> , 72.9 <sup>b</sup>	16.323	0.000*	14th <sup>a</sup> , 17th <sup>b</sup>
E15	Loss of motivation, energy or interest	3.74 <sup>a</sup> , 3.75 <sup>b</sup>	74.8 <sup>a</sup> , 74.9 <sup>b</sup>	17.245	0.000*	11th <sup>a</sup> , 12th <sup>b</sup>
E17	Dietary extremes	3.79 <sup>a</sup> , 4.33 <sup>b</sup>	75.7 <sup>a</sup> , 86.7 <sup>b</sup>	0.080	0.778	8th <sup>a</sup> , 2nd <sup>b</sup>
	<i>Construct 2: Physiological effects</i>					
E1	Chronic pain	3.92 <sup>a</sup> , 4.37 <sup>b</sup>	78.4 <sup>a</sup> , 87.3 <sup>b</sup>	0.258	0.612	6th <sup>a</sup> , 1st <sup>b</sup>
E2	Coronary heart disease	3.49 <sup>a</sup> , 3.71 <sup>b</sup>	69.7 <sup>a</sup> , 74.1 <sup>b</sup>	35.553	0.000*	15th <sup>a</sup> , 14th <sup>b</sup>
E6	High blood pressure	3.72 <sup>a</sup> , 3.73 <sup>b</sup>	74.4, <sup>a</sup> 74.7 <sup>b</sup>	17.816	0.000*	12th <sup>a</sup> , 13th <sup>b</sup>
E8	Stroke or Cancer	3.69 <sup>a</sup> , 3.66 <sup>b</sup>	73.7 <sup>a</sup> , 73.2 <sup>b</sup>	22.952	0.000*	13th <sup>a</sup> , 16th <sup>b</sup>
E9	Headache	4.06 <sup>a</sup> , 3.85 <sup>b</sup>	81.2 <sup>a</sup> , 76.9 <sup>b</sup>	24.156	0.000*	2nd <sup>a</sup> , 10th <sup>b</sup>
E10	Musculoskeletal injuries	3.86 <sup>a</sup> , 4.31 <sup>b</sup>	77.2 <sup>a</sup> , 86.3 <sup>b</sup>	1.070	0.302	7th <sup>a</sup> , 3rd <sup>b</sup>
E13	Diabetes mellitus	3.25 <sup>a</sup> , 3.69 <sup>b</sup>	65.1 <sup>a</sup> , 73.7 <sup>b</sup>	104.46	0.000*	17th <sup>a</sup> , 15th <sup>b</sup>
E14	Feeling faint or dizzy	3.35 <sup>a</sup> , 4.25 <sup>b</sup>	66.9 <sup>a</sup> , 84.9 <sup>b</sup>	20.136	0.000*	16th <sup>a</sup> , 5th <sup>b</sup>
E16	Tightness in the chest	3.94 <sup>a</sup> , 3.98 <sup>b</sup>	78.8 <sup>a</sup> , 79.6 <sup>b</sup>	8.253	0.004*	5th <sup>a</sup> , 8th <sup>b</sup>

Values marked with (<sup>a</sup>) represent results from the construction professionals' group.

Values marked with (<sup>b</sup>) represent results from the construction trade workers' group.

Values that indicate a statistically significant difference between the variances between the two groups are marked with (\*).

**Table 8.6: Comparison of the statistical results obtained from the construction professionals' group <sup>(a)</sup> and construction trade workers group <sup>(b)</sup>**

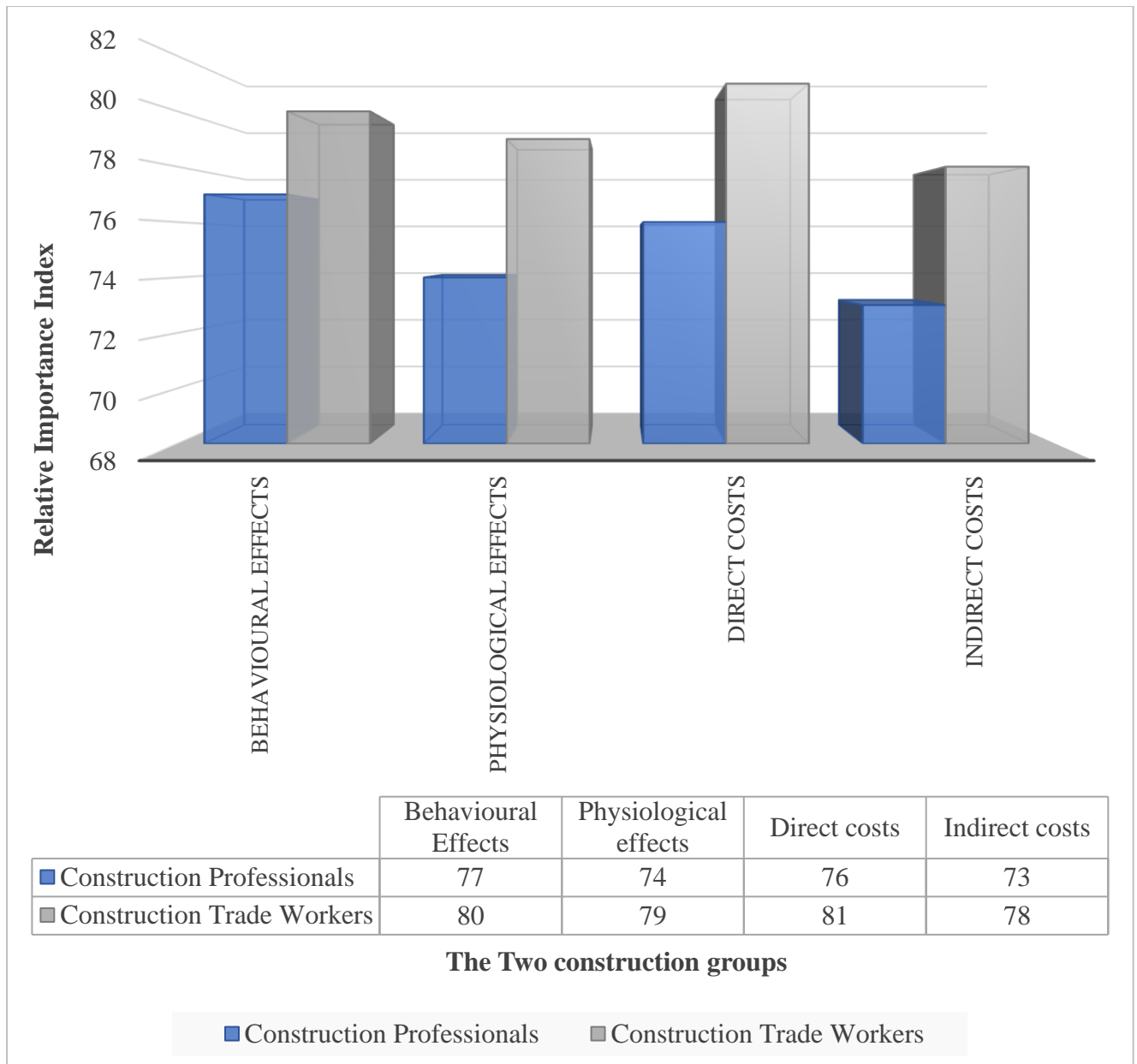
Code	Effects on the construction industry	Group Mean	Group RII %	Levene's Test for Equality of Variances		Group Rank
				F - value	Sig. (Equal)	
	<i>Construct 1: Direct costs</i>					
F1	Poor work performance	3.85 <sup>a</sup> , 3.95 <sup>b</sup>	76.9 <sup>a</sup> , 79.1 <sup>b</sup>	2.253	0.134	5th <sup>a</sup> , 8th <sup>b</sup>
F3	Low productivity	3.88 <sup>a</sup> , 3.99 <sup>b</sup>	77.6 <sup>a</sup> , 79.9 <sup>b</sup>	20.895	0.000*	4th <sup>a</sup> , 7th <sup>b</sup>
F4	High turnover	3.52 <sup>a</sup> , 4.18 <sup>b</sup>	70.4 <sup>a</sup> , 83.6 <sup>b</sup>	1.980	0.160	10th <sup>a</sup> , 4th <sup>b</sup>
F7	Absenteeism/ Sick leave	4.05 <sup>a</sup> , 4.23 <sup>b</sup>	80.9 <sup>a</sup> , 84.7 <sup>b</sup>	9.719	0.002*	1st <sup>a</sup> , 3rd <sup>b</sup>

F9	Work stoppage	3.49 <sup>a</sup> , 3.86 <sup>b</sup>	69.9 <sup>a</sup> , 77.2 <sup>b</sup>	28.405	0.000*	11th <sup>a</sup> , 9th <sup>b</sup>
F11	Medical costs	3.94 <sup>a</sup> , 4.06 <sup>b</sup>	78.8 <sup>a</sup> , 81.2 <sup>b</sup>	5.558	0.019*	3rd <sup>a</sup> , 6th <sup>b</sup>
<b>Construct 2: Indirect costs</b>						
F2	Low motivation	3.73 <sup>a</sup> , 4.24 <sup>b</sup>	74.7 <sup>a</sup> , 84.8 <sup>b</sup>	0.003	0.959	6th <sup>a</sup> , 2nd <sup>b</sup>
F5	Low morale	3.58 <sup>a</sup> , 3.83 <sup>b</sup>	71.6 <sup>a</sup> , 76.5 <sup>b</sup>	16.278	0.000*	8th <sup>a</sup> , 11th <sup>b</sup>
F6	Job dissatisfaction	3.95 <sup>a</sup> , 4.10 <sup>b</sup>	79.1 <sup>a</sup> , 82.0 <sup>b</sup>	32.464	0.000*	2nd <sup>a</sup> , 5th <sup>b</sup>
F8	Breakdown in communication	3.56 <sup>a</sup> , 3.57 <sup>b</sup>	71.3 <sup>a</sup> , 71.5 <sup>b</sup>	29.081	0.000*	9th <sup>a</sup> , 12th <sup>b</sup>
F10	Violence at work	3.44 <sup>a</sup> , 3.86 <sup>b</sup>	68.8 <sup>a</sup> , 77.2 <sup>b</sup>	26.986	0.000*	12th <sup>a</sup> , 10th <sup>b</sup>
F12	Errors in work	3.72 <sup>a</sup> , 4.39 <sup>b</sup>	74.4 <sup>a</sup> , 87.7 <sup>b</sup>	1.351	0.246	7th <sup>a</sup> , 1st <sup>b</sup>

Values marked with (<sup>a</sup>) represent results from the construction professionals' group.  
 Values marked with (<sup>b</sup>) represent results from the construction trade workers' group.  
 Values that indicate a statistically significant difference between the variances between the two groups are marked with (\*).

Levene's Test for equality of variances among the two construction workgroups as presented in Tables 8.5 and 8.6 indicated that the mean scores of the two construction groups were statistically significantly different for some of the variables. These items have their p-values less than 0.05 and marked with (\*) as shown in Tables 8.5 and 8.6. The null hypothesis which assumes no statistically significant differences between the mean scores of the two construction groups will be rejected and the alternative hypothesis that states otherwise will be accepted for these items of coping strategies. However, the null hypothesis will not be rejected for the other factors that revealed no statistically significant differences and assumed equal variances for the two construction working groups.

Comparative assessment of the major constructs of the potential effects among the construction professionals and construction trade workers have been presented in Figure 8.1.



**Figure 8.1: Comparative summary of the relative importance index of the potential effects of psychological distress among the two construction groups of respondents**

The results of the comparative analysis as shown in Figure 8.1, indicate that behavioral effects are the most perceived effects of psychological distress among the construction professionals. Whilst direct costs are the most perceived effects of psychological distress among the construction trade workers in Ghana.

### **8.1.3 Discussion of results on potential effects of psychological disorders on the construction employees and the construction industry**

#### **The perceived effects of psychological disorders on the construction employees.**

##### ***Behavioural effects***

Occupational psychological disorders such as burnout, workaholism and depression can often cause behavioural disorders with associated symptoms such as poor memory, impaired concentration and fatigue or loss of energy. The study revealed perceived effects of psychological disorders on the construction employees which have been categorized under behavioural effects such as: lose valuable things like job, relationships and status, loss memory/forgetfulness, accident-prone, insomnia or sleep disturbances, family problems, sexual dysfunction, loss of motivation, energy or interest and dietary extremes. Accident-prone was highly rated by the research participants as the perceived effect of psychological disorders on construction employees. Similarly, previous studies also advocated that disorders such as stress could affect the safety behaviours of construction employees.

Previous studies also revealed some effects of psychological disorders on the construction employees, which relates to behavioral effects such as depression (Bowen, et. al., 2014a), distress (Chan, et. al., 2012), anxiety (Leung, et. al., 2017), job dissatisfaction (Yang, et. al., 2017) and frustration (Chan, et. al., 2016). The effects of occupational psychological disorders of burnout and workaholism could be seen in behavioural deviations such as overeating, loss of appetite, smoking, alcohol abuse, sleeping disorders, emotional outbursts, or violence and aggression.

##### ***Physiological effects***

Occupational psychological disorders such as burnout and workaholism have been linked with many types of physical ailments such as heart attack, high blood pressure, heart

disease, peptic ulcer, headache, pain in the neck, asthma, and cancer. This study revealed perceived effects of occupational psychological disorders on the construction employees, which have been categorized under physiological effects such as chronic pain, coronary heart disease, stroke, cancer, headache, musculoskeletal injuries, diabetes mellitus, feeling faint or dizzy and tightness in the chest.

Previous studies also revealed some effects of psychological disorders on the construction employees which relates to physiological effects such as fatigue during work (Boschman, et. al., 2013), migraines or headaches (Bowen, et. al., 2014b), gastrointestinal disorders (Chan, et. al., 2012), loss of appetite (Chan, et. al., 2016), sleep disorder (Bowen, et. al., 2014a), skin problems (Leung, et. al., 2012), back pain (Abbe, et. al., 2011), ulcer (Yang, et. al., 2017), heart attack (Enshassi, et. al., 2016) and blood pressure (Wang, et. al., 2017).

### **The perceived effects of psychological disorders on the construction industry.**

#### ***Direct costs***

The impact of occupational psychological disorders in the workplace could have severe consequences not only for the employee but also for the organization. This study revealed perceived effects of construction employees' psychological health condition on the construction industry, which have been categorized under direct costs such as poor work performance, low productivity, high turnover, absenteeism or sick leave, work stoppage, medical costs. The key perceived effects of construction workers' psychological health conditions on the construction industry identified from the study were: absenteeism or sick leave and errors in work. This study was in conformity with a report by European Agency for Safety and Health at Work (2014) which advocated that employees job performance, staff turnover, rates of accidents, illness and absenteeism are all affected by the psychological health condition of the employees.

Other previous studies also revealed some direct costs as effects of psychological disorders on the construction industry such as low performance (Leung, et. al., 2017), low productivity (Chan, et. al., 2016), injury incidents (Abbe, et. al., 2011), absenteeism (Wang, et. al., 2017) and mistakes in work (Leung, et. al., 2012). An individual worker suffering from psychological health conditions of burnout or workaholism would allocate fewer of his or her personal resources and capabilities needed to perform the assigned task efficiently. Even though the same amount of time will be spent on the task, the concentration level of the worker experiencing these psychological disorders will be minimal, and thus their work productivity will be decreased significantly. The consequences of psychological health conditions of construction employees could, therefore, be devastating for the construction industry.

### ***Indirect costs***

Across various workplace, indirect cost claims such as low motivation and job dissatisfaction due to work-related psychological risks factors and employees' psychological health conditions have become predominant. This study revealed perceived effects of construction employees' psychological health condition on the construction industry, which have been categorized under indirect costs such as low motivation, low morale, job dissatisfaction, breakdown in communication, violence at work and errors in decisions.

Previous studies also revealed some indirect costs as effects of employees' psychological disorders on the construction industry such as poor relationship with others (Leung, et. al., 2016), intention to leave work (Chan, et. al., 2016) and decreased motivation (Wang, et. al., 2017). These indirect costs could cause sickness presenteeism which refers to an employee being physically present at work, but cognitively or mentally absent. Psychological health conditions such as burnout could cause changes to an individual's social and working life, with effects such as distancing from colleagues and friends, avoidance of

communication at work and intention to leave work, with eventual consequences on overall project performance and outcome. Psychological health conditions of burnout and workaholism could, therefore, have some indirect cost as effects to the construction industry.

#### **8.1.4 Summary of findings: Exploring the effects of occupational psychological disorders on construction employees and the construction industry.**

Construction employees could experience occupational psychological disorders such as workaholism and burnout due to their work, personality characteristics or lifestyle. This study sought to explore the effects of psychological disorders on construction employees and the construction industry. To achieve this aim, both the methods of focus group discussions and survey questionnaire were employed. The focus group discussions revealed 17 potential effects and 12 potential effects of psychological disorders on the construction employees and the construction industry respectively. A quantitative study was then employed to determine the key effects and to test the reliability of the findings from the focus group study. The results revealed that the highly perceived effects of psychological disorders on construction employees were accident-prone, chronic pain, insomnia or sleep disturbances, as these had the highest mean scores. The key effects also identified as perceived effects of construction employees' psychological health conditions on the construction industry were absenteeism/sick leave, errors in work, job dissatisfaction and increased medical costs. Exploratory factor analysis was employed, and the 17 effects on construction employees were categorized under behavioural effects and physiological effects. The 12 effects on the construction industry were also categorized under direct costs and indirect costs. The results from this study confirm the need for strategic interventions to mitigate the effects of occupational psychological disorders on construction employees and the construction industry of Ghana and to some extent globally. The exploratory nature of the study using preliminary findings from focus group discussions contributes to the literature on occupational health psychology.



## **8.2 Coping strategies adopted by construction employees as their responses or efforts to deal with the causes and effects of occupational psychological disorders<sup>11</sup>**

The data collected from all interviews conducted were gathered for analysis. The individual responses were summarized and merged together. The participants revealed twenty-five (25) items as causes-focused coping behaviours and revealed twenty-two (22) items as effects-focused coping behaviours. Content analysis of the data collected were done to draw similarities from the findings. Themes were extracted from the responses provided and the responses were further grouped under major constructs. The psychological health causes-focused coping behaviours were categorized under four sub-headings: avoiding the cause, altering the cause, adapting to the cause and accepting the cause. The psychological ill-being effects-focused coping behaviours were categorized under healthy and unhealthy coping behaviours. A confirmatory study using questionnaire survey was done to determine whether the coping strategies are statistically significant and for the purpose of descriptive assessment.

### **8.2.1 Results from Qualitative study on Coping strategies**

The results from the qualitative study on coping strategies adopted by the construction professionals and construction trade workers as their efforts to mitigate or reduce the causes and effects of psychological disorders have been presented in Table 8.7. The excerpts from the interviews have also been provided under the major constructs that were developed from the content analysis.

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<sup>11</sup> Some contents of section 8.1 of this Chapter have been published in: Fordjour, G. A., Chan, A.P.C., Amoah, P. and Tuffour-Kwarteng, L. (2019). "Coping Strategies Adopted by Construction Employees to Deal with the Causes and Effects of Occupational Psychological Disorders: A Study in Ghana". *Health*, 11, 755-782.

**Table 8.7: Findings from qualitative study on coping strategies**

S/N	COPING STRATEGIES	SOME EXCERPTS FROM INTERVIEWS
<b><i>CAUSES-FOCUSED COPING STRATEGIES</i></b>		
<b>C1.</b>	Avoiding the cause	<i>"I know my limits and learn to say "no" so I don't take more than I can handle". "I avoid persons who consistently bring problems or limit the time spent with such persons and if possible, end the relationship with them". "I try to have control over my environment and eliminate situations that make me feel anxious or worried, such as turning off TV to avoid hearing bad news". "I avoid unnecessary debates and arguments that makes me upset"</i>
<b>C2.</b>	Altering the cause	<i>"I express feelings about the perceive cause and not keep it within, which may lead to resentment and negative feelings, these sometimes help to mitigate the cause". "I am assertive and hardworking to face every challenge head on". "Adopt better time management skills and plan your tasks ahead".</i>
<b>C3.</b>	Adapting to the cause	<i>"I report condition to management or supervisors". "I try to reframe the problem as a challenging opportunity". "I have a blend or compromise on certain things". "I have a positive perspective about life events". "I have a critical look at the situation to, analyze the importance of it in the long term, if it temporal, then it is not important".</i>
<b>C5.</b>	Accepting the cause	<i>"I avoid controlling the uncontrollable such as people's behavior, rather I focus on building positive reactions to life situations that are beyond my control". "I do not waste time and energy focusing on things that are inevitable". "I react positively and see the other side of every problem as an opportunity, for instance a mistake as a chance to learn, grow and have personal development".</i>
<b><i>EFFECTS-FOCUSED COPING STRATEGIES</i></b>		
<b>C6.</b>	Unhealthy coping strategies	<i>"I either sleep too much sleep or too little". "I use drugs or pills for relaxation". "I smoke sometimes in excess to reduce tension". "I take in lots of alcohol to forget my issues". "I either under eat or overeat; I take in lot of sweets to calm my nerves". "I take in more caffeinated drinks". "I watch TV for hours away from active works". "I busy self with consistent working to avoid problems". "I take out my situation on others such as yelling, anger, outbursts, lash out, physical or emotional violence".</i>

<b>C7.</b>	Healthy coping strategies	<i>"I seek for medical attention". "I do regular exercise". "I adopt healthy eating habit". "I adopt a regular sleeping schedule". "I avoid perfectionism and modify my standards to reasonable ones". "I have gratitude and appreciate all the good things in life instead of focusing on only the negative". "I express my feelings to a trusted person or counsellor to release the burden and find insight into what I am going through". "I learn forgiveness and understand that all humans are imperfect and thus make mistakes; I have a sense of humor, laughing at some of the silly things I do at times as laughter can be used as a way of releasing ill-being symptoms". "Move on and free self from negative energy as to avoid anger and resentment".</i>
<b>C8.</b>	Engaging in recreational and relaxation activities	<i>"I schedule time to relax and recharge my energy for work". "I spend time to connect and engage with people who have positive influence in my life and provide good support systems to me to help release some stress or anxiety". "I engage in activities that are of interest to me and brings me joy such as stargazing, playing piano or cycling". "Going for a massage, playing games, playing with pet, working in garden, walking, time spent in nature, calling friend, exercise or workout, drink warm cup of tea or coffee, journal writing, listening to music, watching comedy, reading a good book, swimming or have long bath, light some scented candles"</i>

The causes-focused coping strategies adopted by the respondents as efforts to deal with the causes of psychological disorders were categorized under the following sub-headings: avoiding the cause, altering the cause, adapting to the cause and accepting the cause, using content analysis. Certain causes of psychological disorders could be controlled or changed, the coping strategies in dealing with such causes could be to avoid the cause or alter the cause (Xiong, et. al., 2015; Quick, et. al., 2013). On the other hand, certain causes are inevitable and cannot be controlled, the coping strategies in dealing with such causes could be to adapt to the cause or accept the cause (Tillmann and Beard, 2001).

The effects-focused coping strategies revealed in this study as efforts by the respondents to deal with the effects of psychological ill-being were also categorized under unhealthy and healthy coping strategies. The coping strategies that are unhealthy can also be considered as maladaptive, in the sense that they help alleviate the effects of psychological

disorders such as headache, inability to sleep, only for a short or temporary period. But the main problem or cause will still be there unresolved. Healthy coping strategies are highly encouraged as they help mitigate or eliminate the effects of psychological disorders permanently (Quick, et. al., 2013).

### **8.2.2 Results of questionnaire survey on Coping Strategies**

The sixteen (16) focus group discussion generated a huge data. The participants revealed 25 causes-focused coping strategies and 22 effects-focused coping strategies, which were then used to design the questionnaire for the survey study. This quantitative study sought to determine the highly adopted coping strategies revealed from the qualitative study and also for confirmatory purposes. The 25 causes-focused coping strategies and 22 effects-focused coping strategies which were revealed from the preliminary studies were initially grouped into major constructs using content analysis. Total variance analysis was also conducted for the quantitative study and it was confirmed that 6 constructs existed among the coping strategies that were identified. The total number of 6 constructs extracted were based on Eigenvalues greater than 1. The cumulative total variance of the 6 constructs was about 77%.

The psychological disorders causes-focused coping strategies were categorized under four main constructs: avoiding the cause, altering the cause, adapting to the cause and accepting the cause, using thematic analysis. The effects-focused coping strategies were also categorized under healthy and unhealthy coping strategies. The internal consistency and reliability of the construct measured were revealed to be good, as the Cronbach alpha value for all the 6 constructs were above 0.7. The values of the Cronbach alpha of each item if it is deleted from a group have also been presented. All the coping strategies analyzed in this study had their mean scores above 3.0. One sample T-test analysis with the test value set at 3, also revealed that all coping strategies measured in this study were significant as their p -values were less

than 0.05 as shown in Tables 8.8 and 8.9. The null hypothesis stating that the individual coping strategies were not statistically significant will be rejected, and the alternative hypothesis accepted.

**Table 8.8: Statistical results of causes focused coping strategies**

Causes- focused coping strategies	Mean	Std. Dev.	P - value (Sig.)	Cronbach Alpha
<b><i>Construct 1: Avoiding the cause</i></b>				<b>0.919</b>
1. Say no when limits are exceeded.	3.81	0.799	0.000	
2. Avoid unnecessary arguments and debates that affect my emotions.	3.90	0.854	0.000	
3. Turn off TV that shows sensitive pictures.	3.84	0.909	0.000	
4. Avoid listening to bad news that leads to worry or anxiety.	3.80	0.810	0.000	
5. End relationship with persons who consistently bring trouble.	3.97	0.901	0.000	
6. Plan for emergency situations.	3.66	0.899	0.000	
7. Withdraw from work duties or change jobs.	3.86	0.797	0.000	
<b><i>Construct 2: Altering the cause</i></b>				<b>0.793</b>
8. Express how one feels about a situation.	3.87	0.905	0.000	
9. I work extra hard to meet the challenge.	3.36	0.631	0.000	
10. Delegate complicated tasks.	3.94	0.862	0.000	
11. Adopt better skills for time management.	3.45	0.822	0.000	
12. Take time off and relax from routine work.	3.43	0.693	0.000	
13. Delay in working.	3.61	0.828	0.000	
14. Seek support from friends or families.	3.47	0.778	0.000	
<b><i>Construct 3: Adapting to the cause</i></b>				<b>0.779</b>
15. Compromise on things.	3.58	0.820	0.000	
16. Assertive with the belief that situations are only temporary.	3.25	0.695	0.000	
17. Optimistic attitude.	3.62	0.760	0.000	
18. See every problem as a challenge or opportunity and make plans towards it.	3.88	0.905	0.000	
19. Positive perspective about life events.	3.40	0.830	0.000	
20. Report condition to supervisor or management.	3.72	0.866	0.000	
<b><i>Construct 4: Accepting that the cause cannot be changed</i></b>				<b>0.852</b>
21. Do not waste time and energy on negative things that cannot be changed.	3.68	0.883	0.000	
22. Avoid controlling uncontrollable situations.	3.52	0.733	0.000	
23. React positively to situations that cannot change.	3.82	0.900	0.000	
24. Let go of past events and move on.	3.42	0.761	0.000	
25. Seek excitement from entertaining activities.	3.70	0.844	0.000	

**Table 8.9: Statistical results of effects focused coping strategies**

Effects- focused coping strategies	Mean	Std. Dev.	P - value (Sig.)	Factor loadings	Cronbach alpha
<b>Construct 1: Unhealthy coping strategies</b>					<b>0.916</b>
1. Poor sleeping either too much sleep or too little.	3.62	0.882	0.000	0.821	
2. Use of drugs or pills for relaxation.	3.33	0.696	0.000	0.717	
3. Excess Smoking.	3.56	0.950	0.000	0.659	
4. Drinking too much alcohol.	3.71	0.944	0.000	0.816	
5. Poor eating habit such as under or overeating.	3.73	0.804	0.000	0.783	
6. Take in lot of sweets.	3.37	0.740	0.000	0.798	
7. Take in more caffeinated drinks.	3.91	0.846	0.000	0.880	
8. Watching TV for hours away from active works.	3.46	0.886	0.000	0.745	
9. Busy self with consistent working to avoid problems.	3.47	0.715	0.000	0.777	
10. Take out stress on others such as yelling, anger, outbursts, lash out, physical or emotional violence.	3.88	0.905	0.000	0.853	
<b>Construct 2: Healthy coping strategies</b>					<b>0.860</b>
12. Consult a professional psychologist/ counsellor.	3.83	0.856	0.000	0.777	
13. Exercise regularly.	3.43	0.758	0.000	0.764	
14. Regular sleeping schedule.	3.40	0.862	0.000	0.737	
15. Prioritize work into urgent and not urgent ones.	3.65	0.888	0.000	0.859	
16. Initiate and make new plans.	3.85	0.862	0.000	0.826	
17. Set reasonable standards and avoid being a perfectionist.	3.63	0.888	0.000	0.530	
18. Show gratitude and appreciate things instead of focusing on negative things.	3.70	0.844	0.000	0.823	
19. Have forgiveness and belief that people are imperfect.	3.92	0.858	0.000	0.784	
20. Avoid negative energy like resentment and anger.	3.48	0.905	0.000	0.771	
21. Have a sense of humour.	3.60	0.982	0.000	0.724	
22. Adopt positive lifestyle.	3.75	0.911	0.000	0.570	

The Blom's fractional rank estimation test revealed the data were normally distributed and hence the results of the two construction groups could be compared for all the variables. A comparison of the mean scores of coping strategies adopted by the construction professionals and construction trade workers group was done using independent two-sample T-test and

presented in Table 8.10 and Table 8.11 respectively. The comparison was done to determine whether the diverse nature of work of the two construction working groups could influence their perceived coping strategies adopted to deal with psychological issues. The coping strategies that revealed statistically significant differences between the two construction groups have their p-values marked with “\*” as shown in the tables. The null hypothesis stating that the mean scores obtained by the two construction groups were not statistically significant will be rejected, and the alternative hypothesis accepted.

Table 8.10: Comparison of the statistical results obtained from the construction professionals' group <sup>(a)</sup> and construction trade workers group <sup>(b)</sup>					
Causes-focused coping strategies	Group Mean	Group RII %	Levene's Test for Equality of Variances		Group Rank
			F -value	Sig. (Equal)	
<i>Construct 1: Avoiding the cause</i>					
1. Say no when limits are exceeded.	3.66 <sup>a</sup> , 3.95 <sup>b</sup>	73.1 <sup>a</sup> , 79.2 <sup>b</sup>	0.149	0.700	9th <sup>a</sup> , 9th <sup>b</sup>
2. Avoid unnecessary arguments and debates that affect my emotions.	3.84 <sup>a</sup> , 3.97 <sup>b</sup>	76.8 <sup>a</sup> , 79.3 <sup>b</sup>	0.339	0.561	4th <sup>a</sup> , 7th <sup>b</sup>
3. Turn off TV that shows sensitive pictures.	3.65 <sup>a</sup> , 4.02 <sup>b</sup>	73.1 <sup>a</sup> , 80.4 <sup>b</sup>	0.507	0.477	10th <sup>a</sup> , 4th <sup>b</sup>
4. Avoid listening to bad news that leads to worry or anxiety.	3.60 <sup>a</sup> , 4.00 <sup>b</sup>	72.0 <sup>a</sup> , 80.9 <sup>b</sup>	0.658	0.418	13th <sup>a</sup> , 6th <sup>b</sup>
5. End relationship with persons who consistently bring trouble.	3.89 <sup>a</sup> , 4.05 <sup>b</sup>	77.9 <sup>a</sup> , 80.9 <sup>b</sup>	0.009	0.927	2nd <sup>a</sup> , 3rd <sup>b</sup>
6. Plan for emergency situations.	3.85 <sup>a</sup> , 3.47 <sup>b</sup>	76.9 <sup>a</sup> , 69.3 <sup>b</sup>	0.009	0.925	3rd <sup>a</sup> , 24th <sup>b</sup>
7. Withdraw from work duties or change jobs.	3.62 <sup>a</sup> , 4.10 <sup>b</sup>	72.4 <sup>a</sup> , 82.0 <sup>b</sup>	0.090	0.765	11th <sup>a</sup> , 1st <sup>b</sup>
<i>Construct 2: Altering the cause</i>					
8. Express how one feels about a situation.	3.67 <sup>a</sup> , 4.07 <sup>b</sup>	73.3 <sup>a</sup> , 81.3 <sup>b</sup>	0.727	0.395	8th <sup>a</sup> , 2nd <sup>b</sup>
9. I work extra hard to meet the challenge.	3.21 <sup>a</sup> , 3.51 <sup>b</sup>	64.1 <sup>a</sup> , 70.3 <sup>b</sup>	76.429	0.000*	23rd <sup>a</sup> , 20th <sup>b</sup>
10. Delegate complicated tasks.	4.13 <sup>a</sup> , 3.75 <sup>b</sup>	82.7, <sup>a</sup> 75.1 <sup>b</sup>	0.703	0.402	1st <sup>a</sup> , 14th <sup>b</sup>
11. Adopt better skills for time management.	3.42 <sup>a</sup> , 3.48 <sup>b</sup>	68.4 <sup>a</sup> , 69.6 <sup>b</sup>	3.631	0.058	19th <sup>a</sup> , 22nd <sup>b</sup>
12. Take time off and relax from routine work.	3.35 <sup>a</sup> , 3.51 <sup>b</sup>	67.1 <sup>a</sup> , 70.3 <sup>b</sup>	20.015	0.000*	21st <sup>a</sup> , 21st <sup>b</sup>
13. Delay in working.	3.70 <sup>a</sup> , 3.53 <sup>b</sup>	74.0 <sup>a</sup> , 70.5 <sup>b</sup>	4.928	0.027*	7th <sup>a</sup> , 19th <sup>b</sup>
14. Seek support from friends or	3.48 <sup>a</sup> , 3.47 <sup>b</sup>	69.6 <sup>a</sup> , 69.3 <sup>b</sup>	0.889	0.346	17th <sup>a</sup> , 23rd <sup>b</sup>

families.					
<b>Construct 3: Adapting to the cause</b>					
15. Compromise on things.	3.59 <sup>a</sup> , 3.58 <sup>b</sup>	71.7 <sup>a</sup> , 71.6 <sup>b</sup>	11.819	0.001*	14th <sup>a</sup> , 18th <sup>b</sup>
16. Assertive with the belief that situations are only temporary.	3.12 <sup>a</sup> , 3.38 <sup>b</sup>	62.4 <sup>a</sup> , 67.6 <sup>b</sup>	46.696	0.000*	25th <sup>a</sup> , 25th <sup>b</sup>
17. Optimistic attitude.	3.48 <sup>a</sup> , 3.75 <sup>b</sup>	69.6 <sup>a</sup> , 75.1 <sup>b</sup>	12.704	0.000*	16th <sup>a</sup> , 13th <sup>b</sup>
18. See every problem as a challenge or opportunity and make plans towards it.	3.80 <sup>a</sup> , 3.97 <sup>b</sup>	76.0 <sup>a</sup> , 79.3 <sup>b</sup>	0.005	0.942	5th <sup>a</sup> , 8th <sup>b</sup>
19. Positive perspective about life events.	3.19 <sup>a</sup> , 3.61 <sup>b</sup>	63.7 <sup>a</sup> , 72.1 <sup>b</sup>	13.207	0.000*	24th <sup>a</sup> , 17th <sup>b</sup>
20. Report condition to supervisor or management.	3.43 <sup>a</sup> , 4.01 <sup>b</sup>	68.7 <sup>a</sup> , 80.1 <sup>b</sup>	17.210	0.000*	18th <sup>a</sup> , 5th <sup>b</sup>
<b>Construct 4: Accepting that the cause cannot be changed</b>					
21. Do not waste time and energy on negative things that cannot be changed.	3.61 <sup>a</sup> , 3.76 <sup>b</sup>	72.1 <sup>a</sup> , 75.2 <sup>b</sup>	1.149	0.285	12th <sup>a</sup> , 12th <sup>b</sup>
22. Avoid controlling uncontrollable situations.	3.38 <sup>a</sup> , 3.67 <sup>b</sup>	67.6 <sup>a</sup> , 73.3 <sup>b</sup>	38.114	0.000*	20th <sup>a</sup> , 15th <sup>b</sup>
23. React positively to situations that cannot change.	3.73 <sup>a</sup> , 3.91 <sup>b</sup>	74.5 <sup>a</sup> , 78.3 <sup>b</sup>	0.547	0.460	6th <sup>a</sup> , 10th <sup>b</sup>
24. Let go of past events and move on.	3.23 <sup>a</sup> , 3.61 <sup>b</sup>	64.7 <sup>a</sup> , 72.3 <sup>b</sup>	24.229	0.000*	22nd <sup>a</sup> , 16th <sup>b</sup>
25. Seek excitement from entertaining activities.	3.57 <sup>a</sup> , 3.83 <sup>b</sup>	71.3 <sup>a</sup> , 76.7 <sup>b</sup>	11.172	0.001*	15th <sup>a</sup> , 11th <sup>b</sup>

Values marked with (<sup>a</sup>) represent scores from the construction professionals' group.

Values marked with (<sup>b</sup>) represent scores from the construction trade workers' group.

Values that indicate a statistically significant difference between the variances between the two groups are marked with (\*).

**Table 8.11: Comparison of the statistical results obtained from the construction professionals' group <sup>(a)</sup> and construction trade workers group <sup>(b)</sup> for effects focused coping strategies**

Effects- focused coping strategies	Group Mean	Group RII %	Levene's Test for Equality of Variances		Group Rank
			F-value	Sig. (Equal)	
Construct 1: Unhealthy coping strategies					
1. Poor sleeping either too much sleep or too little.	3.46 <sup>a</sup> , 3.78 <sup>b</sup>	69.2 <sup>a</sup> , 75.6 <sup>b</sup>	8.024	0.005*	15th <sup>a</sup> , 12th <sup>b</sup>
2. Use of drugs or pills for relaxation.	3.26 <sup>a</sup> , 3.41 <sup>b</sup>	65.2 <sup>a</sup> , 68.1 <sup>b</sup>	3.216	0.074	18th <sup>a</sup> , 21st <sup>b</sup>
3. Excess Smoking.	3.47 <sup>a</sup> , 3.65 <sup>b</sup>	69.5 <sup>a</sup> , 73.1 <sup>b</sup>	8.354	0.004*	14th <sup>a</sup> , 17th <sup>b</sup>
4. Drinking too much alcohol.	3.67 <sup>a</sup> , 3.74 <sup>b</sup>	73.5 <sup>a</sup> , 74.8 <sup>b</sup>	4.765	0.030*	7th <sup>a</sup> , 14th <sup>b</sup>
5. Poor eating habit such as under or overeating.	3.68 <sup>a</sup> , 3.78 <sup>b</sup>	73.6 <sup>a</sup> , 75.6 <sup>b</sup>	6.041	0.015*	6th <sup>a</sup> , 11th <sup>b</sup>
6. Take in lot of sweets.	3.16 <sup>a</sup> , 3.58 <sup>b</sup>	63.2 <sup>a</sup> , 71.6 <sup>b</sup>	67.204	0.000*	20th <sup>a</sup> , 18th <sup>b</sup>



7. Take in more caffeinated drinks.	3.71 <sup>a</sup> , 4.12 <sup>b</sup>	74.1 <sup>a</sup> , 82.4 <sup>b</sup>	0.302	0.583	4th <sup>a</sup> , 1st <sup>b</sup>
8. Watching TV for hours away from active works.	3.07 <sup>a</sup> , 3.85 <sup>b</sup>	61.5 <sup>a</sup> , 76.9 <sup>b</sup>	55.252	0.000*	22nd <sup>a</sup> , 9th <sup>b</sup>
9. Busy self with consistent working to avoid problems.	3.51 <sup>a</sup> , 3.43 <sup>b</sup>	70.3 <sup>a</sup> , 68.7 <sup>b</sup>	0.003	0.957	10th <sup>a</sup> , 20th <sup>b</sup>
10. Take out stress on others such as yelling, anger, outbursts, lash out, physical or emotional violence.	3.69 <sup>a</sup> , 4.08 <sup>b</sup>	73.7 <sup>a</sup> , 81.6 <sup>b</sup>	0.662	0.416	5th <sup>a</sup> , 2nd <sup>b</sup>
<b>Construct 2: Healthy coping strategies</b>					
11. Seek medical attention.	4.13 <sup>a</sup> , 3.22 <sup>b</sup>	82.7 <sup>a</sup> , 64.4 <sup>b</sup>	41.819	0.000*	1st <sup>a</sup> , 22nd <sup>b</sup>
12. Consult a professional psychologist/ counsellor.	3.64 <sup>a</sup> , 4.01 <sup>b</sup>	72.8 <sup>a</sup> , 80.3 <sup>b</sup>	3.026	0.083	9th <sup>a</sup> , 4th <sup>b</sup>
13. Exercise regularly.	3.17 <sup>a</sup> , 3.69 <sup>b</sup>	63.5 <sup>a</sup> , 73.9 <sup>b</sup>	61.708	0.000*	19th <sup>a</sup> , 16th <sup>b</sup>
14. Regular sleeping schedule.	3.08 <sup>a</sup> , 3.72 <sup>b</sup>	61.6 <sup>a</sup> , 74.4 <sup>b</sup>	50.586	0.000*	21st <sup>a</sup> , 15th <sup>b</sup>
15. Prioritize work into urgent and not urgent ones.	3.48 <sup>a</sup> , 3.83 <sup>b</sup>	69.6 <sup>a</sup> , 76.5 <sup>b</sup>	9.135	0.003*	13th <sup>a</sup> , 10th <sup>b</sup>
16. Initiate and make new plans.	3.79 <sup>a</sup> , 3.91 <sup>b</sup>	75.7 <sup>a</sup> , 78.3 <sup>b</sup>	0.181	0.670	2nd <sup>a</sup> , 6th <sup>b</sup>
17. Set reasonable standards and avoid being a perfectionist.	3.49 <sup>a</sup> , 3.77 <sup>b</sup>	69.9 <sup>a</sup> , 75.3 <sup>b</sup>	5.133	0.024*	12th <sup>a</sup> , 13th <sup>b</sup>
18. Show gratitude and appreciate things instead of focusing on negative things.	3.41 <sup>a</sup> , 3.99 <sup>b</sup>	68.1 <sup>a</sup> , 79.9 <sup>b</sup>	2.041	0.154	16th <sup>a</sup> , 5th <sup>b</sup>
19. Have forgiveness and belief that people are imperfect.	3.79 <sup>a</sup> , 4.05 <sup>b</sup>	75.7 <sup>a</sup> , 81.1 <sup>b</sup>	0.243	0.622	3rd <sup>a</sup> , 3rd <sup>b</sup>
20. Avoid negative energy like resentment and anger.	3.51 <sup>a</sup> , 3.45 <sup>b</sup>	70.1 <sup>a</sup> , 69.1 <sup>b</sup>	2.762	0.098	11th <sup>a</sup> , 19th <sup>b</sup>
21. Have a sense of humour.	3.33 <sup>a</sup> , 3.86 <sup>b</sup>	66.7 <sup>a</sup> , 77.2 <sup>b</sup>	7.569	0.006*	17th <sup>a</sup> , 7th <sup>b</sup>
22. Adopt positive lifestyle.	3.65 <sup>a</sup> , 3.85 <sup>b</sup>	72.9 <sup>a</sup> , 77.1 <sup>b</sup>	31.169	0.000*	8th <sup>a</sup> , 8th <sup>b</sup>

Values marked with (<sup>a</sup>) represent scores from the construction professionals' group.

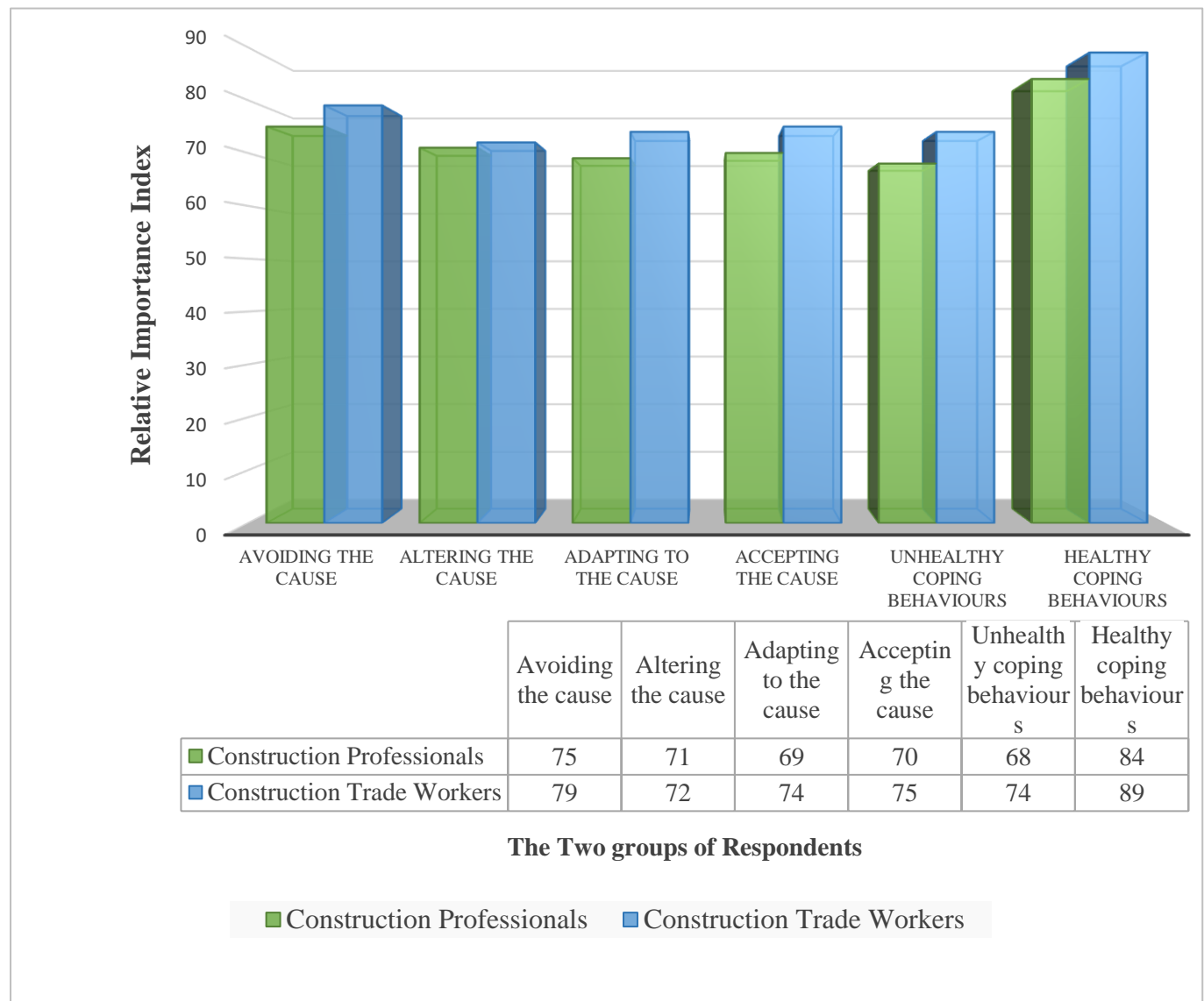
Values marked with (<sup>b</sup>) represent scores from the construction trade workers' group.

Values that indicate a statistically significant difference between the variances between the two groups are marked with (\*).

Levene's Test for equality of variances among the two construction working groups as presented in Tables 8.10 and 8.11 indicated that the mean scores of the two construction groups were statistically significantly different for 11 of the causes-focused coping strategies and 13 of the effects-focused coping strategies. These items have their p-values less than 0.05 and marked with (\*) as shown in Tables 8.10 and 8.11. The null hypothesis that assumes no statistically significant differences between the mean scores of the two construction groups will be rejected and the alternative hypothesis that states otherwise will be accepted for these items of coping strategies. However, the null hypothesis will not be rejected for the other factors that

revealed no statistically significant differences and assumed equal variances for the two construction working groups.

Comparative assessment of the major constructs of coping strategies among the construction professionals and construction trade workers have been presented in Figure 8.2.



**Figure 8.2: Comparative summary of the relative importance index of coping strategies adopted by the two construction groups of respondents**

The results of the comparative analysis as shown in Figure 8.2, indicate that healthy coping behaviours are the effects-focused coping strategies that are most often adopted by both construction professionals and construction trade workers in Ghana to manage the effects of

psychological health conditions. The results also indicate that avoiding the cause strategies are the causes-focused coping strategies that are most often adopted by both construction professionals and construction trade workers in Ghana to deal with the causes of psychological health conditions.

### **8.2.3 Discussion on the results of coping strategies**

Some significant differences in the weighting of the coping strategies were also revealed from the comparison of the statistical results obtained from the construction professionals' group and construction trade workers group in Ghana. For instance: delegate complicated tasks as a causes-focused coping strategy was ranked 1<sup>st</sup> by the construction professionals but 14<sup>th</sup> by the construction trade workers. Withdraw from work duties or change jobs as a causes-focused coping strategy was rather ranked 1<sup>st</sup> by the construction trade workers but 11<sup>th</sup> by the construction professionals. Similarly, seek medical attention as an effects-focused coping strategy was ranked 1<sup>st</sup> by the construction professionals but 22<sup>nd</sup> by the construction trade workers. Take in more caffeinated drinks as an effects-focused coping strategy was rather ranked 1<sup>st</sup> by the construction trade workers but 4<sup>th</sup> by the construction professionals.

The results, however, also revealed some coping strategies had the same rank among the two construction groups in Ghana. The causes-focused coping strategies that had the same rankings are: say no when limits are exceeded, assertive with the belief that situations are only temporary and do not waste time and energy on negative things that cannot be changed, which were ranked 9<sup>th</sup>, 25<sup>th</sup>, and 12<sup>th</sup> respectively by the two construction groups. The effects-focused coping strategies that had the same rankings are have forgiveness and belief that people are imperfect and adopt positive lifestyle, which were ranked 3<sup>rd</sup> and 8<sup>th</sup> respectively by the two construction groups in Ghana.

### **Coping strategies adopted for the causes of occupational psychological disorders**

The coping strategies revealed and measured in this research study shows a range of positive and negative coping strategies adopted as mechanisms to mitigate the causes of psychological disorders. The causes of psychological disorders as indicated previously could be due to work, personality or interpersonal relationships with others. The coping strategies were categorized under the following sub-headings: avoiding the cause, altering the cause, adapting to the cause and accepting the cause.

#### ***Avoiding the cause***

Avoiding the cause-coping strategies are means to escape from a problem or challenging situation, and these efforts are usually wishful expressions of one's thoughts. Avoiding the cause coping strategies that were revealed in this study included: saying no when limits are exceeded, planning for emergency situations, withdrawing from work duties or changing jobs, ending relationship with persons who consistently bring trouble and avoiding unnecessary arguments and debates that affect ones' emotions. The difference in the mean scores for the avoid the causes coping strategies among the two construction groups could be due to various factors such as differences in their nature of work, educational background, professional skills and level of experience. The causes that can be avoided by the construction trade workers in Ghana are those usually related to personality characteristics and interpersonal relationships. Construction professionals in Ghana could also only avoid work-related causes such as the complexity of work methods and quality demands, where they have a certain degree of autonomy or control over their works. Work-related factors that may cause both the construction professional and construction trade workers psychological disorders such as job demands, cannot be avoided entirely, but only to an extent level where demand exceeds the employee's resources and personal capabilities.

A comparison of the findings from this study and the findings from previous studies in the construction industry was done to identify similar coping strategies categorized under avoiding the cause. It was identified that some of the findings of this study were similar and related to previous studies findings, whereas some findings were not found in previous studies. For instance, saying no when limits are exceeded revealed by both the construction trade workers and professionals as a coping strategy to avoid the cause is similar to refusing stressful tasks revealed by other researchers.

Other coping strategies revealed by this study such as: withdrawing from work duties or changing jobs, planning for emergency situations, avoiding unnecessary arguments and debates that affect my emotions and ending relationship with persons who consistently bring trouble also relate respectively to previous findings such as: absenteeism (Haynes and Love, 2004), plan ahead for emergency situations (Yip, et. al., 2008), avoiding phone calls (Chan, et. al., 2012), and social isolation (Yip and Rowlinson, 2006). This indicates that these coping strategies adopted as cognitive and behavioural efforts to avoid the cause of psychological disorders are common among construction personnel.

Construction personnel in Ghana who adopt these coping strategies, believe that the cause or problem will somewhat be solved without them putting any efforts to it. Distancing is also a part of the coping strategies adopted to avoid a cause and involves detaching oneself from a perceived problem while creating a positive outlook. Construction personnel in Ghana who adopt these coping strategies will try not to let a problem affect them personally and behaves as if nothing has happened. These coping strategies of avoiding the cause could enhance the psychological well-being of construction personnel, but has negative consequences on task performance of the Ghanaian construction industry.

### ***Altering the cause***

Altering the cause involves confrontive coping strategies adopted by individuals to overcome or deal with challenging situations. These coping strategies are associated with aggressive efforts and encompass certain degrees of risk taking and hostility. Altering the cause using confrontive coping strategies have been proved by earlier researchers to be efficient in dealing with work-related psychological health factors, that could lead to employees' psychological disorders.

Altering the cause coping strategies that were revealed to be significant across the two construction groups included: working extra hard to meet the challenge, delegating complicated tasks, adopting better skills for time management and delay in working. The differences in the mean scores among the two construction groups for the altering the cause coping strategies could be due to various factors such as differences in job responsibilities, professional skills and level of commitment among the construction personnel in Ghana.

Construction trade workers in Ghana could adopt altering the cause coping strategies to deal with work-related issues such as inadequate resource allocation, by confronting management for a change in the situation. Construction professionals in Ghana could alter the work-related causes by adopting the coping strategies of instrumental support seeking. Instrumental support seeking for assistance, information or advice from persons such as senior colleagues, friends and colleague workers are essential coping strategies to alter the cause of psychological disorders experienced by employees. Construction trade workers could seek support from experienced or senior colleagues to resolve a problem. This coping strategy facilitates cooperation among construction personnel, which results in improved project performances in the Ghanaian construction industry.

A comparison of the findings from this study and the findings from previous studies in the construction industry was done to identify similar coping strategies categorized under

altering the cause. It was identified that some of the findings of this study were similar and related to previous studies findings, whereas some findings were not found in previous studies. Coping strategies revealed by this study such as: expressing how one feels about a situation, working extra hard to meet the challenge, delegating complicated tasks, adopting better skills for time management, taking time off and relaxing from routine work, delaying in working and seeking support from friends or families relate respectively to previous findings such as: talking about the situation (Leung, et. al., 2006), reappraising and finding controllable variables (Haynes and Love, 2004), consulting senior or experienced colleagues (Yip, et. al., 2008), improving on time management (Chan, et. al., 2012), sleeping or taking rests (Chan, et. al., 2016), doing or thinking of unrelated things (Yip and Rowlinson, 2006) and seeking emotional support by talking with friends or family for advice (Leung, et. al., 2006). This indicates that these coping strategies adopted as cognitive and behavioural efforts to alter the cause of psychological disorders are common among construction personnel.

### ***Adapting to the cause***

Adapting to the cause involves the construction employee acknowledging his responsibility for or role in the problem and attempts to put things right. Adapting to the cause coping strategies are planful problem-solving coping strategies, which are overt attempts, self-initiated by individuals to manage a problem and its consequences directly. Adapting to the cause coping strategies that were revealed across the two construction groups included: seeing every problem as a challenge or opportunity and making plans towards it, compromising on things. The differences in the mean scores among the two construction groups for adapting to the cause coping strategies could also be due to various factors such as differences in nature of work, professional skills, and job responsibilities.

Construction personnel in Ghana facing work-related problems such as work overload and tight timeframes, could adapt to the cause and adopt planful coping strategies to effectively

plan their work tasks, resource allocation and daily time schedules. For instance, a construction worker in Ghana, who is in charge of delivering carpentry works, will be responsible for any delays that occur. Both the construction professional and the trade worker will have to assess the problem and then initiate new plans to speed up the progress of the task, in order to avoid psychological disorders such as stress and depression. Adapting to the cause coping strategies will, therefore, help prevent construction personnel from experiencing psychological disorders and also enhance their job performance in the Ghanaian construction industry.

A comparison of the findings from this study and the findings from previous studies in the construction industry was done to identify similar coping strategies categorized under adapting to the cause. It was identified that some of the findings of this study were similar and related to previous studies findings, whereas some findings were not found in previous studies. Coping strategies revealed by this study such as: compromising on things, being assertive with the belief that situations are only temporary, have optimistic attitude and seeing every problem as a challenge or opportunity and make plans towards it, relate respectively to previous findings such as: compromising (Chan, et. al., 2012), having positive perspective of situations (Yip, et. al., 2008), accepting and learning from mistake (Haynes and Love, 2004) and enquiring more about problem (Yip and Rowlinson, 2006). This also indicates that these coping strategies adopted as cognitive and behavioural efforts to adapt to the cause of psychological disorders are common among construction personnel.

#### ***Accept the cause cannot be changed***

Some sources of psychological disorders cannot be avoided such as the death of a loved one, illness, company or national problem. It is better to accept these situations instead of railing over things that cannot be changed, even though it may seem difficult but will be easier over time. Accepting the cause involves positive reappraisal, which are efforts to derive positive meanings from inevitable causes such as work-related challenges.



Coping strategies that were revealed across the two groups to accept that the cause cannot be changed included: avoiding controlling uncontrollable situations and letting go of past events do not waste time and energy on negative things that cannot be changed. The differences in the mean scores among the two construction groups for the accepting the cause coping strategies could be due to various factors such as differences in their type of work, educational background, level of experience, professional skills, job responsibilities and level of commitment among the construction personnel in Ghana. Construction personnel who adopt these coping strategies tend to reappraise problems or situations arising from their work, tend to focus on the opportunities and perceive them as means for personal growth and career development. Acceptance through positive reappraisal can be effective in addressing work-related causes leading to psychological disorders of construction personnel in Ghana.

A comparison of the findings from this study and the findings from previous studies in the construction industry was done to identify similar coping strategies categorized under accepting that the cause cannot be changed. It was identified that some of the findings of this study were similar and related to previous studies findings, whereas some findings were not found in previous studies. Coping strategies revealed by this study such as: letting go of past events and moving on as well as seeking excitement from entertaining activities, relate respectively to previous findings such as: making self-adjustments (Yip, et. al., 2008) and listening to music (Chan, et. al., 2016). This indicates that these coping strategies adopted as cognitive and behavioural efforts to accept that the cause of psychological disorders cannot be changed are common among construction personnel.

### **Coping strategies adopted for the effects of occupational psychological disorders**

The effects of psychological disorders on construction personnel are associated with emotional health symptoms such as: anxiety (Jacobs and Blustein, 2008), distress (Bowen, et. al., 2014), depression (Enshassi, et. al., 2016), and physical health symptoms such as: back

pain (Leung, et. al., 2014), headaches (Sears and Kraus, 2009), sleep disorders (Chan, et. al., 2012) and others. The coping strategies revealed in this study as efforts to deal with the effects of psychological ill-being were categorized under unhealthy and healthy coping strategies.

### ***Unhealthy coping strategies***

Some construction personnel adopt coping strategies such as overeating, smoking or drinking as behavioural expressions to reduce unpleasant emotions or effects of psychological disorders such as tiredness. Unhealthy or negative coping strategies are also known as escapist or maladaptive coping strategies, which are usually adopted as means for emotional discharge. These include the excess consumption of narcotics, nicotine, alcohol, and other substances.

Unhealthy coping strategies that were revealed in this study included: use of drugs or pills for relaxation, taking in more caffeinated drinks and taking out stress on others, excess alcohol intake and excess smoking. The difference in the mean scores could be due to various factors such as differences in personality characteristics, professional skills and educational background among the construction personnel in Ghana. Previous studies compared with the findings of this study also revealed coping strategies that relate to the unhealthy coping strategies identified in this study. For instance: use of narcotics (Bowen, et. al., 2014), excess smoking (Boschman, et. al., 2013), drinking excess alcohol (Chan, et. al., 2014), eating a lot (Leung, et. al., 2006), excess intake of nicotine or coffee (Chan, et. al., 2012), watching DVDs (Chan, et. al., 2016) and scolding or taking out anger or stress on others (Yip and Rowlinson, 2006). Excess smoking and alcohol intake are prevalent coping strategies among construction workers generally. This indicates that these unhealthy coping strategies adopted as cognitive and behavioural efforts to deal with the effects of psychological ill-being conditions are common among construction personnel.

Some construction employees in Ghana consume alcohol or smoke cigarette to reduce tension, change their condition of psychological health and cope with the triggers of

psychological disorders. However, these coping strategies could relieve the effects of psychological disorders such as stress only on a temporary basis. These unhealthy coping strategies are related positively to the poor health outcomes of construction personnel and are posited as the direct link between work-related ill-being factors and their effects.

### ***Healthy coping strategies***

Healthy coping strategies that were revealed in this study included: seeking medical attention, exercising regularly and prioritizing work into urgent and not urgent ones, setting reasonable standards and avoiding being a perfectionist. The differences in the mean scores among the two construction for healthy coping strategies could be due to various factors such as differences in personality characteristics, educational background, job responsibilities, professional skills and level of commitment among the construction personnel in Ghana.

Previous studies compared with the findings of this study also revealed coping strategies that relate to the healthy coping strategies identified in this study such as: attending social gatherings with friends (Chan, et. al., 2016), seeking emotional support by talking with friends or family for advice (Yip, et. al., 2008), sleeping or taking rests (Chan, et. al., 2012), physical exercise (Bowen, et. al., 2014). This also indicates that these healthy coping strategies adopted as cognitive and behavioural efforts to deal with the effects of psychological disorders are common among construction personnel in Ghana and to some extent globally. Healthy effects-focused coping strategies include affective regulation adopted to control ones' emotions, suppress impulsive acts and adopt positive thinking to bolster morale.

**8.2.4 Summary of findings: Coping strategies adopted by construction employees to deal with the causes and effects of occupational psychological disorders: A study in Ghana.**

Coping strategies adopted to deal with psychological health issues could have influences on the general health, productivity and task performance of the employee. To explore the need for occupational psychological health intervention in the Ghanaian construction industry, this study sought to investigate the coping strategies adopted by construction employees to deal with the causes and effects of occupational psychological disorders such as burnout and workaholism. To achieve this aim, the methods of focus group discussions were first employed. A total of 16 semi-structured focus group discussions were held in Ghana, with 90 construction employees. The focus group study revealed 25 coping strategies adopted as efforts to mitigate the causes and 22 coping strategies adopted as responses to moderate the effects of occupational psychological disorders. A quantitative study was also conducted in Ghana to investigate the coping strategies that were highly adopted by the two construction working groups. A target of 150 construction professionals and 150 construction trade workers in Ghana were involved in the questionnaire survey mainly for comparative purposes.

The findings from the study revealed that the construction professionals in Ghana adopted delegating complicated tasks and seeking medical attention as the most common coping strategies to manage the causes and effects respectively. The construction trade workers in Ghana were also revealed to adopt withdrawing from work duties or changing jobs and taking in more caffeinated drinks as the most common coping strategies to manage the causes and effects respectively. Thematic analysis was employed, and the findings were put into main constructs. The causes focused coping strategies were categorized under avoidance, alteration, adaptation, and acceptance. The effects focused coping strategies were also categorized under healthy and unhealthy coping strategies. This study recommends appropriate coping strategies

and interventions in the construction industry such as education of construction personnel on the consequences of various coping strategies.

### **8.3 Chapter 8 Summary**

This chapter presents the research design, results on both the qualitative and quantitative studies as well as the discussions and summary of findings for objectives 4 and 5. The major findings of objective 4 on potential effects of psychological health condition on the construction employees included accident-prone, chronic pains, insomnia, and dietary extremes. The major findings of potential effects of psychological health condition on the construction industry of Ghana also included increased absenteeism, increased medical costs, job dissatisfaction and errors in work.

The major findings of objective 5 on the coping strategies adopted by construction employees in Ghana as their responses or efforts to deal with the causes and effects of occupational psychological disorders, were categorized under unhealthy and healthy effects-focused coping strategies which include Poor sleeping habits and seeking medical attention respectively. The causes-focused coping strategies were also categorised under avoiding the cause (example; saying no when limits are exceeded), altering the cause (example; addressing the issue by expressing how one feels about a situation), adapting to the cause (example; compromising on situations) and accepting that the cause cannot be changed (example; avoid controlling uncontrollable situations).

**CHAPTER 9****RESULTS AND DISCUSSIONS FOR ORGANISATIONAL STRATEGIES AND INFLUENTIAL FACTORS****9.1 Organisational strategies to mitigate the causes of psychological health conditions in the construction industry****9.1.1 Results of the Interview on organisational preventive strategies**

The interview questions were designed to answer the research question on organisational measures that can be adopted to mitigate the causes and effects of psychological distress among construction employees in Ghana. The responses from the interviewees were summarised and grouped according to their similarities. Themes were extracted and the number of interviewees who cited or mentioned a particular item as organisational strategies to mitigate the causes of psychological health conditions in the construction industry, were counted. Table 9.1 presents the factors identified from the qualitative data analysis of the interviews conducted in Ghana and the number of respondents out of 53 research participants who mentioned the particular item.

**Table 9.1: Findings from the qualitative interview on organisational preventive strategies**

<b>S/N</b>	<b>Organisational strategies to improve the psychological health of construction employees</b>	<b>No. of interviewees who cited this</b>
M1	Task redesign (Alternate roles, ergonomic workplace design, additional manpower)	39
M2	Acknowledge or reward good work done	36
M3	Improve supervisory and working relations	34
M4	Ensure better working conditions	31
M5	Provide adequate salary and resources for work	30
M6	Provide flexible work schedules for workers	27
M7	Enforcement of policies for workers well-being	25
M8	Workplace wellness programs (Recreational activities)	22

M9	Encourage workers to take leave and enforce break hours	20
M10	Psychological health systems and counselling services (Scheduled 1-1 meetings, Helplines, Mental Health First Aiders)	18
M11	Seek medical interventions for symptoms (Pay medical bills)	16
M12	Workers' support from management and co-workers.	15
M13	Proper planning of work activities	13
M14	Establish a welfare committee at the workplace	11
M15	Regular health screening for early detection of ill-being conditions	9
M16	Creation of psychological health awareness and programs	8

The respondents for the qualitative study revealed sixteen (16) organisational strategies to mitigate the causes of psychological health conditions in the construction industry. A total of 53 research participants were involved in the qualitative study with a response rate of 71% out of the 67 persons who were invited to partake in the study. The respondents comprised of construction professionals (such as architects, quantity surveyors and engineers), construction trade workers (such as masons, plumbers and carpenters) and labour personnel (which comprise of workers from the factories inspectorate of Ghana and labour department as well as occupational psychologist). The organisational strategies that were identified were based on the experiences, opinions or perceptions of the respondents, as measures that can help improve the psychological health conditions of the construction employees in Ghana. The findings of 16 measures from the interviews conducted formed the bases for the quantitative study. Organisational strategies that have been revealed by previous studies were not considered for the questionnaire survey, as this study sought to identify significant measures that pertain to the Ghanaian construction industry.

### 9.1.2 Results of the confirmatory quantitative study on organisational preventive measures

Questionnaire survey was conducted to confirm the findings from the preliminary study and to measure the level of significance of the organisational strategies identified. Table 9.2 presents the results on the quantitative study.

<b>Table 9.2: One-Sample Test results on the significance of findings from the qualitative study</b>							
S/N	Preventive measures to improve the psychological health of construction employees	Test Value = 3					
		t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
M1	Task redesign (Alternate roles, ergonomic workplace design, additional manpower)	16.382	263	0.000	0.761	0.67	0.85
M2	Acknowledge or reward good work done	22.112	263	0.000	1.000	0.91	1.09
M3	Improve supervisory and working relations	28.948	263	0.000	1.159	1.08	1.24
M4	Ensure better working conditions	23.655	263	0.000	1.034	0.95	1.12
M5	Provide adequate salary and resources for work	16.51	263	0.000	0.739	0.65	0.83
M6	Provide flexible work schedules for workers	15.733	263	0.000	0.731	0.64	0.82
M7	Enforcement of policies for workers well-being	15.324	263	0.000	0.689	0.6	0.78
M8	Workplace wellness programs (Recreational activities)	22.427	263	0.000	0.996	0.91	1.08
M9	Encourage workers to take leave and enforce break hours	24.415	263	0.000	1.061	0.98	1.15
M10	Psychological health systems and counselling services (Scheduled 1-1 meetings, Helplines, Mental Health First Aiders)	15.11	263	0.000	0.705	0.61	0.8
M11	Seek medical interventions for symptoms (Pay medical bills)	15.224	263	0.000	0.682	0.59	0.77
M12	Workers' support from management and co-workers.	15.947	263	0.000	0.735	0.64	0.83
M13	Proper planning of work activities	20.119	263	0.000	0.92	0.83	1.01
M14	Establish a welfare committee at the workplace	23.832	263	0.000	1.027	0.94	1.11
M15	Regular health screening for early detection of ill-being conditions	11.905	263	0.000	0.527	0.44	0.61
M16	Creation of psychological health awareness and programs	14.918	263	0.000	0.667	0.58	0.75



**Ranking of the key organizational preventive measures**

First, descriptive statistics were computed for the data collected from the three groups of respondents, namely: construction professionals, construction trade workers, and labour personnel (this comprise of regulatory personnel and occupational health psychologists). The descriptive analysis included the computation of means, standard deviation, and relative important index (RII) to rank the variables into key organizational strategies, identified by all the participants and also within the individual groups. Table 9.3 presents the results from descriptive statistics on key organizational strategies identified among all the respondents. Table 9.4 presents the results from the descriptive analysis showing differences between groups on key organizational strategies.

**Table 9.3: Results from descriptive statistics on key preventive measures identified among respondents**

S/N	Preventive measures to improve the psychological health of construction employees	MEAN	STD. DEV.	RII (%)	RANK
M3	Enhance good supervisory and working relations	4.16	0.651	83.2%	1 <sup>ST</sup>
M4	Ensure better working conditions	4.06	0.706	81.2%	2 <sup>ND</sup>
M7	Enforce good policies for workers well-being	4.03	0.710	80.7%	3 <sup>RD</sup>
M13	Proper planning of work activities	4.03	0.700	80.5%	4 <sup>TH</sup>
M5	Provide adequate salary and resources for work	4.00	0.735	80.0%	5 <sup>TH</sup>
M15	Regular health screening for early detection of ill-being conditions	4.00	0.722	79.9%	6 <sup>TH</sup>
M16	Creation of psychological health awareness	3.92	0.743	78.4%	7 <sup>TH</sup>
M14	Establish welfare committee at the workplace	3.76	0.755	75.2%	8 <sup>TH</sup>
M12	Workers support from management and co-workers.	3.74	0.727	74.8%	9 <sup>TH</sup>
M2	Acknowledge or reward good work done	3.73	0.749	74.7%	10 <sup>TH</sup>
M8	Workplace wellness programs (Recreational activities)	3.73	0.755	74.6%	11 <sup>TH</sup>
M1	Task redesign (Alternate roles, ergonomic workplace design, additional manpower)	3.70	0.758	74.0%	12 <sup>TH</sup>
M9	Encourage workers to take leave and enforce break hours	3.69	0.731	73.8%	13 <sup>TH</sup>
M6	Provide flexible work schedules for workers	3.68	0.728	73.6%	14 <sup>TH</sup>

M10	Psychological health systems and counselling services (Scheduled 1-1 meetings, Helplines, Mental Health First Aiders)	3.67	0.726	73.3%	15 <sup>TH</sup>
M11	Seek medical interventions for symptoms (Pay medical bills)	3.53	0.719	70.5%	16 <sup>TH</sup>

**Table 9.4: Results from the descriptive analysis showing differences between groups on key organizational strategies**

Overall Rank	Preventive measures to improve the psychological health of construction employees	Construction Professionals		Construction Trade Workers		Labour Personnel	
		Group Mean	Group Ranks	Group Mean	Group Ranks	Group Mean	Group Ranks
1 <sup>st</sup>	Enhance good supervisory and working relations	4.33	3 <sup>rd</sup>	3.89	1 <sup>st</sup>	4.39	2 <sup>nd</sup>
2 <sup>nd</sup>	Ensure better working conditions	4.28	4 <sup>th</sup>	3.78	5 <sup>th</sup>	4.26	4 <sup>th</sup>
3 <sup>rd</sup>	Enforce good policies for workers well-being	4.08	6 <sup>th</sup>	3.79	4 <sup>th</sup>	4.52	1 <sup>st</sup>
4 <sup>th</sup>	Proper planning of work activities	4.38	1 <sup>st</sup>	3.76	6 <sup>th</sup>	4.14	7 <sup>th</sup>
5 <sup>th</sup>	Provide adequate salary and resources for work	4.02	7 <sup>th</sup>	3.83	2 <sup>nd</sup>	4.25	5 <sup>th</sup>
6 <sup>th</sup>	Regular health screening for early detection of ill-being conditions	4.36	2 <sup>nd</sup>	3.63	13 <sup>th</sup>	4.19	6 <sup>th</sup>
7 <sup>th</sup>	Creation of psychological health awareness	3.57	14 <sup>th</sup>	3.81	3 <sup>rd</sup>	4.38	3 <sup>rd</sup>
8 <sup>th</sup>	Establish a welfare committee at the workplace	3.65	12 <sup>th</sup>	3.75	7 <sup>th</sup>	4.00	8 <sup>th</sup>
9 <sup>th</sup>	Workers' support from management and co-workers.	3.75	11 <sup>th</sup>	3.67	12 <sup>th</sup>	3.84	12 <sup>th</sup>
10 <sup>th</sup>	Acknowledge or reward good work done	3.86	10 <sup>th</sup>	3.69	11 <sup>th</sup>	3.67	13 <sup>th</sup>
11 <sup>th</sup>	Workplace wellness programs (Recreational activities)	3.60	13 <sup>th</sup>	3.74	8 <sup>th</sup>	3.91	9 <sup>th</sup>
12 <sup>th</sup>	Task redesign (Alternate roles, ergonomic workplace design, additional manpower)	3.93	9 <sup>th</sup>	3.60	14 <sup>th</sup>	3.61	14 <sup>th</sup>
13 <sup>th</sup>	Encourage workers to take leave and enforce break hours	3.49	16 <sup>th</sup>	3.71	10 <sup>th</sup>	3.90	10 <sup>th</sup>
14 <sup>th</sup>	Provide flexible work schedules for workers	3.51	15 <sup>th</sup>	3.73	9 <sup>th</sup>	3.86	11 <sup>th</sup>
15 <sup>th</sup>	Psychological health systems and counselling services (Scheduled 1-1 meetings, Helplines, Mental Health First Aiders)	4.13	5 <sup>th</sup>	3.43	15 <sup>th</sup>	3.49	15 <sup>th</sup>
16 <sup>th</sup>	Seek medical interventions for symptoms (Pay medical bills)	3.96	8 <sup>th</sup>	3.39	16 <sup>th</sup>	3.22	16 <sup>th</sup>

**Statistically significant differences in the ratings between the three groups of respondents**

The Kruskal-Wallis H inferential test was then undertaken to check if there were any significant differences in the overall ratings between the three different groups. Table 9.5 presents results from Kruskal-Wallis Test on differences between groups, showing Chi-square values and asymptotic significance. The p-value was set at 0.05, test statistics less than 0.05 depict statistically significant differences. For factors that showed significant differences, subsequent Mann-Whitney U tests were carried out to see which particular paired groups disagreed in the overall ratings. Table 9.6 presents the results from Mann-Whitney U on differences between construction professionals and construction trade workers. Table 9.7 presents results from Mann-Whitney U on differences between construction professionals and regulatory personnel. Table 9.8 also presents results from Mann-Whitney U on differences between construction trade workers and regulatory personnel. A comparison of the results from the pair-wise analysis, showing the asymptotic significance values have also been presented in Table 9.9. The results verify the qualitative survey findings.

**Table 9.5: Results from Kruskal-Wallis Test on differences between groups.**

Rank	Preventive measures to improve psychological health of construction employees	MEAN RANK			Chi-Square	df	Asymp. Sig.
		Construction Professionals	Construction Trade Workers	Labour Personnel			
1 <sup>st</sup>	Enhance good supervisory and working relations	150.79	102.96	158.46	36.878	2	0.000 *
2 <sup>nd</sup>	Ensure better working conditions	154.20	103.94	152.76	32.330	2	0.000*
3 <sup>rd</sup>	Enforce good policies for workers well-being	137.60	107.56	189.20	31.079	2	0.000*
4 <sup>th</sup>	Proper planning of work activities	162.44	102.91	144.52	37.398	2	0.000*
5 <sup>th</sup>	Provide adequate salary and resources for work	134.83	116.13	156.28	13.816	2	0.001*
6 <sup>th</sup>	Regular health screening for early detection of ill-being conditions	164.66	97.11	151.26	50.303	2	0.000*

7 <sup>th</sup>	Creation of psychological health awareness	97.39	123.59	166.84	65.872	2	0.000*
8 <sup>th</sup>	Establish welfare committee at the workplace	116.34	132.38	152.13	9.630	2	0.008*
9 <sup>th</sup>	Workers support from management and co-workers.	133.77	129.12	136.46	0.503	2	0.777
10 <sup>th</sup>	Acknowledge or reward good work done	140.50	132.50	122.88	2.352	2	0.309
11 <sup>th</sup>	Workplace wellness programs (Recreational activities)	114.57	134.75	150.42	9.9.36	2	0.007*
12 <sup>th</sup>	Task redesign (Alternate roles, ergonomic workplace design, additional manpower)	147.72	126.37	124.15	5.728	2	0.057
13 <sup>th</sup>	Encourage workers to take leave and enforce break hours	110.91	138.23	149.17	12.548	2	0.002*
14 <sup>th</sup>	Provide flexible work schedules for workers	112.34	139.02	146.17	10.508	2	0.005*
15 <sup>th</sup>	Psychological health systems and counselling services	175.97	110.14	116.50	47.377	2	0.000*
16 <sup>th</sup>	Seek medical interventions for symptoms (Pay medical bills)	171.28	123.25	100.86	46.095	2	0.000*

Note: \* Statistically significant difference at  $P < 0.05$

**Table 9.6: Results from Mann-Whitney U on differences between construction professionals and construction trade workers.**

Rank	Preventive measures to improve psychological health of construction employees	MEAN RANK		Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
		Construction Professionals	Construction Trade Workers			
1 <sup>st</sup>	Enhance good supervisory and working relations	118.40	82.88	2954.500	-5.051	0.000*
2 <sup>nd</sup>	Ensure better working conditions	119.50	82.07	2863.500	-5.060	0.000*
3 <sup>rd</sup>	Enforce good policies for workers well-being	110.57	88.69	3605.000	-3.014	0.003*
4 <sup>th</sup>	Proper planning of work activities	123.72	78.94	2513.500	-6.095	0.000*
5 <sup>th</sup>	Provide adequate salary and resources for work	105.86	92.18	3996.000	-1.856	0.063
6 <sup>th</sup>	Regular health screening for early detection of ill-being conditions	127.09	76.44	2233.500	-6.797	0.000*
7 <sup>th</sup>	Creation of psychological health awareness	83.49	108.75	3443.500	-3.413	0.001*
8 <sup>th</sup>	Establish welfare committee at the	90.39	103.64	4016.500	-1.777	0.076

	workplace					
9 <sup>th</sup>	Workers support from management and co-workers.	100.07	96.47	4476.500	-0.492	0.623
10 <sup>th</sup>	Acknowledge or reward good work done	102.00	95.04	4316.000	-0.926	0.354
11 <sup>th</sup>	Workplace wellness programs (Recreational activities)	88.51	105.04	3860.000	-2.216	0.027*
12 <sup>th</sup>	Task redesign (Alternate roles, ergonomic workplace design, additional manpower)	107.42	91.02	3866.500	-2.169	0.030*
13 <sup>th</sup>	Encourage workers to take leave and enforce break hours	85.35	107.38	3598.000	-2.986	0.003*
14 <sup>th</sup>	Provide flexible work schedules for workers	85.78	107.05	3634.000	-2.880	0.004*
15 <sup>th</sup>	Psychological health systems and counselling services	125.84	77.37	2337.000	-6.425	0.000*
16 <sup>th</sup>	Seek medical interventions for symptoms (Pay medical bills)	119.40	82.14	2872.000	-5.027	0.000*

Note: \* Statistically significant difference at  $P < 0.0$

**Table 9.7: Results from Mann-Whitney U on differences between construction professionals and regulatory personnel.**

Rank	Preventive measures to improve psychological health of construction employees	MEAN RANK		Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
		Construction Professionals	Labour Personnel			
1 <sup>st</sup>	Enhance good supervisory and working relations	74.39	79.04	2688.000	-0.715	0.475
2 <sup>nd</sup>	Ensure better working conditions	76.70	76.26	2847.000	-0.066	0.947
3 <sup>rd</sup>	Enforce good policies for workers well-being	69.04	101.28	1153.500	-6.750	0.000*
4 <sup>th</sup>	Proper planning of work activities	80.72	71.42	2513.000	-1.405	0.160
5 <sup>th</sup>	Provide adequate salary and resources for work	70.97	83.15	2404.500	-1.810	0.070
6 <sup>th</sup>	Regular health screening for early detection of ill-being conditions	79.57	72.81	2609.000	-1.022	0.307
7 <sup>th</sup>	Creation of psychological health awareness	55.90	85.48	2244.000	-2.465	0.014*
8 <sup>th</sup>	Establish welfare committee at the workplace	67.95	86.78	2154.000	-2.841	0.004*
9 <sup>th</sup>	Workers support from management and co-workers.	75.70	77.46	2797.000	-0.265	0.791

10 <sup>th</sup>	Acknowledge or reward good work done	80.50	71.69	2531.500	-1.350	0.177
11 <sup>th</sup>	Workplace wellness programs (Recreational activities)	68.06	86.65	2163.000	-2.852	0.004*
12 <sup>th</sup>	Task redesign (Alternate roles, ergonomic workplace design, additional manpower)	82.30	69.52	2382.000	-1.942	0.052
13 <sup>th</sup>	Encourage workers to take leave and enforce break hours	67.56	87.25	2121.500	-3.053	0.002*
14 <sup>th</sup>	Provide flexible work schedules for workers	68.55	86.06	2204.000	-2.722	0.006*
15 <sup>th</sup>	Psychological health systems and counselling services	92.13	57.70	1566.500	-5.141	0.000*
16 <sup>th</sup>	Seek medical interventions for symptoms (Pay medical bills)	93.89	55.59	1420.500	-6.018	0.000*

Note: \* Statistically significant difference at  $P < 0.05$

**Table 9.8: Results from Mann-Whitney U on differences between construction trade workers and labour personnel.**

Rank	Preventive measures to improve psychological health of construction employees	MEAN RANK		Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
		Construction Trade workers	Labour Personnel			
1 <sup>st</sup>	Enhance good supervisory and working relations	76.58	114.41	2248.500	-5.418	0.000*
2 <sup>nd</sup>	Ensure better working conditions	78.37	111.50	2449.500	-4.550	0.000*
3 <sup>rd</sup>	Enforce good policies for workers well-being	75.38	122.91	2114.000	-5.616	0.000*
4 <sup>th</sup>	Proper planning of work activities	80.46	108.10	2684.000	-3.832	0.000*
5 <sup>th</sup>	Provide adequate salary and resources for work	80.45	108.12	2682.500	-3.735	0.000*
6 <sup>th</sup>	Regular health screening for early detection of ill-being conditions	77.17	113.45	2315.000	-4.957	0.000*
7 <sup>th</sup>	Creation of psychological health awareness	71.34	116.36	1662.000	-7.200	0.000*
8 <sup>th</sup>	Establish welfare committee at the workplace	85.24	100.35	3219.000	-2.027	0.043*
9 <sup>th</sup>	Workers support from management and co-workers.	89.15	94.00	3657.000	-0.655	0.512
10 <sup>th</sup>	Acknowledge or reward good work done	93.96	86.19	3532.000	-1.067	0.286
11 <sup>th</sup>	Workplace wellness programs (Recreational activities)	86.21	98.77	3328.000	-1.736	0.082

12 <sup>th</sup>	Task redesign (Alternate roles, ergonomic workplace design, additional manpower)	91.84	89.63	3769.500	-0.308	0.758
13 <sup>th</sup>	Encourage workers to take leave and enforce break hours	87.36	96.91	3456.000	-1.297	0.195
14 <sup>th</sup>	Provide flexible work schedules for workers	88.47	95.11	3580.500	-0.904	0.366
15 <sup>th</sup>	Psychological health systems and counselling services	89.28	93.80	3671.000	-0.656	0.512
16 <sup>th</sup>	Seek medical interventions for symptoms (Pay medical bills)	97.61	80.28	3124.000	-2.769	0.006*

Note: \* Statistically significant difference at  $P < 0.05$

**Table 9.9: Summary of the three pair of results from Mann-Whitney U Test compared**

Rank	Preventive measures to improve the psychological health of construction employees	Mann-Whitney U Test (P-value of each pair)		
		Construction Professionals & Construction Trade Workers	Construction Professionals & Labour Personnel	Construction Trade Workers & Labour Personnel
1 <sup>st</sup>	Enhance good supervisory and working relations	0.000*	0.475	0.000*
2 <sup>nd</sup>	Ensure better working conditions	0.000*	0.947	0.000*
3 <sup>rd</sup>	Enforce good policies for workers well-being	0.003*	0.000*	0.000*
4 <sup>th</sup>	Proper planning of work activities	0.000*	0.160	0.000*
5 <sup>th</sup>	Provide adequate salary and resources for work	0.063	0.070	0.000*
6 <sup>th</sup>	Regular health screening for early detection of ill-being conditions	0.000*	0.307	0.000*
7 <sup>th</sup>	Creation of psychological health awareness	0.001*	0.014*	0.000*
8 <sup>th</sup>	Establish a welfare committee at the workplace	0.076	0.004*	0.043*
9 <sup>th</sup>	Workers' support from management and co-workers.	0.623	0.791	0.512
10 <sup>th</sup>	Acknowledge or reward good work done	0.354	0.177	0.286
11 <sup>th</sup>	Workplace wellness programs (Recreational activities)	0.027*	0.004*	0.082
12 <sup>th</sup>	Task redesign (Alternate roles, ergonomic workplace design, additional manpower)	0.030*	0.052	0.758
13 <sup>th</sup>	Encourage workers to take leave and enforce break hours	0.003*	0.002*	0.195
14 <sup>th</sup>	Provide flexible work schedules for workers	0.004*	0.006*	0.366

15 <sup>th</sup>	Psychological health systems and counselling services (Scheduled 1-1 meetings, Helplines, Mental Health First Aiders)	0.000*	0.000*	0.512
16 <sup>th</sup>	Seek medical interventions for symptoms (Pay medical bills)	0.000*	0.000*	0.006*

Note: \* Statistically significant difference at  $P < 0.05$

Thematic analysis was employed and the 16 findings were grouped into three main constructs, namely protective measures, moderative measures and interventive measures. Cronbach's Alpha coefficient ( $\alpha$ ) was calculated to determine the internal consistency reliability of the three constructs, as shown in Table 9.10. These coefficients were 0.850 for protective measures, 0.700 for moderative measures and 0.646 for interventive measures. The Cronbach's alpha values for each construct was greater than 0.50, and this indicates that each of the three constructs has satisfactory internal consistency and reliability.

**Table 9.10: Reliability analysis on extracted constructs**

S/N	Preventive measures to improve the psychological health of construction employees	Cronbach's Alpha	Grand Mean	Cochran's Q	Sig.
<b>Construct 1- Protective measures:</b> <i>To reduce or eliminate causes of psychological distress</i>		<b>0.850</b>	4.03	29.522	0.000*
1 <sup>st</sup>	Enhance good supervisory and working relations				
2 <sup>nd</sup>	Ensure better working conditions				
3 <sup>rd</sup>	Enforce good policies for workers well-being				
4 <sup>th</sup>	Proper planning of work activities				
5 <sup>th</sup>	Provide adequate salary and resources for work				
6 <sup>th</sup>	Regular health screening for early detection of ill-being conditions				
7 <sup>th</sup>	Creation of psychological health awareness				
<b>Construct 2- Moderative measures:</b> <i>To moderate the impact of psychological distress</i>		<b>0.700</b>	3.73	57.966	0.000*



8 <sup>th</sup>	Establish a welfare committee at the workplace				
9 <sup>th</sup>	Workers' support from management and co-workers.				
10 <sup>th</sup>	Acknowledge or reward good work done				
11 <sup>th</sup>	Workplace wellness programs (Recreational activities)				
12 <sup>th</sup>	Task redesign (Alternate roles, ergonomic workplace design, additional manpower)				
<b>Construct 3- Interventive measures: <i>To treat effects of psychological distress</i></b>		<b>0.646</b>	3.64	12.804	0.005*
13 <sup>th</sup>	Encourage workers to take leave and enforce break hours				
14 <sup>th</sup>	Provide flexible work schedules for workers				
15 <sup>th</sup>	Psychological health systems and counselling services (Scheduled 1-1 meetings, Helplines, Mental Health First Aiders)				
16 <sup>th</sup>	Seek medical interventions for symptoms (Pay medical bills)				

Note: \* Statistically significant difference at  $P < 0.05$

### 9.1.3 Discussion of results on organisational preventive measures

#### Findings from confirmatory quantitative data analyses

The descriptive statistics for the data collected from all the respondents and for each group of respondents, namely construction professionals, construction trade workers, and labour personnel, were analyzed. The results from the one sample T-test revealed that all the 16 measures identified by the qualitative study were significant with the average mean value of 3. This indicates that all the organizational preventive measures proposed are definitely effective in mitigating the causes of psychological distress, thereby improving the psychological health of construction employees. The results also present the ranking of the level of effectiveness of the proposed organizational preventive measures as revealed by all the

respondents, and for each group, which was based on the mean values and relative importance index (RII) percentage values. The overall results among all the respondents revealed that the most effective organizational preventive measures are (1) enhance good supervisory and working relations (2) ensure better working conditions (3) enforce good policies for workers well-being (4) proper planning of work activities (5) provide adequate salary and resources for work and (6) regular health screening for early detection of ill-being conditions.

It was revealed, however, that the three different groups rated the proposed organizational preventive strategies differently, resulting in a varied ordering in ranks between the three groups. The top 5 organizational preventive measures ranked by the construction professionals were *(1) Proper planning of work activities (2) Regular health screening for early detection of ill-being conditions (3) Enhance good supervisory, and working relations (4) Ensure better working conditions and (5) Psychological health systems and counselling services*. The top 5 organizational preventive measures ranked by the construction trade workers were *(1) Enhance good supervisory and working relations (2) Provide adequate salary and resources for work (3) Creation of psychological health awareness (4) Enforce good policies for workers well-being and (5) Ensure better working conditions*. The top 5 organizational preventive measures ranked by the labour personnel were *(1) Enforce good policies for workers well-being (2) Enhance good supervisory and working relations (3) Creation of psychological health awareness (4) Ensure better working conditions and (5) Provide adequate salary and resources for work*.

A Kruskal-Wallis H test was conducted to verify if the differences between the groups were statistically significant, setting the p-value at 0.05. Table 9.5 illustrates the test results, which suggest that there are some statistically significant differences in the rating by the three groups of respondents for almost all the proposed organizational preventive measures. Only 3 out of the 16 proposed measures showed statistically insignificant differences in the rating by

the groups, and these include workers' support from management and co-workers, acknowledge or reward good work done, and task redesign. This result depicts some level of agreement among the groups of respondents in the ratings of these three measures as effective organizational preventive measures against employees' psychological distress.

The analysis was extended to include a Mann-Whitney U test to identify the group that differed significantly from the other groups, in order to enable further interpretation of the outcomes. Table 9.9 summarises the results of the Mann-Whitney test from the three pairs of results obtained by combining two groups of the respondents, such as construction professionals versus construction trade workers, construction professionals versus labour personnel, and construction trade workers versus labour personnel. The results depict that the construction trade workers differed more significantly from the construction professionals and labour personnel in their rating of the effectiveness of the proposed measures. This result could be due to the fact that the construction trade workers are the direct subjects of any organizational psychological risk factors, and therefore have a better idea of the degree of the effectiveness of the proposed measures on their psychological health than do the other two groups. Nonetheless, this could also be attributed to opinion bias.

The three groups of respondents rated the effectiveness of all the proposed organizational preventive measures as highly effective or very highly effective. Therefore, the difference between the three groups can be considered minor. Hence, it can be concluded that the results from the quantitative study show a very strong indication of the effectiveness of the proposed organizational preventive measures in mitigating the causes of psychological distress in the construction industry. The results from the quantitative study, therefore, verify and confirm the findings from the qualitative interviews.

The findings were grouped into three main constructs using thematic analysis. The Cronbach Alpha test revealed that the inter-item consistency and reliability of each of the three

constructs extracted are acceptable. The individual measures under each of the constructs as been discussed in the subsequent sections.

**Construct 1- Protective measures:**

**To reduce or eliminate causes of psychological distress**

The protective measures are primary preventive measures that aim to eliminate, reduce, or modify the demands, or stressors, to which employees are subjected to in the workplace. This study recommends the seven protective measures identified in this study to mitigate the construction work-related psychological risk factors, such as high task demands, high role demands, poor interpersonal work relationships, poor work conditions, lack of autonomy, lack of feedback, and unfair rewards and treatment. Detailed descriptions of the seven protective measures identified in this study have been provided.

***Enhance good supervisory and working relations***

A friendly work environment often makes a positive and safe workplace for both employees and managers. It is, therefore, in the best interest of managers to ensure good supervisory and working relations with the workers, as this helps to keep the levels of psychological distress in the workplace to a minimum. Respondents ranked this measure of enhancing good supervisory and working relations as the 1<sup>st</sup> most effective organizational preventive measure to psychological distress. As to the respondents, this is a very vital issue that can affect employees' attitudes to work and their job satisfaction. It is expected of managers or supervisors to act as positive role models, especially in times of high levels of pressure and tension at the workplace. This supports the assertion that for organizations to decrease work-related causes of psychological distress, it is essential that management of the organization show high level of commitment and support to workplace health preventive measures. The onus of workplace health promotion measures, therefore, lies to some extent on

the attitude and concern of managers or supervisors for the employee experiencing the ill-being condition.

***Ensure better working conditions***

The results indicate the importance of this measure of ensuring and maintaining suitable working conditions for employees, and this should be mandatory for all construction companies. Better working conditions encompass several measures intended to make workers feel more comfortable and safer while executing their works such as strict on-site hygiene, suitable accommodation, and provision of healthful meals. There have been frequent reports on the lack of hygiene on most construction worksites. For example, in observation of some construction companies, it was noted that bathrooms for managers and engineers are cleaned and maintained more regularly than bathrooms for the trade workers. Also, some companies do not maintain water purifier machines. As a result, the water is usually contaminated with dust or iron rust, which poses a danger to workers' health. By implementing strict on-site hygiene rules for projects, such as site water quality and bathroom hygiene, construction companies would contribute to improving the overall health of their workers. They would also reduce workers' feelings of discrimination and neglect, thereby improving their psychological health.

There should also be the provision of suitable accommodation for workers incorporated with clean kitchens and bathrooms. Also, labour camps must be air-conditioned, especially considering the temperature can reach 50 degrees in summer. Accommodation must not be overcrowded and should follow international standards regarding design and furniture to ensure comfort and an acceptable level of privacy for workers. Improving workers' accommodation would help them get adequate rest, recover from tiredness, and positively affect their morale and psychological health. Construction companies should also regularly provide their workers with planned meals, especially given their high-calorie intake requirements. The provision of

planned meals would not only help improve workers' general health and wellbeing, but it would also show that companies care about their workers, which would in turn help improve their psychological health. Workers' morale can also be boosted by these little comforts, enhancing both their physical wellbeing and psychological state of mind, which subsequently resulted in improved productivity and performance at work.

***Enforce good policies for workers well-being***

Good policies that focused on the positive welfare of construction employees should be enforced and disseminate through official company communications, newsletters of trade associations, and internal publications for its awareness. Dissemination of information on occupational factors in mental, psychological, and physical health, as well as other psychosocially relevant factors, provide the basis for the formulation of good policies that would redound to the benefit of workers. Psychosocial safety climate (PSC) is an example of the policies, practices, trends, and procedures of an organization that are designed to protect the workers' psychological health and safety. Psychosocial safety climate is perceived to be a lead indicator of commonly identified psychosocial hazards at work.

Occupational psychological health services and the program should be integrated into the organizational policy for the overall work activities, be it on-site or outside the organization, and linked with the medical, safety, personnel, risk, and line management practices. Previous researchers have also proposed key organizational characteristics of the said psychological health services to cover: (a) joint management-worker input to program planning and administration; (b) ongoing services; (c) a formalized policy for referrals; (d) mechanisms for maintaining the confidentiality of personal information; (e) guarantee of professional independence of providers; (f) specialized training to assure professional competence of staff; (g) access to these services through health benefits packages; and (h) access to the program by employees at all organizational levels. These programs should take local factors into

consideration. Good policies should, therefore, focus on psychosocial factors and psychological health to improve organizational psychology and work stress in Ghana and to some extent globally.

***Proper planning of work activities***

Proper planning of work activities was deemed as an important measure to help moderate the level of psychological distress at the construction workplace. Respondents, therefore, ranked this measure as the fourth effective organizational preventive measure. Proper planning of work activities ensures clearer responsibilities. Employees regard their job as a prominent source of psychological distress due to factors such as poor planning of work activities and lack of cooperation among different departments on the execution of works. This measure is also supported by the statement of the World Health Organisation that work-related psychological distress can be caused by poor planning of works in an organization. Better managed work activities ensure more cooperative employees leading to positive outcomes for the organization. This implies that when work activities are planned the right way, with clearer role responsibilities, it leads to high job performance and an increase in the levels of productivity. Thus, with better planning of work activities in the construction industry, the levels of psychological distress will be reduced, which can lead to a positive attitude towards work and increase job satisfaction among the construction employees.

***Provide adequate salary and resources for work***

There is usually a significant gap between the cost of a basic acceptable standard of living and the average construction worker's salary in Ghana. Companies in Ghana should, therefore, raise the monthly salary to a reasonable level. Employees' salaries should range between the cost of a basic acceptable standard of living and the minimum statutory wage of government sector employees. A reasonable salary would allow workers to live a decent life

by satisfying their basic needs while supporting their families back home. They would no longer need to sacrifice their quality of life for their families. The study findings reveal that increasing salaries is an essential concern, especially for all the construction trade workers. Addressing this issue would significantly ease workers' financial pressures and frustrations, and ultimately improve their psychological health. Although, this measure of providing adequate salary and resources was rated as the fifth effective organizational preventive measure that will promote positive employee attitude and enhance job satisfaction.

Most employees evaluate the nature of their work as the most important job facet affecting their job satisfaction among various aspects of their job, such as pay, promotion opportunities, supervision and co-workers. This indicates employees are more desirous of other attributes of the job and not just on the salary for their psychological well-being. Psychological distress occurs where demands made on individuals do not match the resources available or meet the individual's needs and motivation. There should, therefore, be the provision of adequate resources needed to execute works smoothly.

#### ***Regular health screening for early detection of ill-being conditions***

Every workplace has a degree of stress attached to it, and invariably psychological distress usually results if the workload is too large for the number of workers and time available. Various forms of psychological distress such as anxiety, tension, and depression occur when the demands by the environment forces or internal forces cannot be met by the resources available to the person. There is, therefore, the need for well documented company-specific management strategies or programmes for regular health screening for early detection of psychological ill-being conditions. Some level of work-related sources of psychological distress may be inevitable. Therefore, preventive measures in the workplace, such as regular screening for early detection is important to identify employees with ill-being symptoms and help them adopt effective coping mechanism especially for causes that cannot be avoided.



Electronic monitoring devices and wearables that have been designed for the detection of indicators of psychological distress can be used at the workplace. This must be done to help employees have a positive attitude towards their work and increasing the extent of job satisfaction.

### ***Creation of psychological health awareness***

In today's rapidly changing environment, it is more important than ever that the construction workers are educated and trained on occupational psychological health issues. Psychological health awareness program should be provided in the mother-tongue of each individual and should include all necessary information, such as social, financial, legal and health rights and safety. Elementary language and simple graphics can be used to convey meaning to the reader. The awareness program should also include information detailing complaint procedures through civil authorities. Moreover, there should be a procedure to ensure that all workers fully understand the information contained in the program and are refreshed regularly. The psychological health awareness programs should be provided by the companies and regulated and supervised by the relevant authorities. It is suggested that a special body or council, consisting of a group of experts from the public and private sector, is created under government supervision, to be responsible for preparing the contents of these awareness programs and their regular implementation.

### **Construct 2 - Moderative measures:**

#### **To moderate the impact of psychological distress**

The moderative measures are secondary preventive measures that intend to moderate the impact of psychological distress on the construction employees. This study recommends the five moderative measures identified in this study to change how organizations and individuals respond to the necessary and inevitable demands of work and organizational life.

These measures can help promote a psychologically safe and healthy construction industry. Detailed descriptions of the five moderative measures identified in this study have been provided.

***Establish a welfare committee at the workplace***

The proposed measure to establish a dedicated welfare committee in the construction industry is essential and deemed important to champion workers' rights in all aspects. The occupational health and safety of construction employees are currently coordinated by a single governmental body that has very limited efficiency. The creation of one welfare committee body devoted exclusively to the supervision and monitoring of construction workers' psychological health and well-being will have positive effects to improve further the psychological health conditions of the employees. The welfare committee can comprise of colleague workers; however, the committee should not disregard the value of having some labour personnel or occupational health psychologist to form part of the committee. Suitable laws and regulations can be formulated by the welfare committee to address construction workers' concerns specifically. This is an important step to integrating all efforts to ease the pressures accumulating on workers, and thus improve their psychological health.

***Workers' support from management and co-workers***

Employee support is a precursor to conducive work environments, psychological health problems, and employee engagement. Workers support from management and co-workers can temper with the link between emotional stress and emotional exhaustion, and predict a change in employee engagement, through the relationship with others. Appropriate coping skills, such as using instrumental support or positive reframing, may have the potential to buffer the adverse health effects on fatigue and concentration/activity levels that result from long working hours. Other researchers also did a meta-analysis of social support in the process of work stress

and found that “social support had a threefold effect on work stressor-strain relations. Social support reduced the strains experienced by the worker, social support reduced perceived stressors, and social support moderated the stressor-strain relationship.

Higher levels of social support from co-workers and supervisors were associated with greater job satisfaction for female construction workers, possibly because supervisors are key for facilitating job training, assignment of desirable tasks, and protection from harassment. The more socially supportive a supervisor was, the less their employees reported incidents of shouting, criticism, and verbal threats. The study also found that victims who felt socially supported by their colleagues were less likely to feel isolated and ridiculed for their private life.

#### ***Acknowledge or reward good work done***

Good treatment can cover various extrinsic and intrinsic rewards afforded by the construction company, through the manager or the supervisors, to the construction workers. Extrinsic rewards as incentives given by the company, such as pay raises and promotions, as well as altruistic interactions between individuals, such as good feedback and friendship. Intrinsic rewards, on the other hand, are those that the individuals experience during the performance or completion, or both, of a task such as feelings of achievement, accomplishment, and growth.

#### ***Workplace wellness programs (Recreational activities)***

The difficulties construction workers face ranges from the exhaustive nature of construction work to challenges inside and outside the workplace. The results indicated the importance of workplace wellness programs and recreational activities for construction employees. The most commonly available form of entertainment is usually watching television. Other public entertainments are usually not free, and generally, workers might not be able to afford activities such as holidays or memberships for sports clubs. Therefore, the

study findings recommend the provision of a variety of recreational facilities and activities in the construction industry to cater to the differing needs of construction workers. For example, companies could offer an entertainment room filled with sports equipment or a playground within their accommodation facilities. Such provisions would improve workers' mental health and also raise their productivity at work, as indicated by the study participants.

Leisure-time physical activity can also be a compensate for negative work experiences or to add positive experiences not available through work. Leisure can also be described as compensatory when people use it to supplement dissatisfying work experiences. Leisure can provide not only positive experiences not adequately encountered in their jobs (supplemental compensation) but also opportunities to recover from negative experiences in their jobs (reactive compensation).

***Task redesign (Alternate roles, ergonomic workplace redesign, additional manpower)***

This study revealed task redesign efforts such as alternative roles, ergonomic workplace redesign, and additional manpower as significant preventive management strategies to mitigate the causes of psychological distress. Task redesign is essential to reduce the psychological health risks associated with high strain jobs employing efforts that are targeted at increased employee control and reduction of psychological demands. High strain jobs are jobs characterized by heavy work demands and responsibilities without commensurate autonomy and control. Previous research has shown that high strain jobs are sources of psychological distress and risky jobs for employees and increase the risk of cardiovascular diseases for their employees. Other studies have also revealed that high strain jobs are accompanied by indicators of psychological ill-being conditions such as exhaustion, job dissatisfaction, life dissatisfaction depression, increased illness days, elevated consumption of sleeping pills and tranquillizers.

Task redesign is consistent with tertiary preventive management strategies with explicit

efforts and implicit efforts on improving employees' health as well as job performance and productivity. The most common job redesign strategy usually adopted for high strain jobs is increasing job control for employees. Employees may be allowed to control some aspects of the workplace or their work, such as task content, task assignments, work pace, goal selection, and methods of payment. The caveat associated with increasing employee control is that employees' efforts and participation in the organization are not independent but interdependent. Task redesign can, therefore, be used as a strategy to retain skilful employees who would have left the job due to work-related stressors.

**Construct 3- Interventive measures:  
To treat the effects of psychological distress**

The interventive measures are tertiary preventive measures that are intended to treat the behavioural, psychological, or medical effects of psychological distress that individuals, groups, and organizations may encounter. This study, therefore, recommends four interventive measures to improve the psychological health of construction employees in Ghana and to some extent globally. Detailed descriptions of the four interventive measures identified in this study have also been provided.

***Encourage workers to take leave and enforce break hours***

Work breaks and holidays are valuable to the psychological health of construction workers, especially for workers who are coping with depression and homesickness, on top of family problems and financial concerns. According to psychological experts, workers as human beings need regular breaks. Some experts believed that the government should strictly prohibit contractors from working on weekends. Moreover, construction companies should provide adequate vacations (at least one vacation per year) so that workers can visit their home countries. Regular vacations would help to avoid the potentially severe adverse effects on

workers' psychological and physical conditions.

***Provide flexible work schedules for workers***

The provision of flexible work schedules for employees constitutes broad categories of organizational preventive measures that are aimed at helping employees to cope well with the total sets of demands in their personal and professional lives. An example of an organization that incorporates flexible work schedules for employees is the United Services Automobile Association (USAA) in San Antonio, Texas. The company provided for at least a decade now, work schedules which encompass telecommuting for a 4-day, 10-hour a day workweek for employees who needed a 3-day weekend to achieve some work-home balance that is usually not available with traditional work schedules. Work schedule has been regarded as an essential dimension of job redesign for preventive stress-related management strategies.

Since the Hawthorne studies in the 1920s and 1930s, flexible work schedules were utilized as a part of organizational life to promote the psychological well-being of employees. Flexible work schedules, however, should not be undertaken independently, without considering other aspects of the work demands. Provision for flexible work schedules, therefore, might not be suitable for all employees given the time demands of most projects. However, this measure can be adopted when necessary, with the intention to minimize the symptoms of psychological distress individuals experience at work.

***Psychological health systems and counselling services***

Provision of psychological health systems and counselling services, such as scheduled 1-1 meetings, helplines, mental health first aiders, for construction employees was revealed to be a significant preventive measure to improve employees' psychological well-being. One area that warrants further consideration is the availability of psychological health support systems and counselling services for construction workers. There is a need for companies to provide

adequate psychological health support services for their employees. The service could be implemented by having a department or sector for social care within the company, or by using the services of social specialists from outside the company. Studies have proven that providing social services such as counselling services has a positive impact on the feelings and productivity of workers. The social expert and psychologist stressed that workers need regular social and psychological health support. Providing extra care would help ease workers' problems, as depressive symptoms could be discovered and dealt with during the early stages. Some of the big companies do provide social services for their employees; however, the need becomes bigger and challenging for smaller companies.

While construction companies might be hostile to paying for these services, it was suggested that the cost could be covered by premium savings, if insurance companies were to consider these services when determining a company's premium for workers' compensation. Insurance companies pay large amounts of money in compensation each year due to injuries and accidents. Therefore, a proactive service aimed at improving workers' psychological health might be beneficial in reducing the insurance company's compensation expenses.

***Seek medical interventions for symptoms (Pay medical bills)***

Seeking medical care is another form of tertiary preventive strategy for psychologically distress induced conditions such as discomfort, distress, suffering, and disability. When organizational measures and individual coping mechanisms have been pushed to the limit, employees may present themselves to clinical experts for the treatment of psychological distress-related conditions. Until recently, clinical experts usually recommended a drug prescription and, at times, with some ad hoc advice as to their responsibility for the treatment of psychological ill-being conditions. Through advances in occupational health and behavioural medicine, clinical experts now recommend relaxation breaks, exercise, and other forms of primary and secondary preventive measures for employees experiencing some form

of work-related psychological ill-condition. The growing public awareness of preventive medicine and health promotional measures has led people to seek help earlier, thereby making the work of clinical experts much easier.

Nonetheless, much of the care provided by clinical experts or physicians for the treatment of major manifestations of psychological ill-being conditions still include medications, physical therapy, and surgery. These measures can have adverse consequences for the patient and delay one's return to work, and this measure was rank the 16<sup>th</sup> preventive measure by the respondents. The results indicate that primary and secondary preventive measures are preferred to be used more frequently and more effectively than tertiary preventive measures.

#### **9.1.4 Summary of findings: Organizational preventive measures to mitigate the causes of psychological distress in the construction industry**

The psychological health of construction employees has become a prominent issue globally. This study sought to identify organizational preventive measures that can be adopted to mitigate the causes of psychological distress in the construction industry. Based on the exploratory and descriptive nature of the study, a mixed-methods approach employing in sequence the methods of qualitative and quantitative research were adopted. Fifty-three (53) interviews and 264 questionnaire surveys were conducted in Ghana with construction professionals, construction trade workers, regulatory personnel, and occupational health psychologist. Using thematic analysis, 16 preventive psychological health measures were revealed from the qualitative study, which was confirmed by the quantitative survey to be statistically significant. The key preventive measures revealed in the quantitative study included good supervisory and working relations, better working conditions, enforcement of policies for workers well-being, proper planning of work activities, provision of adequate



salary and resources for work, and regular health screening for early detection of psychological ill-being conditions. Exploratory factor analysis was employed to group the 16 findings under three main constructs, namely protective measures, moderative measures, and interventive measures. This study offers valuable insights for construction stakeholders and policymakers on preventive measures to promote a psychologically safe and healthy construction industry.

## 9.2 Factors associated with effective implementation of psychological health interventions in the construction industry<sup>12</sup>

This study sought to identify factors associated with effective implementation of psychological health interventions in the construction industry. Sequential mixed methods were adopted by first employing the qualitative method of interview, which was then followed by the questionnaire survey.

### 9.2.1 Results of the Interview on the influential implementation factors

Table 9.11 presents the factors associated with effective implementation of psychological health interventions, identified from the qualitative data analysis of the interviews conducted with the 53 research participants in Ghana. A total of eighteen (18) influential factors of effective implementation of psychological health interventions were revealed by research participants of the qualitative study. The number of interviewees that cited or mentioned a particular factor were counted and have been provided also in Table 9.11.

**Table 9.11: Findings from the qualitative interview on the influential implementation factors**

S/N	Influential factors of effective implementation of psychological health interventions	No. of interviewees who cited this
M1	Magnitude of current workload and time pressure	41
M2	Extent of management commitment and support	38
M3	Willingness of employees to cooperate with the intervention	36
M4	Availability of resources required for implementation	34
M5	Level of awareness on indicators of psychological health conditions	32
M6	Perceptions on the benefits of the psychological health interventions	29
M7	Impact of stigmatization and discrimination	26
M8	Support from colleagues on employee's psychological health	23

<sup>12</sup> Some contents of section 9.2 of this Chapter have been published in: Fordjour, G. A., Chan, A. P. C. and Tuffour-Kwarteng, L. (2020). "Factors Associated with Effective Implementation of Psychological Health Interventions in the Construction Industry". *Journal of Civil Engineering Research & Technology*, 2(1), 1-17.

M9	Flexibility of organizational structure and culture	21
M10	Cost of implementing the intervention	19
M11	Compatibility with organizational policy	16
M12	Time required for the implementation	14
M13	Confidentiality and trust of the implementation process	11
M14	Tailoring of intervention to address specific needs	9
M15	Continual monitoring and evaluation of workers well-being	7
M16	Policies and planning process to implement the system	6
M17	Education and training of key competent persons to handle PH issues at the workplace	4
M18	Identification and assessment of potential risks	3

### **9.2.2 Results of the confirmatory quantitative study on influential implementation factors**

The findings from the qualitative study formed the basis for the quantitative study. The quantitative study was conducted mainly to confirm the findings of the qualitative study and for descriptive assessment of the level of significance of the factors identified.

#### **Ranking of the key influential factors for effective psychological health intervention**

First, descriptive statistics were computed for the data collected from the three groups of respondents, namely: construction professionals, construction trade workers, and labour personnel (this comprise of regulatory personnel and occupational health psychologists). The descriptive analysis included the computation of means, standard deviation, and relative important index (RII) to rank the variables into key organizational strategies, identified by all the participants and also within the individual groups. Table 9.12 presents the results from descriptive statistics on key influential factors for effective implementation identified among all the respondents. Table 9.13 presents the results from the descriptive analysis showing differences between groups on key influential factors.

**Table 9.12: Results from descriptive statistics on key influential factors identified among respondents**

S/N	Influential factors of effective implementation of psychological health interventions	MEAN	STD. DEV.	RII (%)	RANK
M3	Willingness of employees to cooperate with the intervention	4.22	0.681	84.46%	1 <sup>st</sup>
M6	Perceptions of the benefits of psychological health interventions	4.17	0.705	83.33%	2 <sup>nd</sup>
M7	Impact of stigmatization and discrimination	4.15	0.65	82.95%	3 <sup>rd</sup>
M5	Level of awareness on indicators of psychological health conditions	4.11	0.731	82.27%	4 <sup>th</sup>
M10	Cost of implementing the intervention	4.02	0.7	80.38%	5 <sup>th</sup>
M2	Extent of management commitment and support	4.01	0.768	80.23%	6 <sup>th</sup>
M4	Availability of resources required for implementation	3.99	0.775	79.85%	7 <sup>th</sup>
M12	Time required for the implementation	3.98	0.711	79.62%	8 <sup>th</sup>
M18	Identification and assessment of potential risks	3.93	0.759	78.56%	9 <sup>th</sup>
M9	Flexibility of organizational structure and culture	3.92	0.8	78.33%	10 <sup>th</sup>
M1	Magnitude of the current workload and time pressure	3.88	0.774	77.65%	11 <sup>th</sup>
M11	Compatibility with organizational policy	3.81	0.767	76.21%	12 <sup>th</sup>
M16	Policies and planning process to implement the system	3.77	0.761	75.45%	13 <sup>th</sup>
M13	Confidentiality and trust of the implementation process	3.75	0.744	75.01%	14 <sup>th</sup>
M15	Continual monitoring and evaluation of workers well-being	3.73	0.754	74.69%	15 <sup>th</sup>
M8	Support from colleagues on employee's psychological health	3.69	0.741	73.78%	16 <sup>th</sup>
M14	Tailoring of intervention to address specific needs	3.67	0.735	73.48%	17 <sup>th</sup>
M17	Education and training of key competent persons to handle PH issues at the workplace	3.58	0.756	71.59%	18 <sup>th</sup>

The descriptive statistics for the data collected from all the respondents and for each group of respondents, namely construction professionals, construction trade workers, and labour personnel, were analyzed. The results revealed that mean ratings for all the 18 influential factors revealed by the qualitative study are well above the average mean value of 3. This

indicates that all the influential factors identified are significant in influencing the effectiveness of the psychological health interventions in the construction industry. The results also present the ranking of the level of effectiveness of the proposed organizational preventive measures as revealed by all the respondents, and for each group, which was based on the mean values and relative importance index (RII) percentage values. The overall results among all the respondents revealed that the most influential factors are (1) willingness of employees to cooperate with the intervention procedures (2) perceptions on the benefits of the psychological health interventions (3) impact of stigmatization and discrimination (4) level of awareness on indicators of psychological health conditions (5) cost of implementing the intervention and (6) extent of management commitment and support.

**Table 9.13: Results from the descriptive analysis showing differences between groups on key organizational strategies**

Overall Rank	Influential factors of effective implementation of psychological health interventions	Construction Professionals		Construction Trade Workers		Labour Personnel	
		Group Mean	Group Ranks	Group Mean	Group Ranks	Group Mean	Group Ranks
1 <sup>st</sup>	Willingness of employees to cooperate with the intervention	4.22	1 <sup>st</sup>	4.23	4 <sup>th</sup>	4.22	4 <sup>th</sup>
2 <sup>nd</sup>	Perceptions of the benefits of psychological health interventions	4.04	5 <sup>th</sup>	4.31	1 <sup>st</sup>	4.20	5 <sup>th</sup>
3 <sup>rd</sup>	Impact of stigmatization and discrimination	3.93	8 <sup>th</sup>	4.29	2 <sup>nd</sup>	4.33	2 <sup>nd</sup>
4 <sup>th</sup>	Level of awareness on indicators of psychological health conditions	4.17	3 <sup>rd</sup>	3.98	8 <sup>th</sup>	4.19	6 <sup>th</sup>
5 <sup>th</sup>	Cost of implementing the intervention	3.82	11 <sup>th</sup>	4.04	6 <sup>th</sup>	4.32	3 <sup>rd</sup>
6 <sup>th</sup>	Extent of management commitment and support	3.90	9 <sup>th</sup>	3.78	12 <sup>th</sup>	4.46	1 <sup>st</sup>
7 <sup>th</sup>	Availability of resources required for implementation	4.20	2 <sup>nd</sup>	3.75	13 <sup>th</sup>	3.96	11 <sup>th</sup>
8 <sup>th</sup>	Time required for the implementation	3.67	15 <sup>th</sup>	4.28	3 <sup>rd</sup>	4.13	7 <sup>th</sup>
9 <sup>th</sup>	Identification and assessment of potential risks	4.12	4 <sup>th</sup>	3.80	11 <sup>th</sup>	3.78	14 <sup>th</sup>
10 <sup>th</sup>	Flexibility of organizational structure and culture	3.96	7 <sup>th</sup>	3.69	15 <sup>th</sup>	4.12	8 <sup>th</sup>

11 <sup>th</sup>	Magnitude of the current workload and time pressure	4.00	6 <sup>th</sup>	3.65	16 <sup>th</sup>	3.97	10 <sup>th</sup>
12 <sup>th</sup>	Compatibility with organizational policy	3.75	13 <sup>th</sup>	3.73	14 <sup>th</sup>	4.00	9 <sup>th</sup>
13 <sup>th</sup>	Policies and planning process to implement the system	3.88	10 <sup>th</sup>	3.60	17 <sup>th</sup>	3.80	13 <sup>th</sup>
14 <sup>th</sup>	Confidentiality and trust of the implementation process	3.72	14 <sup>th</sup>	3.90	9 <sup>th</sup>	3.61	15 <sup>th</sup>
15 <sup>th</sup>	Continual monitoring and evaluation of workers well-being	3.80	12 <sup>th</sup>	3.55	18 <sup>th</sup>	3.84	12 <sup>th</sup>
16 <sup>th</sup>	Support from colleagues on employee's psychological health	3.63	16 <sup>th</sup>	3.88	10 <sup>th</sup>	3.55	16 <sup>th</sup>
17 <sup>th</sup>	Tailoring of intervention to address specific needs	3.47	17 <sup>th</sup>	4.08	5 <sup>th</sup>	3.51	17 <sup>th</sup>
18 <sup>th</sup>	Education and training of key competent persons to handle PH issues at the workplace	3.43	18 <sup>th</sup>	3.99	7 <sup>th</sup>	3.33	18 <sup>th</sup>

The results also revealed that the three different groups rated the proposed organizational preventive strategies differently, resulting in a varied ordering in ranks between the three groups, as shown in Table 9.13. The top 5 influential factors ranked by the construction professionals were (1) *Willingness of employees to cooperate with the intervention*, (2) *Availability of resources required for implementation*, (3) *Level of awareness on indicators of psychological health conditions*, (4) *Identification and assessment of potential risks* and (5) *Perceptions of the benefits of psychological health interventions*. The top 5 influential factors ranked by the construction trade workers were (1) *Perceptions on the benefits of the psychological health interventions*, (2) *Impact of stigmatization and discrimination*, (3) *Time required for the implementation*, (4) *Willingness of employees to cooperate with the intervention* and (5) *Tailoring of intervention to address specific needs*. The top 5 influential factors ranked by the labour personnel were (1) *Extent of management commitment and support*, (2) *Impact of stigmatization and discrimination*, (3) *Cost of implementing the intervention*, (4) *Willingness of employees to cooperate with the intervention* and (5) *Perceptions on the benefits of the psychological health interventions*.

**Statistically significant differences in the ratings between the three groups of respondents**

The Kruskal-Wallis H inferential test was then undertaken to check if there were any significant differences in the overall ratings between the three different groups. Table 9.14 presents results from Kruskal-Wallis Test on differences between groups, showing Chi-square values and asymptotic significance. The p-value was set at 0.05, test statistics less than 0.05 depict statistically significant differences.

**Table 9.14: Results from the Kruskal-Wallis Test on differences between groups.**

Rank	Influential factors of effective implementation of psychological health interventions	MEAN RANK			Chi-Square	df	Asymp. Sig.
		Construction Professionals	Construction Trade Workers	Labour Personnel			
1 <sup>st</sup>	Willingness of employees to cooperate with the intervention	131.91	133.13	132.7	0.015	2	0.992
2 <sup>nd</sup>	Perceptions of the benefits of psychological health interventions	119.29	147.14	136.34	7.790	2	0.020*
3 <sup>rd</sup>	Impact of stigmatization and discrimination	108.27	148.11	153.04	24.729	2	0.000*
4 <sup>th</sup>	Level of awareness on indicators of psychological health conditions	137.2	119.16	140.91	4.411	2	0.110
5 <sup>th</sup>	Cost of implementing the intervention	112.63	134.25	162.64	21.954	2	0.000*
6 <sup>th</sup>	Extent of management commitment and support	122.13	111.41	174.7	33.537	2	0.000*
7 <sup>th</sup>	Availability of resources required for implementation	151.43	109.75	129.14	16.314	2	0.000*
8 <sup>th</sup>	Time required for the implementation	101.81	161.72	147.17	38.781	2	0.000*
9 <sup>th</sup>	Identification and assessment of potential risks	150.72	120.34	117.56	12.718	2	0.002*
10 <sup>th</sup>	Flexibility of organizational structure and culture	137.55	111.36	149.73	11.721	2	0.003*
11 <sup>th</sup>	Magnitude of the current workload and time pressure	144.68	108.57	141.52	13.637	2	0.001*
12 <sup>th</sup>	Compatibility with organizational policy	128.28	124.64	148.8	5.026	2	0.081
13 <sup>th</sup>	Policies and planning process	145.17	114.05	134.14	9.231	2	0.010*

	to implement the system						
14 <sup>th</sup>	Confidentiality and trust of the implementation process	133.25	144.36	117.02	5.664	2	0.059
15 <sup>th</sup>	Continual monitoring and evaluation of workers well-being	140.76	114.1	141.23	8.238	2	0.016*
16 <sup>th</sup>	Support from colleagues on employee's psychological health	129.94	145.43	121.11	4.802	2	0.091
17 <sup>th</sup>	Tailoring of intervention to address specific needs	113.19	171.91	116.44	38.630	2	0.000*
18 <sup>th</sup>	Education and training of key competent persons to handle PH issues at the workplace	120.89	169.28	107.09	37.766	2	0.000*

Note: \* Statistically significant difference at  $P < 0.05$

A Kruskal-Wallis H test was conducted to verify if the differences between the groups were statistically significant, setting the p-value at 0.05. Table 9.14 illustrates the test results, which suggest that there are some statistically significant differences in the rating by the three groups of respondents for almost all the proposed organizational preventive measures. Only 5 out of the 18 identified influential factors showed statistically insignificant differences in the rating by the groups, and these include; willingness of employees to cooperate with the intervention, level of awareness on indicators of psychological health conditions, compatibility with organizational policy, confidentiality and trust of the implementation process, and support from colleagues on employee's psychological health. This result depicts some level of agreement among the groups of respondents in the ratings of the factors as significant influencers of the effective implementation of psychological health interventions in the construction industry.

For factors that showed significant differences, subsequent Mann-Whitney U tests were carried out to see which particular paired groups disagreed in the overall ratings. Table 9.15 presents the results from Mann-Whitney U on differences between construction professionals and construction trade workers.



**Table 9.15: Results from Mann-Whitney U on differences between construction professionals and construction trade workers.**

Rank	Influential factors of effective implementation of psychological health interventions	MEAN RANK		Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
		Construction Professionals	Construction Trade Workers			
1 <sup>st</sup>	Willingness of employees to cooperate with the intervention	97.61	98.52	4604.5	-0.123	0.902
2 <sup>nd</sup>	Perceptions of the benefits of psychological health interventions	89.21	109.87	3663	-2.756	0.006*
3 <sup>rd</sup>	Impact of stigmatization and discrimination	85.46	114.92	3244	-4.144	0.000*
4 <sup>th</sup>	Level of awareness on indicators of psychological health conditions	103.95	89.98	3982	-1.872	0.061
5 <sup>th</sup>	Cost of implementing the intervention	91.28	107.07	3895	-2.176	0.030*
6 <sup>th</sup>	Extent of management commitment and support	102.92	91.37	4097.5	-1.517	0.129
7 <sup>th</sup>	Availability of resources required for implementation	111.32	80.02	3156	-4.096	0.000*
8 <sup>th</sup>	Time required for the implementation	78.96	123.69	2515.5	-6.003	0.000*
9 <sup>th</sup>	Identification and assessment of potential risks	108.13	84.33	3513	-3.192	0.001*
10 <sup>th</sup>	Flexibility of organizational structure and culture	106.82	86.1	3660	-2.715	0.007*
11 <sup>th</sup>	Magnitude of the current workload and time pressure	109.39	82.63	3372	-3.495	0.000*
12 <sup>th</sup>	Compatibility with organizational policy	99.4	96.11	4491	-0.437	0.662
13 <sup>th</sup>	Policies and planning process to implement the system	107.93	84.6	3536	-3.079	0.002*
14 <sup>th</sup>	Confidentiality and trust of the implementation process	93.96	103.45	4196	-1.255	0.209
15 <sup>th</sup>	Continual monitoring and evaluation of workers well-being	106.65	86.33	3679	-2.708	0.007*
16 <sup>th</sup>	Support from colleagues on employee's psychological health	92.9	104.89	4076.5	-1.586	0.113
17 <sup>th</sup>	Tailoring of intervention to address specific needs	79.54	122.92	2580	-5.746	0.000*
18 <sup>th</sup>	Education and training of key competent persons to handle PH issues at the workplace	82.18	119.35	2876	-4.986	0.000*

Note: \* Statistically significant difference at  $P < 0.0$

Table 9.16 presents results from Mann-Whitney U on differences between construction professionals and regulatory personnel.

**Table 9.16: Results from Mann-Whitney U on differences between construction professionals and regulatory personnel.**

Rank	Influential factors of effective implementation of psychological health interventions	MEAN RANK		Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
		Construction Professionals	Labour Personnel			
1 <sup>st</sup>	Willingness of employees to cooperate with the intervention	90.80	91.33	3841.5	-0.072	0.942
2 <sup>nd</sup>	Perceptions of the benefits of psychological health interventions	86.58	98.17	3369	-1.573	0.116
3 <sup>rd</sup>	Impact of stigmatization and discrimination	79.31	109.98	2554.5	-4.392	0.000*
4 <sup>th</sup>	Level of awareness on indicators of psychological health conditions	89.75	93.02	3724.5	-0.441	0.660
5 <sup>th</sup>	Cost of implementing the intervention	77.86	112.33	2392	-4.723	0.000*
6 <sup>th</sup>	Extent of management commitment and support	75.71	115.81	2152	-5.522	0.000*
7 <sup>th</sup>	Availability of resources required for implementation	96.61	81.90	3236	-1.972	0.049*
8 <sup>th</sup>	Time required for the implementation	79.35	109.91	2559	-4.176	0.000*
9 <sup>th</sup>	Identification and assessment of potential risks	99.08	77.88	2958.5	-2.814	0.005*
10 <sup>th</sup>	Flexibility of organizational structure and culture	87.23	97.12	3442	-1.313	0.189
11 <sup>th</sup>	Magnitude of current workload and time pressure	91.79	89.72	3776	-0.285	0.776
12 <sup>th</sup>	Compatibility with organizational policy	85.38	100.13	3234	-1.975	0.048*
13 <sup>th</sup>	Policies and planning process to implement the system	93.74	86.56	3557.5	-0.970	0.332
14 <sup>th</sup>	Confidentiality and trust of the implementation process	95.79	83.23	3328	-1.723	0.085
15 <sup>th</sup>	Continual monitoring and evaluation of workers well-being	90.61	91.64	3820	-0.138	0.890
16 <sup>th</sup>	Support from colleagues on employee's psychological health	93.54	86.88	3579.5	-0.928	0.354
17 <sup>th</sup>	Tailoring of intervention to address specific needs	90.15	92.38	3769	-0.321	0.748
18 <sup>th</sup>	Education and training of key competent persons to handle PH issues at the workplace	95.21	84.16	3392	-1.716	0.086

Note: \* Statistically significant difference at  $P < 0.05$

Table 9.17 also presents results from Mann-Whitney U on differences between construction trade workers and regulatory personnel.

**Table 9.17: Results from Mann-Whitney U on differences between construction trade workers and labour personnel.**

Rank	Influential factors of effective implementation of psychological health interventions	MEAN RANK		Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
		Construction Trade workers	Labour Personnel			
1 <sup>st</sup>	Willingness of employees to cooperate with the intervention	76.61	76.37	2854.5	-0.036	0.971
2 <sup>nd</sup>	Perceptions of the benefits of psychological health interventions	79.27	73.17	2633.5	-0.929	0.353
3 <sup>rd</sup>	Impact of stigmatization and discrimination	75.2	78.07	2755.5	-0.438	0.662
4 <sup>th</sup>	Level of awareness on indicators of psychological health conditions	71.19	82.89	2422.5	-1.738	0.082
5 <sup>th</sup>	Cost of implementing the intervention	69.18	85.3	2256	-2.415	0.016*
6 <sup>th</sup>	Extent of management commitment and support	62.04	93.89	1663.5	-4.742	0.000*
7 <sup>th</sup>	Availability of resources required for implementation	71.73	82.24	2467.5	-1.566	0.117
8 <sup>th</sup>	Time required for the implementation	80.02	72.26	2571	-1.177	0.239
9 <sup>th</sup>	Identification and assessment of potential risks	78.01	74.68	2738	-0.499	0.618
10 <sup>th</sup>	Flexibility of organizational structure and culture	67.26	87.62	2096.5	-3.041	0.002*
11 <sup>th</sup>	Magnitude of the current workload and time pressure	67.94	86.8	2153	-2.840	0.005*
12 <sup>th</sup>	Compatibility with organizational policy	70.54	83.67	2368.5	-1.957	0.050*
13 <sup>th</sup>	Policies and planning process to implement the system	71.45	82.58	2444	-1.711	0.087
14 <sup>th</sup>	Confidentiality and trust of the implementation process	82.91	68.79	2331.5	-2.139	0.032*
15 <sup>th</sup>	Continual monitoring and evaluation of workers well-being	69.77	84.59	2305	-2.269	0.023*
16 <sup>th</sup>	Support from colleagues on employee's psychological health	82.54	69.23	2362	-2.021	0.043*
17 <sup>th</sup>	Tailoring of intervention to address specific needs	90.99	59.07	1660.5	-4.780	0.000*
18 <sup>th</sup>	Education and training of key competent persons to handle PH issues at the workplace	91.93	57.93	1582.5	-5.240	0.000*

Note: \* Statistically significant difference at  $P < 0.05$

A comparison of the results from the pair-wise analysis, showing the asymptotic significance values, has also been presented in Table 9.18.

**Table 9.18: Summary of the three pair of results from Mann-Whitney U Test compared**

Rank	Influential factors of effective implementation of psychological health interventions	Mann-Whitney U Test (P-value of each pair)		
		Construction Professionals & Construction Trade Workers	Construction Professionals & Labour Personnel	Construction Trade Workers & Labour Personnel
1 <sup>st</sup>	Willingness of employees to cooperate with the intervention	0.902	0.942	0.971
2 <sup>nd</sup>	Perceptions of the benefits of psychological health interventions	0.006*	0.116	0.353
3 <sup>rd</sup>	Impact of stigmatization and discrimination	0.000*	0.000*	0.662
4 <sup>th</sup>	Level of awareness on indicators of psychological health conditions	0.061	0.660	0.082
5 <sup>th</sup>	Cost of implementing the intervention	0.030*	0.000*	0.016*
6 <sup>th</sup>	Extent of management commitment and support	0.129	0.000*	0.000*
7 <sup>th</sup>	Availability of resources required for implementation	0.000*	0.049*	0.117
8 <sup>th</sup>	Time required for the implementation	0.000*	0.000*	0.239
9 <sup>th</sup>	Identification and assessment of potential risks	0.001*	0.005*	0.618
10 <sup>th</sup>	Flexibility of organizational structure and culture	0.007*	0.189	0.002*
11 <sup>th</sup>	Magnitude of current workload and time pressure	0.000*	0.776	0.005*
12 <sup>th</sup>	Compatibility with organizational policy	0.662	0.048*	0.050*
13 <sup>th</sup>	Policies and planning process to implement the system	0.002*	0.332	0.087
14 <sup>th</sup>	Confidentiality and trust of the implementation process	0.209	0.085	0.032*
15 <sup>th</sup>	Continual monitoring and evaluation of workers well-being	0.007*	0.890	0.023*
16 <sup>th</sup>	Support from colleagues on employee's psychological health	0.113	0.354	0.043*
17 <sup>th</sup>	Tailoring of intervention to address specific needs	0.000*	0.748	0.000*
18 <sup>th</sup>	Education and training of key competent persons to handle PH issues at the workplace	0.000*	0.086	0.000*

Note: \* Statistically significant difference at  $P < 0.05$

The analysis was extended to include a Mann-Whitney U test to identify the group that differed significantly from the other groups, in order to enable further interpretation of the outcomes. Table 9.18 summarises the results of the Mann-Whitney test from the three pairs of results obtained by combining two groups of the respondents, such as construction professionals versus construction trade workers, construction professionals versus labour personnel, and construction trade workers versus labour personnel. The results depict that the construction trade workers differed more significantly from the construction professionals and labour personnel in their rating of the level of influence of the factors on the effective implementation of psychological health interventions. This result could be due to the fact that the construction trade workers are the main subjects for the implementation of workplace interventions, and therefore have a better idea of the degree of the influence of the identified factors than do the other two groups. Nonetheless, this could also be attributed to opinion bias.

The identified factors from the qualitative study were rated by the three groups of respondents as very significant or significant influencers. Therefore, the difference between the three groups can be considered minor. Hence, it can be concluded that the results from the quantitative study show a very strong indication of the significance of the factors on the effective implementation of psychological health interventions in the construction industry. The results from the quantitative study, therefore, verify and confirms the findings from the qualitative interviews.

### **9.2.3 Discussion of findings on factors associated with effective implementation of psychological health interventions**

This study revealed factors associated with effective implementation of psychological health interventions that conformed with some previous findings from existing literature. For instance, similar factors were revealed in a study by Fleuren (2004) which included availability of financial resources, administrative support available for the implementation, time available

to implement the intervention, availability of staff responsible for coordinating implementation in the organization. Williams, et. al., (2015) also revealed that the factors that can act as barriers or facilitators to the implementation of evidence-based practices included lack of resources, workload, other staff or management not supportive of the intervention, lack of authority to change existing practices and workplace culture resistant to changes. Harrington (2018) also revealed in an exploratory study conducted that the factors associated with the implementation of workplace wellness programs included financial matters, leadership support and labour management. A study by Fitzgerald, et. al. (2016) added that factors that act as barriers to or facilitators of implementing complex workplace interventions included perceived benefits of participation, negotiation and flexibility of the implementation team, viability and intensity of intervention and individual workplace structures and cultures. Similar factors were also revealed by Cherniack and Lahiri (2010), which included allocations and incentives, organizational and cultural barriers to implementing efficient interventions, and systemic flaws of supply-driven medical care versus demand driven health. The detailed description of the findings from this study has been provided in the following sections. The results from the quantitative study, therefore, verify and confirms the findings from the qualitative interviews.

### **Detailed description of the findings on influential factors for effective implementation of psychological health interventions**

#### ***Willingness of employees to cooperate with the intervention***

The willingness of employees to participate in psychological health programmes was revealed to be the most influential factor. The main reasons employees participate in any workplace health promotional measures can be concerns for their age, lifestyle, and health issues such as blood pressure, cholesterol level, weight, and digestive disorders. Older employees are more likely to participate in workplace health programmes than the younger

ones due to the pressure of keeping up in the fast-paced working environment. Without the driving force or reasons as motivational factors, it might be difficult for employees to cooperate with intervention programme willingly. Employees seek health improvements in efforts to curtail the negative effects of workplace stressors. Investment in psychological health interventions to enhance employees' well-being can reassure the employees that their employer's concern is not only on profit-making but was on their health and well-being. Awareness of this commitment can compel the employees to participate in psychological health intervention programs. A good relationship between employers and their workers can also be a motivating factor for participating in intervention programs. Increasing psychological health consciousness among employees can boost their morale and commitment to the workplace psychological health interventions, and thereby enhance the effectiveness of the implementation.

***Perceptions on the benefits of the psychological health interventions***

Perceptions of managers and employees on the benefits of the interventions can influence the extent of implementation of the psychological health interventions. The perceptions of long-term benefits rather than the benefits from the intervention itself can facilitate its implementation as it encourages engagement and foster buy-in of the intervention. Perceived benefits associated with the intervention such as, managers desire to portray the company's image positively, fostering employees' loyalty and workers desire to enhance their psychological health, can be influential factors to the level of successful implementation of the psychological health interventions in the construction industry. Managers interest in ensuring successful implementation of the interventions is vital to facilitate access to the workers by releasing them from work activities to participate in psychological health programmes and provision of supportive initiatives that would increase psychological health consciousness in

the workplace. The perceived benefits can, therefore, be a driver for the organization's adoption and effective implementation of psychological health interventions as it promotes organizational support and increased workers' participation in the intervention initiatives.

### ***Impact of stigmatization and discrimination***

Stigma and discrimination associated with psychological ill-health can affect the level of acceptability of implementing psychological health interventions in the construction industry. Stigma or discrimination can be one of the main reasons why people do not participate in psychological health interventive measures such as screening of employees for psychological health symptoms. Studies revealed that employees who had experienced a traumatic event at the workplace had it difficult accepting psychological health care, with the reasons that they do not want to be identified as requiring psychiatric help and also did not want to be seen going to a psychiatric hospital. Similar concerns have been raised for low participation in psychological health screening programmes and attending psychiatric hospital settings for treatment. In order to address this concern, the specialized psychological health intervention program for workers experiencing psychological ill-health conditions can be set off-site in office buildings separate from the psychiatric hospital.

### ***Level of awareness on indicators of psychological health conditions***

Poor knowledge of the workers on occupational psychological health conditions can impact the extent of implementation of interventive measures. Employees with the knowledge of psychological health indicators can help improve their psychological health outcomes through changes in their responses to the risk factors. Awareness of psychological health issues can also be a motivational factor to facilitate the implementation of such interventions. Employees' knowledge of the psychological health issues is a recognized core skill for effective implementation as they will be empowered to apply intervention principles. Conducting regular



awareness programmes on psychological health would help employees to upgrade their knowledge on the issues.

### ***Cost of implementing the intervention***

Matters of a financial focus were also noted by a number of the respondents as very influential. The financial matters fall into two main subthemes: appropriate funding for workplace wellness programs, and the savings these wellness programs can bring. One of the major barriers to implementation of programs is the lack of appropriate funding for implementation, program maintenance, or incentives. This concern was especially evident when discussing the matter with leaders of departments that have not implemented a program. Most of these leaders cited the issue of budget or lack of money as a major concern or barrier. Many organizations may face financial difficulties for employing an occupational health officer permanently. Funding, trying to find the money always seems to be a barrier, especially initially early on. Planned budget allocation will be needed to incorporate psychological health promotional needs to the organization's expected budget.

### ***Extent of management commitment and support***

Support from management, especially supervisors, is another barrier to wellness program implementation frequently reported by the research participants interviewed. Due to the target-driven culture in the construction industry, supervisors can be reluctant to release workers to participate in psychological health programmes. Though a disruption on the production line can lead to knock-on effects for overall level efficiencies of the organization's output, managers can adapt to the demands of the intervention for the duration of the designated period, which can be made up for. To ensure effective implementation of psychological health interventions in the workplace, management needs to reinforce their commitment to promoting

employees' psychological health. Management can demonstrate their support by releasing the workers from work activities for psychological health appointments and provide them with the necessary resources. Stakeholder cohesiveness with regards to organizational support is essential to achieving successful implementation.

***Availability of resources required for implementation***

The emphasis here was on fast, easy access to resources required for the implementation of the intervention. While some professionals demonstrated increasingly positive attitudes towards psychological health interventions, they also reported difficulties in making available the essential resources required. The necessary resources, including human, material and capital resources for the implementation of the psychological health intervention for the employees, must be provided as quickly and efficiently as when need. Resources such as mental first aid need to be available, if not at the point of care, then at the very least in an easily accessible designated area within each department for unprecedented psychological health crisis at the workplace.

***Time required for the implementation***

The time required for the implementation is a considerable factor that can impede or facilitate the adoption of psychological health intervention in the construction industry. Construction works are usually time-bound with deadline pressures, leaving workers with little time for rest or other recreational activities. Treatment for psychological health conditions can be heavily time-consuming if they are to be assessed, treated, and managed appropriately. Measures can be taken to try and reduce the time component of the implementation, as this is an essential factor to increase the chance for effective implementation of the intervention at the workplace.

***Identification and assessment of potential risks***

The ability to identify and assess potential risks associated with employees' psychological health conditions is essential for effective implementation in the workplace. Knowledge of psychosocial health issues is necessary and can be obtained through identification and assessment of the potential work-related factors. Information provided on potential risks can be particularly helpful in mitigating the causes of psychological ill-health conditions among workers. Displays of information in the workplace and the daily email on psychological health matters can be considered effective. The design of the intervention for easy identification and assessment of risk factors can be perceived to be a key facilitator for successful implementation of psychological health management in the construction industry.

***Flexibility of organizational structure and culture***

The organizational structure and culture can influence the extent of the adoption of psychological health interventions. The hierarchical organizational structure with the complexity of decision-making processes can inhibit the adoption and effective implementation of psychological health intervention in the construction industry of Ghana. The culture of some construction industry may also be resistant to change and thus be a barrier to the implementation of the innovative ideas of psychological health prevention. For effective implementation of a psychological health intervention in the construction industry, there is the need for supportive work culture and the breaking down of hierarchical organizational structures. The flexibility of the organizational structure and culture to change is, therefore, essential for the effective implementation of any interventive measure. Flexibility management also gives employees the power of autonomy to make changes, thereby enhancing employees' level of commitment and job satisfaction, with a positive influence on their psychological health outcomes. Several studies have revealed that low level of autonomy and power over work issues make employees less valued, leading to psychological ill-being conditions such as

anxiety and depression.

***Magnitude of current workload and time pressure***

Workload is a barrier that has been extensively reported on and was one of the frequently identified barriers that inhibit workplace interventions in the construction industry of Ghana. The construction work environment is one that is heavily reliant on time. Construction employees are constantly under pressure from increased demands, which translates to staff being asked to deal with working overtime. As a barrier to effective psychological health implementation, the workload is a problem as time-bound tasks need to come first and foremost over other personal needs. This leaves construction workers with little or no extra time in their typical working day to utilize the available psychological health initiatives at the workplace. Even though employees are willing to participate in psychological health promotional programmes, little or no time can prevent them from fully engaging in the activities. Time pressure is therefore a critical barrier to effective implementation of psychological health interventions in the construction industry.

***Compatibility with organizational policy***

The compatibility of the intervention with the organizational policy is essential to ensure the effective implementation of psychological health interventions in the construction industry. It is critical for the proposed intervention to fit into existing organizational policy and adapt to the structure and practices of each worksite, to facilitate the effective adaptation of the intervention. The implementation of an intervention might require employees' interactions and significant logistical planning, which might not be suitable for the target-driven culture and organizational policy of the construction industry. However, the intervention can be well-designed to fit into organizational policy and practices to facilitate its adoption and implementation in the construction industry.

***Policies and planning process to implement the system***

There should be laid down policies and a detailed planning process to ensure smooth implementation of the intervention in the organization. Available policies and written plans for implementation provide the necessary guidelines and protocols which are to be followed. Policies should also have input from staff working groups and reflect the needs and ideas of each working group, which can help align professional and organizational goals effectively. Without proper enforcement of policies and the planning process, the implementation process of any new idea or intervention can be unnecessarily challenged. Workplace policies are usually formulated by management; however, workers can be a part of the decision-making process. This will give the workers some degree of autonomy in participating in the intervention program, with some degree of flexibility within the recognized protocols and guidelines, without fear of reprisal. Organizational policies can help create a working environment that is open to innovation, revitalization, and positive change.

***Confidentiality and trust of the implementation process***

Concerns of confidentiality and trust can impede the effective implementation of psychological health interventions. The risk of "backlash" by employees in response to the choice of the intervention can hamper restrictions in its implementation, which may result from these anticipated and realized concerns of lack of confidentiality and trust. Respondents anticipated that the implementation of psychological health interventions in the workplace might create a sense of perceived helplessness among employees. Studies have reported that employees have resisted psychological health screening and other intervention measures in the workplace largely due to the presence of some of these unhealthy concerns. Lack of confidentiality and trust can, therefore, impede the implementation of the intervention in the workplace as workers can be reluctant to reveal their psychological health status due to fear of losing one's job or reputation.

***Continual monitoring and evaluation of workers well-being***

Continual monitoring and evaluation of workers' well-being have an impact on the effectiveness of implementing psychological health interventions. Identification and monitoring of psychological health indicators have also been identified as a significant strategy in enhancing employees' psychological health. With the continuous monitoring and evaluation of workers' psychological well-being, the management can easily establish benchmarks to control poor health and work functionality. Besides, management can eliminate work-related psychological risk factors such as task overload by providing enough workforce for a particular task, so that the worker is not put under pressure with a workload that he cannot bear. The selection of the right worker and the assignment of appropriate tasks can also be put into practice. Assigning an adequate number of workers to risky situations could minimize the number of workplace incidents and thereby promote a psychologically safe and healthy working environment. A managerial tool that could, therefore, enhance the positive psychological health of employees is conducting periodic monitoring and evaluation of psychological health issues at the workplace.

***Support from colleagues on employee's psychological health***

Support from colleagues to push forward the agenda of ensuring all employees are psychologically safe and healthy can impact the level of implementation of psychological health interventions in the workplace. The lack of support from colleagues working in a culture bogged down in rigid and outdated protocols neither facilitates nor encourages the flow of new ideas. Organizations should beware of creating a "culture of blame" that berates staff for trying to work flexibly within protocols, as this activity prevents the formation of new approaches to existing practices. There also needs to desist the notion that a working group has all the knowledge and, therefore, does not recognize the expertise and contributions of the personnel of various working groups. Another factor influencing the effectiveness of interventions is the

discrepancy between the professional objectives of the individual personnel and the organizational objectives which can be more dictated by the political and financial agendas.

***Tailoring of intervention to address specific needs***

The sustainability of the intervention and the ability of the organization to tailor the intervention to meet the needs of their employees can facilitate its effective implementation. The design of the intervention, therefore, impacts its implementation in the workplace. The anticipated employee resistance to change in response to the intervention can impede the implementation of the interventions. The level of intensity of the intervention, therefore, affects the effectiveness of the implementation to some extent. For instance, high-intensity workplace interventions such as combined intervention for health and socio-economic benefits can be well received by the organization and the employees. However, low-intensity workplace interventions such as educational and environmental awareness programmes which cannot meet employees' expectations can have its implementation impeded. There is, therefore, the need to tailor the intervention to address the specific needs of the construction employees.

***Education and training of key competent persons to handle PH issues at the workplace***

The implementation of effective policies and good occupational psychological health programmes are interrelated to improve workers' education and awareness of psychological health issues. Some organizations have policies to educate workers on psychological health interventions. It is necessary to send workers to follow periodic training programs to keep their knowledge of work psychology up to date. However, providing training for key competent persons to handle psychological health issues at the workplace may be costly as well as impractical. On-the-job training would be a great solution for this, as it provides specialized training in the work environment. In addition, training in the course of employment will encourage the worker to stay with the organization as he may feel safer there than with other

organizations.

Besides, the implementation of programs in health psychology at the workplace is recommended by the industry practitioners. In the education and training programmes, the use of visual aids and materials such as multimedia presentations, printed posters, paper articles, and photos, can be provided to increase the awareness of workers on psychological health issues and promote healthy behaviour among employees. Providing specialized training and education programmes for workers is another useful way to increase the chance for effective implementation of psychological health interventions in the construction.

#### **9.2.4 Summary of findings on factors associated with effective implementation of psychological health interventions in the construction industry**

The staggering social and economic costs associated with psychological ill-being conditions among workers require efforts to mitigate its causes and effects through evidence-based psychological health interventions. However, such interventions in the workplace are not without challenges and obstacles. The purpose of the study is to identify influential factors associated with effective implementation of psychological health interventions in the construction industry. This study adopted the mixed-methods approach employing in sequence the methods of qualitative and quantitative research to achieve the aim of the study. A total of 53 interviews and 264 questionnaire surveys were conducted in Ghana with construction professionals, construction trade workers, regulatory personnel, and occupational health psychologist. The qualitative study revealed 18 influential factors associated with the implementation of psychological health interventions. These findings were confirmed by the quantitative survey to be statistically significant. A comparative analysis of the responses from the three groups of respondents showed some statistically significant differences in the ratings of the influential factors, which may be due to the group's interest and diversity. The highly influential factors revealed in the quantitative study included willingness of employees to



cooperate with the intervention procedures, perceptions on the benefits of the psychological health interventions, impact of stigmatization and discrimination, level of awareness on indicators of psychological health conditions, cost of implementing the intervention and extent of management commitment and support. This study offers valuable information for construction stakeholders and policymakers on factors to consider for successful psychological health management and interventions in the construction industry of Ghana and to some extent globally.

### **9.3 Chapter 9 Summary**

This chapter presents the research design, results on both the qualitative and quantitative studies as well as the discussions and summary of findings for objectives 6 and 7. The major findings of objective 6 on organisational strategies that can be adopted to mitigate the causes of psychological health conditions in the construction industry, included Enhancing good supervisory and working relations, Ensuring better working conditions, Enforcing good policies for workers well-being, Proper planning of work activities, Providing adequate salary and resources for work and Regular health screening for early detection of psychological ill-being conditions. The major findings of objective 7 on the factors associated with effective implementation of psychological health interventions in the construction industry, included Willingness of employees to cooperate with the intervention, Perceptions of the benefits of psychological health interventions , Impact of stigmatization and discrimination , Level of awareness on indicators of psychological health conditions, Cost of implementing the intervention and the Extent of management commitment and support.

## **CHAPTER 10**

### **FINAL INTEGRATED MODELS, CONCLUSIONS AND RECOMMENDATIONS**

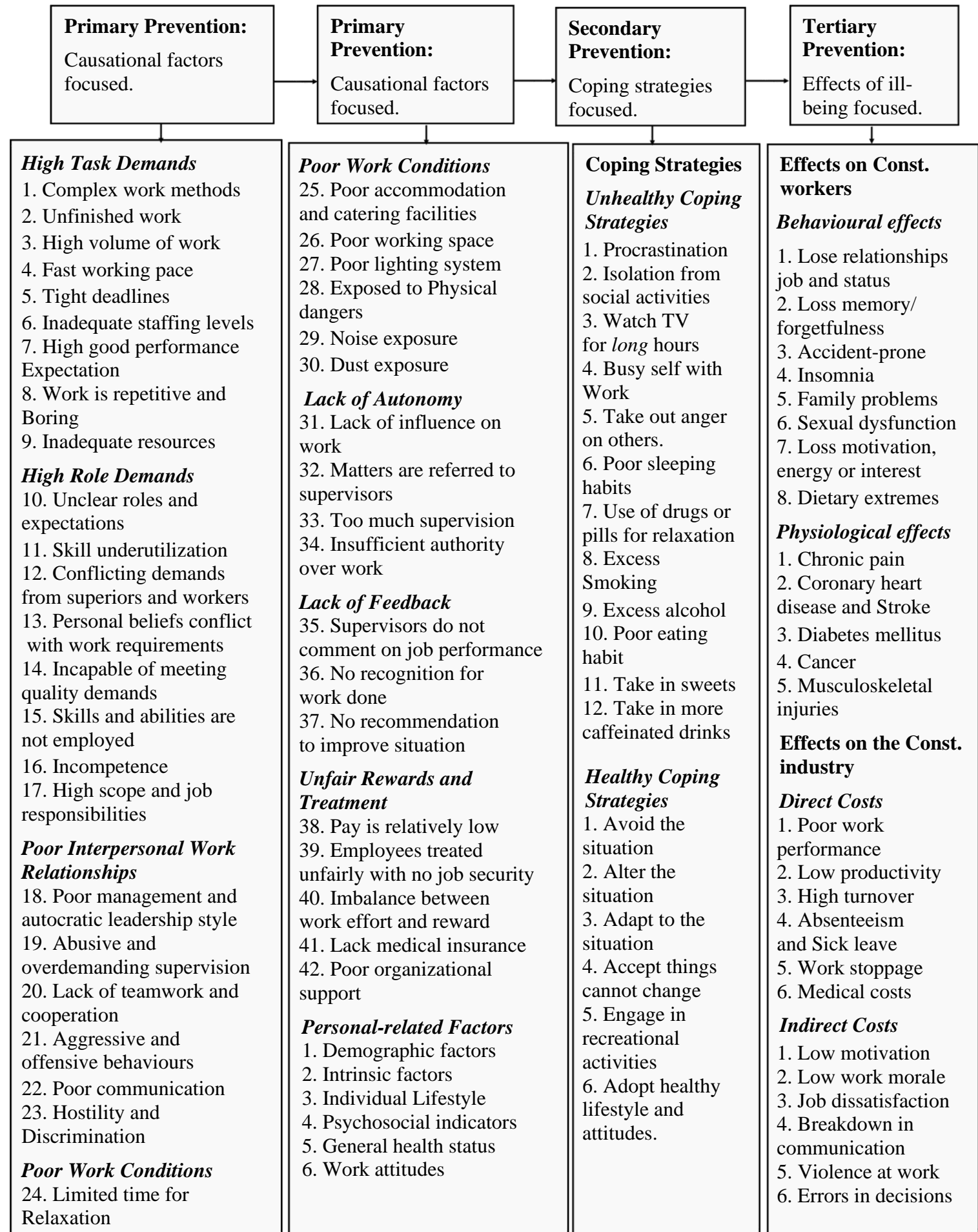
#### **10.1 Final integrated models developed from the study**

Based on the results from the study, preventive psychological health management models were also designed for the construction employees and the construction industry. Integrated models were first developed using the findings from the qualitative and quantitative study. The final integrated models were then developed from the results obtained from the correlation and regression analysis.

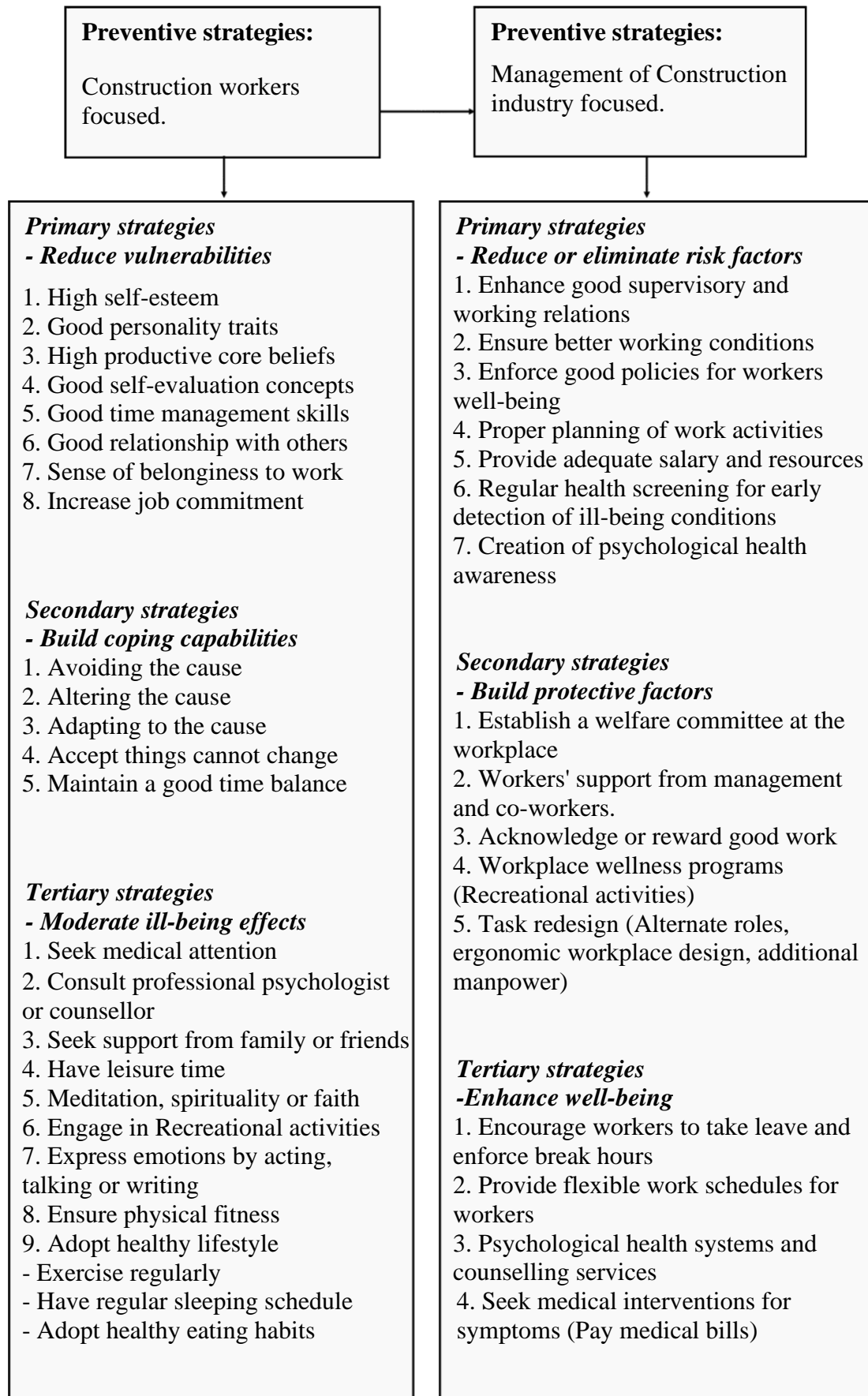
##### **10.1.1 Integrated models designed from the findings of the study**

Figures 10.1 and 10.2 present the preventive psychological health management model designed for construction employees and the construction industry, based on the findings from this study. As shown in Figures 10.1 and 10.2, this study revealed preventive psychological health strategies and interventions for the construction industry, which were divided into primary, secondary and tertiary strategies. The primary strategies aim at reducing or eliminating the construction work-related factors that are likely to expose construction workers to psychological ill-being conditions, such as abusive and overdemanding supervisors and tight deadline pressures. The secondary strategies seek to build construction workers' coping capabilities in dealing with the triggers of psychological ill-being conditions, which cannot be eliminated completely such as unfinished work, high task demands and poor working conditions. The tertiary strategies seek to moderate the effects of psychological health conditions on the construction workers through interventions such as: providing organisational support to workers experiencing some form of psychological health conditions such as stress and depression.

**FIGURE 10.1: OCCUPATIONAL PSYCHOLOGICAL HEALTH MANAGEMENT MODEL**



**FIGURE 10.2: PREVENTIVE PSYCHOLOGICAL HEALTH MANAGEMENT MODEL**



The findings from this study depict strategies managers can adopt in conjunction with the demands of the organizational life to reduce the menace of psychological distress among the construction employees.

### **10.1.2 Correlation and regression analysis of the major findings**

Correlation analysis was employed to determine the relationship between the major findings of the factors associated with psychological health conditions and the symptoms of psychological disorders. Table 10.1 presents the results of the correlation analysis between the major symptoms of psychological disorders and the major findings from the personal-related factors, construction work-related factors, effects, coping strategies, organizational preventive strategies and the influential factors for effective implementation. The correlation analysis between the factors such as between personal-related/ construction work-related causes and effects, and between effects and coping strategies have also been presented in Table 10.1.

Regression analysis was employed to establish the direct causal relationship between the psychological health determinants and the factors associated with it. Table 10.2 presents the regression models between psychological health indicators and the causes (personal and construction work factors). The regression models between psychological health indicators and the effects and with coping strategies have also been presented in Table 10.2. Table 10.3 presents the regression models of psychological health indicators and organisational strategies, and with influential factors. Table 10.4 presents the regression models of construction work causes and the effects and with coping strategies. Table 10.5 presents the regression models of personal causes, and the effects and with coping strategies. The regression models between the effects and organisational strategies and with the influential factors have also been presented in Table 10.5. Table 10.6 presents the regression models between the coping strategies and organisational strategies and with the influential factors. The regression models between the organisational strategies and the influential factors have also been presented in Table 10.6.

**Table 10.1: Correlation analysis of the relationship between the major findings from the study**

Factors	No .	Major Findings	Inter-item correlation matrix													
			Psychological Indicators		Work factors		Personal factors		Effects		Coping strategies		Organisation factors		Influential factors	
			PE	DR	TD	AO	LE	LS	LP	EW	WH	TC	ES	EB	WC	EM
Psychological health indicators	1.	Physically exhausted (PE)	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	2.	Difficult to relax (DR)	0.072	1	-	-	-	-	-	-	-	-	-	-	-	-
Construction work-related factors	3.	Tight deadline pressures (TD)	0.590**	0.055	1	-	-	-	-	-	-	-	-	-	-	-
	4.	Abusive and over-demanding supervisors (AO)	0.381**	0.373**	0.322**	1	-	-	-	-	-	-	-	-	-	-
Personal-related factors	5.	Lack of exercise (LE)	0.458**	0.086	0.601**	0.486**	1	-	-	-	-	-	-	-	-	-
	6.	Low self-esteem (LS)	-0.037	0.261**	-0.003	0.103	0.105	1	-	-	-	-	-	-	-	-
Effects on construction industry	7.	Low productivity (LP)	0.282**	0.316**	0.293**	0.248**	0.148*	-0.074	1	-	-	-	-	-	-	-
	8.	Errors in work (EW)	0.284**	0.303**	0.301**	0.235**	0.131*	-0.058	0.982**	1	-	-	-	-	-	-
Individual coping strategies	9.	Work extra hard (WH)	0.178**	0.679**	0.133*	0.497**	0.198**	0.200**	0.303**	0.312**	1	-	-	-	-	-
	10.	Take in more caffeine (TC)	0.094	0.601**	0.137*	0.322**	0.152*	0.149*	0.375**	0.369**	0.658**	1	-	-	-	-

<b>Organisational preventive strategies</b>	11.	Enhance good supervisory and working relations (ES)	0.333 **	0.396 **	0.458 **	0.224 **	0.358 **	0.225 **	0.346 **	0.352 **	0.294 **	0.326 **	1	-	-	-
	12.	Ensure better working conditions (EB)	0.339 **	0.361 **	0.464 **	0.213 **	0.341 **	0.238 **	0.325 **	0.345 **	0.290 **	0.296 **	0.985 **	1	-	-
<b>Influential factors for effective implementation</b>	13.	Willingness of employees to cooperate with the intervention (WC)	0.391 **	0.181 **	0.379 **	0.371 **	0.384 **	0.271 **	0.189 **	0.173 **	0.142 *	0.196 **	0.409 **	0.385 **	1	-
	14.	Extent of management commitment and support (EM)	0.256 **	0.251 **	0.474 **	0.310 **	0.482 **	0.257 **	0.079	0.084	0.317 **	0.256 **	0.391 **	0.403 **	0.535 **	1

*Note: \*\* indicates Correlation is significant at the 0.010 level (2-tailed).*

*\* indicates Correlation is significant at the 0.050 level (2-tailed).*

**Table 10.2: Regression models of psychological health indicators, causes, effects and coping strategies**

Table 10.2: Regression models of psychological health indicators, causes, effects and coping strategies											
Model	Dependent variable	Independent variables	B	Std. Error	Beta	t	p-Value	R	R2	Anova	
										F	Sig.
1	Physically exhausted (PE)	<i>Relationship between Psychological health symptom (PE) and Causes (Personal and Construction work factors)</i>									
		(Constant)	1.324	0.289	-	4.577	0.000**	0.629	0.396	42.483	0.000
		Tight deadline pressures	0.498	0.063	0.477	7.855	0.000**				
		Abusive and over-demanding supervisors	0.186	0.053	0.193	3.489	0.001**				
		Lack of exercise	0.140	0.059	0.147	2.363	0.019*				
		Low self-esteem	-0.061	0.046	-0.064	-1.316	0.189				
2	Difficulty to relax (DR)	<i>Relationship between Psychological health symptom (DR) and Causes (Personal and Construction work factors)</i>									
		(Constant)	1.814	0.337	-	5.388	0.000**	0.452	0.204	16.641	0.000
		Tight deadline pressures	0.224	0.054	0.233	4.167	0.000**				
		Abusive and over-demanding supervisors	0.406	0.062	0.417	6.559	0.000**				
		Lack of exercise	-0.141	0.072	-0.145	-1.940	0.049**				
		Low self-esteem	0.010	0.074	0.010	0.141	0.888				
3	Physically exhausted (PE)	<i>Relationship between Psychological health symptom (PE) and Effects, Coping Strategies</i>									
		(Constant)	2.874	0.278	-	10.347	0.000**	0.313	0.098	7.039	0.000
		Low productivity (LP)	0.139	0.316	0.140	0.441	0.660				
		Errors in work (EW)	0.141	0.324	0.138	0.434	0.665				
		Work extra hard (WH)	0.172	0.078	0.175	2.215	0.028*				
		Take in more caffeine (TC)	-0.121	0.078	-0.125	-1.542	0.124				
4	Difficulty to relax (DR)	<i>Relationship between Psychological health symptom (DR) and Effects, Coping Strategies</i>									
		(Constant)	0.749	0.207	-	3.623	0.000**	0.717	0.514	68.486	0.000
		Low productivity (LP)	0.497	0.235	0.492	2.110	0.036*				
		Errors in work (EW)	-0.442	0.241	-0.427	-1.833	0.068				
		Work extra hard (WH)	0.503	0.058	0.505	8.704	0.000**				
		Take in more caffeine (TC)	0.237	0.058	0.241	4.063	0.000**				

Note: \*\* indicates Regression is significant at the 0.010 level (2-tailed).

\* indicates Regression is significant at the 0.050 level (2-tailed).



**Table 10.3: Regression models of psychological health indicators, organisational strategies, and influential factors**

Table 10.3: Regression models of psychological health indicators, organisational strategies, and influential factors											
Model	Dependent variable	Independent variables	B	Std. Error	Beta	t	P-Value	R	R2	Anova	
										F	Sig.
5	Physically exhausted (PE)	<i>Relationship between Psychological health symptom (PE) and Organisational strategies, Influential factors</i>									
		(Constant)	1.998	0.282	-	7.078	0.000**	0.446	0.199	16.045	0.000
		Enhance good supervisory and working relations (ES)	-0.390	0.342	-0.380	-1.140	0.255				
		Ensure better working conditions (EB)	0.615	0.344	0.592	1.786	0.075				
		Willingness of employees to cooperate with the intervention (WC)	0.303	0.065	0.322	4.638	0.000**				
		Extent of management commitment and support (EM)	-0.007	0.066	-0.007	-0.104	0.917				
6	Difficulty to relax (DR)	<i>Relationship between Psychological health symptom (DR) and Organisational strategies, Influential factors</i>									
		(Constant)	1.887	0.285		6.611	0.000**	0.451	0.203	16.509	0.000
		Enhance good supervisory and working relations (ES)	1.519	0.346	1.458	4.392	0.000**				
		Ensure better working conditions (EB)	-1.172	0.348	-1.115	-3.369	0.001**				
		Willingness of employees to cooperate with the intervention (WC)	-0.075	0.066	-0.078	-1.135	0.258				
		Extent of management commitment and support (EM)	0.167	0.066	0.172	2.514	0.013*				

Note: \*\* indicates Regression is significant at the 0.010 level (2-tailed).

\* indicates Regression is significant at the 0.050 level (2-tailed).

**Table 10.4: Regression models of construction work-related causes, effects and coping strategies**

Table 10.4: Regression models of construction work-related causes, effects and coping strategies											
Model	Dependent variable	Independent variables	B	Std. Error	Beta	t	p-Value	R	R2	Anova	
										F	Sig.
7	Tight deadline pressures (TD)	Relationship between Construction work-related cause (TD) and Effects, Coping Strategies									
		(Constant)	1.503	0.285	-	5.265	0.000**	0.546	0.298	27.471	0.000
		Low productivity (LP)	-0.352	0.283	-0.348	-1.243	0.215				
		Errors in work (EW)	0.59	0.291	0.568	2.03	0.043*				
		Work extra hard (WH)	0.254	0.059	0.256	4.282	0.000**				
		Take in more caffeine (TC)	0.467	0.055	0.478	8.553	0.000**				
8	Abusive and over-demanding supervisors (AO)	Relationship between Construction work-related cause (AO) and Effects, Coping Strategies									
		(Constant)	1.659	0.261	-	6.356	0.000**	0.515	0.265	23.375	0.000
		Low productivity (LP)	0.569	0.297	0.549	1.915	0.057				
		Errors in work (EW)	-0.47	0.304	-0.442	-1.543	0.124				
		Work extra hard (WH)	0.514	0.073	0.502	7.045	0.000**				
		Take in more caffeine (TC)	-0.051	0.074	-0.051	-0.699	0.485				

Note: \*\* indicates Regression is significant at the 0.010 level (2-tailed).

\* indicates Regression is significant at the 0.050 level (2-tailed).

Table 10.5: Regression models of personal related causes, effects, coping strategies, organisational strategies and influential factors											
Model	Dependent variable	Independent variables	B	Std. Error	Beta	t	P-Value	R	R2	Anova	
										F	Sig.
9	Lack of exercise (LE)	Relationship between Personal related cause (LE) and Effects, Coping Strategies									
		(Constant)	3.037	0.298	-	10.18	0.000**	0.236	0.056	3.825	0.000
		Low productivity (LP)	0.590	0.340	0.565	1.736	0.084				
		Errors in work (EW)	-0.513	0.348	-0.479	-1.473	0.142				
		Work extra hard (WH)	0.181	0.083	0.176	2.172	0.031*				
		Take in more caffeine (TC)	0.002	0.084	0.002	0.020	0.984				
10	Low self-esteem (LS)	Relationship between Personal related cause (LS) and Effects, Coping Strategies									
		(Constant)	3.413	0.299	-	11.424	0.000**	0.26	0.068	4.708	0.001
		Low productivity (LP)	-0.533	0.340	-0.506	-1.566	0.119				
		Errors in work (EW)	0.376	0.349	0.348	1.079	0.282				
		Work extra hard (WH)	0.472	0.250	0.459	1.889	0.060				
		Take in more caffeine (TC)	0.090	0.084	0.088	1.071	0.285				
11	Low productivity (LP)	Relationship between Effects (LP) and Organisational strategies, Influential factors									
		(Constant)	2.224	0.295	-	7.549	0.000	0.369	0.136	10.222	0.000
		Enhance good supervisory and working relations (ES)	-0.094	0.068	-0.099	-1.38	0.169				
		Ensure better working conditions (EB)	0.778	0.357	0.753	2.179	0.030*				
		Willingness of employees to cooperate with the intervention (WC)	-0.43	0.359	-0.413	-1.198	0.232				
		Extent of management commitment and support (EM)	0.088	0.068	0.093	1.287	0.199				
12	Errors in work (EW)	Relationship between Effects (EW) and Organisational strategies, Influential factors									
		(Constant)	2.208	0.288	-	7.666	0.000**	0.363	0.131	9.800	0.000
		Enhance good supervisory and working relations (ES)	0.296	0.349	0.294	0.848	0.397				
		Ensure better working conditions (EB)	0.066	0.351	0.064	0.187	0.852				
		Willingness of employees to cooperate with the intervention (WC)	0.076	0.067	0.082	1.140	0.255				
		Extent of management commitment and support (EM)	-0.094	0.067	-0.101	-1.409	0.160				

Note: \*\* indicates Regression is significant at the 0.010 level (2-tailed).

\* indicates Regression is significant at the 0.050 level (2-tailed).

**Table 10.6: Regression models of coping strategies, organisational strategies and influential factors**

Table 10.6: Regression models of coping strategies, organisational strategies and influential factors												
Model	Dependent variable	Independent variables	B	Std. Error	Beta	t	P-Value	R	R2	Anova		
										F	Sig.	
13	Work extra hard (WH)	Relationship between Coping Strategies (WH) and Organisational strategies, Influential factors										
		(Constant)	2.132	0.297	-	7.179	0.000**	0.379	0.143	10.838	0.000	
		Enhance good supervisory and working relations (ES)	0.492	0.360	0.471	1.368	0.173					
		Ensure better working conditions (EB)	-0.263	0.362	-0.249	-0.726	0.469					
		Willingness of employees to cooperate with the intervention (WC)	-0.107	0.069	-0.112	-1.558	0.120					
		Extent of management commitment and support (EM)	0.284	0.069	0.293	4.120	0.000**					
14	Take in more caffeine (TC)	Relationship between Coping Strategies (TC) and Organisational strategies, Influential factors										
		(Constant)	1.910	0.300	-	6.366	0.000**	0.392	0.154	11.748	0.000	
		Enhance good supervisory and working relations (ES)	1.320	0.363	1.243	3.633	0.000**					
		Ensure better working conditions (EB)	-1.064	0.366	-0.992	-2.910	0.004**					
		Willingness of employees to cooperate with the intervention (WC)	-0.03	0.070	-0.031	-0.430	0.667					
		Extent of management commitment and support (EM)	0.184	0.070	0.186	2.638	0.009**					
15	Enhance good supervisory and working relations (ES)	Relationship between Organisational strategies (ES) and Influential factors										
		(Constant)	2.302	0.230	-	10.013	0.000**	0.457	0.209	34.436	0.000	
		Willingness of employees to cooperate with the intervention (WC)	0.257	0.060	0.280	4.299	0.000**					
		Extent of management commitment and support (EM)	0.224	0.061	0.241	3.696	0.000**					
16	Ensure better working conditions (EB)	Relationship between Organisational strategies (EB) and Influential factors										
		(Constant)	2.337	0.228	-	10.227	0.000**	0.450	0.203	33.220	0.000	
		Willingness of employees to cooperate with the intervention (WC)	0.216	0.059	0.237	3.624	0.000**					
		Extent of management commitment and support (EM)	0.254	0.060	0.277	4.228	0.000**					

Note: \*\* indicates Regression is significant at the 0.010 level (2-tailed).

\* indicates Regression is significant at the 0.050 level (2-tailed).

### **10.1.3 Discussion of the results from the correlation analysis**

The results from the correlation analysis of the relationship between the major findings have been presented in Table 10.1. The results indicate that the major psychological health symptom of physically exhausted, which was highly recorded among the construction employees in Ghana, had positive significant relationship with the construction work-related factors of tight deadline pressure and abusive or overdemanding supervisors. Difficult to relax, which was the second highly recorded psychological health symptom among the construction employees, also had a positive significant relationship with abusive or over-demanding supervisors, but no significant relationship with tight deadline pressure. Physically exhausted also had a positive significant relationship with personal-related factor of lack of exercise, but a negative relationship with low self-esteem. Difficult to relax, on the other hand, had a positive significant relationship with low self-esteem, but no significant relationship with lack of exercise.

The results also revealed that both physically exhausted and difficult to relax had positive significant relationship with psychological effects of low productivity and errors in work. It was also revealed from the correlation analysis that physically exhausted had a positive significant relationship with individual coping strategy of working extra hard, but no significant correlation with taking in more caffeine. Difficult to relax however had positive significant relationship with both individual coping strategies of working extra hard and taking in more caffeine. Both physically exhausted and difficult to relax were also revealed to have positive significant correlation with organisational preventive strategies of enhance good supervisory and working relations and ensuring better working conditions. The results also indicate positive significant relationship between the psychological health symptoms of physically exhausted and difficult to relax and the influential implementation factors of

willingness of employees to cooperated with the intervention and the extent of management commitment and support.

It was also revealed from the correlation analysis that the construction work-related factor of tight deadline pressure had a positive significant relationship with the personal-related factor of lack of exercise, but a negative relationship with low self-esteem. Abusive or overdemanding supervisors also had a positive significant relationship with lack of exercise, but no significant relationship with low self-esteem. The results also revealed that both tight deadline pressure and abusive or overdemanding supervisors had positive significant relationship with psychological effects of low productivity and errors in work. It was also revealed from the correlation analysis that both tight deadline pressure and abusive or overdemanding supervisors had positive significant relationship with individual coping strategies of working extra hard and taking in more caffeine. Both tight deadline pressure and abusive or overdemanding supervisors were also revealed to have positive significant correlation with organisational preventive strategies of enhance good supervisory and working relations and ensuring better working conditions. The results also indicate positive significant relationship between the construction work-related factors of tight deadline pressure and abusive or overdemanding supervisors and the influential implementation factors of willingness of employees to cooperate with the intervention and the extent of management commitment and support.

The results from the correlation analysis was revealed that the personal-related factor of lack of exercise had positive significant relationship with the psychological effects of low productivity and errors in work. Low self-esteem on the other hand had negative correlation with the psychological effects of low productivity and errors in work. It was also revealed that both lack of exercise and low self-esteem had positive significant relationship with individual coping strategies of working extra hard and taking in more caffeine. Both lack of exercise and

low self-esteem were also revealed to have positive significant correlation with organisational preventive strategies of enhance good supervisory and working relations and ensuring better working conditions. The results also indicate positive significant relationship between the personal-related factors of lack of exercise and low self-esteem and the influential implementation factors of willingness of employees to cooperated with the intervention and the extent of management commitment and support.

It was also revealed from the results of the correlation analysis that psychological effects of low productivity and errors in work had positive significant correlation with the individual coping strategies of working extra hard and taking in more caffeine. Both low productivity and errors in work were also revealed to have positive significant correlation with organisational preventive strategies of enhance good supervisory and working relations and ensuring better working conditions. The results also indicate positive significant relationship between low productivity and errors in work and the influential implementation factor of willingness of employees to cooperate with the intervention, but no significant relationship with the extent of management commitment and support.

The results also indicate positive significant relationship between the individual coping strategies of working extra hard and taking in more caffeine and the organisational preventive strategies of enhance good supervisory and working relations and ensuring better working conditions. It was also revealed that both working extra hard and taking in more caffeine had positive significant relationship with the influential implementation factors of willingness of employees to cooperated with the intervention and the extent of management commitment and support. The organisational preventive strategies of enhance good supervisory and working relations and ensuring better working conditions also had positive significant relationship with the influential implementation factors of willingness of employees to cooperate with the intervention and the extent of management commitment and support.

#### **10.1.4 Discussion of the results from the regression analysis**

The results from the regression analysis as shown in Table 10.2 revealed that the psychological health symptoms of physically exhausted and difficult to relax had direct significant causal relationship with the construction work-related factors of tight deadline pressures and abusive or overdemanding supervisors. Both physically exhausted and difficult to relax also had direct significant causal relationship with the personal-related factor of lack of exercise, but no direct significant relationship with low self-esteem.

The results from the regression analysis also indicate that physically exhausted had no direct significant relationship with the psychological effects of low productivity and errors in work. Difficult to relax however had a direct significant causal relationship with low productivity but also had no direct significant relationship with errors in work. It was revealed that physically exhausted had direct significant causal relationship with the individual coping strategy of working extra hard, but no direct significant relationship with taking in more caffeine. Difficult to relax on the other hand had direct significant causal relationship with the individual coping strategies of working extra hard and taking in more caffeine.

As shown in Table 10.3, the results from the regression analysis indicate that psychological health symptom of physically exhausted had no direct significant relationship with organisational preventive strategies of enhance good supervisory and working relations and ensuring better working conditions. Difficult to relax on the other hand had direct significant causal relationship with the organisational preventive strategies of enhance good supervisory and working relations and ensuring better working conditions. It was also revealed that physically exhausted and difficult to relax had direct significant causal relationship with the influential implementation factor of willingness of employees to cooperate with the intervention but had no direct significant relationship with the extent of management commitment and support. Difficult to relax however had a direct significant causal relationship



with the extent of management commitment and support, but no direct significant relationship with the willingness of employees to cooperate with the intervention.

Regression analysis was further employed to establish the relationship between the construction work-related factors and psychological effects and with the individual coping strategies as shown in Table 10.4. The results indicate that the construction work-related factor of tight deadline pressure had no direct significant relationship with the psychological effect of low productivity but had a direct significant causal relationship with errors in work. It was also revealed that abusive or overdemanding supervisors had no direct significant relationship with low productivity and errors in work. The results from the regression analysis also revealed that tight deadline pressure had direct significant causal relationship with the individual coping strategies of working extra hard and taking in more caffeine. Abusive or overdemanding supervisors also had a direct significant causal relationship with working extra hard, but no direct significant relationship with taking in more caffeine.

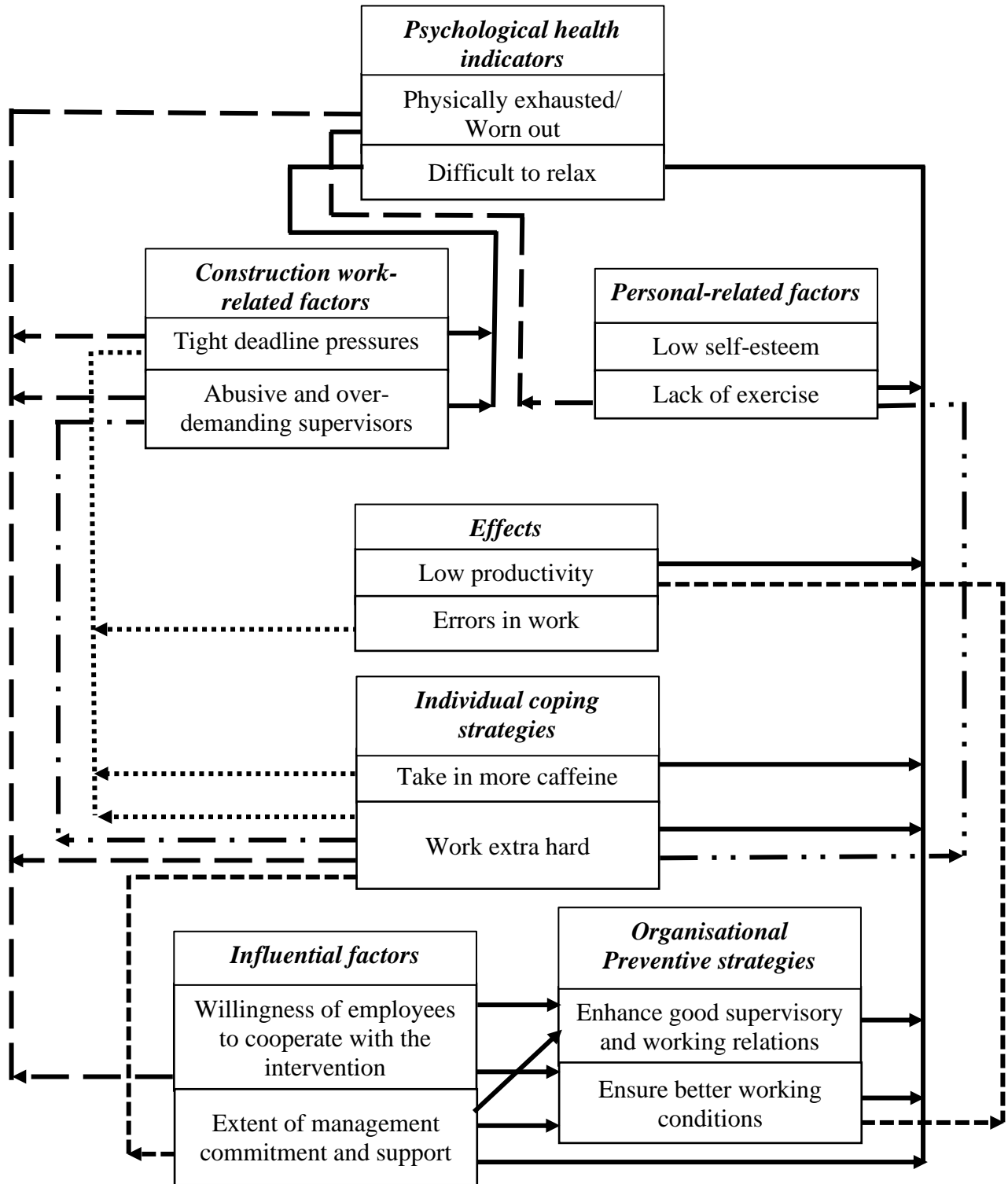
The results from the regression analysis as presented in Table 10.5 also indicate that the personal related causes of lack of exercise and low self-esteem had no direct significant relationship with the psychological effects of low productivity and errors in work. It was also revealed that lack of exercise had a direct significant causal relationship with the individual coping strategy of working extra hard, but no direct significant relationship with taking in more caffeine. Low self-esteem on the other hand, had no direct significant relationship with working extra hard and taking in more caffeine. The results from the regression analysis also revealed that the psychological effects of low productivity had no direct significant relationship with the organisational preventive strategy of enhance good supervisory and working relations but had a direct significant causal relationship with ensuring better working conditions. Errors in work however had no direct significant relationship with the organisational preventive strategies of enhance good supervisory and working relations and ensuring better working conditions. It was

also revealed that both low productivity and errors in work had no direct significant relationship with the influential implementation factors of willingness of employees to cooperate with the intervention and the extent of management commitment and support.

The results from the regression analysis as presented in Table 10.6 revealed that individual coping strategy of working extra hard had no direct significant relationship with the organisational preventive strategies of enhance good supervisory and working relations and ensuring better working conditions. Taking in more caffeine on the other hand had direct significant causal relationship with the organisational preventive strategies of enhance good supervisory and working relations and ensuring better working conditions. It was also revealed that both working extra hard and taking in more caffeine had no direct significant relationship with the influential implementation factor of willingness of employees to cooperate with the intervention, but had direct significant causal relationship with the extent of management commitment and support. The regression analysis also revealed that the organisational preventive strategies of enhance good supervisory and working relations and ensuring better working conditions had direct significant causal relationship with the influential implementation factors of willingness of employees to cooperate with the intervention and the extent of management commitment and support.

#### **10.1.5. Final integrated model developed from regression analysis**

This study sought to offer a holistic model or framework for policymakers and construction stakeholders to improve the psychological health conditions of construction employees in Ghana and to some extent globally. The results from the correlation analysis, which depict a positive or negative relationship between the psychological health symptoms and the perceived factors, were slightly different from the results obtained from the regression analysis. The results from the regression analysis depict direct causal relationship and was employed to develop the final integrated model shown in Figure 10.3.



**Figure 10.3: Final integrated model developed from the study**

*Note: Various line styles were used to present direction from one factor to the other.*

## **10.2 Conclusions and Recommendations of the study**

The study revealed potential factors associated with the psychological health conditions of construction employees in Ghana. The results from the correlation analysis and regression analysis indicate that some of the factors had positive significant relationship with the symptoms of psychological health conditions but had no direct causal relationship with the psychological health symptoms. For instance, it was revealed from the correlation analysis that, the major psychological health symptom of physically exhausted had positive significant relationship with psychological health effects of low productivity and errors in work. However, the results from the regression analysis revealed that physically exhausted had no direct causal relationship with psychological health effects of low productivity and errors in work.

The results indicate that the findings from this study are potential factors that can have direct or indirect consequences on the psychological health and well-being of construction employees in Ghana and to some extent globally. This study therefore recommends that the major players of the construction industry should pay critical attention to the psychological health and well-being of construction employees by considering all the potential factors associated with psychological health. The conclusion and recommendation for the specific factors identified from the study have been provided in the subsequent sections.

### **10.2.1 Conclusion and Recommendation on Determinants of psychological health status among construction employees<sup>13</sup>**

Previous studies have revealed that psychological ill-being could have adverse consequences on the individual employee's physical, mental, and social well-being. Psychological ill-being conditions of construction employees could lead to consequences for

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<sup>13</sup> Some contents of section 10.2.1 of this Chapter have been published in: Fordjour, G. A., and Chan, A. P. C. (2020), "Tracing Symptoms of Psychological Health Status among Construction Employees". *Journal of Health and Medical Sciences*, 3(1), 104-118.

the construction industry, such as increases in turnover rate, decreases in job satisfaction, a general deterioration in work productivity, and poor performance outcomes. The devastating consequences of employees' psychological ill-health made it imperative that the research aimed to assess the current psychological health state of construction employees. This study was done by exploring 48 validated symptoms of psychological health conditions identified from literature reviews and already established quantitative measures. The psychological health symptoms were grouped under physical symptoms, emotional symptoms, cognitive symptoms, and behavioural symptoms. The responses provided by the participants on how frequently they experience these symptoms using a 1-6 Likert scale, was used to assess whether a respondent was in a positive state of psychological well-being or a negative state of psychological ill-being.

A target of 300 questionnaires was equally distributed to construction professionals and construction trade workers in Ghana. A non-probability sampling technique, specifically the purposive sampling method, was adopted in selecting the research participants. Comparative analysis was done to indicate which of the two construction working groups was more prevalent in either a positive state of psychological well-being or a negative state of psychological ill-being. The findings from the study revealed that a significant number of construction employees had experienced the negative symptoms of psychological health conditions. The highly recorded symptoms identified among the two constructions groups were physically exhausted, difficulty relaxing, insomnia, accident-prone, and chronic headaches. These findings confirm the statement by the World Health Organization that every one (1) in four (4) persons in the world suffers from some symptoms of psychological ill-being condition.

The study revealed some statistically significant differences in the level of experiences of the symptoms of psychological health conditions. For instance, the symptom of difficulty relaxing, which was the predominant symptom among the construction professionals, was

ranked as the 2<sup>nd</sup> symptom among the construction trade workers. Similarly, the symptom of physically exhausted, which was the highest ranked symptom among the construction trade workers, was ranked as the 5<sup>th</sup> symptom among the construction professionals. The findings also indicated that psychological ill-being conditions were prevalent among the construction trade workers than the construction professionals, with more than 50% of them having experienced the negative symptoms of psychological health conditions.

The symptoms of poor psychological health conditions identified among the construction employees could have consequences undoubtedly on the ability of employees to carry out their construction works effectively, with an adverse effect on the construction industry. There is a need for occupational psychological support systems in the construction industry to enhance construction employees' health and promote their psychological well-being.

### **10.2.2 Conclusion and Recommendation on Personal intervening factors that might influence the vulnerability of construction employees to occupational psychological disorders.<sup>14</sup>**

Personal- related factors could be very significant to the issues of occupational psychological health management in the construction industry. This study aims to explore the need for psychological health interventions in the construction industry by exploring personal factors that could make construction employees vulnerable to occupational psychological disorders. For this reason, this research explored personal factors that could make construction employees vulnerable to the triggers of occupational psychological disorders such as abusive and overdemanding supervisors, tight deadline pressures, poor working conditions and limited

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<sup>14</sup> Some contents of section 10.2.2 of this Chapter have been published in: Fordjour, G. A., Chan, A. P. C. and Amoah, P. (2019). "Exploring Personal Factors That Might Influence the Vulnerability of Construction Employees to Occupational Psychological Disorders". *Health*, 11, 546-566.

time for relaxation. The personal-related psychological factors explored in this study included: low self-esteem, unproductive core beliefs, negative personality traits, poor time management skills, poor self-evaluation concepts on performance and poor relationship with others. Previous studies have revealed that these personal factors have a link with the core aspect of psychological resource theory.

A non-probability sampling technique, specifically purposive sampling method was adopted in selecting the research participants. The participants in the study were selected on the basis that they have some work experience in the Ghanaian construction industry and belong to either a construction profession or work trade. Low self-esteem, poor time management skills and poor relationship with others were most prevalent among the participants of this study. These personal-related factors could positively predict occupational psychological disorders such as burnout and workaholism among the construction employees. For instance, a construction employee with low self-esteem could be vulnerable to abusive and overdemanding supervisors, which could lead to the employee experiencing psychological disorders of workaholism. Also, a construction employee with poor time management skills could be faced with tight deadline pressures, which could lead to psychological disorders of job burnout. Construction employees who have poor relationship with others could also cause violence at the construction workplace, which could result to hostility, aggression, discrimination and offensive behaviours among the employees. This research thus supports the assumption that perceptions of psychological disorders such as workaholism, job stress or burnout, are not just a product of work conditions, but personal factors.

This study further investigated the relationship between the six personal intervening factors and demographic factors specifically age, educational level and, marital status. Correlation and regression analysis were employed for this analysis. The results indicate that the age and marital status of the respondents had no significant relationship with any of the six

personal intervening factors. However, the educational level of the respondents revealed significant relationship with four of the personal factors, specifically self-esteem, time management skills, productive core beliefs and self-concept evaluation on performance. That is, the highly educated construction employees had lower means scores, which indicate they had higher self-esteem, better time management skills, higher productive core beliefs and better self-concept evaluation on performance than the less educated respondents. Education is, therefore, an important contributory factor to reduce the vulnerability of construction employees to the risks of psychological disorders.

There is the need for the construction employees to take advantage of educational programs and adopt positive personal characteristics to enhance their psychological well-being. This study, therefore, recommends psychological health preventive strategies for the construction employee by focusing on positive personality factors such as high self-esteem, productive core beliefs, positive personality traits, good self-concept evaluation on performance and good time management skills. Though not all employees exposed to similar conditions develop the same psychological ill-being conditions, these personal factors would likely reduce construction employees' vulnerabilities to the risks of psychological disorders. These personal factors can also influence the construction employees' commitment and work engagement in their respective construction companies in Ghana and to some extent globally.

The study findings serve as a basis for further studies into occupational psychological health management and can be a form of reference for academicians, students, and future researchers. As findings of this research broaden perceptions on occupational psychology of construction employees, thereby offering deeper insights into issues that could enhance psychological health management in the construction industry of Ghana and globally. Further research would investigate the biggest challenge for the interventions to reduce the occupational psychological disorders in the construction industry.



**10.2.2.1 Conclusion and Recommendation on Personal predictive factors that makes one vulnerable to psychological health conditions<sup>15</sup>**

Previous studies have shown that occupational psychological disorders such as stress, depression, and anxiety, have adverse consequences on various aspects of the employee's life as well as the company. This study sought to explore personal intervening factors that make one vulnerable to psychological health conditions among the construction employees. To achieve this aim, a target of 300 questionnaires was equally distributed to construction professionals and construction trade workers in Ghana. Quantitative analysis was done, and a comparison of the results made, to determine which of the two construction working groups was more vulnerable to adverse occupational psychological health conditions.

Four main constructs of psychological health indicators namely individual lifestyle, psychosocial symptoms, physiological conditions, and work attitudes were further divided into twenty (20) personal predictive occupational psychological health factors. The measures adopted for the study were based on the review of related literature works in occupational psychology. The previous studies indicate that personal predictive factors of adverse occupational psychological health conditions are directly related to poor individual lifestyle choices (in terms of exercise, eating habits, sleeping patterns and the likes) as well as physiological conditions, psychosocial symptoms (such as unfriendliness, irritability, lack of trust) and poor work attitudes (in terms of work happiness, job commitment and advocacy). The responses provided by the participants on how they relate to these indicators, using a 1-6 Likert scale, were used to assess whether a participant was experiencing adverse occupational psychological health conditions.

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<sup>15</sup> Some contents of section 10.2.2.1 of this Chapter have been published in: Fordjour, G. A. and Chan, A. P. C. (2019). "Exploring Occupational Psychological Health Indicators Among Construction Employees: A Study in Ghana". *Journal of Mental Health and Clinical Psychology*, 3(2): 6-18.

The findings from the study imply that there is the existence of the personal predictive factors of adverse psychological health conditions among both the construction professionals and construction trade workers. The results further revealed that using the measures of individual lifestyle and work attitudes, there were statistically significant differences between the mean scores obtained from the two construction working groups. The results using the measure of psychosocial symptoms and physiological conditions, however revealed that, there were not much statistically significant differences between the mean scores of the two construction working groups. This particular outcome from the study confirms the statement by the World Health Organization that one (1) in four (4) persons in the world suffers from some form of psychological health disorders.

The overall results indicate that the construction trade workers in Ghana were found to be more vulnerable to the adverse occupational psychological health conditions as their mean scores were lower than the mean scores of the construction professionals in Ghana. The outcome of the results could be due to underlining differences among the two construction groups in terms of various characteristics such as individual personality, age, marital status, gender, level of education, years of working experience, task level, role demands, and income levels. For instance, the level of education of the construction professionals was higher than the construction trade workers. On the other hand, factors such as task level and role demand of the construction trade workers were also higher than the construction professionals. These factors could significantly lead to differences in the level of vulnerability to adverse occupational psychological health conditions.

Construction employees are to take full responsibility of maintaining their psychological well-being by ensuring that they are in good physical health, sleeping well, eating well, exercising, and avoiding harmful alcohol and other drugs. These are things that are fundamental to the well-being of all people but of greater importance to people more prone to

psychological ill-being conditions. Good sleep patterns are particularly important for employees' well-being, as sleep disorders are often one of the first signs of experiencing adverse psychological health conditions. Human resource managers, health and safety officers and labour unions should help increase psychological health awareness to encourage construction employees to take their psychological health more seriously.

Stakeholders of the construction industry should also pay critical attention to the well-being of their employees both physically and psychologically. This study recommends psychological interventions for all employees in the construction industry such as the establishment of welfare committee and provision of occupational psychological support systems (for example: offering free counselling services and paying medical bills for employees). Factors leading to employees' psychological well-being conditions should be promoted for the individual and organizational benefits. These will enhance the well-being of all construction employees and promote a psychologically safe and healthy construction workplace in Ghana and globally. This research study forms part of the basic steps in developing a preventive psychological health management model for all construction employees. This model will ensure that the physical, mental and social well-being of both construction professionals and construction trade workers are enhanced and their job performance and productivity levels optimized. The findings from this study will, therefore, add to the body of knowledge on occupational psychology in the construction industry.

### **10.2.3 Conclusion and Recommendation on Construction work-related factors that could expose construction employees to psychological distress.**

This study sought to explore the construction work-related factors that could expose both construction professionals and construction trade workers to psychological disorders. A qualitative research approach was first employed, which aimed at exploring and understanding

the construction work-related factors. A total of sixteen (16) focus group discussions were held in Ghana with 90 construction employees. The focus group discussions revealed forty-two (42) items as construction work-related factors associated with the psychological disorders or ill-being conditions of construction employees. A quantitative research approach was adopted to measure the criticality of the factors revealed in the qualitative study. A target of 300 questionnaires was purposively distributed to 150 construction professionals and 150 construction trade workers in Ghana. A non-probability sampling technique, specifically the purposive sampling method, was adopted in selecting the research participants for both the qualitative and quantitative study.

Using exploratory factor analysis, the 42 construction work-related factors revealed in this study were further grouped under seven main constructs namely: task demands, role demands, poor interpersonal working relationships, poor work conditions, lack of autonomy, lack of feedback and unfair rewards/ treatment. The inter-item consistencies of all the constructs were measured to be very good as their Cronbach alpha values were greater than 0.70. The individual factors had their mean scores greater than 3.0 and their significant values less than 0.050. All the construction works related factors revealed and measured in this study were, therefore, deemed significant to expose both the construction professionals and construction trade workers in Ghana to behavioural and physiological effects of psychological disorders. These factors could, therefore, lead to consequences of direct costs such as low productivity and poor job performance and indirect costs such as low motivation and job dissatisfaction.

The critical construction work-related psychological risks factors identified in the study were: tight deadline pressures, poor working space, abusive and overdemanding supervisors, limited time for relaxation, pay is relatively low, unfinished work, exposure to physical dangers, and poor communication. The construction professionals' group and the construction

trade workers group in Ghana had different opinions regarding the criticality of these factors as construction work-related psychological risk factors, for instance, tight deadline pressure was ranked as the most critical factor by the construction professionals but abusive/overdemanding supervision was ranked as the most critical factor by the construction trade workers. The differences in the opinions of the two construction groups could be due to some underlining factors such as work trade, task level, type of role, pay differential, working experience and other demographic characteristics such as age, gender, and educational background.

Some of the findings were in consistent with findings from previous studies conducted in other developing countries such as China, Nigeria, Sri Lanka, South Africa and Gaza Strip – Palestine. The findings from this study, therefore, form a basis for designing a preventive psychological health management model for all construction employees in Ghana and globally. The findings from this study could be applied to other jurisdictions, especially the developing countries that share common characteristics with that of Ghana. This study thus contributes to the construction literature on occupational psychological issues, with the intention to promote a psychologically safe and healthy construction workplace.

#### **10.2.4 Conclusion and Recommendation on Effects of psychological health condition on construction employees and the construction industry.<sup>16</sup>**

This study sought to identify the effects of occupational psychological disorders such as burnout and workaholism, on construction employees and the construction industry based on the perceptions, opinions or personal experiences of construction employees. To achieve this aim, this study adopted the methods of focus group discussions and questionnaire survey

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<sup>16</sup> Some contents of section 10.2.4 of this Chapter have been published in: Fordjour, G. A. and Chan, A. P. (2020). “Exploring the effects of occupational psychological disorders on construction employees and the construction industry”. *Occupational Diseases and Environmental Medicine*, 8(1), 1-25.

in Ghana. The focus group study provided in-depth information on the research topic. The participants for the study revealed seventeen (17) items as perceived effects of occupational psychological disorders on construction employees. The participants also revealed twelve (12) items as perceived effects of construction employees' psychological health conditions on the construction industry of Ghana. A quantitative study was then conducted as further studies. The methods of exploratory factor analysis were employed, and the findings were categorized under major sub-headings. The perceived effects of psychological disorders on construction employees were categorized under behavioural effects and physiological effects. The perceived effects of construction workers' psychological health conditions on the construction industry were also categorized under direct costs and indirect costs. The internal consistency and reliability of the 4 constructs extracted were revealed to be good.

The results from the study indicated that all the items identified in this study as effects of occupational psychological disorders on construction employees and the construction industry were statistically significant. The null hypothesis stating that the perceived effects of psychological disorders were not statistically significant will be rejected, and the alternative hypothesis accepted. The key perceived effects of psychological disorders on construction employees identified were accident-prone, chronic pain, insomnia or sleep disturbances, musculoskeletal injuries, loss memory/ forgetfulness as these had the highest mean scores. The key items also identified as perceived effects of construction employees' psychological health conditions on the construction industry were absenteeism/sick leave, errors in work, job dissatisfaction and medical costs.

A comparison of the mean scores obtained from the construction professionals and construction trade workers in Ghana revealed statistically significant differences for some of the items measured as effects of occupational psychological disorders. The null hypothesis which states that the mean scores obtained by the two construction groups were not statistically

significant will also be rejected, and the alternative hypothesis accepted. The rankings of the items measured in the study also showed significant differences between the two construction groups. For instance, accident-prone as an effect of occupational psychological disorders on construction employees was ranked 1<sup>st</sup> by the construction professionals but 4<sup>th</sup> by the construction trade workers. Chronic pain was rather ranked 1<sup>st</sup> by the construction trade workers but 6<sup>th</sup> by the construction professionals. On the other hand, absenteeism/sick leave as an effect of occupational psychological disorders on the construction industry was ranked 1<sup>st</sup> by the construction professionals but 3<sup>rd</sup> by the construction trade workers. Errors in work as an effect was rather ranked 1<sup>st</sup> by the construction trade workers but 7<sup>th</sup> by the construction professionals. These results could be due to various reasons such as differences in the nature of work, professional skills, educational background, level of experience, levels of commitment and job responsibilities among the construction personnel. The findings from this study were also in conformity with some previous studies conducted in occupational psychology.

The results of this study indicate that there is a need for strategic interventions in the construction industry of Ghana to mitigate the effects of occupational psychological disorders on construction employees and the construction industry. The consequences of construction employees' psychological health conditions on the construction industry also necessitate some measures by the construction stakeholders to enhance the well-being of construction employees. The limitation of the study includes the focus of the study in a single geographical area. A future study could conduct cross-cultural studies to determine whether the findings from the study would be different from other geographical settings.

This study recommends organisational strategies such as the provision of psychological health systems, interventions for psychological ill-being symptoms and employees support from management and co-workers, as measures to enhance occupational psychological health management in the construction industry of Ghana and to some extent globally. This study also

recommends that construction employees experiencing some effects of psychological disorders should seek medical attention or consult a professional psychologist or counsellor for help. Support from family or friends and the adoption of a healthy lifestyle would also help moderate the effects of psychological disorders on the construction employees in Ghana and globally. The findings from the study would, therefore, enhance occupational psychological health management in the construction industry and contribute to the literature on occupational psychology.

#### **10.2.5 Conclusion and Recommendation on Coping strategies adopted by construction employees as their responses or efforts to deal with the causes and effects of occupational psychological disorders.<sup>17</sup>**

This study sought to explore the coping strategies adopted by construction professionals and construction trade workers to deal with the causes and effects of psychological disorders, this study employed the methods of focus group study and quantitative survey in Ghana. The focus group study provided in-depth information on the coping strategies adopted by construction professionals and construction trade workers in Ghana to deal with psychological health issues. The participants revealed 25 items as causes-focused coping strategies and revealed 22 items as effects-focused coping strategies. The reliability and validity of the study findings were ensured using multiple sources of data collection such as working sheets, audio recording, and note-taking.

Quantitative data analyses were done. The methods of exploratory data analysis were employed, and the psychological health causes-focused coping strategies were categorized under four sub-headings: avoiding the cause, altering the cause, adapting to the cause and

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<sup>17</sup> Some contents of section 10.2.5 of this Chapter have been published in: Fordjour, G. A., Chan, A.P.C., Amoah, P. and Tuffour-Kwarteng, L. (2019). "Coping Strategies Adopted by Construction Employees to Deal with the Causes and Effects of Occupational Psychological Disorders: A Study in Ghana". *Health*, 11, 755-782.



accepting the cause. The effects-focused coping strategies were also categorized under healthy and unhealthy coping strategies. One sample T-test was employed, and all coping strategies measured in this study were revealed to be significant as their p -values were less than 0.05. The null hypothesis stating that the individual coping strategies were not statistically significant will be rejected, and the alternative hypothesis accepted.

A comparison of the mean scores of coping strategies adopted by the construction professionals and construction trade workers group was done using independent two-sample. There were some statistically significant differences between the mean scores of the coping strategies adopted by the two construction groups as their p-values marked were less than 0.05. The null hypothesis stating that the mean scores obtained by the two construction groups were not statistically significant will be rejected, and the alternative hypothesis accepted for those coping strategies. For instance, it was revealed that unhealthy coping strategies such as poor eating habits, excess smoking and excess alcohol intake were highly adopted by the construction trade workers than the construction professionals. The reason could be due to the fact that construction professionals are highly educated than construction trade workers and are fully aware of the consequences of unhealthy coping strategies.

Some of the coping strategies had significantly different rankings among the two construction groups. For instance: delegate complicated tasks as a causes-focused coping strategy was ranked 1<sup>st</sup> by the construction professionals but 14<sup>th</sup> by the construction trade workers. Withdraw from work duties or change jobs as a causes-focused coping strategy was rather ranked 1<sup>st</sup> by the construction trade workers but 11<sup>th</sup> by the construction professionals. This could be due to various factors such as differences in their nature of work, professional skills, educational background, level of experience, job responsibilities and level of commitment among the construction personnel. The results, however, also revealed that some coping strategies had the same rank among the two construction groups. For instance, saying

no when limits are exceeded as a causes-focused coping strategy was ranked 9<sup>th</sup> and adopting positive lifestyle as an effects-focused coping strategy was ranked 8<sup>th</sup> by the two construction groups.

A comparison of the findings from the study with findings from previous related research works in the construction industry was also done to indicate whether similar coping strategies were revealed across the various research works. Some similar findings were identified such as: seeking support from colleagues, withdrawing from work duties, use of drugs or pills for relaxation, excess alcohol intake and excess smoking. This indicates that these similar coping strategies are commonly adopted by construction personnel as cognitive and behavioural efforts to deal with the causes or effects of psychological disorders. However, the majority of the findings were peculiar to this study and have not been revealed by the previous researchers in this field. This study provided a longer list of various coping strategies as compared to the previous research works. The findings from this study add to existing knowledge on coping strategies adopted by construction personnel as efforts or responses to psychological issues.

Appropriate coping strategies adopted to deal with or manage the causes and effects of psychological disorders are essential for the well-being and productivity of the construction personnel. This study recommends psychological health support systems in the construction industry in Ghana and globally. There is a need to enforce healthy coping strategies and education of the construction employees on the negative consequences of the unhealthy coping strategies adopted by them to deal with psychological health issues. This study also recommends that construction employees in Ghana engage in recreational and relaxation activities as a coping strategy to moderate the effects of psychological disorders. The appropriate coping activities recommended include: spending time with family and or friends, doing physical or breathing exercises, spending time in nature, cycling and watching funny

videos, nurturing self, taking time to relax and having fun, to keep one in a better position to face inevitable life challenges. Coping activities adopted as cognitive and behavioural efforts to deal with the effects of psychological disorders are a necessity for one's life and these activities not considered to be luxurious.

It is recommended that psychological issues be openly discussed without intimidation to increase its awareness to all persons in the construction industry of Ghana. This will help reduce common mental and behavioural problems which exist in all professions, as psychological disorders are known to permeate all aspects of life and have no respecter of persons. This study recommends preventive psychological health management model for construction employees, that seeks to reduce employees' vulnerability and build their individual coping capabilities to prevent psychological disorders in Ghana and globally.

#### **10.2.6 Conclusion and Recommendation on Organisational preventive measures to mitigate the causes of psychological health conditions**

This study presents a set of basic ideas on organizational preventive measures to mitigate the causes of psychological distress in the construction industry of Ghana and to some extent globally. The 16 organizational preventive measures revealed in this study were first identified in a qualitative interview conducted with 53 respondents, and the findings were subsequently confirmed in a quantitative survey with 263 respondents. The respondents for both the qualitative and quantitative study included construction professionals, construction trade workers, and labour personnel from regulatory institutions as well as occupational health psychologists in Ghana. The findings from this study depict strategies managers can adopt in conjunction with the demands of the organizational life to reduce the menace of psychological distress among the construction employees. The results from the quantitative study indicated that there were high acceptance levels for all the proposed organizational preventive measures among the respondents. For example, the overall sample rated the effectiveness of all the

proposed measures as highly effective or very highly effective. Similar to the results of the factors, slight differences occurred between the construction trade workers group and the other groups, while the construction professionals and labour personnel showed a high level of agreement in their perceptions of the ratings of the proposed measures.

All the 16 findings may be implemented in any organization to improve the psychological health conditions of construction employees in Ghana. The 16 organizational preventive measures identified were further grouped under three main constructs, namely, protective measures, moderative measures, and interventive measures. The protective measures identified included enhance good supervisory and working relations; ensure better working conditions; enforce good policies for workers' well-being and proper planning of work activities. The moderative measures identified included establishing a welfare committee at the workplace, workers' support from management and co-workers, workplace wellness programs, and task redesign. The interventive measures identified included encouraging workers to take leave and enforce break hours, provide flexible work schedules for workers, psychological health systems and counselling services, and seeking medical interventions for symptoms. The proposed organizational preventive measures follow a proactive model of organizational change, which, as anticipated by the construction stakeholders, can avert most psychological health crises by shaping the causes rather than only reacting to its effects.

This study, therefore, contributes significantly to knowledge and practice, as it adds to the literature on socio-psychological research in the construction industry. Occupational health psychology is a new area in the study of labour issues within human resource management. For this reason, there are many potential gaps to fill. This study, therefore, focused on the psychological health of construction employees in Ghana, which is also under-researched, and therefore warranted a research study in this geographical setting. Future research based on the study findings can meticulously investigate each factor in great detail, to establish a complete

knowledge base pertinent to the region or developing countries in general. Also, one topic that warrants an investigation is the potential barriers to the implementation of the preventive organizational measures in the construction industry.

#### **10.2.7 Conclusion and Recommendation on Factors associated with effective implementation of psychological health interventions in the construction industry.<sup>18</sup>**

This study presents potential factors that can influence the implementation of psychological health interventions in the construction industry of Ghana and to some extent globally. The 18 influential factors revealed in this study were first identified in a qualitative interview conducted with 53 respondents, and the findings were subsequently confirmed in a quantitative survey with 263 respondents. The respondents for both the qualitative and quantitative study included construction professionals, construction trade workers, and labour personnel from regulatory institutions as well as occupational health psychologists in Ghana. The results from the quantitative study indicated that the 18 findings identified from the qualitative study as factors associated with effective implementation of psychological health intervention in the construction industry, were all statistically significant. Thus, from the overall sample the level of influence of all the identified factors were rated as highly influential or very highly influential. The results also indicated that there were high agreement levels for all the influential factors among the respondents. Though slight difference occurred between the construction trade workers group and the other groups, the construction professionals and labour personnel however showed a high level of agreement in their perceptions of the ratings of the influential factors.

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<sup>18</sup> Some contents of section 10.2.7 of this Chapter have been published in: Fordjour, G. A., Chan, A. P. C. and Tuffour-Kwarteng, L. (2020). "Factors Associated with Effective Implementation of Psychological Health Interventions in the Construction Industry". *Journal of Civil Engineering Research & Technology*, 2(1), 1-17.

The results also showed some differences in the ratings of the influential factors. The most influential factors ranked by the construction professionals, the construction trade workers and the labour personnel were willingness of employees to cooperate with the intervention, perceptions on the benefits of the psychological health interventions, and extent of management commitment respectively. All the 18 findings can be addressed in any organization to increase the chance of success for the effective implementation of psychological health interventions to improve the psychological well-being of construction employees. Addressing factors associated with effective implementation of psychological health interventions can also bring about positive outcomes such as financial benefits for the company by reducing the number of absenteeism and increasing the productivity levels of employees. The proposed factors follow a proactive model of organizational change, which, as anticipated by the construction stakeholders, can avert most psychological health crises by shaping the causes rather than only reacting to its effects.

The conduct of this study in a single geographical setting of Ghana can be considered as the limitation of this study. However, the findings from this study contribute significantly to knowledge and practice, as it adds to the literature on socio-psychological research in the construction industry. Occupational health psychology is also a new area in the study of labour issues within human resource management. For this reason, there are many potential gaps to fill. Studies on psychological health of construction employees in Ghana is also under-researched, and therefore warranted a research study in this geographical setting. Future research based on the study findings can meticulously investigate each factor in great detail, to establish a complete knowledge base pertinent to the region or developing countries in general.

### **10.3 Contributions of the study**

#### **10.3.1 Theoretical research contributions**

This study provides a significant contribution to the body of knowledge on occupational psychology. Occupational health and safety continue to be a priority issue for those working and managing the construction industry across the world. The field of construction management research is however replete with studies identifying varying sets of factors affecting safety performance and little on health performance. There has been a diminutive look into an importance, complex issue that is the psychological health and well-being of construction employees, leaving a significant knowledge gap in construction literature globally. Previous studies that have attempted to address the issue of construction workers' psychological health took it from the perspective of workplace conditions and their relationship to workers' motivations, safety performance and accidents. There is a need for a study that expands on the traditional view, which focused solely on work-related factors, to include intrinsic and extrinsic factors, such as employees' behaviours, the surrounding environment and the roles of organisation, community and government.

Hence, this research aimed at investigating the factors associated with the psychological health of employees in the construction industry and develop integrated psychological health management models for the psychological well-being of construction employees. Socio-ecological theory, which depicts spheres of influences over human behaviours and wellness, was used as lens to identify the factors and to derive solutions from multiple perspectives such as individual level, interpersonal level, organizational level and country or community level. Most of the studies on occupational psychology of construction employees have been conducted in countries such as China, USA, South Africa and Australia, with little research attention on the construction employees in major developing countries. The quest of finding solutions to improve the psychological health of construction employees in Ghana kindled an

interest in pursuing a doctoral study on occupational psychology. The Ghanaian construction industry was therefore chosen as the geographical context for this study.

This study has five research questions: (1) what are the causes and effects of psychological health conditions in the construction industry, as well as the individual coping mechanisms to manage these issues? (2) are the causes, effects and coping mechanisms identified from the preliminary findings significant, and what are the primary factors? (3) are there differences between the factors that are of major concern to construction professionals and construction trade workers? (4) what is the relationship between the factors and psychological health conditions of the construction employees? (5) what are the organizational strategies that can be adopted to mitigate the causes and effects of psychological health conditions in the construction industry; and what are the factors associated with the effective implementation of these interventions? This study employed the sequential mixed-methods strategy, whereby qualitative methods of focus groups and interviews were employed to answer the first research question. A total of 16 focus group discussions and interviews with 90 construction employees were held in Ghana. To answer the questions 2, 3 and 4, survey questionnaire was distributed in Ghana to obtain target respondents of 150 construction professionals and 150 construction trade workers. Finally, to answer the 5th research question, 53 interviews and 264 questionnaire surveys were conducted in Ghana with construction professionals, construction trade workers, regulatory personnel, and occupational health psychologist.

The findings from the study revealed that a significant number of the Ghanaian construction employees had experienced the symptoms of poor psychological health conditions. The highly recorded symptoms identified among the two constructions groups were physically exhausted, difficulty relaxing, insomnia, accident-prone, and chronic headaches. The personal factors that were found to be prevalent among the construction employees were



low self-esteem and poor time management skills. Tight deadline pressures and abusive/over-demanding supervision were the most critical factors ranked by the construction professionals and construction trade workers respectively. The key effects of psychological health conditions on the construction industry identified were absenteeism/sick leave, errors in work, job dissatisfaction and increased medical costs. The findings from the study revealed that the construction professionals adopted delegating complicated tasks and seeking medical attention as the most common coping strategies to manage the causes and effects respectively. The construction trade workers were also revealed to adopt withdrawing from work duties or changing jobs and taking in more caffeinated drinks as the most common coping strategies to manage the causes and effects respectively.

The findings from the study confirm the need for occupational psychological health management and interventions for employees in the construction industry of Ghana and to some extent globally. Further study was conducted to reveal the psychological health preventive measures to mitigate the causes and effects of psychological health conditions on the construction industry. The key preventive measures revealed in the study included good supervisory and working relations, better working conditions, enforcement of policies for workers well-being, proper planning of work activities, provision of adequate salary and resources for work, and regular health screening for early detection of psychological ill-being conditions. This study also identified factors for effective implementation of psychological health interventions in the construction industry, of which the highly influential factors included willingness of employees to cooperate with the intervention procedures, perceptions on the benefits of the psychological health interventions, impact of stigmatization and discrimination, level of awareness on indicators of psychological health conditions, cost of implementing the intervention and extent of management commitment and support.

Table 10.7 presents the major findings from the study in Ghana with the comparison of findings from previous studies conducted in other countries.

<b>Table 10.7: Major findings of the study in Ghana compared with related studies in other countries</b>						
<b>Factors</b>	<b>No.</b>	<b>Major Findings from study in Ghana</b>	<b>South Africa</b>	<b>Gaza Strip, Palestine</b>	<b>Australia</b>	<b>China</b>
			Bowen, et. al., (2014)	Enshassi and Al.Swaity, (2015)	Jepson, et. al., (2017)	Leung and Chan, (2017)
<b>Psychological health indicators</b>	1.	Accident-prone	Stress	Nervousness	Stress	Insomnia
	2.	Difficult to relax	-	Headaches	-	Headaches
	3.	Insomnia	-	Back pain	-	Tensed
<b>Construction work-related factors</b>	4.	Tight deadline pressures	Job demand	Long working hours	Long hours of work	Heavy workload
	5.	Abusive and over-demanding supervisors	Job control	Work overload	Bureaucracy	Poor working relationships
	6.	Poor working space	Job support	Working in dangerous environment	Lack of opportunity to learn new skills	Pay differential
<b>Personal-related factors</b>	7.	Low self-esteem	Work-Home Imbalance	-	Work-Home Imbalance	Work-Home conflict
	8.	Poor time management skills	Need to prove oneself	-	Need to prove oneself	Language fluency
	9.	Lack of exercise	-	-	Personal ambitions and expectations	Type A behaviours
<b>Effects on construction industry</b>	10.	Absenteeism/ Sick leave	Psychological effects	Safety Performance	-	Overall performance
	11.	Errors in work	Physiological effects	Safety Behaviour	-	Intention to stay
	12.	Job dissatisfaction	Sociological effects	-	-	-
<b>Individual coping strategies</b>	13.	Delegate complicated tasks	Substance usage	-	Optimism	-
	14.	Withdraw from work duties	-	-	Applying emotional intelligence	-
	15.	Take in more caffeine	-	-	Active planning strategies	-

<b>Organisational preventive strategies</b>	16.	Enhance good supervisory and working relations	-	-	Provision of supportive structures	-
	17.	Ensure better working conditions	-	-	Reliable experts to assess and manage the uncertainty	-
	18.	Proper planning of work activities	-	-	Active planning and communication.	-
<b>Influential factors for effective implementation</b>	19.	Willingness of employees to cooperate with the intervention	-	-	-	-
	20.	Extent of management commitment and support	-	-	-	-
	21.	Impact of stigmatization and discrimination	-	-	-	-

As shown in Table 10.7, the major findings revealed in this study have not been revealed in the previous studies in comparison. This study, therefore, contributes significantly to knowledge and practice, as it adds to the literature on socio-psychological research in the construction industry.

### **10.3.2 Practical Contributions and Recommendations for Managerial Practice**

This study provides valuable insights and help policy makers, practitioners, stakeholders, and advocates promote psychological well-being practices in the construction industry. Identification, selection, and implementation of the most appropriate strategies to mitigate psychological risks factors have been provided in this study. This will enable construction companies and practitioners make more informed decisions on the implementation of psychological health interventions in the construction industry. The study also provides insights on appropriate strategies to overcome potential barriers to psychological health interventions in the construction industry.

In summary, this study recommends the need for both construction professionals and construction trade workers to adopt healthy lifestyle for their psychological health and well-being. This study also recommends that the construction industry in Ghana and to some extent globally adopt positive workplace culture and provide support systems to help alleviate or mitigate the causes and effects of psychological health conditions in the workplace. Despite institutional arrangements put in place in certain construction industries to promote work and happiness, the less than optimal working conditions and inadequate yet dwindling work factors could conspire with other personality factors to put most construction employees at the risk of occupational psychological health problems.

Extrinsic factors such as job security, pay and pension benefits, as well as intrinsic factors such as the feeling of being needed, valued, fulfilling personal and organisational goals, meeting deadlines, adequate job demands and good interpersonal relationships, could enhance the psychological well-being of the workers. It is imperative that the culture of every construction organization incorporate in it an aspect or element of health, to ensure that the values and attitudes of the managers and workers are geared towards improved health and psychological well-being conditions of people in the construction industry. Construction

management should also concern itself with the welfare of the people, by ensuring that workers are protected from physical and psychological health problems as they undertake the construction works. This study therefore recommends the input of all construction employees, managers and supervisors in providing organizational psychological health support to enhance the well-being of construction employees.

The study also recommends psychological health systems and interventions for construction industry to protect the construction employees from the effects of psychological ill-being such as poor health and low work productivity. Examples of the primary strategies proposed for the construction industry include improved supervisory relations, proper planning of project resources, good project time management skills and provision of adequate resources. Examples of the secondary interventions proposed for the construction industry include establishing a welfare committee and offering free counselling services for the construction workers.

In addition to providing employees with resources, it is important that organizations scholars continue to work on identifying strategies for building inclusive climates for psychological health conditions that are reflected at individual, team, and organizational levels. Such efforts can help increase the amount of social support available to employees with psychological health conditions, which can have implications for disclosure, accommodation requests, and help-seeking behaviors. Although interventions that specifically target employees with psychological health conditions are important, organizations may also benefit from paying increased attention to the overall psychological health and well-being of their employees. These efforts can inform employees about the risk factors associated with the onset of psychological health conditions as well as increase recognition of early indicators in the self and others. A supportive and inclusive organizational culture aims not only to minimize the losses associated with employing individuals with psychological health conditions but also to improve the

quality of work life for those employees.

For effective implementation of psychological health interventions in the construction industry, this study recommends the following factors to be considered such as tailoring of intervention to address specific needs, continual monitoring and evaluation of workers well-being, policies and planning process to implement the system as well as education and training of key competent persons to handle PH issues at the workplace. The information provided by this study is also valuable to the Ghana occupational psychological health Council as one of the bases for implementing psychological health promotional measures in the Ghanaian construction industry. The study thus offers professionals responsible for decision-making on construction employees a blueprint on matters to pay particular attention to for the health and well-being of the employees.

#### **10.4 Value of the Study**

Occupational psychology research is still under-explored in the construction literature, and there are many research gaps to be filled, considering the area of context and multi-level perspectives. The mixed-methods approach, the cross-sectional design of comparing two construction working groups and the geographical setting, where such a study has never been conducted, makes this study credible and impactful. The findings from the study form a basis for designing a preventive psychological health management model for construction workers in Ghana and to some extent globally.

This study establishes underlying factors and quantitative models of psychological health influences. The qualitative data generated from this study were somewhat unique from previous studies, as major findings from this study conducted in Ghana have not yet been revealed by related studies that have been conducted in other countries. The preliminary findings from the qualitative study were all confirmed to be statistically significant factors that can influence the psychological health of the construction employees. This study therefore adds

a new dimension to occupational psychological health research in construction literature and build an inclusive conceptual framework based on socio-ecological theoretical lens.

Occupational psychological health studies in the construction industry have been conducted quite extensively in countries such as China, USA, South Africa and Australia. This study is one of the few studies in developing countries on the issues explored and the findings from this study could be applied to other jurisdictions especially the developing countries that share common characteristics with that of Ghana. Also, occupational psychological health management in the construction industry of Ghana has not been explored extensively, though it is an urgent need. This study fills this gap and functions as the seminal work on this topic in the region. This study thus contributes sufficiently to the construction literature on occupational psychological issues, with the intention to promote a psychologically safe and healthy construction workplace.

### **10.5 Limitations of the Study**

The conduct of this study in a single geographical setting that is Ghana is a limitation of this study. The relatively small percentage of female respondents can also be regarded as a limitation of this study in regard to gender balance. This also restricts the study on the evaluation of the effects of gender differences on the outcomes of construction employees' psychological health, which could also be a potential factor. However, it is worth noting that the construction industry of Ghana as with many countries is male dominated and the females in the industry are quite few.

The qualitative nature of the preliminary research design also enhances the limitations of bias and subjectiveness in the responses provided. It should be noted also that, psychological issues cannot be generalized; due to the individual based subjective judgement provided as responses. Notwithstanding, the findings from the study provides valuable insights into the

subject area which can be built upon for future research works in the area of occupational psychology in the construction industry of Ghana and globally.

### **10.6 Recommendations for Future Research**

Construction employees with psychological health conditions can face many obstacles in the workplace resulting from symptomatology, stigmatization, self-perceptions, and misunderstanding by others about the nature of psychological health conditions. While most previous studies were guided by individual perspectives on psychological health conditions, this study have only begun to scratch the surface of fully understanding what it is like to experience and manage a psychological disorder at the construction workplace. A great deal of research demonstrated that psychological health conditions negatively affected work performance and job attitudes. However, many of these studies were limited in their measurement of work-related constructs; organizational scholars are needed to ensure that workplace outcomes are measured with reliable and valid scales that pertains to a particular area of context.

Furthermore, shifting the conversation from identifying the consequences or costs associated with employing individuals with psychological health conditions to identifying the ways in which these employees positively contribute to their organizations would be useful and consistent with person-centered work psychology. Thus, scholars are encouraged to examine how employees with psychological health conditions behave in counter stereotypic ways, example being engaged as well as how having a psychological health conditions helps them to thrive example in terms of creativity and empathy at work.

Several studies have demonstrated that both treatment and accommodations assist employees with managing their disorders in the workplace. Much of this work was descriptive in nature, describing the types of treatment or accommodations individuals received, while



little work has investigated how employees gain access to them. The lack of knowledge regarding accommodation rights creates a barrier for employees, suggestion is made for more research to understand how and where employees gain knowledge about accommodations and treatments benefits. The systematic review of previous studies revealed persistent negative stereotypes of employees with psychological health conditions. Indeed, these negative stereotypes are found in the general public as well as among employees and supervisors, suggesting that the stigma associated with psychological health conditions remains a significant workplace barrier. One limitation in the studies reviewed is that they did not directly address strategies for reducing stigmatizing beliefs.

A fruitful avenue for future research, therefore, is to create and measure the effectiveness of training programs aimed at educating employees across organizational levels about psychological health conditions. Although the literature pertaining to diversity training is already rich the unique stigma of psychological health conditions necessitates additional research to explore ways to reduce both subtle and overt discrimination. An important perspective not fully represented in other-based research was that of organizational leaders. More research regarding how leaders obtain procedural knowledge of managing employees with psychological health conditions is warranted. Employees without psychological health conditions can help foster an inclusive workplace by supporting those who do have a mental illness.

Although previous studies helped to identify psychological health conditions as a critical concern for employers, additional work is needed to understand how organizational factors can promote or hinder the work experiences of those with psychological health conditions. It is known that receiving treatment can help minimize the negative effects of psychological health conditions on work performance; however, less is known about the effectiveness of organizational support systems. One future avenue for research, then, includes

increased examination of organizational resources and policies geared toward assisting employees with psychological health conditions. Furthermore, research on how the composition of the top management team effects implementation of organizational interventions would be useful.

Future research areas can be conducted to determine whether occupational stressors influence strain or psychological distress differently across cultures and occupations. A study can also be done to determine whether social support buffer the impact of stressors on strain in the same way across cultures and occupations. Future research can also explore the relationship between safety and psychological issues in the construction.

### **10.7 Chapter 10 Summary**

This chapter presents the conclusions of all the research objectives of this study and recommendations for managerial practice. The psychological health preventive management models which were developed from the findings from the study, for both the construction employees and the construction industry have also been presented in this chapter 10. A summary of the conclusions and recommendations from all the research objectives has been provided, in addition with the limitation and the value of the study. Recommendations for future research have also been provided in this chapter.

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## Appendix

### Appendix A: Questionnaire for Construction Employees



**Research Project:**  
**Occupational Psychological Health Management of Workers in the  
 Construction Industry of Ghana**

The Research Group of the Department of Building and Real Estate at the Hong Kong Polytechnic University would like to seek your support for the Research project, which *aims at enhancing the occupational psychological health and well-being of construction workers in Ghana*. Please note that the responses you provide are completely anonymous.

#### GENERAL INSTRUCTION;

**Please answer all questions under each part**

**Part 1 (Personal Profile) and two other sections**

**Part 2 has three sections**

**Part 3 also has three sections**

#### COMPOSITIONS

##### Part 1;

**Section A:** Personal Profile

**Section B:** Indicators of Psychological Health Conditions

**Section C:** Construction work-related Psychological Risk Factors

##### Part 2;

**Section A:** Personal-related factors

**Section B:** Questions on Personal predictive factors

**Section C:** Coping strategies for psychological risk factors

##### Part 3;

**Section A:** Coping strategies focused on the effects of psychological disorders

**Section B:** Effects of psychological disorders on the construction employees

**Section C:** Effects of psychological disorders on the construction industry

**PLEASE TICK THE APPROPRIATE ANSWER**

**PART 1****SECTION A: PERSONAL PROFILE**

**Please tick the appropriate answers and answer all questions in this part**

1) Gender:

Male [ ] Female [ ]

2) Age

a. 25-35yrs [ ] b. 36- 45yrs [ ] c. 46-55yrs [ ] d. 56yrs and above [ ]

3) Marital Status

Married [ ] Single [ ] Other [ ]

4) How long have you been working in the construction industry?

a. less than 1 year [ ] b. 1- 5yrs [ ] c. 6 – 10yrs [ ] d. 10 -15yrs [ ] e. Above 15yrs [ ]

5) What is your level of education?

a. GCE “A” level [ ] b. GCE “O” level [ ] c. Junior High School Level [ ]  
d. Secondary School level [ ] e. Technical/Vocational level [ ] f. Tertiary level or Above [ ]

6) Which construction organization do you belong to?

a. D1K1 [ ] b. D2K2 [ ] c. D3K3 [ ] d. D4K4 [ ]

7) Select which work category or trade you fall under?

Construction Working group;

a. Labourer [ ] b. Plumber [ ] c. Plasterer [ ] d. Carpenter [ ] e. Concretor [ ]  
f. Metal worker [ ] g. Welder / Joiner [ ] h. Steel bender / fixer [ ]  
i. Painter / decorator [ ] j. Plant / equipment operator [ ] k. Electrician [ ] l. Demolition worker [ ]  
m. Plant/ equipment Mechanic [ ] n. Scaffolder fixer [ ]

Construction project team management;

a. Engineer [ ] b. Quantity Surveyor [ ] c. Architect [ ] d. Contractor [ ]  
e. Consultant [ ] Other (Please Specify) .....

**SECTION B: Indicators of Psychological Ill-Being conditions**

Which of these symptoms have you experienced over the last one month, please indicate how often by ticking the appropriate number? **Note: 1= Not at all, 2= Very rarely (that is, once a month or less), 3= Rarely (that is, 2 to 3 times a month), 4= Occasionally (that is, 2 to 3 times a week), 5= Frequently (that is, 1 to 2 times a day) and 6= Very frequently (that is, more than 2 times a day).**

S/N	Description	Scale					
<b>Physical Symptoms</b>							
1.	Physically exhausted/ Worn-out/ Tired	1	2	3	4	5	6
2.	Muscular tension / aches	1	2	3	4	5	6
3.	Feeling nauseous/ stomachache/ diarrhoea/ indigestion	1	2	3	4	5	6
4.	Chest pain	1	2	3	4	5	6
5.	Increased rate of heartbeat	1	2	3	4	5	6
6.	Shallow or rapid breathing	1	2	3	4	5	6
7.	Lower Back Pain	1	2	3	4	5	6
8.	Chronic Headaches	1	2	3	4	5	6
9.	Skin Problems	1	2	3	4	5	6
10.	Blood in Urine or Urinate frequently	1	2	3	4	5	6
<b>Emotional Symptoms</b>							
11.	Tensed/ Stressed	1	2	3	4	5	6
12.	Worried	1	2	3	4	5	6
13.	Irritable	1	2	3	4	5	6
14.	Sad/ Depressed	1	2	3	4	5	6
15.	Emotionally exhausted	1	2	3	4	5	6
16.	Numbness	1	2	3	4	5	6
17.	Discouraged	1	2	3	4	5	6
18.	Anxious	1	2	3	4	5	6
19.	Frustration	1	2	3	4	5	6
20.	Mood swings	1	2	3	4	5	6
21.	Bitterness	1	2	3	4	5	6
22.	Rage	1	2	3	4	5	6
23.	Resentment	1	2	3	4	5	6
24.	Crying for no particular reason	1	2	3	4	5	6
25.	Palpitations/ perspiration/ sweaty hands	1	2	3	4	5	6
26.	Trembling/ Nervous ticks/ Butterflies in Stomach	1	2	3	4	5	6
<b>Cognitive Symptoms</b>							
27.	Hard to concentrate	1	2	3	4	5	6
28.	Difficult to think clearly, make decisions or remember things	1	2	3	4	5	6
29.	Insomnia/ difficulty sleeping	1	2	3	4	5	6
30.	Addiction to ungodly habits	1	2	3	4	5	6
31.	Difficulty relaxing	1	2	3	4	5	6

32.	Increase addiction of smoking, alcohol and use of drugs	1	2	3	4	5	6
33.	Accident- prone	1	2	3	4	5	6
34.	Problems with speaking	1	2	3	4	5	6
35.	Brood on previous harm or insults	1	2	3	4	5	6
36.	Magnify issues such as injury and hurt	1	2	3	4	5	6
37.	Exaggerate unfairness	1	2	3	4	5	6
<b>Behavioural Symptoms</b>							
38.	Impulsive behaviour	1	2	3	4	5	6
39.	Poor self-care	1	2	3	4	5	6
40.	Grinding of teeth	1	2	3	4	5	6
41.	Social isolation and withdrawal	1	2	3	4	5	6
42.	Laughing or speaking in high pitch	1	2	3	4	5	6
43.	Label or blame others for our problems	1	2	3	4	5	6
44.	Have conflict with others	1	2	3	4	5	6
45.	Yells at people	1	2	3	4	5	6
46.	Hostile to people	1	2	3	4	5	6
47.	Gives sarcastic comments	1	2	3	4	5	6
48.	Physically aggressive	1	2	3	4	5	6

### SECTION C: Construction work- related psychological risk factors

- 1) Which of these construction work-related factors are likely to expose you to the psychological ill-being conditions? Please indicate by ticking the appropriate number.

**Note: 1= Unlikely, 2= Less Unlikely, 3= Neutral, 4= Likely, 5= Most Likely**

S/N	Construction work-related factors	Scale				
1.	Complex work methods	1	2	3	4	5
2.	Unfinished work	1	2	3	4	5
3.	Unclear roles and expectations	1	2	3	4	5
4.	Poor management and autocratic leadership style	1	2	3	4	5
5.	Abusive and overdemanding supervisors	1	2	3	4	5
6.	High volume of work	1	2	3	4	5
7.	Fast working pace	1	2	3	4	5
8.	Limited time for relaxation	1	2	3	4	5
9.	Skill underutilization	1	2	3	4	5
10.	Conflicting demands from superiors and colleagues	1	2	3	4	5
11.	Lack of influence on work decisions	1	2	3	4	5
12.	Matters being referred to supervisors even when capable of handling them	1	2	3	4	5
13.	Pay is relatively low	1	2	3	4	5
14.	Employees treated unfairly with no job security	1	2	3	4	5
15.	Too much supervision	1	2	3	4	5
16.	Tight deadline pressures	1	2	3	4	5

17.	Poor working space	1	2	3	4	5
18.	Lack of teamwork and cooperation	1	2	3	4	5
19.	Inadequate staffing levels	1	2	3	4	5
20.	Personal beliefs conflict with organizations' requirements	1	2	3	4	5
21.	Incapable of meeting quality demands	1	2	3	4	5
22.	Aggression and offensive behaviours	1	2	3	4	5
23.	High good performance expectation	1	2	3	4	5
24.	Skills and abilities not fully employed	1	2	3	4	5
25.	Incompetence	1	2	3	4	5
26.	Poor communication	1	2	3	4	5
27.	Insufficient authority overwork	1	2	3	4	5
28.	Imbalance between work effort and reward	1	2	3	4	5
29.	No recognition for work done	1	2	3	4	5
30.	Supervisors not commenting on job performance	1	2	3	4	5
31.	Poor design	1	2	3	4	5
32.	Poor lighting system	1	2	3	4	5
33.	Exposure to Physical dangers	1	2	3	4	5
34.	Work being repetitive and boring	1	2	3	4	5
35.	Hostility and discrimination	1	2	3	4	5
36.	High scope and job responsibilities	1	2	3	4	5
37.	Inadequate resources	1	2	3	4	5
38.	Noise exposure	1	2	3	4	5
39.	Dust exposure	1	2	3	4	5
40.	Lack of medical insurance	1	2	3	4	5
41.	No recommendation to improve the situation	1	2	3	4	5
42.	Poor organizational support	1	2	3	4	5

**End of Part 1**  
**Thank You**

**(Please kindly proceed to the next Part 2)**



## Part 2

## SECTION A: Personal-related psychological health factors

Which of these personal statement describes you? Please indicate by ticking the appropriate number? **Note: 1= Unlikely, 2= Less Unlikely, 3= Neutral, 4= Likely, 5= Most Likely**

Personal Factors	No.	Research Statement	Scale				
<b>Low self-esteem</b>	1.	I regard myself as a failure If I do not accomplish the goals I set for myself.	1	2	3	4	5
	2.	I feel I have made progress in life because of my luck not because I deserved it.	1	2	3	4	5
	3.	I am not successful and acknowledged by others after all the hard work I put into my works.	1	2	3	4	5
<b>Negative personality traits</b>	4.	I am sensitive to criticisms and become discouraged to put in my best efforts to work after been blamed or criticized.	1	2	3	4	5
	5.	I feel resentment to people especially those who do not support my decisions and tends to be hostile towards them.	1	2	3	4	5
	6.	I worry a lot and tend to be pessimistic about the future.	1	2	3	4	5
<b>Unproductive core beliefs</b>	7.	I believe no matter my work input, I will still be treated unfairly.	1	2	3	4	5
	8.	I believe I have to try hard enough so life will be easy and trouble-free.	1	2	3	4	5
	9.	I believe I have to always find the perfect solution to problems.	1	2	3	4	5
<b>Poor self-concept evaluation on performance</b>	10.	I am not performing very well at the workplace.	1	2	3	4	5
	11.	I make a lot of mistakes at work.	1	2	3	4	5
	12.	I spend a lot of time to complete a simple task of the day.	1	2	3	4	5
<b>Poor relationship with others</b>	13.	I am not satisfied with the relationship between myself and my colleagues.	1	2	3	4	5
	14.	I often feel less trust for my superiors and co-workers.	1	2	3	4	5
	15.	I often feel less respect for other employees.	1	2	3	4	5
<b>Poor time management skills</b>	16.	I find it difficult to complete my assignments on time.	1	2	3	4	5
	17.	I am often late for work or meetings.	1	2	3	4	5
	18.	I hardly achieve the personal goals I set for myself periodically.	1	2	3	4	5

**SECTION B: Personal Predictive Factors**

Please read the questions below and provide the appropriate answer by circling the right box.

No.	Research Questions	Likert Scale Point					
		1	2	3	4	5	6
1	How often do you engage in some form of exercise?	Not at all	Very rarely (1 in a month or less)	Rarely (2-3 times a month)	Occasionally (2-3 times a week)	Frequently (1-2 times a day)	Very frequently (>2times a day)
2	How frequently do you eat healthy balanced nutrition?	Not at all	Very rarely (1 in a month or less)	Rarely (2-3 times a month)	Occasionally (2-3 times a week)	Frequently (1-2 times a day)	Very frequently (>2times a day)
3	How often do you ensure your body mass index is within the normal range?	Not at all	Very rarely (1 in a month or less)	Rarely (2-3 times a month)	Occasionally (2-3 times a week)	Frequently (1-2 times a day)	Very frequently (>2times a day)
4	How frequently do you drink alcohol?	Very frequently (>2times a day)	Frequently (1-2 times a day)	Occasionally (2-3 times a week)	Rarely (2-3 times a month)	Very rarely (1 in a month or less)	Not at all
5	How often do you take any drug or pill to make you feel relaxed?	Very frequently (>2times a day)	Frequently (1-2 times a day)	Occasionally (2-3 times a week)	Rarely (2-3 times a month)	Very rarely (1 in a month or less)	Not at all
6	How often do you have enough sleep?	Not at all	Very rarely (1 in a month or less)	Rarely (2-3 times a month)	Occasionally (2-3 times a week)	Frequently (1-2 times a day)	Very frequently (>2times a day)
7	How frequently do you notice a dramatic change in your behavior?	Very frequently (>2times a day)	Frequently (1-2 times a day)	Occasionally (2-3 times a week)	Rarely (2-3 times a month)	Very rarely (1 in a month or less)	Not at all
8	How often do you feel hostile or unfriendliness towards you colleagues?	Very frequently (>2times a day)	Frequently (1-2 times a day)	Occasionally (2-3 times a week)	Rarely (2-3 times a month)	Very rarely (1 in a month or less)	Not at all

9	How often do you feel irritable, depressed or unhappy?	Very frequently (>2times a day)	Frequently (1-2 times a day)	Occasionally (2-3 times a week)	Rarely (2-3 times a month)	Very rarely (1 in a month or less)	Not at all
10	How often do you feel anxious or worried due to lack of trust of senior management or personnel at the workplace?	Not at all	Very rarely (1 in a month or less)	Rarely (2-3 times a month)	Occasionally (2-3 times a week)	Frequently (1-2 times a day)	Very frequently (>2times a day)
11	How frequently do you adapt well to situations which are problematic?	Not at all	Very rarely (1 in a month or less)	Rarely (2-3 times a month)	Occasionally (2-3 times a week)	Frequently (1-2 times a day)	Very frequently (>2times a day)
12	How often do you experience harassment/violence in the workplace?	Very frequently (>2times a day)	Frequently (1-2 times a day)	Occasionally (2-3 times a week)	Rarely (2-3 times a month)	Very rarely (1 in a month or less)	Not at all
13	How frequently do you encounter any form of abuse in the workplace?	Very frequently (>2times a day)	Frequently (1-2 times a day)	Occasionally (2-3 times a week)	Rarely (2-3 times a month)	Very rarely (1 in a month or less)	Not at all
14	How often do you experience any symptom of cardiovascular diseases such as shortness of breath or chest pain?	Very frequently (>2times a day)	Frequently (1-2 times a day)	Occasionally (2-3 times a week)	Rarely (2-3 times a month)	Very rarely (1 in a month or less)	Not at all
15	How often do you have any musculoskeletal disorders such as low back pain?	Very frequently (>2times a day)	Frequently (1-2 times a day)	Occasionally (2-3 times a week)	Rarely (2-3 times a month)	Very rarely (1 in a month or less)	Not at all
16	How often do you experience good health?	Not at all	Very rarely (1 in a month or less)	Rarely (2-3 times a month)	Occasionally (2-3 times a week)	Frequently (1-2 times a day)	Very frequently (>2times a day)

17	How often do you suffer any critical medical condition?	Very frequently (>2times a day)	Frequently (1-2 times a day)	Occasionally (2-3 times a week)	Rarely (2-3 times a month)	Very rarely (1 in a month or less)	Not at all
18	How often do you feel satisfied or happy with your job?	Not at all	Very rarely (1 in a month or less)	Rarely (2-3 times a month)	Occasionally (2-3 times a week)	Frequently (1-2 times a day)	Very frequently (>2times a day)
19	How often are you committed to your job?	Not at all	Very rarely (1 in a month or less)	Rarely (2-3 times a month)	Occasionally (2-3 times a week)	Frequently (1-2 times a day)	Very frequently (>2times a day)
20	How often are you able to influence decisions regarding your work?	Not at all	Very rarely (1 in a month or less)	Rarely (2-3 times a month)	Occasionally (2-3 times a week)	Frequently (1-2 times a day)	Very frequently (>2times a day)

### SECTION C: Coping strategies to psychological risk factors

Which of these statements refer to you most as efforts to cope with the causes of psychological health conditions? Please indicate by ticking the appropriate number. **Note: 1=More unlikely, 2= Unlikely, 3= Neutral, 4= Likely, 5= Most Likely.**

ITEM	STATEMENT	RANKS				
1.	Say no when limits are exceeded.	1	2	3	4	5
2.	Avoid unnecessary arguments and debates that affect my emotions.	1	2	3	4	5
3.	Express how I feel about a situation.	1	2	3	4	5
4.	Compromise on things.	1	2	3	4	5
5.	Assertive with the belief that situations are only temporary.	1	2	3	4	5
6.	Do not waste time and energy on negative things that cannot be changed.	1	2	3	4	5
7.	Work extra hard to meet the challenge.	1	2	3	4	5
8.	Optimistic attitude.	1	2	3	4	5
9.	Avoid controlling uncontrollable situations.	1	2	3	4	5
10.	React positively to situations that cannot change.	1	2	3	4	5
11.	Turn off TV that shows sensitive pictures.	1	2	3	4	5
12.	Avoid listening to bad news that leads to worry or anxiety.	1	2	3	4	5

13.	See every problem as a challenge or opportunity and make plans towards it.	1	2	3	4	5
14.	Let go of past events and move on.	1	2	3	4	5
15.	Positive perspective about life events.	1	2	3	4	5
16.	End relationship with persons who consistently bring trouble.	1	2	3	4	5
17.	Delegate complicated tasks.	1	2	3	4	5
18.	Plan for emergency situations.	1	2	3	4	5
19.	Adopt better skills for time management.	1	2	3	4	5
20.	Withdraw from work duties or change jobs.	1	2	3	4	5
21.	Take time off and relax from routine work.	1	2	3	4	5
22.	Delay in working.	1	2	3	4	5
23.	Report condition to supervisor or management.	1	2	3	4	5
24.	Seek support from friends or families.	1	2	3	4	5
25.	Seek excitement from entertaining activities.	1	2	3		5

**End of Part 2**  
**Thank You**

**(Please kindly proceed to the last Part 3)**

**PART 3****SECTION A: Coping strategies focused on effects of psychological disorders**

Which of these statements refer to you most as efforts to cope with the effects of psychological health conditions? Please indicate by ticking the appropriate number. **Note: 1=More unlikely, 2= Unlikely, 3= Neutral, 4= Likely, 5= Most Likely.**

ITEM	STATEMENT	RANKS				
1.	Adopt poor sleeping either too much sleep or too little.	1	2	3	4	5
2.	Use of drugs or pills for relaxation.	1	2	3	4	5
3.	Excess Smoking.	1	2	3	4	5
4.	Drinking too much alcohol.	1	2	3	4	5
5.	Poor eating habit such as under or overeating.	1	2	3	4	5
6.	Take in lot of sweets.	1	2	3	4	5
7.	Take in more caffeinated drinks.	1	2	3	4	5
8.	Watching TV for hours away from active works.	1	2	3	4	5
9.	Busy self with consistent working to avoid problems.	1	2	3	4	5
10.	Take out stress on others such as yelling, anger, outbursts, lash out, physical or emotional violence.	1	2	3	4	5
11.	Seek medical attention.	1	2	3	4	5
12.	Consult a professional psychologist/ counsellor.	1	2	3	4	5
13.	Exercise regularly.	1	2	3	4	5
14.	Regular sleeping schedule.	1	2	3	4	5
15.	Prioritize work into urgent and not urgent ones.	1	2	3	4	5
16.	Initiate and make new plans.	1	2	3	4	5
17.	Set reasonable standards and avoid being a perfectionist.	1	2	3	4	5
18.	Show gratitude and appreciate things instead of focusing on negative things.	1	2	3	4	5
19.	Have forgiveness and belief that people are imperfect.	1	2	3	4	5
20.	Avoid negative energy like resentment and anger.	1	2	3	4	5
21.	Have a sense of humour.	1	2	3	4	5
22.	Adopt positive lifestyle.	1	2	3	4	5

### SECTION B: Potential effects of psychological health conditions on construction employees

How likely are these effects of psychological ill-being conditions on the construction employees do you perceive to be significant? Please indicate by ticking the appropriate number. **Note: 1=More unlikely, 2= Unlikely, 3= Neutral, 4= Likely, 5= Most Likely.**

ITEM	STATEMENT	RANKS				
1.	Chronic pain	1	2	3	4	5
2.	Coronary heart disease	1	2	3	4	5
3.	Lose valuable things like job, relationships and status	1	2	3	4	5
4.	Loss memory/ forgetfulness	1	2	3	4	5
5.	Accident-prone	1	2	3	4	5
6.	High blood pressure	1	2	3	4	5
7.	Insomnia or sleep disturbances	1	2	3	4	5
8.	Stroke or Cancer	1	2	3	4	5
9.	Headache	1	2	3	4	5
10.	Musculoskeletal injuries	1	2	3	4	5
11.	Family problems	1	2	3	4	5
12.	Sexual dysfunction	1	2	3	4	5
13.	Diabetes mellitus	1	2	3	4	5
14.	Feeling faint or dizzy	1	2	3	4	5
15.	Loss of motivation, energy or interest	1	2	3	4	5
16.	Tightness in the chest	1	2	3	4	5
17.	Dietary extremes	1	2	3	4	5

### SECTION C: Potential effects of psychological health conditions on construction

#### Industry

How likely are these effects of psychological ill-being conditions on the construction industry? Please indicate by ticking the appropriate number. **Note: 1=More unlikely, 2= Unlikely, 3= Neutral, 4= Likely, 5= Most Likely.**

ITEM	STATEMENT	RANKS				
1.	Poor work performance	1	2	3	4	5
2.	Low motivation	1	2	3	4	5
3.	Low productivity	1	2	3	4	5
4.	High turnover	1	2	3	4	5
5.	Low morale	1	2	3	4	5
6.	Job dissatisfaction	1	2	3	4	5
7.	Absenteeism/ Sick leave	1	2	3	4	5
8.	Breakdown in communication	1	2	3	4	5
9.	Work stoppage	1	2	3	4	5
10.	Violence at work	1	2	3	4	5
11.	Medical costs	1	2	3	4	5
12.	Errors in work	1	2	3	4	5

**END OF QUESTIONNAIRE  
THANK YOU VERY MUCH FOR YOUR COOPERATION!**

## Appendix B: Questionnaire for Construction Employees and the Labour Personnel



<p style="text-align: center;"><b>Research Project:</b></p> <p style="text-align: center;"><b>Occupational Psychological Health Management of Workers in the Construction Industry</b></p>
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The Research Group of the Department of Building and Real Estate at the Hong Kong Polytechnic University would like to seek your support for the Research project, which *aims at promoting a psychologically safe and healthy construction workplace by enhancing the psychological health and well-being of construction employees in Ghana*. Please note that the responses you provide are completely anonymous.

### COMPOSITIONS

**Section A:** Personal Profile

**Section B:** Organisational Preventive Psychological Health Management Strategies

**Section C:** Factors for effective implementation of psychological health interventions

### General Instruction:

**PLEASE TICK THE APPROPRIATE ANSWER AND ANSWER ALL QUESTIONS**



**PART 1****SECTION A: PERSONAL PROFILE**

- 1) Gender:  
Male [ ] Female [ ]
- 2) Age:  
a. 25-35yrs [ ] b. 36- 45yrs [ ] c. 46-55yrs [ ] d. 56yrs and above [ ]
- 3) Marital Status:  
Married [ ] Single [ ] Other [ ]
- 4) How long have you been working?  
a. less than 1 year [ ] b. 1- 5yrs [ ] c. 6 – 10yrs [ ] d. 10 -15yrs [ ] e. Above 15yrs [ ]
- 5) What is your level of education?  
a. GCE “A” level [ ] b. GCE “O” level [ ] c. Junior High School Level [ ]  
d. Secondary School level [ ] e. Technical or Vocational level [ ]  
f. Tertiary level or Above [ ]
- 6) Select which work category or trade you fall under?
  1. Construction Working group;  
a. Labourer [ ] b. Plumber [ ] c. Plasterer [ ] d. Carpenter [ ] e. Concretor [ ]  
f. Metal worker [ ] g. Welder / Joiner [ ] h. Steel bender / fixer [ ]  
i. Painter / decorator [ ] j. Plant / equipment operator [ ] k. Electrician [ ]  
l. Demolition worker [ ] m. Plant/ equipment Mechanic [ ] n. Scaffolder fixer [ ]  
Other (Please Specify) .....
  2. Construction project team management;  
a. Engineer [ ] b. Quantity Surveyor [ ] c. Architect [ ] d. Contractor [ ]  
e. Consultant [ ] Other (Please Specify) .....
  3. Labour Personnel;  
a. Factories Inspectorate personnel [ ] b. Labour Department personnel [ ]  
c. Occupational Health Psychologist [ ] d. Other (Please Specify)  
.....

**SECTION B: Organizational Preventive Psychological Health Management Strategies**

Which of these strategies do you perceive are the most significant measures to improve the psychological health of employees in the construction industry? Please indicate by ticking the appropriate number. **Note: 1=Most insignificant, 2= Insignificant, 3 = Neutral, 4= Significant, 5= Very Significant**

S/N	Measures to improve the psychological health of construction employees	Scale				
1.	Task redesign (Alternate roles, ergonomic workplace design, additional manpower)	1	2	3	4	5
2.	Acknowledge or reward good work done	1	2	3	4	5
3.	Improve supervisory and working relations	1	2	3	4	5
4.	Ensure better working conditions	1	2	3	4	5
5.	Provide adequate salary and resources for work	1	2	3	4	5
6.	Provide flexible work schedules for workers	1	2	3	4	5
7.	Enforcement of policies for workers well-being	1	2	3	4	5
8.	Workplace wellness programs (Recreational activities)	1	2	3	4	5
9.	Encourage workers to take leave and enforce break hours	1	2	3	4	5
10.	Psychological health systems and counselling services (Scheduled 1-1 meetings, Helplines, Mental Health First Aiders)	1	2	3	4	5
11.	Seek medical interventions for symptoms (Pay medical bills)	1	2	3	4	5
12.	Workers' support from management and co-workers.	1	2	3	4	5
13.	Proper planning of work activities	1	2	3	4	5
14.	Establish a welfare committee at the workplace	1	2	3	4	5
15.	Regular health screening for early detection of ill-being conditions	1	2	3	4	5
16.	Creation of psychological health awareness and programs	1	2	3	4	5

**SECTION C: Factors for effective implementation of psychological health interventions in the workplace**

Which of these organizational factors would be most significant in promoting effective implementation of psychological health interventions in the construction workplace? Please indicate by ticking the appropriate number. **Note: 1=Most insignificant, 2= Insignificant, 3 = Neutral, 4= Significant, 5= Very Significant**

S/N	Influential factors of effective implementation of psychological health interventions	Scale				
1.	Magnitude of current workload and time pressure	1	2	3	4	5
2.	Extent of management commitment and support	1	2	3	4	5
3.	Willingness of employees to cooperate with the intervention	1	2	3	4	5
4.	Availability of resources required for implementation	1	2	3	4	5
5.	Level of awareness on indicators of psychological health conditions	1	2	3	4	5
6.	Perceptions on the benefits of the psychological health interventions	1	2	3	4	5
7.	Impact of stigmatization and discrimination	1	2	3	4	5
8.	Support from colleagues on employee's psychological health	1	2	3	4	5
9.	Flexibility of organizational structure and culture	1	2	3	4	5
10.	Cost of implementing the intervention	1	2	3	4	5

11.	Compatibility with organizational policy	1	2	3	4	5
12.	Time required for the implementation	1	2	3	4	5
13.	Confidentiality and trust of the implementation process	1	2	3	4	5
14.	Tailoring of intervention to address specific needs	1	2	3	4	5
15.	Continual monitoring and evaluation of workers well-being	1	2	3	4	5
16.	Policies and planning process to implement the system	1	2	3	4	5
17.	Education and training of key competent persons to handle PH issues at the workplace	1	2	3	4	5
18.	Identification and assessment of potential risks	1	2	3	4	5

**END OF QUESTIONNAIRE**  
**THANK YOU VERY MUCH FOR YOUR COOPERATION!**