THE HONG KONG POLYTECHNIC UNIVERSITY

DEPARTMENT OF REHABILITATION SCIENCES

CASE MANAGEMENT APPROACH FOR RETURN TO WORK OF INJURED WORKERS: STUDIES ON EFFECTS ON SYSTEM AND WORKERS' READINESS

BY

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR

THE DEGREE OF DOCTOR OF PHILOSOPHY

DECEMBER 2007

CERTIFICATE OF ORIGINALITY

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December 2007

Abstract of thesis entitled “CASE MANAGEMENT APPROACH FOR RETURN TO WORK OF INJURED WORKERS: STUDIES ON EFFECTS ON SYSTEM AND WORKERS’ READINESS” submitted by Lai Hon Sun for the degree for Doctor of Philosophy at The Hong Kong Polytechnic University (December 2007)

ABSTRACT

Injuries in the workplace have a major social and economic impact in modern society. The existing Employees’ Compensation Ordinance in Hong Kong does not lay down management or return-to-work (RTW) arrangements for injured workers. As a result, there is a lack of effective management of injured workers at both the system and the individual worker level. The present study explores the effects of implementing a case management system using the existing practices of handling occupational injuries in Hong Kong. At the same time, this study tests the potential benefits of applying prospect theory by communicating accurate and appropriate information to workers to enhance their RTW outcomes. This thesis is composed of three independent but related studies. Study 1 is an archival study that reviews issues associated with the current practices of handling injured workers in Hong Kong with a focus on insurance companies and rehabilitation service providers. Study 2 is a quasi-experimental study examining the effects of implementing a small-scale case management system dealing with the cases of injured workers with a view to their RTW.

Study 3 is an experimental study testing the effects of using the framing techniques detailed in prospect theory, which considers how wage- and pain-related information can modify the intention of a worker to return to work.

In Study 1, a total of 250 archived cases were extracted from the databases of six insurance companies. Demographic and individual factors such as work nature and income, and injury-related factors such as nature of injury, body parts involved, and types of treatment received were related to RTW outcomes— percentage of permanent disability, sick leave duration, and costs of compensation. The majority of the participants were male (80%) and the mean ages of the male and female participants were 40.3 years (SD = 9.9) and 41.6 years (SD = 9.4) respectively. Common occupational injuries were in the upper limbs (36.4%), lower limbs (30.8%), and trunk (28.4%). The mean rate of permanent disability was 1.1% (SD = 2.1), the mean compensation costs were HK$54,016.1 (SD = HK$113,183.7), and the mean sick leave duration was 78.8 days (SD = 133.9). The majority of the participants (80.8%) had utilized medical services in public hospitals. The work-related outcomes were found to be associated with various demographic, work-specific, and service-specific factors. Injuries to the trunk of cases in the construction industry and in manual work in general were significant predictors of longer sick leave duration and higher costs of

compensation. Only a small number of cases had received specialist care, rehabilitation services, and case management. However, the negative outcomes of these cases, namely, higher permanent disabilities, longer sick leave, and higher compensation costs, were found to be attributable to long delays in referring patients for specialist consultation, rehabilitation and case management. These findings reveal the undesirable outcomes for injured workers under the existing practice in Hong Kong, which does not lay down a system for managing or caring for these workers. The findings also form the basis for Study 2 in this thesis.

In Study 2, a protocol-based case management system was devised and implemented with a group of injured workers referred from a cleaning company between 2003 and 2004 (N = 296). The outcomes of the case management group were compared with those in a cohort group in 2002, who were under the care of the same company where the researcher worked in but did not receive case management (N = 137). Those in the cohort group received conventional medical specialist attention as well as rehabilitation services such as occupational therapy and physiotherapy. The affected outcomes of RTW were sick leave duration, costs of compensation, and rate of returning to work. The results indicated that the workers who had received the case management had significantly shorter sick leave duration (around 33.9%) and lower

costs of compensation (which showed a reduction of an average of around 64.7%, i.e., HK$20,617.3, to HK$7,212.2) than those in the cohort group. However, no significant differences was revealed in the RTW rate between the two groups (94.2% and 96.9%). The results concur with those revealed in other studies of the implementation of case management systems. The main benefits of case management as identified in this study were better coordination of healthcare services by the case managers in order to reduce the time lag between the services provided by different medical specialists, diagnostic procedures, and rehabilitation. Case managers were also found to be effective agents for enhancing an early RTW. Good communication between the employers and those in the workplace, for example, in order to arrange modified or light duties for workers, was critical to the achievement of an effective RTW. Among all the factors, the age of an employee was revealed to be the most significant predictor of a successful return to work. Employees younger than 40 years of age were associated with significantly shorter sick leave duration and lower costs of compensation. Although workers who were between 41 and 50 years of age had longer duration of sick leave and higher costs of compensation, they appeared to benefit the most from the case management intervention.

In Study 3, workers were invited to participate in an experiment in which

wage- and pain-related information was presented in either a negatively or a positively framed format. Intention to return to work was measured in terms of perceived chance of RTW, confidence of RTW, and anticipated sick leave duration. It was hypothesized that workers would be more inclined to attend to information that was negatively framed. The loss in wages and the potential gain in pain would also exert differential effects on the intention of workers to return to work. A total of 141 injured workers were screened and attended one baseline assessment and one exposure session. They were randomly assigned to one of four groups: pain gain, wage loss, ambivalence, and control. The pain gain group was exposed to negatively framed stimuli on pain increase and positively framed stimuli on loss of wages if they had been asked to return to work. The wage loss group was exposed to negatively framed stimuli on wage loss and positively framed stimuli on pain gain. The ambivalence group was exposed to negatively framed information on both wages and pain, while the control group was given positively framed stimuli on both factors. Immediately after exposure to the stimuli, workers were asked to assign ratings to the three outcomes on a 10-point Likert scale. The same procedure was repeated 2 months after the baseline assessment and training for those who were still on sick leave. The participants were followed up after 6 months. At the baseline, no significant differences were revealed in the RTW

outcomes among the four groups. The differences could be more readily seen when participants expressed a higher perceived improvement (60% or higher) or had shorter sick leave duration (60 days or less). Those who perceived themselves as making a better recovery from the injury but who received negatively framed information on an increase in pain perceived their chance of RTW as significantly lower than those in the other two groups that received positively framed information on pain. Similarly, the same effects of influence were found among those who were exposed to negatively framed information on both pain and wages. The findings further support the number size preference reversal proposed by Wong and Kwong (2005a), which is based on the framing effect as laid out in prospect theory. These results suggest that pain plays an important role as a defacilitating factor that influences the intention of workers to return to work. In contrast, employees who had shorter sick leave duration and were exposed to negatively framed information on wage loss were found to have a significantly higher confidence of returning to work than those who received positively framed information on wages. This suggests that workers would be more ready to take risks and commit to returning to work if they had been asked to do so. It is noteworthy that when workers were at an earlier stage in the workplace injury – that is, during the first 60 days in this study - they would be more responsive to messages related to loss

of wages. When the workers were followed up at 2 and 6 months after the baseline - that is, those workers who had not at the time returned to work - the framing effect of both loss in wages and increase in pain did not show significant differences among the four groups. Nevertheless, it was found that the most non-RTW participants were among those who were exposed to negatively framed stimuli on increase in pain. In other words, those who had had longer sick leave, for example, 60 to 180 days or longer, were probably less responsive to the framed information than those who had had fewer than 60 days of sick leave. As this study used a single exposure method, the effects generated would be transient and relatively weak. The outcomes under study were related to the intention of employees rather than their actual RTW behavior. The results should therefore be interpreted with caution. It is recommended that future researchers use repeated exposure of negatively framed information and measure workers' actual RTW behaviors such as their resumption of duties carried out. Lastly, the results shed light on the potential benefits both of delivering early, accurate, and appropriate information that accompanies each stage in the recovery of the injured worker, and of the involvement of a case manager. Our findings further support the validity of applying prospect theory and number size preference reversal to employee compensation and occupational rehabilitation.

The present studies examine both the overall injury management system and the individual's perspective in the occupational rehabilitation process. Problems in the current management approach have been identified that make it ineffective and conducive to delays in the diagnosis and treatment of injured workers. The results support the need for establishing a systematic approach involving case management and early intervention. A comprehensive case management system should ensure that injured workers receive timely and effective healthcare services and should ensure good communication among all stakeholders. In particular, the psychological aspects of the cases of injured employees and their decision-making processes can be managed appropriately at different stages in their rehabilitation. The use of appropriately framed information may be an effective way to enhance the motivation and confidence to return to work in employees with occupational injuries.

ACKNOWLEDGEMENTS

I would like to express my appreciation of the role of the late Professor Alan Tam, who inspired me to take up this PhD research. My deepest thanks go to Professor Chetwyn C.H. Chan for taking up the position of chief supervisor during the difficult time when Professor Tam passed away in 2006. Professor Chan not only encouraged me to continue my research but also constantly gave me much invaluable guidance, especially during Study 3—the prospect theory on RTW decision making, and I thank him also for his assistance in preparing the manuscript for publication submission to publication and his advice in preparing the thesis. Without his help, I would not have been able to complete my studies. My thanks also go to Professor Ellick Wong of the Hong Kong University of Science and Technology who gave me valuable advice on the design of the experimental protocol of prospect theory in Study 3, especially regarding the number size preference reversal.

I am truly thankful to the staff of TRM (HK) Limited for their assistance in selecting appropriate cases for the three studies, for collecting the data throughout my study period of the last 5 years, and especially for their continuous support and patient understanding that have sustained me throughout this work. I would also like to thank the insurance companies that have participated in this study.

My love and thanks go to my wife, Grace, for her encouragement to me throughout the years of study and especially for helping me to get though the difficult times in pursuing my career. Finally, I owe gratitude and appreciation to my children, Cameron and Rebecca, who have given me support and understanding during this long period of study.

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CHAPTER 1

INTRODUCTION

Occupational injury is a major health and economic concern among industrialized countries. The management of occupational injuries has been the subject of much debate and research for many decades, and there are indications that the costs are on a rising trend worldwide (Buckle & Devereux, 2002; Hong Kong Federation of Insurers, 2000). These include not only the direct costs of health care and compensation payments, but also the hidden or indirect costs of lost production; worker retraining or replacement, or both; and absence costs (Buckle & Devereux, 2002; Pransky, Gatchel, Linton, & Loisel, 2005). In Hong Kong, the costs of compensation payments have been reported to be HK$1.2 billion and 1.4 million days of work were lost in 2003 alone (Li, Li-Tsang, Lam, Hui, & Chan, 2006).

An ineffective occupational rehabilitation system leads to substantial financial losses to employers and insurance companies, and causes considerable physical, emotional, and income losses to employees (Feuerstein, Miller, Burrell, & Berger, 1998; Gardner, 2000; Harder & Scott, 2005; Steenstra, Verbeek, Heymans, & Bongers, 2005; R. M. Williams & Westmorland, 2002). Research has shown that fewer than 10% of workplace injury cases develop into long-term disability and contribute to more than

85% of compensation costs (Krause, Dasinger, Deegan, Rudolph, & Brand, 2001; Linton, 2000). There has therefore been a considerable amount of interest in investigating what is the best approach to identifying and managing these injured workers and ensuring successful return-to-work (RTW) outcomes in the most cost-effective way (Feuerstein, Miller, Burrell, & Berger, 1998; Harder & Scott, 2005; Pransky, Gatchel, Linton, & Loisel, 2005; Pransky, Shaw, Franche, & Clarke, 2004).

The Challenge of Occupational Injury Management

The management of occupational injuries has been one of the major challenges for the medical and rehabilitation professions, as well as for other stakeholders including employers and insurance companies. How a worker recovers from a bodily injury is not purely a physical process; it is a complex process involving many psychological, social, and economic factors. The World Health Organization (2005) has defined work-related injuries as “multifactorial” in nature, emphasizing the important roles of individual, workplace, medical, economic, and psychosocial factors (Buckle & Devereux, 2002).

By far, the most common types of occupational injuries involve the musculoskeletal system (Grieco, Molteni, De Vito & Sias, 1998; Hagberg, Silverstein, Wells, Smith, Henderick et al., 1995; NIOSH, 1997; Silverstein, Fine & Armstrong,

1986). It has been well documented that work-related musculoskeletal disorders (WMSD) constitute a disproportionately large part of health care costs and compensation payments among occupational injuries (Feuerstein et al., 2003; Pransky, Gatchel, Linton, & Loisel, 2005; Pransky, Shaw, Franche, & Clarke, 2004; Schultz & Gatchel, 2005). Many musculoskeletal injuries can become chronic with nonspecific and ill-defined symptoms, and associated with prolonged sick leave. It has been pointed out that the longer an injured worker stays off work, the less chance there is that he or she will return to work, and there is a higher chance of psychosocial problems and litigation developing (Feuerstein, Miller, Burrell, & Berger, 1998; Krause, Dasinger, Deegan, Rudolph, & Brand, 2001; Linton, 2001; Rosen, 1994; Waddell, 2004; Waddell, Somerville, Henderson, & Newton, 1992). As a result, various management strategies, such as active rehabilitation, early RTW, and case management have been adopted. These strive to reduce the possibility of the condition becoming chronic as well as to facilitate early RTW (Gardner, 2000; Harder & Scott, 2005; Schultz & Gatchel, 2005).

Need for Early Intervention and Case Management

In recent years, there has been a shift in the research agenda in occupational rehabilitation from medical management of musculoskeletal injury and toward the development of effective rehabilitation programs to facilitate the injured worker in

returning to work. Rehabilitation intervention has also changed from taking place only in the clinical setting to taking place in an integrated way in both clinical and workplace setting (Cheng & Hung, 2007; Feuerstein et al., 2003; Franche, Baril, Shaw, Nicholas, & Loisel, 2005; Pransky, Verma, Okurowski, & Webster, 2006; R. M. Williams & Westmorland, 2002; Young, Roessler et al., 2005). Promoting early RTW has been advocated in the literature as a means of reducing the costs of prolonged sick leave and reducing the potential for litigation (Feuerstein et al., 2003). Many return-to-work (RTW) interventions have been developed in various countries. These interventions have been affected by the structure of the relevant government, and by the legislative system relating to workplace injury management and resource availability. Most of the interventions involved some form of modified work duties in order to help the injured worker gradually learn to cope with the demands of full duties at work (Baldwin, Johnson, & Bulter, 1996; Franche, Corbiere, Lee, Breslin, & Hepburn, 2007; Krause, Dasinger, & Neuhauser, 1998; Li, Li-Tsang, Lam, Hui, & Chan, 2006).

The case management approach has become popular in industrialized countries in recent years. This is a more specific workplace injury management approach that involves both allocating a “case manager” both to coordinate the various health care services required and to ensure good communication with all stakeholders (Feuerstein

et al., 2003; Franche, Baril, Shaw, Nicholas, & Loisel, 2005; Gatchel et al., 2003; Harder & Scott, 2005; Lincoln, Feuerstein, Shaw, & Miller, 2002; Linz et al., 2001). The case manager may be someone from within the work organization, or from the insurance or health care management company. The arrangement varies in different countries and in different systems. This approach has become quite popular in countries like the United States, Australia, and Canada, and is gradually being adopted in Hong Kong.

The role of a case manager is to ensure better communication among all the stakeholders, including the employer, insurance companies, health care providers, and the injured worker (Linz et al., 2001). Bernacki and Tsai (2003) reported that client-centered communication among physicians, supervisors, and employees was able to produce significantly improved RTW outcomes, and that these outcomes are further facilitated by the presence of a case manager. It has been suggested that establishing a case management system in Hong Kong may help to address the problems of delays and mismanagement of injured workers, but there needs to be research evidence to demonstrate its effectiveness.

Return-to-Work Models

As the multi-factorial nature of occupational injuries becomes better known,

the management of occupational injuries has also gradually evolved from a traditionally biomedical model to an integrated “biopsychosocial” model, addressing both the physical and psychosocial risk factors of the injury and emphasizing the management of the “person as a whole” (Schultz, Crook, Fraser, & Joy, 2000; Schultz, Stowell, Feuerstein, & Gatchel, 2007).

In recent years, there has been a greater research focus on the psychological factors that play an important role in affecting the individual’s perception of the consequences of an injury at work and that play an important part in a person’s readiness to return to work (Krause, Dasinger, Deegan, Rudolph, & Brand, 2001; Krause, Dasinger, & Neuhauser, 1998; Li, Li-Tsang, Lam, Hui, & Chan, 2006; Linton, 2001). Psychological problems may include low self-esteem, depression, or anxiety (Waddell, Somerville, Henderson, & Newton, 1992; Watson, Brooker, Moores, & Main, 2004); worry about re-injury or an increase in pain; and catastrophizing (Li, Li-Tsang, Lam, Hui, & Chan, 2006; Sullivan, Stanish, Waite, Sullivan, & Tripp, 1998; Waddell, 2004). In terms of psychosocial issues, control over job demands, job stress, job satisfaction, and support from supervisors and fellow workers are major concerns affecting an injured worker’s readiness for RTW (Krause, Dasinger, Deegan, Rudolph, & Brand, 2001; Olsheski, Rosenthal, & Hamilton, 2002; Sullivan, Feuerstein, Gatchel,

Linton, & Pransky, 2005; Xu et al., 2007). These considerations have led to the development of different psychological or behavioral intervention approaches such as the "readiness-for-change" model or "stages-of-change" model and cognitive behavioral approaches (Li, Li-Tsang, Lam, Hui, & Chan, 2006; Linton et al., 2005; Sullivan, Feuerstein, Gatchel, Linton, & Pransky, 2005; Xu et al., 2007). Recent research studies on these interventions have affirmed the importance of understanding the individual person's cognitive processes concerning the decision to return to work.

The Injured Worker's RTW Decision-Making Processes—The Application of Prospect Theory

The RTW process has been recognized as complex and interactive, affected by physical, psychosocial, economical and occupational factors (Krause, Dasinger, Deegan, Rudolph, & Brand, 2001; Linton, 2000; Schultz, Stowell, Feuerstein, & Gatchel, 2007). After sustaining an injury, the injured worker is exposed to information about the worker's health status and physical abilities, the attitude of the employer and co-workers, and worker compensation benefits. At some stage, the injured worker is required to make a decision, either to stay on sick leave or to choose from the RTW options available. According to the optimizing theory of rational decision making, the injured worker will select a decision that would maximize the goal (Kinicki &

Williams, 2008). Recent research studies have affirmed the importance of understanding the individual person's cognitive processes concerning the decision to return to work. It is very important to understand how the person perceives the consequences of returning to work, both in terms of their personal well-being and in terms of the financial implications. Ting (2006) attempted to apply the prospect theory proposed by Kahneman and Tversky (1979) in a retrospective study on the RTW decision-making processes of injured workers. It was found that variables associated with RTW intention, perceived injury loss, and perceived person-environment fit were significant determinants of RTW outcomes.

According to the prospect theory, people respond predictably to potential gains and losses (Kahneman & Tversky, 1979). They are "risk seeking" when confronted with information about losses but "risk averse" when confronted with information about gains (Tversky & Kahneman, 1981). The "framing" of a situation is the decision maker's cognitive image of the situation and how it provides meaning for the person (Edwards & Elwyn, 2001; Salovey & Williams-Piehota, 2004). Prospect theory was originally proposed and applied in understanding decision-making processes involving finance and economics. It is possible that this theory may also be applicable to the decision-making process of the injured worker with regard to returning to work.

Further investigation in this area will help to acquire a better understanding of how the injured worker thinks and of how best to manage occupational injuries.

The Problems of Occupational Injury Management in Hong Kong

In Hong Kong, the Employees' Compensation Ordinance requires that all employers purchase insurance for work-related injuries. However, the ordinance mainly governs the reporting of occupational injuries and diseases, and there is no regulation concerning rehabilitation or RTW support for injured employees. It is reported that the number of occupational injuries in 2005 was 47,278, and the number of days lost was 1,171,516. The direct cost associated with these injuries was about HK$657 million (Labour Department, Hong Kong SAR, 2006). This has put tremendous financial pressure on the insurance industry and on employers. In 2000, the Hong Kong Federation of Insurers (HKFI) produced a report highlighting the major problems of the employee compensation system in Hong Kong. The report stated that the insurance companies had been taking a loss for over 10 years, due to the lack of systematic management of injuries at work and due to the inefficient RTW process.

Major delays and excessive periods of sick leave have been encountered as a result of having the injured workers managed through the public health care system, and such services in the public health care sector are already heavily utilized by the

general public. In addition, the current legislature does not lay down that employees must cooperate with any rehabilitation service providers, and many workers will opt to stay on sick leave for prolonged periods. Furthermore, the case medical doctor (usually an orthopedic specialist) serves as the leader of the rehabilitation team or the case manager of the injured worker, making recommendations to employers regarding whether the injured worker should continue his or her sick leave or RTW (either to modified or to full duties). However, there is no communication between the employer and the doctor as to whether the level of job duties recommended is actually available. Therefore, there is high risk of re-injury or there may be dispute between the employer and the injured worker, and these will in turn affect the RTW outcome. Hence, there is a strong need for the government to improve the present compensation system in order to ensure that occupational injuries are managed in an efficient and cost-effective manner.

STATEMENT OF PURPOSE

The purpose of this project is to examine the present work injury management system in Hong Kong and pilot test a case management system that is believed to be more effective for enhancing the RTW outcomes of injured workers. This project also attempts to study, using prospect theory, the ways in which the presentation of information relevant to workers' injuries, such as information on wages and pain, may influence the decision making and intention to return to work of employees.

To serve these purposes, this thesis is composed of three sequential studies. Study 1 involves a review of archival data pertaining to a group of workers who suffered occupational injuries and were managed by six insurance companies. The review covers the management processes for these cases. Problems arising from managing these cases are identified and the factors having negative impacts on RTW outcomes are explored. The results of this survey inform the development of a case management approach for managing occupational injuries, which was tested in Study 2. Occupational injuries referred to the company where the researcher worked between 2003 and 2004 were used as the case management group, while those reported in 2001 were used as the control cohort group. Several RTW outcomes, including sick leave

duration, cost of compensation, and percentage of permanent disability, were compared between the two groups. In Study 3, workers were put through an experimental design that tested the effects of using the framing techniques elaborated in prospect theory to frame wage- and pain-related information to modify their intention to return to work. Workers were exposed to information presented in either a negatively or a positively framed format. Intention to return to work was measured in terms of perceived chance of returning to work, confidence in returning to work, and anticipated sick leave duration.

Specific Objectives of the Three Studies

Study 1: A Preliminary Study of the Work Injury Management System in Hong Kong

a. To examine the present workplace injury management system adopted by various insurance companies and identify the possible problems causing delays in employee recovery.
b. To investigate the existing problems and determine what factors may be related to the outcomes of workplace injury management including total sick leave duration, cost of compensation, and percentage of permanent disability.

Study 2: Implementing a Pilot Work Injury Management Program in Hong Kong

a. To determine the effectiveness of a case management system by comparing it with a cohort group.

b. To investigate the factors that may affect the outcomes of a case management system.

Study 3: The Framing Effect of Prospect Theory on Return-to-Work Decision Making.

a. To determine the framing effect of prospect theory on the RTW decision of injured workers.

b. To determine the framing effect of prospect theory on the RTW decision-making process of injured workers over a period of time.

ORGANIZATION OF CHAPTERS

The thesis consists of six chapters including the present one, which is the general introduction to the present research work. A review of the literature on relevant topics is contained in the respective chapters for the three studies. Chapter 2 presents the research study on the present work injury management system in Hong Kong. The aims of the study were to detect the existing problems within the present system as well as to propose a way to improve the system. Chapter 3 presents a study on the effectiveness of a case management system in managing occupational injuries in Hong Kong. It determines how the injury management system helps to reduce the sick leave duration as well as the total cost of compensation. However, the inherent problems

associated with implementing such an approach within the existing system, which focuses on compensation and medical intervention, remain unresolved. Chapter 4 presents the experimental study on the framing effect of prospect theory on the RTW decision of the injured workers. Chapter 5 is the general discussion of the present body of research work, examining the impact of each study on the work injury management system in Hong Kong. Finally, Chapter 6 is the conclusion of the project, discussing the implications of the present findings for future developments in the injury management system in Hong Kong.

CHAPTER 2

STUDY 1 – SURVEY ON WORK INJURY MANAGEMENT SYSTEM

INTRODUCTION

In Hong Kong, the Employees' Compensation Ordinance requires that all employers must purchase employee compensation insurance for their employees. The ordinance requires employers to report occupational injuries but does not require them to provide rehabilitation or RTW management for employees injured at work. It was estimated that in 2000 there was a deficit of HK$2 billion in the field of work-related insurance claims (Hong Kong Federation of Insurers, 2000). The report concerned further indicated that the deficits were due to intense competition in the insurance market, a fragmented insurance market, excessive leakage from the system, increased claims in the field of common law damage, and payment of statutory benefits. The most important contributor of all to the deficit was the lack of a systematic provision of rehabilitation and early RTW services for injured employees, resulting in unnecessarily prolonged sick leave in Hong Kong (Hong Kong Federation of Insurers, 2000).

The local employee compensation system encourages injured employees to request work rehabilitation and RTW services from public hospitals and rehabilitation centers. Nevertheless, there are companies the insurance policies of which stipulate

that specific medical and rehabilitation panels should take care of their injured employees. As a result, there are at least two systems between which employers and injured employees can choose, namely, either the public or the private system. The main differences between the public and private systems are that the former has long waiting lists and subsidized fees (as do other compensation cases not initiated by employees); while the latter has short waiting lists but higher fees (which are usually covered by the insurance companies). The main reason for the long waiting list when injured employees use the public system, is that work rehabilitation and RTW services do not have priority over other cases that do not involve injured workers. As all patients (including injured workers) compete for the same resources, there are significant delays while waiting for specialist consultations, or in receiving the appropriate rehabilitation treatment, such as physiotherapy or occupational therapy. Another problem which injured employees and employers face is that medical doctors may tend to prescribe sick leave with reference to the progress of the employee's medical condition rather than the likelihood of his or her RTW. The lack of communication between the case medical officer, the employer, and the insurance company also contributes to the delays and the ineffective management rehabilitation and RTW of injured workers (Lai & Chan, 2007).

The management of occupational injuries has been the subject of much research for many years. This management includes both the medical management and the rehabilitation of the injured employee with a view to his or her RTW (Pransky, Gatchel, Linton, & Loisel, 2005; Schultz, Stowell, Feuerstein, & Gatchel, 2007). This includes the treatment of symptoms and pathology at the acute stage, as well as rehabilitation, which is designed to restore functional ability in the chronic stage as well as to facilitate the process of return to work. The results showed that physiotherapy programs with multiple interventions were able to reduce disability and impairment. Other interventions included not only symptom relief treatment, but also exercise or conditioning programs aimed at improving the employee's physical capacity to return to work (Krause, Dasinger, & Neuhauser, 1998; Loisel et al., 2002; Steenstra et al., 2006). Therapy aimed at restoring the functional abilities of the employee, and "work-hardening" programs have also reported good success rates in facilitating the RTW process (Isernhagen, 1991).

Lack of timely management and active intervention are important causes of the development of chronicity in occupational disability. It has been shown that injured employees who develop chronic pain and do not return to work, tend to suffer excessively from disability and depression (Linton, 2001). As more employees are on

long-term sickness, the cost of compensation claims, both direct and indirect, has been found to have escalated, even though the number of work-related injuries has not increased (Gardner, 2000; Van Tulder, Koes, & Bouter, 1995). Furthermore, the lack of a standard protocol and statistical data to support a management strategy tends to cause further delays in the rehabilitation of those suffering from work-related injuries (Pfingsten, Hildebrandt, Leibing, Franz, & Saur, 1997; Pransky, Gatchel, Linton, & Loisel, 2005).

In the past, doctors in public hospitals in Hong Kong would also refer patients with work-related injuries to physiotherapy or occupational therapy or both. However, due to the high demand for such services in the public system, patients with work-related injuries do not receive any priority over other public patients. Therefore the rehabilitation services they receive are either not intensive enough or are of insufficient duration. In other words, to get injured employees back to work is not considered a “priority” from the perspective of public healthcare providers. In recent years, insurance companies in Hong Kong have been attempting to develop more effective strategies to improve the management of employee compensation cases. They have been trying to get employers and employees to use more private healthcare services, to employ case management agents, and to try to introduce RTW programs

early. However, no systematic changes have come to fruition and no new services or strategies have been investigated for their cost-effectiveness.

The purpose of the present study is to carry out a preliminary review of the different strategies adopted by major insurance companies in Hong Kong for managing the cases of workers who have suffered from work-related injuries. At the same time, we were interested in determining the effectiveness of each of the identified strategies in terms of an injured worker's duration of sick leave, the percentage of workers acquiring a permanent disability, the costs of compensation, and the cost of the management of injured workers. The results of this study will inform the focus of Studies 2 and 3 in the following ways. First, reviewing the current injury statistics will provide useful information on the kinds of service that are needed most and information on how these services can be best coordinated by the case management system. Second, by examining the data on work injuries managed under the conventional medical model, a useful comparison can be made with a new system developed using a case management model. This will form the basis of Study 2. And by examining the problems associated with the current management of work injuries, Study 2 provides information about the needs of injured workers, especially in the decision-making process relating to RTW, information which will form the basis for

Study 3.

METHOD

Research Design

This study adopts a review of injured employee cases selected from the archival data of major insurance companies in Hong Kong.

Participants

The 10 largest insurance companies offering employee compensation insurance in Hong Kong were contacted initially and invited to participate in this study. These companies provide over 70% of all employee compensation policies for corporate firms in Hong Kong. Six of these insurance companies agreed to participate and provided their archived files of closed cases for our examination. A total of 250 case files on injured workers were selected from the pool of cases managed by these insurance companies between 1998 and 2002. The inclusion criteria were:

1. The injuries involved mainly the musculoskeletal system but without nerve injury.
2. The injuries did not receive surgical intervention.
3. The injuries did not receive psychological assessment or treatment.
4. The injured employee completed a medical assessment board examination with a decision on percentage of permanent disability.
5. The injured employee completed the process of settlement without further legal action.

Variables under Study and Instrumentation

For each of the selected cases, information on age, gender, type of work, and monthly income was extracted. Information extracted on the injury was: body region and nature of injury. Age was categorized into four groups: ≤29, 30-39, 40-49, ≥50. These subgroups were formed based on references in similar research studies on occupational injuries (Arnetz, Sjogren, Rydehn, & Meisel, 2003; Feuerstein et al., 2003; Krause, Dasinger, Deegan, Rudolph, & Brand, 2001). Monthly wages were categorized into three tiers of HK$<10,000, HK$10000-20000, and HK$>20000, as these cover the commonest levels of income in Hong Kong. The types of industry were categorized based on the commonest types cited in occupational injury statistics both in Hong Kong and overseas (Hong Kong Federation of Insurers, 2000; Hong Kong Labour Department, 2002; Mayer et al., 1998). The injured body parts were divided into four categories: head, trunk, upper limb, and lower limb. These divisions were made according to the classification system established by the labor department of the government of Hong Kong to identify occupational injuries (Hong Kong Labour Department, 2002).

Outcome measures of the management strategies included: (1) percentage of permanent disability (%PD), (2) total number of sick leave days taken, (3)

compensation costs (direct, indirect, and settlement). These variables were appropriate to reflect the severity of the injury in terms of the disability produced (%PD). The sick leave duration was an indicator of the effectiveness of the work injury recovery process, while the compensation costs represented the economic impact of the work injuries. Types of rehabilitation and injury management services were studied. The questions considered included: whether referred to a specialist, whether active rehabilitation services such as physiotherapy or occupational therapy were received, and whether a case manager or loss adjuster was appointed to coordinate the appropriate services. A four-page data form was constructed to facilitate the data collection (Appendix I). The name of the injured employee was not collected. Only the first 5 out of 6 digits of the Hong Kong identity card numbers of the employees were entered onto the data form so that cases could be identified while at the same time the identities of the injured workers were protected, in compliance with the Personal Data (Privacy) Ordinance of Hong Kong.

Procedure and Data Collection

A research assistant (RA) was assigned to collect the data from the participating insurance companies. The files of closed cases were presented by the insurance company and the RA would go through each file to check whether it fulfilled the

requirements of the inclusion or exclusion criteria based on the four-page data form. Altogether the RA went through 984 files provided by insurance companies and selected 250 cases for the present study. The number 250 was arbitrarily decided, as it was thought to be a good quantity of cases to reflect the typical characteristics of common work injuries reported by employees from different industries.

Statistical Analysis

The cases were categorized into different subgroups in terms of age, industry type, whether the participants performed manual work, and the body region and the nature of the injury involved. Independent *t* tests and one-way ANOVAs were conducted to test the differences in the demographic, medical, and outcome variables between the identified subgroups. The main dependent variables were the three RTW outcome measures of %PD, sick leave duration, and compensation costs. Linear regression analysis was used to identify the significant predictors on each of these outcomes. All the analyses were conducted with the SPSS for Windows version 14.0 software.

RESULTS

Demographic, Medical, and Work-related Characteristics

The 250 cases consisted of 200 male and 50 female injured workers. The mean age for the male cases was 40.3 years (SD = 9.9); while that for the female cases was 41.6 years (SD = 9.4). When the cases were further divided according to age, the commonest age group was 40-49 years (n = 96), followed by the 30-39 group (n = 72), then the group under 29 (n = 45), and, finally, the over-50 group (n = 37). The male cases had a mean annual salary of HK$15,267.4 (SD = HK$6,047.6); while the female mean was HK$10,833.3 (SD = HK$7,800.6). There were generally more workers employed in manual jobs (n = 169) than in sedentary jobs (n = 81). The manufacturing and construction industries had the highest numbers of injuries, followed by the transportation and catering industries (see Table 2.1).

A large variety of different types of injury was reported by workers. The injuries could be classified according to body part and nature of injury. Among the body parts, the upper limb was the commonest type of injury (91 cases or 36.4%); while 71 cases (28.4%) involved back or neck (trunk) injuries, and 77 cases (30.8%), lower limb injuries were similar in number. By far the commonest type of injury involved “sprain

or strain," which is likely to involve soft tissue injuries of the musculoskeletal system (Table 2.2). These may involve either the upper or lower limbs or the neck and back regions.

Of the 250 injured persons, 80.8% had consulted the accident and emergency department (A&E) or general outpatient department (OPD) of public hospitals. Only 11.2% had consulted private general practitioners or specialists. A total of 1.6% had been admitted as inpatients to public hospitals. Eighty-one cases (32.4%) received consultations with medical specialists and 52 cases (20.8%) received rehabilitation services, namely, physiotherapy or occupational therapy. Only 11 cases (4.4%) received case management, while 7 cases (2.8%) were referred to loss adjusters.

Work-related Outcomes

The mean percentage of permanent disability (%PD) was 1.13% (SD = 2.1). A review of the data indicated that 105 cases had received a 0% permanent disability rating from the Medical Assessment Board (n = 105). The compensation costs ranged from HK$400 to over HK$700,000 with a mean of HK$54,016.1 (SD = HK$113,183.7). The sick leave periods showed wide variations between 1 and 725 days with a mean of 78.8 days (SD = 133.9).

Comparisons of Outcomes across Different Demographic Groups

The 250 cases were, as previously noted, grouped into different age groups: ≤29, 30-39, 40-49, and ≥50 years of age. A one-way ANOVA was performed to test the differences in the three RTW outcome variables among the four age groups (Table 2.1). No statistically significant differences were found in %PD between the four age groups despite the tendency for those in the older age groups to have a higher %PD. Nature of work showed significant differences between manual and non-manual jobs. A further breakdown of the types of industry into specific industries showed significant differences between each industry, and these were significant for all three outcome measures. A comparison of monthly salaries also showed significant effects in sick leave days and compensation costs.

Table 2.1

Comparisons of work-related outcomes across different demographic and work-injured subgroups (N = 250)

	N = 250	%PD Mean (SD)	Sick leave days Mean (SD)	Compensation costs (HK$) Mean (SD)
Gender				
Males	200	1.1(1.9)	79.9(131.8)	57,262.0 (115,453.7)
Females	50	1.1(2.2)	74.1(143.2)	41,032.5 (103,678.6)
		$F_{(1,248)} = 0.037$, p = 0.847	$F_{(1,248)} = 0.075$, p = 0.784	$F_{(1,248)} = 0.822$, p = 0.366
Age				
≤29	45	0.8(1.3)	44.4(79.9)	24,707.1 (44,495.9)
30-39	72	1.1(2.1)	67.1(101.6)	47,051.1 (102,266.7)
40-49	96	1.3(2.2)	93.5(152.3)	67,546.3 (130,645.5)
50 or over	37	1.3(1.9)	105.3(177.3)	68,110.4 (136,585.8)
		$F_{(3,246)} = 0.910$, p = 0.437	$F_{(3,246)} = 2.074$, p = 0.104	$F_{(3,246)} = 1.761$, p = 0.155
Nature of work				
Manual	169	1.3(2.3)	91.1(149.2)	66,087.8 (132,747.2)
Sedentary	81	0.8(1.3)	53.1(89.8)	28,829.4 (43,782.3)
		$F_{(1,248)} = 3.331$, p = 0.069	$F_{(1,248)} = 4.440$, p = 0.035*	$F_{(1,248)} = 6.054$, p = 0.015*
Type of Industry				
Construction	57	2.1(2.8)	169.3(200.2)	135,806.6 (187,214.2)
Manufacturing	67	1.2(2.3)	65.9(116.2)	41,771.7 (89,810.2)
Catering	41	0.7(1.6)	33.0(40.6)	16,844.8 (27,727.6)
Office	21	0.4(0.7)	41.6(83.7)	11,596.4 (14,049.5)
Transportation	50	0.8(0.8)	59.8(95.4)	37,377.8 (51,646.3)
Health Care	13	0.8(0.7)	26.9(39.9)	9,532.4 (9228.9)
		$F_{(5,244)} = 3.888$, p = 0.002*	$F_{(5,244)} = 8.266$, p = <0.001*	$F_{(5,244)} = 9.628$, p = <0.001*
Monthly salary (HK$)				
<10,000	65	1.1(2.6)	47.5(94.8)	18,238.7 (41,517.1)
10,000-20,000	138	1.0(1.8)	79.2(135.0)	46,621.9 (88,489.2)
20,000 or Over	47	1.4(1.8)	120.7(164.3)	125,206.2 (190,982.2)
		$F_{(2,247)} = 0.711$, p = 0.492	$F_{(2,247)} = 4.190$, p = 0.016*	$F_{(2,247)} = 14.200$, p = <0.001*

Note: %PD = percentage of permanent disability.

**p<0.05*

Comparisons of Outcomes across Different Work-Related Injured Groups

The 250 cases were subdivided according to the injury characteristics, namely, the body region of injury and the type of injury (Table 2.2). The injured body regions were subdivided into four subgroups of head, trunk, upper limbs, and lower limbs. The trunk region included all the spinal injuries such as neck and back pain. The four body regions were compared in terms of differences in the three outcome measures of percentage of permanent disability, sick leave duration, and compensation costs (see Table 2.2). The results of the ANOVA showed that there were significant differences between the different body parts on the percentage of permanent disabilities ($F_{(3,249)}$ = 5.249, p = 0.002), sick leave duration ($F_{(3,245)}$ = 4.043, p = 0.008) and the cost of compensation ($F_{(3,246)}$ = 6.120, p < 0.001). A post hoc LSD test showed that those with an injury to the trunk region had significantly longer sick leave than those with upper limb and lower limb injuries. As for the percentage of permanent disability and the cost of compensation, trunk injuries scored significantly higher than head, upper limb, or lower limb injuries.

The types of injury were also classified into five major categories (see Table 2.2). The strain and sprain category was the commonest with 121 cases, followed by contusions (n = 53) and lacerations (n = 45). The ANOVA showed that there were

significant differences among the five different types of injury on the percentage of permanent disability ($F_{(6,243)} = 2.133$, $p = 0.050$), sick leave period ($F_{(6,242)} = 21.168$) and cost of compensation ($F_{(6,243)} = 33.139$, $p < 0.001$). Although there were only 9 cases of fractures, a post hoc LSD test showed that fractures led to longer sick leave periods, a higher percentage of permanent disability, and a higher cost of compensation than other types of injury. In addition, sprain-and-strain type injuries led to longer sick leave duration and higher costs of compensation than abrasion injuries.

Comparisons of Work-Related Outcomes across Cases Receiving Different Injury Management and Rehabilitation Services

The cases were further divided into subgroups to examine the differences for those who received different types of injury management and rehabilitation services (see Table 2.3). They were divided into two groups according to whether they had been referred to specialist services or not. Active rehabilitation implied physiotherapy or occupational therapy. Case management meant a case manager had been employed to coordinate the services required by the injured employee. Another category was the employment of a loss adjuster to investigate the liability for compensation in claim cases and the validity of the claim.

Independent *t* tests showed that those who had received consultations with

specialists (n = 169) had a significantly higher %PD (t = 6.909, df = 248, p <0.001), a higher number of sick leave days (t = 8.080, df = 248, p < 0.001), and a higher total compensation cost (t = 9.746, df = 247, p < 0.001) compared with those who did not have consultations with specialists. There were fewer cases (n = 52) requiring active rehabilitation and these were found to be associated with a higher %PD (t = -5.439, df = 248, p < 0.001), longer sick leave (t = -3.530, df = 248, p < 0.001), and higher compensation costs (t = 5.891, df = 247, p < 0.001). Eleven cases were referred for case management and it was found that there was no significant difference between those with and those without case management on the percentage of permanent disability (t = -1.167, df = 248, p = 0.244) but there were significantly higher compensation costs (t = -6.648, df = 247, p < 0.001) and longer sick leave periods (t = -4.998, df = 248, p < 0.001) than for those without case management. Furthermore, only 7 cases involved employing a loss adjuster. There were no significant differences between those who had a loss adjuster and those who did not, in terms of %PD (t = -1.263, df = 248, p = 0.208), amount of sick leave (t = -1.270, df = 247, p = 0.205), or compensation costs (t = 1.495, df = 248, p = 0.136).

Table 2.2

Comparisons of work-related outcomes across different body regions of injury and types of injury

	Number	%PD (SD)	Total Sick Days (SD)	Compensation Cost in HK$ (SD)
Head	11	0.4(0.8)	53.9(73.7)	21,910.3 (34.455.1)
Trunk	71	1.9(2.9)	121.3(176.7)	100,274.3 (171,078.7)
Upper Limb	91	0.9(1.5)	75.7(128.8)	45,563.9 (86,986.3)
Lower Limb	77	0.8(1.2)	47.8(83.4)	54,016.1 (113,183.7)
	Statistical difference	$F_{(3,246)} = 5.249$, $p = 0.002$*	$F_{(3,245)} = 4.043$, $p = 0.008$*	$F_{(3,246)} = 6.120$, $p < 0.001$*
Abrasion	15	0.3(0.6)	10.8(16.5)	6,288.8 (11,305.5)
Contusion	53	1.0(1.7)	62.9(104.6)	38,156.7 (58,608.8)
Laceration	45	0.9(1.5)	46.0(63.6)	21,417.8 (30.118.7)
Fracture	9	2.9(1.8)	469.0(194.8)	437,802.8 (237,366.8)
Sprain/strain	121	1.3(2.4)	81.3(124.8)	53,069.6 (94,993.8)
	Statistical difference	$F_{(6,243)} = 2.133$, $p = 0.050$*	$F_{(6,242)} = 21.168$, $p < 0.001$*	$F_{(6,243)} = 33.139$, $p < 0.001$*

**p<0.05*

Table: 2.3

Comparison of work-related outcomes among different injury management services

Injury management	No.	%PD Mean (SD)	Sick Leave Days Mean (SD)	Compensation Cost (HK$1,000) Mean (SD)
Consultation with Specialist				
No	169	0.6(1.1)	30.6(60.5)	18.3 (34.9)
Yes	81	2.3(2.8)	181.5(181.5)	128.5 (170.3)
		t = -6.909, *df* = 248, p < 0.001*	*t* = -8.080, *df* = 248, p < 0.001*	*t* = -9.746, *df* = 247, p < 0.001*
Active Rehabilitation				
No	198	0.8(1.3)	55.3(109.9)	41.4 (105.3)
Yes	52	2.4(3.3)	171.6(174.8)	102.1 (129.3)
		t =-5.439, *df* = 248, p < 0.001*	*t* = -3.530, *df* = 248, p < 0.001*	*t* = -5.891, *df* = 247, p < 0.001*
Case Management				
No	239	1.1	67.9	46.7
Yes	11	1.8	321.5	213.3
		t = -1.167, *df* = 248, p = 0.244*	*t* = -6.648, *df* =247, p <0.001*	*t* = -4.998, *df* = 248, p < 0.001*
Loss Adjuster				
No	243	1.1	77.3	52.2
Yes	7	2.1	142.3	153.1
		t = -1.263, *df* = 248, p = 0.208*	*t* = -1.270, *df* = 247, p = 0.205*	*t* = -1.495, *df* = 248, p = 0.136*

**p<0.05*

As most of the cases went through the public health care system, there were potentially considerable waiting times for appointments with specialists or for rehabilitation service appointments. The time lapses between the injury date and the date of the first intervention, for example, by a medical specialist or a rehabilitation consultation, are presented in Table 2.4. There are two observations. First, under the existing system, injured employees took several weeks to access various types of injury management services. Second, there was a delay in referring injured employees for case management. More importantly, both rehabilitation and medical specialist services commenced well before the injured employees received case management services.

Table 2.4
Comparison of the time lapse among different services in worker injury management

Time Lapse (days)	N	Min.	Max.	Mean	SD
Rehabilitation	52	45	144	88.0	20.0
Specialist	81	15	198	130.8	31.3
Case Management	11	158	197	177.4	12.3
Loss Adjuster	7	64	103	85.4	13.7

Prediction of Work-Related Outcomes

A linear regression analysis was used to identify the significant predictors of the work-related outcomes of the workers. The predictors entered were industry type, manual labor requirement, nature of injury, body part injured, use of rehabilitation

services, and consultations with specialist (Table 2.5). These predictors were those variables which had been revealed as having significant influences on the three work-related outcomes, namely %PD, sick leave days, and costs of compensation. The results indicated that injured body part ($B = -.205$, $p = 0.042$) and involvement of a specialist ($B = -1.409$, $p < 0.001$) were significant predictors of %PD, which accounted for 18.6% of the total variance. For the number of sick leave days, industry type ($B = -16.031$, $p = 0.002$), nature of injury ($B = -24.796$, $p = 0.001$), and consultation with medical specialist ($B = -123.073$, $p < 0.001$) were significant predictors, which accounted for 34.7% of the total variance. For the costs of compensation, the significant predictors were industry type ($B = -15445.367$, $p = 0.001$), nature of injury ($B = -25169.429$, $p < 0.001$), body part injured ($B = -10597.996$, $p = 0.042$) and consultation with medical specialist ($B = -84282.927$, $p < 0.001$).

Table 2.5

Linear regression model for each of the work-related outcomes

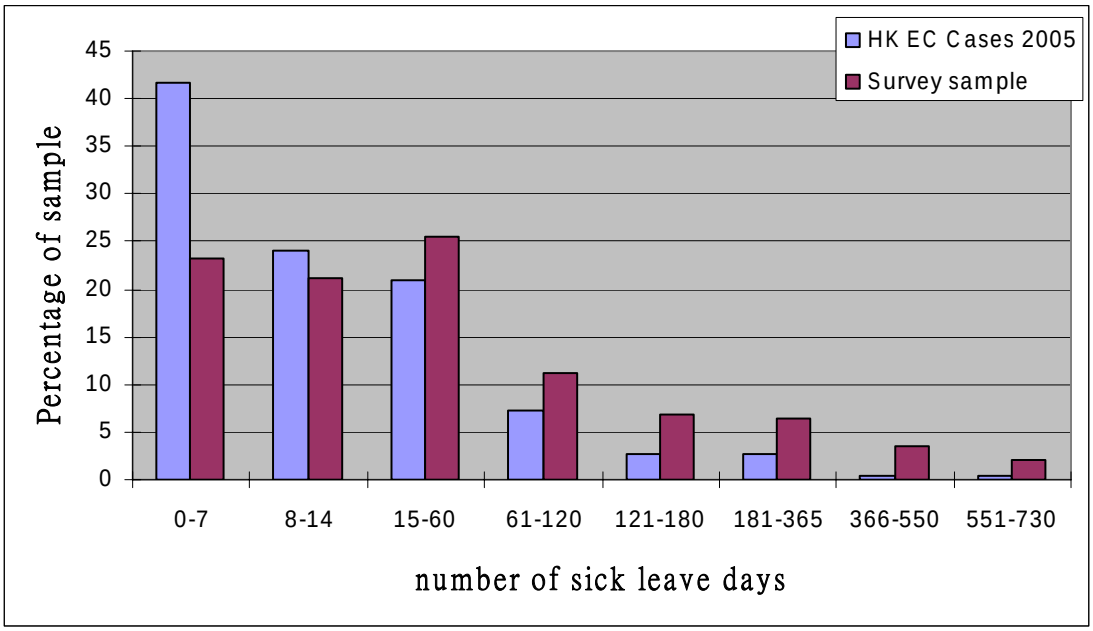
Factors	%PD			Sick Leave Days			Compensation Cost (HK$1,000)		
	Beta	*t*	p	Beta	*t*	p	Beta	*t*	p
Industry type	-.182	-2.088	0.038	-16.031	-3.068	0.002	-15445.367	-3.430	0.001
Manual labor	-.146	0.555	0.580	-9.412	-0.595	0.553	-15763.268	-1.161	0.247
Nature of injury	-.157	-1.340	0.182	-24.796	-3.519	0.001	-25169.429	-4.147	<0.001
Body part injury	-.205	-2.045	0.042	-11.362	-1.893	0.060	-10597.996	-2.048	0.042
Rehabilitation	-0.140	-0.910	0.364	-2.865	-.311	0.756	601.699	0.076	0.940
Specialist	-1.409	-5.369	<0.001	-123.073	-7.785	<0.001	-84282.927	-6.214	<0.001
Case management	-0.517	-0.863	0.389	165.586	4.640	<0.001	101742.816	3.166	0.002
Loss Adjuster	0.762	1.074	0.284	56.597	1.340	0.182	56164.609	1.475	0.142
	F = 10.472, p < 0.001*, adjusted R^2 = 0.186			F = 22.895, p < 0.001*, adjusted R^2 = 0.347			F = 20.379, p < 0.001*, adjusted R^2 = 0.319		

**p<0.05*

Comparison of the Current Sample with the Injured Worker Population in Hong Kong

When compared with all the employee compensation cases in Hong Kong in 2005 (N = 47,278) (Labour Department, HKSAR, 2005), the overall distribution of sick leave days in the cases used in this study was quite similar to that of the population as a whole (Figure 2.1). Our cases appeared to have a higher percentage (30%) who had had longer periods of sick leave (60 days or longer) than the population of injured workers as a whole.

Figure 2.1
Comparison of the number of sick leave days between cases in the present study and that of the Hong Kong injured workers population as a whole



DISCUSSION

The results of the present study provide an insight into the management strategies adopted by various insurance companies in Hong Kong. The work-related outcomes of the cases selected, namely, percentage of permanent disability, number of sick leave days, and total costs of compensation, were found to be affected by various demographic, work-specific, and service-specific factors. Each of them will be discussed in detail below. They also formed the basis for the design of Study 2, which focuses on the potential benefits of implementing a case management system in Hong Kong.

Effects of Demographic and Workplace factors

In the present study, 250 cases were selected from six insurance companies. The majority of the cases involved males (80%) and the ages of the participants were mostly between 30 and 49 years (67.2%). Results showed that age and gender did not have significant effects on the RTW outcomes. It was observed that the cases of those below 30 years old involved shorter sick leave amounts and lower compensation costs. Pransky, Benjamin, Hill-Fotouchi, Fletcher, Himmelstein and Katz (2002) also reported that those in the 30-50 year-old age group were more likely to return to work due to their pre-injury job tenures. In another study, Pransky, Benjamin, Savageau, Currivan and Fletcher (2005) compared the RTW outcomes of older and younger

employees and did not find any significant differences in terms of their injury characteristics and there were no significant differences in the medical care services they received either.

As for the type of industry and the nature of work, a majority of cases came from the construction (22.8%), manufacturing (26.8%), and catering (16.4%) industries and a majority of the participants (67%) were involved in manual labor. Their monthly salary was between HK$10,000 and HK$20,000. A post hoc LSD test showed that cases from construction industries had significantly longer sick leave duration, and a higher percentage of permanent disability and of compensation costs when compared with other industries. This is consistent with overseas research that has found the construction industry to be associated with more severe injuries and to have longer sick leave duration (Anderson, Hunting, & Welch, 2000). These results were also in line with another finding showing that cases where manual work had been involved also had significantly longer sick leave durations and higher compensation costs.

As previously noted, the majority of the cases came from the construction industry (22.8%), manufacturing (26.8%), and the catering industry (16.4%). Their work can be regarded as moderate to heavy in terms of physical demands. Significant differences were revealed in the three work-related outcomes, namely percentage of permanent disability, number of days of sick leave, and total costs of compensation

across the different occupational groups. Those jobs requiring heavier manual work had significantly higher percentages of permanent disability, longer sick leave, and higher compensation costs. These results are consistent with those reported in overseas studies. The US National Research Council (NRC) (2001) has reviewed all the major research studies that compared the incidence rates of back pain in different occupations. They concluded that the highest-risk occupations among males were construction laborers, carpenters, and industrial truck and tractor drivers, all with a prevalence ratio > 2.0. In Hong Kong, construction employees probably form the biggest group of employees required to carry out heavy physical work and therefore their injury prevalence would be high.

Effects of Injury Related Factors

The present study shows that cases with a trunk injury had significantly longer sick leave duration (121.3 days, SD = 176.7 days) and a higher percentage of permanent disability (1.9%, SD = 2.9%) and compensation costs (HK$100,274.2, SD = HK$171,078.7). The trunk injuries included all the spinal injuries, and occupational low back pain has been reported in many research studies to be the commonest occupational injury (Shaw, Feuerstein, Lincoln, Miller, & Wood, 2001; Williams, Feuerstein, Durbin, & Pezzullo, 1998).

As for the nature of the injury, cases with a diagnosis of fracture had significantly

longer sick leave duration (469 days, SD = 194.8 days) and compensation costs (HK$437,802.7, SD = HK$237,366.9) compared with other types of injury. Usually fractures are expected to take 6-12 weeks to heal, while long-bone fractures may take 9-18 weeks to do so (McRae & Esser, 2003). The 9 cases of fractures in the present study took an average of 469 days, which is about 1.5 years, before RTW. While it is not known how severe the injuries were, such results may have reflected the inefficiency of the management system in handling these cases.

The results of the regression analysis show that the industry type, body part, and nature of injury significantly predicted the sick leave duration and compensation costs. Cases with a trunk (or spinal) injury have been associated with heavy physical work and jobs that required repetitive manual lifting such as occurs in the construction industry. It could explain why injuries to the trunk led to longer sick leave duration and higher compensation costs. The US National Institute for Safety and Health (NIOSH)(1997) reviewed the epidemiological evidence of workplace factors being involved in neck, upper limb, and lower-back disorders in the US, and reported that there is “strong evidence” for “work-related lifting” and “forceful movements” being associated with low back pain due to the increased biomechanical strain to the musculoskeletal system.

Recent epidemiological studies have also shown that apart from the physical risk

factors, psychosocial factors are also important contributory element in occupational injuries (Feuerstein et al., 2003; Krause, Dasinger, & Neuhauser, 1998; Linton, 2000; National Institute for Occupational Safety and Health, 1997). These results suggest that it is important to address not only the physical health of injured workers, but also their psychological wellbeing and their social relationships with their families, their fellow workers, and their employers. Effective communication with different stakeholders, coordinated through a case manager, has been suggested as a critical issue affecting the success of RTW outcomes (Franche, Baril, Shaw, Nicholas, & Loisel, 2005).

Effects of Rehabilitation and Injury Management

The present study shows that the insurance companies adopted various management strategies to manage the work injuries. Most of the cases (79%) were without rehabilitation such as physiotherapy or occupational therapy or consultation with a specialist. They were handled under the traditional medical care system of the public hospitals of Hong Kong. If the injured employees had suffered a minor injury, they would improve with medication. Afterwards, they would return to work and attend the medical assessment board. The present result agrees with previous research in that only about 10% of cases developed chronic pain, which consumed majority of the costs of compensation (Grellman, 1997; Webster & Snook, 1990). If the injured

employees required consultations with a specialist, they would need to compete for resources within the public hospital system. In the Hong Kong public healthcare system, they would need to wait for 3-4 months for a consultation with a specialist, and as a result, their sick leave would be prolonged. In the present study, 32% of cases required specialist care. The averaged time gap between the time of injury and the date of first consultation with a specialist was about 130 days. The situation that specialist care is a strong predictor of longer sick leave duration and higher compensation costs is also supported by the results of the regression analysis.

In addition, the cases involving rehabilitation and specialist care had higher percentages of permanent disability (2.20% and 2.38%). Previous studies reported that the longer injured workers were off work, the less likely they were to return to work (Rosen, 1994). According to the phase model of disability, cases with more than 120 days sick leave are classified as chronic injury (Prochaska, Diclemente, & Norcross, 1992). Sufferers develop other problems, for example, psychosocial and occupational problems, which hinder the recovery process (Krause & Ragland, 1994). This could explain the finding of the present study that employees with active rehabilitation and specialist consultation end up with longer sick leave duration and higher compensation costs. This conflicts with other studies which found that rehabilitation and specialist care were provided at an early rather than a later stage after the injury (Durand &

Loisel, 2001; Koes, van Tulder, Kim, & Waddell, 2001; Maher, 2000).

Case management has been one of the approaches that have been adopted recently by insurance companies in Hong Kong. Mobley, Linz, Shukla, Breslin and Deng (2000) indicated that case management of workplace injuries could reduce the costs arising from work-related disability by 50% to 75%. The present study shows that there were only 11 cases (4.4%) that used a case manager to coordinate the rehabilitation process. The regression analysis also shows that case management was a significant predictor of long sick leave duration and higher costs of compensation. It was observed that the average time spent by the case manager involved was 177.4 days (SD = 12.3 days). This suggests that the case had already become chronic before the case manager was appointed and that there would be many adverse effects, both physically and psychologically (Anema, Van der Giezen, & Van Mechelen, 2007). This could explain why appointment of a case manager is associated with longer sick leave and higher costs of compensation in the present study. Previous research has also shown that patients who were referred earlier tended to return to work sooner than those who were referred later (Carosella, Lackner, & Feuerstein, 1994; Durand & Loisel, 2001; Ehrmann-Feldman, Rossignol, Abenhaim, & Gobeille, 1996; Maher, 2000; Voaklander, Beaulne, & Lessard, 1995). It is generally accepted that early intervention is the best approach and ensures a greater success in the RTW. It is also

associated with a shorter period of sick leave and reduced settlement cost (Franche, Baril, Shaw, Nicholas, & Loisel, 2005). Recent research has advocated the screening of workers who would have higher risks for developing long-term disabilities, and this would be possible if a systematic case management approach were to be implemented (Schultz, Crook, Berkowitz, Milner, & Meloche, 2005; Schultz, Crook, Berkowitz, Milner, Meloche & Lewis, 2008).

Interestingly, the cases with case management had a higher percentage of permanent disability than those without case management. A similar situation was observed in the appointment of loss adjuster. Insurance companies may employ a loss adjuster in order to establish their degree of liability for the employee compensation claim. Unfortunately, most of the cases with loss adjuster management involved severe injuries and disputed liability. This may explain why these cases were still found to have less favorable outcomes on %PD, on sick leave duration, and on compensation costs.

Based on the present study, it was found that the insurance companies had their own systems to select certain cases for case management as well as for receiving rehabilitation and specialist care. Based on the regression analysis, their selection is based on the industry type, the nature of the injury, and the body part involved. Fractures and back and neck injuries were the common criteria for initiating case

management. Unfortunately, the delay in referring cases to case managers means that the results are not similar to those of overseas studies (Feuerstein et al., 2003; Linz et al., 2001; Mobley, Linz, Shukla, Breslin, & Deng, 2000). It indicates that the present system adopted by insurance companies may not be the most efficient or cost-effective approach. In addition, the present legal system does not require employees to have a compulsory rehabilitation and RTW process. Hence, there was no systematic management to facilitate the RTW process in these cases. Therefore, those with more complex injuries would go to different medical services with poor or ineffective coordination and poor information sharing between different stakeholders (Franche, Baril, Shaw, Nicholas, & Loisel, 2005). In the end, the insurance companies needed to make more sick leave payments and higher final settlements due to the many delays in the whole process. There may also be legal costs if a case is referred to the courts.

The findings of the present study show that the insurance companies had attempted to establish their own case management systems. As different approaches were adopted by individual companies and no one scheme was adopted by all of them, employers were not responsive and only a small percentage of cases would be assigned a case management service. Yet, international research in developed countries has already shown that a comprehensive case management system helps to speed up the rehabilitation process and enhance communication between employers,

injured employees, and rehabilitation services providers, thus providing a more favorable result (Feuerstein et al., 2003; Linz et al., 2001; Steenstra, Verbeek, Heymans, & Bongers, 2005). In the light of the above-noted problems, a pilot study on implementing a case management system that addresses the specific needs and problems of individual workers after injury in Hong Kong was carried out in Study 2.

CONCLUSION

The present study is a retrospective examination of a sample of cases of injured workers based on information provided by different insurance companies. All cases involved musculoskeletal injuries or disorders that were managed without surgical intervention. The effects of several factors were examined to determine their influence on the workplace injuries and the outcomes of the management process. The results show that the type of industry in which a worker is employed has a highly significant effect on all RTW outcome measures, mainly due to the high injury rates in physically demanding industries such as construction and manufacturing.

In terms of injury management within the present Hong Kong healthcare system, the long waiting time for consultation with specialists and rehabilitation may cause a considerable delay in recovery, and may contribute to the development of chronicity and difficulties in returning to work. These results point to the need for a better coordination of rehabilitation services and more utilization of private services instead of public healthcare for work-related injuries. It is suggested that a comprehensive injury management system including an early intervention and RTW strategy is indicated and that this would improve efficiency and cost effectiveness.

LIMITATION OF PRESENT STUDY

The data collected in the present study was from the administrative database of insurance companies. It was known that the information was collected for reasons other than research. Previous researchers have commented that this type of database does not necessarily contain the information that is conducive to in-depth analysis and hence limit the conclusion to be drawn (Ladouceur, Rahme, Pineau, & Joseph, 2007; Schultz, Crook, & Milner, 2002). Because of this, we were cautious when analyzing the data and readers are reminded to be cautions when interpreting the results. For instance, the information on the classification as to the nature of injury and the body parts involved was not complete. This did not enable us to use these sampling frames for further refining our analysis which could have effects on the outcome variables. Future study should attempt to use a prospective design to replicate this study. The small number of insurance companies participating in the present study would also limit the generalization of the results to the settings that are different from those described in this study.

CHAPTER 3

STUDY 2 – IMPLEMENTING A PILOT WORK INJURY MANAGEMENT PROGRAM IN HONG KONG

INTRODUCTION

The results obtained from Study 1 suggest that a less effective process of occupational rehabilitation can lead to substantial financial losses to employers and insurance companies. A less-effective process can also cause considerable physical, emotional, and income losses to employees. In recent years, other studies have demonstrated the benefits of implementing early intervention and coordinated rehabilitation services for injured workers (Pransky, Verma, Okurowski, & Webster, 2006; Schultz, Crook, Berkowitz, Milner, & Meloche, 2008; Shaw, Pransky, & Fitzgerald, 2001; Steenstra, Verbeek, Heymans, & Bongers, 2005). The benefits lie primarily in reducing the chance of chronicity developing among workers by means of shortening the time taken by injured workers to return to work (Frymoyer & Cats-Baril, 1991; Hashemi, Webster, Clancy, & Volinn, 1997; Rosen, 1994; Webster & Snook, 1990). The present study aims to examine how implementing a case management system might alleviate the problems encountered by employers and employees under the existing employee compensation system in Hong Kong.

LITERATURE REVIEW

It has been reported that about 10% of injured workers develop chronic pain, and this small fraction of cases may consume the majority of the costs of compensating workers in industrialized countries (Grellman, 1997). It has been found that the problems of injured workers are multifactorial, and include physical, psychosocial, and socio-cultural factors (Feuerstein, Shaw, Lincoln, Miller, & Wood, 2003; Grellman, 1997; Krause, Dasinger, Deegan, Rudolph, & Brand, 2001; Schultz, Stowell, Feuerstein, & Gatchel, 2007). Resources have been channeled towards rehabilitating injured workers, as well as helping them to return to work more effectively (Currier, Chan, Berven, Habeck, & Taylor, 2001; Grellman, 1997; Pransky, Shaw, Franche, & Clarke, 2004; Westmorland & Buys, 2004; WorkCover Authority of NSW, 2006). The communication and interpersonal relationships between the injured workers, the physicians, the rehabilitation services, the employers, and the insurance claim managers are also important issues to address (Franche, Baril, Shaw, Nicholas & Loisel, 2005; Pransky, Verma, Okurowski, & Webster, 2006).

Other corporate and statutory factors further reduce the likelihood of an employee returning to work. At the corporate level, human resource policies and the size of the company may limit the effectiveness of any RTW arrangement

implemented within the company (van Duijn, Miedema, & Burdorf, 2004). An employee compensation system that does not stipulate the responsibilities of employees and employers on the issue of RTW provides little incentive for either party to engage in such a process (Hong Kong Federation of Insurers, 2000).

Worker Compensation systems and RTW Programs in Other Countries

In countries where a worker compensation system and an RTW policy are well developed, such as Australia, Canada, and the United States, different approaches have been used to guide different RTW processes. These approaches include medical management, physical reconditioning, and taking account of psychosocial aspects of the situations of injured workers (Feuerstein, Shaw, Lincoln, Miller, & Wood, 2003; Krause, Dasinger, Deegan, Rudolph, & Brand, 2001; Marhold, Linton, & Melin, 2002; Mobley, Linz, Shukla, Breslin, & Deng, 2000; Pransky, Shaw, Franche, & Clarke, 2004; Steenstra, Verbeek, Heymans, & Bongers, 2005). The content of "disability management" or "case management" programs is often determined in consultation with the stakeholders involved, such as the worker, the employer, the insurance company, the medical doctor, and other health service providers (Franche, Baril, Shaw, Nicholas, & Loisel, 2005; Pransky, Shaw, Franche, & Clarke, 2004; R. M. Williams & Westmorland, 2002). Schultz et al. (2007) interpreted the disability management program as an ecological or case management model which focuses on the complex

interactions between microsystems (the workers factors), mesosystems (workplace, healthcare and insurance system factors) and macrosystems (economic, social and legislative factors). The ecological model or case management model also adopts integrated, multi-disciplinary and early intervention approaches. Loisel et al (2005) also add the cultural and political context so as to address the more global and societal aspects of occupational disability. Schultz et al (2007) also point out that the current trend in disability management is to adopt a biopsychosocial model, which takes into consideration the biophysical, psychosocial, temporal, and economic factors in the management of injured workers from the time of injury to final reintegration into the workforce. More importantly, the biopsychosocial model stipulates that the employer should be involved at an early stage and emphasizes workplace-based interventions (Franche, Baril, Shaw, Nicholas, & Loisel, 2005; Loisel et al., 2005; Steenstra, Verbeek, Heymans, & Bongers, 2005; Weir & Nielson, 2001).

In most countries, the employee compensation system is based on a no-fault principle by which injured employees are eligible to claim compensation for incurred injuries regardless of who is at fault. It is this no-fault principle that has motivated the payers and service providers of the system to develop different management strategies for speeding up the RTW process and hence reducing the cost of compensation (Schultz, Stowell, Feuerstein, & Gatchel, 2007; W. S. Shaw, G. Pransky, & T.E.

Fitzgerald, 2001). Case management is one approach that has been gaining popularity in recent years (Linz et al., 2001; Mobley, Linz, Shukla, Breslin, & Deng, 2000; Pransky, Shaw, Franche, & Clarke, 2004).

Definition of Case Management

According to the Case Management Society of America, case managers play the major roles of assessing, planning, implementing, coordinating, monitoring, and evaluating the options and services available to injured employees to match their health needs (Linz et al., 2001). During these processes, the case managers use effective communication skills and human and physical resources to achieve optimal RTW outcomes. Case managers usually have a professional background; for example, as an occupational health nurse, a physical therapist, or an occupational therapist (Fisher, 1996; Leahy, Chan, Shaw, & Lui, 1997; Russo & Innes, 2002). Mobley, Linz, Shuk, Breslin and Deng (2000) indicated that the case management of workplace injuries could reduce the costs arising from disability at work by 50% to 75% through reducing delays in diagnosis, treatment, and RTW (Mobley, Linz, Shukla, Breslin, & Deng, 2000). Schultz et al. pointed out two important determining factors which were the involvement of the employers in the planning and the provision of suitable employment in the company (Schultz, Stowell, Feuerstein, & Gatchel, 2007). The success of these programs often requires the support of the government legislation and

of the policies of the insurance companies.

Lack of Work Injury Management in Hong Kong

In Hong Kong, the employee compensation system does not stipulate that there must be case management or a RTW program to be provided to injured workers (Hong Kong Federation of Insurers, 2000). There are also no provisions made with regard to the role to be played by employers when workers are injured at their place of work. The local system basically follows a “biomedical” model where the case medical doctor has the ultimate responsibility for diagnosing, evaluating, and determining the injured worker’s management and RTW process. Most work injuries are managed through Hong Kong’s public health care system. Medical rehabilitation of work injuries in the public health care system may involve physical interventions such as physical therapy, occupational therapy, or functional and work-related training programs, where available. However, such services in the public health sector are already heavily utilized by the general public, and injured workers must go on the usual waiting list and share facilities with other patients. The case medical doctor (usually an orthopedic specialist) serves as the leader of the rehabilitation team and makes recommendations to employers regarding whether an injured employee should continue his or her sick leave or RTW (either to full or to modified duties). The injured worker completes a medical assessment conducted by a team of medical doctors and a

labor officer from the Hong Kong government to determine his or her level of impairment (Hong Kong Labour Department, 2002). The level of impairment is expressed as a percentage that is used to determine the amount of compensation the injured worker will receive. The total compensation amount is related to the salary the worker earned before the injury, the duration of sick leave due to the injury, and other medical or related expenses during the sick leave period (Hong Kong Federation of Insurers, 2000; Labour Department, 2006; Lai & Tam, 2002). The existing system and provisions were deemed not to be conducive for returning injured workers to work in Hong Kong (Hong Kong Federation of Insurers, 2000; Lai & Tam, 2002). According to statistics provided by the labor department of the government of Hong Kong, the costs of compensation have escalated despite an overall decline in the number of reported work injuries (Lai & Tam, 2002). It has been reported that employee compensation costs have been steadily increasing, from HK$1 billion in 2001 to HK$1.2 billion in 2003 (Li, Li-Tsang, Lam, Hui, & Chan, 2006).

OBJECTIVES OF STUDY

The present paper describes an approach that aims to pilot test the effectiveness of a case management system designed to address the needs and problems of the situation in Hong Kong. The management components of the system were developed with reference to those developed in other countries that have clear provisions for a case management system and RTW procedures. It was hypothesized that if an independent service provider implemented the case management system for the first time, it could facilitate the rehabilitation and RTW process of injured workers and hence reduce sick leave and the amount of compensation paid. The findings of this study may shed light on the effects of a case management system without legislative support by comparing the outcome variables between the case management and control cohort groups—including the compensation costs and the RTW rate. More importantly, the problems encountered in operating the system and the possible solutions might serve as a reference for other organizations that have no RTW policies in place but plan to implement such a system.

METHOD

Research Design

A quasi-experimental study design was used, and a local cleaning company agreed to participate. Effectiveness was evaluated by comparing the results obtained from the outcome measures for a group of injured workers recruited within a 24-month period from 2003 to 2004 with those obtained for a retrospective cohort group who received conventional services - that is, rehabilitation services such as physiotherapy and occupational therapy but no case management services - in the 12 months before the pilot study was implemented in 2002. The outcome measures used in this study were number of sick leave days, cost of compensation, and the RTW rate. The 6-month RTW status of employees in both groups was obtained by extracting the relevant information from the personal human resource files of the employees in the company.

Participants

Two hundred ninety-six injured workers were recruited in the 12-month period between mid-2003 and mid-2004 to participate in the case management group. The comparison group (called the conventional rehabilitation group) consisted of 137 injured workers. The majority of the participants in both groups were females (80.3% and 91.6%) with ages ranging from 17 to 73 years and a monthly wage ranging from

HK$3,153 to HK$163,500 (Table 3.1). Most of them worked as cleaners or manual laborers. Comparisons of these demographic and job characteristics revealed no significant differences in the mean age (t_{365} = 1.546, p = 0.123) and monthly salary (t_{429} = 0.295, p = 0.768) between the two groups. The most commonly injured body parts were the upper and lower limbs, followed by the head and trunk. The most common injuries were contusions and bruises, sprains and strains, and lacerations and cuts, with fractures being less common.

Table 3.1

Demographic, job, and injury profiles of workers in the case management and conventional rehabilitation groups

	Case Management (n = 296)	Conventional Rehabilitation (n = 137)	*t*	*df*	p
Gender					
Male	25 (8.4%)	27 (19.7%)			
Female	271 (91.6%)	110 (80.3%)			
Age, Mean (SD)	46.4 (9.5)	47.4 (11.9)	1.546	365	0.123
Salary, Mean (SD)	HK$5,332.5 ($2,025.9)	HK$6,221.5 ($9,477.0)	0.295	429	0.768
Job Types (n)					
Supervisor	9	7			
Cleaner	248	113			
Manual laborer	22	12			
Others	17	5			
Body Part Injured (n)					
Head	61	23			
Trunk	55	24			
Upper limb	107	45			
Lower limb	56	34			
Others	17	11			
Nature of Injury (n)					
Abrasion	20	2			
Burn	9	3			
Contusion or bruise	91	45			
Laceration or cut	34	12			
Crushing	10	3			
Fracture	24	6			
Sprain or strain	72	48			
Irritation	9	7			
Other	27	11			

*$p<0.05$

Case Management System

The case management approach was characterized by the assignment of a case manager who worked closely with each injured employees. The case manager's role was to enhance communication among different stakeholders, to coordinate and advocate for essential services, to analyze the fiscal benefits of the services, and to resolve any conflicts at an early stage (Fisher, 1996; WorkCover Authority of NSW, 2000). A comparison between the case management approach and the conventional approach is summarized in Table 3.2. Assistance for a safe transition to modified or full duties when returning to work was also arranged. The case managers were all registered physical therapists and occupational therapists, and they had received on-the-job training in the local policies and procedures of employee compensation before participating in the present study.

Table 3.2

The comparison between Case Management and Conventional Approach in managing work injury

	Case Management Approach	**Conventional Approach**
Assumption	Interaction between workers, workplace, healthcare providers, insurers, economic, social and legislative factors	Illness is due to physical pathology
Beliefs and Values	Multiple factors affect the injured worker	Elimination of pathological causes will result in cure and improvement
Goals	Return to the pre-injury work duties	Cure the injury
Key persons	Case manager, worker, doctor, rehabilitation services providers, employer, insurer	Doctor, injured worker, rehabilitation Service providers,
Duties	Coordinate appropriate medical and rehabilitation services	Provide suitable medical and rehabilitation services
	Try to resolve psychosocial problems	Concentrate on physical problems
	Negotiate suitable duties with employer	No communication with other stakeholders within the system.
	Monitor the status of RTW	No assistance in RTW

In the study, a case management program was designed specifically to cater to the individual needs of the injured workers. All cases received between January 1, 2003 and December 31, 2004 were automatically assigned to the case management program. Those who had died in an accident at work or who had refused to join the program were excluded from the study. The program was fully funded by the employer and the insurance company. A case manager was assigned to each of the injured workers as soon as the case was referred to the program.

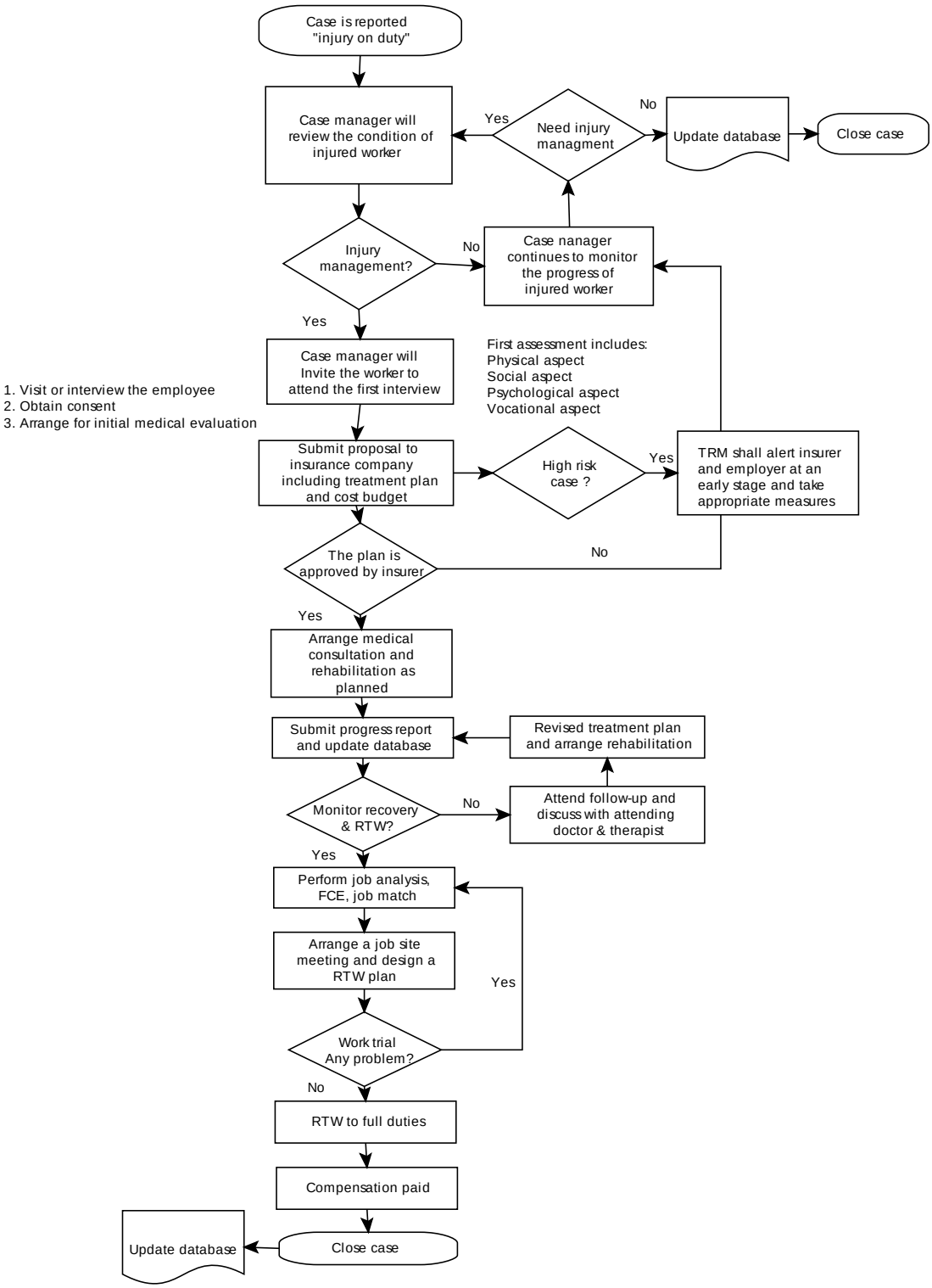
The role of the case manager was to work with the injured workers and the employer with reference to the provisions stipulated in the local employee compensation regulations. The injured workers were required to give their written consent, as laid down by the Hong Kong Personal Data (Privacy) Ordinance (Chapter 486), so that relevant medical and personal information could be accessed. The case manager conducted regular assessments of the injured workers during the early stages of medical care and rehabilitation following the injuries. When additional medical and rehabilitation services were indicated as needed for the injured worker, the case manager would submit a proposal for services to the employer and insurer to secure funds in order to provide early rehabilitation interventions. The case manager monitored the progress of the injured worker receiving medical or rehabilitation services or both in the public or private sector. Whenever necessary, the case manager

would accompany the injured worker to attend consultations at the public hospital in order to communicate directly with the doctor in charge. The case manager further evaluated the case of the injured worker to determine whether an RTW plan was required. For those cases that required such services, the case manager conducted a job analysis and functional capacity evaluation, and then designed the appropriate RTW plan to ensure a smooth and safe RTW. Where workers were able to return to work immediately after the medical and rehabilitation interventions, the case manager would liaise with the employer to ensure a smooth transition to the resumption of work. Figure 3.1 presents a flowchart illustrating the entire process of case management.

Each case was defined as closed whenever the injured worker completed the medical and rehabilitation services or returned to work or both, and in some cases when a solicitor was engaged. The cost of compensation was calculated according to the Employees' Compensation Ordinance (Chapter 282), or was based on the monetary settlement agreed upon the appointed solicitor or on the instructions in a court judgment. In cases that were still not settled at the time the data collection was completed, the reserve recommended by the insurer was taken as the total cost of compensation. This cost included wage payments, compensation for permanent disability, and reimbursement of medical expenses. Other information used included duration of sick leave and RTW status (return to the original or a new employer) both

at the time when a case was closed and 6 months thereafter. Sick leave duration was defined as being from the date on which the injury occurred to the date when the sick leave certified by the medical doctor ended. For the unsettled cases, the sick leave period estimated by the insurer was used.

Figure 3.1: Work flow of the case management program



Conventional Rehabilitation

The comparison group of workers received conventional rehabilitation. The process of referral was initiated by medical doctors in the accident and emergency department or by orthopedic specialists where a physiotherapy intervention was required. Physiotherapy courses ranged from a few to tens of sessions (a few weeks to a few months) depending on the progress of the injured worker toward full physical capacity as determined by the medical doctors. Injured workers were referred to occupational therapists for functional training and for a RTW arrangement to be made if deemed appropriate by the medical doctors. This training usually took 8 to 12 sessions (2 to 3 months) to complete. Progress reports from the physiotherapist and occupational therapist were regularly sent to the case medical doctor and RTW decisions were based on these reports. Among the decisions that might be taken were that the injured employee could resume the work undertaken prior to the injury, that he or she could perform light duties leading progressively to full duties, or that he or she was not able to resume the work carried out prior to the injury. The employer, the insurance company, and the case managers took a passive role in recording the activities of the injured workers and arranging a RTW after receiving the recommendations made by the medical doctor.

Outcome Variables

The main variables used to measure the outcomes of the intervention programs were number of sick leave days, compensation, rate of RTW (on two occasions: when the case was closed and 6 months thereafter), and percentage of permanent disability (%PD). The number of sick leave days was defined as the number of days granted by the attending doctor that were related to the specific workplace injury. Compensation was defined as the money paid out by the employer under the Employees' Compensation Ordinance in Hong Kong. The rate of RTW (case closed) was defined as the number of workers who returned to work after injury compared with the total number of injured workers in each of the two groups. The rate of RTW (6 months) was defined as the number of workers who maintained an RTW status 6 months after the case was closed compared with the total number of workers who had achieved an RTW status at the time when the case was closed. The percentage of permanent disability suffered by an injured worker was assessed by a two-tier Employees' Compensation Assessment Board appointed by the Commissioner for Labour in accordance with the Ordinance. The percentage was extracted from the report received by the injured worker after attending the assessment.

The data collected included demographic information, injury profile, sick leave period, cost of compensation, and RTW status. SPSS version 14 was used to

conduct the analyses. The data of the outcome variables were normalized by the log 10 function to cater to the wide within-group variations before being entered into the between-group comparisons. *T* tests were used to compare the differences in outcome measures between the case management and conventional rehabilitation groups. For categorical data such as RTW status, chi-square was used to test the group differences. A regression analysis and dummy-variable regressions were used to further test the effect of age on these outcome variables between the two groups. The same procedure was not conducted for the effect of RTW status because of the comparatively small sample sizes in two of its three subgroups among the case management group (n = 12).

RESULTS

Outcome Variables of Case Management and Conventional Rehabilitation

The mean number of sick leave days taken by workers in the case management group was 27.5 (SD = 78.6) while that of the conventional rehabilitation group was 41.6 (SD = 85.5), with the mean for the former group significantly less (33.8%) than that for the latter group ($t = 5.073$, $df = 425$, $p < 0.001$) (Table 3.2). The mean cost of compensation for workers in the case management group was HK$7,212 (SD = HK$3,147.9) while that for the conventional rehabilitation group was HK$20,617 (SD = HK$91,195), with the mean for the former group significantly lower than that for the latter group ($t = 2.374$, $df = 423$, $p = 0.030$). With regard to RTW status, 287 workers (97.0%) in the case management group and 129 workers (94.2%) in the conventional rehabilitation group managed to return to their pre-injury job duties (or positions), with no significant differences between the two groups ($\chi^2 = 1.906$, $p = 0.167$). The mean percentage of permanent disability as obtained from the statutory assessment board was 0.40 (SD = 1.31) for the case management group and 0.58 (SD = 1.53) for the conventional rehabilitation group, with no significant differences between the two groups ($t = 1.248$, $df = 431$, $p = 0.213$).

Table 3.3

Comparisons of outcomes of workers in the case management and conventional rehabilitation groups

	Case Management (n = 296)	Conventional Rehabilitation (n = 137)	*t*	*df*	p
Sick-leave (days), Mean (SD)	27.5 (78.6)	41.6 (85.5)	5.134	425	<0.001
Cost of compensation, Mean (SD)	HK$7,212.2 (HK$3,147.8)	HK$20,617.3 (HK$91,195.4)	2.189	423	0.030
Returned to work (n)	287	129	1.906[@]	1	0.167
Permanent disability (%), Mean (SD)	0.40 (1.31)	0.58 (1.53)	1.248	431	0.213

Note: [@]chi-square statistics used instead of *t* test.

Further analysis of the results indicated substantial within-group variations, particularly in terms of number of sick leave days and compensation cost. As the number of days of sick leave might influence the cost of compensation, post hoc analyses were conducted by dividing the participants into: $\leqq$30 days of sick leave and >30 days of sick leave subgroups. Similar results were found for the $\leqq$30 days of sick leave subgroup and the total group. Significant differences were found in the number of days of sick leave ($t = 4.653$, $df = 353$, $p < 0.001$) and the cost of compensation ($t = 4.653$, $df = 353$, $p < 0.001$), but not for the rate of RTW or the percentage of permanent disability ($p > 0.050$) between these two groups. For the >30 days sick leave subgroup, no significant differences were found for any of the four outcome measures ($p > 0.050$) when compared with the total group.

Regression Analysis on Outcome Variables

The effects of the participants' ages on the number of sick leave days and the cost of compensation were analyzed using a multiple regression analysis followed by a dummy-variable regression analysis. In the multiple regression analysis, age of participants (Age), group membership (Group, case management versus conventional rehabilitation), and interaction between Age and Group were entered as the predictors.

Two separate regression analyses were run with the number of sick leave days and costs of compensation as the dependent variables. For the number of sick leave

days, the regression model was statistically significant ($F_{(1,413)}$ = 11.870, p = 0.001). The Age (B = 0.055, SE = 0.017, p = 0.001) and Age x Group (B = -0.038, SE = 0.019, p = 0.046) were found as the significant predictors. Constant and Group were statistically not significant (B = 0.790, SE = 0.792, p = 0.319; and B = 0.974, SE = 0.895, p = 0.277 respectively). For the cost of compensation, the regression model was statistically not significant ($F_{(3,415)}$ = 1.825, p = 0.142). None of the predictors was found to be statistically significant (p > 0.050) either. In the dummy-variable regression, the participants in each group were further divided into three subgroups: 40 years of age or below, 41 to 50 years of age, and 51 years of age or above (Table 3.3).

In general, in the case management group, the days of sick leave increased as the age of the participants increased. By contrast, in the conventional rehabilitation group, the participants in the 41-50 year age group had the longest number of sick leave days. The pattern of the costs of compensation across the three age groups and the two intervention groups were found to be similar to those of days of sick leave. The dummy-variable regression models for using Age and Group for predicting days of sick leave and costs of compensation were both statistically significant. For the days of sick leave, DV 1 (the 41-50 age group as compared with the $\leq$40 age group) and DV 1 x Group were the significant predictors (Table 3.3). The total variance explained by

the regression equation was 8.8% and the equation was: days of sick leave = 5.44 + 2.48 * Group + 31.15 * DV1 + 8.30 * DV 2 – 20.61 * DV 1 * Group + 4.40 * DV 2 * Group, where Group is 0 = case management group and 1 = conventional rehabilitation group. Similarly, for the cost of compensation, DV 1 was the significant predictor while DV 1 x Group was only marginally significant. The total variance explained by this regression equation was 4.3% and the equation was: cost of compensation = 560.51 + 987.76 * Group + 12,223.75 * DV 1 + 1,464.76 * DV 2 – 9323.65 * DV 1 * Group + 1,331.51 * DV 2 * Group, where Group is 0 = case management group and 1 = conventional rehabilitation group.

The employer of the participants who achieved an RTW status in the study was contacted 6 months post-injury in order to determine the lasting effect of the RTW. It was found that 275 workers in the case management group (95.8% of 287) and 124 in the cohort group (96.1% of 129) had maintained a working status. The proportions of workers that maintained an RTW status in the two groups were not significantly different (chi-square (df = 3) = 5.528, p = 0.137).

Table 3.4

Results of dummy-variable regressions for predicting sick leave days and cost of compensation by Age (< 40, 41-50, and 51 or above) and Group (case management versus conventional rehabilitation)

	Case Management (n = 287)	Conventional Rehab. (n = 129)
Number of participants		
≤ 40 years	81	27
41-50 years	135	71
51years or over	71	31
Sick leave (days), Mean[SD]		
≤ 40 years	7.9 (6.5)	5.4 (1.9)
41-50 years	18.46 (34.4)	36.59 (42.2)
51years or over	20.62 (38.5)	13.74 (7.06)
Cost of compensation, Mean[SD]		
≤ 40 years	HK$1,548.3 (1,975.1)	HK$560.5 (463.2)
41-50 years	$4,448.4 (11,806.9)	$12,784.3(40,158.8)
51years or above	$4,344.5 (7,812.1)	$2,025.3 (3,786.7)

	b	*SE*	*t*	*p*
Sick leave days, total $R^2 = 0.088$				
Constant	5.44	5.95	0.915	0.361
Group	2.48	6.87	0.361	0.718
DV 1	31.15	6.99	4.455	<0.001
DV 2	8.30	8.14	1.019	0.309
DV 1 x Group	-20.61	8.23	-2.504	0.013
DV 2 x Group	4.40	9.57	0.459	0.646
Cost of compensation, total $R^2 = 0.043$				
Constant	560.51	3512.67	0.160	0.873
Group	987.76	4,056.01	0.244	0.808
DV 1	12,223.75	4,126.87	2.962	0.003
DV 2	1,464.76	4,804.75	0.305	0.761
DV 1 x Group	-9,323.65	4,859.20	-1.919	0.056
DV 2 x Group	1,331.51	5,647.19	0.236	0.814

Note: Group is case management versus conventional rehabilitation groups;
DV 1 = Dummy variable 1 set for the 41-50 year age group with the ≤ 40 year age group as the reference category; DV 2 = Dummy variable 2 set for the 51 years or over age group with the ≤ 40 year age group as the reference category.

DISCUSSION

The present study examined the benefits of implementing the case management approach within an existing employee compensation system that focused primarily on medical rehabilitation and compensation. The main findings are that the participants in the case management group had shorter sick leaves and lower costs of compensation than those receiving conventional rehabilitation services. However, no differences were found in the RTW rates or percentages of permanent disability. When within-group variations were further controlled for, the effects of case management were in general diminished among participants who took more than 30 days of sick leave. Age appeared to be a confounding factor influencing the number of sick leave days and the cost of compensation among the workers who were in the case management group. Workers who were $\leqq$40 years old had the shortest sick leave and incurred lower costs of compensation than the other older age-group workers. Workers who belonged to the 41-50 year age group seemed to benefit the most from the case management intervention in terms of these two outcomes when compared with their conventional rehabilitation counterparts. Once the workers achieved RTW status, they maintained this status at a high rate regardless of which intervention they had received.

Benefits of Case Management

According to Linz et al. (2001), the case management of work injuries can

minimize delays in diagnosis, treatment, and RTW, which in turn reduces the cost of compensation. In the present study, the case management approach involved engaging rehabilitation professionals who worked with the injured workers from immediately after the injury occurred until the end of the RTW process. The case manager communicated with the injured workers regularly through personal or telephone interviews to ensure they received the most appropriate interventions in the shortest time possible. Another feature of the case management approach used in this study, which was unique to the local employee compensation system, involved adding services from independent service providers when the rehabilitation services available in the public sector (for which the workers were eligible), such as hospitals and rehabilitation centers, were not adequate. The services provided by independent service providers were usually more intensive in terms of the frequency and duration of each treatment session. These services consisted of physiotherapy, occupational therapy, clinical psychotherapy, or a combination of these. The effectiveness of the case management approach perhaps centered on more timely intervention and closer communication between the injured workers and the rest of the parties involved in the rehabilitation and RTW processes.

Previous studies have indicated the importance of early intervention in the management of workplace injuries. In the present study, the work flow of case

management emphasized early intervention. Case managers actively contacted the workers right after their injuries. The workers were then invited to attend an interview. The information gathered from the interview enabled the case managers to formulate a treatment plan and a cost budget. Interventions were made after gaining approval from the insurance company. In contrast, the conventional rehabilitation program relied on the employee to take the initiative to seek advice from the human resource department of the employer or the insurance company. The time lag involved in each of the communication processes could substantially delay the treatment to be received by the employee. Previous studies have revealed that the main reason for early intervention is that problems associated with the injuries can easily develop into chronic physical, mental, or psychosocial issues, or a combination of these (Gatchel, Polatin, & Mayer, 1995; Linton, 2001; Olsheski, Rosenthal, & Hamilton, 2002). Other studies on workers with low back pain have indicated that early intervention is the critical factor in reducing the overall costs of employee compensation (Frymoyer & Cats-Baril, 1991; van Duijn, Miedema, & Burdorf, 2004). Involvement of case managers has been found to reduce the chance of cases developing into chronicity, to shorten the time off work of the employee, and to reduce the total cost of compensation (Krause, Frank, Sullivan, Dasinger, & Sinclaire, 2001).

RTW to work is one of the key measures of a successful case management

program (Gatchel, Pllatin, & Mayer, 1995). Van Duijn, Miedema and Burdorf (2004) further suggested that the major obstacle to an early RTW was the negative attitudes of employers and physicians, and their lack of knowledge of modified work programs (van Duijn, Miedema, & Burdorf, 2004). Acceptance and support for injured workers from their employer and colleagues has been found to be crucial to a successful RTW process (Feuerstein, Shaw, Lincoln, Miller, & Wood, 2003; Krause, Dasinger, Deegan, Rudolph, & Brand, 2001). Enhancing communication among the parties concerned should be the main aim of the case management approach (Baril, Clarke, Friesen, Stock, & Cole, 2003; Pransky, Shaw, Franche, & Clarke, 2004). The case management protocol (Figure 3.1) described in the present study was specifically designed to address the problem of lack of communication among the different stakeholders. The case manager in the present system provided counseling and support for the injured worker, negotiated with the employer over suitable duties, and monitored the worker's situation after he or she had returned to work. Many researchers have advocated the early involvement of employers in the RTW process (Linton, 2001; Olsheski, Rosenthal, & Hamilton, 2002), explaining that the involvement of employers can minimize the development of potential conflicts and misunderstandings between worker and employer, and perhaps with a third party such as the insurer (Franche, Baril, Shaw, Nicholas, & Loisel, 2005; Pransky, Shaw, Franche, & Clarke, 2004).

Effects of Age on Outcomes of Case Management

It is noteworthy that the age of injured workers was found to be a significant factor that could influence the outcomes of case management intervention. Our results suggest that workers who were 40 years old or younger had the lowest number of sick leave days and the lowest costs of compensation. Moreover, although workers who were between 41 and 50 years old had more days of sick leave and higher costs of compensation, they appeared to benefit the most from the case management intervention. Those in the case management group tended to have significantly fewer sick leave days. Our results concur with other studies which revealed that younger employees were predictors of a successful RTW (Baril, Clarke, Friesen, Stock, & Cole, 2003; Cifu et al., 1997; Dikmen et al., 1994; Felmingham, Baguley, & Crook, 2001; Ponsford, Olver, Curran, & Ng, 1995; Ruff, Marshall, Crouch, Klauber, & Levin, 1993). For example, Felmingham, Baguley and Crook (2001) concluded that older workers were less likely to resume employment than younger workers after an injury at work because they were slower to recover from an injury and had less opportunity to obtain a work trial placement. They further explained that the phenomenon possibly had both a social and financial component. The social component was that younger workers would in general be more favorably placed in terms of their employability than older workers (Schoppen et al., 2001). As a result, their chances for a successful

RTW might be considered high by their employers. The financial component was that younger workers were more likely to have young families and to be breadwinners than their older counterparts. They would have a much higher incentive to resume their pre-injury duties as soon as possible. Nevertheless, the design of this study did not enable us to further tap into these factors. Future research should look into how the case management approach interacts with these factors, and perhaps a more cost-effective triage system can be devised with new data. Our result did not reveal that workers more than 50 years old had poorer outcomes than their younger counterparts did. This probably reflects the fact that older workers would tend to choose to leave the workforce after injury instead of actively seeking opportunities to return to work.

Previous literature has reported the successful implementation of case management in countries with legislative requirements for employers regarding occupational rehabilitation, such as the United States, Canada, and Australia, where employers are required by law to provide RTW programs or light duties for injured workers (Franche, Baril, Shaw, Nicholas, & Loisel, 2005; Linz et al., 2001; Steenstra, Verbeek, Heymans, & Bongers, 2005; Westmorland & Buys, 2004). In contrast, the Hong Kong Compensation Ordinance does not require the employer to assist the injured in returning to work. This would be one of the reason for the delay in work

return for injured workers in Hong Kong.

Limitations of the study

The present study reports the benefits of implementing a case management approach in the local employee compensation system, which did not favor active rehabilitation and RTW after an injury to a worker. The results appear to favor the local implementation of such a system. The results can probably be generalized only to those places that have similar legislation and a similar employee compensation system. Caution should therefore be exercised when interpreting these results. This study was also limited by the use of a control cohort group the participants in which entered into the study earlier than those in the case management group did. This would confound the equivalence of the characteristics of the participants in the two groups. Future research should use a more stringent research design and more stringent group composition which would allow better conclusions to be drawn from the between-group comparisons. Further research should examine the efficacy of each of the processes of case management, using more stringent methods such as randomized clinical trials.

The present study also brings out the importance of addressing the individual needs of the injured workers. The psychosocial factors and financial

considerations are often as important as the physical suffering, affecting the RTW ooutcome of the injured workers. These factors will form the basis for Study 3 which is to be presented in Chapter 4.

Special Recommendation

Because the case management system was new to the legislative environment in Hong Kong, a few problems were encountered in the early stages of its implementation. These problems are worth describing to help organizations that might plan to implement a case management system:

1. The employers and employees preferred to utilize the public healthcare system rather than private sector services because they perceived the public system as being bias free and they were more familiar with it.
2. The injured workers and their supervisors were not familiar with the role of case managers and were reluctant to cooperate with them. Many workers were suspicious that case managers were being appointed by the employer to try to exploit or manipulate them. Hence, it was very important for the case manager to establish good communication and rapport with the injured worker. A case manager must show a caring attitude and demonstrate his or her professional knowledge in order to gain the confidence and trust of an injured worker.
3. Similarly, employers and supervisors showed resistance to offering light duties to

the injured workers, especially those with more severe injuries.

4. In cases with disputes over liability or other issues, the Hong Kong Labour Department would suggest that the injured worker seek legal advice, but once a solicitor was appointed, the sick leave might be greatly prolonged and costs might substantially increase. International research has also reported that litigation is an unfavorable prognostic factor for RTW (Steenstra, Verbeek, Heymans, & Bongers, 2005).
5. There was an overwhelming focus on the costs incurred by the different stakeholders, rather than considerations such as the functional outcome and wellbeing of the worker. The present results also show that for those cases involving severe injuries or prolonged sick leave, the introduction of case management was able to reduce compensation costs significantly, but not the duration of sick leave.
6. In order to use resources appropriately, selection those at high risk of developing of permanent disability is necessary so that appropriate management can be provided (Loisel et al., 2005; Schultz, Crook, Berkowitz, Milner, & Meloche, 2008).

CHAPTER 4

STUDY 3 - THE FRAMING EFFECT OF PROSPECT THEORY ON RTW DECISION MAKING

INTRODUCTION

Delay in RTW has become a social problem in many countries, affecting employers and insurance companies as well as the injured workers and their family members (Schultz, Stowell, Feuerstein, & Gatchel, 2007). Dembe (2001) points out that besides the physical aspect, there are other factors such as social, psychological, macrosociological and macroeconomic and political factors that affect the RTW decision making of the injured workers. In the conventional model, the management of and research into RTW is based on the biomedical model that focuses on the recovery of the impaired function and the training of abilities. Schultz, Crook, Fraser and Joy (2000) have suggested that the biomedical model fails to explain the phenomenon of workers not returning to work. Contemporary research on occupational rehabilitation has shifted to an integrated biopsychosocial model (Krause, Dasinger, Deegan, Rudolph, & Brand, 2001; Linton, 2000, 2001; Pransky, Gatchel, Linton, & Loisel, 2005; Schultz, Crook, Berkowitz, Milner, & Meloche, 2005; Schultz, Stowell, Feuerstein, & Gatchel, 2007). This model focuses on the contributions of the worker and the workplace, as well as medical, economic, and social factors. Besides the multifactorial nature of RTW, Pransky, Gatchel, Linton, and Loisel (2001, 2005)

further suggest that focus should be placed on both the processes and outcomes of RTW. Clinicians, employers, unions and insurers should work closely within the disability paradigm.

RTW involves a complex and dynamic process. Injured workers not only deal with the symptoms and disabilities, but also encounter service providers and stakeholders. These are the case physicians, therapists, case managers, insurance claim manager, supervisor or employer, and government officials (Dembe, 2001; Schultz, Stowell, Feuerstein, & Gatchel, 2007). All exert influence to differing extents on the injured workers. Injured workers are also exposed to various sources of information, including the different stakeholders in the employee compensation system, and relevant literature such as pamphlets, magazines, and newspapers. At some point in time, injured workers have to make decisions about RTW, such as when to take on a work trial and when to resume pre-injury work duties.

The present study examines the effects of applying prospect theory in exploring the decision-making process of individual workers with regard to RTW. A review of the literature on different conceptual models of RTW and the decision-making process now follows.

LITERATURE REVIEW

The Concept of Return to Work

RTW status has been used extensively as an outcome measure in occupational disability research because it has the advantages of being relatively objective, available through administrative records and individual questionnaires, and relevant to early interventions (Baldwin, Johnson, & Bulter, 1996; Gatchel, Pllatin, & Mayer, 1995; Pransky, Gatchel, Linton, & Loisel, 2005; Young, Wasiak et al., 2005). It is commonly used to determine the success of medical intervention or in the case management of workplace injuries (Feuerstein et al., 2003). However, Baldwin et al. (1996) point out that RTW, like many other outcomes of healthcare, is influenced by factors that are not directly related to health care. Pransky, Gatchel, Linton and Loisel (2005) argue that the concept of RTW is poorly defined and there is no clear consensus among researchers about what constitutes a successful RTW outcome, despite a massive amount of research having been published. The term “return to work” can reflect a wide range of definitions of vocational outcomes, including the duration or extent of an ability or inability to work due to functional limitations (Baldwin, Johnson, & Bulter, 1996; Schultz, Stowell, Feuerstein, & Gatchel, 2007). Recent research seems to support a broader or more holistic view of RTW, as a behavior or process that is influenced by physical, psychological, and social factors (Feuerstein et al., 2003;

Franche & Krause, 2002; Linton et al., 2005; Pransky, Gatchel, Linton, & Loisel, 2005; Young, Roessler et al., 2005).

In terms of temporal factors, Baldwin et al. (1996) suggested that the first RTW of workers after an injury, liked hospital discharge, frequently marks the end of only the first several episodes of work disability caused by the original injury. Wasiak, Young, Roessler, McPherson and van Poppel et al. (2007) considered that RTW outcomes should be seen in terms of short-term, intermediate, and final outcomes. The key players in the process - the different stakeholders - should be considered with the worker and his or her family, as these persons or groups stand to gain or lose according to the result of the RTW process (Young, Roessler et al., 2005). The major stakeholders include the employer, supervisors, fellow workers, health care providers, and the insurer (Loisel et al., 2001). All these different perspectives and considerations have led to the development or evolution of different RTW conceptual models, and these are summarized here.

Models of RTW

There have been a number of reviews of RTW models that bring out the different perspectives and viewpoints of researchers (Feuerstein, 1991; Franche, Baril, Shaw, Nicholas, & Loisel, 2005; Franche & Krause, 2002; Krause, Dasinger, Deegan, Rudolph, & Brand, 2001; Loisel et al., 2002; Mayer et al., 1998; Schultz, Crook,

Fraser, & Joy, 2000; Steenstra et al., 2006). Schultz, Stowell, Feuerstein and Gatchel. (2007) categorize the models as biomedical, forensic, psychosocial, ecological or case management and biopsychosocial. The biomedical model is the traditional approach to managing workplace injuries that regards an injury as medical problem. It assumes that illness is due to physical pathology and that the elimination of pathological causes which will result in improvement leading to RTW. Compensation for impairments is based on clearly identified medical causes. In Hong Kong, the medical model dominates the operation of the employee compensation system including the perceptions of the insurance companies and employers. Under this model, the medical profession is the center of service delivery and decision making on RTW. Schultz et al. (2007) point out that the medical model might work well for workers with acute and uncomplicated injuries but less well for workers with chronic complex disabilities and illnesses. This is because the RTW of the latter very often has many dimensions, in a way that an injury resulting “only” in bodily impairment does not. These dimensions may include psychological and social issues for the worker and labor relations between the worker and his or her employer.

The most commonly adopted model of RTW by insurance companies is the forensic or insurance model (Schultz, Stowell, Feuerstein, & Gatchel, 2007). The main tenets of this model are that financial incentives are correlated with prolongation and

exacerbation of physical or psychological symptoms, and that people who anticipate secondary gains are likely to be dishonest about their symptoms. As a result, thorough and exhaustive assessment is used to discriminate between “honest” and “dishonest” claimants. Schultz et al. (2007) point out that this model of RTW tends to have short term gains but may increase a claimant’s suffering as well as the compensation cost in the long run due to incorrectly identification of claimants.

Ecological and case management models are other approaches that have been widely used in recent years. They assume that occupational disability can be understood by the interplay between the various components in the macrosystem (economic, social and legislative factors), those in the mesosystem (workplace, healthcare providers and insurers) and those in the microsystem (the worker). As these systems function within the socio-political context of the workplace. RTW should involve the management of all these components (Loisel et al., 2001; Schultz, Stowell, Feuerstein, & Gatchel, 2007). The management of work injuries should also adopt early intervention and a multi-disciplinary approach. The employer has a critical role in RTW process and while the workers need incentives to be put through the process (Loisel et al., 2001). The advantage of using the ecological and case management models for RTW is that they can reduce long term disability costs. Nevertheless, there could be an increase in the costs of management that would be passed on to the

employer (Schultz, Stowell, Feuerstein, & Gatchel, 2007).

In recent years, more attention has been paid to the psychological and social factors affecting injured workers. The psychosocial model of RTW addresses problems associated with the consequence of the physical injuries at the individual level and the system level. It recognizes that psychosocial factors play a predominant role in disability management and readiness to return to work. This model stipulates the importance of using cognitive behavioral therapy and psychological counseling as the interventions to facilitate injured workers to go through the RTW process (Krause, Dasinger, Deegan, Rudolph, & Brand, 2001; Sullivan, Feuerstein, Gatchel, Linton, & Pransky, 2005).

Currently, there is an increasing consensus in the literature that a more "integrated" approach, addressing both the physical and psychosocial factors, is more appropriate (Schultz, Stowell, Feuerstein, & Gatchel, 2007). The biopsychosocial model conceptualizes disability and RTW as the consequences of interactions among biological, physical, behavioral or psychological, environmental, ergonomic, and social factors (Schultz, Stowell, Feuerstein, & Gatchel, 2007; Sullivan, Feuerstein, Gatchel, Linton, & Pransky, 2005). Not only do these multiple factors contribute to the etiology of disability, but they also have reciprocal effects on one another that may intensify and perpetuate each other and, ultimately, the intensity and duration of

disability. In managing occupational injuries, the biopsychosocial model emphasizes the early assessment of medical, psychological, and system-based risk factors of disability. This is believed to enable appropriate management to be undertaken as soon as possible (Feuerstein, 1991; Schultz, Stowell, Feuerstein, & Gatchel, 2007). The disadvantage of this model is a potential for higher rehabilitation and management costs because of the intense utilization of assessment and case management. Schultz et al. (2008) suggested that screening cases of work injury, identifying cases that have a high risks of developing disability, and then providing intervention could be one of the key factors for successful injury management.

All the models discussed so far have focused on identifying the risk factors for RTW and the management approaches. There is another group of models that describe how a person who suffers an injury might experience different stages or phases of recovery and adaptation throughout the RTW process. This notion of change through phases or stages is very important, as it suggests that different risk factors may become salient at different stages and therefore different intervention strategies are needed. The communication or interaction strategies with the injured workers by the different stakeholders would also need to change appropriately in the different stages.

The phase model of occupational disability (Krause & Ragland, 1994) describes the changes in the worker's physical and psychological conditions during the acute,

subacute, and chronic phases of low back pain. This model further describes six stages of occupational disability with specified time periods; for example, “long-term” disability is 7-12 weeks off work, chronic disability is 6-18 months off work, and permanent disability is more than 18 months off work. The sub-acute stage is regarded as the golden period for rehabilitation and case management. However, this model emphasizes the physical rather than the psychosocial perspective toward the injury.

The readiness for change model was first developed by Prochaska, Diclemente, Velicer, Ginpil and Norcross (1985) to describe the mental processes and motivational changes in people affecting their addictive behavior in relation to smoking and smoking cessation. This model has been applied to study the motivational and decision-making processes of injured workers regarding RTW (Franche, Baril, Shaw, Nicholas, & Loisel, 2005; Franche & Krause, 2002). The model identifies five sequential stages relevant to RTW:

i. Precontemplation—The worker is usually more concerned with the pain and suffering caused by the injury. Behavior in favor of RTW is not manifested.
ii. Contemplation—The worker starts considering RTW in the foreseeable future, and may start thinking about the advantages and disadvantages of returning to work. There is no active or concrete plan of action at this stage.
iii. Preparation for action—The worker thinks more seriously about RTW in the near

future and actively seeks information or makes concrete plans about the process. The worker may be more responsive to help from external sources such as the case manager, the insurance claims manager, or the employer.

iv. Action—The worker puts a plan into action and is motivated to initiate and follow through on targeted behavioral changes.

v. Maintenance—The worker maintains the successful action strategies in order to ensure a sustainable RTW process.

The readiness for change model offers a theoretical basis for the progressive changes of workers through the RTW process. This has been found to be particularly relevant for describing the behaviors of workers who suffered from chronic pain or had complicated case histories (Chan et al., 2006; Li-Tsang, Chan, Lam, Lo-Hui, & Chan, 2007; Li, Li-Tsang, Lam, Hui, & Chan, 2006; Xu et al., 2007). Franche and Krause (2005) further show that severity of injury will have an impact on the time taken for RTW. For instance, workers with more severe injuries were found to take 3 months to consider RTW, that is to reach the preparation stage, while a worker with a mild injury might take only 1 week. This model is quite widely recognized and different variations of it have been applied by different groups to study RTW behavior as well as other forms of health behavior. Van Duijn et al. (2004) proposed a six-stage model consisting of attention, understanding, changing attitude, changing intention,

changing behavior, and maintenance. These stages were developed to describe the changes in the thinking and behavior of the workers in response to participating in a modified work program. Li et al. (2006) reported on the effects of a “training for work readiness” program that consisted of a 3-week individual counseling program to facilitate the workers to enter the action stage. The theoretically based instrument called the Chinese Lam Assessment of Stages of Employment Readiness (C-LASER) was designed to assess outcomes in the studies of Li et al. (2006) and Chan et al. (2006).

The readiness for change model addresses some important psychological dimensions that were previously found to impact on workers’ decisions regarding RTW. These dimensions are decisional balance, self-efficacy, and motivational stage (Franche & Krause, 2002). They were found to affect workers’ actual behavior throughout the RTW process. Decisional balance is the cognitive process of weighing the advantages and disadvantages of returning to work, and these considerations are said to influence the workers as they move through the recovery process. The self-efficacy of workers would also change throughout the different stages. According to the readiness for change model, injured workers start to consider the RTW option from the contemplation stage to the action stage. This means that they will weigh up the advantages and disadvantages of returning to work or staying on sick leave before

they make the final RTW decision. However, they can “relapse” into a previous stage at any point (Franche, Baril, Shaw, Nicholas, & Loisel, 2005; Franche & Krause, 2002).

In Study 2 of this thesis, it was found that the success of workers in returning to work was significantly influenced by their financial status and pain experience. With this in mind, it is further anticipated that wages and pain will influence workers to differing extents at different stages of RTW, and will probably influence workers’ decision making with regard to RTW. The present study aims to acquire a better understanding of the psychological processes that might influence injured workers in their decision making with regard to RTW.

Motivation and Decision Making with regard to RTW

An injured worker’s decision on RTW is likely to be affected by intrinsic and extrinsic factors. Extrinsic factors are defined as those system and contextual factors such as the provisions of the medical system, the rights and benefits laid down by the employee compensation system, and the support from the employers who makes the appropriate accommodations to facilitate RTW (Landy, 1985). Intrinsic factors are the psychological factors such as catastrophizing and fear avoidance behavior arising from the perception of tolerance of pain that affect the RTW decision making of injured workers (Boersma & Linton, 2006; Linton et al., 2005; Vlaeyen & Linton,

2000). Sullivan et al. (1995) state that catastrophizing is an exaggerated negative orientation toward pain where a relatively neutral event is irrationally made into a catastrophe. As a result, it affects mood negatively, increases pain and develops into chronic disability. On the other hand, fear avoidance influences cognitions and behaviour and can lead the injured worker to reduce his or her activity level so as to avoid pain. Chronic disability may eventually developed (Vlaeyen & Linton, 2000). Waddell et al (1993) point out that fear avoidance beliefs about physical activities and work are a good predictor of chronic disability. A vast amount of research work has been done on how the extrinsic and intrinsic factors might influence workers' success in returning to work (Dasinger, Krause, Thompson, Brand, & Rudolph, 2001; Franche & Krause, 2002; Krause, Dasinger, Deegan, Rudolph, & Brand, 2001; Pransky, Gatchel, Linton, & Loisel, 2005). Nevertheless, investigations of how these factors, in particular the intrinsic factors, may influence the decision-making process of individual workers are still very scarce. The following paragraphs review motivation theory and decision-making processes relevant to the RTW of injured workers.

A motivation is a reason or a set of reasons to justify or support an individual's engagement in a behavior (Porter, Bigley, & Steer, 2003). For instance, individuals search for food, water, and shelter in order to fulfill their basic needs. The social learning theory of Bandura (1969) offers a good theoretical foundation for using

motivation to explain the RTW phenomenon. According to this theory, expectations of outcome when combined with expectations of self-efficacy predict the abilities of individuals to achieve a desired outcome. RTW after injury can be regarded as an outcome that relates to the motivation and efficacy of workers (Roessler, 1989). Schultz, Meloche, Berkowitz, Milner and Zuberbier (2004) further suggested that a worker's motivation to return to work can be expressed as a function of expectations of recovery and the value placed on the work or employment, balanced by personal costs such as pain (Schultz, Stowell, Feuerstein, & Gatchel, 2007). For example, the worker, on the one hand, may be motivated to return to work in order to regain the full wage benefits and maintain his or her job tenure (Pransky, Gatchel, Linton, & Loisel, 2005). On the other hand, if a worker was not happy in his work beforehand, with low job control over his or her job, a high level of job stress, or a perception of an unsatisfying or physically demanding work environment, then he or she may have a poor motivation to return to work (Crook, Milner, Schultz, & Stringer, 2002; Hoogendoorn, Van Poppel, Bongers, & Bouter, 2000; Shaw, Segal, Polatajko, & Harburn, 2002). The potential gains and losses associated with RTW are indeed very important considerations for the injured worker (Gatchel, Mayer, Kidner, & McGeary, 2005; Mayer et al., 1998). The losses relate to the reduction of potential benefits such as decreases in the sum of total compensation if injured workers take an early RTW.

Gains are those concerning the increases in potential benefits such as earning a full salary after an early RTW. From a different perspective, losses might be a decrease in the level of comfort if taking up an RTW option or an aggravation of the symptoms after returning to work.

Several studies have demonstrated how expectations of recovery can be used to predict the RTW process of workers with musculoskeletal pain (Cole, Mondloch, & Hogg-Johnson, 2002; Schultz et al., 2002; Schultz et al., 2004). Dersh, Polatin, Leeman and Gatchel (2004) conceptualized the motivation of workers to return to work (or to remain off work) as a rivalry between secondary losses and gains following workplace injuries. There have been plenty of studies on how secondary gains would jeopardize a RTW. For instance, the forensic model of disability suggests that secondary gains, such as a potential increase in compensation payments or disability benefits, could lead to a magnification of the sensation of pain (Fishbain, Rosomoff, & Cutler, 1995; Gatchel, Adams, Polatin, & Kishino, 2002). However, financial gain as a result of a disability payment is only the most straightforward type of secondary gain. The person may also assume a “sick role” that has multiple benefits and often leads to the receipt of much more care and attention than the person would normally have (Dersh, Polatin, Leeman & Gatchel, 2004). Research in these areas would help to improve our understanding of the thinking processes and motivations of

injured workers and would hence be beneficial in the design of interventions for "facilitating" workers in deciding on the form of RTW most appropriate to their own physical, psychosocial, and financial situations.

Models of Decision Making

A review of models of decision making would enable us to comprehend the possible underlying mechanisms mediating the decision made by injured workers with regard to their RTW. In general, decision making can be classified as following a rational versus a non-rational process (Kinicki & Williams, 2008; Plous, 1993). Rational decision making assumes that decision makers are fully objective and logical with a clear goal. A decision that is made therefore is assumed to maximize the benefits of the decision maker. A rational decision-making process involves six steps: defining the problem, identifying the decision criteria, allocating weights to criteria, developing of alternatives, evaluating alternatives and finally selecting those alternatives that would give the most value (Kinicki & Williams, 2008). Nevertheless, some decision cannot understand the information available to them for making a rational decision. As a result, the may utilize a non-rational decision making process. The satisficing model of non-rational decision making is based on the belief that decision makers will simplify the decision-making process by extracting only the perceived essential features related to the problem. Then, the decision will be made

based on comparing the information at hand against those satisficing criteria for choosing the “good enough” option. The implicit favorite model of non-rational decision making is commonly found in situations when complex and non-routine decisions are to be made. Decision makers taking the implicit favorite model would simplify the decision-making process as a result of the perceived complexity of the problem. Instead of going through the six steps of the rational decision making process, decision makers would have already identified a preferred alternative at the early stage of the decision making process, and the rest of the decision-making process is just to confirm that the implicit favorite is an appropriate choice. Finally, the intuitive model is based on the belief that decisions are made by an unconscious process created out of distilled experience. Decision makers are likely to decide intuitively when a high level of uncertainty exists with little precedent to draw on (Hogarth, 1987; Kinicki & Williams, 2008; Plous, 1993). In the present study, the rational decision making model is selected to understand the RTW decisions of injured workers. This is because workers’ compensation is a well established system in which injured workers usually will have enough time and information to decide on the RTW decision.

In the rational decision-making model, expected utility theory and prospect theory are perhaps the most relevant theories to describe the conflicting situations encountered by every injured workers in the employee compensation system.

Expected utility theory describes how people would behave if they followed the path of rational decision making (Hogarth, 1987; Plous, 1993). The assumptions made by the theory are: (a) decision makers possess complete information on the chance of success and the consequences of each of the alternative courses of action; (b) decision makers can comprehend such information and are able to implicitly or explicitly quantify the advantages and disadvantages of each of these alternatives; and (c) decision makers can analyze and compare these advantages and disadvantages, and choose the course of action that maximizes the expected utility.

However, previous studies have shown that injured workers are not likely to get access to all the necessary information required for decision making, as there may be poor communication or miscommunication between the worker and other stakeholders such as the case doctor, the insurer, and the employer (Franche, Baril, Shaw, Nicholas, & Loisel, 2005). An exchange of information between the different physicians treating the injured worker may also be lacking, or they may have different opinions regarding the worker's progress (Mortelmans, Donceel, Lahaye, & Bulterys, 2006). Furthermore, there may be many psychological factors affecting an injured worker's cognitive processes and emotions at the time. Hence, the decision-making process of the injured worker is a complex issue that may not be explained simply by expected utility theory.

Although the rational decision model is rather straightforward and easy to understand, people do not seem to behave according to the assumptions of the model. Decision makers are often faced with the problem of lack of access to information (Hogarth, 1987; Kahneman & Tversky, 1990; Plous, 1993). Moreover, they are likely to feel uncertain about the information even if they can access it. In RTW decision making, messages from different health care providers concerning factors influencing one's state of health will have a significant impact on the injured worker's cognitive process (Franche & Krause, 2002). Uncertainty can revolve around the prognosis of the injury, whether there will be long-term disability, around job security, as well as around potential compensation benefits (Gatchel, Adams, Polatin, & Kishino, 2002). Studies have reported that a perception of a deterioration in health, as well as negative attitudes and feelings about back pain, reduces a worker's willingness to return to work after a long absence (Krause, Dasinger, Deegan, Rudolph, & Brand, 2001; Ohlund et al., 1994). All these factors - financial considerations, fear of pain, and perception of health consequences - contribute to the "decisional balance" when the worker goes through the decision-making process with regard to RTW (Franche & Krause, 2002).

Uncertainty means that there are risks that are difficult to calculate when making decisions in favor of any particular course of action (Kahneman & Tversky, 1990;

Plous, 1993). As a result, a worker's attitude toward taking risk will influence the extent to which he or she is willing to make decisions (Franche & Krause, 2002). For instance, a worker may know his health status at the time of decision making but not the long-term prognosis or the chances of a recurrence of the problems arising from the injury. As a result, the worker might prefer to take a less risky decision on RTW such as to continue to take sick leave even though he or she continues to suffer a 20% cut in wages as a result of not knowing whether an 8-hour-a-day job can be done without aggravating the pain. Most of the time, the situation will not be clear until the injured worker returns to work. The reactions of fellow workers and employers to the worker's intention to return will be particularly unclear beforehand. This offers a plausible answer to the question of why expected utility theory has not been found successfully describe the RTW phenomenon.

Prospect Theory

Prospect theory was introduced by Daniel Kahneman and Amos Tversky in 1979 as an alternative method of explaining how individuals make choices in situations of risk (Edwards, 1996). It assumes that people will respond in a predictable manner in reaction to the anticipated gains and losses involved in RTW. People will be more inclined to be risk seeking when they are confronted with information about potential losses but more inclined to be risk averse when they are confronted with information

about potential gains (Tversky & Kahneman, 1981).

Unlike expected utility theory, prospect theory suggests that preference for risk seeking or risk avoidance largely depends on how information on returning to work (or the scenario for it) is framed. The premise of framing is that whether information is presented in the form of a gain or of a loss influences an individual's decision (Kahneman & Tversky, 1979, 1982, 1990, 2000; Tversky & Kahneman, 1981, 1991). Prospect theory further postulates that the evaluation of the gain or loss would depend on a strategic selection of a reference point that differentiates gains from losses. Wong and Kwong (2005a) put forward a similar view that there are two important components in prospect theory: frame of reference and subjective value function. A reference point refers to an internal standard (an objective value) that people make reference to when evaluating an option as positive or negative. An option will be regarded as positive when its value is larger (or higher) than the reference point, but as negative when its value is smaller (or lower) than the reference point. For example, in a scenario in which 600 people are infected with an unusual disease, the effectiveness of a medical program could be framed in a positive way (i.e., 200 people will be saved). The reference point for this positively framed scenario will be "total loss of life." On the other hand, it can be described negatively (i.e., 400 people will die). The reference point for this negatively framed scenario will be "no lives lost." Thus, the medical

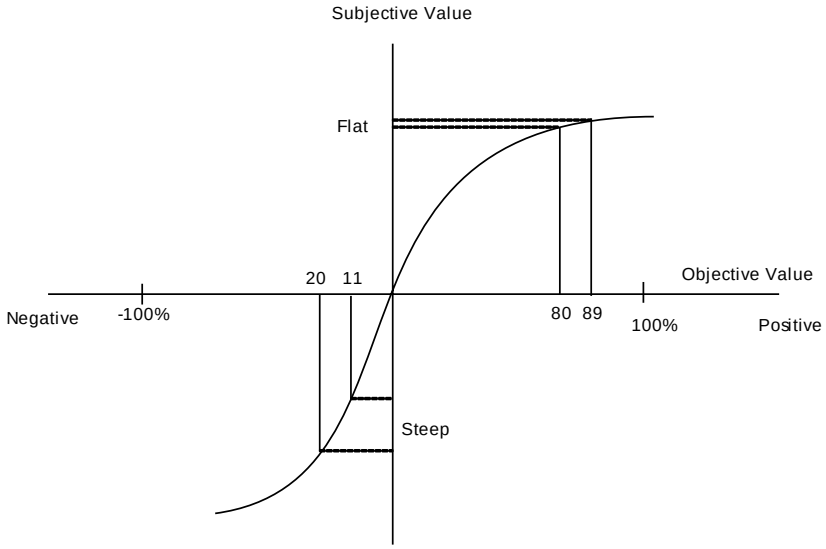
program is more attractive when it is presented in a positive frame that when it is presented in a negative frame (Wong & Kwong, 2005a). The perceived gain or loss depends on the direction of the deviation from the neutral reference point. In RTW decision making, the wage difference will be between full payment when working full time and a payment of four fifths of wages after being injured at work. Thus, the message can be framed negatively when it refers to a loss of full wages (i.e., a worker will lose 20% of his or her wages when staying on sick leave and lose nothing when he or she returns to work). On the other hand, the message can be framed positively when it refers to "full wage gain" (i.e., a worker will gain payment of full wages after returning to work and gain 80% of his or her wages when staying on sick leave).

Research has found that people often have unstable and inconsistent preferences. Changes in the content of peripheral information (Highhouse & Johnson, 1996), evaluation scales (Tversky, Sattath, & Slovic, 1988), or evaluation modes (Hsee, 1996) can lead to preference reversals. Wong and Kwong (2005b) introduced number size preference reversal based on prospect theory (Kahneman & Tversky, 1979; Tversky & Kahneman, 1981) and reference-dependent theory (Tversky & Kahneman, 1991). It is proposed that the perceived difference between two options on an attribute looms large when that attribute is framed by small numbers (e.g., 3% versus 7% absence rates), yet the difference diminishes when it is framed by large numbers (e.g., 97% versus 93%

presence rates). In a series of experiments, Wong and Kwong (2005b) demonstrated that number size preference reversal is due to people paying more attention to negatively framed information (small number) than to positively framed information (large number). It further confirms the framing definition that decision makers respond differently to objectively equivalent descriptions of the same problem (Levin, Schneider, & Gaeth, 1998). Number size framing is demonstrated in Figure 4.1. In the positive domain, the difference between 80% and 89% appears to be small because the two numbers are on the flat part of the value function. However, the difference between 20% and 11% in the negative domain appears to be large because the two numbers are on the steep part of the value function.

Figure 4.1

An illustration of how presenting information with large numbers or small numbers influences the perceived difference between two choices (adapted from Wong & Kwong, 2005b, p. 56).



The framing effect of prospect theory has been studied in a variety of social and personal settings; for example, medical interventions (Levin & Gaeth, 1988), health promotion (Meyerowitz & Chaiken, 1987), medical diagnostics (Banks et al., 1995), and screening strategies(Lerman & Rimer, 1995). The number size framing proposed by Wong and Kwong (2005b) is different from attribute framing or goal framing. In attribute framing, usually one option is presented. People generally find the option to be more attractive when the attribute is framed positively than when it is framed negatively (Levin & Gaeth, 1988). In goal framing, people are more likely to perform

an action when the consequence of that action is negatively framed than when it is positively framed (Banks et al., 1995; Rothman, Bartel, Wlaschin, & Salovey, 2006). In applying number size framing to RTW decision making, the target attributes for an injured worker to pay more attention to during the RTW decision-making process are framed with small numbers, while the attribute requiring less attention is framed with large numbers. This implies that the information presented to the injured worker should not be arbitrarily decided; careful choices of number sizes may actually shift the attention of the injured worker to the desirable content of the attribute in order to make the desirable RTW decision.

Facilitating versus Defacilitating Factors on RTW

Franche, Baril, Shaw, Nicholas and Loisel (2005) revealed that wages were a significant factor considered by injured workers when they progressed from the contemplation to action stages, and were hence considering to return to work. According to the Employees' Compensation Ordinance in Hong Kong, injured workers are eligible to receive four fifths of their wages (i.e., of their take home income). In other words, workers lose 20% of their wages when they are on sick leave due to a workplace injury. The longer workers are on sick leave, the more money they will lose. Apart from wage loss, workers may face job loss if they take an extended period of sick leave. Their jobs could be taken by temporary workers or shared out

among fellow workers. These factors could be interpreted as unfavorable or uncertain if the injured workers continue to stay on sick leave. It is understandable that workers would prefer to turn such uncertain situations into certainties; that is, to receive a full wage and return to work. The move from an uncertain to a certain state was found to be the underlying motivation of the injured workers in the study of Gatchel, Adam, Polatin and Kishino (2002). With these reasons in mind, we can see wages as a facilitating factor that motivates the workers to make a positive decision on RTW.

In contrast, sustained and recurrent pain, future disability, and other labor relations and social factors in the workplace, such as the attitude of the employer and the support of fellow workers, are factors out of a worker's control (Franche & Krause, 2002). It is rather certain from the perspective of the worker that these factors do not exist if he or she chooses not to return to work. However, if the worker does choose to return to work, these factors become uncertainties because the worker would be exposed to scenarios that are nonexistent when he or she is on sick leave. If the assumption that workers will move from an uncertain to a certain state still holds, then pain and other related labor relations and social factors are "defacilitating" factors that demotivate a worker from making a positive decision on RTW.

The Rationale for Study 3

There has been very little research conducted that explores the extent to which

the effect of message framing can explain the decision-making process in the minds of injured workers when facing an RTW scenario. Injured workers need to make decisions about their RTW continuously throughout the rehabilitation process. Such a decision is involved when they progress through different stages of change, such as from contemplation to preparation and action with regard to RTW. To the injured worker, RTW can be regarded as taking a risk because it is uncertain whether he or she will be capable of resuming pre-injury duties. The acceptance of the injured worker by his or her employer and fellow workers will also be uncertain. Of course, it can be argued that an injured worker can be involved in a work trial before resuming full duties. But the physical demands and social reactions experienced during a work trial are very often different from those in the situation when an injured worker resumes permanent duty.

Prospect theory hypothesizes that the decision making of the individual is contingent on the perceived risks that is, the potential gains or losses brought about by a decision, rather than the actual intensity or impact of its outcome (Kahneman & Tversky, 1979). An individual's decision can be further modulated by the positive or negative framing of the information on the basis of which the decision is made (Tversky & Kahneman, 1986). Wong and Kwong (2005a) introduced the concept of number size preference reversals, which indicates that people pay more attention to

negatively framed information than to positively framed information. In the context of this study, we attempted to manipulate the way in which information was presented to the participants. It was anticipated that the same kind of information presented in two opposite framings, namely positive (large numbers, say 80-100%) versus negative (small numbers, say 0-20%), would affect the decision making of the participants. It was hypothesized that the participants' responses would be more significantly influenced by attributes presented in negative frames than in positive frames. Another variable manipulated in this experiment was the content of the information related to a worker's RTW. It was anticipated that information on wages, which is regarded as a facilitating factor, and pain, which is regarded as a defacilitating factor, would also influence a participant's decision on RTW.

The present study was designed to explore the framing effect of prospect theory on the RTW decision-making process of the injured worker. If a framing effect is observed, the content of the attributes used in the framing condition will be examined to determine the facilitating effect of wages and the defacilitating effect of pain.

METHOD

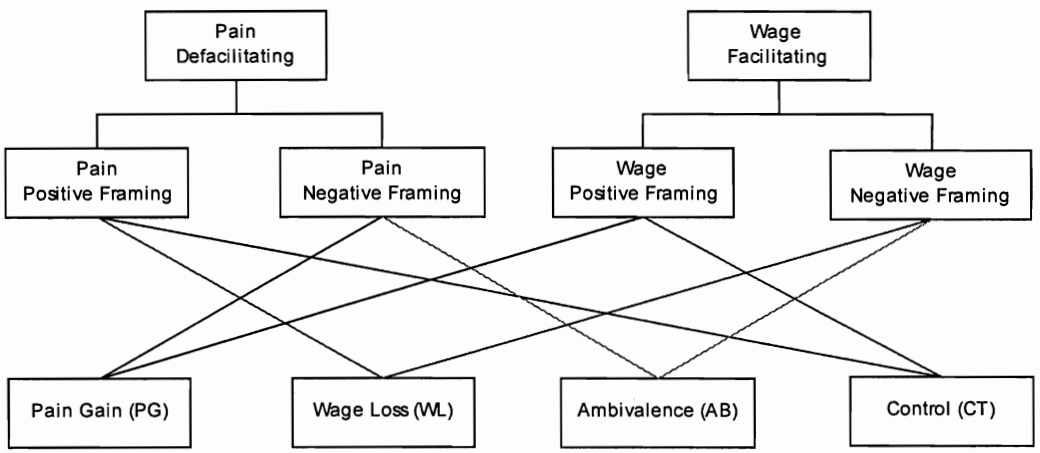
Research Design

The present study had two main variables: information content and methods of presentation. Each variable had two conditions. The information content was wages and pain, whereas methods of presentation were positive and negative framing, resulting in a total of four information-presentation pairs. This study adopted a four-group repeated measures experimental design. In each group, the participants were presented with stimuli composed of two information-presentation pairs (Figure 4.2). The PG Group, the pain gain group, had pain information presented in a negative frame (small percentage values) and wage information presented in a positive frame (large percentage values). The CT group, the control group, had both wage and pain information presented in a positive frame. The AB group, the ambivalence group, had both wage and pain information presented in a negative frame. The WL group, the wage loss group, had wage information presented in a negative frame and pain information presented in a positive frame. After presenting the two pairs of information, each participant was asked to make a rating of three RTW outcomes. These outcomes were: (a) perceived chance of successful RTW, (b) confidence of successful RTW, and (c) anticipated sick leave to be taken before RTW. They were also required to make a response to: (i) whether they would return to work or stay on

sick leave if asked to return to work on the next day; and (ii) the mode of duty if choosing to return to work.

The same participants were contacted twice, for a follow-up assessment on their RTW status and total sick leave taken, at 2 months and 6 months post-injury. Those who had been on sick leave were presented with the same framing condition as at the initial assessment and asked to complete the outcome measure on RTW a second time.

Figure 4.2
Design of the experimental groups



Participants

The participants had different types of injury and had been referred by insurance companies to receive case management (N = 141). A sample size of 69 achieves 81% power to detect an R-squared of 0.2 attributed to eight independent variables using an F test with a significance level of 0.05.

The inclusion criteria were: (a) aged between 20 and 60 years old; (b) sustained musculoskeletal injuries; (c) had taken less than 100 sick leave days; and (d) volunteered to participate in the study. The exclusion criteria were: (a) recent history of head injury, concussion, or memory loss; (b) known history of psychiatric illness, malignancy, cerebral vascular accident, heart problems, infection, or systemic inflammation; (c) workplace injury claim that had not been settled prior to the present work-related injury; (d) unclear liability for the workplace injury claim; and (e) pregnancy.

Informed consent was obtained from all participants (Appendix II). Ethics approval was obtained from the Ethics Committee of the Department of Rehabilitation Sciences, The Hong Kong Polytechnic University. The participants, invited by the case manager to attend the initial assessment, were randomly assigned to one of the four experimental groups by using the Latin Square Design. The principle was that participants would have an equal chance to be assigned to one of the four groups in a systematic way. The group factors were entered in sequence into a tabular grid (see Table 4.1).

Table 4.1
Summary of group factors in a tabular grid

PG	WL	AB	CT
AB	CT	PG	WL
WL	AB	CT	PG
CT	PG	WL	AB

As the participants were receiving case management and RTW intervention at the time when they were recruited for the experiment, each participant had been assigned a case manager from the company where the researcher worked. For this study, the role of the case manager was to monitor the progress of the participant from the first session to the end of the experiment. The case manager would coordinate suitable medical treatment and rehabilitation for participants if this was indicated. When a participant was recommended to return to work, the case manager would perform a work capacity evaluation and negotiate with the employer to arrange suitable duties based on the result of the work capacity evaluation. The RTW status reported by the case manager formulated the RTW outcome of the participant.

In the present study, the case manager was responsible for screening the cases referred by insurance companies. If the case met the requirements of the inclusion and exclusion criteria, the case manager would then contact the participant and arrange a time for the initial interview.

The Task Protocol

In the context of injured workers returning to work, pain is commonly regarded as a defacilitating factor. The reason is that pain is assumed to be a “noxious” sensation which deters an injured worker from returning to work. The increase in pain if returning to work can therefore be regarded as a loss to the workers; that is, a loss of a comfortable state. In contrast, wages are commonly regarded as a facilitating factor in returning to work. As a matter of fact, they are used as an incentive for stimulating injured workers to resume their work duties. In the local situation, injured workers receive 100% of their salary if they resume working compared with 80% if they are on sick leave. The increase in wages if returning to work can therefore be regarded as a gain to the workers; that is, an economic gain. In the experimental task, the participants were presented with information on wages and pain but in either a positive or a negative frame; this was believed to have modulating effects on the participants’ ratings of RTW outcomes.

(i) The Wage Factor

The negative framing of wages was presented as the potential financial loss if the participant chose to stay off work. According to the Employees’ Compensation Ordinance (ECO) in Hong Kong, injured workers receive 80% of their wages during sick leave in the first 2 years after the injury. In other words, workers will have no

financial loss (0%) if they choose to return to work but a 20% loss if they choose not to return to work. In contrast, wages can also be expressed in a positively framed condition in which the potential financial gain is that reference is made to what the workers would have earned before the injury. In other words, workers will have a 100% wage gain if they choose to return to work but an 80% gain if they choose not to return to work. The wordings appearing in the stimuli presented to the participants were:

Negative frame based on wage loss factor:

"According to the Employees' Compensation Ordinance, you would lose no money after returning to work but you will ***lose 20% of your wages*** *when you stay off work."*

Positive frame based on wage loss factor:

"According to the Employees' Compensation Ordinance, you are entitled to full wages when you return to work after an injury but you are entitled ***to only 80% of your wages*** *when you stay off work."*

(ii) The Pain Factor

Pain can be expressed in a negative frame when it is presented as an increase in pain after returning to work. In the present study, the negative framing of pain was presented as a situation in which 2% of injured workers experience an increase in pain

if staying off work and 13% of injured workers experience an increase in pain after returning to work. On the other hand, since pain itself has a defacilitating effect, the positive framing for the pain factor is expressed in terms of “comfort level” or “no experience of pain increase.” In the present study, the positive-framing condition for the pain factor was presented as a situation in which 98% of workers can maintain a level of comfort or experience no increase in pain when staying off work, and 87% of workers can maintain a level of comfort or experience no increase in pain after returning to work. As a result, the negative framing of pain was considered to be a 13% increase in pain for returning to work and a 2% increase in pain for not returning to work. The positive framing of pain was an 87% gain in level of comfort for returning to work and a 98% gain in level of comfort for not returning to work. The wordings appearing in the stimuli presented to the participants were:

Negative frame based on pain increase factor:

*“Based on past experience, **13%** of workers are likely to experience increasing discomfort after returning to work and **2%** of workers are likely to experience **increasing discomfort** when continuing to stay off work.”*

Positive frame based on pain increase factor:

*“Based on past experience, **87%** of workers feel no pain increase after returning to work and **98%** of workers **feel no pain** increase when they stay off work.”*

Table 4.2

Summary of the different framing conditions presented to the four experimental groups, PG, WL, AB and CT

			Wage factor	Pain factor
PG Group	Pain gain condition—Emphasizing the defacilitating effect of pain using a negative frame	RTW	100%	13%
		Non-RTW	80%	2%

			Wage factor	Pain factor
CT Group	Wage and pain control condition—Both factors presented using a positive frame	RTW	100%	87%
		Non-RTW	80%	98%

			Wage factor	Pain factor
AB Group	Wage and pain ambivalent condition—Both factors presented using a negative frame	RTW	0%	13%
		Non-RTW	20%	2%

			Wage factor	Pain factor
WL Group	Wage loss condition—Emphasizing the facilitating effect of wages using a negative frame	RTW	0%	87%
		Non-RTW	20%	98%

Experimental Procedures

The participant who agreed to take part in the present study, were invited to attend the first assessment at the investigator's office. A research assistant (RA) was assigned to collect their personal information as well as present the framing conditions to them.

(i) Informed Consent

After screening, the participants were assigned to different experimental groups. In the first session, the objectives and procedures of the experiment were explained to the participants by the RA. Informed consent was obtained from the participants and they were reminded that they had the right to withdraw from the experiment at any time without jeopardizing the case management that they were receiving from the researcher's company.

(ii) Baseline Assessment

The participants were asked to complete an information sheet, which covered the personal particulars, the social and work history, the job characteristics, and the nature of their injury. Furthermore, the participants were asked to complete two self-administered questionnaires: the Short Form-36 and the State Trait Anxiety Inventory - Chinese version. The former was used to measure the health-related quality of life of the participants, whereas the latter was used to measure the

psychological state of the participants, in particular their anxiety state. Both were chosen because they have been translated in Chinese and have been validated in Hong Kong. The same RA was responsible for administering all the questionnaire instruments.

Short Form-36 (SF-36). The MOS 36-item Short-Form Health Survey (SF-36) is a 36-item measure of health-related quality of life (Ware, Snow, Kosinski, & Gandek, 1993). The instrument has been commonly used in clinical practice and research, health policy evaluations, and general population surveys. The SF-36 Chinese (Hong Kong) version was translated and validated for the Chinese population in Hong Kong (Lam, Lauder, & Lam, 1999). It has eight subscales: physical functioning, role limitations-physical (limitation of daily roles due to physical problems), body pain, general health, vitality, social functioning, role limitations-emotional (limitation of daily roles due to emotional problems), and mental health. Each total score has a range of 100 with higher scores indicating a better health-related quality of life (Ware, Snow, Kosinski, & Gandek, 1993). It has been shown that the Chinese version is relevant for use with the Chinese population in Hong Kong (Lam, Lauder, & Lam, 1999), and a validated set of normative values for all eight scales has been established for all ages, and specifically for the age groups 18-40, 41-64, and 65 or above. In this study, the full scale was used to measure the health-related quality-of-life status of the participants at

the time when they were presented with the stimuli and made responses to the anticipated RTW outcomes. The scores of the participants were compared to the norms for the “all-ages” group in the Chinese (Hong Kong) version of the SF-36.

The Chinese Version of the State Trait Anxiety Inventory (STAI-C). The STAI-C measures the anxiety states of individuals. In the instrument, the construct of anxiety state is conceptualized as having two dimensions: state and trait (Cattell & Scheier, 1958, 1961). The term “trait” refers to a relatively stable characteristic of people, while the term “state” refers to a transient condition, which tends to vary from moment to moment (Shek, 1988, 1993). The Chinese version of the STAI was developed and its psychometric properties were reported in Tsoi, Ho, and Mak (1986) and Shek (1988, 1993). Shek (1988) validated the Chinese version of the STAI and showed the Cronbach’s alphas to be 0.90 and 0.81 for the A-state and A-trait respectively. In this study, only the 20 items of the A-state subscale were used to measure the anxiety state of the participants at the time when they were presented with the stimuli and made responses to the anticipated RTW outcomes.

Presentation of experimental stimuli. After the participants had completed the SF-36 and STAI-C questionnaires, the RA presented the stimuli according to the experimental group assigned. All the instructions and stimuli were presented in a standardized manner by the RA to the participant. The experimental stimuli were

presented on a piece of A4-size card and the RA read out the content of the stimuli to the participants. The order of presentation of the wage and pain factors was always the same, with the wage factor (positive or negative frame) presented first before the pain factor (positive or negative frame). The participant was given 1-2 minutes to respond to the stimuli, and could ask questions if he or she did not understand the content of the stimuli. The RA would try her best to answer the questions. The whole process took about 30 minutes to complete.

Anticipated RTW outcomes. After the stimuli had been presented to the participants, they were required to make responses to five items by marking the A4 card. The content of the items was related to RTW and they were asked to imagine that they had been offered the chance of returning to their work preinjury at this point in time with the outcomes as described in the stimuli, and make their responses accordingly. The five items were (see Appendix III):

1. Perceived chance of successful RTW. The ratings were made on a 0 to 10-point scale with 0 indicating “no, never” and 10 indicating “yes, definitely.”
2. Perceived confidence of successful RTW. The ratings were made on a 0 to 10-point scale with 0 indicating “absolutely not” and 10 indicating “yes, definitely.”
3. Anticipated sick leave to be taken before returning to work. The response was

in terms of the number of months.

4. The preference for staying on sick leave or for returning to work. The responses were “staying on sick leave” or “RTW.”

5. Mode of duty arrangements if returning to work. The responses were “same employer, same time,” “same employer, less time,” “different employer, same time,” and “different employer, less time.”

Further assessment of the decision-making attributes. After giving responses to the anticipated RTW outcomes, the participants were further required to complete 12 items exploring the attributes that could have influenced their responses to the anticipated outcomes. They were wage loss; pain increase after RTW; confidence in RTW; present health status; physical function, role limitations—physical, and body pain; general health, vitality, and social functioning; and role limitations—mental and mental health. The first four items addressed the attributes related to prospect theory while the latter eight items related to the general health status of the participants (Appendix 2). The participants were required to rate the attributes on a scale of 1 to 5 with 1 indicating “definitely no effect,” 2 indicating “no effect,” 3 indicating “don’t know,” 4 indicating “has an effect,” and 5 indicating “definitely has an effect.”

(iii) Follow-up Assessment

The participants were contacted by telephone around 8 weeks after the stimuli

presentation and baseline assessment. They were asked about their RTW status and, if they had succeeded in returning to work before this point, about their total sick leave duration. Appointments were made for those who were still on sick leave and had not achieved a RTW status to attend an interview session conducted by the researcher. The experimental protocols of the first session were then repeated. The participants were presented with the same framing conditions of wages and pain. They were required to complete the same five items on anticipated RTW outcomes. Furthermore, the SF-36 was administered for the second time. Those who had already returned to work were not required to complete the experimental protocol or the assessments.

Six months after the initial baseline assessment, the participants were contacted by telephone again. Those who had been on sick leave and had not been able to return to work were requested to complete the assessment a third time. The assessment results would provide information on the participants who were regarded as chronic cases.

Strategy of Data Analysis

Depending on the level of measurement, one-way ANOVAs or chi-square tests, or both, were used to compare the demographic, job, and injury characteristics of the participants among the four experimental groups. One-way ANOVAs were conducted to test the framing effects (positive versus negative; wages versus pain) on participants' decision making with regard to potential RTW outcomes. In addition,

one-way ANOVAs were conducted to identify which demographic characteristics would have an effect on the RTW decision-making processes of the participants. All significant variables were then entered as the predictors of the dummy variable regression analysis to test the extent to which these variables would interact with the framing effect that influences the decision making of the participants with regard to RTW outcomes. To further refine the analysis, participants were selected according to the perceived percentage of improvement and the amount of sick leave at the time of initial assessment. One-way ANOVAs were again conducted to test the framing effects influencing the perceived RTW outcomes of the participants. Similar strategies were used to analyze the participants' results obtained at the follow-up assessments at the 2-month and 6-month points.

RESULTS

A total of 141 participants agreed to participate in the study and completed the baseline assessment. The assessment was repeated at 2 months after the original baseline assessment. During the 2-month follow-up period, 94 participants (66.6%) managed to resume working, while 47 participants (33.3%) who had not managed to return to work completed the follow-up assessment. A summary of the demographic, job, and injury characteristics of the participants is presented in Table 4.3. The demographic variables included gender, age, salary, and occupation. The job characteristics were categorized in terms of manual handling and job type. The injury characteristics included body parts, nature of injury, and sick leave duration.

Demographic Characteristics of Participants

(i) Gender

At the baseline, there were significantly more male (n = 91, 64.5%) than female participants (n = 50, 35.5%) (χ^2 = 9.156, *df* = 3, p = 0.027). Across the four experimental groups, it appeared that Groups B and D had more male than female participants. At the follow-up assessment, no significant differences were found in the gender distribution of the participants among the four experimental groups (χ^2 = 2.139, *df* = 3, p = 0.544).

(ii) Age

The mean age of all the participants was 40.6 years (SD = 11.0). No significant differences were found in the age of participants among the four experimental groups ($F_{(3,137)} = 0.696$, p = 0.556). When the participants were further divided into four age subgroups, namely, 0-30, 31-40, 41-50, and 51 years of age or above, no significant differences were found in the proportions of participants among these subgroups ($\chi^2 = 4.602$, *df* = 9, p = 0.868).

Table 4.3

Demographic characteristics of participants at the initial assessment

	PG Group	CT Group	AB Group	WL Group	Statistics
Number of participants					
Initial assessment	34	35	37	35	
Follow-up assessment	11	12	11	13	
Gender (n)					
Male	18	24	20	29	$\chi^2 = 9.156$, $df = 3$, p=0.027*
Female	16	11	17	6	
Age					
Mean Age (SD)	38.7 (10.7)	40.8 (10.0)	42.3 (10.2)	41.4 (11.7)	$F_{(3, 137)} = 0.696$, p = 0.556
0-30	11	6	7	9	
31-40	6	9	6	5	
41-50	12	13	16	13	
51 or above	5	7	8	8	
Total	34	35	37	35	$\chi^2 = 4.602$, $df = 9$, p = 0.868
Job demand					
Manual handling (Yes/No)	21 / 13	22 / 13	27/10	27/8	$\chi^2 = 16.899$, $df = 3$, p= 0.153
Job type					
Unskilled (n)	9	9	7	10	$\chi^2 = 5.215$, $df = 12$, p=0.950
Semiskilled (n)	13	16	17	12	
Skilled (n)	8	6	7	7	
Clerical (n)	3	2	4	3	
Managerial (n)	1	2	2	3	
Monthly Income					
HK$0–$5,000 (n)	6	2	4	1	$\chi^2 = 16.899$, $df = 12$, $p = 0.153$
HK$5,001–$10,000 (n)	13	15	20	18	
HK$10,001–$15,000 (n)	12	10	8	13	
HK$15,001–$20,000 (n)	1	8	3	3	
>HK$20,000 (n)	2	0	2	0	
Injured Body Part					
Upper limb (n)	15	13	19	16	$\chi^2 = 16.210$, $df = 12$, $p = 0.182$

Lower limb (n)	7	10	6	2	
Back (n)	11	7	9	15	
Neck (n)	1	5	2	2	
Multiple areas (n)	0	0	1	0	
Nature of Injury					
Abrasion (n)	3	0	2	2	$\chi^2 = 11.589$, df=12, p=0.479
Contusion (n)	6	10	8	4	
Fracture (n)	6	5	10	5	
Sprain/strain (n)	17	20	15	22	
Multiple injury (n)	2	0	2	2	
Sick leave duration					
0–60 days (n)	14	14	16	12	χ^2 =0.655, df=3, p=0.884
61 or above (n)	20	21	21	23	

$*p<0.05$

Job Characteristics of Participants

(i) Manual Lifting

The participants were categorized into manual lifting and non-manual lifting subgroups according to the nature of their pre-injury job. Ninety-seven participants (68.8%) had a job requiring manual lifting, while 44 participants (31.2%) were not required to carry out manual lifting in their jobs. No significant differences were found in the subgroup distributions of the participants among the four experimental groups ($\chi^2 = 16.899$, $df = 3$, p = 0.153).

(ii) Job Type

The participants were classified according to their skill levels. The five skill levels were identified as unskilled (not requiring any technical skill) semiskilled (requiring

some technical skill but no recognized qualification), skilled (having recognized training in the relevant field), clerical (office duties), and managerial (management or supervision level). Most of the participants were either unskilled (n = 35, 24.8%) or semiskilled (n = 58, 41.1%). No significant differences were revealed in the proportions of the participants in each category among the job-type subgroups (χ^2 = 5.215, *df* = 12, p = 0.950).

(iii) Income Level

The monthly income sof the participants wer categorized into five levels (i.e., HK$0 – $5,000, HK$5001 – HK$10,000, HK$10,001 – HK$15,000, HK$15,001 – $20,000, and HK$20,001 or above). Most of the participants earned a salary below HK$15,000 (n = 122, 86.5%). No significant differences were revealed in the proportions of participants in each category among the four experimental groups in terms of income level (χ^2 = 16.899, *df* = 12, p = 0.153).

Workplace Injury Characteristics

(i) Body Part

The injured body parts of the participants were categorized into five regions, namely, upper limb, lower limb, back, neck, and others. Most of the workers had sustained either an upper limb injury (n = 63, 44.7%) or a back injury (n = 42, 29.8%). No significant differences were revealed in the proportions of participants in each

category among the four experimental groups (χ^2 = 16.210, *df* = 12, p = 0.182).

(ii) Nature of Injury

The nature of injury was further categorized into five groups, namely, abrasion, contusion, fracture, sprain or strain, and others. Most of the participants suffered from a sustained contusion (n = 28, 19.9%) or a sprain-or-strain-type injury (n = 74, 52.5%). The differences in the proportions of participants among the four experimental groups were statistically non-significant (χ^2 = 11.589, *df* = 12, p = 0.479)

(iii) Sick Leave Duration

The average sick leave for all the participants at the baseline was 107.3 days (SD = 95.0 days). No significant differences were found in the participants among the four experimental groups ($F_{(3,\ 137)}$ = 2.18, p = 0.093). The participants were further classified into two subgroups according to the amount of sick leave: shorter than or equal to 60 days and longer than 60 days. No significant differences were found between the two subgroups (χ^2 = 0.655, *df* = 3, p = 0.884).

Pre-assessment Health Status Data

The Chinese version of the SF-36 as well as the Chinese version of the State-Trait Anxiety Inventory (STAI-C) were administered to all the participants prior to the first assessment of the framing effect of prospect theory. A summary of the results, which

are also presented in Table 4.4, follows.

(i) SF-36 Scores

Table 4.4 summarizes the participants' subscale and total scores on the SF-36. No significant differences between experimental groups were revealed in the participants' mean total ($F_{(3, 137)} = 53.279$, $p = 0.670$) and subscale scores for physical function ($F_{(3, 137)} = 0.689$, $p = 0.560$); role limitations—physical ($F_{(3, 137)} = 0.540$, $p = 0.656$); body pain ($F_{(3, 137)} = 2.090$, $p = 0.104$); general health ($F_{(3, 137)} = 0.561$, $p = 0.642$); vitality ($F_{(3, 137)} = 0.757$, $p = 0.520$); social function ($F_{(3, 137)} = 1.537$, $p = 0.208$); role limitations—emotional ($F_{(3, 137)} = 0.344$, $p = 0.794$); and mental health ($F_{(3, 137)} = 0.497$, $p=0.685$).

Table 4.4

Summary of the results of the SF-36 and the STAI-C for the participants at the baseline assessment

	PG Group	CT Group	AB Group	WL Group	Statistics
SF-36 Score					
Physical Function (SD)	64.71(20.5)	58.57(21.1)	58.38(22.1)	59(22.1)	$F_{(3, 137)}$ =0.689, p=0.560
Role Physical (SD)	10.29(19.5)	6.57(16.8)	10.14(24.6)	5.71(13.6)	$F_{(3, 137)}$ =0.540, p=0.656
Body Pain (SD)	58.53(11.2)	61.29(8.89)	61.08(11.7)	57.14(12.1)	$F_{(3, 137)}$ =2.090, p=0.104
General Health (SD)	43.09(11.8)	46.00(13.4)	48.51(21.1)	49(15.4)	$F_{(3, 137)}$ =0.561, p=0.642
Vitality (SD)	69.26(11.3)	67.86(16.9)	69.19(10.5)	65.14(12.7)	$F_{(3, 137)}$ =0.757, p=0.520
Social Function (SD)	43.75(14.5)	50.36(17.5)	45.27(14.5)	48.93(11.4)	$F_{(3, 137)}$ =1.537, p=0.208
Role Emotional (SD)	25.49(33.9)	25.87(37.3)	18.92(34.7)	25.72(33.4)	$F_{(3, 137)}$ =0.344, p=0.794
Mental Health (SD)	62.33(62.3)	64.64(12.9)	61.19(14.1)	62.51(11.4)	$F_{(3, 137)}$ =0.497, p=0.685
Mean Total Score (SD)	47.18 (6.91)	48.27 (8.65)	46.58 (8.04)	46.64 (6.91)	$F_{(3, 137)}$ =0.365, p=0.778
Chinese State Trait and Anxiety Inventory					
STAI-C score(SD)	48.13 (9.37)	45.94 (10.18)	47.31 (11.18)	46.64 (9.70)	$F_{(3, 137)}$ =53.279, p=0.670

(ii) STAI-C Scores

The results on the STAI-C are also presented in Table 4.4. No significant differences were found between the participants among the four experimental groups ($F_{(3, 137)} = 53.279$, $p = 0.670$).

Framing Effect of Prospect Theory

The participants were randomized and assigned to four experimental groups:

PG	pain gain group
WL	wage loss group
AB	ambivalence group
CT	control group

Depending on the group membership, participants in each group were presented with information on wages and pain that was framed in a predetermined manner. The framing effects anticipated from each group are summarized in Table 4.5.

Table 4.5
Anticipated framing effects on the participants in the four experimental groups

	Anticipated Framing Effects	Pain	Wage
PG Group	Pain Gain	Negative	Positive
CT Group	Wage and Pain Control	Positive	Positive
AB Group	Wage and Pain Ambivalent	Negative	Negative
WL Group	Wage Loss	Positive	Negative

(i) Effects of Pain and Wages on RTW Decision Making

In the present study, the participants were presented with information on potential changes in pain and wages if they were to return to work in either positively or negatively framed messages. A one-way ANOVA revealed that the group main effect was not significant ($F_{(3, 137)} = 0.807$, $p = 0.492$) for the perceived chance of RTW ($F_{(3, 137)} = 0.955$, $p = 0.416$), confidence of RTW ($F_{(3, 123)} = 0.529$, $p = 0.664$), and anticipated amount of sick leave (Table 4.6). These results suggest that different framing effects did not seem to differentially influence the participants in each of the four groups.

Table 4.6

Comparisons of participants' scores on anticipated RTW outcomes across the four experimental groups

	Group	n	Score (SD)	Statistics
Perceived Chance of RTW	PG	34	7.32 (1.90)	$F_{(3,137)} = 0.807$, $p = 0.409$
	CT	35	7.57 (2.19)	
	AB	37	6.70 (2.76)	
	WL	35	7.20 (2.44)	
Perceived Confidence of RTW	PG	34	7.65 (1.65)	$F_{(3,137)} = 0.416$, $p = 0.416$
	CT	35	7.31(2.21)	
	AB	37	6.73 (2.63)	
	WL	35	7.34 (2.72)	
Anticipated Sick leave duration	PG	30	4.62 (3.27)	$F_{(3,123)} = 0.529$, $p = 0.664$
	CT	32	4.80 (3.54)	
	AB	32	5.59 (4.66)	
	WL	33	5.55 (3.91)	

When the participants were asked to indicate their predicted choice of RTW, it was found that 101 of them preferred RTW while 10 preferred to stay on sick leave. There were no significant differences in the choices of RTW among the four groups ($\chi^2 = 2.261$, $df = 3$, $p = 0.520$).

Table 4.7

Summary of the participants who chose the option of staying on sick leave or returning to work

	PG	CT	AB	WL	Total
Sick leave	10	7	12	11	40
RTW	25	28	24	24	101

When the participants were asked their preferred mode of RTW if they were to return to work the next day, 109 of them preferred to return to the same employer, and 22 preferred some kind of modified duties. On the other hand, 32 participants wanted to change to a different employer. The distribution of preferred mode was statistically significant ($\chi^2 = 8.579$, $df = 9$, $p = 0.477$).

Table 4.8

Summary of participants' choices regarding their preferred mode of RTW

	PG	CT	AB	WL	Total
SS	22	23	24	18	87
SL	3	3	6	10	22
DS	7	6	6	6	25
DL	2	3	1	1	7
Total	34	35	37	35	141

Note: SS: Same Employer, same time SL: Same employer, less time
DS: Different employer, same time DL: Different employer, less time

(ii) Effect of Other Demographic Characteristics Influencing RTW Decision Making

Dummy variable regression analyses were used to further test the influence of a few demographic, job, and injury characteristics of the participants that could have modulated their decision-making processes as a result of the framing effect. One-way ANOVAs were first conducted to identify which demographic characteristics would have an effect on the participants' RTW decision-making processes. All significant variables were then entered as the predictors of the dummy variable regression analysis. The variables were age, gender, salary, body parts, nature of injury, and manual lifting.

The participants were subdivided into four age subgroups (see Table 4.1 for groupings) and the age main factor was not found to significantly influence the participants' ratings on perceived chance of RTW ($F_{(3, 137)} = 0.481$, $p = 0.986$), perceived confidence of RTW ($F_{(3, 137)}=0.336$, $p = 0.799$), or anticipated sick leave duration ($F_{(3, 137)} = 0.241$, $p = 0.867$). The gender effect was found to be a non-significant factor influencing the participants' perceived chance of RTW ($F_{(1, 139)} = 0.618$, $p = 0.433$), perceived confidence of RTW ($F_{(1, 139)} = 0.065$, $p = 0.799$), and anticipated sick leave duration ($F_{(1, 139)} = 1.527$, $p = 0.219$). In terms of monthly salary, the participants were divided into four subgroups and the salary effects on the perceived chance of RTW ($F_{(3, 137)} = 0.731$, $p = 0.535$), perceived confidence of RTW ($F_{(3, 137)} = 0.281$, $p = 0.839$), and anticipated sick leave duration ($F_{(3, 137)} = 2.227$, $p = 0.088$) were not significant.

The body part variable was divided into four subgroups according to body region. As with ANOVA statistical analysis, the effects of body part on the perceived chance of RTW ($F_{(3, 136)} = 2.206$, $p = 0.090$) and perceived confidence of RTW ($F_{(3, 136)} = 2.561$, $p = 0.058$) were not significant. However, body part was found to exert significant effects on the participants' ratings of anticipated sick leave duration ($F_{(3, 136)} = 2.982$, $p = 0.034$). An LSD post hoc test further suggested that those participants with neck and back injuries tended to anticipate a longer sick leave duration than those in the other subgroups, and the participants were further divided into four subgroups, according to the nature of their injury. The effect of nature of injury was found to significantly influence the participants' ratings on perceived chance of RTW ($F_{(3, 137)} = 5.571$, $p = 0.001$) and perceived confidence of RTW ($F_{(3, 137)} = 4.737$, $p = 0.004$), but not on anticipated sick leave duration ($F_{(3, 137)} = 0.102$, $p = 0.959$). The LSD post hoc test further suggested that the participants with fractures and multiple injuries rated their perceived chance and confidence of RTW ($p = 0.009$) significantly lower than other groups. When the participants were divided into two groups according to whether their job required manual lifting or not, the manual lifting effect was found tnot o be not significant in influencing the participants' ratings on perceived chance of RTW ($F_{(1, 139)} = 2.067$, $p = 0.153$) and confidence of RTW ($F_{(1, 139)} = 2.067$, $p = 0.062$). Nevertheless, the participants who were required to do manual lifting at work were found to have an

anticipated sick leave duration significantly longer than those who were not required to do manual lifting ($F_{(1, 125)} = 7.249$, $p = 0.008$).

(iii) Combined Effects of Framing and the Participants' Characteristics

The results of the influences of the participants' demographic, job, and injury characteristics on their ratings of RTW outcomes suggest that body part and nature of injury can be regarded as potential predictors for entering into the dummy variable regression equation together with the group effect. The body part variable was regrouped into four groups including upper limb, lower limb, trunk, and multiple areas. The nature of injury variable was regrouped into four groups including abrasion and contusion, fracture, sprain and strain, and multiple injuries. The dependent variables were perceived chance of RTW, confidence of RTW, and anticipated sick leave duration. Altogether, there were three regression analyses for each of the dependent variables.

The results showed that multiple injuries were a good predictor of perceived chance of RTW (n = 6, mean = 4.5, SD = 3.1) and perceived confidence of RTW (n = 6, mean = 4.83, SD = 3.2) (Table 4.9). In addition, multiple areas of injury was also a significant predictor of perceived confidence of RTW (n = 10, mean = 5.90, SD = 1.6). As for the anticipated sick leave duration, the trunk was the significant predictor (n = 10, mean = 6.9, SD = 1.5). This showed that participants with multiple injuries and multiple areas of injury scored lower in chance and confidence of RTW. The sick leave duration of

multiple areas was also longer than for other body parts.

(iv) Further Analysis of the Framing Effect

Variables found to exert significant effects on the participants' ratings of RTW outcomes were percentage of improvement and sick leave duration. The participants were asked to report their self-perceived percentages of improvement at the initial assessment on a visual analog scale with 0% indicating "no improvement" and 100% indicating "full recovery." The sick leave duration of participants was defined as the period between the date of the accident and the date of the initial assessment. A linear regression was carried out in order to determine how well the variables of percentage of improvement and sick leave duration predicted the perceived chance of RTW, perceived confidence of RTW, and anticipated sick leave duration.

The results show that both sick leave duration and perceived percentage of improvement can significantly predict perceived chance of RTW, perceived confidence of RTW, and anticipated sick leave duration. As the medians of the percentage of improvement and sick leave duration were 60% and 60 days respectively, these figures will be used for the next stage of statistical analysis.

Table 4.9

Result of dummy variable regressions for predicting perceived chance of RTW, perceived confidence of RTW, and anticipated sick leave duration

	B	SE	*t*	p
Perceived Chance of RTW, $R^2 = 0.215$				
Constant	5.182	2.547	2.035	0.044
DV1 (Body, lower limb)	0.279	0.584	0.478	0.633
DV2 (Body, trunk)	-0.698	0.494	-1.415	0.16
DV3 (Body, multiple parts)	-1.131	0.853	-1.326	0.188
DV1 (Injury, sprain/strain)	-1.196	0.662	-1.808	0.073
DV2 (Injury, fracture	0.466	0.507	0.919	0.36
DV3 (Injury, multiple injury)	-3.398	1.033	-3.29	0.001*
Overall	0.043	0.03	1.414	0.16
Perceived Confidence of RTW, total $R^2 = 0.212$				
Constant	7.274	2.421	3.005	0.003
DV1 (Body, lower limb)	0.74	0.555	0.134	0.894
DV2 (Body, trunk)	-0.416	0.469	-0.888	0.377
DV3 (Body, multiple, parts)	-1.977	0.811	-2.437	0.016*
DV1 (Injury, sprain/strain)	-1.418	0.629	-2.255	0.026
DV2 (Injury, fracture	0.105	0.482	0.219	0.827
DV3 (Injury, multiple injury)	-3.286	0.982	-3.347	0.001*
Overall	4.4	9.57	0.459	0.646
Anticipated sick leave, $R^2 = 0.199$				
Constant	-4.778	4.416	-1.082	0.282
DV1 (Body, lower limb)	1.171	1.042	1.123	0.264
DV2 (Body, trunk)	2.112	0.880	2.400	0.231
DV3 (Body, multiple, parts)	1.775	1.472	1.206	0.018*
DV1 (Injury, sprain/strain)	-0.035	1.194	-0.029	0.977
DV2 (Injury, fracture	0.067	0.913	0.073	0.942
DV3 (Injury, multiple injury)	1.208	2.120	0.57	0.57
Overall	0.053	0.053	1.001	0.319

Abrasion/contusion and upper limb are the reference groups

*$p<0.05$

Table 4.10

Result of linear regression on percentage of improvement and sick leave duration

	B	SE	*t*	p
Perceived Chance				
% Improvement	0.046	0.009	5.213	0.001*
Sick leave	-0.05	0.02	-2.705	0.008*
Perceived Confidence				
% Improvement	0.041	0.009	4.809	0.001*
Sick leave	-0.005	0.02	-2.435	0.026*
Anticipated Sick Leave				
% Improvement	-0.031	0.015	-2.038	0.044*
Sick leave	0.016	0.003	4.819	0.001*

**p < 0.05*

Participants with 60% Improvement or More

Participants with 60% improvement or more were selected for further analysis. There were a total of 79 participants (56.0% of the total group) (Table 4.11). This group of participants was selected and another ANOVA was run to test the differences in RTW outcomes among the four experimental groups. The results indicated a significant group effect on the participants' ratings of perceived chance of RTW ($F_{(3, 75)} = 3.225$, $p = 0.027$) but not of perceived confidence of RTW ($F_{(3, 75)} = 1.487$, $p = 0.225$) or anticipated sick leave duration ($F_{(3, 75)} = 0.171$, $p = 0.915$). A post hoc test further suggested that participants in the PG group rated perceived chance of RTW significantly lower than those in the CT and WL groups. Participants in the AB group also scored significantly lower than those in the CT group.

Table 4.11

Result of ANOVA statistical analysis for perceived chance of RTW, perceived confidence of RTW, and anticipated sick leave duration for participants with 60% improvement

	Group	N	Score (SD)	Statistics	LSD Post hoc
Perceived Chance of RTW	PG	21	7.43 (2.03)	$F_{(3,75)} = 3.225$; $p = 0.027$*	PG & CT, PG & WL, CT & AB
	CT	20	8.70 (1.13)		
	AB	17	7.29 (2.52)		
	WL	21	8.67 (1.68)		
Perceived Confidence of RTW	PG	17	7.71 (1.82)	$F_{(3,75)} = 1.487$; $p = 0.225$	
	CT	21	8.35(1.49)		
	AB	22	7.47 (2.61)		
	WL	19	8.62 (1.77)		
Anticipated Sick Leave Duration	PG	17	4.78 (3.68)	$F_{(3,75)} = 0.171$; $p = 0.915$	
	CT	21	4.25 (3.01)		
	AB	22	4.06 (2.96)		
	WL	19	4.52 (3.09)		

*$p < 0.05$

Participants with 60 Days or Less Sick Leave Duration

Fifty-six participants (39.7%) with a sick leave duration of 60 days or less were selected for further analysis (Table 4.12). A one-way ANOVA indicated that the group main effect was not significant in terms of influencing participants' ratings of perceived chance of RTW ($F_{(3,52)} = 2.615$, p = 0.061) and anticipated sick leave duration ($F_{(3,47)} = 0.456$, p = 0.714). However, the group effect was significant for perceived confidence of RTW ($F_{(3,52)} = 2.941$, p = 0.042). Post hoc tests suggested that participants in the WL group rated confidence of RTW significantly higher than those in the PG and CT groups. No significant differences were found between other groups.

Table 4.12

Results of ANOVA statistical analysis for perceived chance of RTW, perceived confidence of RTW, and anticipated sick leave duration for participants with 60 days sick leave or less

	Group	n	Score (SD)	Statistics	LSD Post hoc
Perceived Chance of RTW	PG	14	6.86 (2.35)	$F_{(3,52)} = 2.615$; $p = 0.061$	PG & WL
	CT	14	8.21(1.76)		
	AB	16	8.06 (1.69)		
	WL	12	8.83 (1.52)		
Perceived Confidence of RTW	PG	14	7.36(1.95)	$F_{(3,52)} = 2.941$; $p = 0.042$*	PG & WL, CT & WL
	CT	14	7.93(2.02)		
	AB	16	8.00(1.41)		
	WL	12	9.25 (0.97)		
Anticipated Sick Leave Duration	PG	14	3.33 (2.39)	$F_{(3,52)} = 0.456$; $p = 0.714$	
	CT	14	3.04 (2.83)		
	AB	16	4.00 (3.08)		
	WL	12	3.00 (1.13)		

$p < 0.05$

Combined Improvement and Sick Leave Duration Effects

Participants with 60% improvement or more as well as a sick leave duration of 60 days or less were selected for further data analysis. Altogether, 35 participants were selected (24.8% of the total group) (Table 4.13). A one-way ANOVA indicated a significant group effect on perceived chance of RTW ($F_{(3,31)} = 3.891$, $p = 0.018$) and perceived confidence of RTW ($F_{(3, 31)} = 741$, $p = 0.021$), but not on anticipated sick leave ($F_{(3, 31)} = 0.790$, $p = 0.509$). LSD post hoc tests further showed that both the PG and AB groups scored significantly lower on both perceived chance and perceived confidence of RTW than those in the CT and WL groups.

Table 4.13

Summary of statistical analysis results for participants with combined improvement and sick leave duration effects

	Group	n	Score (SD)	Statistics[1]	LSD Post hoc
Perceived Chance of RTW	PG	7	6.57 (2.94)	$F_{(3,52)} = 3.891$; $p = 0.018$*	PG & CT, PG & WL
	CT	8	9.25(1.17)		
	AB	9	7.89(1.54)		
	WL	11	9.09(1.30)		
Perceived Confidence of RTW	PG	7	7.00(2.58)	$F_{(3,52)} = 3.741$; $p = 0.021$*	PG & CT, PG & WL
	CT	8	9.00(1.51)		
	AB	9	8.11(1.17)		
	WL	11	9.36 (0.92)		
Anticipated Sick Leave Duration	PG	7	3.57(2.82)	$F_{(3,52)} = 0.790$; $p = 0.509$	
	CT	8	2.19(1.07)		
	AB	9	3.78(3.38)		
	WL	11	3.09(1.14)		

$p < 0.05$

Follow-Up Study

After the initial assessment, the participants were contacted for the second time after 2 months in order to obtain information on their RTW status. Participants who reported not managing to return to work were invited to attend a re-assessment session. At the reassessment, the participants were required to complete the SF-36, and five prediction questions on perceived chance of RTW, perceived confidence of RTW, anticipated sick leave duration, choice of RTW, and mode of RTW, which was done at the initial assessment. A total of 47 participants (33.3% of the total group) were reported as not having returned to work and were involved in the re-assessment. An ANOVA with

a repeated measure was used to determine if there was any difference between the baseline assessment and the assessment 2 months later (Table 4.14).

Table 4.14
Result of ANOVA with a repeated measure in comparison with the baseline assessment and the follow-up assessment 2 months later

	Initial score Mean (SD)	Follow-up score Mean(SD)	Statistics
% Improvement	56.4(19.7)	63.2(16.6)	$F_{(1,43)} = 7.146$, $p = 0.011$*
SF-36	46.2(5.9)	47.8(10.4)	$F_{(1,43)} = 1.094$, $p = 0.301$
Perceived Chance of RTW	7.7(2.3)	6.8(2.6)	$F_{(1,43)} = 4.877$, $p = 0.033$*
Perceived Confidence of RTW	7.9(2.4)	7.1(2.3)	$F_{(1,43)} = 5.307$, $p = 0.026$*
Anticipated Sick Leave Duration	4.6(4.9)	6.5(5.9)	$F_{(1,43)} = 10.388$, $p = 0.003$*

$p < 0.05$

(i) Perceived Percentage Improvement

When the participants were asked to rate their self-perceived percentage of improvement, it was found that the baseline percentage improvement was 56.4% (SD = 19.7%) and the 2-month follow-up percentage improvement was 63.2% (SD = 16.6%). Results of the ANOVA showed a significant difference between the baseline assessment and the 2-month follow-up assessment on percentage improvement ($F_{(1,43)} = 7.146$, p =

0.011). On the other hand, there were no significant interaction effects between the percentage of improvement and the pain factor ($F_{(1,43)} = 0.910$, $p = 0.765$) or between the percentage of improvement and the wage factor ($F_{(1,43)} = 0.627$, $p = 0.433$). In addition, there were no interaction effects among the percentage of improvement, and the pain and wage factors ($F_{(1,43)} = 0.988$, $p = 0.326$).

(ii) SF-36 Reassessment

At the 2-month follow-up assessment, the participants were asked to complete the SF-36 questionnaire again. The result was compared with the baseline assessment. The SF-36 score at the baseline assessment was 46.2 (SD = 5.9) while the SF-36 score at the follow-up assessment was 47.8 (SD = 10.4). The results of the ANOVA did not show any difference between the initial and follow-up SF-36 scores ($F_{(1,43)} = 1.094$, $p = 0.301$). In addition, there were no interaction effects between the SF-36 score and the pain factor ($F_{(1,43)} = 0.004$, $p = 0.952$), nor between the SF-36 score and the wage factor ($F_{(1,43)} = 1.948$, $p = 0.170$). In addition, there was no interaction between the SF-36 result, and the pain and wage factors ($F_{(1,43)} = 0.137$, $p = 0.713$).

(iii) Anticipated RTW Outcomes

The participants were asked about their perceived chance and perceived confidence of RTW, and anticipated sick leave duration after they were presented with the experimental protocol for the second time. The baseline assessment for perceived

chance of RTW was 7.7 (SD = 2.3), for perceived confidence of RTW it was 7.9 (SD = 2.4), and for anticipated sick leave duration it was 4.6 months (SD = 4.9 months). At the follow-up assessment, perceived chance of RTW was 6.8 (SD = 2.6), perceived confidence of RTW was 7.1 (SD = 2.3), and anticipated sick leave duration was 6.5 months (SD = 5.9 months). The results of the ANOVA showed that the participants scored significantly lower at the follow-up assessment on both perceived chance of RTW ($F_{(1,43)} = 4.877$, $p = 0.033$) and perceived confidence of RTW ($F_{(1,43)} = 5.307$, $p = 0.026$). In addition, they anticipated a significantly longer sick leave duration at the follow-up assessment when compared with the baseline assessment ($F_{(1,43)} = 5.307$, $p = 0.026$). There was no interaction among perceived chance of RTW, perceived confidence of RTW, anticipated sick leave duration, and the pain and wage factors.

(iv) Choice and Mode of RTW

There were 47 participants who had not returned to work by the 2-month follow-up assessment. Out of these 47 persons, 30 had anticipated that they would return to work but continued to be on sick leave, while 17 participants continued to be on sick leave in line with their prediction at the baseline assessment. When the participants were asked to predict their choice of RTW and mode of RTW, 35 of them preferred the RTW option when they were asked hypothetically to return to work the next day while 12 participants preferred to stay on sick leave. The predictability of the RTW anticipation among the

participants was 68.1%.

Table 4.15

Summary of participants' choice for RTW or staying on sick leave at the 2-month follow-up assessment

		Follow Up		
		RTW	Sick leave	Total
Initial Assessment	RTW	25	5	30
	Sick leave	10	7	17
	Total	35	12	47

A *t* test was used to compare the anticipated RTW group and the sick leave group on perceived chance of RTW, perceived confidence of RTW, and anticipated sick leave duration (see Table 4.16). It was found that the sick leave group scored significantly lower than the RTW group on perceived chance of RTW ($t_{45} = 3.394$, df=45, p = 0.001), perceived confidence of RTW ($t_{45} = 4.253$, df=45, p < 0.001), and anticipated sick leave duration ($t_{45} = -2.799$, df=45, p = 0.008).

Table 4.16

Comparison of RTW outcomes for the groups who chose RTW and for those who chose to stay on sick leave

	RTW Group N = 35	Sick Leave Group N = 12	t	df	*p*
Perceived Chance of RTW	7.5(2.2)	4.8(2.9)	3.394	45	0.001*
Perceived Confidence of RTW	7.7(1.7)	4.9(2.6)	4.253	45	0.000*
Anticipated Sick Leave Duration	5.4(3.9)	10.0(5.9)	-2.799	39	0.008*

*$p<0.05$

When they were asked their preferred mode of RTW, 32 participants preferred to return to the same employer and 15 participants wanted to change to a different employer. The latter was an indication that these participants had some problem with their employer. The predictability of the anticipated choices for RTW modes was 65.9%.

Table 4.17
Comparison of choices for RTW modes at the 2-month follow-up assessment and the baseline assessment

		Two-Month Follow Up				
		SS	SL	DS	DL	Total
Baseline Assessment	SS	21	1	6	2	30
	SL	1	4	0	1	6
	DS	4	1	4	0	9
	DL	0	0	0	2	2
	Total	26	6	10	5	47

Note: SS: Same Employer, same time
SL: Same employer, less time
DS: Different employer, same time
DL: Different employer, less time

Predicted RTW Outcomes and Actual RTW Outcomes

All the participants were followed up at 6 months post-injury in order to determine the relationship between the baseline prediction of RTW status and the actual RTW status 6 months after the initial assessment. A logistic regression was performed. It was found that the predicted choice of RTW could significantly predict the actual RTW outcome at 6 months (OR = 9.861; p = 0.000; 95%CI: 4.160 to 23.374) but not at the 2-month follow-up assessment (OR = 1.4; p = 0.446; 95% CI: 0.589, 3.327).

Table 4.18

Summary of regression analysis results comparing the 2-month and 6-month follow-up results

	B	SE	Odds Ratio	95% CI	P value
2-month follow up	0.336	0.442	1.400	0.589 to 3.327	0.446
6-month follow up	2.289	0.440	9.861	4.160 to 23.374	<0.001*

*$p<0.05$

DISCUSSION

The main findings of this study are that pain- and wage-related information, when presented to participants who were at a subacute or chronic stage of work rehabilitation, to a certain extent influenced the decisions they made in anticipation of returning to work. Such effects were found to be significant when information was negatively framed and presented to those who perceived themselves as making a greater improvement (i.e., ≥ 60%) or taking less sick leave (i.e., ≤ 60 days), or both, as a result of a decision in favor of returning to work. In general, the participants who perceived themselves as making a greater improvement and who received negatively framed information on an increase in pain if they were to return to work (i.e., the pain increase group) were found to perceive a lower chance of RTW than those who received positively framed pain information (both the wage loss and control groups). Similarly, those who received negatively framed information on pain and wages (the ambivalence group) also perceived a lower chance of RTW than the control group. The participants who had less sick leave and received negatively framed information on wage loss if they were not to return to work were found to perceive a higher confidence of RTW than those who received positively framed information (both the pain increase and control groups). The patterns of responses of the participants who perceived themselves as making greater improvement and having a shorter sick leave duration were similar to

those who only perceived themselves as making an improvement. The participants who received negatively framed information on an increase in pain were found to have significantly lower perceived chances and confidence of RTW than those in the groups receiving positively framed information on pain. Those who received negatively framed information on pain and wages (the ambivalence group) differed significantly from their those who received positively framed information in the same way (the control group).

Characteristics of Workers Participating in the Study

The mean sick leave duration of the workers participating in this study was 107.3 days, suggesting that most of them were in the subacute and chronic stage of recovery from the injuries from which they were suffering (Spitzer et al., 1987). The scores on the SF-36 and STAI-C taken at the baseline indicated that the workers had a lower health-related quality of life (61.3%, as measured by the SF-36) than the general population in Hong Kong. Their anxiety status was also found to be higher (21.2%, as measured by the STAI-C) than that of the general population. The characteristics of the sample in this study concur with those of other studies in which injured workers commonly suffered from both physical and psychological disabilities (Krause, Dasinger, Deegan, Rudolph, & Brand, 2001; Marhold, Linton, & Melin, 2002; Pransky, Verma, Okurowski, & Webster, 2006). As there were no significant differences at the baseline assessment among the workers randomly assigned to each of the four experimental

groups, the results obtained from the study could not have been biased by confounding factors arising from nonequivalent groups.

The Initial Negative-Framing Effects of Pain and Wage—For All Workers

This study was designed to explore the possible framing effects of pain- and wage-related information presented to workers and that potentially influenced their perceived chance of and confidence of returning to work. We hypothesized that the decision making of workers could be influenced by the way in which the information was framed, either negatively (presented in small numbers) or positively (presented in large numbers). The hypotheses did not seem to be supported when all workers in each of the four conditions, namely, the pain gain (PG), wage loss (WL), pain- and wage-ambivalent (AB), and control (CT) groups, were compared. However, for the workers with a 60% or above level of perceived improvement or fewer than 60 days of actual sick leave, or both, significant group effects were revealed. There are some plausible reasons why there were non-significant results from the whole group.

First, the average sick leave duration at the time when the workers completed the experimental protocol and first baseline assessment was 107.3 days, suggesting that the majority of them had already taken a substantial amount of sick leave. The chronicity of the workers' injuries is believed to confound the results. Previous studies suggested that workers who had a sick leave duration longer than 12 weeks would substantially reduce

their chances of returning of work (Frank, Sinclaire, & Hogg-Johnson, 1998; Krause, Dasinger, Deegan, Rudolph, & Brand, 2001; Krause & Ragland, 1994; Spitzer et al., 1987). Boersma and Linton (2006) further suggested that psychological factors could combine with the physical disabilities and contribute to a substantial reduction in the chance of RTW. These psychological factors were pain-related fear, distress, and the avoidance of activity. The sample of workers in this study was found to have lower scores on general health (measured by the SF-36) and anxiety (measured by the STAI-C) than the general population who did not have a work-related injury. If this was the case, the single exposure of workers to the pain- and wage-related information at the baseline was not likely to be able to generate sufficiently strong effects for all the workers participating in the study. Instead, it was likely that the single exposure to the pain- and wage-related information for those workers who reported experiencing improvement or those who ultimately had a shorter sick leave duration would have adequate effects their perceived chance and confidence of RTW. In fact, the results of other studies indicate that a 3-week period of training to achieve work readiness for injured workers who had been off work for more than 1 year, was adequate to improve workers' confidence in their ability to return to work and to produce a higher RTW rate (Li, Li-Tsang, Lam, Hui, & Chan, 2006; Xu et al., 2007). This suggests that influences on workers' RTW decisions and behaviors might involve a longer-term process, particularly for those who

are in the subacute or chronic stage. Nevertheless, a single exposure to pain- and wage-related information seemed to be useful for generating some modulating effects on workers' decisions about RTW scenarios.

Second, our results could have been confounded by the different stages of work readiness that the workers participating in this study had been in. According to Prochaska, Diclemente and Norcross (1992), the behavioral changes that individuals undergo are likely to involve a sequential progression from pre-contemplation to contemplation, preparation, action, and maintenance of the desirable behaviors. In this study, the desirable behaviors were workers making decisions about a RTW scenario, that is, one in which they were requested to go back to work the next day. Xu et al. (2007) found that among the various physical, psychosocial, and stage-of-change parameters, the reduction of pre-contemplation and an increase in actions taken on rehabilitation and job-related activities were the most significant predictors of successful RTW. Although this study did not measure the workers' stage-of-change status, the results indicated that their perceived chances and confidence of RTW were confounded by various injury- and work-related factors. For instance, workers who had suffered neck and back injuries were found to rate anticipated sick leave duration significantly longer than workers with other injured body parts. Workers with fractures or multiples injuries were found to score significantly lower on perceived chance and perceived confidence of RTW than

workers with other injuries. Workers whose work involved manual lifting were revealed to rate anticipated sick leave duration significantly longer than those whose work did not involve manual lifting. The findings of Bruyns, Jaquet, Schreuder, Klmijn, Kuypers et al. (2003) showed that type of job was one of the predictors of RTW after nerve injuries to the hand. Jaquet, Luijsterbury, Kalmijn, Kuypers, Hofman et al. (2001) also found that type of work and level of injury were the significant predictors of RTW in patients with median and ulnar nerve injuries.

The grouping of workers with a greater than 60% perceived improvement and fewer than 60 days sick leave duration produced a more homogeneous sample and hence reduced the confounding effects. This gives useful information for setting up inclusion criteria for any future study.

Negative-Framing Effects of Pain and Wage—Where Workers Had Higher Perceived Improvement and Shorter Sick Leave

The results of regression analysis indicate that demographic characteristics, including age, gender, and salary, did not have significant effects on participants' perceived scores on RTW. Rather, the perceived percentage of improvement and the sick leave duration were the two significant predictors of chance of RTW, confidence of RTW, and anticipated sick leave duration. A previous study by Krause and Ragland (1994) revealed that if workers were asked to estimate their percentage of improvement,

this figure could reflect the recovery that they had attained. Furthermore, Tate, Yassi and Cooper (1999) found that their participants' self-perceived higher pain scores could be predictors of a longer duration of sick leave. In the present study, the percentage of improvement was estimated by asking the participants to compare their health condition at the interview with that before the injury. The mean was 55.9% (SD = 20.9), which is about half way through the phase of disability according to Krause and Ragland's disability model (1994).

The participants were further classified into high and low percentages of improvement with a cut-off at 60%, which was the median for all participants. Another method of grouping was to classify participants into short and long sick leave duration at the baseline assessment, with a cut-off at 60 days which was also the median for all participants. The participants with a 60% or higher percentage of improvement or fewer than 60 days of sick leave or both would have had a higher level of recovery (according to Krause and Ragland's model) and a greater readiness to return to work (according to the stage-of-change model) than those with less than 60% improvement or more than 60 days of sick leave or both (Tate, Yassi, & Cooper, 1999).

Perceived Improvements and Increases in Pain

The results indicate that participants who received negatively framed information on pain (i.e. the pain increase and ambivalence groups) perceived that they

had a lower chance of RTW than those who received negatively framed information on wages (i.e., the wage loss group). The former two groups also perceived a lower chance of RTW than those who received positively framed information on both pain and wages (i.e., the control group). This suggests that negatively framed information on pain would have an immediate influence on participants' perception of their chances of returning to work. Such effects were not observed among those who received negatively framed information on wage.

Our findings on the effect of negatively framed information, that is, the use of small numbers on the pain information, support the number size preference reversal of prospect theory proposed by Wong and Kwong (2005a). This further demonstrates that for two options involving a tradeoff between two attributes, the preference would be given to those framed with small numbers. In the context of injuries to workers, our findings indicate that pain produces a stronger effect than wages on participants' perception of their chance of RTW. As pain leads to avoidance behavior - in other words, not returning to work - in this study, the information given to the participants was that there would be an increase in the intensity of pain if they had returned to work. The significantly lower ratings on chances of RTW suggest that the participants, after receiving the negatively framed information on pain, would have had a lower intention to return to work if they had been given the chance. The pain increase information

resulting in lower perceived chance behavior can be explained in terms of the theory of planned behavior and the fear avoidance model.

The theory of planned behavior posits that people form an intention in advance of a behavior (Ajzen, 1985). The best predictor of behavior is intention which is a function of three variables, namely attitudes, subjective norm, and perceived behavioral control. Under theory of planned behavior, attitudes are an individual's evaluation of performing a behavior that is based on one's belief about the likely consequences of performing the behavior. Subjective norm is an individual's perception of social pressure to perform a certain behavior that depends on one's belief about the normative expectations of others (Ajzen, 2002). Perceived behavioral control is an individual's perception of his or her control of his or her ability to perform a behavior. In this study, the negatively framed information was supposed to exert a direct effect on the participants' attitudes toward RTW. No direct effects were expected either on the subjective norm or on the perceived control of behavior. The pain increase information would act on the participants' belief in an increase in pain after returning to work. As a result, the participants expressed significantly lower perceived chance of RTW, that is, a reduced intention compared with those who had received wage loss information or no negatively framed information.

The participants' reduced intention after receiving negatively framed

information on pain increase can also be explained using Letham, Slade, Troup and Bentley's (1983) fear avoidance model. This model proposes that the avoidance of movement or activities is caused by the fear that activity will cause harm and will worsen pain. Previous studies have demonstrated the fear avoidance effects arising from problems with the musculoskeletal and cardiovascular system leading to disuse syndrome (Boersma & Linton, 2006; Fritz & George, 2002; Grotle, Vollestad, Veierod, & Brox, 2004; Vlaeyen & Linton, 2000). Xu et al. (2007) suggest that the negative effects of pain could reinforce the pain-related behaviors and workers might be restrained by the pain from engaging in a RTW process. This pain-related fear avoidance could be amplified and could further exert its effects on the belief system and could ultimately find expression in a decrease in the intention to return to work.

Participants in the pain increase group and the ambivalence group, namely, those receiving negatively framed information on both pain and wages, both had a significantly lower perceived chance of RTW than those in the wage loss group. This suggests that the factor of increase in intensity of pain if one were to return to work appears to have a stronger impact than loss of income on a worker's intention. The stronger effects of pain increase, despite its transient nature, could to some extent explain why workers would prefer to stay on sick leave if the RTW circumstances were less clea, for example, when there is no firm commitment on job modification or

accommodation from the employer, or when full recovery is not confirmed by the doctor. This argument may be supported by van Duijn, Miedema and Burdorf's (2004) study which concluded that the lack of possibilities for the modification of work tasks, the lack of employer's commitment, and the lack of social support from colleagues could be the obstacles to injured workers who return to work. This also sheds light on the importance of instituting a good case management system to monitor the progress of workers. Lai and Chan (2007) found that participants in a control group without a case manager to negotiate an RTW program tended to have a long sick leave.

Shorter Sick Leave and Loss of Wages

In the last section, negatively framed information on pain increase was found to effectively influence those workers who experienced a 60% or more improvement in their condition to perceive their chance of RTW more negatively. In this section, the results of those who had taken 60 days of sick leave or fewer will be presented. It is noteworthy that the results found in this group were somewhat different from those in the 60% improvement group. Similarly, number size preference reversal was observed. The most significant results are that the participants in the wage loss group scored significantly higher than those in the pain increase and control groups on confidence of RTW. In other words, those who received negatively framed information on loss of wages had a significantly higher confidence of RTW than the other two groups with

positively framed information on loss of wages (i.e., the pain increase and control groups). The control group (with positive framing of both wage and pain factors) also tended to rate higher on the perceived chance of RTW than those in the pain increase group, but the statistical significance was marginal. In contrast, those who were in the pain increase group perceived a lower chance of RTW than those in the control group. The process by which the participants were influenced by the negatively framed information and hence made positive responses on confidence of RTW can equally be explained by the theory of planned behavior and therefore will not be repeated here.

The higher confidence of RTW of the workers in the wage loss group can be explained in two ways. First, the indication is that the participants in the wage loss group who had shorter sick leave seemed to manifest a higher intention to take a risk as higher confidence of RTW could mean that they were more inclined to return to work since it was a change from a less uncertain situation (i.e., staying on sick leave) to a more uncertain situation (i.e., returning to work). This phenomenon may be supported by expected utility theory and prospect theory. Expected utility theory suggests that people intend to make a decision which maximizes benefits to them. In this study, the stipulation of the Workers' Compensation Ordinance that workers lose 20% of their wages when staying off work was explicitly presented to the participants. It is likely that the participants who had a shorter sick leave duration regarded regaining the lost 20% of

wages as a benefit to them. As this piece of information was negatively framed in the study, they became more sensitive to the losses they had suffered. In fact, in the government's Ordinance and in another promotional pamphlet, there is the mention of injured workers is a "gain of 80% of wages during sick leave" (Hong Kong Labour Department, 2002). This could have biased the workers in terms of their potential losses. As a result, the workers were more inclined to recognize their losses and hence maximize their gains by indicating their higher confidence of RTW. Prospect theory can also partially explain why the participants showed a higher confidence of RTW. The theory postulates that factually equivalent information concerning risky decisions can be presented or "framed" in one of two ways: as emphasizing potential gains or potential losses (Banks et al., 1995; Rothman, Bartel, Wlaschin & Salovey, 2006). It further suggests that individuals are inclined to be risk seeking when they are confronted with information about potential losses but inclined to be risk averse when they are confronted with information about potential gain (Tversky & Kahneman, 1981). In the wage loss scenario, information on loss of wages appeared to raise the participants' confidence of RTW, which was indicated by their intention. We further postulate that the negatively framed information on loss of wages could act on the participants' belief that they had been losing wages and would lose more money by staying off work. This belief would improve their motivation and this would be reflected in an increase in confidence

of RTW. The consequence of RTW would have been that the participants could have maximized the wage benefit. It is important to note that these effects were most significant among those who had shorter sick leave duration, that is, 60 days or fewer, among which the impact of wage loss appeared to be strong. Our findings concur with those of studies on other aspects of life such as mammography utilization (Banks et al., 1995) and sunscreen use (Detweiler, Bedell, Salovey, & Pronin, 1999) which show that "loss" messages were more effective than "gain" messages in persuading individuals to engage in healthy behaviors.

Second, the information on loss of wages appeared to have exerted stronger facilitating effects on those participants who had shorter sick leave duration when compared with pain increase information, which was found to be defacilitating. In contrast, the pain increase information appeared to exert stronger defacilitating effects than information on loss of wages, the effect of which was supposed to be facilitating for those participants who perceived themselves as having a greater improvement. The facilitating factor of wage loss has been demonstrated in other studies. Schultz et al.'s study (2004) on 253 subacute and chronic injured workers found that pain was not a significant predicting factor in their RTW model. Instead, the expectation of recovery and the perception of health changes were the main factors affecting the outcome. Van der Giezen, Bouter and Nijhuis (2000) surveyed 328 employees both in the acute stage

and 1 year after the first day of sick leave. They found that being a breadwinner was a good predictor of RTW outcomes. The implication of being a breadwinner is that individuals will place a higher value on the loss of wages, such as the 20% loss for participants in this study, if they continue to stay on sick leave, but not if they return to work. Returning to work would be a direct way to cut such losses despite containing fewer certainties than staying on sick leave.

Effects of Perceived Improvement and Shorter Sick Leave

There were 35 participants who both had shorter sick leave duration and also perceived themselves as making a greater improvement. It is intuitive to postulate that these participants would rate the chance of RTW significantly lower but confidence of RTW significantly higher, despite the fact that these two intentions could be contradictory to each other. The results show that the workers in this group, no matter whether they were in the wage loss or pain increase groups, tended to rate the chance of RTW significantly lower than the other participants. This suggests that among the two workplace injury factors, that is, shorter sick leave and perceived improvement, the workers' perception of their own conditions appeared to dominate their intention to return to work The design of this study did not allow us to draw conclusions on the beliefs and readiness of the participants who perceived themselves as gaining a greater improvement, that is, 60% or more. Nevertheless, the findings of other studies suggest

that these workers probably were those who had higher levels of readiness and general health, and hence a greater intention to return to work (Xu et al., 2007; Li et al., 2006, Li-Tsang et al., 2007). They appear to have been more alerted to the negatively framed pain increase information which reduced their intention to return to work. it expressed a lower chance of RTW. This further indicates that pain was still a prominent defacilitating factor for workers when considering returning to work.

Chronicity, General Health, and Outcomes

There were 47 participants who did not achieve RTW status and were on sick leave 2 months after the baseline assessment and exposure to differently framed information. The average sick leave duration for this group was 136.5 days (SD = 95.9). This suggests that these participants had entered into a chronic or long-term disability stage according to the phase model of occupational disability (Franche & Ragland, 1994). The results indicated that these participants had significant improvements in their general health, health-related quality of life, as well as perceived improvement from the baseline. When they were presented with the same negatively or positively framed information, or both, for the second time, all of the participants regardless of their group, gave significantly lower ratings on perceived chance of RTW and perceived confidence of RTW, and higher ratings on anticipated sick leave duration, than those assigned at the baseline. No significant differences were found between the participants among the four

groups in the experiment. Our findings indicate that as the participants progressed into a chronicity stage, the information on wage loss and pain increase did not seem to have an effect. Rather, it appears that there was a general decrease in intention to return to work, that is, in both the perceived chance of, and confidence of RTW. Similar phenomena were observed among those participants who were still on sick leave and had not returned to work 6 months after the baseline assessment and information presentation. There were 37 of these participants in total. All of them expressed a preference to stay on sick leave when asked how they would have reacted if they had been required to resume work the next day. Their ratings of perceived chance and confidence of RTW were significantly lower than for the 2-month follow-up cohort group. It is however important to note that there were fewer participants in the cohort group, and the results should therefore be interpreted with caution. Another confounding factor is that the participants who did not return to work could have been those with higher levels of disability (or severity of injuries). Analysis of the results shows that 55.3% of these participants had fracture injuries and 17.2% had more than one area of injury.

Our results further support the notion that psychosocial issues are important, indeed dominant, factors affecting workers' RTW and the longer workers do not return to work, the less likely it becomes that they will be able to achieve this outcome (Krause, Dasinger, Deegan, Rudolph, & Brand, 2001; Linton, 2000; Pransky, Gatchel, Linton, &

Loisel, 2005; Schultz, Stowell, Feuerstein, & Gatchel, 2007; Shaw & Huang, 2005).

Implications of the Study

The findings of the present study indicate that workers' intention to return to work can be influenced by presenting them with negatively framed information. The content of the information, for example, information emphasizing the loss of wages (facilitating) and an increase in pain (defacilitating), will also have an impact on workers' perception of the outcomes of returning to work. This suggests that an appropriate dissemination of accurate wage- and pain-related information to workers, in particular during the early and subacute stages of rehabilitation, will influence workers to be more inclined to make positive decisions on RTW. The mechanisms involved may possibly work through the modification of beliefs and attitudes toward committing to less certain RTW scenarios. The changes in workers' intentions can then modify their RTW behaviors.

Limitations of the Study

This study has several limitations. First, the participants recruited could have biased the results because they were cases referred from a small number of insurance companies associated with the researcher. The types of injury and the job natures of the workers were limited, which restricts the generalization of the results. Second, the intensity of the effect of the framing of information was only a single exposure at the baseline or at most twice for those who were still on sick leave 2 months later. This

intensity of effect is relatively weak compared with real-life situations in when workers can be exposed to pain- and wage-related information all the time. This could have weakened the effect size of using appropriately framed information. In contrast, the participants were not required to actually return to work, as indicated by their responses. This might have inflated the results on perceived chance and confidence of RTW. Third, the cases were referred by insurance companies according to their selection criteria. As a result, there were substantial variations in sick leave duration among the participants. With a relatively small sample size, the within-group variations may have further weakened the power of the study.

This study only selected two common types of information, which were pain and wages. There may be other information of equal importance that was not covered, such as job security, job satisfaction, or labor relations. Their impacts on workers' intention or readiness to return to work in the future have been overlooked. Last but not least, this study did not attempt to control the roles of other stakeholders. At the time when the participants were exposed to the selected content and format of information, they had been receiving information from other sources, which could have confounded the outcomes of this study.

Practical Implications

According to the findings of the present study, medical doctors, case managers, or rehabilitation service providers should make use of positively framed rather than negatively framed information on pain when communicating the information to workers. For instance, information on the gain in the level of comfort can be presented to workers instead of scores on pain intensity changes after receiving rehabilitation therapy. This may help to alleviate some of the fears and avoidance due to chronic pain among workers, which will increase the success of a returning to work. Workers could also be given negatively framed information on loss of wages, such as that they will experience a loss of 20% of their wages if they do not return to work, rather than a gain of 80% if they stay on sick leave. As well as being given by medical and case management personnel, such information can also be incorporated in pamphlets issued by the Labour Department of the local government and other service providers. The results of this study further indicate the importance of providing accurate and consistent information. More importantly, the information should be communicated and disseminated effectively to all stakeholders including doctors, rehabilitation service providers, insurers, employers, case managers, and the family members and friends of the workers concerned.

Suggestions for Future Research

Future research should focus on applying appropriately framed pain- and wage-related information to clinical interventions and testing its efficacy at enhancing RTW outcomes by means of large-scale randomized trials. In such studies, the effects of providing accurate information might be more intense than in this study, which involved only one or two single exposures. This would provide direct benefits to workers and their stakeholders. These studies should use comprehensive measures to reflect the changes and benefits among the workers, which could include readiness to change (Chan et al., 2006; Xu et al., 2007), the physical and psychological well-being of workers (Pransky et al., 2005; Young et al., 2005), and long-term follow up such as at 6 months. It is also important to conduct further theoretical studies to explore the mechanisms underlying the changes in intention to return to work and the behaviors associated with it. In particular, the variables used with the theory of planned behavior and prospect theory should be refined and manipulated in order to achieve a better understanding of the process of attitudinal modification among workers. Last but not least, future studies should investigate the appropriateness of timing and level of recovery. According to the phase model of disability, the effect of framing can be examined at the acute, subacute, and chronic stages. Experimental study using the different framing messages of pain and wages could be further expanded.

CHAPTER 5

GENERAL DISCUSSION

Occupational injuries have been a major health and economic concern among industrialized countries. They can result in direct and indirect losses to injured workers, employers, insurance companies, as well as to society as a whole. There has been a vast amount of research conducted on occupational injuries in the last few decades, aiming at finding the most cost-effective and efficient way to help injured workers recover from their injuries and ultimately to return to work. In Hong Kong, the Employees' Compensation Ordinance does not lay down a system of rehabilitation or make provisions for RTW but rather stipulates what compensation and benefits employees might receive in case of death and injury as a result of carrying out their duties at the workplace. This means that injured workers are not required to participate in rehabilitation while the employers are not obliged to participate in facilitating the recovery and RTW of their employees. Although under the Employees' Compensation Ordinance, each employee is covered by insurance policies and insurance companies bear the responsibility for providing the compensation and benefits, the services promoting rehabilitation and RTW to a large extent tap into the resources of the public health system. The lack of an effective system facilitating the RTW of workers and the focus on compensation and benefits in the statutory regulations by stakeholders has

resulted in problems such as delayed service provision, prolonged sick leave, and poor RTW outcomes. This study aimed to review the management approaches to occupational injuries in Hong Kong, to pilot test the benefits of using the case management approach, and to examine the relevance of using prospect theory to enhance workers' perceptions of, and intention to, return to work. In the three sequential studies, we reviewed the management approaches and the problems faced by insurance companies in handling the rehabilitation of injured workers; we designed a case management approach and explored the effects of implementing such an approach using a cohort group comparison design; and we explored how the framed information on loss of wages and an increase in pain might influence workers' perception of, and intention to, return to work as posited by prospect theory.

Study 1—Review of Management Approaches in Hong Kong

This archival study of 250 workplace injury cases revealed consistent problems with long sick leave durations and high costs of compensation. The results suggest that the current problems might be attributed to two major factors, which are (a) the strong dependence of the rehabilitation services on the public health care system, and (b) the lack of an effective management approach that focuses on the rehabilitation and RTW of injured workers. Regression analyses suggest that insurance companies would have their own criteria for referring cases to the attention of medical specialists, rehabilitation

services and case management. For instance, they would use diagnostic groups that they perceive as high risk that is, involving a costly insurance claim, including back and neck injuries, fractures, and sprain and strain injuries. The insurance companies, following the provisions of the Employees' Compensation Ordinance and also as a normal practice, tend to rely on the public hospitals and rehabilitation centers to provide rehabilitation services. Without effective case management, cases were found to easily take 5 months to obtain rehabilitation services. According to the phase model of RTW proposed by Krause and Ragland (1994), these workers would have been well into the chronic stage and may develop chronic disability.

Apart from the chronicity, the injured workers were affected by other psychosocial and occupational factors. This has been deemed undesirable, and the present management approaches adopted by insurance companies are not likely to provide the best services for catering for the rehabilitation and RTW needs of workers. In fact, 88% of the injured workers in the study 1 sought services from the local public health care system and had to compete for the same resources with the general public for these services. The private services that are provided by the insurance companies were found to be severely underutilized. This possibly explains why there would be delays in the acquisition of medical and rehabilitation services by injured workers when these workers shared the same appointments system and service logistics as others, such as

elderly people and people with chronic diseases. According to Schultz et al (2008), identification of a high risk case and early intervention is crucial for a successful RTW after workplace injuries, but the existing case management approaches used by insurance companies might not be conducive to the practice of early intervention. If early intervention is adopted and the psychosocial problems are identified at an early stage, the sick leave as well as the compensation payments may be reduced further.

In many industrialized countries such as the United States, Canada, and Australia, legislation has been in place for many years requiring that employees comply with the rehabilitation recommended and that the employer be actively engaged in the RTW process. In Hong Kong, there is no such requirement, and many workers just opt to stay on sick leave. The recent move by the Labour Department of the government to establish the Voluntary Rehabilitation Program (VRP) is a step toward facilitating a more active rehabilitation of injured workers and should be further developed into a compulsory program. There is therefore a great need to develop an effective case management approach to managing workers in order to achieve positive RTW outcomes. It is noteworthy that insurance companies in Hong Kong were found to overemphasize the need to settle cases; for example, through the injured person attending the Medical Assessment Board for a decision on the percentage of permanent disability in order to reach a compensation amount and so to close a case, or through the negotiation of a

direct settlement. This is highly undesirable from the RTW perspective. To further improve the situation, insurance companies might consider shifting their focus toward instituting an effective system of case management, and toward provision of efficient and effective medical and rehabilitation services for the workers, so giving the first priority to the RTW needs of the injured workers and employers.

Study 2—Testing of an Effective Case Management Approach

A standardized case management approach was designed and tested for its suitability for use with workers who worked in a cleaning company and who had been referred from insurance companies to the company for which the present researcher worked. The results showed that the workers who received case management had significantly shorter sick leave durations (shortened by 30%) and decreased costs of compensation (reduced by 60%) compared with those who had been referred to the same company earlier and had received no case management. These results have important implications, especially from the insurer's and the employer's perspectives. However, there were no significant changes in terms of other outcomes such as the degree of permanent disability, or the success rate of RTW. These factors are also related to the types of injury sustained, and there should be other types of outcome to evaluate the success of the RTW process, such as functional outcomes and psychological measures.

The results indicate that a proactive case management approach can have positive

effects on shortening sick leave duration as well as on reducing the costs of compensation. Other studies have reported that case management was effective in minimizing delays in case referrals, in the provision of rehabilitation services, and in RTW (Feuerstein et al., 2003; Linz et al., 2001). These outcomes, however, were not measured in the present study. Nevertheless, we consider that the positive RTW outcomes probably arise from enhancing the tripartite communication between the injured worker, the employer, and the insurance company. Frank, Sinclaire and Hogg-Johnson (2005) demonstrated that the various stakeholders involved in occupational rehabilitation have their own vested interests in the workers and in their compensation. It is intuitive that the interests of stakeholders may be different. If the situation is not confronted, these interests can develop into conflicts in particular conflicts between employers and employees, and between insurance companies and employees. The only feasible way forward is to encourage early communication among these stakeholders, using the linkage provided by a case manager. At the same time, the case manager can enhance the provision and synergy of the medical and rehabilitation services.

The findings of this study further demonstrate the benefits brought about by implementing a case management approach that is characterized by early intervention and close communication among the stakeholders involved in workers' compensation

and RTW. Such a system can make reference to existing systems adopted by various countries (Linz et al., 2001; Mobley, Linz, Shukla, Breslin, & Deng, 2000; Schultz, Stowell, Feuerstein, & Gatchel, 2007). Mortelmans, Donceel, Lahaye and Bulterys (2007) addressed the issue of "stakeholder information asymmetry," a situation in which critical information is either not appropriately exchanged, or not exchanged at all, between all the stakeholders involved in the worker's rehabilitation process. Recent RTW models have also directed more attention toward understanding the interpersonal and intergroup communication issue and take into consideration the interests of different stakeholders (Schultz, Stowell, Feuerstein, & Gatchel, 2007).

Besides enhancing communication, it was observed that active participation of the injured workers and employers would be crucial. Young et al. (2005) and Franche et al. (2005) advocate that the various stakeholders should play an active role in participating in rehabilitation and RTW programs. In other systems, employers are obliged to play an active role in providing safe and sustainable environments for employees to return to work after injuries (Westmorland & Buys, 2004). In countries such as the United States, Canada, and some members of the European Union, the rehabilitation of injured workers is considered part of the "disability management" policy in the workplace, which consists of both preventive and remedial strategies affecting the whole organization of the company (Westmorland & Buys, 2004). In the case management system adopted in

this study, the case manager did try to work closely with the employers to design RTW programs for the injured workers. There were some successful cases, while other employers were not so cooperative. There needs to be greater collaboration from employers in order to establish a more comprehensive and integrated case management system that can provide suitably modified duties for injured workers in order to facilitate an early RTW process.

Study 3—Appropriate Framing of Information and Workers' RTW Intention

RTW is a complicated process affected by many physical, psychosocial, social, legislative, and labor relations factors (Franche, Corbiere, Lee, Breslin, & Hepburn, 2007; Pransky, Gatchel, Linton, & Loisel, 2005; Young, Roessler et al., 2005). Our findings show that prospect theory seems to offer a conceptual framework that can describe the decision-making process of the injured workers who participated in this study. As predicted, workers' decisions appear to be influenced by their own value set and biased brought about their injuries. It is noteworthy that the prospect theory was found to be more applicable to those workers who showed more readiness to return to work and who are more in control of their own RTW process (i.e. in the contemplation stage of RTW readiness).

For workers who were more ready to consider returning to work, their confidence of RTW was higher when they were exposed to negatively framed information on loss

of wages (using small numbers). In contrast, those who were exposed to negatively framed information on increase in pain had a lower perceived chance of returning to work. It shows that negatively framed messages seem to have a greater influence on the decision making and on the intentions of injured workers. These findings have important implications for the stakeholders involved in occupational rehabilitation. It is likely that when injured workers are in the contemplation stage of RTW readiness and are exposed to information about increases in pain, they might be more inclined to refrain from choosing a RTW option. In contrast, injured workers who are more exposed to information on loss of wages might be more inclined to choose to return to work. The results also indicate that the timing of the appropriate information to be given to injured workers is crucial. It is suggested that information be provided at an early stage when workers are more ready to engage in making changes to the existing non-RTW situation (Waddell, 2004). In this study, the results indicated that this earlier stage was when the sick leave taken was equal to, or less than, 60 days. With these considerations in mind, service providers should be careful to select the right ways to convey accurate information to injured employees as effectively as possible, in order to achieve an enhanced RTW.

A Proposed Management Approach for Injured Workers in Hong Kong

Based on the results of the present thesis, a management model can be proposed for

the management of workplace injury in Hong Kong.

1. High-risk cases may benefit from being identified earlier by the system (Schultz et al, 2008) and from being provided with case management as soon as possible so that a close monitoring of the recovery can be performed. The case manager should provide suitable assistance in the process of rehabilitation, such as arranging independent private rehabilitation service providers.
2. In addition, the case manager should communicate closely with the employer, with the insurance company, and with the rehabilitation service provider so that the recovery process will be transparent to all parties concerned. This will avoid any misunderstanding or conflict among the various stakeholders.
3. If the condition of the injured person improves after rehabilitation, the case manager should start using appropriately framed messages relating to pain and wages in order to foster motivation for RTW. The case manager or rehabilitation service providers should avoid emphasizing the pain condition and should encourage the injured worker to focus on the loss of wages and the benefit of returning to work.
4. Assistance in RTW and close follow up after returning to work would be important for successful case management.

Limitations of the Studies

There are several limitations to the present studies. The studies were conducted on the basis of a restricted source of injured workers. In Study 1, the cases were from six insurance companies. In Study 2, only a cleaning company was selected for case management study. In Study 3, the cases were from the case management company of the investigator. This weakens the generalization of the results to the workplace injury population in Hong Kong. First, the data were collected from a single source of injured workers, through the case management company of the present investigator. Furthermore, the results of case management were only compared to a cohort group in a quasi-experimental design. A more stringent research design with a randomized control trial would provide more sound scientific evidence to confirm the effectiveness of the case management system.

In all three studies, the participants were invited to take part at various stages of recovery. This may have made it difficult to determine the effect of management strategies. According to the phase model of disability (Krause & Ragland, 1994) and the readiness for change model (Franche & Krause, 2002), workers have different cognitive behaviors when they are at different stages of recovery. This could affect their responses to the various intervention strategies implemented. Ideally, it would be best to implement the case management and appropriate information-framing strategies

throughout the entire work rehabilitation process.

In all the studies, most of the injured workers were still heavily utilizing the public health care system, even when the cases were managed by case managers, as in Studies 2 and 3. The insurance company would usually want to keep the costs of health care as low as possible, but there needs to be a trade-off between the cost and the quality of the service. Further investigations are needed into how the public and private health care services can be effectively employed, in order to provide the most cost-effective and efficient rehabilitation to injured workers.

The present studies mainly examined a few objective and easily quantified outcomes of RTW, such as percentage of disability, sick leave duration, and costs of compensation. These factors may not provide a comprehensive understanding of how a worker copes with a return to full duties, or of his or her degree of physical and psychosocial well-being. In addition, the research designs of the three studies involved mainly quasi-experimental designs and retrospective studies. A more stringent research design using randomized controlled trials and a prospective study design may provide stronger scientific evidence to support the effectiveness of the case management system.

CHAPTER 6

CONCLUSION

This thesis is to review the existing workers' injury and rehabilitation management approaches and to examine a case management approach in Hong Kong. The use of prospect theory to explain the decision making of workers and to modify their intentions to return to work is also demonstrated. The results shed light on the future development of employee injury management in Hong Kong at both the system level and the employee level.

The present thesis gives an overall review of the present occupational injury management system in Hong Kong. The problems in the existing management of workplace injuries in Hong Kong have also been highlighted through the retrospective study of closed cases in Study 1. A review of 250 cases revealed that the lack of overall service coordination and over reliance on the public health care system has an impact on workers' sick leave duration and compensation costs. The problems within the public healthcare system are likely to be attributable to the relatively long time lapse between the injury and the workers' receiving specialist care and rehabilitation services. The results further indicate that the cases where there were severe injuries and that consequently required more intensive medical care suffered the most. This can be explained in three ways. First, there is a lack of a well-developed work injury

management system in Hong Kong. In particular, the Employees' Compensation Ordinance emphasizes the administrative procedures and monetary compensation for the injured employee rather than the system of rehabilitation and RTW. In contrast, the latter are emphasized in statutory employee compensation systems in other developed countries such as Australia, Canada, and the United States. Second, under the existing statutory regulations in Hong Kong, injured employees are given a free choice to utilize either the public or the private medical and rehabilitation services. The results reveal that far more injured workers choose to receive services provided by the public health care system; that is the Hospital Authority in Hong Kong. In fact, some of the insurance companies in Hong Kong also prefer to use the public health care services because of their low costs. As one would expect, the use of the public health care services would result in long delays as public health care services have limited resources and long waiting lists. The long delays in receiving medical and rehabilitation services are believed to contribute to the negative outcomes of RTW.

The findings of Study 1 led to the design of a case management approach relevant for use in Hong Kong. The benefits of implementing such a case management approach were explored in Study 2. The findings suggest that the case management approach was better at reducing the sick leave duration as well as in reducing the costs of compensation of workers more than were conventional rehabilitation services without

case management. The receipt of early interventions by medical and rehabilitation services for injured workers was found to be the main feature of the case management approach. The case manager who played a major role in enhancing the communication among the stakeholders such as the worker, the employer, the insurance company, and the rehabilitation service provider was also crucial. Apart from ensuring communication, the case manager assisted the injured worker in the RTW process, particularly in the planning of modified duties. The results of this study may provide insights for policy makers, government officials, insurance companies, and service providers to enable them to further improve the existing system in Hong Kong.

Taking the focus away from the system level, Study 3 used an experimental design to test how workers' decision making and hence their RTW intentions could be modified. The results are believed to benefit the communication among the worker injury stakeholders; in particular, between workers and case managers. Using prospect theory as the theoretical basis, the results demonstrate that information related to wages and pain, when it was negatively framed (i.e., through using small and precise numbers), significantly influenced workers' perceived chance of and confidence of returning to work. The findings further indicate the differential effects between information on wages and pain. Increase in pain, as a defacilitating factor, when negatively framed would further reduce the worker's perceived chance of returning to work. In contrast,

loss of wages, as a facilitating factor, when negatively framed, would increase the worker's confidence of returning to work. The results also reveal that the timing of presenting the information was an important factor. In this study, the cut off used was a sick leave duration of fewer than 60 days. In general, the earlier the information was appropriately presented to workers, the greater would be the positive influence on RTW. Another finding was that when the worker showed a greater perceived improvement, he or she was more inclined to be influenced by the information. This study used a perceived improvement of more than 60%. This means that the most benefit is gained when cases are handled when the injured worker is in the subacute rather than chronic stage. The results of the present studies provide further evidence of the importance of work-related and psychological factors in influencing the RTW outcomes of injured workers. They also shed light on the notion that the RTW outcomes can be closely related to the communication practices of rehabilitation service providers and case managers.

Suggestions for Future Studies

The present studies reviewed the problems of work rehabilitation and adopted a pilot case management approach to the existing workers' compensation system in Hong Kong. Future research should extend to a wider work injury population with different background and work demand, and examine its efficacy with injured workers by using a

randomized controlled trial method. A large-scale randomized clinical trial can further minimize the biases associated with the research design, and the results can be generalizable to a wider population in Hong Kong. It is, however, important that such clinical trials should address the physical, psychosocial, and financial benefits to the worker, to the employer, and to productivity as a whole.

The benefits of using accurate and appropriately framed information to enhance workers' RTW should be further explored, especially for those workers who are in control of the situation and are ready to consider a RTW option. Intervention programs can be developed that address issues on pain and wages by using appropriately presented information. Instead of a single exposure of the information, workers can be provided with the opportunity to be repeatedly exposed to the information. Apart from presenting the information, the concept of increase in pain and loss of wages concepts can be further explored in depth in individual counseling or in group communication sessions. The efficacy of these interventions can be studied either using large-scale randomized controlled trials or a correlational design. The study of how the concept of prospect theory can be integrated into the setting of a worker's compensation settlement and his or her rehabilitation is also important. Cost-effective and efficient studies can be conducted to study the long-term benefits of changing the existing statutory and service provision system from a compensation-oriented to a RTW-oriented system in Hong

Kong.

The findings of the present study may provide some guidance for the development of a worker's injury management system in Mainland China. Future studies could attempt to implement a case management system appropriate to the policy, health care, and industry situations in Mainland China and test its efficacy and benefits.

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Appendix I

Sample of the survey form for Study 1

SURVEY ON THE OUTCOMES OF VARIOUS WORK INJURY MANAGEMENT PROGRAMS IN HONG KONG

Personal Information

1. Gender: M / F

2. Date of birth (dd/mm/yyyy): / /

3. Martial Status (please tick the appropriate box below):

□Single □married □divorced □widow

4. Family background (please tick the appropriate box below):

Live with

□ Children (if ticked, please specify the number of children:___)
□ Parents

5. Occupation: _____.

6. How long has the worker been working in the present post: _____.

7. No of working hours per day:_____ per week: _____ .

8. Please select if any of the following job nature is/are present:

	1. Lifting
	2. Sustained muscle work
	3. Twisting or jerky movement
	4. Sustained vibration (whole body or local)
	5. Prolonged sitting
	6. Frequent squatting
	7. Prolonged standing
	8. Prolonged walking
	9. Carrying
	10. Pushing
	11. Pulling
	12. Crawling

	13. Climbing
	14. Fingering
	15. Handling

History of the Present and Past Injury

9. Date of accident (dd/mm/yyyy): / /

10. Please select the nature of injury from the followings:

	Abrasion		Fatal
	Amputation		Fracture
	Burn (chemical)		Irritation
	Burn (heat)		Laceration
	Concussion		Multiple injuries
	Contusion		Puncture
	Crushing		Sprain
	Cut		Sprain
	Dislocation		Strain
	Electric shock		Subluxation

- Others (please specify): _____.

11. Please select the body part injured due to this single incident from the followings:

	Abdomen		Finger		Nose
	Ankle		Foot		Pelvis
	Arm		Forearm		Shoulder
	Back		Hand		Skull
	Chest		Hip		Thigh
	Ear		Knee		Trunk
	Elbow		Leg		Wrist
	Eye		Lip		
	Face		Neck		

12. Was this incident the worker's first episode of work related injury?

□ YES (go to question 17)
□ NO (go to question 13)

13. Please specify the date and nature of the last vocational injury:

13a. Date (dd/mm/yyyy): / /

13b. Is the last injury similar to the present injury?

□ YES
□ NO

13g. How long was the off work period _____Days

13h. The percentage of PD:_____

17. When did the worker return to work (dd/mm/yy)? / /

18. The percentage of PD:_____

19. Did the worker apply for common law claims

□ YES
□ NO

20. Did the worker apply for Legal Aid ?

Management Services

17. Where did the worker receive the treatment from at the time of injury?

	1. Private general practitioner
	2. Department of Accident and Emergency of Government hospital
	3. General out-patient doctor of Government Clinic

18. Did the worker take part in any rehabilitation program?

□ YES (go to question 19)
□ NO (go to question 21)

19. Please specify the date of the first attendance of the rehabilitation program

(dd/mm/yyyy): / /

20. Please choose the nature of the rehabilitation program from the followings

	Private Rehabilitation Program
	Public Rehabilitation Program
	Others

_____(Please specify)
(PT, OT, Hydrotherapy, Chinese Bone Setter etc)

21. The frequency of attendance of the rehabilitation program?

____ per week.

22. How long have you received such rehabilitation program?

_____times

23. Did the worker receive other form of rehabilitation program?

YES (Please go to question 23a)
NO (Please go to question 24)
23a. Please choose the nature of the rehabilitation program from the followings

	Private Rehabilitation Program
	Public Rehabilitation Program
	Others

_____(Please specify)
(PT, OT, Hydrotherapy, Chinese Bone Setter etc)

23b. The frequency of attendance of the rehabilitation program?

_____ per week

21. Did the worker consult any specialist?

YES (go to question 22)
NO (go to question 25)

22. Please specify the date of the first specialist consultation (dd/mm/yyyy):

23. Please select the nature of the specialist consultation from the followings:

	1. Private Specialist
	2. Specialist of Government Hospital
	3. Others (please specified)

24. Nature and duration / number of session(s) of this specialist consultation:

25. Is HealthCare Management involved in your injury management?

□ YES (go to question 26)
□ NO (go to question 28)

26. Please specify the date of the HealthCare Management instructed (dd/mm/yyyy): / /

27. Please specify the duration of this HealthCare Management services:

Closing of the Injury Management

28. The total days of sick leave granted due to this accident:

29. The amount of reserved from the insurance company: $

30. Please specify the date of settlement (dd/mm/yyyy): / /

31. The amount of settlement paid: $

32. The initial evaluated % personal disability:

33. The final assessed % personal disability:

34. The cost of sick leave period:

35. The cost of specialist: $

36. The cost of investigation: $

37 The cost of physiotherapy:

38 The cost of occupational therapy:

39 The cost of Health Care management:

40. Have the worker returned to his normal duties or modified duties?

-END-

Appendix II

Sample of Consent Form

and

Ethical Approval from the Departmental Research Committee,

Department of Rehabilitation Sciences

for Study 2 and Study 3

THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學

MEMO

To : CHAN Che Hin, Department of Rehabilitation Sciences

From : KWONG Shek Chuen, Chairman, Departmental Research Committee, Department of Rehabilitation Sciences

Ethical Review of Research Project Involving Human Subjects

I write to inform you that approval has been given to your application for human subjects ethics review of the following research project for a period from 01/05/2003 to 31/12/2004:

Project Title : Implementing a pilot work injury management program in Hong Kong

Department : Department of Rehabilitation Sciences

Principal Investigator : CHAN Che Hin

Please note that you will be held responsible for the ethical approval granted for the project and the ethical conduct of the research personnel involved in the project. In the case the Co-PI has also obtained ethical approval for the project, the Co-PI will also assume the responsibility in respect of the ethical approval (in relation to the areas of expertise of respective Co-PI in accordance with the stipulations given by the approving authority).

You are responsible for informing the Departmental Research Committee Department of Rehabilitation Sciences in advance of any changes in the research proposal or procedures which may affect the validity of this ethical approval.

You will receive separate notification should you be required to obtain fresh approval.

KWONG Shek Chuen
Chairman
Departmental Research Committee
Department of Rehabilitation Sciences

THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學

MEMO

To : CHAN Che Hin, Department of Rehabilitation Sciences

From : KWONG Shek Chuen, Chairman, Departmental Research Committee, Department of Rehabilitation Sciences

Ethical Review of Research Project Involving Human Subjects

I write to inform you that approval has been given to your application for human subjects ethics review of the following research project for a period from 01/08/2006 to 31/08/2007:

Project Title : Effect of message framing on influencing decision-making on return to work among injured worker

Department : Department of Rehabilitation Sciences

Principal Investigator : CHAN Che Hin

Please note that you will be held responsible for the ethical approval granted for the project and the ethical conduct of the research personnel involved in the project. In the case the Co-PI has also obtained ethical approval for the project, the Co-PI will also assume the responsibility in respect of the ethical approval (in relation to the areas of expertise of respective Co-PI in accordance with the stipulations given by the approving authority).

You are responsible for informing the Departmental Research Committee Department of Rehabilitation Sciences in advance of any changes in the research proposal or procedures which may affect the validity of this ethical approval.

You will receive separate notification should you be required to obtain fresh approval.

KWONG Shek Chuen
Chairman
Departmental Research Committee
Department of Rehabilitation Sciences

The Hong Kong Polytechnic University
Department of Rehabilitation Sciences

Research Project Informed Consent Form

Project title: Implementing a pilot work injury management program in Hong Kong.

Investigator(s): Lai Hon Sun, M.Appl.Sc. Chief investigator

Project information:

The present study is to examine how the case management approach helps the injured worker during the recovery. Each injured worker will be assigned a case manger to enhance communication among different stakeholders, to coordinate and advocate for essential services, to analyze the fiscal benefits of the services and to resolve any conflicts at an early stage. The case managers were all registered physical therapist and occupational therapists.

All the treatment costs are borne by insurance companies and the participants have the right to accept or refuse the treatment provided. The case manager will communicate the participant at least once per week to ensure better understanding the needs of injured worker. All the benefits under the Employees' Compensation Ordinance would not be affected.

The result of the present study would help the understanding of the case management approach and would improve the present injury management system in Hong Kong.

Consent:

I, _____, have been explained the details of this study. I voluntarily consent to participate in this study. I understand that I can withdraw from this study at any time without giving reasons, and my withdrawal will not lead to any punishment or prejudice against me. I am aware of any potential risk in joining this study. I also understand that my personal information will not be disclosed to people who are not related to this study and my name or photograph will not appear on any publications resulted from this study.

I can contact the chief investigator, Mr. Lai Hon Sun at telephone 9472- for any questions about this study. If I have complaints related to the investigator(s), I can contact Mrs. Michelle Leung, secretary of Departmental Research Committee, at 27665397. I know I will be given a signed copy of this consent form.

Signature (subject): Date:

Signature (witness): Date:

Appendix III

Sample of the research presentation to the participants in Study 3

香港理工大學康復治療科學系

項目:
工人受傷後之健康狀況、能力、態度及心理之評估

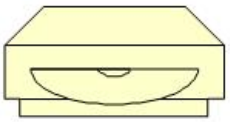
同意書

本人同意參加香港理工大學康復治療科學系設計的工人受傷後之健康狀況、能力、態度及心理之評估。本人明白參與這測試會接受在能力、身体狀況、態度及心理之評估。當中會利用一些器材、會面或問卷調查。評估時間大概需時大約四十分鐘。過程中如果感到任何不適，應立刻向工作人員報告。

本人有權在任何時間內提出停止參與研究。本人也有權在過程中不回答認爲敏感之問題。本人知道在這研究中取得的資料是絕對保密。本人同意給香港理工大學康復治療科學系有限度地利用這些資料作研究及教學之用途。本人的身份將不會被披露，而本人也有權知道自己之資料及這些資料的用途。

工人簽署:_____ 日期:_____
研究人員簽署:_____ 日期:_____
證人簽署:_____ 日期:_____

請回答SF-36所有問題



Frame A

問題

根據僱員補償條例:

- *如果你在受傷後復工，將可賺取**全額(100%)**之工資。*
- *如果你因傷而放病假及不能復工，你只能收取**八成(80%)**之工資。*

另一方面，根據研究調查數據:

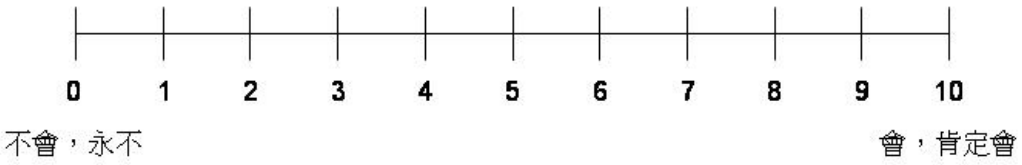
- *在受傷後復工，有**近百分之十三(13%)**的工人會感到痛楚增加；*
- *而繼續放病假的工人，**只有百分之二(2%)**的工人會感到痛楚增加。*

問題

	賺取工資之百份比	痛楚增加之機會
復工之工人	100%	13%
繼續放病假之工人	80%	2%

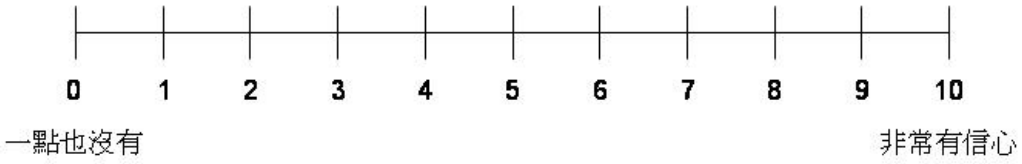
問題

依照以上的數據，你對受傷後復工的**機會**有多大？



問題

依照以上的數據，你對受傷後復工的**信心**有多大？



問題

依照以上的數據，你會選擇下列那一個？

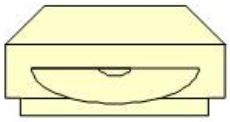
復工	1
繼續放病假	2

問題

你估計在工傷後，需要多少時間才能復工？

如超過**24**個月請註明: _____

請給予SF-36的結果



問題

依照以上的數據及你現在的健康狀況(SF-36 的結果)，
你對受傷後復工的**機會**有多大？

不會，永不　　會，肯定會

問題

依照以上的數據及你現在的健康狀況(SF-36 的結果)，
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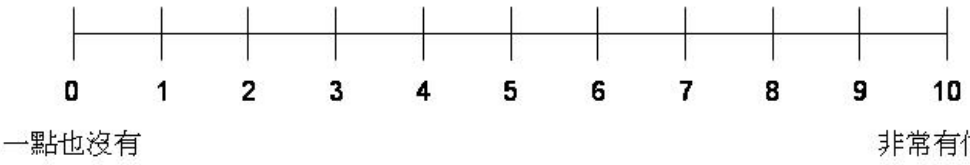


問題

依照以上的數據，你會選擇下列那一個？

復工	1
繼續放病假	2

問題

你估計在工傷後，需要多少時間才能復工？

如超過**24**個月請註明: _____

請回答實驗之問題

實驗問題

		完全沒有影響	沒有影響	不知道	有影響	有很大影響
1	人工上之損失對我的選擇有沒有影響	1	2	3	4	5
2	復工後所感到之痛楚對我的選擇有沒有影響	1	2	3	4	5
3	復工之信心對我的選擇影響有沒有影響	1	2	3	4	5
4	現在之身體狀況對我的選擇影響有沒有影響	1	2	3	4	5
		完全沒有影響	沒有影響	不知道	有影響	有很大影響
1	整體健康的因素對我的選擇有沒有影響	1	2	3	4	5
2	身體疼痛對我的選擇有沒有影響	1	2	3	4	5
3	體能對我的選擇有沒有影響	1	2	3	4	5
4	日常活動之生理上對我的選擇有沒有影響	1	2	3	4	5
5	精力對我的選擇有沒有影響	1	2	3	4	5
6	社交功能上對我的選擇有沒有影響	1	2	3	4	5
7	日常活動之心理對我的選擇有沒有影響	1	2	3	4	5
8	心理健康對我的選擇有沒有影響	1	2	3	4	5

Frame B

問題

根據僱員補償條例:

- *如果你在受傷後復工，將可賺取**全額(100%)**之工資。*
- *如果你因傷而放病假及不能復工，你只能收取**八成(80%)**之工資。*

另一方面，根據研究調查數據:

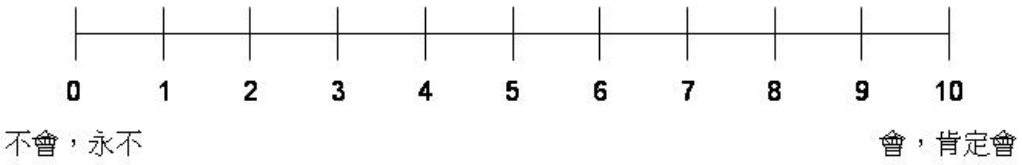
- *在受傷後復工，有**百分之八十七(87%)**的工人感到舒適；*
- *而繼續放病假的工人，**有百分之九十八(98%)**的工人感到舒適。*

問題

	賺取工資之百份比	感覺舒適之百分比
復工之工人	100%	87%
繼續放病假之工人	80%	98%

問題

依照以上的數據，你對受傷後復工的**機會**有多大？



問題

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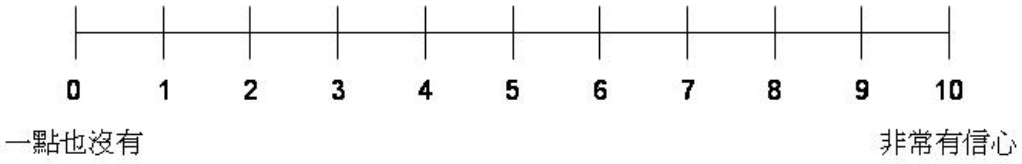

問題

依照以上的數據，你會選擇下列那一個？

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繼續放病假	2

問題

你估計在工傷後，需要多少時間才能復工？

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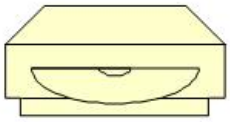
請給予SF-36的結果



問題

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不會，永不　　會，肯定會

問題

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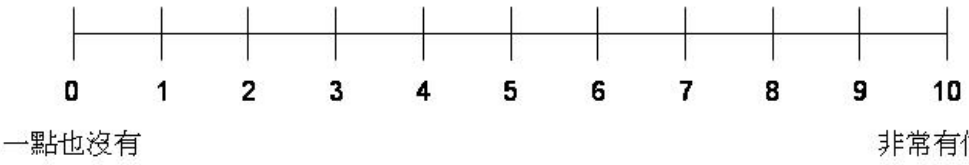

問題

依照以上的數據，你會選擇下列那一個？

復工	1
繼續放病假	2

問題

你估計在工傷後，需要多少時間才能復工？

如超過**24**個月請註明: _____

請回答實驗之問題

實驗問題

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8	心理健康對我的選擇有沒有影響	1	2	3	4	5

Frame C

問題

根據僱員補償條例:

- *如果你在受傷後復工，工資**將沒有(0%)任何損失***
- *如果你因傷而放病假及不能復工，你會**損失兩成(20%)的工資***

另一方面，根據研究調查數據:

- *在受傷後復工，有**近百分之十三(13%)**的工人會感到痛楚增加；*
- *而繼續放病假的工人，**只有百分之二(2%)**的工人會感到痛楚增加。*

問題

	工資損失之百份比	痛楚增加之機會
復工之工人	0%	13%
繼續放病假之工人	20%	2%

問題

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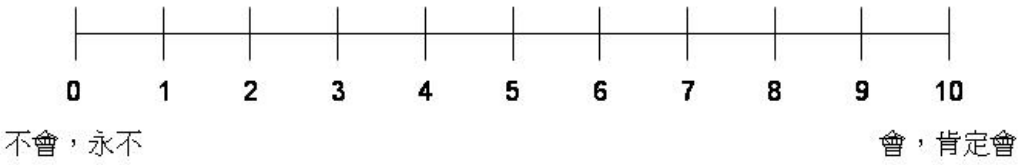

問題

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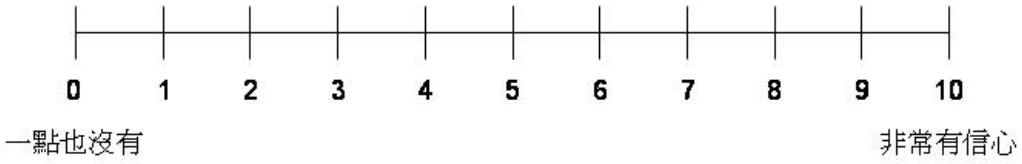

問題

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問題

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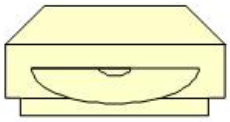

問題

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問題

依照以上的數據及你現在的健康狀況(SF-36 的結果)，
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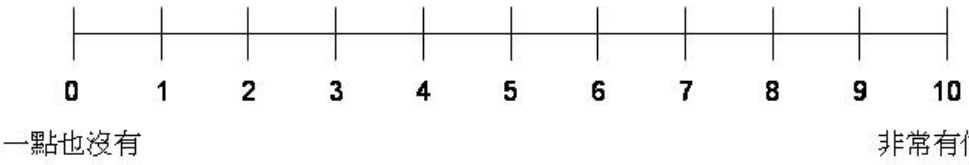

問題

依照以上的數據，你會選擇下列那一個？

復工	1
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問題

你估計在工傷後，需要多少時間才能復工？

如超過**24**個月請註明: _____

請回答實驗之問題

實驗問題

		完全沒有影響	沒有影響	不知道	有影響	有很大影響
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Frame D

問題

根據僱員補償條例:

- *如果你在受傷後復工，工資**將沒有(0%)任何損失***
- *如果你因傷而放病假及不能復工，你會**損失兩成(20%)的工資***

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- *在受傷後復工，有**百分之八十七(87%)**的工人感到舒適；*
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問題

	工資損失之百份比	感覺舒適之百分比
復工之工人	0%	87%
繼續放病假之工人	20%	98%

問題

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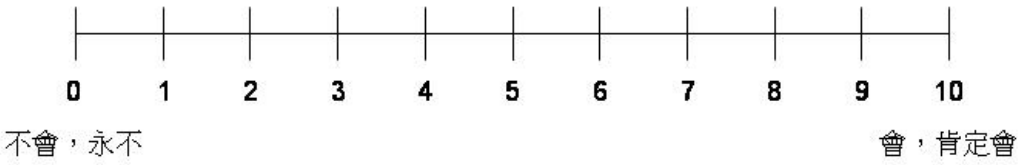

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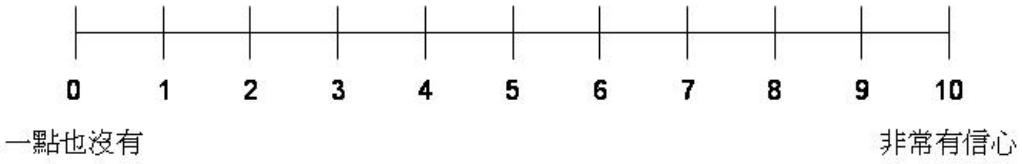

問題

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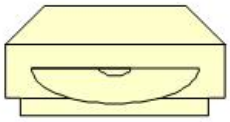
問題

你估計在工傷後，需要多少時間才能復工？

如超過**24**個月請註明: _____

請給予SF-36的結果

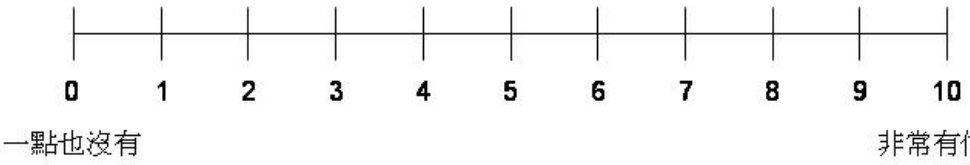


問題

依照以上的數據及你現在的健康狀況(SF-36 的結果)，
你對受傷後復工的**機會**有多大？

問題

依照以上的數據及你現在的健康狀況(SF-36 的結果)，
你對受傷後復工的<u>信心</u>有多大？



問題

依照以上的數據，你會選擇下列那一個？

復工	1
繼續放病假	2

問題

你估計在工傷後，需要多少時間才能復工？

如超過**24**個月請註明: _____

請回答實驗之問題

實驗問題

		完全沒有影響	沒有影響	不知道	有影響	有很大影響
1	人工上之損失對我的選擇有沒有影響	1	2	3	4	5
2	復工後所感到之痛楚對我的選擇有沒有影響	1	2	3	4	5
3	復工之信心對我的選擇影響有沒有影響	1	2	3	4	5
4	現在之身體狀況對我的選擇影響有沒有影響	1	2	3	4	5
		完全沒有影響	沒有影響	不知道	有影響	有很大影響
1	整體健康的因素對我的選擇有沒有影響	1	2	3	4	5
2	身體疼痛對我的選擇有沒有影響	1	2	3	4	5
3	體能對我的選擇有沒有影響	1	2	3	4	5
4	日常活動之生理上對我的選擇有沒有影響	1	2	3	4	5
5	精力對我的選擇有沒有影響	1	2	3	4	5
6	社交功能上對我的選擇有沒有影響	1	2	3	4	5
7	日常活動之心理對我的選擇有沒有影響	1	2	3	4	5
8	心理健康對我的選擇有沒有影響	1	2	3	4	5

Appendix IV

Sample of SF-36 Questionnaire used in Study 3

簡明健康狀況調查表 (SF-36)

姓名: 日期:

說明: 這項調查是詢問您對自己健康狀況的了解。此項資料記錄您的自我感覺和日常生活的情況。

請您按照說明回答下列問題。如果您對某一個問題不能做出肯定的回答，請按照您的理解選擇最合適的答案。

1 總括來說，您認爲您的健康狀況是:

(只圈出一個答案)

極好	1
很好	2
好	3
一般	4
差	5

2 和一年前相比較，您認爲您目前全面的健康狀況如何？

(只圈出一個答案)

比一年前好多了	1
比一年前好一些	2
比一年前差不多	3
比一年前差一些	4
比一年前差多了	5

3 下列各項是您日常生活中可能進行的活動。以您目前的健康狀況，您在進行這些活動時，有沒有受到限制？如果有的話，程度如何？

(每項只圈出一個答案)

活動	有很大限制	有一點限制	沒有任何限制
a. 劇烈活動，比如跑步，搬重物，或參加劇烈的體育活動	1	2	3
b. 中等強度的活動，比如搬桌子，使用吸塵器清潔地面，玩保齡球或打太極拳	1	2	3
c. 提起或攜帶蔬菜，食品或雜貨	1	2	3
d. 上幾層樓梯	1	2	3
e. 上一層樓梯	1	2	3
f. 彎腰，跪下，或俯身	1	2	3
g. 步行十條街以上 (一公里)	1	2	3
h. 步行幾條街 (幾百米)	1	2	3
i. 步行一條街 (一百米)	1	2	3
j. 自己洗澡或穿衣服	1	2	3

4 在過去四個星期裏，您在工作或其它日常活動中，會不會因爲身體健康的原因而遇到下列的問題？

(每項只圈出一個答案)

	會	不會
a. 減少了工作或其它活動的時間	1	2
b. 實際做完的比想做的要少	1	2
c. 工作或其它活動的種類受到限制	1	2
d. 進行工作或其它活動時有困難 (比如覺得更爲吃力)	1	2

5 在過去四個星期裏，您在工作或其它日常活動中，會不會由於情緒方面的原因 (比如感到沮喪或焦慮)遇到下列的問題？

(每項只圈出一個答案)

	會	不會
a. 減少了工作或其它活動的時間	1	2
b. 實際做完的比想做的要少	1	2
c. 工作時或從事其它活動時不如往常細心了	1	2

6 在過去四個星期裏，您的身體健康或情緒問題在多大程度上防礙了您與家人、朋友、鄰居或社團的日常社交活動？

(只圈出一個答案)

毫無影響	1
有很少影響	2
有一些影響	3
有較大影響	4
有極大影響	5

7 在過去四個星期裏，您的身體有沒有疼痛？如果有的話，疼痛到什麼程度？

(只圈出一個答案)

完全沒有	1
很輕微	2
輕微	3
有一些	4
劇烈	5

8 在過去四個星期裏，您的身體上的疼痛對您日常工作 (包括上班和家務)有多大影響？

(只圈出一個答案)

毫無影響	1
有很少影響	2
有一些影響	3
有較大影響	4
有極大影響	5

9 下列問題有關您在在過去四個星期裏的自己我感覺和其它情況。針對每一個問題，請選擇一個最接近您的感覺的答案。

在過去四個星期裏有多少時間：

(每項只圈出一個答案)

	常常 如此	大部 份時間	相當 多時間	有時	偶爾	從來 沒有
a. 您覺得充滿活力？	1	2	3	4	5	6
b. 您覺得精神非常緊張？	1	2	3	4	5	6
c. 您覺得情緒低落，以至於沒有任何事能使您高興起來？	1	2	3	4	5	6
d. 您感到心平氣和？	1	2	3	4	5	6
e. 您感到精力充足？	1	2	3	4	5	6
f. 您覺得心情不好，悶悶不樂？	1	2	3	4	5	6
g. 您感到筋疲力盡？	1	2	3	4	5	6
h. 您是個快樂的人？	1	2	3	4	5	6
i. 您覺得疲倦？	1	2	3	4	5	6

10 在過去四個星期裏，有多少時間由於您的身體健康或情緒問題妨礙了您的社交活動 (比如探親、訪友等)？

(只圈出一個答案)

常常有影響	1
大部份時間有影響	2
有時有影響	3
偶爾有影響	4
完全沒有影響	5

11 如果用下列的句子來形容您，您認爲有多正確？

(每項只圈出一個答案)

	肯定對	大致對	不知道	大致不對	肯定不對
a. 您好像比別人更容易生病	1	2	3	4	5
b. 您和所有您認識的人一樣健康	1	2	3	4	5
c. 您覺得自己的身體狀況會變壞	1	2	3	4	5
d. 您的健康極好	1	2	3	4	5

Appendix V

Sample of STAI-C Questionnaire used in the Study 3

THE CHINESE STATE TRAIT ANXIETY INVENTORY

以下是一些用來形容自己的句子。請閱讀每一句後將你現時的感覺用"O"號表示在右方適當的空間上,答案是沒有分對或錯的,不要花太多時間在任何句子上,只要將最能表達你現時感覺的答案表示出來就可以了。

Patient No: 12345

	完全沒有	一點兒	相當	十分		答案
1 我感到平靜	1	2	3	4	Q1	1
2 我感到安心	1	2	3	4	Q2	1
3 我感到壓力	1	2	3	4	Q3	2
4 我是後悔	1	2	3	4	Q4	2
5 我感到從容	1	2	3	4	Q5	3
6 我感到煩惱	1	2	3	4	Q6	4
7 我正在擔心可能會發生的不幸事情	1	2	3	4	Q7	3
8 我感到安寧	1	2	3	4	Q8	2
9 我感到焦慮	1	2	3	4	Q9	1
10 我感到舒服	1	2	3	4	Q10	1
11 我感到自信	1	2	3	4	Q11	1
12 我感到緊張	1	2	3	4	Q12	3
13 我感到心神不定	1	2	3	4	Q13	2
14 我感到神經過敏	1	2	3	4	Q14	2
15 我感到鬆弛	1	2	3	4	Q15	3
16 我感到滿足	1	2	3	4	Q16	4
17 我感到擔心	1	2	3	4	Q17	4
18 我感到過份興奮和失措	1	2	3	4	Q18	1
19 我感到喜悅	1	2	3	4	Q19	1
20 我感到愉快	1	2	3	4	Q20	1