School of Public Health

Occupational Health and Safety Management Perceptions in Malaysian Public Hospitals: Implications for the Implementation of Standardized Management Systems

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DECLARATION

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgement has been made. This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

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Date: 1 March 2010

ABSTRACT

All industries in Malaysia, including government organizations, have had to comply with the Occupational Safety and Health Act 1994 to fulfill their responsibilities as an employer to ensure that workers have a safe workplace. The Occupational Safety and Health Act 1994 requires employers to perform minimum duties to ensure the safety, health and welfare of their workers, thus, the joint responsibility between employer and employees in the government organizations are expected to ensure the safety of a workplace. Although this regulation binds employers, the Social Security Organization (SOCSO) statistics showed a fluctuation in industrial accidents, from 114,134 accidents in 1995 to 85,338 accidents in 1998, then the accidents increased to 92,074 in 1999, 95,006 in 2000, and subsequently the accident was reduced to 85,926 in 2001 until 56,339 in 2007. As a consequence, the adoption of an effective OHS management system as a tool to assist in meeting legal obligations should ensure the development of a safety culture and provide the best approach to reduce accidents in an organization. Thus, government organizations need to transform the philosophy of the Occupational Safety and Health Act 1994 into reality and the implementation of an OHS management system will assist in resolving OHS problems successfully and is also a means to legal compliance. The purpose of this study was to evaluate the information about current OHS practices that can influence the development and implementation of an effective OHS management system and provide a systematic process for the implementation of a OHS management system to enable the Malaysian public hospital sector to meet its OHS obligations.

This study used a correlation quantitative non-experimental investigation, i.e. survey, where the study focused on collecting and analyzing the data in a single study. Proportionate stratified random sampling was used in selecting the respondents. 418 employees from three state hospitals in the northern region of Malaysia participated in this study and that gave a response rate of 43.15%. The questionnaire was adapted from the Safety Climate Assessment tool, where it was to identify perceptions of the hospital employees regarding several OHS management elements and implication towards their OHS performance. Analysis of data was done using SPSS version 12 and AMOS 4.0 and

the outcomes of the data were evaluated and recommendations were made on the strategies to introduce an effective implementation of an OHS management system in the hospital sector in Malaysia.

From the structural equation modeling, this research demonstrated that a direct relationship existed between the independent variables and dependent variables. The reliability results revealed that the measurement constantly assesses what it is intended to measure and all the scales shown reasonable validity in determining how well the concept is defined by the measures. The findings of this study revealed that the general view of employees with regard to their OHS practices was in the range of low to medium, indicating a mixture of "disagree" to "almost agree". Based on the perceptions of employees to have effective OHS practices in the workplace, this study also disclosed evidence that the critical elements of occupational health and safety management were accident and injury procedures, leadership style, management commitment, health and safety objectives and safety reporting procedures, and safety training. In addition, the findings of this study reported five elements including health and safety objectives, safety reporting, management commitment, the role of the supervisor, and leadership style were seen to support the implementation of an effective OHS management system, however, safety training was not significant but lack of safety training might hinder the effective management of OHS. In sum, the significant results of this study were (1) management commitment; (2) health and safety objectives; (3) training and competence; (4) role of supervisors; (5) safety reporting; (6) leadership style; and (7) safety incidents: accidents and injuries in the workplace. It seems that all elements of OHS management and one dependent variable that are safety incidents were critical to ensure good practices of OHS in the workplace.

Lastly, some implications of this study were this survey's instrument can be an effective measurement tool to demonstrate improvement and to reflect on how to improve problematic areas in their workplace. Furthermore, employees' perceptions are vital as a realistic approach of determining whether an organization has attained an acceptable level of safety in their workplace.

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ABBREVIATIONS

AEO	Assistant Environmental Officer
DOSH	Department of Occupational Safety and Health
CFA	Confirmatory Factor Analysis
CIS	International Occupational Safety and Health Information Centre, ILO
EFA	Exploratory Factor Analysis
ERT	Emergency Response Team
HIRARC	Hazard Identification, Risk Assessment, Risk Control
HSE	Health and Safety Executive
ILO	International Labour Organization
ISO	International Organization for Standardization
MBWA	Management by walking around
NIOSH	National Institute of Occupational Safety and Health
NOHSC	National Occupational Health and Safety Commission Australia
OHS	Occupational Health and Safety
OHSAS	Occupational Health and Safety Assessment Series
OHSM	Occupational Health and Safety Management
OHSMS	Occupational Health and Safety Management System
OSH-MS	Occupational Safety and Health - Malaysian Standard
PDCA	Plan-Do-Check-Act
PPE	Personal Protective Equipment
PPI	Positive Performance Indicator
SEM	Structural Equation Modeling
SIRIM	Standards and Industrial Research Institute of Malaysia
SOCSO	Social Security Organization
5S	Seiri – Sorting; Seiton – Straighten; Seiso – Sweeping or Shining or Cleanliness; Seiketsu – Standardizing; Shitsuke – Sustaining the discipline

CHAPTER 1

INTRODUCTION

1.0 Introduction

An important agenda in today's world for every organization, especially in the service industries, is to maintain its survival in the competitive environment. For many decades, most organizations have focused on quality to ensure their survival, but in recent years, the trend has shifted to include occupational health and safety as a determinant of an organization's competitiveness (LaMontagne et al., 2004). Organizations have started to show interest in health and safety management for the following reasons (Hale, Heming, Carthey and Kirwan, 1997):

- Regulatory interest to comply with the Occupational Health and Safety Act;
- Reports on major disasters that emphasized the failings of management to protect the health and safety of their workers;
- Government requirements for occupational health and safety management systems to assist organizations to comply with regulations; and
- Increased awareness of corporate responsibility.

In addition, many organizations have experienced problems in administering health and safety in the workplace, as the "people" element had neglected correct procedures in carrying out their jobs (Fleming & Lardner, 1999). Herbert W. Heinrich, an expert in industrial safety, discovered that 88 percent of disasters in industry were the result of human factors (Goetsch, 2005) and safety experts estimated that they contributed to 80 – 90% of all industrial accidents (Fleming & Lardner, 1999). Major disasters like Chernobyl had shown that safety management is especially important in high reliability industries (Fleming & Lardner, 1999). Furthermore, the poor attitude of management towards occupational health and safety has been considered as the most important underlying factor for poor accident records (Coyle, Sleeman & Adams, 1995).

In addition, Blegen, Pepper and Rosse (2005) indicated that previous studies have identified the following factors as influencing workers' injury:

- Supervisors' attitudes, actions, expectations and communication
- Supervisors' tasks that include safety
- Senior management and workers' involvement in safety issues
- An organizations commitment to safety and willingness to solve safety problems
- Attitude and behavior of workers

Consequently, to systematically prevent and control the possibility of accidents and illnesses in the workplace and to comply with statutory requirements, Occupational Health and Safety Management Systems (OHSMS) have become one of the major strategies for addressing workplace safety and health (LaMontagne et al., 2004). The system is a set of plans, actions and procedures based on the common OHSMS, the system consists of five elements (policy, organizing, planning and implementation, evaluation, and action for improvement) to systematically manage health and safety in the workplace (NOHSC, 1997). Many organizations have found that a good management system and improvement of performance through an efficient management system and a well-structured performance evaluation is vital to their survival (Coelho & Moy, 2003). Previous research has revealed that excessive number of injuries and accidents are caused by unsatisfactory or absence of health and safety systems (Lin & Mills, 2001). Nevertheless, from studies on safety systems, respondents perceived that there was a need to examine an organization's safety activities when its safety system was not working well (Petersen, 2000).

The greatest problem in safety is the difficulty of measuring an organization's OHS performance (Petersen, 2000). Previously, numbers of accident were the primary means of evaluating the effectiveness of a company's safety program. However, in recent years, audits are commonly used to gauge the effectiveness of safety programs. Another measure of safety system effectiveness is through perception surveys. Using perception surveys, Petersen (2000) identified that "high achievement" organizations had a high degree of supportive relationships which utilize the principles of group decision-making and the supervisor plays a significant role in realizing this success. In addition, safety excellence happens when supervisors, managers and executives are made accountable for the safety performance of the group that they manage or supervise (Petersen, 2000).

The International Labour Organisation (ILO) highlighted that implementing an OHS management system is a way to improve the safety culture in organizations and at the same time comply with OHS regulations (Dias, 2005). However, the Health and Safety Executive (UK) (HSE) (2002a) affirmed that a good health and safety management system may only exist on paper and does not necessarily improve OHS performance as two crucial components of any successful OHS management system are management leadership and action and employee involvement and agreement. Nevertheless, the assessment of a health and safety management system is a proactive measure of an organization's safety performance (Kelly & Boucher, 2003). Hence, effective health and safety management has been considered an important element when managing the interaction between systems and people.

1.1 Background of the Study and the Research Problem

All industries in Malaysia, including government organizations, have had to comply with the Occupational Safety and Health Act 1994 to fulfill their responsibilities as employers to ensure that workers have a safe work-place. Although this regulation binds employers, the Social Security Organization (SOCSO) statistics showed a fluctuated number of industrial accidents, from 114,134 accidents in 1995 to 85,338 in 1998. The accidents increased to 92,074 in 1999, 95,006 in 2000, but subsequently fell to 85,926 in 2001 and 56,339 in 2007. Although there were reductions from 1995 to 1998, the numbers of accident showed an increase in 1999 and 2000, with reductions from 2001 to 2007. There was an increase of almost 10,000 accidents from 1998 - 2000.

Based on a study by the Malaysian Ministry of Human Resources (2006), the reasons given by employers for the increased numbers of accident from1998 (85,338) to 2000 (95,006), includes: (1) not being aware of the Occupational Safety and Health Act 1994; (2) no time for Occupational Health and Safety (OHS) matters; (3) insufficient allocation of resources for OHS; (4) OHS is not an important element in business; and (5) the "accidents will not happen to me" syndrome. As for employees, their non-compliance was basically due to reasons such as (1) not aware of health and safety rules and regulations; (2) OHS rules and regulations are difficult to follow; and (3) feelings of discomfort when complying with OHS rules and regulations. Even worse was the common belief that "accidents will happen, no matter what" instead of "accidents can be prevented if the right precautions are taken" (Malaysian Ministry of Human Resources, 2006). Furthermore, the current Human Resources Minister, Datuk S. Subramaniam also stated that many employers and employees perceive safety in the workplace as something "forced" upon them by legislation and said that "at present, Malaysia has still not reached a stage where safety and health concerns are adopted as part of the working culture" (Carvalho, 2008).

In addition, the Department of Occupational Safety and Health (DOSH), a government enforcement agency, stated that compliance with the Act and its regulations still needs significant improvement. Due to limitations of manpower, DOSH only managed to comprehensively enforce legislation in certain sectors such as manufacturing, construction, mining and quarrying. In other sectors, DOSH's enforcement has been reactive, such that it was conducted based on imminent issues, complaints or accidents (Malaysian Ministry of Human Resources, 2006). As a result, DOSH needs to carry out inspections on government organizations to find out how well they have complied with the legislation and ascertain if the health and safety requirements of their employees at the workplace are being met (Cruez, 2006).

The Occupational Safety and Health Act 1994 requires employers to perform minimum duties to ensure the safety, health and welfare of their workers, and joint responsibilities between employer and employees in government organizations are expected to ensure safety in a workplace (Almeida, 2006).

Datuk Lee Lam Thye, former Chairman of National Institute of Occupational Safety and Health (NIOSH) stated that the adoption of an effective OHS management system assists in meeting legislative obligations; develop a safety culture and the best approach to reduce accidents in an organization (Lee, 2000; Lee, 2004; NST, 2002; Hamisah, 2003a; Almeida, 2006). Moreover, former Malaysian Human Resources Minister, Datuk Dr. Fong Chan Onn urged all organizations in high-risk industries be required to adopt the Occupational Safety and Health Systems - Malaysian Standard (OSH-MS) as an accident-free environment helps an organization to enhance its productivity and profitability (Almeida, 2006).

The scenario of OHS management systems in Malaysia shows that since 1999, OHSAS 18001 has been the only OHS management system being implemented with 268 companies certified to this system (SIRIM, 2009). Most transnational companies operating in Malaysia have their own OHS management systems. Since there is no national standard for OHS management systems in Malaysia, the government developed the Occupational Safety and Health Management Systems – Malaysian Standard, based on the ILO standards, in 2003. Until 2005, OSH-MS1722 was introduced but so far only private organizations are certified to the standard. Besides these OHS management systems, the Healthcare Quality Standard for hospitals was introduced after 1997 to ensure that healthcare organizations monitor and improve their performance and implement ways to continuously improve their healthcare system. So far only 74 out of 250 public and private hospitals have subscribed to Healthcare Quality Standard (MSQH, 2009).

Government organizations in Malaysia, especially public hospitals, are required to comply with the Occupational Safety and Health (OSH) Act 1994 which is based on the principle of self-regulation. As such, the implementation of an OHS management system in public hospitals and other government organizations will assist in preventing OHS problems and is also a means to facilitate legal compliance. However, there is currently a lack of research on the effectiveness of the implementation of OHS management systems in various sectors in Malaysia. Consequently, it is timely that research be conducted to see the feasibility of implementing the OSH-MS1722 in public hospitals so as to further improve their OHS practices and compliance.

This investigation evaluates the information about current OHS practices that can influence the development and implementation of an effective OHS management system for public hospitals in Malaysia. It also attempts to develop an approach that can provide a practical OHS management system to assist Malaysian public hospitals to meet their OHS obligations.

1.2 Research Objectives

The purpose of this study was to evaluate the information about current OHS practices that can influence the development and implementation of an effective OHS management system and provide a systematic process for the implementation of an OHS management system to enable the Malaysian public hospital sector to meet its OHS obligations. The study is guided by the following research objectives:

i. to investigate the perception of hospital employees regarding the different elements of OHS management;
ii. to examine whether the elements of OHS management are viewed as supportive or preventive factors to the implementation of an OHS management system in Malaysian public hospitals; and
iii. to recommend practical strategies for the development and implementation of an effective OHS management system in Malaysian public hospitals.

1.3 Research Questions

To attain the above objectives, several research questions were addressed. Objectives 1 and 2 were achieved through the following enquiries:

i. What is the perception of hospital employees regarding the OHS management elements?

ii. Do the elements of OHS management act as supportive or preventive factors to the implementation of OHS management system?
iii. Do demographic characteristics like age, gender, ethnicity, level of education, length of employment and position affect employee perceptions of OHS management?

Objective 3 can be achieved by identifying suitable strategies based on the findings of prior surveys and reviewing the strategies adopted in other countries.

1.4 The Scope of the Study

There are many industries that contribute to the Malaysian economy, one of which is the healthcare industry. Healthcare facilities include hospitals, clinics, dental offices, out-patient surgery centers, birthing centres and nursing homes. As stated earlier, this study was focused on the public hospital sector. The public hospital: (1) is listed under the 1st schedule Occupational Safety and Health Act 1994 – public services (DOSH, 2008); (2) provides basic healthcare needs to the public and must maintain patient safety practices; (3) it has the potential to make medical mistakes which might lead to injury, disability, longer hospital stays, or longer recovery (Commonwealth of Massachusetts Group Insurance Commission, 2005); (4) it has employees who are involved in numerous health and safety issues associated with healthcare facilities including bloodborne pathogens and biological hazards, potential chemical and drug exposure, waste anesthetic gas exposures, respiratory hazards, ergonomic hazards from lifting and repetitive tasks, laser hazards, hazards associated with laboratories, and radioactive material and x-ray hazards; (5) it has the third highest number of industrial accidents compared to other public service sectors (SOCSO, 2009); and (6) it is in the healthcare industry and healthcare is a key industry to the Malaysian economy – health tourism as there has been an increasing number of foreigners seeking health treatment and services in Malaysia (UNPAN, 2003).

This study is limited to the northern region of Peninsular Malaysia sampling frame: (1) Hospital Sultanah Bahiyah, Alor Setar, Kedah; (2) Hospital Tuanku

Fauziah, Kangar, Perlis; and (3) Hospital Pulau Pinang, Georgetown, Pulau Pinang.

1.5 Organization of the Thesis

This introduction chapter presents an outline of the thesis, the background of the study and the problem statement, followed by research objectives, research questions, and scope of the study. Chapter 2 examines the legislative systems for occupational health and safety in Malaysia and Australia with an overview of occupational of health and safety issues in both countries; selected theory and literature of the subject matter with emphasis on: OHS management systems, safety culture and climate, and health and safety performance. The methods used in this study, instrument development, data collection procedure and data analysis are discussed in Chapter 3. Chapter 4 details the study's results. Finally, Chapter 5 discusses the findings, suggests recommendations for future research, and notes the limitations of the study and its contribution to research on the topic.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

Health and safety at the workplace is mandatory for every employer who must ascertain that employees' health, safety and welfare requirements are met. Attention given to the health and safety of employees is critical to the enhancement of employees' productivity as it emphasizes the organization's performance. Thus, employers need to be aware of their duties towards employees so as to achieve a world-class health and safety performance. This chapter reviews the relevant theory and literature of OHS management systems, safety culture and climate and its relation with health and safety performance and related literature review on the dimensions of the instruments for the assessment of the desired performance. This review is divided into five major parts. The first part elaborates on search strategy. In the second part, the definitions of key terms of variables involved in this study are highlighted. The third part focuses on the overview of health and safety issues in Malaysia and Australia. The fourth part concentrates on theories of safety management practices. In the last part, a review of the most relevant studies related to OHS management systems; safety culture and climate and its relation with health and safety performance; cultural factors in organizations; and demographic factors in health and safety activities are demonstrated.

2.1 Literature Review Search Strategy

The steps to a comprehensive literature search are:

i. Develop a search strategy by identifying the topic and list down various keywords and find all articles that match within those key words. The keywords are as following:
    - Safety climate
    - Safety culture

- Safety management
- Safety reporting
- Safety performance
- Leadership style and safety
- Safety communication
- Role of supervisor and safety
- Safety training
- Organizational climate and safety
- Health and safety management system
- Cultural factors
- etc.

ii. Identify relevant resources including books, journal articles, conference papers, dissertations, websites, etc. Common databases are: ERIC (Educational Resources Information Center), Dissertation Abstracts Online, ABI/Inform (a worldwide business management and finance database), Sociological Abstracts (sociology literature), MEDLINE (biomedical literature including health care, clinical psychology, gerontology, etc.), etc.

iii. If many irrelevant articles, narrow the key words to get relevant and current articles.

iv. Search the literature comprehensively through the library, interlibrary loan or any journal databases to obtain potential studies applicable to the scope of study.

v. Keep record of the keywords used and compile a master list so that similar study will only be searched once.

vi. Assess the articles by reading the title, abstract, problem statement, research objectives, methods, results, conceptual frameworks, and future research to determine if the articles meet the researcher's needs.

vii. Integrate all the articles by comparing and contrasting all the articles according to the researcher's research questions.

2.2 Definitions of Key Terms

This section covers definitions of the variables involved in this study:

i. Health and Safety Management Systems

Robson et al. (2007) stated that there is no agreement on what constitutes an OHSMS and its dimensions are broad. Gallagher (1997) defined health and safety management systems as the organization of planning and review, management organizational procedures, consultative actions and specific program components to enhance health and safety performance.

The Civil Aviation Safety Authority, Australia (2002) explained safety management systems as the combination of work practices, beliefs and approaches to improve and manage all facets of an organization's operations to ascertain that an organization is free from accidents.

From these definitions of OHSMS, there appear three critical components: (1) management planning and accountabilities; (2) consultation with workers; and (3) certain program components such as training, incident/accident reporting and investigation, monitoring and evaluation, etc. (Gallagher et al., 2003).

ii. Safety Performance

Measurement of safety performance consists of two approaches: (1) traditional indicators; and (2) leading indicators. Examples of traditional indicators are number of injury/accident, the lost time injury incidence, first aid cases and even financial indicators (Eckhardt, 2002). Some of the leading indicators used by most companies are (1) use of pre-task instruction cards, (2) use of job safety analyses, (3) inspections, (4) employee safety improvement contacts, (5) safety meeting attendance, (6) organizational planning and support: expectations and involvement, goal setting and action planning, (7) industrial hygiene and safety practices: design and construction, operation and maintenance, (9) safe practices, (10) site training systems, (11) behavior management: on-going feedback system and behavior observation system, and (12) performance tracking (Eckhardt, 2002). Yule, Flin and Murdy (2007) even stated that some examples of leading performance measures are safety audits, hazard analyses and safety climate studies.

Recently, safety climate has been considered as one indicator of safety performance as organizations started giving attention to organizational and management impact on their performance (Nahrgang, Morgeson & Hofmann, 2007).

iii. Safety Climate and Safety Culture

The terms "culture" and "climate" have been used interchangeably in the literature to reveal employees' attitudes towards safety (Glendon & Stanton, 2000; HSE, 2002a). The Health and Safety Executive (HSE) (2002a) definition of safety climate is the view of employees with regard to their safety practices in the organization. Neal and Griffin (2002, p. 69) identified safety climate as "perceptions of policies, procedures, and practices relating to safety in the workplace". Salminen and Seppala (2005) described safety climate as the workers' perceptions and views related to management's approach towards risks and safety. Consequently, this study considers safety climate as the perceptions of workers related to safety practices, policies, procedures and safety conduct in the workplace.

The term safety culture has numerous definitions according to various disciplines. Hale (2000, p. 7) described safety culture as "the attitudes, beliefs, and perceptions shared by natural groups as defining norms and values, which determine how they react in relation to risks and risk control systems". The HSE (2002a) definition of safety culture is the collective corporate value that results in positive view point and actions of all employees concerning safety and health. According to Cooper (2000), there are three attributes of safety culture: psychological (how people feel – safety climate), behavioural (what people do –

safety-related actions and behaviours), and situational (what the organization has – policies, procedures, regulations, organizational structures, management systems). Thus, the essence of the safety culture definition is the sharing of common beliefs and values that safety is a priority.

After much debate on the meaning of climate and culture, Guldenmund (2000, p. 222) came to the conclusion that safety climate represents "attitudes to safety within an organization" while safety culture indicates "the strong convictions or dogmas underlying safety attitudes specifically underlie all organisation's attitudes". Nevertheless, Williamson et al. (1997, p. 15) stated that "In understanding the safety climate or culture of a workplace, the perceptions and attitudes of the workforce are important factors in assessing safety needs"

iv. Organizational Climate

Organizational climate research has been carried out to determine factors that influence employees' perception of their workplace, such as leadership, roles of management and communication, which have an effect on employees' stimulus to accomplish job outcomes (Neal, Griffin & Hart, 2000) and individual work-life wellbeing like stress, morale, quality of work-life, employee engagement, absenteeism, turnover and performance (McPherson, 2007). Glendon and Stanton (2000, p. 198) described organizational climate as "the perceived quality of an organization's internal environment and is a more superficial concept than organizational culture which describes the current state of an organization". Hanges, Aiken and Chen (2004) stated that organizational climate conveys "how" organizations accomplished their goals through sharing of ideas, goals, or obligations with their employees. Reichers and Schneider (1990, p. 22) identified organizational climate as "the shared perception of the way things are around here". Stone et al. (2005) identified organizational climate as employees' views about their workplace attributes such as decision making, leadership and work practices. Thus, the basis of organizational climate is the common actions, approaches and opinions demonstrated by all employees regarding their work environment.

v. Safety Communication

HSE (1999, p. 4) explained communication as “the style, frequency and methods of communication and interaction between management and workforce of an organization” and this is demonstrate through “regular conversations about safety and risks … be aware of problems and discover solutions and openness of communication to replace a culture of blame and distrust” (p. 5). Furthermore, communication also expresses the transfer of information about health and safety matters in the workplace (Fernandez-Muniz, Montes-Peon & Vazquez-Ordas, 2007).

vi. Training and Competence

In general, training refers to instruction and practice for acquiring knowledge and skills about rules, concepts, or attitudes necessary to function effectively in a specified task. With regard to OHS, the definition of training consists of instruction in hazard recognition and control measures, learning safe work practices and proper use of personal protective equipment, and acquiring knowledge of emergency procedures and preventive actions (Cohen & Colligan, 1998). In addition, safety training is defined as knowledge of safety given to employees in order for them to work safely with no danger to their wellbeing (Law, Chan & Pun, 2006).

vii. Leadership Style

Machin (2005, p.3) defined leadership style as the degree of concern the leaders have for their employees' (physical) welfare.

2.3 An Overview of Health and Safety Issues

Relevant health and safety legislation and health care standards in Malaysia and Australia were reviewed. The overview of occupational accidents, diseases, and compensation in Malaysia and Australia is also examined. A further discussion of the health and safety issues is explained in Appendix 1.

2.4 Theories on Safety Management Practices

Work-related accidents and diseases are preventable by complying with the Occupational Safety and Health Act, developing an awareness of occupational safety and health hazards among workers, assessing the nature and extent of hazards, introducing and maintaining effective control and evaluation measures, organizational accident prevention programs, etc. This study examines five models/strategies that can be used to overcome these problems: (1) an occupational health and safety management system, (2) the integration of management systems, (3) a model for managing outstanding performance, (4) a reciprocal determinism model, and (5) an integrative model of organizational climate.

2.4.1 Occupational Health and Safety Management Systems

The setting up of a safety and health management system through continuous improvement in the workplace has been seen as one means to improve working conditions and to satisfy legal compliance. There are various models and methods of OHS management systems (European Agency for Safety and Health at Work, 2002). Three models cited by this survey are the European Agency for Safety and Health at Work, the National Occupational Health and Safety Commission (NOHSC) and the ILO Occupational Safety and Health Management Systems (ILO-OSH 2001).

The first model is the European Agency for Safety and Health at Work. The 2002 study on the use of occupational health and safety management systems in the Member States of the European Union identified five ideal elements of an effective occupational health and safety management system:

i. The OHS input – initiation

There are four variables under this category: management commitment and resources; regulatory compliance; accountability, responsibility and authority; and employee participation.

ii. The OHS process – formulation and implementation

There are five sub-elements under the formulation of the OHS process: OHS policy/goals and objectives, performance measures, system planning and development, baseline evaluation and hazard/risk assessment, and OHS Management System manual and procedures. The implementation of the process consists of four variables including (1) training, (2) hazard control (process design, emergency preparedness and response, hazardous agent management), (3) preventive and corrective action and (4) procurement and contracting.

iii. The OHS output

The OHS output contains five sub-elements: (1) OHS goals and objectives, (2) number of illness and injury, (3) workforce health, (4) changes in efficiency, and (5) overall organization performance.

iv. OHS feedback

The communication system (document and record management system); and the evaluation system (auditing and self-inspection, incident/accident investigation, and medical surveillance program) are two variables involved in this section.

v. Improvement – open system elements

Three variables in this category are continual improvement, integration, and management review.

The second model is the National Occupational Health and Safety Commission (NOHSC). NOHSC (1997) stated that OHS management systems can be classified as:

i. Traditional vs. innovative management

Traditional management focuses on the "key persons" involved in safety and health management (supervisors and safety and health specialists) and employee's participation is not vital. On the other hand, innovative management viewed employee obligation as crucial with the role of management in safety and health management.

ii. Safe workplace strategy vs. safe person-control strategy

Safe workplace strategies point to the managing of hazards during the design and implementation stage and safe person control centers on the supervision of employee behavior.

The third model is the ILO Occupational Safety and Health Management Systems. The ILO Occupational Safety and Health Management Systems (ILO-OSH 2001) contain the following main elements:

i. Policy
   - occupational safety and health policy
   - worker participation

ii. Organizing
   - responsibility and accountability
   - competence and training
   - occupational safety and health management system documentation
   - communication

iii. Planning and implementation
   - initial review

- system planning, development and implementation
- occupational safety and health objectives
- hazard / risk prevention

iv. Evaluation
- performance monitoring and measurement
- investigation of work – related injuries, ill health, diseases and incident/accident, and their impact on safety and health performance
- audit
- management review

v. Action for improvement
- preventive and corrective action
- continual improvement

In conclusion, the positive impact of occupational safety and health management systems is now being acknowledged by governments, employers and workers worldwide in countries that have developed occupational safety and health management systems standards. Good occupational safety and health practices can increase workplace efficiency, reduce risks of lost productivity and accidents and minimize risks of legal action for workers' compensation.

2.4.2 The Integration of Management Systems

The integration of management systems is described as "a process of putting together different function-specific management systems into a single and more effective integrated management system (IMS)" (Beckmerhagen, Berg, Karapetrovic & Willborn, 2003, p. 214).

The integrated management system proposed by Savic (2001) combines four systems: the Quality Management System (ISO 9000: 2000), the Environment Management System (ISO 14000), the Risk Management System (ISO 17000) and the Health and Safety Management System (ISO 18000). According to

Savic (2001), "the planning of activities is carried out jointly on the level of functions, (product quality, expenses, occupational safety and health, environment safety), then the plans are realized and the checking of the plan quality is carried out on the level of activity – i.e. is carried out on the process itself" (p. 36). The integration of these systems will produce a synergetic effect and is possible as all systems focus on risk reduction and this enables human performance to be optimized.

Some benefits of integration from previous literature review as indicated by Beckmerhagen, Berg, Karapetrovic and Willborn (2003), and Zutshi and Sohal (2005) are:

- more focused and simple standards of management systems
- less paperwork needed for all management systems
- cost reduction in registration, auditing and implementation
- the elimination of repetitive policies, procedures and records for all management systems
- enhanced communication among all levels in the organization as resources are used and staff are trained effectively to understand the integrated system
- coordination of documentation for all management systems
- objectives, resources and procedures are standardized in all functional areas
- concurrent auditing for integrated systems
- an enhanced decision-making procedure due to the latest information from an integrated management system

Organizations, however, face barriers in implementing this integrated system, some of which indicated by Beckmerhagen, Berg, Karapetrovic and Willborn (2003), and Zutshi and Sohal (2005) are:

- Employees perceive negatively to new changes. Education and training is vital to change employees perception of the new system
- Lack of qualified personnel and the usage of consultants. Organizations incur high cost and consultants cannot support maintenance of the system all the time

- Fast reporting is needed to review the progress of the system
- Time-delays in integration as organizations need more time to implement the new system
- Difficult to communicate new changes to employees as they are resistant to the new system and have doubts about its added value
- Previous bad experience with the failure of other systems
- Always updating procedures and systems due to frequent adjustment of regulations and guidelines

Besides the integration of the above-mentioned management systems, drawing on HSE (2002b) research findings, it was seen that integration of behavioural safety interventions into safety and health management system revealed improvement of safety and health. Behaviour modification interventions are accomplished by encouraging employees to increase the value of critical behaviours in order to minimize risk and decrease the frequency of behaviours that increase risk. For example, promote employees to wear personal protective equipment to minimize risk at work.

In conclusion, organizations must tackle these challenges before making a decision to implement an integrated system so as to ensure its smooth and efficient running without interrupting the organization's productivity. Furthermore, these integration systems can be used as one determinant to ensure survival of the organization in the current competitive market.

2.4.3 The Model of Safety Management

James Melville Stewart (2002) introduced a model of safety management (Figure 2.1) through observation from various companies with an outstanding safety recast in order to understand and identify excellence factors that contributed to workplace safety and achievement of safety improvement. He found that excellence in safety begins with management commitment. Management is responsible and accountable for the safety and health of workers. Stewart stated that the basic driver to safety is the "soft" factors including management commitment, line ownership, and workforce involvement. These factors are supported by safety systems and practices. The outcome for this model is safe physical environment and safety-aware attitudes and should result in outstanding safety performance.

This model is good in a way as it focused on outstanding safety performance and its determinants that drive towards an outstanding safety performance. Commitment of senior management is vital to increase safety and health performance (Vassie, Tomas & Oliver, 2000). Management commitment is a vital factor as managerial competence in occupational safety and health must at least be commensurate with the risks inherent in the business undertaking and must be as good as that required to operate the business successfully. The managerial responsibility for occupational safety and health includes the risks run by people in various work activities and the risks that those activities pose to other workers and members of the public. Management commitment to occupational safety and health is reflected in the ability of the upper-level management to demonstrate an enduring, positive attitude towards occupational safety and health, even in times of fiscal austerity, and to promote occupational safety and health in a consistent manner across all levels within the organization. Only when there is congruence between words, practice and attitude of the manager's and those of the management, employees will feel they are part of the organization and safety performance will improve (Erickson, 2000).

Workers have the right to participate in any occupational safety and health activity. The responsibility is seen in employees' willingness to participate in all activities that support the learning of the process, continual improvement activities and employee's desire to reinforce, support and correct one another and this responsibility can only be exercised optimally in a supportive organizational climate (Topf, 2000). Moreover, employee participation has been identified as one determinant of successful occupational safety and health management (Alli, 2001). It implies that workers' involvement is a process involving behaviour that is dynamic, action-oriented, and problem solving that continuously seeks for improvement in a safety conscious environment.

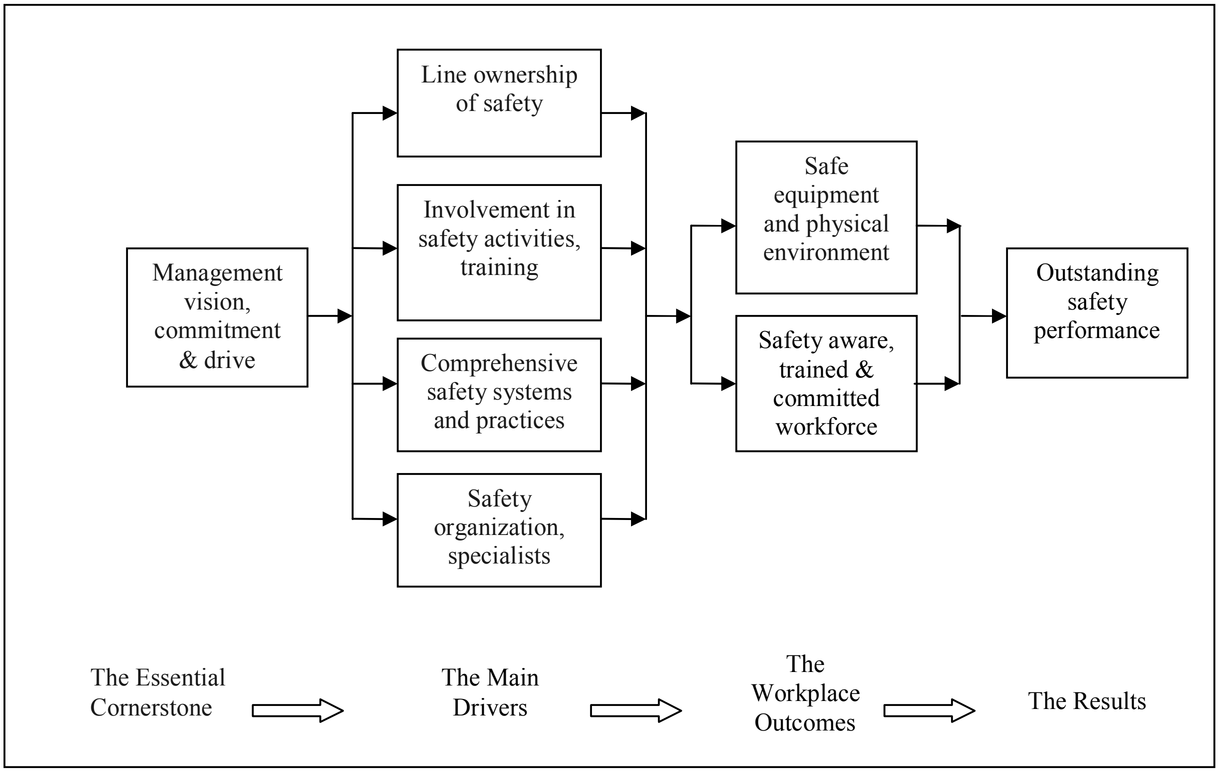

Figure 2.1: The Model of Managing Outstanding Safety
Source: Stewart (2002)

2.4.4 The Reciprocal Determinism Model

Cooper (2000) stated that Bandura's reciprocal model is suitable for analyzing organizational safety culture as it focuses on psychological, situational and behavioral factors. Even accident causation models also acknowledge these reciprocal relationships between the three factors. The reciprocal determinism model adapted by Cooper (2000) indicates internal psychological factors like safety climate as a subjective measurement, observable ongoing safety-related behaviors and objective situational factors like a safety management system. The reciprocal determinism is shown in Figure 2.2. In sum, it takes more than one factor to determine excellence in safety performance.

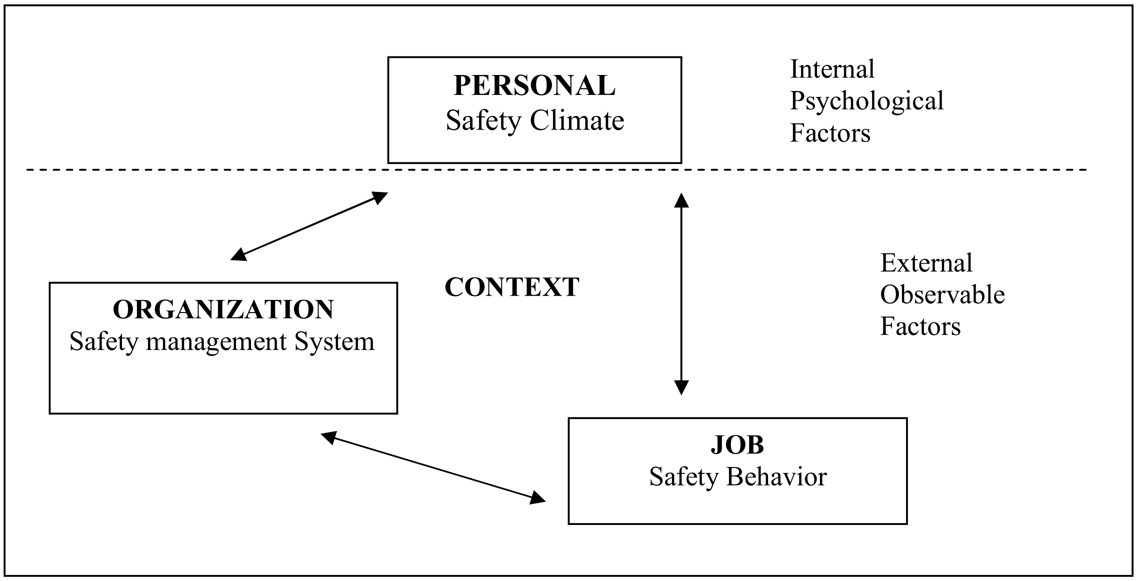

Figure 2.2: The Reciprocal Determinism Model
Source: Cooper (2000)

2.4.5 An Integrative Model of Organizational Climate and Safety

The organizational climate construct comprises individual perceptions of the workplace environment like leadership, roles, and communication (Neal, Griffin & Hart, 2000). Figure 2.3 illustrates dimensions that are critical to ensure the effectiveness of the outcome process. The core structural domain consists of two critical factors like leadership and organizational structural characteristics. These factors are input to the next stage that is process domain. Supervision, work design, group behavior, quality are the factors developed from the input process. These are crucial and affect the efficiency of the outcome: workers' and patients outcomes. The input and process domain constitutes an organizational climate that ought to predict a specific safety climate. In sum, organizational attributes like leadership, supervision, work design, communication process, etc. influence employees to be motivated and as a result contribute to the improvement of health and safety matters in their organizations.

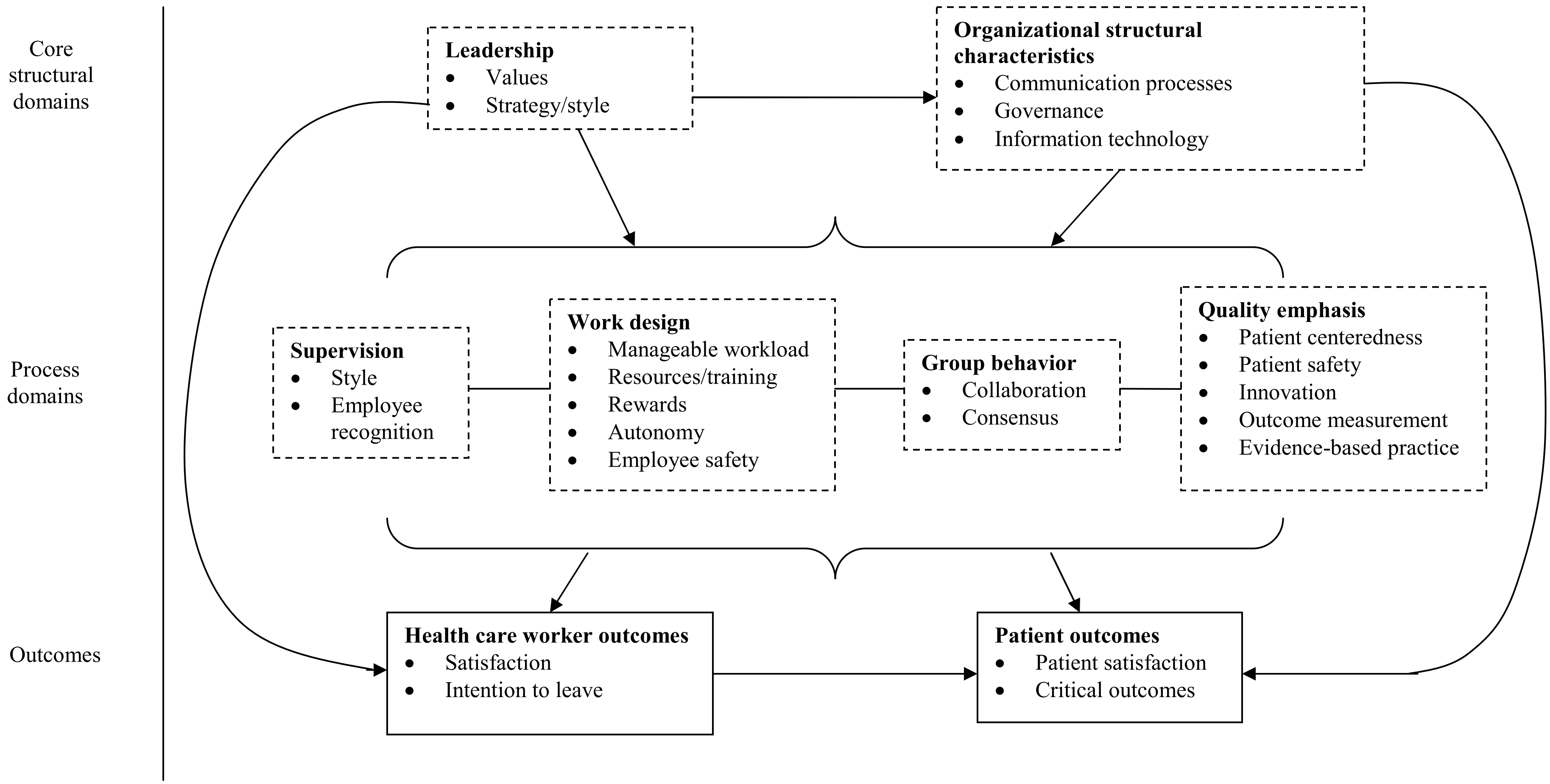

Figure 2.3: An integrative model of health care working conditions on organizational climate and safety

Boxes outlined with dotted lines represent domains of organizational climate. Boxes outlined with solid lines represent outcomes. Core domains are in bold. Sub-constructs are bulleted underneath. The dotted arrows connecting core structural domains represent direct effects on outcomes, which are mediated by the process domains.
Source: Stone et al. (2005)

2.5 Review of Previous Research Studies

Relevant research findings on OHS management systems; safety culture and climate and its relation with health and safety performance; cultural factors in organizations; demographic factors in health and safety activities; and related literature reviews on the dimensions of the instruments are mentioned here.

2.5.1 Occupational Health and Safety Management Systems

The advancement of technology and the changes in work processes have alerted organizations to dedicate their attention to organizational and management impacts on safety performance particularly the function of health and safety management. Petersen (2000) stated that excellence health and safety management must fulfill the following six criteria:

i. Safety must be a core value of an organization through daily behavior-based safety by supervisors and teams;
ii. There must be involvement by middle managers to ensure quality performance of subordinates, supervisors or team performances to demonstrate safety behavior in the workplace;
iii. Visibly demonstrated executive action;
iv. Obtain hourly involvement in meaningful daily activities;
v. Allow flexibility;
vi. Be perceived as positive by employees.

Furthermore, the benefits of a health and safety management system as indicated by the Civil Aviation Safety Authority, Australia (2002) are as follows:

i. Market the safety standards of the organization's operations;
ii. Guard against direct and indirect costs of incidents and accidents;
iii. Improve communication, morale and productivity of employees;
iv. Meet an organization's legal responsibilities to manage safety at the workplace.

Vassie and Lucas (2001) survey of health and safety management in the manufacturing sectors indicated that empowered workers who played active health and safety roles could result in health and safety performance improvements although the empowerment was limited. Although employee participation and involvement are crucial, the accountability and responsibility in the safety and health must come from senior management as required by the Occupational Health and Safety legislation (Vassie & Lucas, 2001). In addition, a company's objective and communication to all workers is the crucial aspect of effective health and safety management as a lack of communication may hinder employee involvement (Vassie & Lucas, 2001).

Previous research has suggested that management's commitment to safety is a significant determinant of employee involvement to safety (O'Toole, 2002). In addition, employees' perception of management's action to safety can result in accident reduction. Besides, as indicated by HSE (2002b), many aspects of employees' safety behavior can be influenced by management priority in safety that includes:

- The success of safety initiatives;
- The reporting of near-miss occurrences, incidents and accidents;
- Employees working safely;
- Employees taking work related risks;
- Influencing production pressures;
- Implementing safety behavior and health interventions;
- The effectiveness and credibility of safety officers;
- The effectiveness and credibility of safety committees.

Marsh et al. (1995) stated that management commitment has a high impact on all aspects of intervention. Besides management commitment, safety training and safety policy are also important determinants to enhance safety performance. Lin and Mills (2001) found that clear policy statements and safety training played an important role in reducing the number of industrial accidents.

Cheyne, Oliver, Tomas and Cox (2002) conducted a study on employee attitudes towards safety in the manufacturing sector in the UK. It identified safety standards and goals, and safety management, which included personal involvement, communication, workplace hazards and physical work environment as factors that enhance safety activities in an organization. The study also found a good physical working environment and employee involvement as key factors that contribute to safety activities in organizations.

Clarke (2003) examined organizational structures and values on the safety attitude and behavior of contingent, core and contract workers in the U. K. The findings of the study indicated that organizational restructuring might damage mutual trust between core workers and managers. The inclusion of contingent workers and contract employees into the workforce of an organization could threaten the integrity of safety culture and gradually destroy the trust of core employees towards safety activities in an organization.

Besides the above studies, Bottani, Monica & Vignali (2009) examined 116 companies that implemented and not yet implemented safety management systems. Their purpose was to evaluate the performance of safety management systems among adopters and non-adopters companies. They reported that adopters companies demonstrated excellent performance compare to non-adopters companies. Additionally, Fernandez-Muniz et al. (2009) study on relation between occupational safety management and firm performance was conducted among a sample of 455 Spanish companies using structural equation modeling statistical technique. They examined relationships between elements of occupational safety management system including (1) policy; (2) incentives; (3) training; (4) communication; (5) planning: preventive and emergency; (6) control and review:

internal control and benchmarking and performance measures including (1) safety performance; (2) competitive performance; (3) economic-financial performance. Their results showed that safety management had a positive impact on the three dimensions of performance measures and concluded that there was a congruent between employees' protection and company's competitiveness.

Even though the use of an OHS management system approach has gained popularity, Gallagher, Underhill and Rimmer (2003) discovered some obstacles to its effective implementation of an OHS management system. The barriers are (1) lack of success in meeting the necessary requirement factors such as management commitment, employee involvement, effective communication, etc.; (2) unsuitable usage of audit tools to guarantee compliance; (3) difficulty of implemention in certain sectors due to workforce attributes such as infamiliarity with OHSMS, lack of resources, temporary employees that are not committed, under-trained, etc. Besides these barriers, they also noted that research on the effectiveness of OHSMS was still not in agreement due to (1) an inconsistent definition of what OHSMS is; (2) the focus was more on individual correlation rather than on OHSMS; (3) no reliable measures of OHS performance; and (4) inconsistent findings of empirical research especially to denote association between OHSMS performance and injury outcomes.

In addition to Gallagher et al. (2003), Robson et al. (2007) had done a systematic literature review to integrate support on the effectiveness of OHSMS intervention on workers health and safety and related economic outcomes. A comprehensive examination of the 23 articles indicated that most studies showed positive findings on OHSMS interventions, a few studies reported null results, but no negative outcomes. The authors, however, concluded that "the evidence is insufficient to make recommendations either in favor of or against particular OHSMSs" (p. 349) as the current research knowledge fail to give significant outcomes.

In sum, although "OHSM has evolved internationally as the major strategy to reduce serious social and economic problems of ill-health at work" (Gallagher, Underhill & Rimmer, 2001, p.11), yet there is insufficient evidence in the empirical research on the effectiveness of the implementation of OHS management systems. However, there are studies that focus on OHS management but they concentrate on the success of health and safety outcomes and lack any study that directly neither investigated the effectiveness of the systems nor examined the support and barriers of implementing an OHS management system.

2.5.2 Occupational Health and Safety Performance

The performance of an organization is critical to ensure its success and survival in the marketplace. The National Occupational Health and Safety Commission (NOHSC) (2002) indicated that an evaluation of OHS performance enables an organization to discover OHS problems and take necessary preventive action.

Gallagher et al. (2001) affirmed that there are two categories of measurement for occupational health and safety performance: (1) the traditional measures such as Lost Time Injury frequency, accident statistics, and compensation claims; and (2) Positive Performance Indicators (PPIs) including safety audits; the percentage of sub-standard circumstances recognized and approved as an outcome of the safety audit; and the percentage of workers getting training of OHS. However, the outcome measures like Lost Time Injury frequency do not describe the appropriate OHS performance as it measures what has happened (reactive measures) but the PPIs tools are used to manage risk in the workplace and measuring how well an organization is functioning through monitoring the processes (NOHSC, 2002).

Most companies assess their safety system using measures like number of accidents and audits (Carder & Ragan, 2003), but using accident statistics to measure safety performance is difficult when there is no accident to analyze. Furthermore, a near miss, an incident that causes no injury cannot be used to measure safety performance, as it is not an evidence of accident although it can give an alert for the future. As for audits, previous research reported a negative correlation between audit and accidents (Carder & Ragan, 2003). The current trend adopted by most companies is to use safety climate (Nahrgang, Morgeson & Hofmann, 2007). Traditional measures were found to have some limitations such as (1) they are not sensitive in providing useful information about safety problems of a specific work site; (2) do not provide a means to evaluate risk exposure of employees; and (3) are invariably retrospective (Seo et al., 2004, p. 429). Consequently, safety climate tools give information about safety problem before any accident and injury arise as they are thus “leading indicator” of safety performance (Seo et al., 2004).

Enhancing safety performance is important to the success of health and safety management at work. Critical to this is the reciprocal relationship between safety management and safety behavior within the safety culture in the organization (Cooper & Phillips, 1995; Cooper, 2000). These reciprocal relationships reflect the interrelationships between person, situational and behavioral factors to ascertain the attainment of safe acts.

Lin and Mills (2001) survey findings stated that safety performance was influenced by size of company and management and employee commitment to safety and health. Company size plays an important role in achieving a high level of safety performance. Previous research showed that smaller companies have poorer standards compared to big companies (Lin & Mills, 2001). Furthermore, the involvement of management and workers showed positive results in enhancing safety performance as per Lin and Mills (2001) findings. The key to excellence in health and safety performance is the involvement of senior management (Vassie, Tomas & Oliver, 2000). Their findings indicated that safety awareness among all workers is crucial to improve health and safety performance of a company.

To determine safety improvement in organizations, Donald and Young (1996) conducted an intervention-based study on the attitude of employees in a UK power generation company. The findings showed that the safety performance changes, which indicated improvements in number of accidents and absenteeism. Improvements were also detected in the general attitude towards safety.

In terms of manpower, organizations need to hire the right person for the right job to ensure the minimization of workplace hazards. The study of Hassan, Nor Azimah and Chandrakantan (2005) found that hiring practices is one aspect that requires serious attention by companies as employees should be hired based on good safety records from previous experience in other companies. Companies in particular sectors should pool their resources to set up certification bodies to train and certify employees in occupational safety and health. These external bodies can then set industry wide safety and health standards, norms, and values that are accepted by industry players. Employees can attain these standards and obtain certification through safety training or any other means. Organizations can then use these certifications as a criterion for selection and promotion of employees in specific operational areas.

In conclusion, numerous indicators of safety performance have been used by previous researchers, some focus on organizational performance and several concentrate on individual performance. The choice of safety performance attributes depends on the practical interest of researchers and whether they can get the relevant data like numbers of accident and injury as these are confidential and most organizations would not impart such data to outsiders. Moreover, empirical evidence has proven that the measurement of health and safety management such as safety climate instrument is correlated with safety practices (Shannon & Norman, 2009; Yule, Flin & Murdy, 2007), unsafe behavior (Neal et al., 2000; Tomas et al., 1999), reduction in accidents (Huang, Ho, Smith & Chen, 2006), etc.

2.5.3 Safety Culture/Safety Climate

Previous studies by Mitchison and Papadakis (1999) have demonstrated that effective safety management improves the level of safety in organizations and thus can be seen to decrease damages and harm from accidents (as cited in Bottani, Monica & Vignali, 2009). Safety management refers to the tangible practices, responsibility and performance related to safety (as cited in Mearns, Whitaker & Flin, 2003). Mearns et al. noted some common themes of safety management practices: management commitment to safety, safety communication, health and safety objectives, training needs, rewarding performance, and worker involvement. They also maintained the associations between safety management, safety climate, and safety culture. Safety climate is considered to be the precise indicator of overall safety culture while safety management practices display the safety culture of top management and as a result, good safety management practices are reflected in the enhanced safety climate of all employees.

In addition, previous surveys have associated a weak safety culture with a decline in safety performance. Some international examples of poor safety performance are the Tokaimura Japan accident, the Chernobyl nuclear accident in 1986 and Three Mile Island (U. S.) nuclear accident in 1979 (UK Advisory Committee on the Safety of Nuclear Installation, 2003). As such, human interaction with its environment is critical, hence safety culture comes into the work system to protect employees from unsafe affects of operations. The development of a strong culture will reinforce organizational absolute commitment to sustainable safe performance (Railway Group Safety Plan, 2002).

Some symptoms of safety culture problems in an organization are: workers are blamed for problems, the emergence of strong subcultures, employees are afraid to report accidents or injuries, excessive sick-time, high turnover, lack of commitment to process safety, lack of consistency in worker attitudes about what issues are important, lack of preventive maintenance, lack of teamwork, poor housekeeping, top management are unaware of the “real” condition of the plant and employees, recurring problems, over-emphasis on behavioral safety (UK Advisory Committee on the Safety of Nuclear Installation, 2003). An organization has to correct a "weak" situation when some of these symptoms appear or there will be a decline in performance.

As a result of accidents and injuries, organizations have been applying leading indicators such as safety climate to assess their safety performance (Yule, Flin & Murdy, 2007). Numerous studies have indicated that a safety climate anticipates safety-related outcomes (Yule, Flin & Murdy, 2007), for example, accidents and injuries (Huang, Ho, Smith & Chen, 2006), safety performance (Nahrgang, Morgeson & Hofmann, 2007; Shannon & Norman, 2009) and workers' safety behavior (Neal et al., 2000; Tomas et al., 1999). Previous studies of Barling et al. (2002); Brown and Holmes (1986); Hofman and Stetzer (1996); and Lee et al. (1993) on the relationship between positive safety climate and lower number of accidents demonstrated that positive safety attitude employees were less likely to be involved in accidents (as cited in Clarke, 2006).

Table 2.8 presents several prior studies on safety climate and the dimensions being measured. Unlike most studies in safety climate, Hsu, Lee, Wu, and Takano's (2007) study was comprehensive as they categorized safety climate into four levels: organization, management, team, and individual. They reported that the organizational level comprised safety policy features, for instance, top management commitment, a reward system, a reporting system, and resource allocation while management level included safety planning, control, and support factors like safety training, safety activities, and safety management. Team level contains safety implementation factors, for example, communication, coordination, and cooperation in a work team and the individual level consists of safety performance of frontline workers such as safety awareness, safety attitude and safety behavior.

Table 2.8: Dimensions of safety climate in previous studies

Studies	Climate Dimensions
Brown & Holmes (1986)	management concern, management activity, risk perception
Budworth (1997)	management commitment, supervisor support, safety systems, safety attitudes, safety reps
Cheyne et al. (2002)	communication, individual responsibility, safety standards and goals, personal involvement, workplace hazards, physical work environment
Cooper (1995)	management commitment, management actions, personal safety commitment, perceived risk levels, effects of work pace, belief about accident causation, effects of job induced stress, safety communication, emergency procedures, safety training, and role of safety representatives
Cox & Cheyne (2000)	management commitment, priority of safety, communication, safety rules, supportive environment, involvement in safety, personal priorities and need for safety, personal appreciation of risk, work environment
Cox & Cox (1991)	Personal skepticism, individual responsibility, work environment, safety arrangements, personal immunity
Dedobbeleer & Beland (1991)	management commitment, worker involvement
Salminen & Seppala (2005)	organizational responsibility, workers' concern about safety, workers' indifference in regards to safety, and the level of safety actions
Hsu et al. (2007)	organizational level: top management commitment, reward system, reporting system, and resource allocation; management level: safety training, safety activities, safety management; team level: communication, coordination, cooperation in a work team; individual level: safety performance such as safety awareness, safety attitude and safety behavior
Huang et al. (2006)	management commitment, return-to-work policies, post-injury administration, safety training
Williamson et al. (1997)	personal motivation for safe behavior, positive safety practice, risk justification, fatalism/optimism
Zohar (1980)	importance of safety training programs, management attitudes toward safety, effects of safe conduct on promotion, level of risk at workplace, effects of required work pace on safety, status of safety officer, effects of safe conduct on social status, status of safety committee

Similarly, Cox and Cheyne (2000) examined three types of assessment to measure safety climate: (1) the multiple measurement-organizational attribute approach, (2) the perceptual-organizational attribute approach, and (3) the perceptual measurement-individual attribute approach. The first approach focused on various organizational attributes like structure, safety policy, systems and processes, and reports and it can be measured through observation and audit. The second measured organizational perceptions like commitment and the last examined individuals' perceptions about their feelings and attitudes towards organizational issues like commitment, responsibility, behavior, etc.

From prior studies, the most notable determinant is management attitude or action toward safety. Management commitment to safety indicates the extent to which top management demonstrates positive and supportive safety attitudes (Hsu et al., 2007). Safety commitment has been described as a personal recognition and participation in safety activities demonstrated by an attempt to enhance safety in the workplace and comply with the safety goals (Cooper, 1995). A prior study by Smith et al. (1978) noted that employees' perception of management's action to safety had resulted in accident reduction (as cited in Yule, Flin & Murdy, 2007). In addition, the Hong Kong Occupational Safety and Health Council (1998) conducted a study of the safety climate in the hotel industry in Hong Kong. The findings indicated that most senior managers had a positive response towards all aspects of safety climate. Supervisory and front-line staff were particularly positive towards factors like risk taking behavior, obstacles to safe behavior, contributory influences and the reporting of accidents.

Supervision illustrates an attempt showed by supervisors in coaching and supervising workers' safety (Hsu et al., 2007). Empirical studies revealed that supervisors play a vital role in ensuring safety in the workplace (Yule, Flin & Murdy, 2007). From past research, they found that employees complied with safety rules and procedures when they perceived that the action of their supervisor was fair. In contrast, Brown et al. (2000) discovered that supervisors who demanded more of their workers demonstrated negative influence on safety climate (as cited in Yule, Flin & Murdy, 2007). Furthermore, they found that supervisors who delegated job task motivated employees to acknowledge their safety accountability.

In addition, earlier studies discovered the link between safety training and increased safety performance (Huang et al., 2006). Consequently, effective training facilitates workers to have a sense of belonging and thus is more accountable for safety in their workplace. Previous studies also found an association relating to training and the improvement of healthy and safe working situation where elements such as management support to safety training, goals setting, feedback from management, incentives and rewards were critical in enhancing safety performance (Sattler & Lippy, 1997).

The findings of Hsu et al. (2007) regarding Taiwanese and Japanese safety leadership revealed that the Taiwanese leadership style was “Top-Down Directive” where top management communicated safety policies and were involved in safety activities. Their supervisors supervised safety issues carefully by performing the “walking around” concept. They also reported that Japanese safety leadership was more focused on “Bottom-Up Participative” where top management promoted employees’ participation in any safety activities and were less willing to use disciplinary measures against employees’ unsafe actions.

Havold and Nesset (2009) explained communication as “the extent to which an organization provided an effective information exchange regarding internal safety matters” (p. 4). In other words, communication is the style, frequency and methods of interaction between management and workforce of an organization about safety and risks at work. Open communication describes how safety information is distributed between groups in an organization (Hsu et al., 2007). Therefore, the purpose of communication is to convey safety goals and essential health and safety information to employees so that they are familiar with their organization’s direction and to encourage them to be more involved in safety activities. Clarke (2006) discovered from previous studies like Hofmann and Morgeson (1999), Mearns et al. (2003), and Parker et al. (2001) that effective communication has been seen as a vital tool in safe working implementation. In addition, the findings of Mearns et al. (1998) revealed that safety communication decreases safety risk and thus, improves safety in the workplace (as cited in HSE, 2005).

The reporting system is the basis to discover the limitations and vulnerability of safety management prior to accidents (von Thaden et al., 2003). In other words, it indicates front-line workers' willingness to give details of safety issues and problems in the workplace. HSE (2005) stated that employees must be given feedback concerning the action taken to their reporting. Clarke (1998) described that incident/accident reporting can be perceived as an indicator of workers' perceptions about managers' commitment to safety. Her study revealed that workers who perceived negatively about managers' commitment to safety can trigger employees' unsafe acts.

Over the past decades, a great number of studies have been undertaken on safety climate, nevertheless, there is inadequate agreement on relevant attributes to be included in the safety climate concept (Williamson et al., 1997) and preference for safety climate attributes depends on practical interest of researchers (Huang et al., 2006). Furthermore, Salminen and Seppala (2005) also noted that most surveys have constructed their own measures to assess safety climate and these have lead to differing outcomes due to the dissimilarity in the instruments. Flin et al. (2000) and Guldenmund (2000) discovered 27 safety climate studies that had a variety of items with different factor structures and dissimilar definitions (as cited in Shannon & Norman, 2009). Some researchers also replicated various safety climate scales but the results were inconsistent (Flin et al., 2000). Previous safety climate studies demonstrated that management safety commitment and workers' safety involvement were being replicated constantly (Salminen & Seppala, 2005; Williamson et al., 1997).

In spite of numerous research on safety climate, Zohar (2008, p. 385), stated that “merely developing more measurement scales and re-testing climate-behavior relationships will hold back scientific progress”. For that reason, researchers should focus on the psychometric analyses of the safety climate scales. To date, not many studies have tried to verify the correlation between safety climate and the outcome variables or examining the construct, criterion and content validity of the scale (Seo et al., 2004; Havold & Nesset, 2009). Therefore, there is a necessity to develop a more extensive tool and validate the scale comprehensively so that it can explain the safety climate concept. In sum, a combination of different types of assessment can ensure the high reliability of the safety climate measurement.

2.5.4 Cultural Factors in Organizations

Specific cultural factors are vital in determining patterns of work behavior in the workplace as to better manage multicultural workforces and uncertainty in jobs. This is important as a particular behavior may give low work value that may affect workplace effectiveness. Professor Geert Hofstede, Emeritus Professor, Maastricht University (2009) states that "Culture is more often a source of conflict than of synergy. Cultural differences are a nuisance at best and often a disaster.” As such, it is vital for managers to assess their existing local values to determine effective change management.

Below are the dimensions of the cultural values in the Malaysian and Australian workforces noted in 1980 (Hofstede, 2009).

i. Low vs. high power distance

Power distance is the extent to which the less powerful members of institutions and organizations expect and accept that power is distributed unequally. In other words, the degree to which an employee is comfortable in communicating or negotiating with his/her superior (Abdullah & Gallagher, 1995). Malaysia has the highest power distance where the relationship between an employee and his/her superior is more on a hierarchical basis and employees show obedience to authority.

Australians on the other hand have a low power distance and the relationship with employee is of a greater equality between societal levels. This dimension emphasizes cooperative interaction and forms a stable culture in the workplace (Hofstede, 2009).

ii. Individualism vs. a collectivism society

Individuality is the degree to which people are expected to stand up for themselves and to choose their own affiliations while collectivism is the extent to which people act predominantly as a member of a life-long group. Australia scored the second highest behind the United States in individualism. Privacy is regarded as a cultural norm and this individuality are emphasized when doing business and people speak out, question, are confrontational, and are direct with their superiors. Malaysia is high on the collectivism dimension where people are loyal to their group, dependent on their organization and conflict avoidance. Decision making is according to what is best for the group and the use of "we" mentality to refer to everybody in a group.

iii. Uncertainty avoidance

Uncertainty avoidance reveals the extent to which members of a society attempt to cope with anxiety by minimizing uncertainty. In other words, this dimension concentrates on how cultures adapt to changes and cope with uncertainty. Malaysia has high uncertainty avoidance cultures that favor rules, regulations and controls (e.g. about religion and food), structured situations, is less tolerant of deviant ideas, consensus seeking, minimizing risks, prefers details, specific plans and employees tend to remain longer with their present employer. Australia has a low uncertainty avoidance culture that favors fewer rules, tolerates generalization, seeks individual opinions, approves of risk taking, etc.

iv. Masculinity vs. femininity

This dimension focuses on the degree to which a society stresses achievement or nurture. Masculinity cultures focus on competitiveness, assertiveness, ambition, and the accumulation of wealth and material possessions, while "feminine" cultures emphasis on relationship, environmental awareness, and the quality of life. A higher Masculinity Index indicates that the country's culture is more masculine. Australia can be categorized as a masculine country while Malaysia is in the middle.

Table 2.9 indicates Hofstede's cultural dimension index undertaken in Australia and Malaysia.

Table 2.9: Hofstede's cultural index

Dimensions / Country	PDI	IDV	MAS	UAI	LTO
Australia	36	90	61	51	31
Malaysia	104	26	50	36	-

PDI: Power Distance; IDV: Individuality; MAS: Masculinity; UAI: Uncertainty avoidance; LTO: Long-term orientation
Source: Hofstede (2009)

Further, some Malaysian examples that are relevant to workplace efficiency as revealed by Abdullah (1994) were as follows:

- A soft-spoken Malay ethnic is perceived to be passive and ineffective when he/she deals at the cross-cultural level. On the other hand, a foreigner who is trying to defend his point loudly may be perceived as an impolite person by a Malaysian.

- A self-interest person is considered as a deviant person by a Malaysian as the “we” orientation shows that Malaysian people are concerned for others and sometimes in the extreme can be regarded as a busybody.
- Extreme loyalty to a superior shows that Malaysian people are obedient and blindly obey authority without questioning their action, for example, practices like “The boss is always right” or nepotism.
- The concept of face-saving by trying to protect other people’s dignity is a Malaysian attitude as “loss of face is more painful than any physical pain”.
- Actions especially by Malay people must be in accordance with the religion of Islam.
- A list of Malaysian ethnic values is illustrated in Table 2.10.

In sum, managers must not ignore the cultural values practised by their employees and there is a need to build suitable shared practices so as to create a workforce that is able to confront with challenges in the future.

2.5.5 Demographic Factors in Health and Safety Activities

Studies have shown differences exist between age groups where older individuals were more uncertain of taking risks compared to the younger generation (Thomas, 1999). Kotwal and Lerner (1995) study (as cited in Sattler & Lippy, 1997) on warning labels reported that:

> "Older subjects generally used signal words that implied greater hazards to represent the amount of risk involved in a given situation. Since older users have indicated that a given signal word implies a lower level of hazard than the same word implies for younger users, it may be necessary to apply relatively strong signal words for older users in order to connote a given level of hazard."

Even a researcher like Desaulniers (1991) described individuals who were 40 and above were likely to take preventative measures in reaction to warnings (as cited in Sattler & Lippy, 1997).

Table 2.10: List of Malaysian ethnic values

Malays			
Respect for elders	Friendliness	Good manners (sopan santun)	Indirect
Spirituality	Politeness	Faith in God (Tawakal)	Food and ceremonies
Humility	Loyalty	Obedience	Tacit reciprocal obligations
Face	Apologetic	Fairness	Tolerance
Tact	Formalities	Sincerity	Deference to elders
Generosity	Accommodating	Courtesy	Cooperation (gotong-royong)
Patience	Trustworthiness	Self-respect (hormat diri)	Rituals
Harmony/peace	Discipline	Honesty	Compliance
Sensitivity to feelings	Non-confrontational		
Chinese			
Food	Money	Respect for hierarchy	Generosity
Hard work	Perseverance	Integrity	Prosperity
Success	Position	Honesty	Gambling/risk taking
Diligence	Face	Entrepreneurship	Wealth
Education	Thrift	Pragmatic/practical	Family oriented
Happiness	Harmony		
Indians			
Fear of god	Participation	Loyalty	Brotherhood
Sense of belonging	Hard work	Karma	Modesty
Family	Security	Harmony	Food

Source: Abdullah (1992)

As for gender studies, Sattler and Lippy (1997) and Thomas (1999) discovered that female employees were more likely to comply with warnings as they searched for and read warning messages and this attitude lead to safety preventative measures. However, researchers cannot be certain that gender might be the main issue in the differences as the variation might be due to other factors like being more knowledgeable of the hazards, frequency of application, proficiency, etc. Consequently, Malle (1996) supported this finding as "men view risks as less dangerous compared to women".

In sum, dissimilarity in studies on gender, age, and length of employment existed as tacit knowledge and complacency in an individual, and different work-related roles contribute to the differences in the research findings. As such, managers cannot take for granted that senior employees are more experienced than their younger colleagues and thus management of health and safety is excellent. The more experienced they are, the more they want to violate safety rules and procedure as one-way short-cuts in doing work.

2.6 Conclusion

The globalization of workplaces has lead to a rise in health and safety risks and problems of productivity reflected through work-related accidents and ill-health incidence. These costs affect society, companies, and workers as well as their families. The economic cost resulting in compensation, lost-work days, interruption of production, medical expenses, retraining, etc. is a burden to companies' competitiveness. Therefore, there is a need for new solutions for these emerging occupational health and safety (OHS) problems. To meet the challenges posed by these changes, revamping safety and health practices through strategies to improve performance is critical so as to motivate the workforce create a safe and healthy environment that will lead to the decrease of work-related accidents and ill-health. Consequently, giving attention to occupational safety and health is a priority that enhances the morale of workers as well as reducing companies' economic costs.

In conclusion, governments, employers and workers in countries that have developed OHS management system standards, are now acknowledging the positive impact of an OHS management system. Good occupational health and safety practices can increase workplace efficiency, reduce risks of lost productivity and accidents and reduce risks of legal action for workers' compensation.

CHAPTER 3

RESEARCH METHODOLOGY

3.0 Introduction

The purpose of this chapter is to discuss the methodology utilized to achieve the research objectives presented earlier. The research framework and hypotheses, research design, survey instrument development, data collection and data analysis procedure are described in detail.

This chapter consists of five main sections. The initial section gives information on the research framework and its hypotheses; research design, specifically the research flowchart process; operational definition; research setting and the sampling procedures. The second part explains the development of the survey instrument, a pre-test of the questionnaire, the administration of the survey instrument, namely the data collection procedure. The last part explicates various phases of the data analysis process, including data screening, construct validity, confirmatory factor analysis and hypotheses testing.

3.1 The Research Framework and the Hypotheses of the Study

The conceptual framework for the study is presented in Figure 3.1. As can be observed, the research focuses on the impact of health and safety management and demographic variables on two dependent variables: satisfaction of employees towards their safety system and number of safety incident/accident. Safety incident/accident was categorized into accidents and injuries. There are two types of independent variables in this study: health and safety management and demographic characteristics. In this study, the latent variable health and safety management consists of six independent variables: a supervisor's leadership style, the role of the supervisor, management commitment, training and competence, health and safety objectives, and safety reporting. The second latent variable, demographic characteristics consist of variables like age, gender, ethnics, level of education, length of employment, and position.

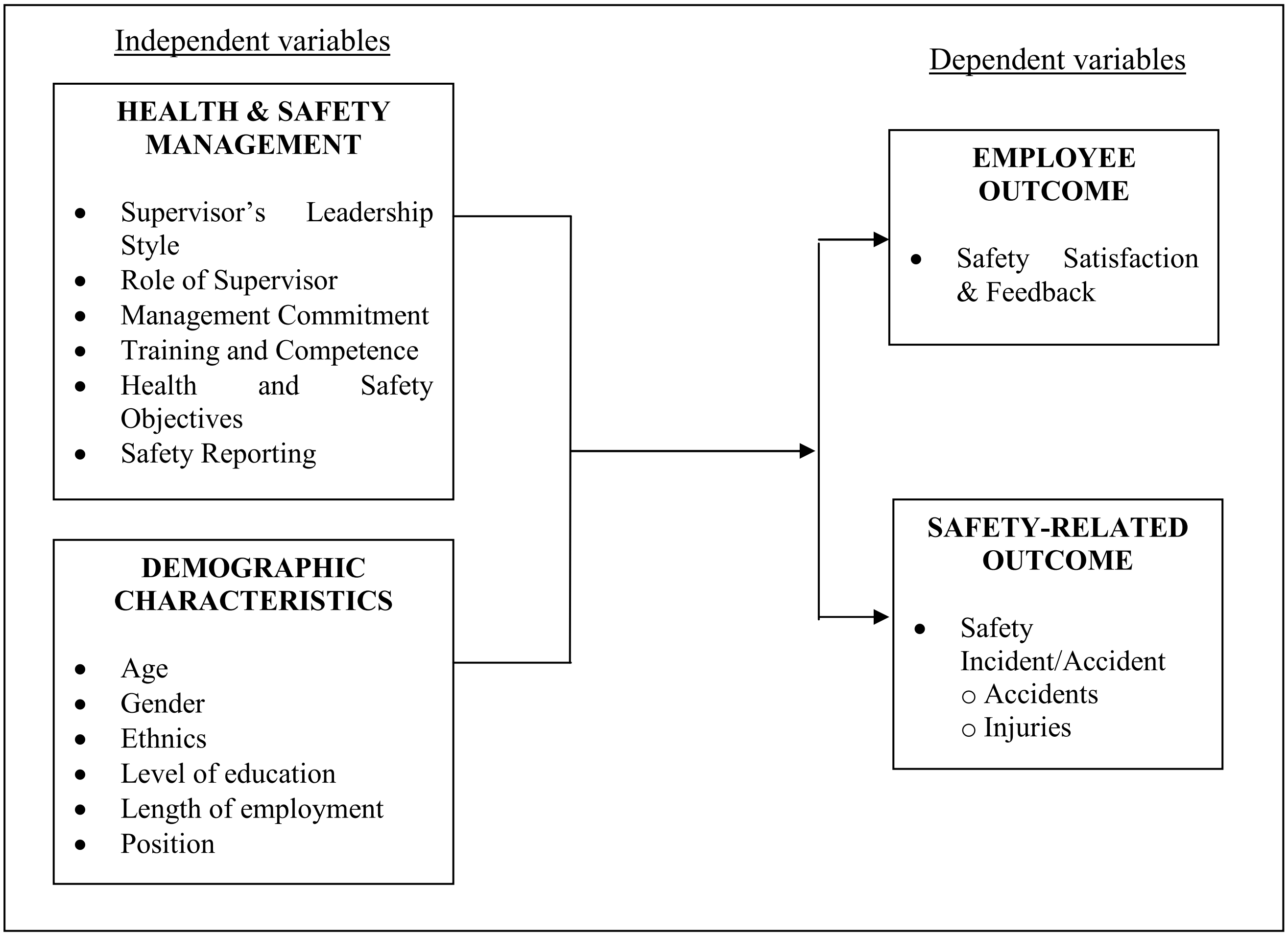

Figure 3.1: The Conceptual Framework of this study

From the conceptual framework in Figure 3.1, the following hypotheses were proposed:

1. H1a: The presence of health and safety management elements will have an association on the level of education and gender.

   H1b: The presence of health and safety management elements will have an association on the length of employment and gender.

2. H2a: Health and safety management elements and demographic characteristics have a significant relationship with satisfaction towards safety systems in the workplace.

   H2b: Health and safety management elements and demographic characteristics have a significant relationship with accidents in the workplace.

   H2c: Health and safety management elements and demographic characteristics have a significant relationship with injuries in the workplace.

3. H3: All the independent variables (supervisor's leadership style, role of supervisor, management commitment, training and competence, health and safety objectives, and safety reporting) will have a direct relationship with the dependent variables (safety satisfaction and feedback, and safety incident/accident)

3.2 Research Design

This study focuses on a quantitative non-experimental research design, i.e. surveys. The purpose of a survey research is to generalize the sample findings of a population as it provides a numeric description of trends, attitudes or opinions by studying a sample of that population (Creswell, 2003). According to Polgar and Thomas (2000), surveys are commonly used in research for the purpose of (1) establishing the attitudes, opinions or beliefs of persons concerning certain issues,

(2) studying characteristics of population on certain variables, and (3) collecting information about the demographic characteristics (age, gender, income, etc.) of populations. Reasons for choosing this design are that the researcher can collect all the completed responses within a reasonable period of time and it is cost-effective. (Sekaran, 2003). The nature of the survey is cross-sectional, with the data collected at one point in time.

A diagrammatic representation of the study flowchart process is shown in Figure 3.2. Currently the Malaysian government has developed the OHS management system and introduced it to public in 2005 but so far implementation has not been realized in the government sector. As such, this survey highlights to the government the perception of hospital employees especially on the barriers and supportive elements of health and safety management to enable the implementation of the OHS management system in public hospitals. In view of the fact that employers are accountable for the health, safety and welfare of their employees, they have the obligation to manage the issues of occupational health and safety appropriately. One effective means to perform this responsibility is through the implementation of an OHS management system.

This study discovers interrelationships among significant variables from the aspects of occupational health and safety management and health and safety performance.

The design for this population is random sampling focusing on state hospitals in the northern region of Malaysia. The strategy is justified because the services offered to the community in all public hospitals are similar and employees are transferable within public hospitals in Malaysia. The sample of this study is Malaysian state hospital employees stratified by occupational groups: doctor, nurse, medical officer, management officer, medical support staff and management support staff. This study used self-administered questionnaires as its method of data collection.

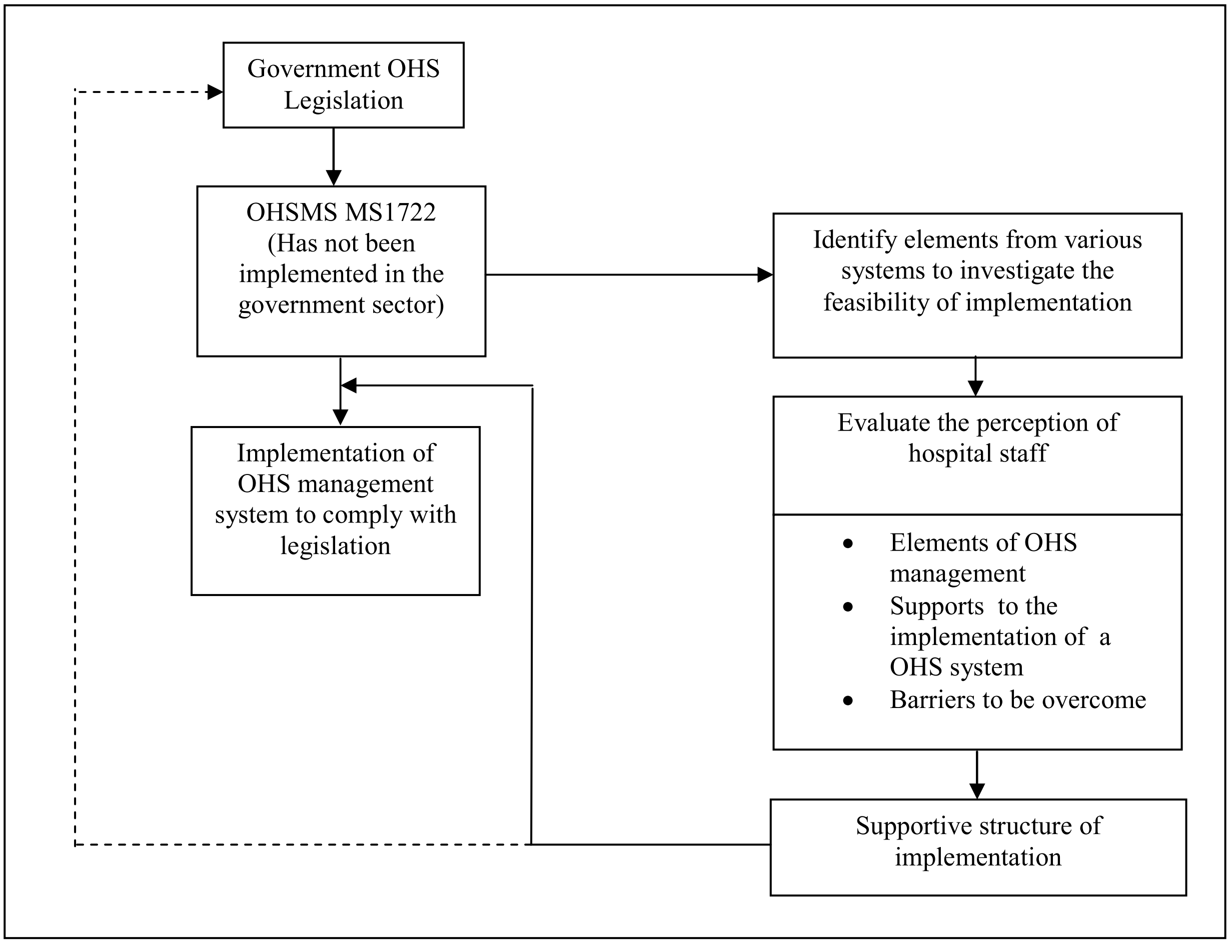

Figure 3.2: Flowchart of the study process

3.3 An Operational Definition of a Regional Hospital

As there is no standardized definition of the term "rural" or "regional", describing "rural" or "regional" has been controversies in developed and developing countries. Couper (2003) asserted that numerous factors that must be included in explaining the term, the health service available, geographic location (outside metropolitan area), demography (population), primary industry (agriculture), socio-cultural issues, schooling, recreational facilities, general services, etc. For the purpose of this study, definition of "regional" healthcare relates to "the provision of health services to areas according to geographic location outside metropolitan centers where there is no ready access to many specialists, intensive and/or high technology care ……" (Couper, 2003, p. 2).

There are two types of hospital in Malaysia: (1) government or public hospitals; and (2) private hospitals. There are 135 public hospitals (as at 9 February 2010) and 122 private hospitals in Malaysia (Malaysian Ministry of Health, 2010). Public hospitals are divided into four types: (1) State Hospital - 14 hospitals; (2) District Hospital with Expertise - 33 hospitals; (3) District Hospital without Expertise - 83 hospitals; and (4) Psychiatric Hospital - 5 hospitals (Malaysian Ministry of Health, 2010).

This study is confined to the public general hospitals in the northern part of Malaysia which includes (1) Georgetown, Pulau Pinang; (2) Alor Setar, Kedah; (3) Kangar, Perlis. Although there are 74 general, district and private hospitals accredited to the Malaysian Society For Quality in Health (MSQH) Standards (as at 31 December 2009) (see Appendix 2), the selection of these hospitals does not indicate whether one hospital is better or worse than another hospital but determines the major role these selected general hospitals play in providing health care services to local populations and also to their local economies; and to ensure the improvement of OHS performance of these health care providers.

3.4 The Sampling Procedure

3.4.1 The Population of the Study

The target population is the employees of the three state hospitals in the northern region of Peninsular Malaysia. The survey was conducted on state hospitals because they have more employees, thus providing better statistical power. Furthermore, employees of public hospitals can easily move between public hospitals. Hence the survey will be able to provide an overview of the situation in public hospitals (please refer to Appendix 3 for the hospitals in the northern region of Malaysia). Table 3.1 shows the total number of employees and sample size of the three state hospitals in the northern region.

Table 3.1: Information about the population and sample

No.	Hospital	No. of Employees (as at 2007)	Samples size
1.	Hospital Sultanah Bahiyah, Alor Setar, Kedah	2,508	331
2.	Hospital Tuanku Fauziah, Kangar, Perlis	1,327	297
3.	Hospital Pulau Pinang, Georgetown, Pulau Pinang	3,038	341
	TOTAL	**6,873**	**969**

3.4.2 The Sample of the Study

A sample is a part of the population from which it was drawn. This survey used stratified proportional random sampling according to occupational group: doctor, nurse, medical officer, management officer, medical support staff and management support staff. Stratified sampling can be used whenever the population can be segregated into smaller sub-populations according to standardized identifiable attribute of interest (Sekaran, 2003). With a probability sample, every member of the population has an equal (or known) chance of being included. The procedure for sampling these employees was using the random number table.

Sample size refers to the number of participants investigated in a study. Sample size determination is crucial as larger samples are a waste of time, resources and money, and very small samples could result in incorrect outcomes (and thus avoid a Type II error) (Cohen, 1988). The sample size for research activities according to Krejcie and Morgan (1970) needs to indicate a given population as inadequate or too much data is a waste of time. They also noted that sample sizes larger than 30 and less than 500 are suitable for most research. A sample size of 30 is normally used as a cutoff value as the sampling distribution of 30 or more is regarded as normally distributed (Dawson & Trapp, 2004). Thus, this study used level of significance (or type I error) of 0.05 as the researcher is willing to accept a 5 percent chance in rejecting the null hypothesis.

Table 3.1 shows the appropriate sample size of this study: 969 employees while Table 3.2 illustrates population and sample size according to occupational groups. The sample size (n = 969) is determined using Krejcie and Morgan's (1970) table of sample sizes assuming alpha levels of 0.05.

Table 3.2: Breakdown of population and sample according to occupational groups

Hospital / Post	Hospital Tuanku Fauziah, Kangar, Perlis			Hospital Sultanah Bahiyah, Alor Setar, Kedah			Hospital Pulau Pinang, Georgetown, Pulau Pinang		
	Population	**Sample**	**% of sample**	**Population**	**Sample**	**% of sample**	**Population**	**Sample**	**% of sample**
Doctor	126	29	9.8	348	45	13.6	432	48	14.1
Nurse	605	134	45.1	1,186	157	47.4	1287	144	42.2
Officer (management)	24	6	2.0	16	2	0.6	15	3	0.9
Supporting staff (management)	131	30	10.1	633	84	25.4	877	98	28.7
Officer (medical)	53	12	4.0	66	9	2.7	61	7	2.1
Supporting staff (medical)	388	86	29.0	259	34	10.3	366	41	12.0
TOTAL	**1,327**	**297**	**100**	**2,508**	**331**	**100**	**3,038**	**341**	**100**

3.5 The Development of Survey Instruments

A survey using a questionnaire was adopted in order to obtain an understanding of the relevant issues based on the study’s objectives. The survey approach was employed as it is the most common technique to evaluate safety-critical factors and participants remain anonymous (Kho, Carbone, Lucas, & Cook, 2005; von Thaden et al., 2003). The first phase was to examine earlier literature reviews on related studies.

3.5.1 Selection of Survey Instruments

Management systems including ILO-OSH 2001, BS 8800: 2004 (BSI Business Information, 2006), OHSAS 18001: 2007, AS/NZS 4801: 2001 (AS/NZS, 2001; SAI Global Limited, 2006), ISO 14001: 2004 (Environmental Management Systems), and SafetyMAP audit tool were reviewed. The documents were selected as it is commonly recognized that they are of appropriate international standard. They indicated key OHS management system elements, which are appropriate to be used in various industries, and are simple to interpret.

Besides that, numerous surveys on safety climate and safety culture were also reviewed. After a comprehensive review of management systems standards and audit and safety culture and safety climate tools, the instrument for this study has been adapted from the Safety Climate Assessment tool developed by Flin, Mearns and Burns (2004) from the University of Aberdeen. Justification of the chosen instrument was based on Singla, Kitch, Weissman & Campbell (2006) suggestion that “Choice of instruments will depend on the intended use, the target population, reliability, validity, and other considerations” (p. 105) and “no one survey is perfectly suited to all applications…” (p. 113). Consequently, the chosen instrument fit this survey as the purpose of this study was to “evaluate the information about current OHS practices that can influence the development and implementation of an effective OHS management system …”. Furthermore, Williamson et al. (1997, p. 15) stated that “In understanding the safety climate or culture of a workplace, the perceptions and attitudes of the workforce are important factors in assessing safety needs”. Therefore, the chosen instrument has the capacity to give precise measurement of the overall safety climate across numerous departments in the hospitals by assessing attitudes and experiences about safety climate in their workplace.

This instrument was adapted and modified slightly by replacing the original term “patient safety” with “health and safety” throughout the instrument. The questionnaire was intended to identify perceptions on the implications of safety climate dimensions towards their OHS performance in public hospitals in Malaysia. Fishbein and Ajzen (1975) stated that “Attitude is an important concept that is often used to understand and predict people's reaction to an object or change and how behaviour can be influenced” (as cited in Page-Bucci, 2003, p. 2)

The scale used by Flin et al. (2004) grouped the dimensions into the following ten sections: communication, work duties, safety satisfaction, senior management, errors and incidents, role of supervisors, training and competence, safety rules, reporting, and supervisor leadership style (refer Appendix 4). This scale has been used in the pilot survey of this study.

3.5.2 Reverse-scored Items and Back-translation

Negatively-worded items in attitude surveys were reverse-scored so that a total positively-oriented score is achieved as negative items were not easy to understand and the items had a discouraging effect upon participants (Bradley, Royal & Bradley, 2008). Furthermore, a negatively-worded item is an approach to decrease patterned answers from respondents (Stewart et al., 2006). For example, "Staff are afraid to ask questions about health and safety when something that does not seem right has happened" has a scale of 1 = strongly disagree to 5 = strongly agree and this scale has been reversed to 5 = strongly disagree to 1 = strongly agree.

Since the national language of Malaysia is Bahasa Malaysia, the questionnaire had to be translated into Bahasa Malaysia to assist respondents to answer the survey confidently. There are various techniques in translating a questionnaire: (1) Back-translation, (2) Bilingual technique, (3) Committee approach, and (4) Pretest procedure (Brislin, 1970). For this survey, the researcher used a back-translation method. For back-translation, according to Brislin (1970, p. 186), a researcher should use two bilinguals: translating from the source to the target language, and translating back from the target to the source. A decentering process should be employed to ensure that the source and target language are identical in meaning by revising the original English questions so that both versions have the same meaning (Brislin, 1970).

Based on Brislin's (1970) suggestion, the process for back-translation of this study was as follows:

1. Two competent translators familiar with the content involved in the source language questionnaires were recruited.

2. One translator was given two weeks to translate the questionnaire from the source to the target language.
3. Another bilingual translated back from the target to the source language. The time period given was two weeks.
4. Two translators were invited to assess the original and back-translated versions for errors in differences in meaning.
5. The materials were tested on the target language-speaking respondents, some were given the English version and others the translation.

3.5.3 Questionnaire Design

Overall the final questionnaire survey seeks information on the following two sections: (1) demographic of respondents; (2) survey regarding OHS management adapted from Flin et al. (2004) that consists elements like safety communication, safety involvement, training and competence, safety reporting, work pressure, safety satisfaction, management commitment, health and safety objectives, errors and incidents, the role of a supervisor in health and safety, safety rules, and a supervisor's leadership style (refer to Appendix 5). Individual scale scoring was computed by summing the item scores and dividing by the total number of items. The following illustrates the measurements used in this survey:

i. Communication about Health and Safety

Measures consisted of scales related to participants' perception about the safety communication in their current department/unit/ward which included 7 items. Responses were taken on Likert-type five-point scales ranging from "strongly disagree" (1) to "strongly agree" (5). Table 3.3 outlines the health and safety communication items. 4 items were worded to reflect negative safety communication – for example, "Important health and safety information is often lost during shift changes" were scaled in reverse strongly disagree (5) to strongly agree (1).

Table 3.3: Communication about Health and Safety

1.	Health and safety issues that may affect me are well communicated.
2.	Staff will freely speak up if they see something that may negatively affect health and safety at work.
3.	Staff have the freedom to question the decisions or actions about health and safety of those with more authority.
*4.	Staff are afraid to ask questions about health and safety when something that does not seem right has happened. (Reversed)
*5.	Problems often occur in the exchange of information about health and safety across hospital departments / units. (Reversed)
*6.	Important health and safety information is often lost during shift changes. (Reversed)
*7.	I receive no communication about health and safety in any form from top management. (Reversed)

*negative item

ii. Safety Participation/Involvement

The safety participation scale consisted of 3 items which measured the extent to which employees are involved in health and safety activities in their organization. The items are accompanied by a 5-point rating scale ranging from "strongly disagree" (1) to "strongly agree" (5). Table 3.4 summarizes the worker participation items. Higher values reflected more positive worker participation.

Table 3.4: Worker Participation/Involvement

1.	I know the person who represents me in the Health and Safety Committee.
2.	I am involved in health and safety initiatives at work such as the health and safety committee.
3.	I am clear about my responsibilities for health and safety.

iii. Training and Competence in Health and Safety

Participants responded to four items asking the extent to which they agreed about their training and competency in health and safety. Table 3.5 shows the items of training and competence in health and safety. Responses were made on a 5-point scale ranging from ‘‘strongly disagree” (1) to ‘‘strongly agree” (5).

Table 3.5: Training and Competence in Health and Safety

1.	I understand the health and safety requirements for my job.
2.	I understand the health and safety risks in my job.
3.	My training has covered the health and safety risks I face in my job.
4.	I am always certain what to do to ensure high standards of health and safety in my work.

iv. Reporting on Health and Safety Matters

The five items that measured reporting on health and safety matters are presented in Table 3.6. Each item was responded to using a 5-point scale ranging from ‘‘strongly disagree” (1) to ‘‘strongly agree” (5). One item was worded to reflect negative reporting and the scale was reversed to “strongly disagree” (5) to “strongly agree” (1).

Table 3.6: Reporting on Health and Safety Matters

1.	All health and safety incidents are reported here.
2.	I am encouraged to report health and safety incidents.
3.	I think that reporting health and safety incidents makes a difference to safety here.
4.	People are willing to report health and safety incidents here.
*5.	I think it is a waste of time reporting health and safety errors/near misses because nothing gets done about it. (Reversed)

*negative item

v. Work Pressure

Eight items measured the perceptions of whether work pressure interferes with the ability to comply with safety practices as in Table 3.7. Responses were made on a 5-point scale ranging from ‘‘Strongly disagree” (1) to ‘‘Strongly agree” (5). 4 items were worded to reflect negative perception about work pressure. For example: “If I didn’t take a risk now and again, I wouldn’t get my work done” and the scale was reversed to “strongly disagree” (5) to “strongly agree” (1).

Table 3.7: Work Pressure

1.	Health and safety issues are never sacrificed to get more work done.
2.	We have enough staff to handle the workload.
*3.	Staff work longer hours than what is considered to be best for their health and safety. (Reversed)
*4.	We work in "crisis mode" when trying to do too much, too quickly. (Reversed)
*5.	If I didn't take a risk now and again, I wouldn't get my work done. (Reversed)
6.	I am able to take scheduled rest breaks and still get my work done.
7.	I am satisfied with my current work schedule.
*8.	There is pressure from other hospital departments/units to get more work done. (Reversed)

*negative item

vi. Safety Satisfaction

Seventeen items were developed to measure the satisfaction of employees regarding the effectiveness of various safety systems in the workplace, such as wearing protective masks, wearing gloves, safety induction, safety audits, workplace design, etc. Table 3.8 shows respondents evaluated the extent of their satisfaction with these 17 safety measures, for example: "Hospital Health and Safety Committee". This indicator was measured subjectively and respondents were required to describe their degree of satisfaction with a 5-point Likert scale ranging from "Highly Dissatisfied" (1) to "Highly Satisfied" (5).

Table 3.8: Safety Satisfaction

	How satisfied are you with the following aspects of the safety system?
1.	Disposable personal protective equipment (e.g. gloves, masks).
2.	Uniforms and aprons.
3.	Lead coats (for x-ray).
4.	Personal alarms.
5.	Police presence.
6.	Security guard presence.
7.	Controlled entry to department/unit/ ward.
8.	Hospital safety induction.
9.	Department/unit/ward safety induction.
10.	Safety audits/inspections.
11.	Hospital Health and Safety Committee.
12.	Department/unit/ward Health and Safety Committee.
13.	Workplace design.
14.	Housekeeping/cleaning.
15.	Competency of co-workers.
16.	Occurrence/incidence reporting system.
17.	Investigation and follow-up measures after injuries and accidents have taken place.

vii. Management Commitment

Table 3.9 illustrates seven items concerning the perceptions regarding the management commitment towards health and safety in the hospital. Responses were made on a 5-point scale ranging from ‘‘Strongly disagree” (1) to ‘‘Strongly agree” (5). 3 items were worded to reflect negative perception about management commitment and the scale was reversed to “strongly disagree” (5) to “strongly agree” (1). For example: “Senior managers seem interested in health and safety only after an adverse event happens”.

Table 3.9: Management Commitment

1.	I know who the Senior Managers are.
*2.	Senior Managers seem interested in health and safety only after an adverse event happens. (Reversed)
3.	The actions of Senior Managers show that health and safety is a top priority.
*4.	Senior Managers put their budget before safety. (Reversed)
5.	Senior Managers genuinely care about the health and safety of people at this hospital.
*6.	The hospital’s procedures are only there to cover the backs of Senior Managers. (Reversed)
7.	I trust Senior Managers to act on safety concerns.

*negative item

viii. Health and Safety Objectives

Five items explain the perceptions about health and safety goals were shown in Table 3.10. For instance: “Top management has set out a clear vision for health and safety in this hospital”. Responses were made on a 5-point scale ranging from ‘‘Strongly disagree” (1) to ‘‘Strongly agree” (5).

Table 3.10: Health and Safety Objectives

1.	Top management has set out a clear vision for health and safety in this hospital.
2.	My supervisor discusses in specific terms who is responsible for achieving performance targets in health and safety.
3.	Top management emphasizes the importance of having a collective sense of mission for health and safety.
4.	Top management articulates a compelling vision of the future for health and safety.
5.	My supervisor makes it very clear what one can expect to receive when performance goals for health and safety are achieved.

ix. Errors and Incidents

Table 3.11 shows fourteen items regarding the perceptions of employees about errors and incidents in the hospital. Seven items concerned errors and seven items described incidents in the hospital. For measuring errors, responses were made on a 5-point scale ranging from ‘‘Strongly disagree” (1) to ‘‘Strongly agree” (5). For surveying errors, 3 items were worded to reflect negative perception about errors in the workplace and the scale was reversed to “strongly disagree" (5) to "strongly agree" (1). For example: "When an event is reported, it feels like the person is being written up, not the problem".

For incident items, two items were used to measure accidents and near misses. Participants were asked to indicate the number of work-related accidents and near misses that they had witnessed in the past 30 days. An association of such accidents or near misses was made across five categories ranging from (1) none; (2) 1 – 2; (3) 3 – 5; (4) 6 – 10; and (5) more than 10.

Participants were also asked to report the number of injuries as a result of the following problems at work: moving and handling; needlestick and sharp injuries; slips, trips or falls; exposure to dangerous substances (including radiation); and work related stress that they experienced in the past 12 months. Exposure to such injuries was calculated as the number of exposures across the five categories ranging from (1) none; (2) 1 – 2; (3) 3 – 5; (4) 6 – 10; and (5) more than 10.

Subjective indicators were selected as it is difficult to acquire objective data since organizations are afraid of making accident data public because of the possible legal outcomes (Fernandez-Muniz et al., 2009). Furthermore, Fernandez-Muniz et al. noted that many studies have used self-reporting elements of safety performance as outcome variables and the results showed positive association between objective and subjective assessment of performance. Vinodkumar and Bhasi (2009) also pointed out that organization accident frequencies are inaccurate for researcher to use due to their under-reporting value.

Table 3.11: Errors and Incidents

Part 1: Errors

1.	We are informed about errors/mistakes that happen in this department/unit/ ward.
2.	In this department/unit/ward, we discuss ways to prevent errors/mistakes from happening again.
3.	We are given feedback about changes put into place based on event/incident reports.
*4.	Staff feel mistakes are held against them. (Reversed)
*5.	When an event is reported, it feels like the person is being written up, not the problem. (Reversed)
6.	Mistakes have led to positive changes here.
*7.	Staff worry that mistakes they make are kept in their personnel file. (Reversed)

*negative item

Part 2: Incidents

8.	In the last month, how many incidents did you see that inadvertently harmed staff?
9.	In the last month, how many errors or near misses did you see that could have harmed staff?
10.	During the last year how many times have you been injured or felt unwell as a result of the following problems at work?
a.	Moving and handling.
b.	Needlestick and sharp injuries.
c.	Slips, trips or falls.
d.	Exposure to dangerous substances (including radiation.)
e.	Work related stress.

x. The Role of a Supervisor

Measures consisting of eleven items related to participants' perception about the role of their supervisor are shown in Table 3.12. Responses were taken on Likert-type five-point scales ranging from "strongly disagree" (1) to "strongly agree" (5). Three items were worded to reflect negative role of supervisor – for example, "Whenever pressure builds up, my supervisor wants us to work faster, even if it means taking shortcuts" were scaled in reverse strongly disagree (5) to strongly agree (1).

Table 3.12: The Role of a Supervisor in Health and Safety Issues

1.	My supervisor says a good word when he/she sees a job done according to established safety procedures.
2.	My supervisor is well qualified in health and safety.
*3.	My supervisor seems interested in health and safety only after an adverse event happens. (Reversed)
4.	My supervisor seriously considers staff suggestions for improving health and safety for workers.
5.	I feel very confident about my supervisor's skills to deal with health and safety issues.
*6.	Whenever pressure builds up, my supervisor wants us to work faster, even if it means taking shortcuts. (Reversed)
7.	The actions of my supervisor show that health and safety is a top priority.
8.	My supervisor is known to be successful at the things he/she tries to do.
9.	I trust my supervisor to act on health and safety concerns.
10.	My supervisor knows about the work that needs to be done.
*11.	My supervisor overlooks health and safety problems that happen over and over. (Reversed)

*negative item

xi. Safety Rules

Table 3.13 contains three items concerning perceptions regarding the safety rules in the hospital. Responses were made on a 5-point scale ranging from ‘‘Strongly disagree” (1) to ‘‘Strongly agree” (5). One item was worded to reflect negative perceptions about management commitment. For example, “The rules are too strict and I can work better without them”.

Table 3.13: Safety Rules

1.	The written safety rules and instructions are easy for people to understand and implement.
*2.	The rules are too strict and I can work better without them. (Reversed)
3.	The rules always describe the safest way of working.

*negative item

xii. The Supervisor’s Leadership Style

A supervisor’s leadership style was measured with ten items as in Table 3.14. Participants indicated on a 5-point scale ranging from (1) ‘‘Not at all”; (2) “Once in a while”; (3) “Sometimes”; (4) “Fairly often”; and (5) ‘‘Frequently if not always”. They were asked to judge how frequent their supervisor performs each style.

Table 3.14: The Supervisor's Leadership Style

	My Supervisor …….
1.	Provides me with assistance in exchange for my efforts.
2.	Instills pride in me for being associated with him/her.
3.	Talks enthusiastically about what needs to be accomplished.
4.	Specifies the importance of having a strong sense of purpose.
5.	Spends time teaching and coaching.
6.	Acts in ways that build my respect.
7.	Gets me to look at problems from many different angles.
8.	Helps me to develop my strengths.
9.	Suggests new ways of looking at how to complete assignments.
10.	Has a strong sense of justice.

xiii. Open-ended Question

The last question that respondents had to answer was open-ended. They were invited to make comments on their workplace occupational health and safety practices.

3.6 The Pilot Study and Expert Judgments

A pilot study was carried out to evaluate every item in the survey in terms of item quantity and overall reliability. Its purpose was to confirm whether the items were easily understood, to ascertain the time required to manage the survey, and to determine its ease of use. The study was done in two phases: (1) distribution of the English questionnaire, and (2) distribution of the Bahasa Melayu questionnaire. The results of this pilot study and comments received from participants were used to modify any unclear wording in the questionnaire. The pilot study was conducted at a district hospital in the northern region of Malaysia: Hospital Jitra, Kedah, Malaysia.

The original scale as in Table 3.15 and the full version as in Appendix 4 was pilot tested on respondents and the safety expert's judgments. Content validity was also examined to ensure that each item really explains the meanings in the concept (Hair, Anderson, Tatham & Black, 1998). Ten safety experts: seven practitioners from various industries and three academicians from three public universities evaluated the items and their suitability in each dimension.

Table 3.15: Factors and total number of items included in the initial instrument

Factor	Description	Number of item	Rating scale
Safety communication	Perception about safety communication including openness in communication	7	1 = strongly disagree to 5 = strongly agree
Training & competence	Attitudes to acquire knowledge and skills about risks in job	6	1 = strongly disagree to 5 = strongly agree
Health & Safety reporting	Attitudes and perception relating to feedback about incidents	8	1 = strongly disagree to 5 = strongly agree
Work pressure	Perceptions of individual job duties relating to safety issues	9	1 = strongly disagree to 5 = strongly agree
Safety satisfaction	Attitudes and perceptions relating to aspects of safety measures in the workplace	17	1 = highly dissatisfied to 5 = highly satisfied
Management safety commitment	Perceptions of management commitment to safety issues	13	1 = strongly disagree to 5 = strongly agree
Errors and incidents	Attitudes and perceptions about errors and incidents in the workplace	14	• 1 = strongly disagree to 5 = strongly agree (errors – 7 items) • Categorical frequency (incidents – 7 items)
Role of supervisor in safety and health	Perceptions of supervisor's role in ensuring safety in the workplace	28	1 = strongly disagree to 5 = strongly agree
Safety rules	Perceptions of rules about safety in the workplace	3	1 = strongly disagree to 5 = strongly agree
Supervisor's leadership style	Perceptions of leadership style in ensuring safety in the workplace	14	1 = not at all to 5 = frequently
TOTAL		119	

3.7 The Administration of the Survey Instruments

In order to have a good total response, data collection procedure must be well administered.

3.7.1 The Data Collection Procedure

Data were collected from Malaysian state hospital employees stratified by occupational groups: doctor, nurse, medical officer, management officer, medical support staff and management support staff. In an effort to increase total response, a letter of support from the Director General of Health, Malaysian Ministry of Health was obtained prior to data collection (refer Appendix 6). Administration of the survey was conducted by the researcher.

Firstly, as the researcher required a list of employees' names from the three state hospitals, letters were written to the Directors of the State Hospitals (Perlis, Kedah and Pulau Pinang) requesting their consent for a name list of hospital employees. Two weeks after appointments with respective Human Resources (HR) departments of each state hospital, the researcher received a contact list of hospital employees. From the list, a sample was chosen using stratified proportionate random sampling according to occupational groups: doctor, nurse, medical officer, management officer, medical support staff and management support staff. The random number table was used to attain this sample. The researcher then destroyed the contact list as it was confidential.

Secondly, the researcher distributed the Information sheet (Appendix 7) and consent form (Appendix 8) to the selected respondents. Two weeks prior to the distribution of the survey, all selected employees received a letter (as per the information sheet in Appendix 7) with two copies of consent forms (one for the researcher and one for the participant's record) asking for their participation in the survey. The information sheet was to assist in making informed choices. Employees were told that the study was designed to assess their perceptions on the health and safety practices in their hospitals. To encourage frankness, employees were given written assurance that their responses would be kept confidential. The consent form explained that participants may withdraw from the study at any stage and withdrawal would not interfere with routine care of the survey. A week later, the researcher collected the signed consent forms.

Lastly, the researcher distributed the survey to the participants who had indicated their agreement to participate in the survey. Due to the travelling time to the hospitals, the survey was delivered in three stages: (1) Hospital Tuanku Fauziah, Kangar, Perlis; (2) Hospital Sultanah Bahiyah, Alor Setar, Kedah; and (3) Hospital Pulau Pinang, Georgetown, Pulau Pinang. A survey packet containing a covering letter, a set of questionnaires and a postage-paid return envelope were delivered to respondents through inter-office mail. To increase the survey's total response, follow-ups were performed using the codes on the returned envelope. Three weeks after the surveys were first distribute, the researcher sent a reminder notice to all participants. Two weeks later, the researcher made reminder telephone calls to those employees who had not completed the survey.

3.8 Analysis of the Data

The data analysis was done using statistical analysis from the Statistical Package for Social Science (SPSS) version twelve and AMOS version 4.0 (Arbuckle, 1999). Significance was set at a two-tail with an alpha level of 0.05. There are two levels of analysis: (1) validity and reliability analysis using SPSS and AMOS; and (2) hypotheses testing using SPSS.

For the first stage, reliability testing focused on internal consistency for all instruments using Cronbach's alpha. To assess the validity of the instrument, analysis such as content validity, concurrent validity, and construct validity have been utilized. A priori of analyzing exploratory factor analysis and confirmatory factor analysis (measurement model and structural model) was decided for this study.

The second stage of the analysis involved the chi-square test of independence and logistic regression.

The following are the processes undertaken before and during data analysis.

3.8.1 Data Screening

Before proceeding to the statistical analysis, raw data must be examined to ensure its accuracy. Some of the steps considered were:

i. Data Cleaning Process

To ensure the accuracy of the data being coded and entered into the data file, a verification procedure was completed during which data were examined using descriptive statistics and graphic representations of the variables (Tabachnick & Fidell, 2007). Data cleaning can be achieved by frequency tables, histograms, bar stem-and-leaf displays, and box plots (Meyers, Gamst, & Guarino, 2006). Summarization of variable values can be obtained from a frequency table, for example, demographic variables. Descriptive methods were used to simplify and characterize the data through measures of central tendency, variability, association and graphic displays. Stem-and-leaf plots give visual description of a variable's distribution. Excessive scores can be recognized from the box plots.

The researcher produced frequencies of responses to each item and looked for out-of-range values for responses as this survey required a response between 1 and 5. The values of each variable must be "within range", i.e. within the valid values range.

ii. Missing Data

Missing data is a common problem in data analysis and thus must be taken care of as it has a negative effect on statistical power and the end result is biased statistical findings such as upward or downward measures of central tendency, and downward correlation coefficients (Tsikriktsis, 2005). Some of the reasons for the missing values were: errors in data entry, respondents refused to answer certain sensitive questions like income, the failure of respondents to complete the whole questionnaire, and respondents had no opinions or possessed inadequate information to answer the question (Hair et al., 1998, Tabachnick & Fidell, 2007, Tsikriktsis, 2005).

The researcher used descriptive statistics as an investigative tool to identify the randomness of missing data where examination of variables with and without missing data was distinguished.

The method of addressing missing data used by researcher in this study was mean substitution where all missing values were replaced with the mean of that variable.

iii. Treatment of outliers

Outliers are cases with extreme values on a single variable (univariate) or on a combination of variables (multivariate) (Meyers, Gamst & Guarino, 2006). Some causes of outliers are data entry errors, unusual events, unexplainable observations, unusual or unique combine patterns (Hair et al., 1998). Univariate outliers were identified by examining the frequency distribution or box plot of each variable (Tabachnick & Fidell, 2001). Multivariate outliers were detected using Mahalanobis distance statistics where each case is evaluated using a chi-square distribution with a stringent alpha level of 0.001 (Hair et al., 1998, Tabachnick & Fidell, 2001). A possible solution for these outliers is elimination (Meyers, Gamst & Guarino, 2006).

The treatment of multivariate outliers for this study was done through SPSS regression using the Mahalanobis distance where the outliers were evaluated using the chi-Square distribution (Tabachnick & Fidell, 2001). Case label (IDRes) was used as the dummy dependent variable and the remaining variables were treated as independent variables (Tabachnick & Fidell, 2001). The decisive factor for multivariate outliers is Mahalanobis distance at $p < 0.001$ and it is measured as χ^2 with degrees of freedom equivalent to the number of variables, in this study: 94 variables. To determine the multivariate outliers, the Mahalanobis distance must be greater than χ^2 . Table 3.16 shows an example of the Mahalanobis distance results.

Table 3.16: Results of Mahalanobis distance

min = 22.239	max = 263.664
Chi-Square value = χ^2 (DF, p-value) = χ^2 (94, 0.001) = 142.119	
Multivariate Outlier = Mahalanobis Distance > Chi-Square value = 263.664 >142.119	

iv. Normality

The data obtained was analyzed for normality to ensure its suitability using standard univariate analysis. Normality of data can be examined through statistical approaches like skewness and kurtosis, the Kolmogorov-Smirnov test and graphical approaches, for example, histograms, stem-and-leaf plots, and box plots. The variable's frequency value distribution should approximate the bell-shaped curve or a straight diagonal line (Hair et al., 1998, Meyers, Gamst & Guarino, 2006, Tabachnick & Fidell, 2001).

As stated by Hair et al. (1998, p. 23), sample size affects a study's finding where the outcome of a smaller samples are either (1) "too little statistical power for the test to realistically identify significant results" or (2) "too easily 'overfitting' of the data that they fit the sample very well but yet have no generalizability". Large sample sizes of more than 200 to 400 respondents also have disadvantages for they can "make the statistical tests overly sensitive due to the increased statistical power from the sample size" (Hair et al., 1998, p. 23).

v. Data Transformation

Data transformation is used to modify variables that violate the statistical assumptions of normality, linearity, and homoscedasticity (Hair et al., 1998). The square root is applied to correct a moderate violation, logarithms are used for a more extensive violation, and an inverse square root is utilized to deal with a serious violation (Meyers, Gamst & Guarino, 2006). Square root and logarithm transformations were utilized to accommodate skewed data in this study (refer to Appendix 13).

3.8.2 The Reliability and Validity of the Instruments

The reliability and validity of a questionnaire is a vital process. This study utilized Cronbach's alpha to measure the reliability of the instruments. For validity, this study utilized content validity, construct validity, and concurrent validity. Content validity was measured using the assessments of safety experts. Construct validity (factor analysis) used exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) while concurrent validity used correlation.

Reliability is the correlation between two scores ranging from 0 to 1.00 where Cronbach's alpha is the most common form of internal consistency reliability coefficient. A lenient cut-off of 0.60 is common in exploratory research; the generally agreed upon lower limit for alpha is 0.70 (Hair et al., 1998) and many researchers require a cut-off of 0.80 for a "good scale" (Dawson & Trapp, 2004). Thus, the cut-off alpha for this study during the pilot survey is 0.60 and any measures below 0.60 were modified to ensure the questionnaire was clear and understood by participants.

Content validity refers to the degree to which a test measures an intended content area and is determined by expert judgment. In other words, content validity is the extent to which the questions measure all the important aspects of the concepts. Thus, to ensure all the items really measure what they intend to measure, the content validity of the instrument was administered according to the following: (1) safety experts were identified from public universities and the industrial sector; (2) 119 questionnaire items were prepared under the content heading of the following: communication, work duties, safety satisfaction, hospital management, errors and incidents, the role of the supervisors, training and competence, safety rules, reporting, and the supervisor's leadership style; and (3) the safety experts examined the listing to obtain expert opinions.

There are two types of factor analysis: exploratory and confirmatory (Worthington & Whittaker, 2006). Construct validity in this study was tested by exploratory factor analysis (EFA), and confirmatory factor analysis (CFA) to verify whether the scale measure the intended constructs (Worthington & Whittaker, 2006). Exploratory factor analysis is an inductive strategy (bottom-up approach) used for summarization and data reduction where the data is illustrated in smaller numbers of concepts compared to the original variables, while confirmatory factor analysis is a deductive strategy (top-down approach) to verify the instrument's construct validity (Meyers, Gamst & Guarino, 2006). To execute factor analysis, the sample must be 100 or greater or a minimum of five-to-one ratio between case and variable (Hair et al., 1998, Tabachnick & Fidell, 2007).

The following defines the steps taken by this study in determining its Exploratory Factor Analysis (EFA) process:

1. Identify the items to be used in EFA
2. Examine the correlation matrix to be used for an EFA (Bartlett-Test, anti-image-correlation-matrix, Kaiser-Meyer-Olkin-Criteria [KMO])
3. Select type of analysis:
   - extraction – First phase use Principal Components Analysis, second phase use Principle Factor Analysis
   - rotation – First phase use varimax method (orthogonal), and second phase use oblimin method (unorthogonal)
4. Determine the number of factors via:
   - screen plot
   - eigen values (number factors with eigenvalues of 1.00 or higher) and percentage of variance explained
5. Identify which items belong in each factor through the factor loadings
6. Drop items as necessary and repeat steps 4 to 5 until the number of factors are achieved (use the number of factors that the theory would predict)
7. Repeat steps 3, 4 and 5 for the second phase
8. Name and define the factors
9. Examine the correlations amongst the factors
10. Examine the internal reliability for each factor

For exploratory factor analysis, in the first phase, principal components extraction with varimax rotation was employed to reduce the data into factors that distinguish them into specific scales (McDonald, Corrigan, Daly & Cromie, 2000; Tabachnick & Fidell, 2007). Varimax rotation is an orthogonal rotation with an assumption that all the items are uncorrelated (Tabachnick & Fidell, 2007).

In the second phase, principal axis factoring analysis with oblique rotation was used to establish the factor structure of the measurement (Tabachnick & Fidell, 2007). Direct oblimin is an unorthogonal rotation with an assumption that all the items are correlated (Tabachnick & Fidell, 2007). The principle axis factoring extraction is used for the development of new scales and is better generalized to confirmatory factor analysis (Worthington & Whittaker, 2006).

The minimum level of factor loadings must be more than ± 0.30, loadings of ± 0.40 is significant and loadings of ± 0.50 or greater are most significant (Hair et al., 1998). However, sample size plays a major role in determining significant factor loadings. Loadings of 0.30 is considered significant for a sample sizes of 350 or greater (Hair et al., 1998). The Kaiser-Meyer-Olkin (KMO) test was used to estimate whether the data was suitable for analysis and the level of KMO must be 0.50 and above (Tabachnick & Fidell, 2007; Varonen & Mattila, 2000).

The steps taken in a Confirmatory Factor Analysis (CFA) are:

1. Identify the items to be used in CFA (based on final result in EFA)
2. Select type of analysis:
   a. Measurement model – to confirm the instrument's construct validity as identified by exploratory factor analysis (EFA) by testing the relationships between the measures (i.e., manifest/observed variables) and the constructs (i.e., latent variables)
   b. Structural model – to determine direct or indirect relationship between all latent variables
3. Measurement model analysis was done first – every latent variable (safety satisfaction and feedback; safety incident/accident; supervisor's leadership style; role of supervisor; training and competence; health and safety objectives; management commitment; and safety reporting) was measured individually with its manifest/observed variables and the associated errors.
4. Construct a path diagram between the latent variable and its observed variables and the measurement errors
5. Identify the fit indices to ascertain the appropriateness of the model using indices like Chi-square (χ^2), χ^2 p-level, cmin/df ratio, root-mean-squared-error of approximation (RMSEA), goodness-of-fit index (GFI), comparative fit index (CFI), normed fit index (NFI), Tucker-Lewis Index (TLI)
6. If model is not fit, use modification indices (MI) to improve its fit indices

7. Repeat steps 4, 5 and 6 for the structural model. Step 4 consists of a diagram between all latent variables to determine its relationship

3.8.3 Hypotheses Testing

To test the interrelationships between research variables, logistic regression analysis was utilized. Further analysis included correlation testing to determine the associations between each response in each respective variable. Other tests also included the chi-square test of independence to determine the relationship and differences of two variables and descriptive statistics to simplify and characterize the data.

3.9 Ethical Issues

Prior to data collection, participants were informed of the purpose of this study through an information sheet (Appendix 7) to assist participants to make informed choices. They were requested to take part in the study, informed that their participation was voluntary and that they had the right not to answer any questions or withdraw at any time from this study. They were also informed that their names would not be recorded and given assurance that their responses would be kept confidential. Participants who confirmed their agreement to participate in the survey were asked to sign a consent form (Appendix 8). The data and information regarding this study will be treated as confidential and kept safe in locked storage for the required period. Ethical approval of this study was endorsed by the Human Research Ethics Committee at Curtin University of Technology (Appendix 9). There is no ethics approval process from the public hospitals in Malaysia which do not require the reporting of the Australian review body's approval.

3.10 Summary

In this chapter, the researcher illustrated the research design of the study specifically the sampling method. The sample was Malaysian state hospital employees stratified by occupational groups: doctor, nurse, medical officer, management officer, medical support staff and management support staff. Next, the development of the survey instrument and the administration of the survey instrument particularly the data collection process were described. Subsequently, a pre-test of the questionnaire was carried out. Then, various phases of the data analysis process, including construct validity, correlation and hypotheses testing were clarified. Finally, the ethical concern was highlighted.

CHAPTER 4

RESEARCH FINDINGS

4.0 Introduction

This chapter illustrates data analysis outcomes. The first part gives an overview of the data collected. Next, the respondents' profile is described. Descriptive statistics and analysis on the goodness of measures to test the validity and reliability of the variables follow. Finally, the results of hypotheses testing are expressed.

4.1 Summary of Data Collection

The following clarifies the number of response, response bias, and normality test of the survey.

4.1.1 Number of return

A total of 969 questionnaires were distributed to public hospital employees from three state hospitals in the northern region of Malaysia. Responses were received from 536 employees, a response of 55.3% (refer Table 4.1). A further 118 responses were excluded from the survey due to:

- Many unanswered items in different sections throughout the whole survey (7 responses).
- Many two rating scales, e.g., "4"s and "3"s in different sections throughout the entire survey (9 responses).
- Did not answer any items throughout the entire survey (102 responses).

Only 418 usable returns were used for analysis representing a total response of 43.15%. Although this response was low, however, currently, most studies tend to have lower total response, for example, Bottani, Monica and Vignali's (2009) survey on performance differences between adopters and non-adopters of safety management systems had 23.2% responses; 22.4% for small size enterprises and 14.06% for medium size enterprises in Kongtip, Yoosook and Chantanakul's (2008) survey; Havold and Nesset (2009) found from Newell et al.

(2004) survey on the Navy Equal Opportunity/Sexual Harassment that the number of response dropped from 60% in 1989 to 30% in 1999; and the total response in Vassie, Tomas and Oliver's (2000) study was 11.4% and 13.9% in UK and Spanish, respectively. According to researchers from Malaysia, a total response of between 15 – 25 percent is what most researchers in Malaysia receive (Rozhan, Rohayu & Rasidah, 2001). Even, McFarlane, Olmsted, Murphy and Hill (2006) noted from a survey by Cull, Karen, O'Connor, Sharp and Tang (2005) that the total response among physicians have dropped.

Table 4.1: Total return of the survey

Hospital	Sample size	Initial returns	Unused returns	Useable returns
Hospital Sultanah Bahiyah, Alor Setar, Kedah	331	161	7	154
Hospital Tuanku Fauziah, Kangar, Perlis	297	216	9	207
Hospital Pulau Pinang, Georgetown, Pulau Pinang	341	159	102	57
TOTAL	**969**	**536**	**118**	**418**

Tables 4.2, 4.3, and 4.4 as in Appendix 10 show the total of return from the respective state hospitals according to post. Nurses were the majority respondents in Hospital Sultanah Bahiyah, Alor Setar, Kedah and Hospital Tuanku Fauziah, Kangar, Perlis while management supporting staff were the majority respondents in Hospital Pulau Pinang, Georgetown, Pulau Pinang. Table 4.5 in Appendix 10 shows the overall response from the three state hospitals according to post and nurses were the majority respondents in this survey (182 out of 418 responses). This might be due to higher proportion of sample selection during data collection.

4.1.2 Test of Non-Response Bias

For a survey research, "it is very important to pay attention to response rates" (Groves, 2006, p. 647). Thus, the test of non-response bias is to discover possible bias in the sample as it might be in conflict with survey generalizability and validity (Thomsen, 2000) as those who respond to surveys answer questions in a different way than those who do not. In other words, if the non-responders are significantly different from responders, then there is a possiblility of bias in the survey (McFarlane, Olmsted, Murphy & Hill, 2006). Furthermore, Holbrook, Krosnick and Pfent (2008, p. 500) expressed that "non-response bias will occur if respondents and non-respondents differ on the dimensions or variables that are of interest to the researchers" and "non-response bias can lead to inaccurate conclusions if data from the non-respondents would have changed the overall results of the survey" (Draugalis & Plaza, 2009, p. 2). However, as stated by McFarlane, Olmsted, Murphy and Hill (2006, p. 4175), "low total response are not necessarily an indicator of response bias.

There are many ways to assess non-response bias in a survey: (a) compare respondents' characteristics with known population parameters using sampling weight; (b) compare the characteristics of respondents in a survey (subjective estimates); and (c) extrapolating the attributes of non-responders based on the respondents traits using successive waves of a survey and time trends analysis (Armstrong & Overton, 1977).

Four demographic variables (gender, ethnicity, level of education, and length of employment) were chosen to test the non-response bias as they were available and significant to the survey assessment (McFarlane, Olmsted, Murphy & Hill, 2006). A chi-square test was used to measure the early and late responders based on the four demographic variables. Late responders were classified based on the returned questionnaire after a follow up was done by reminder notice and telephone to increase the number of response. Late responders play a role in poor data quality and were seen as less reliable (Chandhok, 2008, p. 2098) and can be categorized as unwilling respondents or similar to non-respondents (Armstrong & Overton 1977, Draugalis & Plaza, 2009).

Table 4.6 shows the results of the non-response test. From the table, the p-values disclosed no statistical significant ($p > 0.05$) between the late and early responders, thus, the analysis was performed on all the 418 respondents.

Table 4.6: Chi-Square test for early and late responses

Variables	χ^2	**p-value**
Gender	0.254	0.614
Ethnicity	4.959	0.175
Level of education	5.141	0.076
Length of employment	0.448	0.799

Note: The critical values were not significant

Besides the chi-square test, an independent sample t-test was also used to determine whether significant differences exist in the mean score for selected variables in this study among the early and late responders. From Table 4.7, it was shown that the early and late responders did not differ in terms of their responses to the study variables. Therefore, all the 418 respondents can be used in the analysis.

Table 4.7: Differences in major variables by early and late responses (Independent t-test)

Variables	Early responses (N=284) M (SD)	Late responses (N=134) M (SD)	t-value	p-value
Supervisor's leadership style	3.13 (0.85)	3.05 (0.89)	0.982	0.327
Role of supervisor	3.54 (0.62)	3.46 (0.59)	1.278	0.202
Health and safety objectives	3.57 (0.62)	3.48 (0.64)	1.332	0.184

4.1.3 Normality Test

Appendix 13 (refer Tables 4.8 - 4.13) demonstrates the normality test for all the items used in this survey. The tables show that most of the items skewed negatively or positively. For the positive skewed items, square root was applied to correct the violation while the negative skewed items were corrected using logarithm transformations.

4.2 The Demography of Respondents

Table 4.14 in Appendix 11 reveals the demographic information where the majority of respondents were above the age of 40. About 78.7% (female) and 21.3% (male) comprised all six ethnic groups of Malaysians, namely Malay (85.4%), Chinese (8.4%) and others (6.2%). The majority of respondents were diploma holders (38.5%), and 35.2% Malaysian Certificate of Education (MCE) holders. Job positions of the respondents were physicians, radiographers, paramedics, pharmacists, respiratory therapists, nurses, and supporting staff (43.5% of the respondents worked as nurse). About 36.8% of employees have worked between 1 to 5 years.

Table 4.15 in Appendix 11 shows the working mode and duration of the respondents. Generally employees work for five to six days per week. About 52.6% of employees worked between 21 to 40 hours per week. As for the working mode, the majority worked in 3-shift work (51.2%) while 48.8% worked in normal shifts.

4.3 Safety Experts' Feedback and the Pilot Survey

The original scale of 119 Likert-type items was subjected to a pilot study and safety experts' evaluation. From the survey, items were removed if they were reflected as inappropriate, redundant, and confusing or consisted of extremely low item-total correlations. Some items were perceived clear and relevant but needed modification as some in certain dimensions were rather too long.

Safety experts reviewed whether the items reflect the content domain implied by their label. Accordingly, further items were refined to eliminate related items across categories and 25 items were deleted from the initial group of 119. As a result, the final version was 94 items. Table 4.16 as in Appendix 12 illustrates summary of feedback from safety experts regarding items in all the dimensions and their suggestions for each item according to the theme.

Table 4.17 shows the final version of the instrument after modification based on feedback from safety experts and the pilot study, which groups the components into the following twelve sections: communication, safety responsibility, work duties, safety satisfaction, management commitment, health and safety goals, errors and incidents, role of supervisors, training and competence, safety rules, reporting, and supervisor's leadership style. The results revealed that "the role of the supervisor" dimension had the most deleted items, i.e. 14.3 percent (17 items). Overall the total number of items eliminated from specific factors were 21.0 percent (25 items) and 10 items (8.4 percent) were relocated to another factor to ensure the items were with the appropriate theme.

4.4 The Validity and Reliability of the Instrument

This study used exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to test the validity of the instrument. Types of EFA used in this study were content validity; concurrent validity; and construct validity. Internal consistency reliability was used to test the reliability of the scale.

Table 4.17: Summary of feedback from safety experts and the pilot study regarding items in the safety climate dimension

Factor	Total items in original scale	% of items deleted from the factor	% of items relocate to another factor	% of items taken from another factor	Total items in revised scale
Safety communication	7	-	0.8 (1)	0.8 (1)	7
Training & competence	6	-	1.7 (2)	-	4
Health & safety reporting	8	2.5 (3)	-	-	5
Work duties	9	0.8 (1)	-	-	8
Safety satisfaction	17	-	-	-	17
Management commitment	13	3.4 (4)	1.7 (2)	-	7
Errors and incidents	14	-	-	-	14
Role of supervisor	28	13.5 (16)	0.8 (1)	-	11
Safety rules	3	-	-	-	3
Supervisor's leadership style	14	0.8 (1)	3.4 (4)	0.8 (1)	10
Health & safety goals	-	-	-	4.2 (5)	5
Safety responsibility	-	-	-	2.6 (3)	3
TOTAL	119	21.0 (25)	8.4 (10)	8.4 (10)	94

4.4.1 Exploratory Factor Analysis (EFA)

This study utilized exploratory factor analysis (EFA) to examine the factorial validity of the constructs. The following process of EFA was done:

i. All 94 items of the final instrument were analyzed using factor analysis in SPSS software.

ii. There are two phases of factorial: (i) all the items were submitted to an exploratory factor analysis with principle components extraction and varimax rotation to summarize and reduce a large number of variables down to a smaller number of components, (ii) the remaining items were then factorized using principle axis factoring extraction and direct oblimin rotation to establish the factor structure of the measurement.

iii. Observe Bartlett-Test (significant must be less than 0.05), Kaiser-Meyer-Olkin-Criteria [KMO] (value must be more than 0.60), and anti-image-correlation-matrix: measures of sampling adequacy (MSA) value must be near or more than KMO value during the first phase of the factor analysis.

iv. Observe the number of factors via:
    a. screen plot
    b. Total variance explained table - to determine eigenvalues of 1.00 or higher and percentage of variance explained

v. Items in each factor were examined through the factor loadings in rotated component matrix table.

vi. In the anti-image-correlation-matrix table, items were dropped when the MSA value was less than the KMO value.

vii. Steps 3 to 6 were repeated until the number of factors as the theory were achieved

viii. Steps 3 to 6 were repeated for the second phase in the final analysis.

ix. From the rotated component matrix table, only factor loadings of more than ± 0.30 were taken and the factors were labeled.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy for this survey was greater than 0.60 and the Bartlett's test of sphericity was significant (Tabachnick & Fidell, 2007; Varonen &

Mattila, 2000). The anti-image correlation matrix demonstrated that all measures of sampling adequacy (MSA) were above the acceptable level of 0.50. Therefore, it was appropriate to factor analyze the data.

The following are the results of the EFA for dependent and independent variables during the second phase of factor analysis.

i. Exploratory Factor Analysis (EFA) for Dependent Variables

A priori criterion was set according to the number of factors extracted, i.e. 2 factors. This technique is practical when a study tries to test a theory or replicate another study (Hair et al., 1998).

Thirty one items of the dependent variables were submitted to an exploratory factor analysis with principle axis factoring extraction and direct oblimin rotation. Table 4.18 in Appendix 14 shows the factor analysis for the items in the dependent variables; where the rotated solution demonstrated two factors which together explained 32.67%: (1) safety satisfaction and feedback (21 items, $\alpha = 0.910$), and (2) safety incident/accident (7 items, $\alpha = 0.762$). The items left for analysis were only 28 items.

The results suggested that four items from the safety incidents dimension were factored into the safety satisfaction dimension, thus the new factor was renamed as safety satisfaction and feedback. A further three items from the safety incidents dimension were eliminated from the scale as the factor loadings were lower than 0.30 (SI4 = -0.147, SI5 = 0.222, SI7 = -0.090). The KMO measure of sampling adequacy for the dependent variables was 0.860 and the Bartlett's Test of Sphericity was significant ($\chi^2 = 5733.82$, df = 465, $p < 0.000$). The measures of sampling adequacy (MSA) were in the range of 0.712 to 0.935.

ii. Exploratory Factor Analysis (EFA) for Independent Variables

The 63 items of independent variables were first submitted to an exploratory factor analysis with principle components extraction and varimax rotation. During factor analysis with principle components extraction and varimax rotation, 22 items were dropped, thus only 41 items were left. These 41 items were then factorized using principle axis factoring extraction and direct oblimin rotation. A further two items from the safety rules dimension were eliminated from the instrument as one item had a factor loading lower than 0.30 (rule1 = 0.247) while another item (rule2 = -0.315) was a single item in a factor. A retained factor must have at least three items to define a factor (Seo et al., 2004; Varonen & Mattila, 2000).

Thirty nine items were factored into six factors which explained 54.40% of the variance: (1) the role of the supervisor (8 items, $\alpha = 0.913$), (2) a supervisor's leadership style (10 items, $\alpha = 0.945$), (3) training and competence (6 items, $\alpha = 0.823$), (4) health and safety objectives (5 items, $\alpha = 0.877$), (5) management commitment (5 items, $\alpha = 0.740$), (6) safety reporting (5 items, $\alpha = 0.764$).

From Table 4.19 in Appendix 14, the results suggested that the role of the supervisor only maintained 8 out of 11 items. The supervisor's leadership style retained its ten items while health and safety objectives sustained its 5 items. The result also revealed that two items from safety involvement was factored into the training and competence dimension. The items factored into this dimension give the impression that safety involvement is considered as part of the competence dimension needed to ensure involvement and commitment towards safety in the workplace. Furthermore, the original scale developed by Flin, Mearns and Burns (2004) included these items in the training and competence dimension.

As for the management commitment factor, it can be seen that this factor retained 4 out of 7 items and one item from safety communication dimension factored into management commitment dimension. This item was originally included in the management commitment scale as per Flin, Mearns and Burns (2004) instrument. Furthermore, support from management toward safety activities in the workplace is crucial. Lack of commitment from management is linked with higher industrial accident (Cooper, 1995) and gives the notion that unsafe actions or attitude towards safety do happen in organizations. One item from work pressure dimension was factored into the safety reporting dimension and this factor was labeled as safety reporting. This is so as one item from the work pressure dimension was only a general question regarding inclusion of health and safety issues while performing tasks.

The KMO measure of sampling adequacy for the independent variables was 0.937 and the Bartlett's Test of Sphericity was significant (χ^2 = 10,742.89, df = 820, p < 0.000). Measures of Sampling Adequacy (MSA) were in the range of 0.817 to 0.966.

4.4.2 Internal Reliability

The internal consistency reliability coefficient for all instruments was calculated using Cronbach's alpha. With all items in the original scale, the Cronbach's alpha for the pilot study was 0.948 (n = 52).

Table 4.20 presents the Cronbach's alpha, mean and standard deviation for the summated scale of the final instrument after factor analysis. The Cronbach's alpha for all dimensions in the scale were in the range of 0.740 to 0.945. Overall, Cronbach's alpha for the scale was 0.949. Thus, the coefficient of the revised instrument was above the acceptable level of 0.70 (Hair et al., 1998). The table also shows that the highest mean was contributed by safety reporting (mean = 3.90, SD = 0.52) while the lowest mean was from the safety incident/accident dimension (mean = 1.58, SD = 0.54).

4.4.3 Concurrent Validity

Bivariate correlations were used to analyze concurrent validity between independent variables and two outcome factors (Cooper & Schindler, 2008; Johnson, 2007; Seo et al., 2004). The item-level analysis from Table 4.21 in Appendix 15 reveals that some items showed weak or negative relationships with other items in the measurement. Although safety incident/accident associated negatively and some weakly with all dimensions of the independent variables and safety satisfaction and feedback (dependent variable), they also substantiated a predictive relationship. For instance, the negative correlation between safety incident/accident (dependent variable) and the independent variables such as the role of the supervisor (r = -0.156; p > 0.01); health and safety objectives (r = -0.175; p > 0.01); management commitment (r = -0.225; p > 0.01); safety reporting (r = -0.106; p > 0.05); and safety satisfaction and feedback (r = -0.123; p > 0.05) indicated that improvement in the independent variables predicted a decreased in the safety incident/accident. In addition, a positive relationship between independent variables implicated enhanced independent variables and thus predicted an increased in the dependent variable, i.e. safety satisfaction and feedback (refer Table 4.21 in Appendix 15).

The direction of these associations was consistent with prior studies (Huang et al., 2006; Johnson, 2007). Kline (2005) indicated that the non-significant relationships between independent variables and safety incident/accident (dependent variable) might be due to the consequence of mediating variables (as cited in Johnson, 2007). Thus, structural equation modeling was used to test this analysis to determine whether mediator variables existed in this study. It was found that there was a direct relationship between all the independent variables with the outcome variables: safety satisfaction and feedback, and safety incident/accident.

The correlation analysis indicated that scores on the 6 dimension scales of the independent variables were generally moderately dependable. Further, the association between all items was not near unity (correlation value not equal to 1), thus implying that the instruments are not measuring a single construct (von Thaden et al., 2003). A correlation of less than 0.20 revealed a weak association (Sorra & Nieva, 2004), for example, safety incident/accident with safety reporting = -0.106; role of supervisor = -0.156; health and safety objectives = -0.175; and safety satisfaction and feedback = -0.123. It was also found that safety incident/accident did not correlate with two independent variables: leadership style ($r = -0.004$; $p > 0.05$); and training and competence ($r = -0.073$; $p > 0.05$).

Table 4.20: Summary of statistics and Cronbach's alpha

Dimension	# of item	Mean	SD	α
Safety satisfaction and feedback	21	3.5222	0.50890	0.910
Safety incident/accident	7	1.5783	0.53795	0.762
Role of supervisor	8	3.5161	0.60841	0.913
Supervisor's leadership style	10	3.1060	0.86490	0.945
Training and competence	6	3.6958	0.59777	0.823
Health and safety objectives	5	3.5402	0.62893	0.877
Management commitment	5	3.5435	0.58754	0.740
Safety reporting	5	3.8995	0.57847	0.764
TOTAL	67	**OVERALL α**		0.949
Dependent Variables	28			0.861
Independent Variables	39			0.949

4.4.4 Confirmatory Factor Analysis (CFA)

To further validate the instrument structure, a confirmatory factor analysis (CFA) was conducted through the use of AMOS 4.0 (Arbuckle, 1999). The following process of CFA was carried out:

i. All the 94 items during the final analysis in exploratory factor analysis (EFA) were used in CFA. The same factor structures proposed by EFA were used in the CFA analysis.
ii. Two types of analysis were done accordingly:
   a. The measurement model was done first to confirm the instrument's construct validity as identified by exploratory factor analysis (EFA)

b. The structural model was done in the second stage after the measurement model was adequately fit to determine the direct or indirect relationship between all latent variables

iii. For the measurement model analysis, a path diagram was constructed for every latent variable (safety satisfaction and feedback; safety incident/accident; the supervisor's leadership style; the role of the supervisor; training and competence; health and safety objectives; management commitment; and safety reporting) with their manifest/observed variables and the associated errors. This analysis was done individually for every latent variable.

iv. Fit indices like Chi-square (χ^2), χ^2 p-level, cmin/df ratio, root-mean-squared-error of approximation (RMSEA), goodness-of-fit index (GFI), comparative fit index (CFI), normed fit index (NFI), Tucker-Lewis Index (TLI) were identified to ascertain the appropriateness of the model

v. Modification indices (MI) were used when the model was not fit in order to improve its fit indices

vi. Steps 3 to 5 were repeated for the structural model. Step 3 consisted of a diagram between all latent variables to determine its relationship

Eight measurement models of this survey were tested as in step 3 to confirm the instrument's construct validity as identified by exploratory factor analysis (EFA). Measurement models test relationships (i.e., paths) between the measures (i.e., manifest/observed variables) and the constructs (i.e., latent variables) (Tabachnick & Fidell, 2007). Items with factor loading below 0.3 were considered not significant and eliminated from the measurement model (Hair et al., 1998).

There are three types of goodness-of-fit measures: "(1) absolute fit measures – measures the overall model fit, both structural and measurement models, with no adjustment for the degree of overfitting that might occur; (2) incremental fit measures – compare the proposed model to baseline model specified by the researcher; and (3) parsimonious fit measures – adjust the measures of fit to provide comparison between models with differing numbers of estimated coefficient" (Hair et al., 1998, p. 611).

From previous studies, Byrne (2001), Hair et al. (1998), Nasser & Wisenbaker (2003) and Tabachnick & Fidell (2007) reported the acceptable cutoff values for the fit indices as per Table 4.22 in Appendix 16. Usually most studies reported multiple indices as good-fitting models give a reliable outcome, and comparative fit index (CFI) and root-mean-squared-error of approximation (RMSEA) are often reported (Tabachnick & Fidell, 2007). This study reported numerous goodness-of-fit indices suggested by researchers to assess measurement adequacy: chi-square (χ^2), χ^2 p-level, cmin/df ratio, root-mean-squared-error of approximation (RMSEA), goodness-of-fit index (GFI), comparative fit index (CFI), normed fit index (NFI), Tucker-Lewis Index (TLI). Since χ^2 is sensitive by sample size, which will yield an inflated chi-square statistic or Type I error, it is recommended to use other fit indices too (Evans, Glendon & Creed, 2007; Hsu et al., 2008).

4.4.4.1 Dependent Variables

There are two dependent variables in this study: (a) safety satisfaction and feedback; and (b) safety incident/accident. The following shows the confirmatory factor analysis (CFA) for both dependent variables.

i. Safety Satisfaction and Feedback

The safety satisfaction and feedback dimension identified through the exploratory factor analysis contained twenty one items, where four items from safety feedback dimension were factored into the safety satisfaction dimension. The results of the confirmatory factor analysis (CFA) for this dimension are shown in Figure 4.1. The diagram shows that the factor loading of each observed variable was from 0.53 to 0.92.

The CFA for this latent was conducted on the parceling level of analysis. Item parceling was used to aggregate two or more items together as an alternative to improve model fit (Meade & Kroustalis, 2006; Worthington & Whittaker, 2006). Furthermore, item parceling is more reliable and normally distributed (Hall, Snell & Foust, 1999). Item parceling was established according to the systematic random selection from similar domains (Fletcher & Perry, 2007). Five parcels were created to represent the safety satisfaction and feedback dimension as in Table 4.23 in Appendix 16.

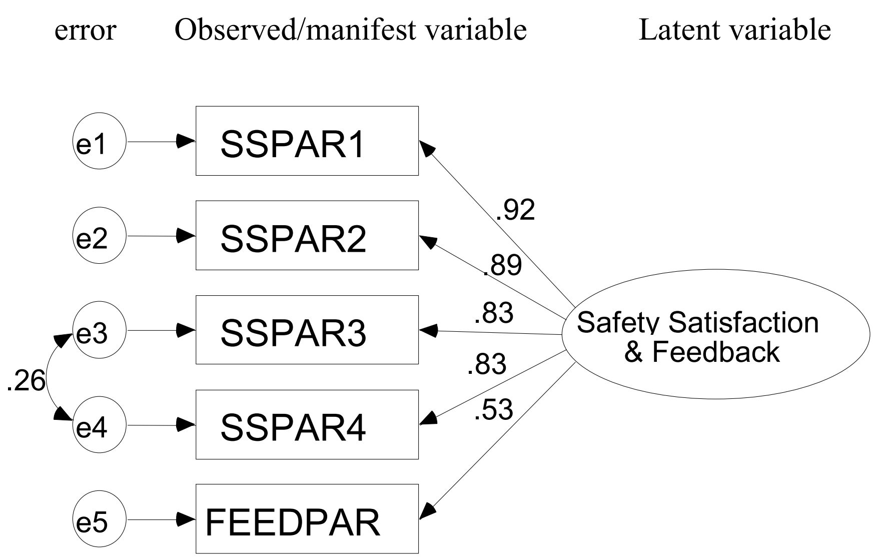

Figure 4.1: A first order measurement model for Safety Satisfaction and Feedback

Latent constructs are shown in ellipses, and observed variables are shown in rectangles

Table 4.24: Goodness-of-fit values for safety satisfaction and feedback dimension

Model	χ^2	d.f.	X^2/d.f.	p-value	GFI	RMSEA	CFI	NFI	TLI	PNFI
Hypothesized Model	25.878	5	5.176	0.000	0.975	0.100	0.986	0.983	0.972	0.491
Re-specified Model	8.002	4	2.000	0.092	0.992	0.049	0.997	0.995	0.993	0.398

Initially, Table 4.24 shows that the hypothesized model represents a poor fit with almost all the indices being below the recommended value. Thus, possible improvements to model fit was done through correlated the error terms as suggested by modification indices (MI). Marsh and

Grayson (1995, p. 177) indicated that “method effect refers to the influence of a particular method that inflates a correlation among the different traits measured with the same method” and Joreskog and Sorbom (1996, p. 222) revealed that “where measures are repeated, as in a scale, there is a tendency for measurement errors … to correlate over time due to memory or other retest effects” (as cited in Evans, Glendon and Creed, 2007). Furthermore, modification indices (MI) refer to “misspecified error covariances” due to item characteristics like related item content or respondent attributes like social desirability (Byrne, 2001). As a result, only one error term was allowed to correlate within the same factor in this study where the re-specified model was a better fit, $\chi^2 = 8.002$, $p < 0.000$ (Figure 4.1).

ii. Safety Incident/Accident

The safety incident/accident dimension identified through the exploratory factor analysis contained seven items. The results of the confirmatory factor analysis (CFA) for this dimension are shown in Figure 4.2. The CFA for this latent was conducted on the individual level of analysis where all the seven observed items were analyzed with its latent and errors. The diagram shows the factor loading of each observed variable was from 0.41 to 0.72.

Table 4.25 shows the hypothesized model that represents a poor fit. After taking into consideration the modification indices (MI) suggestion for model fit improvement, only two error terms were permitted to correlate within the same factor in this study where the re-specified model was a better fit, $\chi^2 = 20.882$, $p < 0.000$ (Figure 4.2).

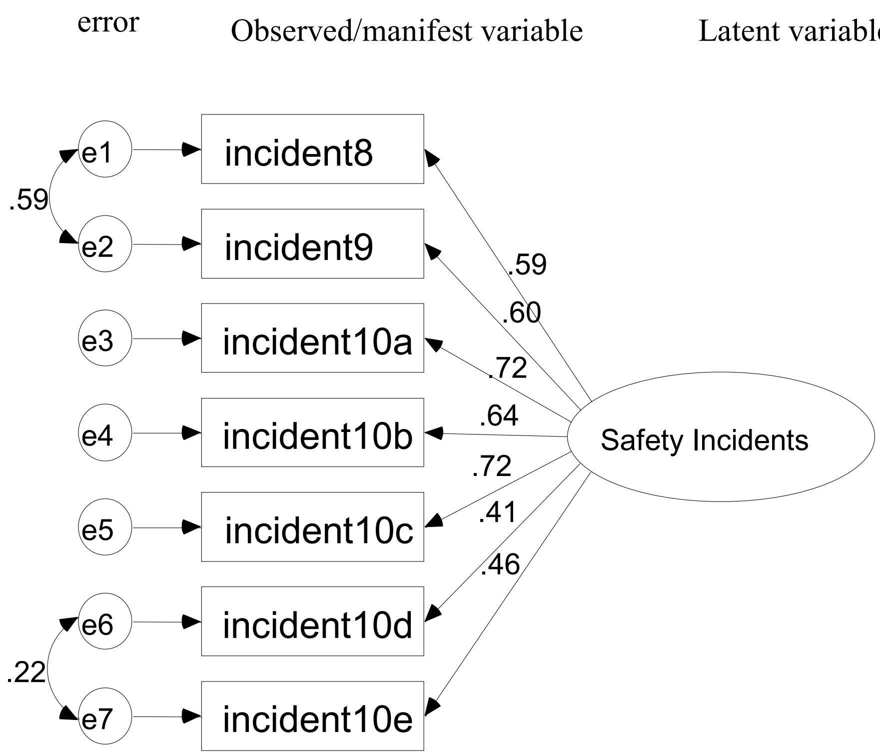

Figure 4.2: A first order measurement model for Safety Incidents/Accidents
Latent constructs are shown in ellipses, and observed variables are shown in rectangles

Table 4.25: Goodness-of-fit values for safety incidents/accidents dimension

Model	χ^2	d.f.	χ^2/d.f.	p-value	GFI	RMSEA	CFI	NFI	TLI	PNFI
Hypothesized Model	169.635	14	12.117	0.000	0.877	0.163	0.828	0.817	0.743	0.545
Re-specified Model	20.882	12	1.740	0.052	0.986	0.042	0.990	0.977	0.983	0.559

4.4.4.2 Independent Variables

There are six independent variables in this study: (a) a supervisor's leadership style; (b) the role of the supervisor; (c) training and competence; (d) health and safety objectives; (e) management commitment; and (f) safety reporting. The following shows the confirmatory factor analysis (CFA) for all the independent variables.

i. The Supervisor's Leadership Style

The supervisor's leadership style dimension identified through the exploratory factor analysis contained ten items. The results of the confirmatory factor analysis (CFA) for this dimension are shown in Figure 4.3. The diagram shows the factor loading of each observed variable was from 0.85 to 0.92.

The CFA for this latent was conducted on the parceling level of analysis and established according to randomly selected items from similar domains. Tables 4.26 in Appendix 16 shows five parcels were created to represent the supervisor's leadership style dimension.

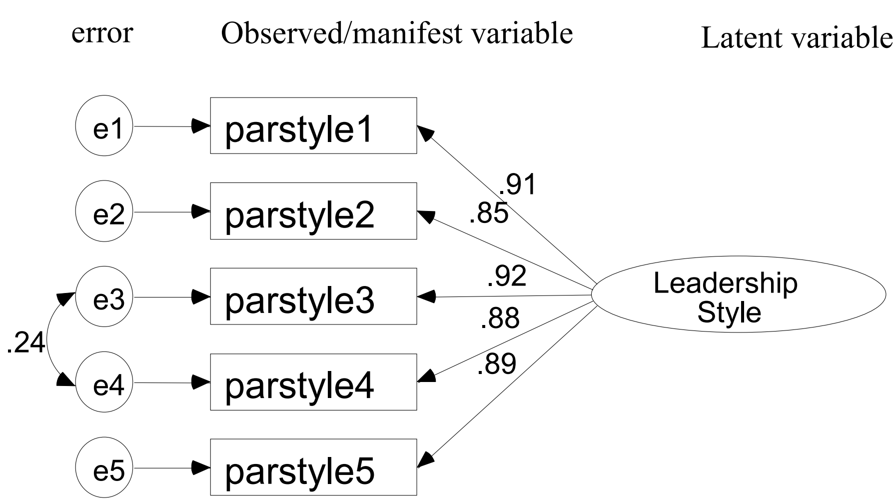

Figure 4.3: A first order measurement model for the supervisor's leadership style

Latent constructs are shown in ellipses, and observed variables are shown in rectangles

Table 4.27: Goodness-of-fit values for the supervisor's leadership style dimension

Model	χ^2	d.f.	χ^2/d.f.	p-value	GFI	RMSEA	CFI	NFI	TLI	PNFI
Hypothesized Model	18.431	5	3.686	0.002	0.982	0.080	0.994	0.991	0.987	0.496
Re-specified Model	7.632	4	1.908	0.106	0.993	0.047	0.998	0.996	0.996	0.399

Table 4.27 shows the hypothesized model that represents a poor fit. After taking into consideration the modification indices (MI) suggestion for model fit improvement, only one error term was permitted to correlate within the same factor in this study where the re-specified model was a better fit, χ^2 = 7.632, p < 0.00 (Figure 4.3).

ii. The Role of the Supervisor

The role of the supervisor dimension identified through the exploratory factor analysis contained eight items. The results of the confirmatory factor analysis (CFA) for this dimension are shown in Figure 4.4. The diagram shows the factor loading of each observed variable was from 0.77 to 0.92.

The CFA for this latent was conducted on the parceling level of analysis and established according to randomly selected items from similar domains. Tables 4.28 in Appendix 16 shows four parcels were created to represent the role of the supervisor dimension.

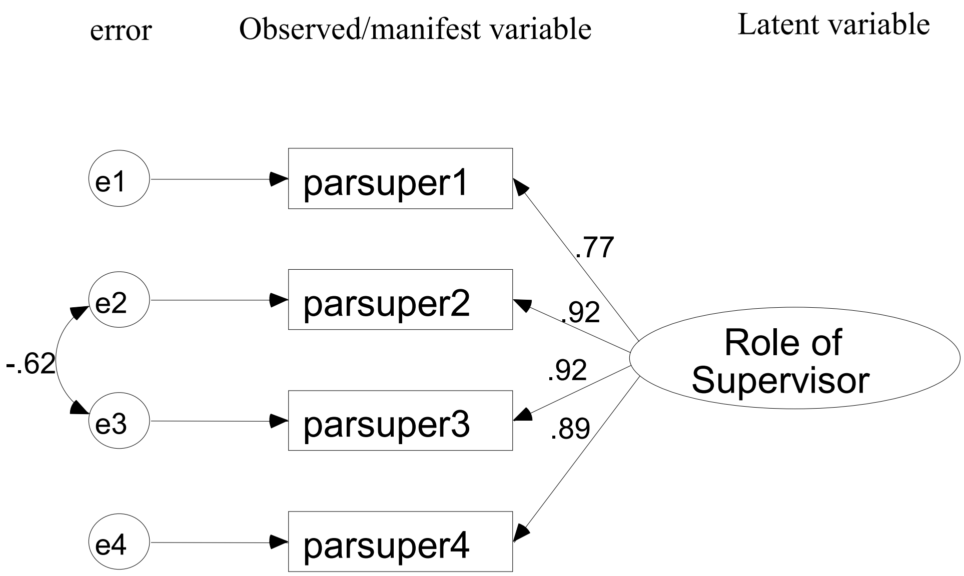

Figure 4.4: A first order measurement model for the role of the supervisor

Latent constructs are shown in ellipses, and observed variables are shown in rectangles

Table 4.29: Goodness-of-fit values for the role of the supervisor dimension

Model	χ^2	d.f.	χ^2/d.f.	p-value	GFI	RMSEA	CFI	NFI	TLI	PNFI
Hypothesized Model	22.420	2	11.210	0.000	0.976	0.156	0.984	0.983	0.953	0.328
Re-specified Model	1.756	1	1.756	0.185	0.998	0.043	0.999	0.999	0.996	0.166

Table 4.29 shows the hypothesized model that represents a poor fit. After taking into consideration the modification indices (MI) suggestion for model fit improvement, only one error term was permitted to correlate within the same factor in this study where the re-specified model was a better fit, $\chi^2 = 1.756$, $p < 0.000$ (Figure 4.4).

iii. Training and Competence

The training and competence dimension identified through the exploratory factor analysis contained six items, with two items from safety involvement dimension factored into this dimension. The confirmatory factor analysis (CFA) for this latent was conducted on the individual level of analysis where all the six observed items were analyzed with its latent and errors. The results of the CFA for this dimension are shown in Figure 4.5. The diagram shows the factor loading of each observed variable was from 0.54 to 0.86.

Table 4.30 shows the hypothesized model that represents a poor fit. After taking into consideration the modification indices (MI) suggestion for model fit improvement, only three error terms were permitted to correlate within the same factor in this study where the re-specified model was a better fit, $\chi^2 = 6.383$, $p < 0.000$ (Figure 4.5).

Table 4.30: Goodness-of-fit values for the training and competence dimension

Model	χ^2	d.f.	χ^2/d.f.	p-value	GFI	RMSEA	CFI	NFI	TLI	PNFI
Hypothesized Model	100.040	9	11.116	0.000	0.922	0.156	0.910	0.903	0.850	0.542
Re-specified Model	6.383	6	1.064	0.382	0.995	0.012	1.000	0.994	0.999	0.398

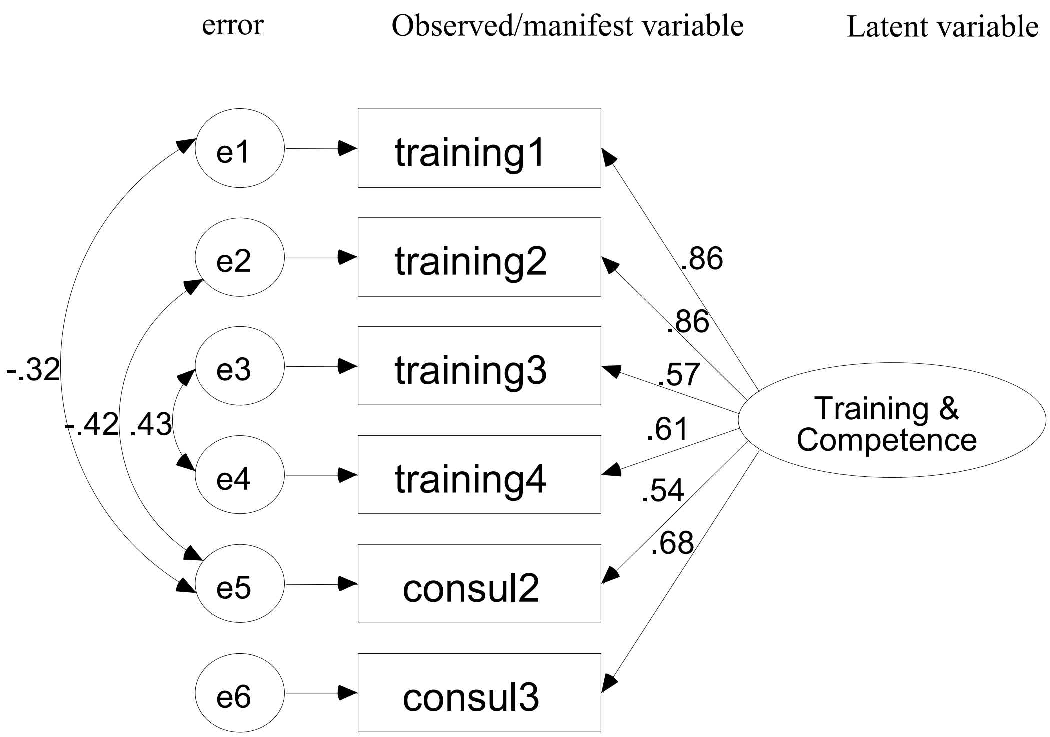

Figure 4.5: A first order measurement model for training and competence

Latent constructs are shown in ellipses, and observed variables are shown in rectangles

iv. Health and Safety Objectives

The safety objectives dimension identified through the exploratory factor analysis contained five items. The confirmatory factor analysis (CFA) for this latent was conducted on the individual level of analysis where all the five observed items were analyzed with its latent and errors. The results of the CFA for this dimension are shown in Figure 4.6. The diagram shows the factor loading of each observed variable was from 0.57 to 0.86.

Table 4.31 shows the hypothesized model that represents a poor fit. After taking into consideration the modification indices (MI) suggestion for model fit improvement, only two error terms were permitted to correlate within the same factor in this study where the re-specified model was a better fit, $\chi^2 = 3.371$, $p < 0.000$ (Figure 4.6).

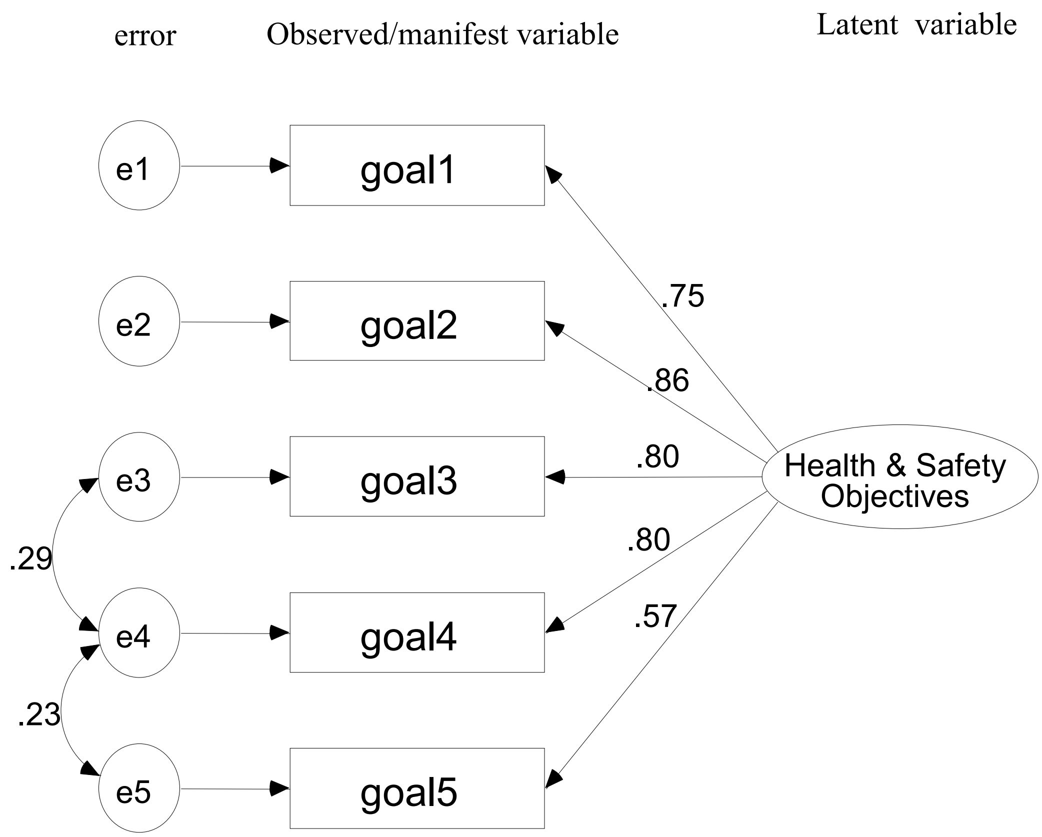

Figure 4.6: A first order measurement model for safety objectives
Latent constructs are shown in ellipses, and observed variables are shown in rectangles

Table 4.31: Goodness-of-fit values for safety objectives

Model	χ^2	d.f.	χ^2/d.f.	p-value	GFI	RMSEA	CFI	NFI	TLI	PNFI
Hypothesized Model	29.479	5	5.896	0.000	0.973	0.108	0.978	0.974	0.956	0.487
Re-specified Model	3.371	3	1.124	0.338	0.997	0.017	1.000	0.997	0.999	0.299

v. Management Commitment

The management commitment dimension identified through the exploratory factor analysis contained five items, where one item from safety communication dimension was factored into this dimension. The confirmatory factor analysis (CFA) for this latent was conducted on the individual level of analysis where all the five observed items were analyzed with its latent and errors. The results of the CFA for this dimension are shown in Figure 4.7. The diagram shows the factor loading of each observed variable was from 0.48 to 0.85.

Table 4.32: Goodness-of-fit values for management commitment

Model	χ^2	d.f.	χ^2/d.f.	p-value	GFI	RMSEA	CFI	NFI	TLI	PNFI
Hypothesized Model	30.330	5	6.066	0.000	0.973	0.110	0.949	0.940	0.899	0.470
Re-specified Model	6.450	3	2.150	0.092	0.994	0.053	0.993	0.987	0.977	0.296

Table 4.32 shows the hypothesized model that represents a poor fit. After taking into consideration the modification indices (MI) suggestion for model fit improvement, only two error terms were permitted to correlate within the same factor in this study where the re-specified model was a better fit, χ^2 = 6.450, p < 0.000 (Figure 4.7).

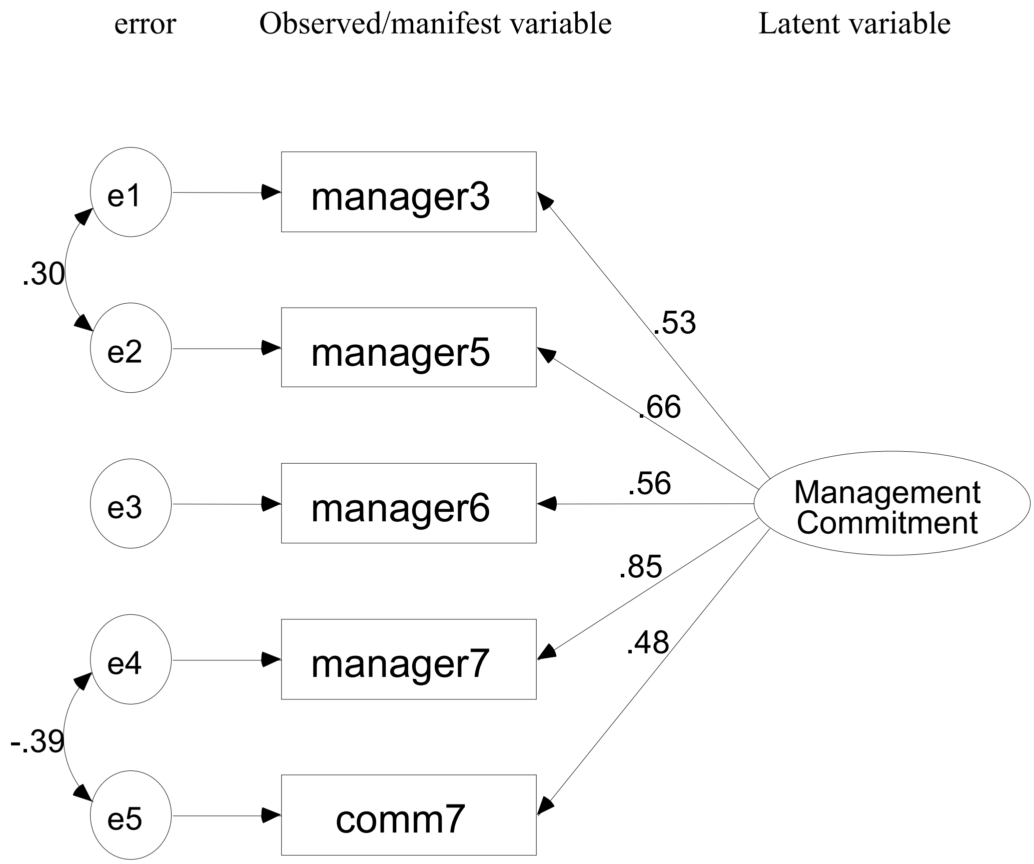

Figure 4.7: A first order measurement model for management commitment
Latent constructs are shown in ellipses, and observed variables are shown in rectangles

vi. Safety Reporting

The safety reporting dimension identified through the exploratory factor analysis contained five items, where one item from work pressure dimension was factored into this dimension. The confirmatory factor analysis (CFA) for this latent was conducted on the individual level of analysis where all the five observed items were analyzed with its latent and errors. The results of the CFA for this dimension are shown in Figure 4.8. The diagram shows the factor loading of each observed variable was from 0.39 to 0.84.

Table 4.33 shows the hypothesized model that represents a poor fit. After taking into consideration the modification indices (MI) suggestion for model fit improvement, only two error terms were permitted to correlate within the same factor in this study where the re-specified model was a better fit, $\chi^2 = 3.927$, $p < 0.000$ (Figure 4.8).

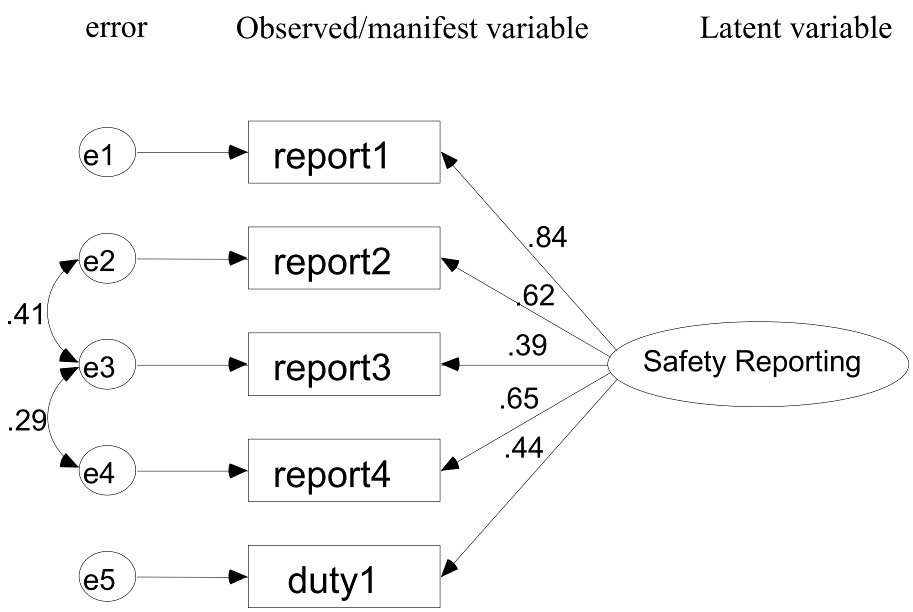

Figure 4.8: A first order measurement model for safety reporting

Latent constructs are shown in ellipses, and observed variables are shown in rectangles

Table 4.33: Goodness-of-fit values for safety reporting

Model	χ^2	d.f.	χ^2/d.f.	p-value	GFI	RMSEA	CFI	NFI	TLI	PNFI
Hypothesized Model	66.132	5	13.226	0.000	0.947	0.171	0.887	0.880	0.774	0.440
Re-specified Model	3.927	3	1.309	0.269	0.996	0.027	0.998	0.993	0.994	0.298

4.5 Descriptive Statistics for Safety Incidents/Accidents

Table 4.34 describes frequency of safety incidents/accidents in three hospitals. The findings show that majority of the respondents (68%) reported that they witnessed accidents for the past one month and 70% respondents witnessed near misses for the last thirty days. As for injury due to moving or handling tasks, it was found that 64% informed that they did not have any injury while doing those particular tasks. 79% respondents stated that they were not exposed to any needlestick and sharp injuries while 73% of respondents revealed that they did not have any injury due to slips, trips or falls. Majority of respondents (61%) told that they did not have any injury due to exposure to dangerous substances and 74% of respondents described that they felt unwell due to exposure to work related stress.

Table 4.34: Descriptive statistics for safety incidents/accidents

N = 418		Frequency (%)	Results	Frequency (%)
Witness incidents	None	283 (67.7)	NO	283 (67.7)
	1 - 2	96 (23.0)	)	)
	3 - 5	33 (7.9)	) YES	) 135 (32.3)
	6 - 10	5 (1.2)	)	)
	More than 10	1 (0.2)	)	)
Witness near misses	None	293 (70.1)	NO	293 (70.1)
	1 - 2	103 (24.6)	)	)
	3 - 5	17 (4.1)	) YES	) 125 (29.9)
	6 - 10	4 (1.0)	)	)
	More than 10	1 (0.2)	)	)
Injuries or unwell due to moving & handling	None	269 (64.4)	NO	269 (64.4)
	1 - 2	108(25.8)	)	)
	3 - 5	32 (7.7)	) YES	) 149 (35.6)
	6 - 10	8 (1.9)	)	)
	More than 10	1 (0.20)	)	)
Needlestick & sharp injuries	None	331 (79.2)	NO	331 (79.2)
	1 - 2	69 (16.5)	)	)
	3 - 5	13 (3.1)	) YES	) 87 (20.8)
	6 - 10	5 (1.2)	)	)
	More than 10	-	)	)
Injuries or unwell due to slips, trips or falls	None	305 (73.0)	NO	305 (73.0)
	1 - 2	89 (21.3)	)	)
	3 - 5	21 (5.0)	) YES	) 113 (27.0)
	6 - 10	3 (0.7)	)	)
	More than 10	-	)	)
Injuries or unwell due to exposure to dangerous substances	None	258 (61.7)	NO	258 (61.7)
	1 - 2	83 (19.9)	)	)
	3 - 5	33 (7.9)	) YES	) 160 (38.3)
	6 - 10	24 (5.7)	)	)
	More than 10	20 (4.8)	)	)
Injuries or unwell due to exposure to work related stress	None	109(26.1)	NO	109 (26.1)
	1 - 2	130 (31.1)	)	)
	3 - 5	90 (21.5)	) YES	) 309 (73.9)
	6 - 10	59 (14.1)	)	)
	More than 10	30 (7.2)	)	)

4.6 Hypotheses Testing

To determine the direct or indirect relationship of all variables, the hypotheses identified in this study were tested using structural equation modeling (SEM) through AMOS version 4. Besides SEM, a chi-square test of independence was carried out to answer objective 1 and logistic regression analysis to identify support and barriers in objective 2.

4.6.1 Structural Model of the Instrument

A structural equation modeling (SEM) was used to test the model to determine whether the six dimensions of health and safety management influenced the safety incident/accident and safety satisfaction and feedback directly or indirectly. All items were computed into composite variables to test the relationship between all independent variables and two dependent variables. The results of the structural model are shown in Figure 4.9.

Table 4.35: Goodness-of-fit values for the structural model of the instrument

Model	χ^2	d.f.	χ^2/d.f.	p-value	GFI	RMSEA	CFI	NFI	TLI	PNFI
Hypothesized Model	0.371	1	0.371	0.542	1.000	0.000	1.000	1.000	1.014	0.036

Table 4.35 shows the initial model that represents a good fit, χ^2 = 0.371 (Figure 4.9). Results indicated a direct positive relationship between all six dimensions of health and safety management (the role of the supervisor, the supervisor's leadership style, health and safety objectives, health and safety training, management commitment and safety reporting) with safety satisfaction and feedback, and a direct negative relationship between four dimensions of health and safety management (the role of the supervisor, health and safety objectives, management commitment and safety reporting) and a positive relationship between two independent variables (the supervisor's leadership style and health and safety training) with safety incidents/accidents (refer Table 4.36 in Appendix 16).

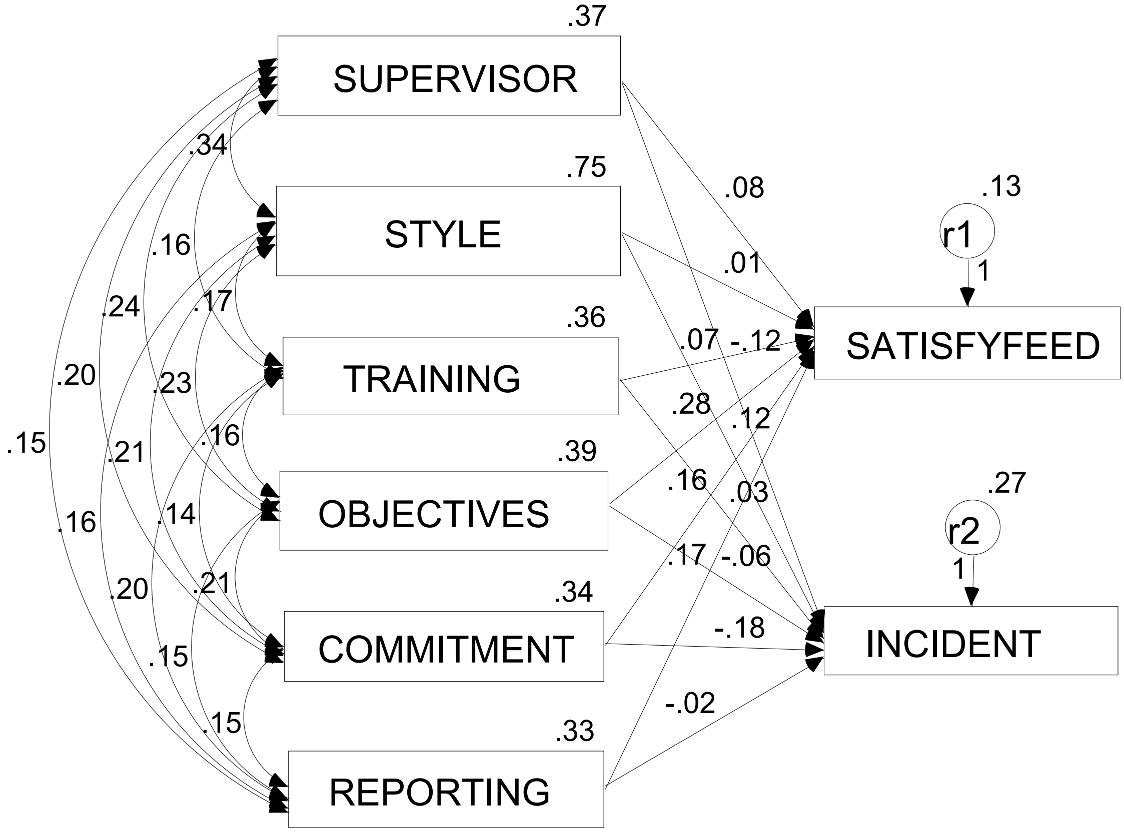

Figure 4.9: Structural model of the instrument

4.6.2 Perception on Occupational Health and Safety Management Elements

Descriptive statistics particularly mean and chi-square analysis were used to determine the perception of hospital employees regarding the health and safety management dimension with two dependent variables: safety satisfaction and feedback; and safety incident/accident. These analyses were used to answer the study's objective 1: to investigate the perception of hospital employees regarding the different elements of occupational health and safety (OHS) management.

4.6.2.1 Priorities of Employee's Perception

Descriptive statistics were used to measure the elements of occupational health and safety management that is perceived to be the most important among employees. Employee's perception of occupational health and safety management was measured by eight elements as shown in Table 4.37. Among the elements, safety reporting element was perceived as fairly high with a mean of 3.9 and a standard deviation of 0.58, while the safety incident/accident element was perceived as rather low with a mean score of 1.58 and a standard deviation of 0.54. As indicated by the survey results, the means of employees' perception on occupational health and safety practices were between the ranges of 1.58 to 3.9, thus indicating a mixture of "disagree" to "almost agree". The results indicated that the general view of the employees with regard to their occupational health and safety practices were low.

Table 4.37: Priorities of employee's perception on OHS management

Variables	Mean	SD
Safety reporting	3.89	0.57
Training & competence	3.69	0.59
Management commitment	3.54	0.58
Safety objectives	3.54	0.62
The role of the supervisor	3.51	0.60
The supervisor's leadership style	3.10	0.86
*Safety satisfaction & feedback	3.52	0.50
*Safety incident/accident	1.57	0.53

* Dependent variables

4.6.2.2 Relationships between Variables Using Crosstab with Chi-Square Analysis

The chi-square test of independence was utilized to investigate if two variables have relationships (dependent) or no relationship (independent) where "significant" results meaning that "we are able to reject the null hypothesis" and this significant result confirms that "there is some relationship between the variables" (Tabachnick & Fidell, 2007). Although one of the general rules of the chi-square test of independence is that there must be a minimum of five observations expected in each cell, but this assumption has been violated in this study as the test is not reliable test when numerous response variables are examined (Lavassani, Movahedi & Kumar, 2009). Furthermore, "a standard (and conservative) rule of thumb (due to Cochran) is to avoid using the chi-square test for contingency tables with expected cell frequencies less than 1, or when more than 20% of the contingency table cells have expected cell frequencies less than 5" (The University of North Texas Health Science Center, n.d.). However, surveys such as Larntz (1978), Lewontin and Felsenstein (1965), Roscoe and Byars (1971), Slakter (1966), and Yarnold (1970) revealed that the chi-square test is "generally applicable even if a significant proportion of the expected values are less than 5" and based on Lewontin and Felsenstein (1965:31), "the chi-square statistic will be correctly distributed as long as all of the expected values are 1 or greater" (as cited in Hamilton, 2009).

Analysis was done in two stages. Stage 1 was between levels of education with nine variables including safety satisfaction and feedback; training and competence; health and safety objectives; the role of the supervisor; management commitment; safety reporting; the supervisor's leadership style; accidents; and injuries with gender as the control variable. Stage 2 comprised length of employment with nine variables including safety satisfaction and feedback; training and competence; health and safety objectives; the role of the supervisor; management commitment; safety reporting; the supervisor's leadership style; accidents; and injuries with gender as the control variable.

i. Stage 1 analysis

Stage 1 consists of analysis between levels of education with nine variables with gender as the control variable. Subjects were classified into three education levels: a high school education; certificate or diploma education; and a university degree.

a. Gender, level of education and safety satisfaction and feedback

Table 4.38 in Appendix 17 indicates the relationship between three variables where the row is the effect or dependent variable, the column is the causal or independent variable and control variable, in this case, gender as there might be a relationship between safety satisfaction and feedback and level of education for men and women.

About 47% of males with a school level of education were more likely to feel comfortable about their satisfaction towards the safety system in their workplace. About 50% of females with a school level of education were more likely to feel comfortable about their satisfaction towards the safety system in their workplace.

Overall, it was seen that the findings for females were significant compared to males, and females were more likely to feel comfortable about their satisfaction towards the safety system in their workplace than were males. However, the significance reported for females is slightly above the 0.05 level (0.096 to be exact) where $\chi^2 = 7.894$, df = 4, $p < 0.10$. This indicated that there was a relationship or difference between these two variables for females and females with a school level of education felt that their safety system was just acceptable.

b. Gender, level of education and training and competence

Table 4.39 in Appendix 17 shows the relationship between the level of education and training and competence with gender as the control variable. About 50% of males with a school level of education were more likely to feel that their safety training and competence was acceptable to ensure a good health and safety management in their workplace. About 46% of females with a certificate or diploma education level were more likely to feel that their safety training and competence was acceptable to ensure a good health and safety management in their workplace.

Overall, it was seen that the findings for females were significant compared to males, and females were more likely to feel training and competence were just satisfactory, where $\chi^2 = 13.392$, df = 4, $p < 0.05$. This indicated that there was a relationship or difference between these two variables for females and females with a certificate and diploma education level felt that safety training and competence in their workplace was just adequate to increase their knowledge on health and safety matters.

c. Gender, level of education and health and safety objectives

Table 4.40 in Appendix 17 illustrates the relationship between the level of education and health and safety objectives with gender as the control variable. About 49% of males with a school level of education were more likely to feel that they understand the clear health and safety objectives of their organizations to ensure a good commitment towards health and safety matters in their workplace. About 45% of females with a school level of education were more likely to feel that they were comfortable with the health and safety objectives of their organizations to ensure a good commitment towards health and safety matters in their workplace.

Overall, it was seen that both male and female employees with a school level of education were more likely to feel that they understand the clear health and safety objectives of their organizations. However, the significance reported for males is slightly above the 0.05 level (0.056 to be exact) where $\chi^2 = 9.214$, df = 4, $p < 0.10$ and significant chi-square reported for female was $\chi^2 = 11.385$, df = 4, $p < 0.05$. This indicated a significant relationship or difference existed between these two variables and that males and females with a school level of education perceived that their health and safety objectives were understandable.

d. Gender, level of education and the role of the supervisor

Table 4.41 in Appendix 17 demonstrates the relationship between the level of education and the role of the supervisor with gender as the control variable. Overall, it was seen that both male (42%) and female (48%) employees with a school level of education were more likely to perceive that their supervisor's role in health and safety matters was not up to expectation, where no significant relationship or difference was shown between male and female subjects. This indicated that there was no relationship between these two variables for both males and females and that the employees with a school level of education perceived no difference about their supervisor's role in health and safety matters.

e. Gender, level of education and management commitment

Table 4.42 in Appendix 17 discloses the relationship between the level of education and management commitment with gender as the control variable. Overall, it was seen that males with a school level of education (49%) and females with a certificate and diploma level of education (48%) were more likely to perceive that their manager's commitment towards health and safety matters was just satisfactory, and both p-values for males and females were not significant. This indicated that there was no relationship between these two variables for both males and females and males with a school level of education and females with a certificate and diploma level of education perceived no difference about their management commitment towards health and safety matters.

f. Gender, level of education and safety reporting

Table 4.43 in Appendix 17 displays the relationship between the level of education and safety reporting with gender as the control variable. Overall, it was seen that males with a school level of education (42%) and females with a certificate and diploma level of education (54%) were more likely to perceive that their safety reporting system is effective. However, the significance reported for males and females were slightly above the 0.05 level (to be exact 0.098 for males and 0.082 for females), where $p < 0.10$. This indicated that there was a relationship or difference between these two variables for both males and females and that the employees perceived no difference about their safety reporting system.

g. Gender, level of education and the supervisor's leadership style

Table 4.44 in Appendix 17 expresses the relationship between the level of education and the supervisor's leadership style with gender as the control variable. Overall, it was seen about 72% of males with a school level of education perceived that their leader did not show any involvement in health and safety matters compared to the females, where the chi-square = 20.492, df = 4, $p < 0.000$. This indicated that there was a relationship between these two variables for males and males with a school level of education perceived that their supervisor did not guide employees regarding health and safety matters in their workplace. As for the females (52%), no significant results were found.

h. Gender, level of education and accidents

Table 4.45 in Appendix 17 exhibits the relationship between the level of education and accidents with gender as the control variable. Overall, it was found that 52% of females with a school level of education perceived that accidents or near-misses have not occurred in the past thirty days compared to males, where results were significant, the chi-square = 6.711, df = 2, $p < 0.05$. This indicated that there was a relationship between these two variables for females and females with a school level of education perceived that accidents or near-misses had not occurred for the past thirty days. As for the males (45%), no significant results were found.

i. Gender, level of education and injuries

Table 4.46 in Appendix 17 reveals the relationship between the level of education and injuries with gender as the control variable. Overall, it was found that the test was not significant for both males and females. This indicated that there was no relationship between these two variables and both males (47%) and females (48%) with a school level of education perceived no difference about injuries like needlestick and sharp injuries; slipping, tripping or falling; moving and handling; exposure to substances; and work stress that they experienced for the past twelve months.

ii. Stage 2 analysis

Stage 2 consists of analysis between lengths of employment with nine variables with gender as the control variable. Subjects were classified into four lengths of employment: less than or equal to 2 years; 2.1 to 6 years; 6.1 to 15 years; and 15.1 years and above.

a. Gender, length of employment and safety satisfaction and feedback

Table 4.47 in Appendix 17 shows the relationship between the length of employment and safety satisfaction and feedback with gender as the control variable. Overall, it was found that the test was not significant for both males and females with p-value more than 0.05. This indicated that there was no relationship between these two variables for males and females. Males with a length of employment from 2.1 to 6 years (35%) and females with a length of employment from 15.1 years onwards (28%) perceived no difference towards the safety system in their workplace and were comfortable with their safety system.

b. Gender, length of employment and training and competence

Table 4.48 in Appendix 17 reveals the relationship between the length of employment and training and competence with gender as the control variable. Overall, it was found that 37% of males with a length of employment from 2.1 to 6 years perceived that they were comfortable with their safety training in the workplace compared with the females, where the chi-square = 16.740, df = 6, $p < 0.05$. This indicated that there was a relationship or difference between these two variables for males and males with a length of employment from 2.1 to 6 years (37%) perceived that their safety training was acceptable to ensure a good health and safety management in their workplace. As for the females (28%), no significant results were found.

c. Gender, length of employment and the role of the supervisor

Table 4.49 in Appendix 17 demonstrates the relationship between the length of employment and the role of the supervisor with gender as the control variable. Overall, it was found that the test was not significant with a p-value more than 0.05. This indicated that there was no relationship between these two variables where both males and females perceived no difference of their supervisor's role to maintain the health and safety matters in their workplace although males with a length of employment from 2.1 to 6 years (35%) and females with a length of employment from 15.1 years and above (27%) perceived that they were comfortable with their supervisor's role in managing health and safety issues in the workplace.

d. Gender, length of employment and health and safety objectives

Table 4.50 in Appendix 17 illustrates the relationship between the length of employment and health and safety objectives with gender as the control variable. Overall, it was found that the test was significant, where for males with a length of employment from 2.1 to 6 years, the chi-square = 14.200, df = 6, $p < 0.05$ and for females with a length of employment of less than or equal to 2 years, the chi-square = 16.196, df = 6, $p < 0.05$. This indicated that there was a relationship between these two variables among both gender where males (40%) and females (29%) perceived differently of their health and safety objectives in the workplace.

e. Gender, length of employment and management commitment

Table 4.51 in Appendix 17 explains the relationship between the length of employment and management commitment with gender as the control variable. Overall, it was found that the test was only significant for males (33%) with a length of employment from 2.1 to 6 years, where the chi-square = 14.614, df = 6, $p < 0.05$ and not significant for females (27%) with a length of employment from 15.1 years and above. This indicated that there was a relationship between these two variables for males, for they perceived differently than females regarding management commitment showed by their superior.

f. Gender, length of employment and safety reporting

Table 4.52 in Appendix 17 shows the relationship between the length of employment and safety reporting with gender as the control variable. Overall, it was found that the test was not significant for both males (33%) with a length of employment from 2.1 to 6 years and females (31%) with a length of employment from 15.1 years and above, with p-values more than 0.05.

This indicated that there was no relationship between these two variables where both males and females perceived no difference of the safety reporting system in their workplace.

g. Gender, length of employment and the supervisor's leadership style

Table 4.53 in Appendix 17 displays the relationship between the length of employment and the supervisor's leadership style with gender as the control variable. Overall, it was found that the test was not significant for both genders with p-values more than 0.05. This indicated that there was no relationship between these two variables where both males (41%) and females (27%) perceived no difference of the leadership style shown by their superior, although 41% of males with a length of employment from 2.1 to 6 years perceived that their supervisor did not lead them in managing health and safety issues while 27% of females with a length of employment from 15.1 years and above perceived that their supervisor rarely directed them in health and safety issues.

h. Gender, length of employment and accidents

Table 4.54 in Appendix 17 presents the relationship between the length of employment and accidents with gender as the control variable. Overall, it was found that the test was not significant for both males and females with p-values more than 0.05. This indicated that there was no relationship between these two variables where both males and females perceived no difference about the occurrence of accidents or near-misses in the past thirty days although 28% of males and 34% of females with employment of 15.1 years and above perceived that they had not witnessed any occurrence of accidents or near-misses in the past thirty days.

i. Gender, length of employment and injuries

Table 4.55 in Appendix 17 reveals the relationship between the length of employment and injuries with gender as the control variable. Overall, it was found that the test was not significant for males (35%) and significant for females with the chi-square = 9.325, df = 3, $p < 0.05$. This indicated that there was a relationship between these two variables where 28% of females with employment of 15.1 years and above perceived that they experienced injuries like needlestick and sharp injuries; slips, trips or falls; moving and handling; exposure to substance; and work stress for the past twelve months.

iii. Summary of the chi-square analysis regarding perception on the health and safety management elements

The first analysis as in Table 4.56 in Appendix 17 was done between levels of education, nine dimensions of health and safety management, and gender. Level of education was classified into three: high school, certificate and diploma, and university degree education. Overall analysis showed that significant results were found among female employees with a school level, and certificate and diploma education. As for males, only those with a school level of education were found significant.

Female employees with a school level of education perceived that safety satisfaction, health and safety objectives, and accident prevention are important variables of the health and safety management dimension while female employees with a certificate and diploma level perceived that training and competence and safety reporting are important variables of the health and safety management dimension. As for male employees with a school level education, they perceived that health and safety objectives, safety reporting, and leadership style are important variables of the health and safety management dimension.

The second analysis as in Table 4.57 in Appendix 17 was done between the length of employment, nine dimensions of health and safety management, and gender. Length of employment was classified into four: less than or equal to 2 years; 2.1 to 6 years; 6.1 to 15 years; and 15.1 years and above. Overall analysis showed significant results among female employees with less than or equal to 2 years, and 15.1 years and above of employment. As for males, only those with 2.1 to 6 years of employment were found significant.

Female employees with less than or equal to 2 years of employment perceived that health and safety objectives is an essential variable of the health and safety management dimension while female employees with 15.1 years and above perceived that injury prevention is an essential variable of the health and safety management dimension. As for male employees with 2.1 to 6 years of employment, they perceived that training and competence, health and safety objectives, and management commitment are essential variables of the health and safety management dimension.

4.6.3 Elements of OHS Management that Support or Hinder the Implementation of the OHS Management System

Logistic regression was utilized to investigate which elements of OHS management prevent or support the implementation of the OHS management system in Malaysian public hospitals. The purpose of logistic regression is to accurately predict the category of outcome for individual cases using the most parsimonious model through incorporating all predictor variables that are useful in predicting the response variable.

A reduced model was developed using three types of elimination test in logistic regression: enter, forward and backward. The process started with the full model (all independent variables included) and proceeded for possible elimination using the "enter" method. The forward and backward methods were also applied and results compared with the enter method. For the final model, only those predictors from the three steps that can significantly predicted the dependent variable were chosen for analysis. This is because the final model is more efficient and parsimonious version of the full model (Bowie, 2006). Menard (2002) stated that stepwise or backward procedures have been accepted widely in purely predictive research and exploratory research (as cited in Bowie, 2006). Backward elimination reduces the risk of failing to find a relationship when one exists (Menard, 2002, as cited in Bowie, 2006, p. 55). In stepwise logistic regression variables are entered or removed based on their importance (Menard, 2002, as cited in Bowie, 2006, p. 55).

The following significance tests can be used in binary logistic regression: the Omnibus Tests of Model Coefficients, and Hosmer and Lemeshow chi-square test of goodness of fit. The Hosmer and Lemeshow test (also called the chi-square test) is the recommended test for an overall fit model due to its robustness rather than the traditional chi-square test (Garson, 2009). A non-significant result ($p > 0.05$) can be concluded as the model adequately fits the data. The Omnibus Tests of Model Coefficients states the significance level by the traditional chi-square method (Garson, 2009). A significant result ($p < 0.05$) indicated that the model adequately fits the data, where at least one of the predictors is significantly associated with the dependent variable.

This study intends to determine to what extent the independent variables may have an impact on the dependant variables: safety satisfaction and feedback, and safety incident/accident: accidents and injuries. The measurement of outcome variables: safety satisfaction and feedback, and safety incident/accident: accidents and injuries were modified to dichotomous variables, and for that reason, a logistic regression was performed to answer this study's objective 2: to determine whether the perception of OHS management elements prevent or support the implementation of the OHS management system in Malaysian public hospitals.

i. Safety satisfaction and feedback

The first dependent variable in this study was safety satisfaction and feedback. The dimension had two dichotomous measures: 0 = not satisfied with the safety system and 1 = satisfied with the safety system. The "0" level of the dependent was used as the reference value and the "1" level as predicted value. Twelve independent variables including the role of the supervisor, the supervisor's leadership style, training and competence, safety reporting, management commitment, safety objectives, age, gender, ethnicity, education level, job position, and length of employment were considered in the logistic regression models.

The "enter" method of logistic regression model was first estimated with the twelve factors (the role of the supervisor, the supervisor's leadership style, training and competence, safety reporting, management commitment, safety objectives, age, gender, ethnicity, education level, job position, and length of employment) as predictors. The categorical data was put in "first to last order".

Table 4.58 in Appendix 18 concludes the "enter" method of logistic regression analysis. Four predictors (education level: university degree; health and safety objective; management commitment and safety reporting) made a statistically significant contribution in explaining the variance in safety satisfaction and feedback. Employees who were satisfied with the safety system in the hospitals predicted that a university degree level of education (25%); health and safety objective (slightly more than 5 times); management commitment (almost 2 times); and safety reporting (slightly over 1.5 times) compared with employees who were not satisfied with the safety system. The results of the Omnibus Tests of Model Coefficients "goodness of fit" for this "enter" model was a chi-square value of 139.657, df = 18, p-value = 0.000. The results of significance can be concluded that there was an adequate fit of the data to the model. The Hosmer and Lemeshow test showed a non-significance result, where the chi-square = 8.086, df = 8, p-value = 0.425. It can be concluded that the model sufficiently fits the data.

In the second step, a "forward stepwise" (likelihood ratio) was estimated using the twelve factors (the role of the supervisor, the supervisor's leadership style, training and competence, safety reporting, management commitment, safety objectives, age, gender, ethnicity, education level, job position, and length of employment) as predictors. The categorical data was put in "first to last order".

Table 4.59 in Appendix 18 shows the "forward stepwise" method of logistic regression analysis. Five predictors (education level: school level; education level: certificate and diploma level; health and safety objective; management commitment; and safety reporting) made a statistically significant contribution in explaining the variance in safety satisfaction and feedback. Employees who were satisfied with the safety system in the hospitals predicted that university degree (22%); health and safety objective (over 5 times); management commitment (over 2 times); and safety reporting (slightly over 2 times) compared to those employees that were not satisfied with the safety system. The results of the Omnibus Tests of Model Coefficients "goodness of fit" for this "forward" model was a chi-square = 127.259, df = 5, p-value = 0.000. The results of significance can be concluded that there was adequate fit of the data to the model. The Hosmer and Lemeshow test showed a significant result, where the chi-square = 15.907, df = 8, p-value = 0.044. It can be concluded that the model did not adequately fit the data.

In the third step, a “backward stepwise” (likelihood ratio) was estimated using the twelve factors (the role of the supervisor, the supervisor’s leadership style, training and competence, safety reporting, management commitment, safety objectives, age, gender, ethnicity, education level, job position, and length of employment) as predictors. The categorical data was put in “first to last order”.

Table 4.60 in Appendix 18 shows the “backward stepwise” method of logistic regression analysis. Four predictors (education level: university degree; health and safety objective; management commitment; and safety reporting) made a statistically significant contribution in explaining the variance in safety satisfaction and feedback. Employees who were satisfied with the safety system in the hospitals predicted that university degree of education level (26%); health and safety objective (almost 6 times); management commitment (almost 2 ½ times); and safety reporting (slightly over 2 times) compared to those employees who were not satisfied with the safety system. The results of the Omnibus Tests of Model Coefficients “goodness of fit” for this “backward” model was a chi-square = 130.019, df = 6, p-value = 0.000. The results of significance can be concluded that there was adequate fit of the data to the model. The Hosmer and Lemeshow test showed a non-significance result, where the chi-square = 8.532, df = 8, p-value = 0.383. It can be concluded that the model adequately fits the data. In the last step, an “enter” method was estimated using the four factors (education level, health and safety objectives, management commitment, and safety reporting) as predictors. The categorical data was put in “first to last order”.

Table 4.61 in Appendix 18 illustrates the final model using the “enter” method logistic regression analysis. Four predictors (education level: university degree; health and safety objective; management commitment; and safety reporting) made a statistically significant contribution in explaining the variance in safety satisfaction and feedback. Employees whose education was at university level were almost 22% more likely to be satisfied with the safety system in the hospitals compared to employees who were not satisfied with the safety system. Employees who complied with the health and safety objectives in their workplaces were almost 5.5 times likely to be satisfied with the safety system in the hospitals compared to employees who were not satisfied with the safety system. Employees who perceived that their management team demonstrated positive and higher commitment towards health and safety in their workplaces were almost 2.5 times more likely to be satisfied with the safety system in the hospitals compared to employees who were not satisfied with the safety system. Employees who always comply with safety reporting procedures were found to be slightly over 2 times more likely to be satisfied with the safety system in the hospitals compared to employees who were not satisfied with the safety system. The results of the Omnibus Tests of Model Coefficients "goodness of fit" for this "enter" model was a chi-square = 127.259, df = 5, p-value = 0.000. The results of significance can be concluded that there was an adequate fit of the data to the model. The Hosmer and Lemeshow test showed a significant result, where a chi-square = 15.907, df = 8, p-value = 0.044. It can be concluded that the model did not adequately fit the data.

Overall, it was seen that only four variables significantly predicted the variance in "safety satisfaction and feedback". Thus the formula to be developed from this model is:

$Z = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4$

Logit (Safety satisfaction and feedback) = -12.523 - 1.496 (education level: university degree) + 1.669 (health and safety objectives) + 0.826 (management commitment) + 0.713 (safety reporting).

ii. Safety incident/accident: Accidents

The second dependent variable in this study was accidents. The dimension had two dichotomous measures: 0 = witness no accident and near misses and 1 = witness an accident and near misses. The "0" level of the dependent was used as the reference value and the "1" level as predicted value. Twelve independent variables including the role of the supervisor, the supervisor's leadership style, training and competence, safety reporting, management commitment, safety objectives, age, gender, ethnicity, education level, job position, and length of employment were considered in the logistic regression models.

In the first step, the “enter” method of logistic regression model was estimated with the twelve factors (the role of the supervisor, the supervisor’s leadership style, training and competence, safety reporting, management commitment, safety objectives, age, gender, ethnicity, education level, job position, and length of employment) as predictors. The categorical data was put in “first to last order”.

Table 4.62 in Appendix 18 displays the “enter” method logistic regression analysis. Three predictors (the role of the supervisor; the supervisor’s leadership style; and management commitment) made a statistically significant contribution in explaining the variance in accidents. Employees who had witnessed no accident predicted that the role of the supervisor (slightly more than 50%); the supervisor’s leadership style (almost 1.5 times); and management commitment (slightly more than 50%) were important to ensure excellent conditions of health and safety matters compared to employees who had witnessed an incident. The results of the Omnibus Tests of Model Coefficients “goodness of fit” for this “enter” model was a chi-square = 36.604, df = 18, p-value = 0.006. The results of significance can be concluded that the data adequately fits to the model. The Hosmer and Lemeshow test showed a non-significance result, where a chi-square = 6.810, df = 8, p-value = 0.557. It can be concluded that the model sufficiently fits the data.

In the second step, a “forward stepwise” (likelihood ratio) was estimated using the twelve factors (the role of the supervisor, the supervisor’s leadership style, training and competence, safety reporting, management commitment, safety objectives, age, gender, ethnicity, education level, job position, and length of employment) as predictors. The categorical data was put in “first to last order”.

Table 4.63 in Appendix 18 shows the “forward stepwise” method of logistic regression analysis. One predictor (management commitment) made a statistically significant contribution in explaining the variance in accidents. Employees who had witnessed no incident/accident predicted that committed management (almost 60%) are important to ensure excellent conditions of health and safety matters compared to employees who had witnessed an incident/accident. The results of the Omnibus Tests of Model Coefficients “goodness of fit” for this “enter” model was a chi-square = 16.360, df = 1, p-value = 0.000. The results of significance can be concluded that there was an adequate fit of the data to the model. The Hosmer and Lemeshow test showed a significant result, where a chi-square = 13.089, df = 6, p-value = 0.042. It can be concluded that the model did not adequately fit the data.

In the third step, a "backward stepwise" (likelihood ratio) was estimated using the twelve factors (the role of the supervisor, the supervisor's leadership style, training and competence, safety reporting, management commitment, safety objectives, age, gender, ethnicity, education level, job position, and length of employment) as predictors. The categorical data was put in "first to last order".

Table 4.64 in Appendix 18 shows the "backward stepwise" method of logistic regression analysis. Three predictors (the role of the supervisor; the supervisor's leadership style; and management commitment) made a statistically significant contribution in explaining the variance in accidents. Employees who had witnessed no accident predicted that the role of the supervisor (almost 60%); leadership style (almost 1.5 times); and committed management (slightly over 50%) were important to ensure excellent conditions of health and safety matters compared to employees who had witnessed an accident. The results of the Omnibus Tests of Model Coefficients "goodness of fit" for this "enter" model was a chi-square = 22.696, df = 4, p-value = 0.000. The results of significance can be concluded that there was an adequate fit of the data to the model. The Hosmer and Lemeshow test showed a non-significance result, where the chi-square = 4.286, df = 8, p-value = 0.830. It can be concluded that the model adequately fits the data.

In the last step, an "enter" method was estimated using the three factors (the role of the supervisor, leadership style, and management commitment) as predictors. Table 4.65 in Appendix 18 illustrates the final model using the "enter" method logistic regression analysis. Three predictors (the role of the supervisor, leadership style, and management commitment) made a statistically significant contribution in explaining the variance in accidents. Employees who perceived the involvement of supervisors in health and safety matters were almost 60% more likely to have no accidents in the workplace compared to employees who perceived their supervisor not to be involved in health and safety matters. Employees who perceived fair leadership style in managing health and safety matters were almost 1.5 times more likely to reduce accidents in the workplace compared to employees who perceived that leadership style is not fair. Employees who perceived their management were committed in health and safety matters were slightly over 50% more likely to have no accidents in the workplace compared to those who perceived their management not committed in health and safety matters. The results of the Omnibus Tests of Model Coefficients "goodness of fit" for this "enter" model was a chi-square = 22.696, df = 3, p-value = 0.000. The results of significance can be concluded that there was an adequate fit of the data to the model. The Hosmer and Lemeshow test showed a non-significance result, where the chi-square = 9.086, df = 8, p-value = 0.335. It can be concluded that the model adequately fits the data.

Overall, it was seen that only three variables were significantly predicted the variance in accidents. Thus the formula to be developed from this model is:

$Z = b_0 + b_1X_1 + b_2X_2 + b_3X_3$

Logit (Accidents) = 2.470 - 0.514 (the role of the supervisor) + 0.369 (leadership style) - 0.643 (management commitment).

iii. Safety incident/accident: Injury

The third dependent variable in this study was injury. The dimension had two dichotomous measures: 0 = had no injury and 1 = had an injury. The "0" level of the dependent was used as the reference value and the "1" level as predicted value. Twelve independent variables were considered in the logistic regression models.

In the first step, the "enter" method logistic regression model was estimated with the twelve factors (the role of the supervisor, the supervisor's leadership style, training and competence, safety reporting, management commitment, safety objectives, age, gender, ethnicity, education level, job position, and length of employment) as predictors. The categorical data was put in "first to last order".

Table 4.66 in Appendix 18 displays the “enter” method of logistic regression analysis. Five predictors (gender: female; length of employment: 2.1 – 6 years; length of employment: 6.1 – 15 years; the role of the supervisor; and management commitment) made a statistically significant contribution in explaining the variance in injuries. Employees who had experienced an injury predicted that gender: female (almost 2 times); length of employment: 2.1 – 6 years (slightly over 4 times); length of employment: 6.1 – 15 years (almost 2.6 times); the role of the supervisor (slightly more than 50%) and management commitment (slightly over 60%) compared to those employees that had not experienced an injury. The results of the Omnibus Tests of Model Coefficients “goodness of fit” for this “enter” model was a chi-square = 36.007, df = 18, p-value = 0.007. The results of significance can be concluded that the data was adequately fit to the model. The Hosmer and Lemeshow test showed a non-significance result, where the chi-square = 2.999, df = 8, p-value = 0.934. It can be concluded that the model sufficiently fits the data.

In the second step, a “forward stepwise” (likelihood ratio) was estimated using the twelve factors as predictors. The categorical data was put in “first to last order”.

Table 4.67 in Appendix 18 shows the “forward stepwise” method logistic regression analysis. Three predictors (length of employment: 2.1 – 6 years; length of employment: 6.1 – 15 years; and management commitment) made a statistically significant contribution in explaining the variance in injuries. Employees who had experienced an injury predicted that “length of employment: 2.1 – 6 years” (almost 3 times); “length of employment: 6.1 – 15 years” (slightly over 2 times); and management commitment (slightly over 50%) compared to employees who had not experienced an injury. The results of the Omnibus Tests of Model Coefficients “goodness of fit” for this “enter” model was a chi-square = 20.432, df = 4, p-value = 0.000. The results of significance can be concluded that there was an adequate fit of the data to the model. The Hosmer and Lemeshow test showed a non-significance result, where the chi-square = 7.147, df = 8, p-value = 0.521. It can be concluded that the model adequately fits the data.

In the third step, a “backward stepwise” (likelihood ratio) was estimated using the twelve factors (the role of the supervisor, the supervisor’s leadership style, training and competence, safety reporting, management commitment, safety objectives, age, gender, ethnicity, education level, job position, and length of employment) as predictors. The categorical data was put in "first to last order".

Table 4.68 in Appendix 18 shows the "backward stepwise" method of logistic regression analysis. Four predictors (gender: female; length of employment: 2.1 – 6 years; length of employment: 6.1 – 15 years; and the role of the supervisor) made a statistically significant contribution in explaining the variance in injuries. Employees who had experienced an injury predicted that "gender: female" (almost 2 times); "length of employment: 2.1 – 6 years" (almost 3.5 times); "length of employment: 6.1 – 15 years" (slightly over 2 times); and the role of the supervisor (slightly over 60%) compared to those employees who had not experienced an injury. The results of the Omnibus Tests of Model Coefficients "goodness of fit" for this "enter" model was a chi-square = 27.224, df = 7, p-value = 0.000. The results of significance can be concluded that there was an adequate fit of the data to the model. The Hosmer and Lemeshow test showed a significant result, where the chi-square = 16.039, df = 8, p-value = 0.042. It can be concluded that the model did not adequately fit the data.

For the final step, an "enter" method was estimated using the three factors (gender, length of employment, and the role of the supervisor) as predictors. The categorical data was put in "first to last order". Table 4.69 in Appendix 18 illustrates the final model using the "enter" method of logistic regression analysis. Four predictors (gender: female; length of employment: 2.1 – 6 years; length of employment: 6.1 – 15 years; and the role of the supervisor) made a statistically significant contribution in explaining the variance in injuries. Female employees were almost 2 times more likely to experience an injury compared to male employees. Employees who worked from 2.1 to 6 years in the hospital were almost 3.5 times more likely to experience an injury compared to other senior employees who are regularly exposed to health and safety matters. Employees who worked from 6.1 to 15 years in the hospital were slightly over 2 times more likely to experience an injury compared to other employees who are regularly exposed to their health and safety matters. Employees who perceived supervisors involved in health and safety matters were slightly over 60% more likely to have met an injury in the workplace compared to employees who perceived their supervisors not involved in health and safety matters. The results of the Omnibus Tests of Model Coefficients "goodness of fit" for this "enter" model was a chi-square = 27.224, df = 6, p-value = 0.000. The results of significance can be concluded that there was an adequate fit of the data to the model. The Hosmer and Lemeshow test showed a non-significance result, where the chi-square = 6.877, df = 8, p-value = 0.550. It can be concluded that the model adequately fits the data.

Overall, it was seen that only four variables were significantly predicted the variance in "injuries". Thus the formula to be developed from this model is:

$Z = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4$

Logit (Injuries) = 3.834 + 0.596 (gender: female) + 1.184 (length of employment: 2.1 to 6 years) + 0.722 (length of employment: 6.1 to 15 years) - 0.501 (the role of the supervisor).

iv. Summary of logistic regression analysis

Table 4.70 in Appendix 18 illustrates the summary of the logistic regression analysis. The results show that three dependent variables were analysed with all independent variables. It was found that only four independent variables (education level: university degree, health and safety objectives, management commitment, and safety reporting) made a statistically significant contribution in explaining the variance in safety satisfaction and feedback.

It was found that only three independent variables (the role of the supervisor, the supervisor's leadership style, and management commitment) made a statistically significant contribution in explaining the variance in accidents.

It was found that only four independent variables (gender: female, length of employment: 2.1 – 6 years, length of employment: 6.1 – 15 years, and the role of the supervisor) made a statistically significant contribution in explaining the variance in injuries.

4.6.4 Summary of Hypothesis Testing Results

Table 4.71 shows the summary of the overall hypothesis testing of this study.

Table 4.71: Summary of hypothesis testing results

Objective 1	Hypothesis	Supported	Rejected
to investigate the perception of hospital employees regarding the different elements of OHS management	H1a: The presence of health and safety management elements will have an association with the level of education and gender.	• Safety satisfaction & feedback • Training & competence • Health & safety objectives • Safety reporting • Leadership style • Accidents	• The role of the supervisor • Management commitment • Injuries
	H1b: The presence of health and safety management elements will have an association with the length of employment and gender.	• Training & competence • Health & safety objectives • Management commitment • Injuries	• Safety satisfaction & feedback • The role of the supervisor • Safety reporting • Leadership style • Accidents

Objective 2	Hypothesis	Safety satisfaction & feedback	
		Supported	Rejected
to examine whether the elements of OHS management are viewed as supportive or preventive factors to the implementation of OHS management system in Malaysian public hospitals	H2a: Health and safety management elements and demographic characteristics have a significant relationship with satisfaction towards safety systems in the workplace.	• Health & safety objectives • Management commitment • Safety reporting • Education level: University degree	• The role of the supervisor • Leadership style • Training & competence • Gender: Male & Female • Education level: school level, certificate & diploma • All types of age • All types of ethnicity • All types of job position • All types of length of employment

Objective 2	Hypothesis	Accidents	
		Supported	Rejected
to examine whether the elements of OHS management are viewed as supportive or preventive factors to the implementation of OHS management system in Malaysian public hospitals	H2b: Health and safety management elements and demographic characteristics have a significant relationship with accidents in the workplace.	• The role of the supervisor • Leadership style • Management commitment	• Health & safety objectives • Safety reporting • Training & competence • Gender: Male & Female • All types of education level • All types of age • All types of ethnicity • All types of job position • All types of length of employment

Objective 2	Hypothesis	Injuries	
		Supported	Rejected
to examine whether the elements of OHS management are viewed as supportive or preventive factors to the implementation of OHS management system in Malaysian public hospitals	H2c: Health and safety management elements and demographic characteristics have a significant relationship with injuries in the workplace.	• The role of supervisor • Gender: Female • Length of employment: 2.1 – 6 years • Length of employment: 6.1 – 15 years	• Health & safety objectives • Safety reporting • Training & competence • Leadership style • Management commitment • Gender: Male • All types of education level • All types of age • All types of ethnicity • All types of job position • Length of employment: Less than or equal to 2 years • Length of employment: 15.1 years & above

Objective 2	Hypothesis	Supported	Rejected
to examine whether the elements of OHS management are viewed as supportive or preventive factors to the implementation of OHS management system in Malaysian public hospitals	H3: All the independent variables (the supervisor's leadership style, the role of the supervisor, management commitment, training and competence, health and safety objectives, and safety reporting) will have a direct relationship with the dependent variables (safety satisfaction and feedback, and safety incident/accident)	Yes	

4.7 Strategies to ascertain the appropriateness and effectiveness of an OHSMS implementation

Based on the analysis of the hypotheses, Figure 4.10 is an approach that can be used to implement an occupational health and safety management system effectively. From this approach, some strategies are recommended to effectively implement the OHS management systems. These are to answer objective 3 of the study: to recommend practical strategies for the development and implementation of effective OHS management system in Malaysian public hospitals.

Figure 4.10 is a proposal that consists of various phases in implementing a successful OHSMS. The phases are: (1) OHS outcome from this study's findings; (2) Establishment of safe person, safe place and safe system strategies; (3) Determination of OHSMS elements for implementation priority; and (4) Implementation and development of OHSMS elements; and (5) Safety audit or safety review.

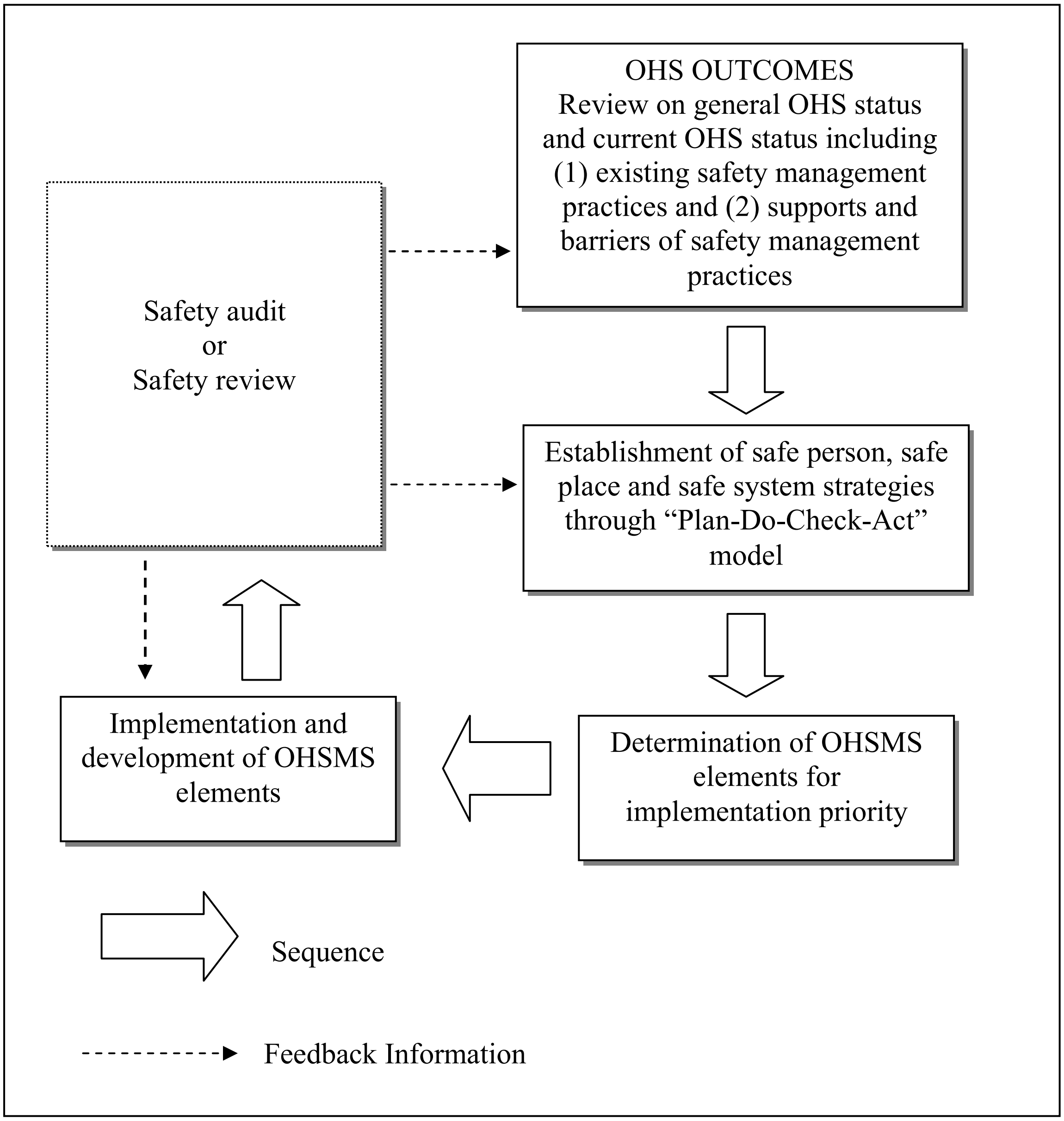

Figure 4.10: Conceptual framework for the review on the implementation of OHSMS (Partly adapted from Law, Chan & Pun, 2006)

4.7.1 OHS Status

Tables 4.72 (a) – (d) describe the findings of the overall OHS status in the state hospitals. From Table 4.72 (a), about 68% of the respondents emphasized that they were not satisfied with the effectiveness of various safety systems in their workplace. From Table 4.72 (b), the survey noted that almost 83% of the respondents perceived that incident/accident (i.e. accidents and injuries) happened in their organization. Tables 4.72 (c and d) also demonstrate whether employees had witnessed any accidents and near misses over the past one month and experienced injuries over the past twelve months. With regard to accidents and near misses, Table 4.72 (c) shows about 39% had witnessed occasional accidents and near misses in the past one month while Table 4.72 (d) reveals that about 80% of the respondents experienced injuries during the past twelve months.

Table 4.72 (a): OHS status: Satisfaction towards safety systems

	Not satisfied	**Satisfied**	**Total**
Safety satisfaction and feedback	285 (68.2%)	133 (31.8%)	418

Table 4.72 (b): OHS status: Safety incidents/accidents

	No incidents	**There are incidents**	**Total**
Safety incident/accident	72 (17.2%)	346 (82.8%)	418

Table 4.72 (c): OHS status: Accidents and near misses

	No	**Yes**	**Total**
Witness accidents and near misses	255 (61%)	163 (39%)	418

Table 4.72 (d): OHS status: Injuries

	None	Yes	Total
Experienced injuries	85 (20.3%)	333 (79.7%)	418

Existing health and safety management practices were used as a measure for OHS management. The results for the specific OHS status were:

i. Female employees with a school level of education perceived that safety satisfaction, health and safety objectives, and accident prevention are important variables of the health and safety management dimension.
ii. Female employees with a certificate and diploma level of education perceived that training and competence and safety reporting are important variables of the health and safety management dimension.
iii. Male employees with a school level of education perceived that health and safety objectives, safety reporting, and leadership style are important variables of the health and safety management dimension.
iv. Female employees with employment of less than or equal to 2 years perceived that health and safety objectives is an essential variable of the health and safety management dimension.
v. Female employees with employment of 15.1 years and above perceived that injury prevention is an essential variable of the health and safety management dimension.
vi. Male employees with employment of 2.1 to 6 years perceived that training and competence, health and safety objectives, and management commitment are essential variables of the health and safety management dimension.

In sum, based on the perceptions of the respondents, it was discovered that:

i. Accidents and injury procedures must be reviewed from time to time to ensure a free-accident-and-injury working place is realized.
ii. The leadership style and role of the supervisor should be emphasized to ensure that leaders are more involved in health and safety matters in the workplace.

iii. Management commitment is critical in revealing effective management of OHS in the workplace.
iv. Health and safety objectives and safety reporting procedures should be reviewed periodically to ensure effective OHS management.
v. Safety training should be given to all employees to ensure they are alert and take precautious in any aspects of health and safety to ensure hazards and risks are eliminated or reduced while performing work.

Some of the reasons for this dissatisfaction based on the open-ended question (refer Table 4.73 in Appendix 19) were:

i. No continuous education and training on OHS
ii. Lack of awareness training
iii. Personal protective equipment (PPE) not of good quality
iv. Hospital environment not conducive for effective working
v. Sharing of OSH information is lacking
vi. Workstation design not comfortable
vii. Ergonomic issues are on the increase
viii. The role of a supervisor is not consistent
ix. No effective safety communication
x. Exposure to dangerous substances without enough protection
xi. Cooperation among top management and employees is neglected
xii. Staff are experiencing more work stress
xiii. Improper disposal of waste
xiv. Safety rules not displayed

OHS support is a prerequisite for effective OHS management. OHS status also comprises the findings on the existing support on OHS management but these supports can also be barriers of effective OHS management. The results were:

i. Staff with the university level of education felt that health and safety objectives and safety reporting were not updated from time to time to ensure the effective management of OHS. The same goes for management commitment. Staff perceived that their management was not fully committed in health and safety matters.
ii. Female staff and those with an employment length of between 2.1 to 6 years perceived that the safety incident/accident in their workplace was not taken seriously.
iii. The ineffective role of the supervisor, management commitment and leadership style were seen to have an association with numerous accidents and near misses in the workplace.
iv. Female staff and those with an employment length of between 2.1 to 15 years perceived that the role of the supervisor is vital to prevent injuries from happening frequently.

In conclusion, five measures such as health and safety objectives, safety reporting, management commitment, the role of the supervisor, and leadership styles were seen to be supportive in effective OHS management but if not managed efficiently, these variables can be a barrier at a later stage. Although safety training was not significant, its lack might hinder the effective management of OHS.

4.7.2 The establishment of safe person, safe place and safe system strategies through the "Plan-Do-Check-Act" model

Mearns and Flin (1995) affirmed that "the identification of hazards and their corresponding control measures provides the foundation for a safety program and essentially determines the scope, content and complexity of a successful occupational health and safety management system (OHSMS)" (as cited in Makin & Winder, 2008, p. 935). Thus, effective risk management concentrates on blending three elements that exist in an organization: people, physical workplace and management (Makin & Winder, 2008). They reported that three strategies such as safe place, safe person, and safe system are used in dealing with hazards introduced by the combination of these three elements.

Safe place strategies concentrate on a risk assessment process and hierarchy of control to remove hazards in the physical workplace. Some examples of safety management elements are inspection, job hazard analysis, accident control, hazard elimination, etc. (Law, Chan & Pun, 2006). Safe person strategies emphasize the human factor in providing employees with the necessary knowledge, skill and abilities to deal with hazards around them. Examples of the safety management elements are safety training, safety rules, personal protection program, safety and health awareness, etc. (Law, Chan & Pun, 2006). Safe system strategies highlight hazards resulting from management aspects like poor supervision, lack of leadership, lack of feedback and poor communication, etc. Some safety management elements included regular feedback, open communication, goal setting, accountability, safe working procedures, etc. (Makin & Winder, 2008). The "Plan, Do, Check, Act" cycle should be employed directly over the three strategies as in Figure 4.11 to allow the OHSMS elements to be materialized with emphasizes on leadership and commitment and be reviewed at the end of the cycle.

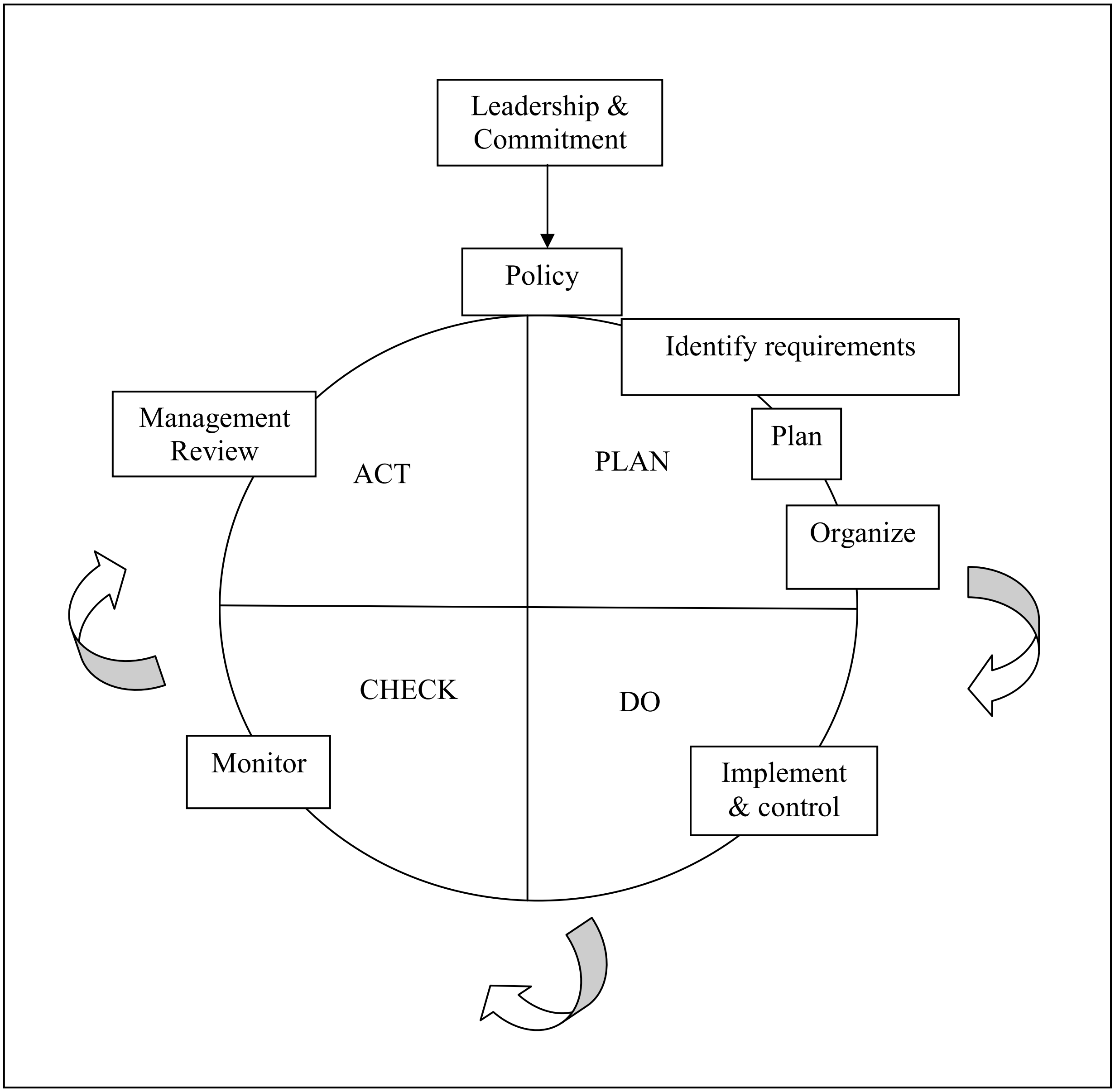

Figure 4.11: Determination of the OHSMS element (Adapted from RSC, 2009)

4.7.3 The determination of OHSMS elements for implementation priority

This phase illustrates six health and safety management elements that must be prioritized as the foundation for effective OHSMS implementation is risk assessment. An effective procedure for implementing OHSMS elements as in Figure 4.12 is to practise these six elements one at a time to ensure their effectiveness.

Figure 4.12: A conceptual framework of OHSMS foundation
(Adapted from Yu & Hunt, 2004)

Stage 1: Review safety policy and safety plan

The safety policy must be described clearly and disseminated to all employees. The safety plan developed must be integrated into the organizational strategic plan. Management must review the safety policy periodically according to needs and make strong commitments in terms of resources and priority for safety issues.

Stage 2: Examine hazard identification and control plans

All workers must be involved in the risk assessment process from the initial stage to the controlling stage by defining their roles and responsibilities clearly. A sense of belonging to a program facilitates workers to be committed and motivated in providing honest contributions to any health and safety programs. Further, periodic training enables employees to upgrade their knowledge and skills to perform their work efficiently.

Stage 3: Evaluate safety management practices

To enable employees to be more motivated and committed, job empowerment, regular feedback, safety education and training, safety rules and procedures, etc. must be assessed to ensure a constant decline in unsafe practices.

Stage 4: Assess incident/accident investigation and emergency plans

Define the incident/accident investigation and emergency plans clearly and inform the affected employees. A continuous attempt through teamwork must be explained to ensure safety conformance to reduce the cost of accidents.

Stage 5: Evaluate safety communication and documentation

The management of health and safety matters including hazard identification, safety standards and procedures, safety roles and responsibilities, etc. must be documented and disseminated to all employees. Safety committees and safety teams must be set up to manage the communication of these safety practices. Employees' job descriptions and work instructions must include safety roles and responsibilities to be performed.

Stage 6: Review safety program and audits

Safety programs must be continuously assessed to determine all safety practices are allied to the safety policy. Audit tools are used to give feedback to employees to ensure constant safety enhancement.

4.7.4 The implementation and development of OHSMS elements

The last phase in this framework is to implement the OHSMS. Some strategic issues in the implementation of an OHSMS according to Yu and Hunt (2004) are:

i. Organizational and cultural changes

Successful implementation needs a modification of the organizational culture and safety management attitude.

ii. Employees full commitment and involvement

Successful implementation needs employees' commitment and involvement from the beginning of the process.

iii. Clarity of roles and expectations

Roles and expectations needed to be clearly defined to all employees so that they really know how to handle their jobs according to procedure.

iv. Long-term focus

Implementation of an OHSMS is a long-term development and thus, management and employees must implement each element with persistence to ensure the success of such a system.

The following Figure 4.13 is a framework of the OHSMS. There are five vital elements needed to ensure its success: policy, organizing, planning and implementing, measuring performance, and reviewing performance. An initial status review is a must before implementation. This initial review is to ensure that the organization has evaluated risk assessment conditions every now and then to determine the effectiveness of the OHSMS implementation.

The fundamental elements in an OHSMS consist of safety policy and management commitment. Organizing comprises (1) responsibility and accountability, (2) competence and training, (3) OHSMS documentation, and (4) communication.

Planning and implementation includes (1) initial review, (2) system planning, development and implementation, (3) OHS objectives, and (4) hazard prevention.

Measuring and reviewing performance includes (1) performance monitoring and measurement, (2) investigation of work related injuries and OHS performance, (3) audit, and (4) management review.

Key stages to an OHSMS : (1) establish senior management commitment to an OHSMS, (2) develop a safety policy, (3) allocate roles and make statements of safety responsibility and accountability for all job levels, (4) put in place risk management procedures, setting goals to identify and mitigate system weaknesses, (5) establish a hazard reporting system to control risk, (6) establish an accident and incident reporting system, (7) train all staff and assess competence on safety critical aspects of performance, (8) monitor, investigate and analyze adverse events, (9) review staff/organization performance and OHSMS.

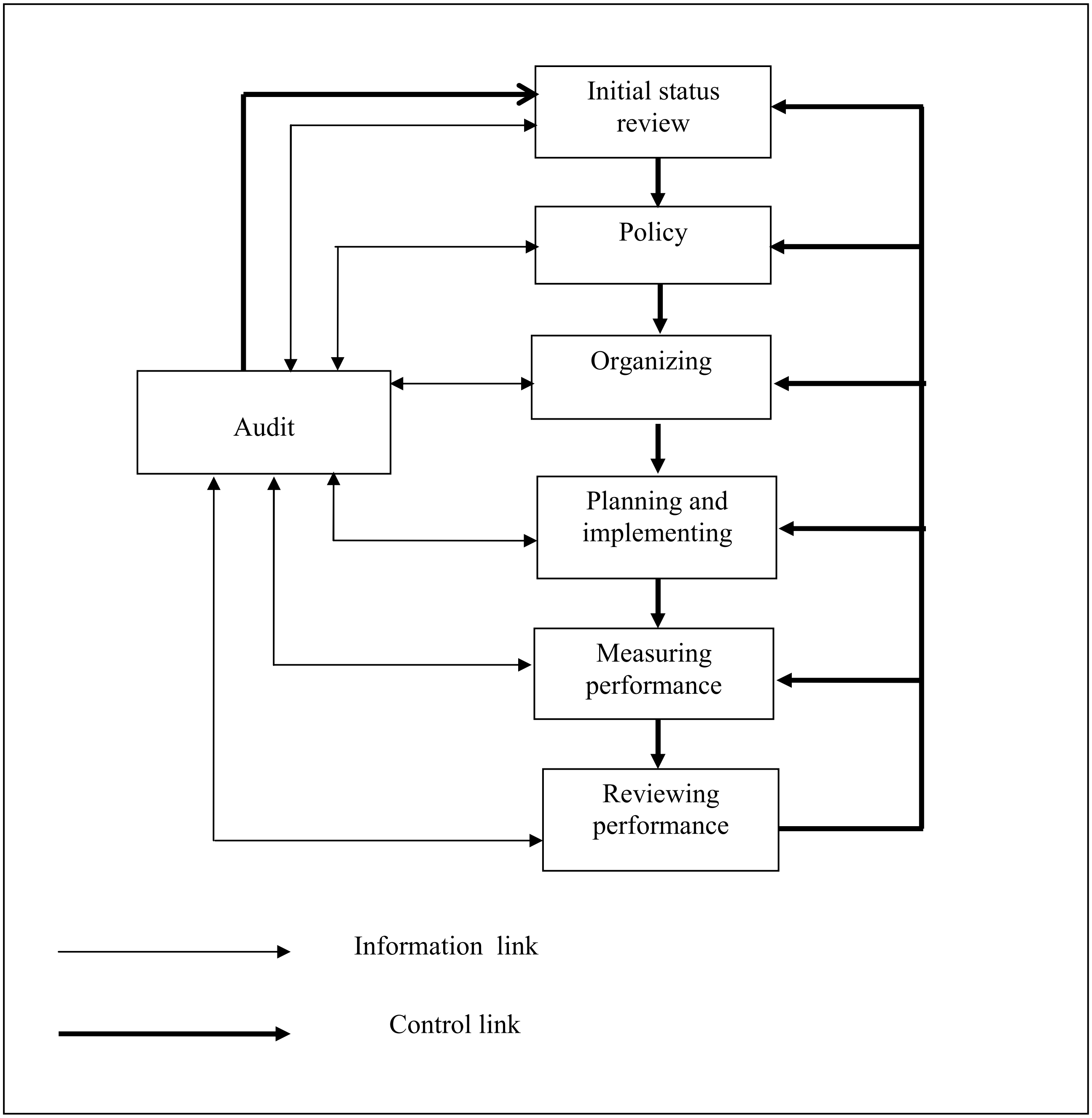

Figure 4.13: Framework for an OHSMS
(Partly adapted from RSC, 2009)

CHAPTER FIVE

DISCUSSION AND CONCLUSION

5.0 Introduction

The present study outlines the development of a health and safety management model that has denoted six dimensions: a supervisor's leadership style**;** the role of the supervisor; training and competence; health and safety objectives; management commitment; and safety reporting. These six dimensions represent the independent variables of this study. Safety satisfaction and feedback; and safety incidents/accidents comprising of accidents and injuries were the two outcome variables. This chapter discusses the research findings in three sections: the first explains the findings from the instrument validation, the second describes the hypotheses testing results, and the final section discusses the limitations of the study, its contribution to both theoretical and managerial practices and directions for future research and contains recommendations.

5.1 Validation of the Instrument

The results of the validation phase are a vital step in the requirement of a valid and reliable instrument. As most of the scales appeared to be skewed, transformation was examined, but was not executed as "factor analysis is generally robust to non normality" (Glendon & Litherland, 2001, p. 168)

5.1.1 Scale Reliability

The internal consistency reliability coefficient for the pilot study was 0.948 and the revised scale was 0.949. The Cronbach's alpha for all dimensions in the revised (final) scale were in the range of 0.740 to 0.945. The results revealed that the measurement constantly assesses what it is intended to measure (Cooper & Phillips, 2004; Seo et al., 2004); indicated adequate internal consistency (Glendon & Litherland, 2001); and higher scores emphasized greater or a stronger sense of safety practices in the workplace (Huang et al., 2006).

5.1.2 Content Validity

Content validity defines to what extent a single item in a measure relates its meaning to the underlying theoretical concept. Content validity assessment by safety experts disclosed that 25 items were deleted from the initial group of 119 items as they were inappropriate, redundant, and comprised low item-total correlations. Thus, the revised instrument comprised of 94 items. Even though the assessments were subjective, content validity was ascertained to persistent procedures (Havold & Nesset, 2009). Furthermore, Seo et al. (2004) reported that results of content validity showed evidence that "clear operational definitions of supervisor, management, and upper management should be given at the start of the questionnaire to avoid confusion" (p. 434).

5.1.3 Construct Validity

The results of the exploratory factor analysis (EFA) permit this study to refine the instrument measurement to enhance its usability and validity. The usage of EFA is an initial procedure before confirmatory analysis (Gerbing & Hamilton, 1996 as cited in Seo et al., 2004). All the scales revealed reasonable validity in determining how well the concept is defined by the measure (Hair et al., 1998).

Although the safety climate scale in this study differed from other studies, the items in each factor were able to indicate the conceptual definition of the underlying construct. As found in other studies like Brown and Holmes (1986) and Zohar (1980), the usage of the same safety climate instrument failed to produce the same factor structure. Some possible explanations for these differences are cultural factors, different management styles (Glendon & Litherland, 2001), different safety practices and distinct work environments (Varonen & Mattila, 2000).

Some of the dimensions are, to some extent, not similar with previous studies particularly on safety communication, safety rules, work pressure, and feedback about errors/mistakes. There is strong evidence that (1) the items in the safety rules dimension are more consistent with other factors, for instance, one item fell into the role of the supervisor but was eliminated due to a lower factor loading; (2) four items of feedback about errors/mistakes were loaded into the safety satisfaction dimension; (3) one item in the communication dimension was included in the management commitment dimension; (4) two items of safety involvement were factored into the training and competence dimension; and (5) one item of work pressure was incorporated into the safety reporting dimension. Overall, four items were eliminated, i. e. SI4 = -0.147, SI5 = 0.222, SI7 = -0.090 and rule1 = 0.247, where the factor loadings were less than 0.30 (Hair et al., 1998). These findings are consistent with Havold & Nesset's (2009) study, who found that (1) items in safety rules dimension were factored into the safety satisfaction dimension, and (2) items about feedback in the learning culture dimension were factored into the communication dimension. Consequently, difficult items were eliminated from the final scale before confirmatory factor analysis (CFA) was executed.

The Kaiser-Meyer-Olkin-Criteria (KMO) measure of sampling adequacy for all the constructs was above 0.60 and the Bartlett's Test of Sphericity was significant suggesting that correlations among all the items existed (Cooper & Philips, 2004; Lin, Tang, Miao, Wang & Wang, 2008). Even though the respondents answered the same questionnaire and employees were from the hospital sector, nevertheless, the occupational categories varied, as a result, the factor analysis of the safety climate scale were very context dependent (Salminen & Seppala, 2005).

Eight measurement models that are safety satisfaction and feedback, safety incidents/accidents, the supervisor leadership style, the role of the supervisor, management commitment, training and competence, health and safety objectives, and safety reporting were tested to disclose further confirmation of the scale construct validity. The measurement model indicated that many items contained correlated errors within each latent variable. This is consistent with Seo et al. (2004) study on "a cross-validation of safety climate scale". Overall, it was seen that the instrument presented good evidence of construct validity confirm by the goodness-of-fit indices. A valid and reliable safety climate instrument gives information concerning safety problems prior to accidents and injuries (Seo et al., 2004). Furthermore, Guldenmund (2000) indicated that "research should not be undertaken to develop new safety climate measurement instruments, but should rather focus on the validity of the constructs …"

5.1.4 Concurrent Validity

Correlation analysis was applied to determine criterion validity among the scales as to confirm support of concurrent criterion validity (Seo et al., 2004). Moderate to higher correlations between safety climate scales revealed that the constructs were dependable as reflected by this study's findings. Results also suggested that the six components of safety climate were negatively correlated with safety incidents/accidents and positively correlated with each other. The safety incident/accident showed a weak correlation with other dimensions and this may have resulted from infrequent incidences (Seo et al., 2004). The outcome is also congruent with Huang et al. (2006); and Vinodkumar and Bhasi (2009) findings of safety climate and self-reported injury that stipulated safety climate is a crucial factor anticipating self-reported injury. In addition, this analysis is aligned with Johnson's (2007) study on the predictive validity of safety climate where the positive and negative directions of the relationship showed improved safety climate predicted reduction in injury frequency in the workplace and vice versa. Seo et al. (2004) also indicated that "significant negative correlation coefficients suggested that the higher perceived safety climate was, the fewer the number of accidents or near-misses" (p. 438). The study of Varonen and Mattila (2000, p. 768) reported that the correlation of safety climate with accidents demonstrated "the better the safety climate of the company, the lower the number of accidents". Although the correlation coefficient of role of supervisor and safety incident/accident was statistically significant at the 0.01 level, the results must be clarified with care as "the statistical significance may be the result of abundant degrees of freedom rather than real association" (Seo et al., 2004, p. 443).

Similarly, Evans, Glendon & Creed (2007) revealed that the positive correlation of safety climate implied a higher perception of operational safety, and thus, "support the notion that safety climate scales were measuring an aspect of perceived safety performance" (p. 678). This view is supported by Zimolong and Elke (2006) who discovered from previous research that high safety performances were correlated with elements including strong safety management commitment, interaction between workers and supervisors, and open communication on safety. Furthermore, they also indicated that significant relationships existed between performance and comprehensive training, managerial style, good communication channels, empowerment, good relations between management and workers, the allocation of safety activities, and strong commitment from top management and supervisors.

5.2 Number of Response

Number of response is vital in a survey research as low response can lead to bias on overall outcome (Burkell, 2003) and thus the results cannot be trusted (Draugalis & Plaza, 2009). In addition, Hernon and Schwartz (2000, p. 119) revealed that ''insufficient attention has focused on return rates and whether the population is truly represented'' (cited in Burkell, 2003). In addition, "the higher the level of nonresponse, the greater the potential bias" (Burkell, 2003, p. 246).

The results revealed that overall participation of 43.15 % of this study was low with 47% of employees from Hospital Sultanah Bahiyah, Alor Setar, Kedah; 70% of employees from Hospital Tuanku Fauziah, Kangar, Perlis; and 17% of employees from Hospital Pulau Pinang. This low response was supported by studies like Bottani et al. (2009); Havold and Nesset (2009); Kongtip et al. (2008); and Vassie et al. (2000). Further supporting was from a team of Malaysian researchers that revealed "response of between 15 – 25 percent is what most researchers in Malaysia received" (Rozhan et al., 2001). It was also seen that participation from all physicians from the three hospitals and respondents from Hospital Pulau Pinang were among the lowest. This findings was in line with previous studies and the reasons might be due to the demanding job arrangement of the physician, the respondents' time is precious, respondents have negative response for the closed-ended questions, survey was too long, stereotyping and think that some of the questions as "don't make sense" (Price, 2000). Further strategies like electronic survey, mixed-mode survey, short questionnaire (McFarlane et al., 2006), face-to-face administration, incentives (Burkell, 2003), average waiting period for follow up call attempt, etc. should be designed to increase higher response of survey. Burkell (2003, p. 255) stated that these strategies "do not eliminate the dilemma but merely represent a best possible response to an impossible problem".

5.3 Hypotheses Testing Results

i. Priorities of employee's perception

This study's results showed that the general views of employees with regard to their OHS practices were in the range of low to medium as the means of employees' perceptions on occupational health and safety practices were between the ranges of 1.58 to 3.9, thus indicating a mixture of "disagree" to "almost agree". Evidence from previous research demonstrated that employees' awareness and involvement of health and safety were a matter of being "forced" upon them by legislation (Carvalho, 2008) and employees discovered that the legislation, regulations and requirements of health and safety were not easy to understand as the issue was really complex (HSE, 2005). The results of this study are consistent with prior studies as the perception of employees on occupational health and safety practices were in the range of low to medium since most employees perceived that safety and health legislation is not easy to understand and they are being "forced" to comply with the legislation. In addition, Health and Safety Executive(HSE) observed that there was also a trend to look at health and safety practices as preventing quick and effective working. Therefore, if this type of perceptions were ignored by the management and employees not given proper training, then it could lead to negative consequences for individuals and the organization. In consequence, the findings of previous studies showed a relationship between employee pessimism and poor safety performance (Oyan, 2000). When management blames the employee for injury and accident, OHS performance is lower (Erickson, 2000). For that reason, an organizational culture/climate is vital in determining that employees and employers give a high priority to implementing best practice in health and safety. Lin and Mills (2001) found from previous research that the leadership of the organization needs to play a major role in safety, as management is accountable for most "humanware" problems.

ii. Perceptions on the Elements of Occupational Health and Safety Management

The chi-square test of independence was used to examine the statistical significance of the differences or relationships between the independent and dependent variables. Consistent with Williamson et al. (1997, p. 15), who stated "in understanding the safety climate or culture of a workplace, the perceptions and attitudes of the workforce are important factors in assessing safety needs", empirical evidence from this study can be used to give information about safety problems before any accidents and injuries arise and it can be used as a "leading indicator" of safety performance (Seo et al., 2004). Hence, based on the perceptions of employees to have effective OHS practices in the workplace, the results of this study found that critical elements of occupational health and safety management were accident and injury procedures, leadership style, management commitment, health and safety objectives and safety reporting procedures, and safety training. This is in accordance with studies done by Lin and Mills (2001); Neal, Griffin and Hart (2000); Stewart (2002); Stone et al. (2005); and Vassie, Tomas and Oliver (2000) whose results showed that these elements are essential to safety performance.

This study, in line with Huang et al. (2006); and Seo et al. (2004), indicated that management commitment, the role of the supervisor and safety training were significant factors in the prevention of accidents in the workplace. However, Mearns et al. (2003) reported that reactive management commitment implied a higher number of unsafe incidences. The findings by Mearns et al. might be true for this study as only male employees with a school level of education perceived that their leaders did not show adequate commitment in their health and safety duty. Congruent with the study by Hsu et al., (2007), safety leadership denoted that top management and supervisors must be involved in safety activities and this study found that supervisors and top management were involved in health and safety activities in their workplace. Furthermore, safety reporting is also critical as an indicator of workers' perceptions about managers' commitment to safety (Clarke, 1998). This study's finding is consistent with Clarke's study where employees perceived that safety reporting is a vital element in managing OHS in the workplace.

Although there is a lack of studies that focus on the impact of demographic factors like gender, age, education, position level, and tenure on organizational climate (Kuenzi & Schminke, 2009), however, Hastings et al. (1995) supported this survey by reporting that demographic factors have a significant influence on employees' performance (as cited in Rose & Schelewa-Davies, 1997). This survey has attempted to seek the perceptions of both men and women employees in relation to health and safety issues that affect them at work. Therefore, as stated by the Health and Safety of Women in Construction (HASWIC) (1997, p. 15), "Analysis by gender is important to identify where there are significant gender-based differences in occupational injuries and illness".

Prior studies on different age and safety climates by Glendon and Litherland (2001) and Vinodkumar and Bhasi (2009) found that differences existed between junior and senior employees regarding safety climate. However, the results of this study differ from these previous studies, where junior and senior employees perceived no difference in the OHS practices in their organization. One possible explanation for this is the workplace culture where junior employees perceive their seniors as providing guidance and motivation in health and safety.

Prior studies like Sattler and Lippy (1997) and Thomas (1999) discovered that female employees complied with warnings. This study's findings are consistent with these studies, where female employees were found to perceive that the OHS management elements are critical to effective OHS practices. Malle (1996) strengthened this study's findings and pointed out that "men view risks as less dangerous compared to women".

As for length of employment, Vinodkumar and Bhasi (2009) reported dissimilar findings of safety climate among different lengths of employment as they denoted that "experience is believed to refine skill, improve efficiency and influence attitude towards work and especially towards safety at workplace" (p. 7). The results of this study are consistent with their findings where different lengths of employment were perceived differently regarding the importance of the OHS management elements. In addition, empirical evidence discovered associations between more experienced employees and improved safety as reduction in injuries was linked with senior employees (Lauver & Lester, 2007). This study's findings differ from Lauver and Lester, where senior employees were more involved with injuries in the workplace. However, previous findings also revealed that increased tenure was related to more injuries as more responsibility was given which was perceived as an extra work risk (Lauver & Lester, 2007). This study's finding is consistent with this prior study where senior employees were involved with injuries in the workplace.

The results of this study concerning levels of education differ from those reported by Thomas (1999). In her study, no significant differences between subjects of different education levels and usage of personal protection equipment were found. This study reveals dissimilar findings between subjects of different education levels and OHS management elements, for example, employees with a school level of education perceived that health and safety objectives, safety reporting, leadership style, and accidents procedure are critical elements of OHS management while employees with a certificate or diploma level perceived that training and competence, and safety reporting are critical elements of OHS management.

In sum, to ensure the survival of organizations, improvement of performance through efficient management systems and well-structured performance evaluation are vital (Coelho & Moy, 2003). Carder and Ragan (2003) also supported this argument and highlighted that (1) management commitment and employee involvement, (2) work site analysis, (3) hazard prevention and control, and (4) safety and health training are the major elements of an effective safety program. In addition, enhanced safety in the workplace produces increased "safe acts" (Hilyer, Leviton, Overman & Mukherjee, 2000). Although the studies highlighted above were undertaken in western countries, the findings have some general application in the Malaysian setting. The findings of this study showed that the Carder and Ragan criteria were perceived as significant in providing a conducive working environment to protect employees from any health and safety problems.

iii. **Elements of OHS Management that Support or Hinder the Implementation of an OHS Management System**

Logistic regression analysis was applied to examine which elements of OHS management prevent or support the implementation of the OHS management system in Malaysian public hospitals.

Consistent with prior research of Hsu et al. (2007) on leadership and management commitment, Clarke (1998) on safety reporting, Cox and Cheyne (2000) on safety rules, and Hong Kong Occupational Safety and Health Council (1998) on the role of the supervisor, the findings of this study reported that five elements, health and safety objectives, safety reporting, management commitment, the role of the supervisor, and leadership style were seen to support the implementation of an effective OHS management system.

Furthermore, the Contra Costa Health Services (2003) survey at the General Chemical-Richmond Works Facility reported that managers and employees were unmotivated when communication of a safety vision was unreliable, but, in the case of this study, it was found that health and safety objectives were significant. One possible reason for this might be health and safety objectives were communicated effectively to all employees. However, a previous study by Varonen and Mattila (2000) reported that "supervision alone may not influence the safety climate and the behavior of workers" (p. 767). Besides, workers had an attitude of "resigned acceptance" as to safety performance when supervisors and managers were uncertain of health and safety requirements. As a consequence, although these five elements were seen to support the implementation of OHSMS, but it also could be a barrier to the implementation if not managed effectively.

In addition, safety training was seen to be a barrier to the implementation of OHSMS. The results of this study on safety training, however, differ from those reported in other studies such as Cohen and Jense (1984); Cooper and Phillips (2004); Reber and Wallin (1984) (as cited in Huang et al., 2006). In their studies, Huang et al. (2006) noted that safety training was reported to have significant consequence in enhancing safety performance and related to low number of accident. This study's findings, in contrast, indicated that safety training was not significant but a lack of it might hinder the effective management of OHS.

In sum, Bottani, Monica and Vignali (2009) further confirmed that "accidents are mainly due to human errors or lack of coordination, which accounts for 24% and 46% of the accident causes" (p. 158). What is more, the ILO's philosophy of prevention and protection in the field of occupational safety and health affirmed "and whereas condition of labour exist ……. to produce unrest so great that the peace and harmony of the world are imperiled; and an improvement of those conditions is urgently required; as, for example, by the regulation of the hours of work, including the establishment of a maximum working day and week … the protection of the workers against sickness, disease and injury arising out of his employment …" (Alli, 2001, p. 3). Thus, consistent communication of safety and health legislation, regulations and requirements and safety and health training regarding their work duties are vital to enhance safety performance. This will also ensure that the significant elements will not be barriers to the implementation of OHSMS.

iv. **Strategies to ascertain the appropriateness and effectiveness of an OHSMS implementation**

It is not an easy task to implement an effective OHSMS in an organization as it might encounter support or hindrance. Lack of resources and relevant expertise has been seen as one difficulty in fulfilling the requirements of OHSMS implementation. Nevertheless, Reese (2009) highlighted that participation from everyone in the workplace is vital to ensure effective implementation and emphasized that safety training and education is crucial to the avoidance of accidents. Moreover, Gustin (2008, p. 1) indicated that "safety is a condition of employment" and consequently everyone has to "make a commitment and assume responsibilities". The ILO (2005) reported that occupational accidents and ill-health are avoidable and cooperation among all people with a positive commitment will ensure this mission can be achieved. However, individual accountability is the main factor in a safety mission where it must be expanded to all departments and starting from the management to all employees (Murphy, 2003). In addition, he added that safety does not "just happen" and a committed team will reduce the frequency of injury resulting in a safer, compliant and more efficient workplace. Prior studies also demonstrated a reduction in illness/injury incidence, lowered lost-time frequency, and less compensation in companies which implemented an OHSMS (Bottani, Monica & Vignali, 2009; Robson et al., 2007). Larsson, Pousette and Torner (2008) also indicated that increased manager safety behavior enables improvement in employee safety behavior. Robson et al. (2007) also noted that management commitment to OHS is critical to ensure the success of OHSMS implementation although there is not enough support from previous studies to make suggestion either in favor of or against OHSMS and also research on OHSMS is inconclusive (Gallagher et al., 2003).

In sum, this study maintains a strong commitment from top management and good employee involvement are critical elements for effective OHS management with support from supervisors in determining their role effectively. Failure to blend every element efficiently will limit the effectiveness of implementing an OHSMS. Safety training was also seen to enhance employee knowledge and participation in health and safety as a lack of training and under-committed employees will be unlikely to be involved in an OHSMS.

5.4 Cultural Issues in Malaysia

Professor Geert Hofstede discovered that cultural factors frequently produce disagreement between people in an organization rather than collaboration. Some of the dimensions of cultural values in Malaysia he noted are:

i. High power distance

Malaysia has a high power distance. This means that the liaison between employer and employee is based on a chain of command where employees are obedient to their superiors. This is actually good in a way as committed management can use their power to control employees to obey their commands. Employees have a high opinion of their superiors and would not call them by their first name but with a respect due “Mr …”.

In addition, this study’s results found that management commitment, the role of the supervisor, and leadership style were significant, thus, giving the impression that a high power distance dimension is better in developing employees' good safety attitudes. Another critical factor is that the number of accidents have decreased from 114, 134 in 1995 to 56,339 in 2007, a reduction of almost 49% in 12 years. This shows that high power distance is used to influence employees to ascertain if they take good care of their health and safety while at work.

At times, this high power distance creates disharmony among employees and their superiors when certain decisions were made against the value of the employee(s). For example, if the safety reporting procedure in an organization is not effective, the employee(s) will voice the matter to their superiors. This will create a strained relationship between the employee(s) and their superiors.

ii. A collectivism society

Malaysia is high on the collectivism dimension as employees are loyal to their group and always think of "we" rather than "I". Employees are more concerned with others and tend to protect other people's dignity, sometimes to the extreme. This is true in public hospitals as the employees' duties are to serve their community, thus, they work in a group trying to solve common problems in their workplace. They are multi-racial and hold something in common to improve and serve their multi-racial patients effectively. Furthermore, they have a "gotong-royong" (to work together or help one another to accomplish a certain task) spirit in carrying out tasks and are sensitive to other people's feelings.

iii. High uncertainty avoidance

Malaysia has a high uncertainty avoidance culture where an organization has a structured design which follows rules and procedures, consensus decision making, minimizes risk, in which employees are loyal to their employer especially working with government agencies. These public employees tend to remain longer with their employer as working with the government guarantees certain benefits like a retirement fund and medical benefits. Most Malaysian employees try to minimize risks by working with government agencies.

With rules and procedures, it can force employees to comply with the organization's rules to ensure a safe and healthy working environment. For example, the results of this study show that health and safety objectives and safety reporting dimension were found to be significant. This demonstrates that public hospital employees are high on uncertainty avoidance where they perceive that health and safety objectives are important to give them guidance while safety reporting is necessary to voice their opinions about unsafe acts and unsafe conditions in the workplace.

iv. Masculinity-Femininity culture: middle of the road

Malaysia was found to be in the middle regarding this masculinity-femininity culture where at one stage employees are more competitive, assertive, ambitious and have the desire to accumulate wealth, but at certain period, they are more focused on relationships, environmental awareness and the quality of life. This shows that employees deserve to be treated with dignity and respect but at times they like styles to empower others, to be more competitive especially during promotion and career enhancement. This study's results revealed that public employees are concerned about injuries they may experience as this will affect their quality of life and show their working environmental is not safe.

5.5 Research Contributions

This study addresses a number of research gaps. Contributions from this study can be seen from three aspects: theoretical, methodological, and managerial.

5.5.1 Theoretical Contribution

The theoretical value of this study is that it takes into account the factors that impede the implementation of an OHSMS. Although there has been considerable research on an OHSMS, mainly on integrated management systems and auditing of an OHSMS, there is limited research on developing strategies based on the elements of OHS management before implementing an OHSMS. This study provides early research in identifying support and barrier factors from the OHS management elements before implementing an OHSMS. As a consequence, this study supports the work of Gallagher et al. (2003) on barriers to success of OHSMS where there is a need to identify factors that influence the implementation of such systems.

5.5.2 Methodological Contribution

Most studies either do not validate their instrument or only focus on construct validity using exploratory factor analysis (EFA). This study takes a different perspective by using content validity, concurrent validity and construct validity to validate the instrument used in order to meet standards for vigorous research. Construct validity was completed using two types of validation test: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) using structural equation modeling (SEM).

Most previous studies focused on the normal SPSS software to analyze the relationship of the independent and dependent variables. This study utilized structural equation modeling (SEM) to analyze the relationship between the independent variables and dependent variables. SEM was commonly used in safety climate research to determine the associations between variables. SEM includes analysis techniques such as covariance structure analysis, latent variable analysis, confirmatory factor analysis, path analysis, multiple regression and linear structural relation analysis. SEM is also a powerful tool for multiple latent and predictor variables measurement. As the aim of this research is, generally, to disclose associations between variables, i.e., to show that one variable has a relationship with another variable, thus, SEM is based on “causal” relationships that explain changes in variables where exogenous constructs (independent variables) will result in changes in endogenous constructs (dependent variables).

5.5.3 Managerial Implications

Numerous significant managerial implications have resulted from this study that should assist management in making decisions on health and safety issues.

Firstly, a health and safety management instrument is a beneficial assessment tool for hospitals as it is important for risk management assessment. Employees’ perceptions are vital as a realistic approach of determining whether an organization has attained an acceptable level of safety in their workplace.

Secondly, this survey instrument can be an effective measurement tool to demonstrate improvement and to reflect on how to improve problematic areas in the workplace. It can be used to compare departments within a hospital system to identify areas that require special attention.

Thirdly, this tool can also be used to improve compliance with the Occupational Safety and Health Act 1994, thereby reducing exposure to risk in the workplace. Furthermore, employees might continue to be more motivated to improve safety when they realize that management is more visible and supportive of safety activities and they feel valued when their safety is being taken care of properly.

Lastly, this tool provides for employee feedback through follow-up to the survey findings where it is useful for change management. This can be done through focusing on scores of the dimensions of health and safety management that were prearranged from high to low, where the dimension with the lowest score can be targeted for improvement. Also general areas of weakness can emerge thus indicating targets for improvement.

5.6 Limitations and Future Research Directions

The present study has some limitations that should be mentioned. From these limitations, further research could be suggested to improve this type of study.

5.6.1 Limitations

One limitation is the cross-sectional inquiry, making the outcomes only relevant to the point during the study and incapable of creating causal implications as all variables were examined concurrently. For example, this study design could not tell whether safety climate/safety management predicts safety satisfaction or vice versa. Nevertheless, this study is valuable for introducing groundwork for future research.

Another limitation is the low response in this survey. This study total response was only 43% which was not as high as desired, but the response of 15 – 25 percent is common in Malaysia

(Rozhan, Rohayu & Rasidah, 2001). One possible explanation was the low response among the medical staff, especially physicians (Singer et al., 2007).

A further limitation of this study is that performance measures used in this study were restricted to employee and safety related outcomes. Employee outcomes concentrate on safety satisfaction and safety related outcomes focus on numbers of safety incident/accident. The safety related outcomes focus on the traditional or reactive measures with subjective measures used to examine this variable. Reactive and proactive assessments were used to measure the safety satisfaction dimension.

Another constraint is the proportionate sampling frame used by this study focusing on individual responses. The results are not free from biases as each stratum is sampled exactly in proportion to its size in the population. Imbalance exists with certain stratum where a smaller percentage of the population exists and so does not represent the stratum.

Fifthly, there are many industries that contribute to the Malaysian economy, one of which is the healthcare industry. Healthcare facilities include hospitals, clinics, dental offices, out-patient surgery centers, birthing centers and nursing homes in all fourteen states in Malaysia. However, the focus of this study was on hospitals, namely public state hospitals in the three states in the northern region of Malaysia and it excluded data gathering from healthcare facilities in all fourteen states in Malaysia.

An additional limitation is associated with the existence of non-significant relationships between coefficients that reduce the significance and strength of correlation coefficients (Johnson, 2007).

Finally, this study focus is on limited measures of health and safety management scales. More rigorous methodology should be considered to enable a more systematic analysis of these measurements (Glendon & Litherland, 2001). Additional work is required to examine the properties of health and safety management instruments to ensure that they have valid outcome measures. Moreover, triangulation measures like observations or interviews could further highlight more significant results (Glendon & Litherland, 2001).

5.6.2 Suggestions for Future Research

After discussing the limitations of the study, it is practical to suggest possibilities for further research reflected from the limitations recognized above.

Firstly, future studies should use a longitudinal research design. Longitudinal research assessing the standard measures for health and safety management in hospitals is required as it would provide additional and even stronger support for the effects reported in this study. This type of design would be better for examining the development of efficient health and safety management and for tracking problematic areas in the hospital. This also would permit more precise evaluation of the causality direction that cannot be achieved in cross-sectional studies.

Secondly, the low response among physicians and medical officers could be improved using other means of data collection, internet-based questionnaires or interviews. Since medical staff have limited time to complete and return a questionnaire, the instrument may need to be reduced in extent to maximize the total response.

Thirdly, this study focuses on the subjective measures in its outcome variable. Future research may discover further measures that are more objective (Huang et al., 2006) that could provide a tangible measure of safety performance to be used as an industry-wide benchmark, the results of which could be correlated with actual safety performance.

Next, future research should focus on a disproportionate sampling frame. The proportion of each stratum is varied as some groups are small relative to the larger population. To produce meaningful data, more representation of the smaller groups in the bigger population can be done using a disproportionate sampling frame.

Fifthly, this study focuses on only three state hospitals in the northern region of Malaysia. Further research should focus on all types of healthcare facilities in the fourteen Malaysian states to ensure that it does not restrict the generalizability (the degree that the results can be generalized from the study sample to the entire population) of the findings to all healthcare facilities. Application to other types of healthcare facilities, especially rural hospitals, would enable researchers to understand its reliability in other settings. It is possible that perceptions of respondents in all healthcare facilities on health and safety management at their workplaces may be different as a result of their ability to deal with various types of health and safety problems. Furthermore, it allows comparisons across different locations.

Subsequently, the existence of non-significant relationships between coefficients in this study will reduce the significance and strength of correlation coefficients. Thus, further research should replicate this study to explore the function of possible mediators and moderators in affecting the indirect relationship between OHS management variables.

Lastly, the limitation measure of health and safety management scales needs additional work to examine the properties of health and safety management instruments to ensure they have valid outcome measures. The elements of OHS management should be exhaustive and include elements like employees' knowledge and compliance with safety, emergency preparedness, safety motivation, etc. to examine the state of health and safety practices at any period of time.

Future study is required to further refine this instrument using structural equation modeling (SEM) to come out with a model of good fit, produce parsimonious measures and develop standard measures for examining health and safety management in hospitals. Standardization of the measures will facilitate organizations to exploit evidence-based implications for effectively managing health and safety in their workplaces. The establishment of such databases will assist the managerial level to keep track of their performance. In addition, triangulation measurement will enable a researcher to have more in-depth findings to clarify significant findings.

Besides addressing the limitation of this study, further research is required to assess possible relationships between OHSMS pre-implementation and the improvement of safety levels in public hospitals focusing on the psychological climate like role clarity, social support, possibilities for development, etc. that influence safety behavior. To determine changes in safety levels, a longitudinal design is suitable.

5.7 Recommendations

The following are some insights from this study:

5.7.1 Significant Results from This Study

This section describes the initial OHS status review of this survey's findings. This review focuses on general OHS status, current OHS practices, and support and barriers factors of the OHS management elements.

Overall, the OHS status of the three state hospitals is as follows: (1) 68.2% of employees are not satisfied with the safety systems in their workplace; (2) 82.8% of employees perceived that incident/accident have happen in their workplace over the past twelve months; and 79.7% of employees stated that they experienced injuries in their workplace, especially female employees.

The significant results of this study based on current OHS practices, and support and barriers factors of the OHS management elements were (1) management commitment; (2) health and safety objectives; (3) training and competence; (4) the role of the supervisors; (5) safety reporting; (6) leadership style; and (7) safety incidents/accidents: accidents and injuries in the workplace. It seems that all elements of OHS management and one dependent variable, safety incidents/accidents, were critical to ensure good practices of OHS in the workplace.

In sum, based on the perceptions of the respondents, it was discovered that:

i. Management commitment is critical in revealing effective management of OHS in the workplace. This is so as management, who is responsive and proactive, may turn any challenges in the workplace into opportunities to encourage more positive thinking and action on preventing health and safety hazards. This will lead to compliance in health and safety legislation, for instance, S. 15 (2) (e) of the Occupational Safety and Health Act 1994: to provide and maintain a working environment that is safe and without risks to the health and welfare of employees.

ii. The leadership style and the role of the supervisors should be emphasized and made consistent so that leaders are more involved in managing the health, safety and welfare of employees in the workplace. This can be done by introducing a management awareness program to alert them of their responsibilities and accountabilities towards the health, safety and welfare of employees.

iii. Accident and injury procedures must be continuously reviewed to ensure an accident-and-injury free working place is realized. Incidents/accidents can be avoided or reduced through effective risk management in the workplace. (Refer Table 5.1 for the risk management stages.) Accurate record keeping is also vital to assist Department of Occupational Safety and Health (DOSH) officers in making inspections.

iv. Health and safety objectives and safety reporting procedures should be reviewed periodically to ensure effective OHS management. Health and safety objectives act as guideline for employees to know their direction in performing their health and safety roles. These objectives must be measurable and attainable. Safety reporting is also important as employees should give feedback on any violation of health and safety acts or unsafe conditions in the workplace.

v. Safety training should be given to all employees to ensure they are alert and aware of all aspects of health and safety so that hazards and risks are eliminated or reduced while performing work. Furthermore, basic knowledge on how to perform their jobs safely is vital to avoid accidents and injuries. This will lead to compliance in health and safety legislation, for instance, S. 15 (2) (c) of the Occupational Safety and Health Act 1994: to provide information, instruction, training and supervision to ensure, as far as practicable, the safety and health of employees while at work.

5.7.2 Intuitive Insights from Three Years Involvement in the Work

This study did not detect any trend of poor OHS practices at the state hospitals. All three practised positive OHS management with the Department of Environmental Health as a secretariat to look after the issue of OHS in the hospitals.

Based on two interviews with Assistant Environmental Officers (AEO) from the Department of Environmental Health at Hospital Sultanah Bahiyah, Alor Setar, Kedah and Hospital Tuanku Fauziah, Kangar, Perlis, the following are the OHS practices in their hospitals and all public hospitals in Malaysia, in general.

i. Both hospitals already have their own OHS Policy from the Ministry of Health and the policy was demonstrated at strategic places in the compounds of the hospital buildings.

ii. There are 2 committees in the hospitals – the OHS Committee (Secretary is the AEO) and the Disaster Management Committee.

iii. Employees in the hospitals undergo training – e.g. in-house training on short courses, e.g. OHS orientation (2 times per year), Personal Protective Equipment, Standard Operating Procedure, 5S, auditing, infection control training, ERT, fire drills, etc. These training sessions were given mainly to medical staff and related areas.

iv. Medical employees have to attend continuous medical education - e.g. 2 courses per year for nurses and medical assistants.

v. Among the nurses group, the nurses form a mentor-mentee group to discuss issues relating to their work and try to solve problems.

vi. The investigations in the hospitals are more focused on reactive rather than proactive measures.

vii. Management is not very serious in performing its OHS role.

viii. Some of the problems that seem to be barrier to effective OHS management:

  a. Staffing – not enough staff to handle the work load

  b. Training – non-medical staff lack exposure to health and safety training

c. Little budget for OHS issues

d. Lack of top management understanding and commitment towards OHS issues

From my observation, employee shortage plays an important role to determine whether OHS matters are managed properly according to the rules and procedures. When faced with a shortage of staff, training will not be a priority as the management cannot find replacements to do the job. Even risk assessment is a secondary matter. However, employees will only be alerted to any serious safety issues if there is a pandemic or epidemic of contagious, infectious or viral illnesses, e.g. bird flu, H1N1, etc. For normal health and safety issues in the workplace, they feel complacent and possess the attitude of "it won't happen to me" syndrome and think of accidents "as a matter of chance" only.

5.7.3 Suggestions for Implementing OHSMS in Malaysian Hospitals

To comply with the OHS legislation, the management and employees must employ the participation/involvement approach to improve their workplace environment focusing on (1) psychosocial factors especially the mental stress of workers so that employees are motivated to work in more relaxed way and be optimistic and adapt to changes in working life without treating health and safety issues "as a matter of chance". Examples of psychosocial risks are: work stress, hostility and violence, sexual harassment and other forms of harassment - mobbing, and discrimination at work; (2) health and safety risks in the workplace due to an increase in hazards. Both management and employees must take preventive measures so as to minimize health and safety risks and ensure staff are only exposed to acceptable risk limits; and (3) rewards and incentive schemes in terms of financial incentive or non-financial incentive like praise, employee of the month or awards to promote employee involvement to deal with safety effectively.

Successful implementation needs modification of organizational culture and a safety management attitude. The following initial input of management of change must be practised before utilizing any OHSMS.

i. Develop a safety policy. Policy gives the hospital direction regarding safety issues. It reflects the involvement and commitment of all employees in maintaining a safe work environment. It must define the rights, responsibilities of all employees, and types of measures used to ensure safety in the workplace. This policy must be communicated to all employees and other people at work so that they understand their rights and responsibilities.

ii. Establish a higher management commitment as a motivation force, a flexible organizational structure, and ensure there are enough resources to assist OHS programs. Managers are role models to support health and safety issues. Furthermore, management is responsible for the accountability of health and safety in the workplace. It also must support health and safety activities with sufficient resources. A flexible organization structure is critical as employees are more welcome to approach managers regarding any unsafe acts or conditions in the workplace. Managers can do this by performing "management by walking around" (MBWA) conducting friendly-surveys on health and safety matters.

iii. Compliance with the OHS legislations through safety rules and procedures. Rules and procedures must be obeyed and followed by all employees to ensure a safe and healthy work environment exists. For example, standard and safe operating procedure in performing the duties of a nurse in steps, making sure all steps are followed without any shortcuts.

iv. Accountability and responsibility of management and employees. Even though health and safety are management responsibilities, employees also are required to work safely as it is an essential of their job requirement to perform responsibility to ensure the safety of themselves and their friends while at work. This can be done by allocating what roles to perform and make statements of safety responsibility and accountability for all job levels. As a condition of employment, management is accountable for their health and safety performance. This can be done, for example, by participating in health and safety programs, attending health and safety meetings, etc.

v. Employee involvement in the activities of health and safety programs. This is to ensure employees feel that they have some control over their jobs and feel wanted. For example, involve them in health and safety committees, and assist in inspections, etc. Furthermore, employees are always in contact with potential hazards around them.

vi. Training and education must be arranged for all staff, especially new employees, to assess competence on safety critical aspects of performance to ensure employees possess enough knowledge to work safely. On-going training in work procedures facilitates employees to meet their responsibilities and accountabilities to do their jobs safely.

vii. Perform "hazard identification, risk assessment, risk control" (HIRARC) to ensure hazards and risks are minimized at the workplace. (Refer Table 5.1 on how to do HIRARC)

viii. Establish an accident and incident reporting system, a hazard reporting system to control risk, incident/accident investigation and emergency plans. The systems and plans should be reviewed periodically to reflect changes in personnel, policies, procedures, guidelines, types of resources available, etc.

ix. Preventive action to protect employees from any disaster. It acts as a corporate responsibility of hospitals to look after the safety of employees. One example is to have a Disaster Recovery Plan that helps prevent any dangerous effects caused by unforeseen and unplanned events either man-made or natural causes.

x. Procurement conforms to safety standards in hospitals. This is to ensure that contractors comply with the safety standards and safety legislation. One method is to give contracts to reliable contractors who fulfill the terms and conditions of a proposed procurement.

xi. Communication and feedback systems to ensure dissemination of OHS information. This information must be relevant, accurate and timely. It is the primary responsibility of management to provide essential information to work safely. This is to assist employees' understanding in performing their OHS responsibilities. Employees must have accessibility to this information, for example through circulars, fact sheets posted on noticeboards and through health and safety committees, etc.

xii. Monitor and evaluate the system and performance to detect any discrepancy. Performance and system review acts as a means to find out the effectiveness of the management strategies and actions that were implemented. This can be done by detecting any discrepancy between standards of planning and actual situations.

Thus, the promotion of OHSMS should be included in the Ministry of Health strategic planning so as to be attached to its current and long-term working program thus creating awareness and understanding of the importance of OHSMS to achieve good OHS practices. The Ministry of Health also should work on a pilot implementation of the above input so as to evaluate its effectiveness.

Table 5.1: Risk management should be performed in the plan-do-check-act (PDCA) stages

PLAN: ESTABLISH THE RISK ASSESSMENT APPROACH	
1.	Planning: o Define risk assessment approach (e.g. safe place, safe person, safe system strategies) o Identify hazards and risks o Analyze and evaluate hazards and risks o Identify and evaluate various risk control options o Select appropriate control option for each hazard and risk o Management approves residual risks
2.	Informing: Top management informs managers and employees regarding risk management to get their voluntarily and continuous involvement in improving the workplace.

DO: IMPLEMENT AND OPERATE THE RISK ASSESSMENT APPROACH	
3.	o Define management actions, resources, priorities, roles and responsibilities o Correlate to risk control plan for managing identified risks o Implement controls o Define how to measure effectiveness of controls o Implement procedures for detection of incident/accident
CHECK: MONITOR AND REVIEW THE RISK ASSESSMENT APPROACH	
4.	o Execute monitoring and review procedures o Regularly review effectiveness of selected control techniques o Measure effectiveness of controls o Regularly review risk assessments and update residual risks
ACT: MAINTAIN AND IMPROVE THE RISK ASSESSMENT TECHNIQUES	
5.	o Implementation of identified improvements to risk assessment techniques o Take appropriate preventive and corrective actions o Review lessons learned o Communicate taken actions o Meet documentation requirements o Ensure documents are controlled o Ensure records are controlled
6.	On the basis of the results from the monitoring stage, successful techniques were continuously conducted, while unsuccessful techniques were reviewed for the planning of further improvement actions.
7.	Continuous improvement process.

5.7.4 Supportive and Barrier Factors and Suggestions How to Develop Positive Factors

OHS support is a precondition of an effective OHS management in the workplace. This study's results found that supports can also be barriers of effective OHS management. This is so as some employees (for example: employees with a length of employment of less than 2 years to 6 years and employees with a school, certificate and diploma level of education) perceived the following factors as support to OHS management, while some employees (for example: employees with a length of employment of more than 6 years and with a degree and above level of education) identified factors which can act as barriers to effective OHS management. The following factors contribute as supportive and barriers towards effective OHS management: (1) management commitment; (2) health and safety objectives; (3) training and competence; (4) the role of the supervisors; (5) safety reporting; (6) leadership style; (7) safety incidents/accidents: accidents and injuries in the workplace; (8) satisfaction towards safety systems in the workplace. Besides these eight factors, employees also stated that safety communication is important in managing OHS issues.

In addition, the following factors can be developed as constructive factors towards effective OHS management.

i. Training and competence – should be an on-going process and focus on continuous education for all employees, including office and medical employees. The training should deal with general OHS issues and specific OHS procedures for working safely. General OHS issues include OHS awareness training, new employee orientation, communication of company safety rules, hazard communication training, etc. Specific OHS training includes supervisor training on their responsibilities, equipment and machinery training, accident investigation, job safety analysis, air-borne and blood-borne diseases, disaster recovery techniques, etc.

ii. Health and safety objectives – must be reviewed continuously to ensure effective compliance to OHS legislation. This will ensure safe work practices among all employees as they have guidance helping them to perform their responsibilities.

iii. Management commitment - cooperation and involvement among top management with enough resources like budget to ensure effective implementation of any OHS programs.

As management commitment and employee involvement are complementary, visible top management involvement is critical so that employees know that management's commitment is serious and that managers must be accountable for meeting their responsibilities.

iv. Safety incidents/accidents – always review the procedure of accidents and injuries to ensure employees are exposed to acceptable risk limits. This can be done by conducting frequent worksite inspections so that new or previously missed hazards are identified. Investigate accidents and "near miss" incidents so that causes and methods of prevention can be established.

v. Satisfaction towards safety systems – dissatisfaction among employees concerned personal protective equipment (PPE) which was not of good quality, the hospital environment was not conducive for working, workstation designs were not comfortable, there was improper disposal of waste and exposure to dangerous substances without enough protection, ergonomic issues, and work stress. These factors should be dealt as precautions to protect employees' health, safety and welfare at the workplace and can be done through on-going training, relevant information and communication through tool-box talks with employees.

vi. Safety reporting – be reviewed periodically to get feedback frequently. Feedback is important to determine problem areas of the working environment so that corrective action can be quickly taken.

vii. Leadership style – be a role model to show employees the importance of working safely, become more involved and non-discriminatory in tackling health and safety issues. Create a win/win situation where employees' capabilities are recognized through praise, awards, etc. This will enable an environment of trust to be created.

viii. The role of the supervisors – they must be more involved and committed to look after the health, safety and welfare of employees. This can be achieved by providing leadership and collaborative direction to all employees through open communication to generate creativity and innovate employees in managing OHS matters. Practise new ways of supervising, and not the traditional methods of top-down, an autocratic style to coach and motivating, ordering, and telling employees to listen. This will enable employees to be motivated, productive and have mutual respect.

ix. Effective safety communication - sharing of OHS information. Display safety rules so that employees acquire current knowledge on health and safety matters. Some effective ways are through health and safety committees involving employees, weekly tool box talks and management by walking around (MBWA). Try to convey hospital strategies in terms of priorities and sub-priorities. For example, key priorities: Improving OHS performance and sub-priorities: Improving the reporting of hazards, lifting the standard of housekeeping.

Failure to consider and address the above OHS management dimensions effectively can prove a hindrance to any OHS activities and thus the implementation of an OHSMS will be unsuccessful.

5.7.5 An Overall Action Plan to Implement the OHSMS in Hospitals

OSH Master Plan 2015 (OSH-MP 15) which was launched by the Prime Minister of Malaysia on 2 May 2009 is an action framework to enrich knowledge, awareness and commitment towards OHS in decreasing industrial accidents and work-related illnesses in the workplace. OSH-MP 15 acts as a strategic vision and direction for health and safety matters. Under strategic initiatives: strengthen the capacity of government to influence OHS outcomes (in strategy 1: fostering and enhancing government leadership and practices), by 2015, all organizations have to implement OHSMS. For that reason, the Ministry of Health has to conform to the strategic planning of the Malaysian government by implementing the initial input before being certified to any OHSMS in Malaysia. Furthermore, implementing OHSMS shows that Ministry of Health is displaying their commitment and corporate responsibility to safety and health and this will strengthen their corporate image. By being certified to OHSMS, an organization is capable of controlling its OHS risks and improves its performance.

Although there is no universally standardized agreed system on OHSMS, some common elements in all management systems are: (1) policy; (2) planning; (3) implementation and operation; (4) performance assessment; and (5) management review and continual improvement.

Implementation of an OHSMS is a long-term development and thus, management and employees must implement each element with persistence to ensure the success of such a system. Implementation of an OHSMS should be carried out in the plan-do-check-act (PDCA) stages as follows:

i. Plan – document OHS policy and planning that focuses on legal responsibilities, hazards and risk identification and assessment, and establish objectives and targets that deal with employees' safety.
ii. Do – execute the implementation stage such as introducing preventive and protective measures, emergency prevention and response, training and competence, communication and awareness, procurement, contracting and management of change.
iii. Check - maintain the OHSMS practically through monitoring and measurement, investigating incidents/accidents, implementing corrective action, and auditing to ensure the effectiveness of the OHSMS.
iv. Act – management conduct a review to ensure continuous improvement of the OHSMS.

In Malaysia, there are two OHSMS: (1) OHSAS 18001: 2007; and (2) MS1722: 2005. MS1722 is a Malaysian Standard on OHSMS based on the International Labour Organization's standard OSH MS 2001. The requirements of this standard are equivalent to OHSAS 18001.

In conclusion, the overall action plan to implement an OHSMS is (1) initial input of management of change must be embraced; (2) perform "hazard identification, risk assessment and risk control" (HIRARC) as this is a fundamental task in everyones job; (3) establish rewards and incentives to motivate employees involvement; (4) do an initial status review to ensure that the organization evaluates risk assessment conditions every now and then to determine the effectiveness of the OHSMS implementation; and (5) select which OHSMSs to be certified and go to the nearest certification bodies like SIRIM, NIOSH, etc. to obtain more information on certification and auditing of the OHSMS.

5.8 Conclusion

The purpose of the study was to investigate the current practices and attitudes of hospital employees towards the management of OHS that can provide workable implementation of an OHS management system to enable Malaysian public hospital sector to meet its OHS obligations. The results of the study were examined using construct, content and concurrent validity and internal consistency reliability. This study has confirmed an empirical relationship between the six dimensions of safety climate and two outcome variables: safety satisfaction and feedback, and safety incidents/accidents. All the constructs demonstrated an acceptable internal consistency. The instrument also confirmed a rational validity in assessing what they are supposed to measure. In conclusion, consistent safety perceptions and attitudes on organizational safety climate justify further research as the perceptions and attitudes may differ among individuals and general perceptions about safety problems in the workplace should be longitudinal in order to compare any changes in the safety climate study. Moreover, the safety climate scale should be replicated to test the consistency of the factor construct in a study across different industries. Furthermore, barriers or supports to implement OHSMS are critical to enable effective implementation.

For the implementation of OHSMS in all public hospitals in Malaysia, the Ministry of Health should consider putting into practice the strategies proposed by this study. Firstly, the Ministry of Health should improve the OHS outcomes in public hospitals as revealed by this study's findings by focusing on two crucial elements, management leadership and action and employee involvement and agreement. Then a risk assessment should be undertaken through plan-do-check-action (PDCA) strategy to deal with hazards at the workplace. Later, an OHSMS should be chosen either certified to OHSAS 18000 or MS 1722 from the certification bodies. A yearly audit will be done by the certification body. As a consequence, implementation of an OHSMS will ensure that the numbers of injury and accident will be reduced and thus improve the safety culture (the shared values and beliefs of an organization) of public hospitals and comply with OHS regulations.

REFERENCES

Abdullah, A. (1992, March). The influence of ethnic values on managerial practices in Malaysia. *Malaysian Management Review, 27*(1). Retrieved March 02, 2009, from http://mgv.mim.edu.my/MMR/9203/frame.htm

Abdullah, A. (1994, Sept.). Leading and motivating the Malaysian workforce. *Malaysian Management Review, 29*(3). Retrieved March 02, 2009, from http://resources.mim.edu.my/mmr/MA1010.htm

Abdullah, A., & Gallagher, E. (1995, June). Managing with cultural differences. *Malaysian Management Review, 30*(2). Retrieved March 02, 2009, from http://resources.mim.edu.my/mmr/MA1010.htm

Alli, B. O. (2001). *Fundamental principles of occupational health and safety*. Retrieved January 20, 2008, from http://www.ilo.org

Almeida, P. (2006, January 5). Ministry studying various proposals to improve safety. *The Malay Mail*. Retrieved from http://www.mmail.com.my/

Arbuckle, J. L. (1999). *AMOS 4.0* [Computer software]. Chicago: Smallwaters.

Armstrong, J. S., & Overton, T. S. (1977). Estimating nonresponse bias in mail surveys. *Journal of Marketing Research, 14*, 396 – 402.

Australian Bureau of Statistics (2007). *Australian National Accounts: State Accounts*. Retrieved January 30, 2008, from http://www.abs.gov.au/AUSSTATS/

AS/NZS 4801 Occupational Health and Safety Management Systems – Specification with guidance for use (2001). Retrieved March 22, 2006, from http://www.standards.com.au/PDFTemp/Previews/OSH/as/as4000/4800/4801.pdf

Beckmerhagen, I. A., Berg, H. P., Karapetrovic, S. V., & Willborn, W. O. (2003). Integration of management systems: Focus on safety in the nuclear industry. *International Journal of Quality & Reliability Management*, *20*(2), 210 – 228.

Blegen, M. A., Pepper, G. A., & Rosse, J. (2005). Safety climate on hospital units: A new measure. *Advances in Patient Safety*, *4*, 429 - 433.

Bottani, E., Monica, L., & Vignali, G. (2009). Safety management systems: Performance differences between adopters and non-adopters. *Safety Science, 47*, 155 – 162.

Bottomley, B. (1999a, November). *Occupational health & safety management systems: Information paper.* Retrieved March 22, 2006, from http://www.nohsc.gov.au/Pdf/OHSSolutions/ohsms_infopaper.pdf

Bottomley, B. (1999b, November). *Occupational health & safety management systems: Strategic issues report.* Retrieved March 22, 2006, from http://www.nohsc.gov.au/Pdf/OHSSolutions/ohsms_stratrep.pdf

Bowie, D. K. (2006, Dec.) *Using multivariate logistic regression analysis to predict black male student persistence at a predominately white institution: An approach investigating the relationship between engagement and persistence.* PhD Thesis. Louisiana State University. Retrieved February 20, 2009, from http://etd.lsu.edu/docs/available/etd-11122006-163133/unrestricted/Bowie_dis.pdf

Bradley, K. D., Royal, K. D., & Bradley, J. W. (2008, August). An investigation of "honesty check" items in higher education course evaluations. *Journal of College Teaching & Learning, 5*(8), 39 – 48.

Brislin, R.W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology, 1*(3), 185 – 216.

Brown, R., & Holmes, H. (1986). The use of a factor-analytic procedure for assessing the validity of an employee safety climate model. *Accident Analysis and Prevention, 18*, 445 – 470.

BSI Business Information (2006). *BS 8800:2004 Occupational health and safety management systems.* Retrieved April 22, 2006, from http://www.bsi-global.com/

Budworth, N. (1997). The development and evaluation of a safety climate measure as a diagnostic tool in safety management, *IOSH Journal,1*, 19 – 29.

Burkell, J. (2003). The dilemma of survey nonresponse. *Library & Information Science Research*, *25*, 239–263.

Byrne, B. M. (2001). *Structural equation modeling with AMOS: Basic concepts, applications, and programming.* Mahwah, New Jersey: Lawrence Erlbaum Associates, Publishers.

Carder, B., & Ragan, P. W. (2003). A survey-based system for safety measurement and improvement. *Journal of Safety Research, 34*(2), 157 – 165.

Carvalho, M. (2008, June 22). *Number of workplace accidents going down*. *The Star*. Retrieved from http://thestaronline.com/

CCH (1996). *Planning occupational health & safety* (4th ed.). New South Wales, Australia: CCH Australia Limited.

Chandhok, P. (2008). *Estimating nonresponse bias in the omnibus household survey*. Joint Statistical Meetings, 2097 – 2104. Retrieved June 18, 2010, from http://www.amstat.org/sections/srms/proceedings/y2008/Files/301357.pdf

Cheyne, A., Oliver, A., Tomas, J. M., & Cox, S. (2002). The architecture of employee attitudes to safety in the manufacturing sector. *Personnel Review*, *31*(6), 649 – 670.

Civil Aviation Safety Authority, Australia (2002). *Civil aviation safety authority Australia safety management systems: What's in it for you?* Retrieved March 20, 2004, from http://www.casa.gov.au/avreg/business/sms/index.htm

Clarke, S. (1998). Safety culture on the UK Railway Network. *Work and Stress*, *12*(3), 285 - 292.

Clarke, S. (2003). The contemporary workforce: Implications for organizational safety culture. *Personnel Review*, *32*, 40-57.

Clarke, S. (2006). Safety climate in an automobile manufacturing plant: The effects of work environment, job communication and safety attitudes on accidents and unsafe behaviour. *Personnel Review*, *35*(4), 413 – 430.

Coelho, J. F. G. M., & Moy, D. (2003). The new performance evaluation methodology and its integration with management systems. *The TQM Magazine*, *15*(1), 25 – 29.

Cohen, A., & Colligan, M. (1998). *Assessing occupational safety and health training: A literature review.* Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 98-145.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). New Jersey: Lawrence Erlbaum Associates.

Comcare, Australia (2004, June). *Positive performance indicators: Measuring safety, rehabilitation and compensation performance.* Retrieved March 31, 2006, from http://www.comcare.gov.au/pdf_files/PUB_10_PPIs_sept04_v3-.pdf

Commonwealth of Australia (2009). *Comparison of workers' compensation arrangements in Australia and New Zealand.* Retrieved April 23, 2009, from http://www.safeworkaustralia.gov.au/NR/rdonlyres/2F9B1EA6-7E2A-407C-AA5299D0F6B2D0C5/0/Comparison_of_Workers_Compensation_Arrangements_in_Aust_and_NZ_2008.pdf

Commonwealth of Massachusetts Group Insurance Commission (2005, Winter). *For your benefit: Choosing the right hospital can make a difference.* Retrieved January 22, 2006, from http://www.mass.gov/gic/pdf/fybwinter2005.pdf

Contra Costa Health Services (2003). *Safety evaluation of the General Chemical-Richmond Works Facility*. Retrieved March 31, 2008, from www.cchealth.org/special/pdf/general_chemical_final_report.pdf

Cooper, D. (1995). *Measurement of safety climate: A component analysis*. Institute of Safety & Health (IOSH) meeting on 1 Feb. 1995. Retrieved March 20, 2008, from http://www.b-safe.net/articles/bsms1.pdf

Cooper, D. R., & Schindler, P. S. (2008). *Business research methods* (10th ed.). New York: McGraw-Hill Companies, Inc.

Cooper, M. D. (2000). Towards a model of safety culture. *Safety Science*, *36*(2), 111 – 136.

Cooper, M. D., & Phillips, R. A. (1995). Killing two birds with one stone: Achieving quality via total safety management. *Leadership & Organization Development Journal*, *16*(8), 3 – 9.

Cooper, M. D., & Phillips, R. A. (2004). Exploratory analysis of the safety climate and safety behavior relationship. *Journal of Safety Research*, *35*(5), 497 – 512.

Couper, I. D. (2003, July 17). Rural hospital focus: Defining rural. *The International Electronic Journal of Rural and Remote Health Research, Education, Practice and Policy, 3 (205).* Retrieved January 27, 2006, from http://rrh.deakin.edu.au/publishedarticles/article_print_205.pdf

Cox, S., & Cheyne, A. (2000). Assessing safety culture in offshore environments. *Safety Science*, *34,* 111 - 129.

Cox, S., & Cox, T. (1991). The structure of employee attitudes to safety: A European example. *Work and Stress*, *5*, 93 - 106.

Coyle, I. R., Sleeman, S. D., & Adams, N. (1995). Safety climate. *Journal of Safety Research*, *26*(4), 247 – 254.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousand Oaks, California: SAGE Publications.

Cruez, A. F. (2004, December 1). Workplace accidents on the rise. *New Straits Times*. Retrieved from http://www.nst.com.my/

Cruez, A. F. (2006, January 16). DOSH check on safety of govt. agency workers. *New Straits Times*: Local News. Retrieved from http://www.nst.com.my/

Dawson, B., & Trapp, R.G. (2004). *Basic & clinical biostatistics* (4th ed.). New York: Lange Medical Books/McGraw-Hill.

Dedobbeleer, N., & Beland, F. (1991). A safety climate measure for construction sites. *Journal of Safety Research*, *22*(2), 97 – 103.

Department of Safety and Health (DOSH) (2008). *DOSH website*. Retrieved January 28, 2008, from http://dosh.mohr.gov.my

Dias, L. A. (2005). *Occupational safety and health management systems in construction: The need for a recognition system at the national level.* Retrieved April 26, 2006, from http://www.fundacentro.gov.br/CTN/XXVIII%20SIMP%C3%93SIO%20INTERNACIONAL%20DA%20AISS_Anis_do_Evento/ALVESDIAS.pdf

Donald, I., & Young, S. (1996). An attitudinal-based approach to improving safety in organizations. *Leadership & Organization Development Journal*, *17*(4), 13-20.

Draugalis, J. R., & Plaza, C. M. (2009). Best practices for survey research reports revisited: Implications of target population, probability sampling, and response rate. *American Journal of Pharmaceutical Education*, *73*(8), Article 142.

Eckhardt, B. (2002). *Changes in safety measurement.* Retrieved April 20, 2004, from http://concreteproducts.com/ar/concrete_changes_safety_measurement

Erickson, J. A. (2000). Corporate culture: The key to safety performance. *Occupational Hazards*, *62*(4), 45-50.

European Agency for Safety and Health at Work (2002). *Study identifies key ingredients for successful OSH management systems.* Retrieved April 20, 2004, from http://agency.osha.eu.int/news/press_releases/en/05_08_2002

Evans, B., Glendon, A. I., & Creed, P. (2007). Development and initial validation of an Aviation Safety Climate Scale. *Journal of Safety Research*, *38*, 675 – 682.

Fernandez-Muniz, B., Montes-Peon, J. M., & Vazquez-Ordas, C. J. (2007). Safety culture: Analysis of the causal relationships between its key dimensions. *Journal of Safety Research*, *38*, 627 – 641.

Fernandez-Muniz, B., Montes-Peon, J. M., & Vazquez-Ordas, C. J. (2009). Relation between occupational safety management and firm performance. *Safety Science*, *47*(7), 980 – 991.

Ferry, C; Robinson, C., & Beaufils, C. (1998). *Transforming organisational culture using evaluation and quality improvement program (EQuIP): The written guidelines and the voice of experience.* St Vincent's Healthcare Campus Sisters of Charity Health Service Darlinghurst Nursing Monograph, 42 – 45. Retrieved February 02, 2006, from http://www.clininfo.health.nsw.gov.au/hospolic/stvincents/stvin98/index.html

Fleming, M., & Lardner, R. (1999). Safety culture – the way forward. *The Chemical Engineer*, 16 - 18. Retrieved January 15, 2007, from http://www.keilcentre.co.uk/downloads/Culture.pdf

Fletcher, T. D., & Perry, K. M. (2007, April). *A comparison of parceling strategies in structural equation modeling.* Paper presented at the 22nd Annual Conference of the Society for Industrial and Organizational Psychology, New York. Retrieved January 12, 2009, from http://www.umsl.edu/~fletchert/papers/Fletcher_Perry_SIOP07.pdf

Flin, R., Mearns, K., & Burns, C. (2004). *Hospital safety climate scale.* University of Aberdeen.

Flin, R., Mearns, K., O'Connor, P., & Bryden, R. (2000). Measuring safety climate: Identifying the common features. *Safety Science*, *34*(1-3), 177 – 192.

Gallagher, C. (1997). *Health and safety management systems: Benefits of an integrated, innovative, safe place approach.* Retrieved March 20, 2004, from http://www.whs.qld.gov.au/conference/ergonomic97/gallaghe.pdf

Gallagher, C., Underhill, E., & Rimmer, M. (2001, April). *Occupational health and safety management systems: A review of their effectiveness in securing healthy and safe workplaces.* Retrieved March 22, 2006, from http://www.nohsc.gov.au/Pdf/OHSSolutions/ohsms_review.pdf

Gallagher, C., Underhill, E., & Rimmer, M. (2003). Occupational safety and health management systems in Australia: Barriers to success. *Policy and Practice in Health and Safety*, *1*(2), 67 – 81.

Garson, G. D. (2009). *Logistic regression*. Retrieved March 22, 2006, from http://faculty.chass.ncsu.edu/garson/PA765/logistic.htm

Glendon, A. I., & Litherland, D. K. (2001). Safety climate factors, group differences and safety behavior in road construction. *Safety Science*, *39*, 157 - 188.

Glendon, A.I., & Stanton, N.A. (2000). Perspectives on safety culture. *Safety Science*, *34*, 193-214.

Goetsch, D. L. (2005). *Occupational safety and health for technologists, engineers and managers (5th ed.)*. New Jersey: Prentice Hall.

Groves, R. M. (2006, special issue). Nonresponse rates and nonresponse bias in household surveys. *Public Opinion Quarterly*, *70*(5), 646–675.

Guldenmund, F.W. (2000). The nature of safety culture: A review of theory and research. *Safety Science*, *34*(1-3), 215 – 257.

Gustin, J. F. (2008). *Safety management: A guide for facility managers* (2nd ed.). Lilburn: Fairmont Press, Inc.

Hanges, P. J., Aiken, J., & Chen, X. (2004). *Diversity, organizational climate, and organizational culture: The role they play in influencing organizational effectiveness.* Retrieved July 20, 2008, from www.lib.umd.edu/ocda/hanges_arlreport.pdf.

Hair, J. F., Jr., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivatriate data analysis* (5th ed.). Upper Saddle River, New Jersey: Prentice-Hall Inc.

Hale, A.R. (2000). Culture's confusions. *Safety Science*, *34*(1-3), 1-14.

Hale, A. R., Heming, B. H. J., Carthey, J., & Kirwan, B. (1997). Modelling of safety management systems. *Safety Science*, *26*(1/2), 121 – 140.

Hall, R. J., Snell, A. F., & Foust, M. S. (1999). Item parceling strategies in SEM: Investigating the subtle effects of unmodeled secondary constructs. *Organizational Research Methods*, *2*, 233 – 256.

Hamilton, M. J. (2009). *The University of New Mexico - Chapter 13: Analysis of frequencies*. Retrieved June 30, 2009, from http://www.unm.edu/~marcusj/Ch13.pdf

Hamisah Hamid (2003a, May 31). New work safety systems by year-end. *New Straits Times*: Business Times, p.4.

Hamisah Hamid (2003b, June 20). Companies to become more efficient by adopting OSH-MS. *New Straits Times*: Business Times, p. 4.

Hassan, A., Nor Azimah, C.A., & Chandrakantan, S. (2005). *Reducing workplace injury through effective management practices: Some empirical evidence from Malaysian companies.* Paper presented at the 18th Asian Conference on Occupational and Environmental Health,11 – 13 May 2005, Wellington, New Zealand.

Havold, J.I., & Nesset, E. (2009). From safety culture to safety orientation: Validation and simplification of a safety orientation scale using a sample of seafarers working for Norwegian ship owners. *Safety Science*, *47*(3), 305 – 326.

Health and Safety Executive (HSE) (1999). *Development of a business excellence model of safety culture.* Retrieved March 20, 2007, from http://www.hse.gov.uk

Health and Safety Executive (HSE) (2002a). *Safety culture: A review of the literature*. HMSO, London. Retrieved March 20, 2004, from http://www.hse.gov.uk/research/hsl_pdf/2002/hsl02-25.pdf

Health and Safety Executive (HSE) (2002b). *Strategies to promote safe behaviour as part of a health and safety management system.* Retrieved March 2, 2008, from http://www.hse.gov.uk/research/crr_pdf/2002/crr02430.pdf

Health and Safety Executive (HSE) (2005). *A review of safety culture and safety climate literature for the development of the safety culture inspection toolkit*. Retrieved March 20, 2007, from http://www.hse.gov.uk/RESEARCH/rrpdf/rr367.pdf

Health and Safety of Women in Construction (HASWIC) (1997). *Women in the construction workplace: Providing equitable safety and health protection.* Retrieved May 10, 2008, from http://www.cdc.gov/elcosh/docs/d0500/d000561/d000561.html

Hilyer, B., Leviton, L., Overman, L., & Mukherjee, S. (2000). A union-initiated safety training program leads to improved workplace safety. *Labor Studies Journal*, *24*(4), 53 – 66.

Hinze, J. (2005, February). *Injury under-reporting in the United States construction industry*. Retrieved May 02, 2008, from http://web.dcp.ufl.edu/hinze/Under-Reporting-Final-Report.htm

Hofstede, G. (2009). *Geert Hofstede Cultural Dimensions*. Retrieved May 10, 2009, from http://www.geert-hofstede.com/

Holbrook, A. L., Krosnick, J. A., & Pfent, A. (2008). Chapter 23: The causes and consequences of response rates in surveys by the news media and government contractor survey research firms. In J. M. Lepkowski, C. Tucker, J. M. Brick, E. de Leeuw, L. Japec, P. J. Lavrakas, M. W. Link, & R. L. Sangster (Eds.), *Advances in Telephone Survey Methodology* (pp. 499 – 528). New Jersey: John Wiley & Sons, Inc. Retrieved June 18, 2010, from http://communication.stanford.edu/faculty/krosnick/docs/TSMII%20chapter%20proof.pdf

Hong Kong Occupational Safety and Health Council (1998). *Survey of health and safety climate in Hong Kong hotel industry*. Retrieved April 23, 2008, from http://www.oshc.org.hk/download/research/27/2/e_hotel_industry.DOC

Hsu, S.H., Lee, C.C., Wu, M.C., & Takano, K. (2007). *Exploring cross-cultural differences in safety climate of oil refinery plants in Japan and Taiwan*. Paper presented at the International Conference on Business and Information, 11-13 July 2007, Tokyo, Japan. Retrieved March 20, 2008, from http://ibacnet.org/bai2007/proceedings/Papers/2007bai7280.doc

Hsu, S.H., Lee, C.C., Wu, M.C., & Takano, K. (2008, January). A cross-cultural study of organizational factors on safety: Japanese vs. Taiwanese oil refinery plants. *Accident Analysis and Prevention*, *40*(1), 24 – 34.

Huang, Y.H., Ho, M., Smith, G.S., & Chen, P.Y. (2006). Safety climate and self-reported injury: Assessing the mediating role of employee safety control. *Accident Analysis and Prevention*, *38*, 425 – 433.

Inculcate safety culture at workplace (2002, May 5). *New Straits Times*: Management Times. Retrieved from http://www.nst.com.my/

International Labour Organisation (ILO) (2000). *Programme of action for occupational safety and health in Thailand towards the 21th Century: An advisory report.* Retrieved September 10, 2005, from http://www.ilo.org/public/english/region/asro/bangkok/asiaosh/country/thailand/progact/sec1.htm

International Labour Organisation (ILO) (2001a). *ILO-MS 2001*. Retrieved April 10, 2006, from http://www.ilo.org/

International Labour Organisation (ILO) (2001b, November). Globalization and its effects on occupational health and safety. *Asian-Pacific newsletter on Occupational Health and Safety*, 8 (3), 51–79. Retrieved September 9, 2005, from http://www.ttl.fi/NR/rdonlyres/2DDB37D7-AE01-4505-ABB0-EBD64769139C/0/apn_2001_3.PDF

International Labour Organisation (ILO) (2005). *Prevention: A global strategy - Promoting safety and health at work*. Retrieved March 11, 2008, from http://www.ilo.org/public/english/protection/safework/worldday/products05/report05_en.pdf

Johnson, S.E. (2007). The predictive validity of safety climate. *Journal of Safety Research*, *38*(5), 511 – 521.

Kelly, T., & Boucher, B. (2003). *Measuring safety performance*. Paper presented at the 21st International Systems Safety Conference, 4 - 8 August 2003, Ottawa, Canada.

Kho, M.E., Carbone, J.M., Lucas, J., & Cook, D.J. (2005). Safety climate survey: Reliability of results from a multicenter ICU survey. *Quality Safety Health Care*, *14*, 273 – 278.

Kongtip, P., Yoosook, W., & Chantanakul, S. (2008). Occupational health and safety management in small and medium-sized enterprises: An overview of the situation in Thailand. *Safety Science*, *46*(9), 1356 – 1368.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, *30*, 607 – 610.

Kuenzi, M., & Schminke, M. (2009). Assembling fragments into a lens: A review, critique, and proposed research agenda for the organizational work climate literature. *Journal of Management*, *35*, 634-717.

LaMontagne, A. D., Barbeau, E., Youngstrom, R. A., Lewiton, M., Stoddard, A. M., McLellan, D., Wallace, L. M., & Sorensen, G. (2004). Assessing and intervening on OSH programmes: Effectiveness evaluation of the Wellworks-2 intervention in 15 manufacturing worksites. *Occupational & Environmental Medicine*, *61*, 651 – 660.

Larsson, S., Pousette, A., & Torner, M. (2008). Psychological climate and safety in the construction industry-mediated influence on safety behavior. *Safety Science*, *46*(3), 405 – 412.

Lauver, K. J., & Lester, S. C. (2007). Get safety problems to the surface: Using human resource practices to improve injury reporting. *Journal of Leadership & Organizational Studies*, *14*, 168 – 179.

Lavassani, K. M., Movahedi, B., & Kumar, V. (2009, Spring). Developments in analysis of multiple response survey data in categorical data analysis: The case of enterprise system implementation in large North American firms. *Journal of Applied Quantitative Methods*, *4*(1), 45 – 53.

Law, W.K., Chan, A.H.S., & Pun, K.F. (2006). Prioritising the safety management elements: A hierarchical analysis for manufacturing enterprises. *Industrial Management & Data Systems*, *106*(6), 778 – 792.

Lee Lam Thye (2000, November 2). Importance of safety and health at workplace. *New Straits Times*: Business Times, p. 4.

Lee Lam Thye (2004, April 19). Safer workplaces will boost productivity. *New Straits Times*: Outlook, p. 11.

Lin, J., & Mills, A. (2001). Measuring the occupational health and safety performance of construction companies in Australia. *Facilities*, *19*(3/4), 131 – 138.

Lin, S.H., Tang, W.J., Miao, J.Y., Wang, Z.M., & Wang, P.X. (2008). Safety climate measurement at workplace in China: A validity and reliability assessment. *Safety Science*, *46*(7), 1037 – 1046.

Machin, M. A. (2005). *Predictors of coach drivers' safety behaviour and health status*. Paper presented at the 2nd International Conference in Driver Behaviour and Training, 15-17 Nov 2005, Edinburgh, Scotland. Retrieved December 20, 2007, from www.usq.edu.au/users/machin/Machin, 2005.pdf

Makin, A.M., & Winder, C. (2008). A new conceptual framework to improve the application of occupational health and safety management systems. *Safety Science*, *46*, 935 – 948.

Malaysian Ministry of Health (2010). *Ministry of Health website*. Retrieved February 16, 2010, from http://www.moh.gov.my

Malaysian Ministry of Human Resources (2006). *Speeches of the Minister of Human Resources.* Retrieved April 20, 2006, from http://www.mohr.gov.my/

Malaysian Society for Quality in Health (MSQH) (2009). *The Malaysian Society for Quality in Health (MSQH) standards.* Retrieved February 02, 2010, from http://msqh.com.my/

Malle, B. (1996). *Issues in social and personality psychology*. Retrieved May 20, 2009, from http://darkwing.uoregon.edu/~bfmalle/issues/q9.html

Marsh, T. W., Robertson, I. T., Duff, A. R., Phillips, R. A., Cooper, M. D., & Weyman, A. (1995). Improving safety behavior using goal setting and feedback. *Leadership & Organization Development Journal*, *16*(1), 5 – 12.

McDonald, N., Corrigan, S., Daly, C., & Cromie, S. (2000). Safety management systems and safety culture in aircraft maintenance organizations. *Safety Science*, *34*, 151 – 176.

McFarlane, E., Olmsted, M. G., Murphy, J., & Hill, C. A. (2006). *Nonresponse bias in a mail survey of physicians*. Paper presented at the 61st Annual Conference of the American Association for Public Opinion Research (AAPOR) (pp. 4176 – 4180), 20 May 2006, Montreal, Quebec.

McPherson, M. (2007, March). *Work-life balance, employee engagement and discretionary effort: A review of the evidence*. Retrieved June 17, 2010, from http://eeotrust.org.nz/

Meade, A. W., & Kroustalis, C. M. (2006, July). Problems with item parceling for confirmatory factor analytic tests of measurement invariance. *Organizational Research Methods*, *9*(3), 369 – 403.

Mearns, K., Whitaker, S. M., & Flin, R. (2003). Safety climate, safety management practices and safety performance in offshore environments. *Safety Science*, *41*, 641 – 680.

Meyers, L. S., Gamst, G., & Guarino, A. J. (2006). *Applied multivariate research: Design and interpretation.* Thousand Oaks, California: Sage Publications, Inc.

Murphy, D. L. (2003). Safety in public emergency services: Lessons learned from the private sector. *Fire Engineering*, 69 – 72.

Nahrgang, J.D., Morgeson, F.P., & Hofmann, D.A. (2007). *Predicting safety performance: A meta-analysis of safety and organizational constructs*, Poster session presented at the 22nd Annual Conference of the Society for Industrial and Organizational Psychology, New York. Retrieved April 15, 2008, from http://www.msu.edu/~morgeson/nahrgang_morgeson_hofmann_2007.pdf

Nasser, F., & Wisenbaker, J. (2003). A Monte Carlo study investigating the impact of item parceling on measures of fit in confirmatory factor analysis. *Educational and Psychological Measurement*, *63,* 729 – 757.

National Occupational Health and Safety Commission Australia (NOHSC) (1997). *Health and safety management systems: An analysis of system types and effectiveness.* Retrieved March 20, 2004, from http://www.nohsc.gov.au/OSHInformation/NOHSCPublications/fulltext/toc/toc06397.htm

National Occupational Health and Safety Commission (NOHSC) (2002, May). *Extending the use of OHS positive performance indicators in Australian industry.* Retrieved April 2, 2006, from http://www.nohsc.gov.au/PDF/Statistics/ReportExtendingtheuseofPPIs.pdf#search='safety%20performance%20measurement%20tools'

Neal, A. & Griffin, M. A. (2002). Safety climate and safety behaviour. *Australian Journal of Management*, *27*, 67 - 78.

Neal, A., Griffin, M.A., & Hart, P.M. (2000, Feb.). The impact of organizational climate on safety climate and individual behavior. *Safety Science*, *34*(1-3), 99 – 109.

O' Toole, M. (2002). The relationship between employees' perceptions of safety and organizational culture. *Journal of Safety Research*, *33*(2), 231 – 243.

Oyan, T. (2000). Putting optimism into your safety program. *Occupational Hazards*, *62*(1), 66 - 69.

Page-Bucci, H. (2003, February). *The value of Likert scales in measuring attitudes of online learners.* Retrieved March 22, 2007, from http://www.hkadesigns.co.uk/websites/msc/reme/likert.htm

Petersen, D. (2000, January). Safety management 2000: Our strengths & weaknesses. *American Society of Safety Engineers: Professional Safety*, 16 – 19.

Polgar, S., & Thomas, S. A. (2000). *Introduction to research in the health sciences* (4th ed.). Edinburgh: Churchill Livingstone.

Price, J.H. (2000). "Show me the money": Medical directors' responses to a mail survey. *American Journal of Managed Care, 6*(11), 1257-1259.

Railway Group Safety Plan (2002). *Railway safety research programme: Theme strategy 21-safety culture.* Webdocument, 14 pp. Retrieved February 9, 2003, from www.railwaysafety.org.uk/pdf/Theme21J.pdf

Reese, C. D. (2009). *Occupational health and safety management: A practical approach* (2nd ed.). Boca Raton: CRC Press.

Reichers, A.E., & Schneider, B. (1990). Climate and culture: An evolution of constructs. In Schneider B. (Ed.) *Organizational Climate and Culture*, San Francisco: Jossey-Bass.

Robson, L. S., Clarke, J. A., Cullen, K., Bielecky, A., Severin, C., Bigelow, P. L., Irvin, E., Culyer, A., & Mahood, Q. (2007). The effectiveness of occupational health and safety management system interventions: A systematic review. *Safety Science*, *45*, 329 – 353.

Rose, J., & Schelewa-Davies, D. (1997). The relationship between staff climate in residential services. *Journal of Intellectual Disabilities*, *1*, 19 – 24.

Royal Society of Chemistry (RSC) (2009, February). *Occupational health and safety management systems.* RSC: Advancing the Chemical Sciences, version 2. Retrieved April 20, 2009, from http://www.rsc.org

Rozhan, O., Rohayu, A.G., & Rasidah, A. (2001). Great expectations: CEOs' perception of the performance gap of the HRM function in the Malaysian manufacturing sector. *Personnel Review*, *30*(1), 61 – 80.

SAI Global Limited (2006). *AS/NZS 4801: 2001*. Retrieved April 22, 2006, from http://www.standards.com.au/

Salminen, S., & Seppala, A. (2005). Safety climate in Finnish-and Swedish-speaking companies. *International Journal of Occupational Safety and Ergonomics*, *11*(4), 389 – 397.

Sattler, B., & Lippy, B. (1997, May 23). *Hazard communication: A review of the science underpinning the art of communication for health and safety.* Retrieved May 20, 2009, from http://www.osha.gov/SLTC/hazardcommunications/hc2inf2.html

Savic, S. (2001). Integration of management systems in terms of optimization of workplace human performance. *Facta Universitatis Series: Working and Living Environmental Protection*, *2*(1), 27 – 38.

Sekaran, U. (2003). *Research methods for business: A skill building approach*. New York: John Wiley & Sons, Inc.

Seo, D.C., Torabi, M. R., Blair, E. H., & Ellis, N. T. (2004). A cross-validation of safety climate scale using confirmatory factor analytic approach. *Journal of Safety Research*, *35*(4), 427 – 445.

Shannon, H.S., & Norman, G.R. (2009). Deriving the factor structure of safety climate scales. *Safety Science*, *47*(3), 327 – 329.

Singer, S., Meterko, M., Baker, L., Gaba, D., Falwell, A., & Rosen, A. (2007). Workforce perceptions of hospital safety culture: Development and validation of the patient safety climate in healthcare organizations survey. *HSR: Health Services Research*, *42*(5), 1999 – 2021.

Singla, A. K., Kitch, B. T., Weissman, J. S., & Campbell, E. G. (2006, September). Assessing patient safety culture: A review and synthesis of the measurement tools. *Journal of Patient Safety, 2*(3), 105 – 115.

SIRIM (2009). *SIRIM QAS: Occupational health and safety management systems certification scheme (OHSAS 18001) & ISO 1400.* Retrieved May 08, 2009, from http://www.sirim-qas.com.my

Social Security Organization (SOCSO) (2009). *Industrial statistic based on industrial sectors.* Retrieved August 30, 2009, from http://www.perkeso.gov.my

Sorra J.S., & Nieva V.F. (2004, September). *Hospital on patient safety culture* (Prepared by Westat, under Contract No. 290-96-0004). AHRQ Publication No. 04-0041. Rockville, MD: Agency for Healthcare Research and Quality. Retrieved March 22, 2007, from http://www.ahrq.gov/qual/hospculture/hospcult.pdf

Stewart, J. M. (2002). *Managing for world class safety*. New York: John Wiley & Sons.

Stewart, T. J., Roberts, E., Eleazer, P., Boland, R., & Wieland, D. (2006). Reliability and validity issues for two common measures of medical students' attitudes toward older adults. *Educational Gerontology*, *32*, 409 – 421.

Stone, P. W., Harrison, M. I., Feldman, P., Linzer, M., Peng, T., Roblin, D., Scott-Cawiezell, J., Warren, N., & Williams, E. S. (2005, Feb.). Organizational climate of staff working conditions and safety – An integrative model. *Advances in Patient Safety*, *2*, 467 – 481.

Sujata, V. P. (2008, April 28). Check industrial accidents, employers urged. *The Star*. Retrieved from http://thestaronline.com/

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics*. Boston: Pearson Education Inc.

The Australian Council on Health Care Standards (ACHS) (2002, June). *The Australian Council on Healthcare Standards EQuIP Standards* (3rd ed.). Retrieved January 30, 2006, from http://www.easternhealth.org.au/boxhill/standards-june2002.pdf

The Australia Safety and Compensation Council (ASCC) (2008). *Occupational disease indicators: April 2008*. Retrieved April 20, 2009, from http://www.safeworkaustralia.gov.au/NR/rdonlyres/AD149923-2908-43FC-ACC1-0AE1EDFE1537/0/ODIndicatorsreport2004052008.pdf

The Australia Safety and Compensation Council (ASCC) (2008). *The cost of work-related injury and illness for Australian employers, workers and the community: 2005-06*. Retrieved April 20, 2009, from http://www.safeworkaustralia.gov.au/NR/rdonlyres/EAD5247E-98E7-4750-A35E A6BC9B1E7781/0/CostsofWorkRelatedInjuryAndDisease_Mar2009.pdf

The National Research Centre for Occupational Health and Safety Regulation (2002). *About occupational health and safety regulation in Australia*. Retrieved January 30, 2006, from http://www.ohs.anu.edu.au/ohs/index.php

The University of North Texas Health Science Center (n.d.). *Glossary of research terms*. Retrieved June 20, 2009, from http://www.hsc.unt.edu/ORC/Documents/Research_Terms.pdf

Thomas, T. L. (1999). *Evaluation of training technique as a means of influencing safety knowledge, risk perception and proper respirator donning ability among respiratory protection users.* Master Thesis. Faculty of the Virginia Polytechnic Institute and State University. Retrieved October 20, 2008, from http://scholar.lib.vt.edu/theses/available/etd-102599-151953/unrestricted/TraciThomas.pdf

Thomsen, S. (2000). An examination of nonresponse in a work environment questionnaires mailed to psychiatric health care personnel. *Journal of Occupational Health Psychology*, *5*(1), 204 – 210.

Tomas, J.M., Melia, J.L., & Oliver, A.M. (1999). A cross validation of a structural equation model of accidents: Organisational and psychological variables as predictors of work safety. *Work and Stress*, *13*(1), 49 – 58.

Topf, M. D. (2000). Why employee involvement may not be enough? *Occupational Hazards, 62*(5), 41-43.

Tsikriktsis, N. (2005). A review of techniques for treating missing data in OM survey research. *Journal of Operation Management*, *24*, 53–62.

UK Advisory Committee on the Safety of Nuclear Installation (2003). *Why is safety culture needed?* [Web document], 2 pages. Retrieved February 9, 2003, from http://nuclearsafetyculture,freeyellow.com/page2.html

United Nations Online Network In Public Administration and Finance (UNPAN) (2003). *Economic management and outlook.* Retrieved January 26, 2006, from http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN018030.pdf

Varonen, U., & Mattila, M. (2000). The safety climate and its relationship to safety practices, safety of the work environment and occupational accidents in eight wood-processing companies. *Accident Analysis and Prevention*, *32*(6), 761 – 769.

Vassie, L. H., & Lucas, W. R. (2001). An assessment of health and safety management within working groups in the UK manufacturing sector. *Journal of Safety Research*, *32*(4), 479 – 490.

Vassie, L., Tomas, J. M., & Oliver, A. (2000). Health and safety management in UK and Spanish SMEs: A comparative study. *Journal of Safety Research*, *31*(1), 35 – 43.

Victorian WorkCover Authority (2006). *SafetyMap*. Retrieved March 31, 2006, from http://www.workcover.vic.gov.au/vwa/home.nsf/pages/so_safetymap_intro

Vinodkumar, M. N., & Bhasi, M. (2009). Safety climate factors and its relationship with accidents and personal attributes in the chemical industry. *Safety Science*, *47*(5), 659 – 667.

von Thaden, T.L., Wiegmann, D.A., Mitchell, A.A., Sharma, G., & Zhang, H. (2003). *Safety culture in a regional airline: Results from a commercial aviation safety survey.* Paper presented at the 12th International Symposium on Aviation Psychology, Dayton, OH.

Williamson, A.M., Feyer, A.M., Cairns, D., & Biancotti, D. (1997). The development of a measure of safety climate: The role of safety perceptions and attitudes. *Safety Science*, *25*(1 – 3), 15 – 27.

Worthington, R. L., & Whittaker, T. A. (2006). Scale development research: A content analysis and recommendations for best practice. *The Counseling Psychologist, 34,* 806-838.

Yule, S., Flin, R., & Murdy, A. (2007). The role of management and safety climate in preventing risk-taking at work. *International Journal of Risk Assessment and Management*, *7*(2), 137 – 151.

Yu, S. C. K., & Hunt, B. (2004). A fresh approach to safety management systems in Hong Kong. *The TQM Magazine*, *16*(3), 210 – 215.

Zimolong, B., & Elke, G. (2006). Occupational health and safety management. In G. Salvendy (Ed.), *Handbook of Human Factors and Ergonomics* (pp. 1 – 66). New York: Wiley. Retrieved May 2, 2008, from www.ruhr-unibochum.de/imperia/md/content/psy_auo/ohsmanagement.pdf

Zohar, D. (1980). Safety climate in industrial organizations: Theoretical and applied implications. *Journal of Applied Psychology*, *65*(1), 96 – 102.

Zohar, D. (2008). Safety climate and beyond: A multi-level multi-climate framework. *Safety Science*, *46*(3), 376 – 387.

Zutshi, A., & Sohal, A. S. (2005). Integrated management system: The experiences of three Australian organizations. *Journal of Manufacturing Technology Management*, *16*(2), 211 – 232.

Appendix 1

2.3 AN OVERVIEW OF HEALTH AND SAFETY ISSUES

2.3.1 The Legislative Framework of the Occupational Health and Safety

This section examined the occupational health and safety legislation in Malaysia and Australia.

i. Legislative Framework for the Occupational Health and Safety in Malaysia

Health and safety is not a new phenomenon in Malaysia. Since end of 19th century, 120 years ago, Malaysia has its own health and safety legislation. Before 1994, the main Occupational Health and Safety legislation in Malaysia was the Factories and Machinery Act 1967 that provided limited coverage of safety, health and welfare of workers at the workplace. As this prescriptive legislation could not deal with new occupational health and safety issues, hence, in 1994, the Occupational Safety and Health Act was formulated where it focused on the safety and health protection to all workers. Changes from the prescriptive style of health and safety legislation was based on Lord Robens Report 1972 that emphasis on self-regulation approach, that is the primary responsibility to ensure safety and health at work lies with those who create the risks and those who work with the risks. The concept of self-regulation encourages consultation, cooperation and participation of workers and management in efforts to upgrade the standards of safety and health at the workplace. Today the key laws on OHS in Malaysia are the Factories and Machinery Act 1967 and the Occupational Safety and Health Act 1994.

Below are the five eras of health and safety legislation in Malaysia:

a. Steam Boiler Safety Era – Before 1914

In 1878, the inspection of the safety aspect of steam boilers was introduced as tin mines used steam boilers in their operations. Four allied Malay states or *Negeri-Negeri Melayu Bersekutu* (Perak, Selangor, Pahang and Negeri Sembilan) had their own steam boiler enactments. The first steam boiler regulation was the Selangor Boiler Enactment 1892. Followed by Perak Boiler in

1903. By 1908, all the Allied Malay States had a uniform steam boiler legislation that was enforced by inspectors of boiler.

b. Machinery Safety Era – 1914 till 1952

The steam boiler enactment was replaced by Machinery Enactment 1913 on 1 January 1914. Besides inspection of steam boilers, inspectors had to inspect machineries, including combustion engines, water turbines and other related auxiliary machineries. Later in 1932, the Machinery Enactment of 1913 was abolished and replaced with Machinery Enactment of 1932 where registration and inspection of installation were enforced. Inspectors were put under the Mineral Department as machineries were used in the mining sector.

c. Industrial Safety Era – 1952 till 1970

In 1952, the Machinery Branch under the Mineral Department was renamed Machinery Department and split from the Mineral Department as most inspections had progressed to other industries besides mining. In 1953, all of the machinery enactments of the Allied Malay States (*Negeri-Negeri Melayu Bersekutu*), Non-Allied Malays States (*Negeri-Negeri Melayu Tidak Bersekutu*) and Strait States (*Negeri-Negeri Selat*) were abolished and replaced with the Machinery Ordinance 1953. With the enforcement of this ordinance, roles of inspectors had been expanded to cover the safety of workers besides steam boiler and machinery safety.

d. Industrial Safety and Hygiene Era – 1970 till 1994

In 1970, the Machinery Ordinance 1953 was abolished and replaced with the Factory and Machinery Act 1967 and eight regulations under the act. This act was to overcome the weaknesses in the Machinery Ordinance 1953, where workers' were not protected if they worked in a workplace that doesn't use machinery. Provisions relating to industrial health are also added. The function and responsibilities of inspectors were reorganized and the name of the department was changed to Factory and Machinery Department. Generally, the Act was drafted to provide minimum standards of safety, health and welfare of workers at workplace consisting of 5 employees or more and at premises which machinery were being used, including factories, building construction sites and works of engineering construction. This era also viewed the existence of activities including the formation of the Anti-Pollution Section in the year 1971; formation of Industrial Hygiene Unit in the year 1971 and upgrade of its status to Industrial Hygiene Section in the year 1980; start of petroleum safety activities with the formation of Petroleum Safety Section in the year 1985; start of special inspection activities to prevent major industrial accident; industrial safety and health activity exercises with expert help from International Labour Organization in the year 1987; formation of C.I.S in 1988; and formation of Major Hazards Section in the year 1991.

e. Occupational Safety and Health Era – After 1994

Occupational Safety and Health Act 1994 (Act 514) was gazetted on February 1994 where all industries are covered. Industrial sectors that are covered are as follows: (1) manufacturing; (2) mining and quarrying; (3) construction; (4) agriculture, forestry and fishing; (5) utilities – gas, electric, water and sanitary services; (6) transport, storage and communication; (7) wholesale and retail traders; (8) hotels and restaurants; (9) finance, insurance, real estate, business service; and (10) public services and statutory authorities. This legislation also covers 90% of employees and exempts those working on ships and in the armed forces.

Before 1994, the legislation of health and safety in Malaysia were more of a prescriptive style where it focused on machinery and workplace hazards and individuals at work must improve the dangerous conditions after being inspected by enforcement officers. This is so as employers perceived government to be accountable for OHS matters and workplaces need to be inspected to improve hazardous working conditions. However, this prescriptive legislation could no longer cope with constant changes from the rapid industrialization.

Based on the Western Australia health and safety legislation, Occupational Safety and Health Act 1994 was introduced where the principle of self-regulation was adopted. Self-regulation approach ensures accountability and cooperation of employers and workers to achieve a safe workplace through proactive actions. This proactive action is done through duty of care provision. Furthermore, compliance officers have become an auditor to audit organizations health and safety performance instead of inspectors.

The purpose of Occupational Safety and Health Act 1994 is to promote and stimulate occupational safety and health awareness among workers and to create organizational effective safety and health measures. There are three main principles in this Act: (1) self-regulation, where employers must develop a good policy and orderly management system to be carried out; (2) consultation, where employers, employees and the government must negotiate to settle issues and problems relating to occupational safety and health at the workplace; and (3) co-operation, where employers and employees must co-operate to take care, nurture and to increase the quality of occupational safety and health at the workplace. This Act replaced any conflict in existing occupational safety and health laws such as the Factory and Machinery Act 1967. The Occupational Safety and Health Act 1994 complements any existing legislative provision and if there are any conflicts, the Occupational Safety and Health Act 1994 will overcome it.

This Act also provide for the appointments of enforcement officers, establishment of National Council for Occupational Safety and Health, formation of policy and arrangement of measures to protect safety, health and welfare of people at work and others who might be endangered by the activities of people at work. The powers to enforce, to inspect and the liabilities for breaking the law are also clearly defined.

In conjunction with this Act, in April 1994, the Department of Factory and Machinery has been renamed as the Department of Occupational Safety and Health (DOSH). DOSH carries out enforcement of (1) Occupational Safety and Health Act 1994; (2) Factories and Machinery Act 1967; and (3) Petroleum Act (Safety Measures) 1984.

ii. Legislative Framework for the Occupational Health and Safety in Australia

Australian health and safety legislation is control by a framework of Acts, Regulations and support material including codes of practice and standards. Each states and territories in Australia (Australia Capital Territory, New South Wales, Northern Territory, Queensland, South Australia, Tasmania, Victoria, Western Australia, and Federal Government) has their own Occupational Health and Safety (OHS) legislation (CCH, 1996). The legislations are:

- Federal – The Occupational Health and Safety (Commonwealth Employment) Act 1991 administered by Comcare Australia;
- New South Wales – The Occupational Health and Safety Act 1983 administered by New South Wales WorkCover Authority;
- Victoria – The Occupational Health and Safety Act 1985 administered by Victorian Work Cover Authority;
- Queensland – The Workplace Health and Safety Act 1995 administered by Workplace Health and Safety Queensland;
- South Australia – South Australian WorkCover Authority;
- Western Australia – The Occupational Safety and Health Act 1984 administered by WorkSafe Western Australia;
- Tasmania – The Workplace Health and Safety Act 1995 administered by Workplace Standards Tasmania;
- Australian Capital Territory – The Occupational Health and Safety Act 1989 administered by ACT WorkCover;
- Northern Territory – NT Work Health Authority;

There are also OHS statutes covering the mining industry in some states. Initially, all states and territories in Australia adopted the 19th century British health and safety legislation (particularly the 1878 Factories Act, and later 1901 Act), which is a prescriptive legislation that relied upon detailed, highly technical specification standards. Later on, all of the statutes are reform to be based on the UK Robens model where duty of cares is included. Even some states go further than the Robens model in some respects (The National Research Centre for Occupational Health and Safety Regulation, 2002). In 1985, the federal government legislated the establishment of the National Occupational Health and Safety Commission (NOHSC). NOHSC is a tripartite body, with members appointed by federal, state and territory governments, and members appointed by the Australian Chamber of Commerce and Industry, and the Australian Council of Trade Unions with functions including initiate research, collect statistics, and develop national standards. State and territory governments must adopt NOHSC standards before they have any legal force due to the Federal Parliament's constitutional limitations.

iii. Discussion of Legislative Framework for Occupational Health and Safety

From the review of the OHS legislation in Malaysia and Australia, it was discovered that the current OHS legislation used by both countries utilize the same philosophy of self-regulation where all parties no matter employer, employee or other people at work have to be responsible for the health and safety in the workplaces. One distinct aspect is the amount of OHS legislation, where Malaysia has only one OHS legislation to be enforced throughout the 14 states but in Australia, there are nine OHS legislation enforced by the states and territories. Although these states have their own OHS legislation but the philosophy behind the OHS legislation still apply the self-regulation approach. Nevertheless, the primary aim of the OHS legislation is to promote safety and health awareness and to instill a safety and health culture among workers.

Another dissimilarity that might exist is on the cultural issues in both countries where it will minimize the enforcement of the legislation. Thus, support from government in terms of developing the right culture is also critical to ensure effective enforcement of the OHS legislation. Furthermore, the occupational safety and health legislation should be reviewed and upgraded from time to time so that it covers issues like safety, health and welfare of all employees as the growth of precarious employment can contribute to workers' protection and thus reduce companies' costs like insurance, medical costs, lost-time injury, etc. Lack of political will, insufficient resources, lack of management's involvement within enterprises, inadequate preventive measures, inadequate utilization of existing preventive measures at workplaces, and the relaxed enforcement of the authorities should be given critical consideration as to maintain motivated employees to comply with the legislation.

2.3.2 Healthcare Standards

This section looked into the healthcare standards in Malaysia and Australia.

i. The Australian Council on Healthcare Standards (ACHS): EQuIP Standards

EQuIP was launched in mid 1996 by the Australian Council on Healthcare Standards (ACHS). EQuIP provides continuous quality improvement tools to health care organizations through continual review of performance, assessment and accreditation (ACHS, 2002). There are six functions in the EQuIP Framework: (1) Continuum of care; (2) Leadership and management; (3) Human resources; (4) Information management; (5) Safe practice and the environment; and (6) Improving performance.

The Continuum of care comprises of four standards: (1) principles of service provision, access and entry to the health care organization; (2) principles of consumer/patient assessment; (3) principles of care planning, delivery and evaluation; and (4) principles of separation and continuing management.

The Leadership and management consists of four standards: (1) the role of the governing body and the need for strong leadership and direction; (2) the implementation of risk management principles including the development of an organization-wide risk management policy and a risk management system; (3) the need for strong leadership in improving performance; and (4) promotes consumer participation and addresses the need to involve consumers.

The human resources management function covers all staff, including permanent, casual, visiting staff and volunteers and has one standard: supports the delivery of quality and safe care and service.

There are three standards in the information management: (1) management of the sources of data and information; (2) creation of information from data and its use within the organization; and (3) systems for information technology.

Safe practice and the environment function contains of one standard: to ensure a safe, functional and healthy environment for staff, consumers/patients and visitors through effective management of safety risks, buildings, plant, equipment, utilities, consumables, supplies and waste.

Improving performance summarize the need for a systematic approach to continuous quality improvement and the evaluation of quality improvement outcomes.

EQuIP benefits to the organization according to Ferry, Robinson and Beaufils (1998) include:

- development of a culture which strives for continual improvement
- focus on customer satisfaction
- enhanced communication between staff
- improved coordination of patient care services
- an acceptance of continual change
- accreditation no longer seen as a threatening process but rather a learning experience.

ii. The Malaysian Society for Quality in Health (MSQH) Standards

The healthcare standards in Malaysia centered on quality of healthcare in the healthcare industry and are limited to quality in Malaysian hospitals whether public or private hospitals. The principle of these healthcare standards is consumer-focused. The Malaysian standards has been adopted from the Australian Council of Healthcare Standards and modified to suit local needs and conditions.

The Ministry of Health Malaysia and the Association of Private Hospitals of Malaysia established the Malaysian Society for Quality in Health (MSQH) in 1997 with the goal of ensuring continuous quality improvement in healthcare services and facilities especially in Malaysian hospitals (MSQH, 2009). The MSQH has the responsibility to develop and review the Malaysian Hospital Accreditation Standards for patient care and facility's operation to retain high professional standards of care. These standards will ensure healthcare organizations to monitor and improve their performance and to implement ways to continuously improve the healthcare system. A WHO Consultant from Australian Council of Healthcare Standards has been providing the guidance in the development of the Malaysian Hospital Accreditation Program. The Australian approach has been adapted with some changes to suit local needs and conditions. The quality of healthcare is a main interest of the government, stakeholders, healthcare providers and consumers of health services due to: (1) wide variation exists in the standards of services between public and private healthcare providers, (2) to establish common national and internationally recognized standards, (3) to provide the best possible care to the patients, and (4) to ensure the right person doing the right things right with the right process and equipment, in the right (safe) environment to the right patient with the right (good) outcome.

MSQH standards focus into five (5) major areas: (1) organization and management, (2) human resource and management, (3) policies and procedures, (4) facilities and equipment, and (5) quality improvement activities. These standards provide the basis for organizational assessment of the delivery of quality patient care and services, and the utilization of available resources. These standards are applicable to all types of hospitals - public and private, large and small, urban and rural.

As at 31 December 2009, there are 74 public and private hospitals in Malaysia accredited with these standards (refer Appendix 2 for listing).

iii. Discussion of the Healthcare Standards

The similarity of this healthcare standard in both countries is the focus of quality improvement of the organizations' performance. Although Malaysia healthcare standards pursued the guidance of Australian healthcare standards, the areas covered is not the same as some changes had been done to suit the Malaysian needs. Furthermore, this standard is a voluntary basis. This standard also support and documents a well-organized and administered health care delivery system.

With multiracial population in both countries, the success of this healthcare standard depends upon the political stability and continuous social development from government in the accomplishment of improved standard of living, assured social harmony, and support for health equity to determine concurrent improvement of healthcare services. Consequently, continuous efforts and fine-tune from hospitals are critical to determine that their quality of patient safety is enhanced. With certification of this healthcare standard, hospitals undergo evaluation process in enhancing their performance.

2.3.3 Occupational Health and Safety Management Systems

This section explored the occupational health and safety management systems in Malaysia and Australia and the ILO OSH Management Systems.

i. Occupational Health and Safety Management Systems in Malaysia

Department of Standards Malaysia (DSM) is the National Standards Body for Malaysia established under Standards of Malaysia Act 1996. Standards and Industrial Research Institute of Malaysia (SIRIM) Berhad is appointed as the sole national standards development agency by DSM (SIRIM, 2009).

SIRIM QAS International Sdn. Bhd., a wholly owned subsidiary of Standards and Industrial Research Institute of Malaysia (SIRIM) Berhad is the leading certification, inspection and testing body in Malaysia for Occupational Health and Safety Management Systems Certification Scheme. SIRIM QAS International Sdn. Bhd. is accredited by DSM (Department of Standards Malaysia) and UKAS (United Kingdom Accreditation Service).

OHSAS 18001 has been the only OHS management systems in Malaysia since 1999 that is OHSAS 18001: 1999. OHSAS 18001 is a copyright of British Standards Institute, United Kingdom but not a British Standard (SIRIM, 2009). OHSAS 18000 has been developed to be compatible with the ISO 9001: 1994 (Quality) and ISO 14001: 1996 (Environmental) Management Systems standards.

OHSAS 18001 is an abbreviation for Occupational Health and Safety Assessment Series (OHSAS). Currently there are two series of the OHSAS - (1) OHSAS 18001: 2007 – Specification; and (2) OHSAS 18002: 2008 - Guidelines for the implementation of OHSAS 18001. OHSAS 18001 was issued on 15 April 1999 and OHSAS 18002 was introduced in 2000. The standard was developed in response to urgent customer demand for a recognizable Occupational Health and Safety Management System standard against which a company's management systems can be assessed and certified. The arrangement specifies the necessity for the establishment of an occupational health and safety (OHS) management system in any organization to facilitate the organization to control its OHS risks and improve its performance. As such, OHSAS 18001 focus on occupational health and safety of employee at the workplace.

Every organization that has certification of OHSAS 18001 will be monitored closely through surveillance audit so that they comply with the OHSAS 18001 elements. A certificate of conformity will be granted to those organizations, which have demonstrated that they meet the requirements of the OHSAS 18001: 2007 - Occupational Health and Safety Management Systems. Re-certification will be issued after three years. According to SIRIM (2009), those companies that have OHSAS 18001 certification showed an improvement in their OHS performance where there were reduction in major and minor accidents, decreased in medical leaves, declined in medical costs and improved safety culture.

However, certification to OHSAS 18001 does not ensure compliance to Occupational Health and Safety legislation but in the long run, the obligation to apply the OHSAS requirements with the concept of continuous improvement will drive the organizations to progress towards legal compliance.

According to SIRIM (2009), in Malaysia, so far, as at 31 December 2008, there are 268 companies that have Occupational Health and Safety Management System (OHSAS 18001) certification. These companies comprise of (1) 20 companies from the construction sector; (2) 60 companies from the chemical and material sector; (3) 30 companies from the electrical and electronic sector; (4) 99 companies from the food, agriculture and forestry sector; (5) 39 companies from the mechanical and automotive sector and (6) 20 companies from the service sector.

Most of the large companies like Petronas, Shell, Mobil, Motorola and others have their own model of Occupational Health and Safety Management System. Transnational companies operating in Malaysia have their own OHS management systems.

Up until OHSAS 18001 was introduced, there is no standard system in Malaysia yet and not all organizations have the Occupational Health and Safety Management System. With the aim to protect workers from the hazards at work and to prevent accidents from occurring, the Malaysian government has formulated the Occupational Safety and Health Management System – the Malaysian Standard in 2003 (OSH-MS 1722:2003). This standard was based on the ILO OSH

MS 2001. Implementation of the OHS management systems through continuous improvement in the workplace is a mean to legal compliance. Due to this problem Malaysian government intends to introduce the Malaysian Standard by 2004 (Hamisah Hamid, 2003b) but it was only realized in 2005. In 2005, Malaysian government appointed SIRIM Berhad as the certification body for MS1722. Thus, MS 1722 Part 1: 2003- Requirements and MS 1722 Part II: 2005 – Guidelines were introduced to the public. Since the requirements of this standard are equivalent to OHSAS 18001, auditing and certification to this standard is performed at the same time. So far, as at 8 May 2009, there were 42 companies from the private sector certified to this standard.

ii. Occupational Health and Safety Management Systems in Australia

Bottomley (1999a, p.3) defined occupational health and safety management system as:

- The South Australian Safety Achiever Bonus Scheme definition: "An orderly arrangement of interdependent activities and related procedures that drives an organisation's OHS(W) performance."

- Definition that AS/NZS 4801 and AS/NZS 4804 used: "that part of the overall management system which includes organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, reviewing and maintaining the health and safety policy and so managing the health and safety risks associated with the business of the organization."

The Australian Occupational Health and Safety Management Systems are (1) AS/NZS 4801: 2001 Occupational Health and Safety Management Systems – Specification with guidance for use, (2) AS/NZS 4804 Occupational Health and Safety Management Systems – General guidelines on principles, systems and supporting techniques. There are five elements in AS/NZS 4801 Occupational Health and Safety Management Systems – Specification with guidance for use: (1) Occupational Health and Safety Policy, (2) planning, (3) implementation, (4) measurement and evaluation, and (5) management review.

To achieve effective OHS performance, audit tools that integrate crucial elements of an OHSMS are used. The Australian audit systems include (1) Western Australia's WorkSafe Plan, (2) South Australia's Safety Achiever Business System, (3) Victoria's SafetyMAP, (4) Queensland's TriSafe Management Systems Audit, (5) New South Wales' CPSC Guidelines, and (6) Commonwealth's ComCare's SRC Risk Management Model.

Bottomley (1999b) revealed that there are five key elements in Western Australia's WorkSafe Plan: (1) management commitment, (2) planning, (3) consultation, (4) hazard management, and (5) training. As indicated by Victorian WorkCover Authority (2006), SafetyMAP (Safety Management Achievement Program) is an audit tool that evaluate an organization's health and safety management system. There are five elements in SafetyMAP: (1) health and safety policy, (2) planning, (3) implementation, (4) measurement and evaluation, and (5) management review. The South Australia's Safety Achiever Business System consists of (1) commitment and policy, (2) planning, (3) implementation, (4) measurement, and (5) review (Gallagher et al., 2003).

iii. The ILO Occupational Health and Safety Management Systems

The ILO Guidelines (ILO, 2001a) on occupational safety and health management systems (ILO-OSH 2001) were adopted at a tripartite meeting of experts in April 2001. It focuses on the same specification as other international standards and is compatible with other management systems standard. ILO-OSH 2001 stressed that OHS should be a line management responsibility at the organization and encourage integration of their model with other management systems. ILO OSH-MS 2001 centers on two levels: (1) a national level for implementing a national framework for policy on occupational health and safety; and (2) organizational level as it is the responsibility of employers to assure the health and safety conditions of their employees.

The ILO –OSH Management System consist of the following components:

- Policy – contains 2 elements: (1) OHS policy and (2) workers participation
- Organizing – includes 4 factors: (1) responsibility & accountability, (2) competence & training, (3) OHS documentation and (4) communication

- Planning and Implementation – comprises of 4 aspects: (1) initial review; (2) system planning, development and implementation; (3) OHS objectives and (4) hazard prevention
- Evaluation – covers of 4 features: 1) performance monitoring and measurement; (2) investigation; (3) audit; (4) management review
- Action for improvement involves 2 elements:(1) preventive and corrective action; and (2) continual improvement

iv. Discussion of Occupational Health and Safety (OHS) Management Systems

The similarity in all OHS management systems is to maintain a healthy workforce, to retain a safe system of work, to support the wellbeing of the employees, and to achieve a good safety outcome. The common principle in the OHS management systems is almost similar whereby these principals are in use: commitment and policy, planning, implementation, measurement and evaluation, and management review. Furthermore, all the OHS management systems in both countries are applicable to any organization who wants to eliminate or minimize its OHS risks despite of size, type or level of maturity. It can also be used to comply with relevant OHS legislation, and standards and codes of practice in both countries. Accountability from the management is critical to ensure the success of the implementation.

In Australia, there are eight OHS management systems but in Malaysia, there is one OHS management system to be subscribed by organization that is OSHAS 18001.

For an effective OHS management systems, several researches recognized that determinants like recognition and rewards programs; collaboration and sharing effort; measures to strengthen senior management values; better communication systems; allocation of resources; incorporate OHS planning into the organization strategic plans; etc. are critical for good performance. Moreover, a primary basis for national OHS programs is the government's commitment to implement it.

2.3.4 An Overview of Occupational Accidents, Diseases and Compensation

This section examined the occupational accidents, diseases and compensation in Malaysia and Australia.

i. Occupational Accidents, Diseases and Compensation in Malaysia

Occupational safety and health performance varies enormously between countries, economic sectors, sizes of enterprises, and groups at particular risk (Alli, 2001). There is significantly difference between small and large organizations in term of workplace fatalities. Alli (2001) concluded that economic sectors such as agriculture, forestry, mining, manufacturing and construction have the highest prevalence in occupational deaths. The same goes for small workplaces compared to large enterprises. Specific workforces at risk are women, home-based workers, part-time workers, contract workers and drivers (ILO, 2000).

Table 2.1 shows the accidents and occupational diseases statistics. Although there are regulations to bind employers, SOCSO statistics show a rise and fall number of industrial accidents, from 114,134 accidents in 1995 to 85,338 in 1998, then an increased to 92,074 in 1999, 95,006 in 2000, afterwards to 56,339 accidents in 2007. There was even a fluctuation in the disease statistics. In 1997, the number of diseases was 832 cases, then declined to 178 cases in 1998, and later increased to 278 cases in 2000. What is more, the Director-general of Department of Occupational Safety and Health (DOSH), Datuk Dr Johari Basri said that in 2007, 4,873 notices were issued to employers to improve workplace dangers with 215 companies being compounded and 108 companies charged under Section 15 of the Occupational Safety and Health Act 1994 (Sujata, 2008). This phenomenon was due to employers' non-compliance with the Occupational Safety and Health Act 1994 (New Straits Times, 2002). One of the main aspects of employer's non-compliance was the failure on the part of the management to develop safety and health systems at the workplace.

As the reporting of occupational accidents and diseases improves, organizations are becoming increasingly aware of the associated economic costs. They include costs for lost work time and productivity, compensation and medical expenses by the social security system, and accident damage. Even, Cruez (2004) stated that accidents in the workplaces have increased organizations expenditure through its direct and indirect cost. Nonetheless, it is clear from the available statistics that the reporting of occupational accidents and diseases improves and this might be due to the awareness of the associated economic costs. In addition, the cooperation of companies with the enforcement body to ensure health, safety and welfare of their workers plays an important role in this development.

Table 2.2 illustrates that economic sectors such as agriculture, forestry and fishing; manufacturing; construction; trading; services and public services have the highest prevalence in occupational deaths and accidents reported. For example, the manufacturing industry demonstrated insignificant decreased in industrial accidents, from 36,968 accidents in 1997 to 41,331 accidents in 2000 and dropped to 21,609 accidents in 2006. Similarly, the number of industrial fatalities in manufacturing industry also revealed irrelevant reduction where there were 387 deaths reported in 1997, decreased to 232 deaths in 1999, and then increased to 282 deaths in 2000. The fluctuated amount can be attributed to the increase of industrial development where more technological innovations are being used in the workplace. In addition, new types of occupational diseases have increased through the usage of new chemical substances. The increased activities in the industrial sectors provide workers with real health hazards. On the other hand, the decrease number of accidents may reveal restricted social security coverage (ILO, 2000) or even, there might be cases where under-reporting of statistics had happened especially hazard contributed from modern working arrangement.

Hinze (2005, p. 2) reported that "injury under-reporting is a major problem because every injury that gets swept under the table is an injury whose root cause will never be investigated." Hence, the availability of accurate statistics on industrial accidents and occupational diseases reflects some difficulties in the development of occupational health and safety and there is a need to support significant analyses in discovering the causes of occupational accidents and diseases and promote effective prevention policies (ILO, 2005).

Table 2.1: Number of accidents, occupational diseases and compensation due to industrial accidents

No.	Year	Number of reported industrial accident	No of reported Occupational diseases	Compensation recipients
1.	1995	114, 134	-	182,763
2.	1996	106,508	-	179,936
3.	1997	86,589	832	194,421
4.	1998	85,338	178	196,668
5.	1999	92,074	192	209,821
6.	2000	95,006	278	228,705
7.	2001	85,926	204	230,344
8.	2002	81,810	216	239,372
9.	2003	73,858	189	247,790
10.	2004	69,132	194	255,381
11.	2005	61,182	-	252,439
12.	2006	58,321	263	259,081
13.	2007	56,339	341	286,891

Source: SOCSO Annual Reports 1995 – 2007 (2009)

As a result of the accidents and diseases, workers who were injured or killed on duty, or who become infected with diseases in the course of their employment found themselves unable to earn a living. A few decades ago, there was very little support for these problems and employees were eliminated from the workforce. With this in mind, Malaysia has set up a system that compensates occupational accidents and diseases to lessen the burden of employees through the Employees Social Security Act 1969 for preventive and rehabilitative programs. Social Security Organization (SOCSO) enforced this act. There are two schemes to compensate workers who are earning less than RM3,000 for employment injury (which includes occupational diseases) and invalidity: (1) Employment Injury Insurance Scheme, and (2) Invalidity Pension Scheme. The Employment Injury Insurance Scheme provides an employee with protection for (1) accidents that occur while commuting and working; and (2) diseases from exposure at the workplace. The Invalidity Pension Scheme is a non-occupational related scheme and covers an employee against invalidity or death due to any cause not connected with his employment.

From Table 2.1, the figures for compensation recipients are enormous. The compensation had increased from 182,763 in 1995 to 286,891 in 2007. Although there is a downward trend in occupational accidents but workers' compensation costs increased. According to SOCSO, the annual mean value for compensation claims for 1990 – 1994 was 154.3 million and the cost had increased to 577.3 million in 1998 – 2002. Even the Director-general of Department of Occupational Safety and Health (DOSH), Datuk Dr Johari Basri pointed that compensation paid by SOCSO for those involved in industrial and commuting accidents had increased from RM959mil in 2006 to RM1.06bil in 2007 (Sujata, 2008). The statistics point not only to the economic costs, but also to the social burdens associated with such costs and the suffering of individual workers and their families.

Table 2.2: Number of Accidents by Industries: 1997 – 2003 & 2006 - 2007

Year	1997		1998		1999	
Industries	No. of cases reported	Death reported	No. of cases reported	Death reported	No. of cases reported	Death reported
Agriculture, Forestry & Fishing	23296	265	12678	34	12753	132
Mining & Quarrying	760	18	739	8	756	14
Manufacturing	36968	387	37261	228	40730	232
Electricity, Gas, Water & Sanitary Services	364	14	979	12	592	11
Construction	3510	81	3573	104	4747	146
Trading	9235	126	12986	139	14685	127
Transportation	3245	88	4050	78	4462	91
Financial Institutions & Insurance	363	7	700	15	627	8
Services	3723	56	5294	94	5987	65
Public Services	5125	265	7078	334	6735	83
TOTAL	86589	1307	85338	1046	92074	909

Table 2.2: Number of Accidents by Industries: 1997 – 2003 & 2006 - 2007

Year	2000		2001		2002	
Industries	No. of cases reported	Death reported	No. of cases reported	Death reported	No. of cases reported	Death reported
Agriculture, Forestry & Fishing	11893	115	12424	75	9456	69
Mining & Quarrying	626	11	573	7	545	12
Manufacturing	41331	282	35642	243	33523	214
Electricity, Gas, Water & Sanitary Services	537	8	499	13	516	14
Construction	4873	159	4593	89	5015	88
Trading	15452	151	13774	192	13685	134
Transportation	4778	98	4382	91	4439	90
Financial Institutions & Insurance	687	11	602	6	567	9
Services	6581	72	5950	106	5924	87
Public Services	8248	97	7487	136	8140	141
TOTAL	95006	1004	85926	958	81810	858

Table 2.2: Number of Accidents by Industries: 1997 – 2003 & 2006 - 2007

Year	2003		2006		2007	
Industries	No. of cases reported	Death reported	No. of cases reported	Death reported	No. of cases reported	Death reported
Agriculture, Forestry & Fishing	6947	40	3567	37	3255	352
Mining & Quarrying	536	8	394	8	362	55
Manufacturing	29780	213	21609	188	19607	3622
Electricity, Gas, Water & Sanitary Services	510	8	509	15	476	105
Construction	4654	95	3686	64	3703	589
Trading	13395	151	11430	127	11658	1664
Transportation	4104	108	3610	78	3639	638
Financial Institutions & Insurance	572	7	538	2	612	157
Services	5617	84	4832	69	4718	830
Public Services	7743	108	8146	145	8309	1543
TOTAL	73858	822	58321	733	56339	755

Source: SOCSO Annual Reports 1997 – 2003, 2006 - 2007 (2009)

ii. Occupational Accidents, Diseases and Compensation in Australia

There are 11 workers' compensation systems in Australia. Below is the information about the compensation systems and agencies accountable for administering workers' compensation as at 30 June 2008 (Commonwealth of Australia, 2009).

a. New South Wales

Policy: WorkCover NSW

Current legislation: Workplace Injury Management and Workers Compensation Act 1998 and Workers Compensation Act 1987

b. Victoria

Policy: Victorian WorkCover Authority (WorkSafe Victoria)

Current legislation: Accident Compensation Act 1985 and Accident Compensation (WorkCover Insurance) Act 1993

c. Queensland

Policy: Department of Employment and Industrial Relations

Current legislation: Workers' Compensation and Rehabilitation Act 2003

d. Western Australia

Policy: WorkCover WA

Current legislation: Workers' Compensation and Rehabilitation Act 1981

e. South Australia

Policy: WorkCover SA

Current legislation: Workers' Rehabilitation and Compensation Act 1986 and WorkCover Corporation Act 1994

f. Tasmania

Policy: Department of Justice and WorkCover Tasmania

Current legislation: Workers' Rehabilitation and Compensation Act 1988

g. Northern Territory

Policy: Department of Employment, Education and Training

Current legislation: Work Health Act 1986

h. Australian Capital Territory

Policy: Office of Industrial Relations

Current legislation: Workers' Compensation Act 1951

i. Commonwealth

The following shows that there are three policies under the Commonwealth.

Policy 1: Comcare - Department of Education, Employment and Workplace Relations

Current legislation: Safety, Rehabilitation and Compensation Act 1988

Policy 2: Seacare - Department of Education, Employment and Workplace Relations

Current legislation: Seafarers Rehabilitation and Compensation Act 1992

Policy 3: MRCS - Military Rehabilitation and Compensation Commission

Current legislation: Military Rehabilitation and Compensation Act 2004

Table 2.3 shows the number of claims and incidence statistics. The statistics show insignificant reduction in number of claims and number of incidence, from 153030 claims in FY1997/98 to 132055 claims in FY2006/07. The statistic shows that manufacturing industry has the highest number of claims. As for the number of incidence, there was an insignificant reduction in the statistics. In FY1997/98, the amount was 20.8 per 1000 employees, and then declined to 14.2 per 1000 employees in FY2006/07. Initially, the mining sector has the highest number of incidence in FY1997/98 (43.3 per 1000 employees), then in the later years the manufacturing, construction, and transport and storage sectors have the highest accidents.

Table 2.4 shows the number of frequency (per million hours worked) and number of claims statistics. There was a reduction in the statistics, where, in FY1997/98, the number of frequency was 12.2 per million hours worked, and then declined to 8.8 per million hours worked in FY2006/07. Initially, the mining sector has the highest number of incidence in FY1997/98 (19.6 per million hours worked), then in the later years the manufacturing, and transport and storage sectors have the highest accidents.

Table 2.5 shows the median total compensation payment from FY2000/01 to FY 2005/06 and the number of claims statistics. There was an increased in the total compensation payment, where, in FY2000/01, the total compensation was $5,300, and then increased to $6,100 in FY2005/06. The mining sector has the highest compensation payment throughout the year from FY2000/01 to FY 2005/06.

Table 2.3: Occupational Health and Safety Statistics Report – Number of Incidence: FY1997/98 – FY 2006/07

Year	**FY1997/98**		**FY1998/99**		**FY1999/00**	
Industries	No. of Claims	No. of Incidence (per 1000 employees)	No. of Claims	No. of Incidence (per 1000 employees)	No. of Claims	No. of Incidence (per 1000 employees)
Agriculture, Forestry and Fishing	5980	33.2	6135	32.3	6205	32.0
Mining	3380	43.3	2500	32.8	2350	31.5
Manufacturing	37250	36.4	35135	35.5	33955	33.2
Electricity, Gas and Water Supply	1465	23.2	1250	19.6	1145	18.1
Construction	13990	37.0	13565	33.1	14005	30.8
Wholesale Trade	8275	18.5	7710	17.1	7755	17.5
Retail Trade	14320	13.3	13800	12.1	15395	13.1
Accommodation, Cafes and Restaurants	6515	16.4	6755	16.5	7020	16.4
Transport and Storage	12030	36.4	11560	33.4	11510	33.2
Communication Services	2895	21.7	2190	15.8	1860	11.5
Finance and Insurance	1570	5.3	1520	5.0	1335	4.3
Property and Business Services	8905	11.3	9885	11.6	9895	10.9
Government Administration and Defence	4725	13.7	4635	13.2	4940	14.7
Education	6130	10.5	6105	10.1	6655	10.9
Health and Community Services	15800	20.3	16555	20.6	16425	19.9
Cultural and Recreational Services	3455	18.1	3300	16.5	3085	14.5
Personal and Other Services	5700	20.7	5690	21.0	5660	19.8
Not Stated	645	**	1210	**	610	**
TOTAL	153030	20.8	149495	19.7	149810	19.1

** data suppressed because relative standard error is greater than 50%
Financial year from 1 July – 30 June
Source: The Australia Safety and Compensation Council (ASCC) Online Statistics Interactive National Workers' Compensation Statistics Databases

Table 2.3: Occupational Health and Safety Statistics Report - Number of Incidence: FY1997/98 – FY 2006/07

Year	**FY2000/01**		**FY2001/02**		**FY2002/03**	
Industries	No. of Claims	No. of Incidence (per 1000 employees)	No. of Claims	No. of Incidence (per 1000 employees)	No. of Claims	No. of Incidence (per 1000 employees)
Agriculture, Forestry and Fishing	5880	29.1	5765	26.6	5565	30.4
Mining	2240	29.9	2320	30.4	2300	27.9
Manufacturing	31405	30.3	29675	30.2	29280	29.1
Electricity, Gas and Water Supply	980	14.6	930	14.0	805	11.0
Construction	13630	31.4	12395	28.6	12865	28.7
Wholesale Trade	7045	17.8	6625	17.0	6305	15.9
Retail Trade	15330	13.0	14105	11.5	13880	10.8
Accommodation, Cafes and Restaurants	6835	15.1	6705	15.0	6695	15.1
Transport and Storage	11580	32.3	11640	33.4	11385	32.7
Communication Services	1665	10.6	1545	11.3	1530	11.1
Finance and Insurance	1395	4.4	1455	4.5	1390	4.2
Property and Business Services	9985	10.2	10005	10.1	10565	10.4
Government Administration and Defence	4750	12.5	5400	13.2	5850	13.7
Education	6615	10.6	6430	9.9	6780	10.0
Health and Community Services	16175	18.9	16225	18.4	16340	17.9
Cultural and Recreational Services	3135	15.0	3090	14.2	2895	13.0
Personal and Other Services	5880	20.8	5840	19.7	5785	18.5
Not Stated	205	**	165	**	125	**
TOTAL	144740	18.1	140320	17.4	140345	16.9

** data suppressed because relative standard error is greater than 50%
Financial year from 1 July – 30 June
Source: The ASCC Online Statistics Interactive National Workers' Compensation Statistics Databases

Table 2.3: Occupational Health and Safety Statistics Report – Number of Incidence: FY1997/98 – FY 2006/07

Year	**FY2003/04**		**FY2004/05**		**FY2005/06**	
Industries	No. of Claims	No. of Incidence (per 1000 employees)	No. of Claims	No. of Incidence (per 1000 employees)	No. of Claims	No. of Incidence (per 1000 employees)
Agriculture, Forestry and Fishing	5150	27.3	4940	26.5	4705	25.9
Mining	2380	26.3	2415	24.2	2340	19.1
Manufacturing	28430	29.3	28565	29.1	27770	28.8
Electricity, Gas and Water Supply	820	11.0	905	12.0	705	8.3
Construction	14090	28.2	14365	26.4	14200	25.0
Wholesale Trade	6435	16.1	6615	16.8	7025	17.7
Retail Trade	13940	10.8	13500	10.0	12865	9.4
Accommodation, Cafes and Restaurants	6560	14.4	6550	13.2	6345	13.3
Transport and Storage	11485	30.5	11225	28.4	11180	27.6
Communication Services	1515	10.4	1365	9.4	1315	8.2
Finance and Insurance	1365	4.2	1220	3.7	1220	3.5
Property and Business Services	10665	10.1	11005	10.3	10335	9.1
Government Administration and Defence	5620	12.8	5530	12.2	4910	10.8
Education	6865	9.9	6740	10.0	6565	9.1
Health and Community Services	17280	18.6	17635	18.4	16475	16.2
Cultural and Recreational Services	2715	12.1	2695	11.0	2750	10.9
Personal and Other Services	5930	19.2	6045	18.9	5535	17.1
Not Stated	75	**	115	**	330	**
TOTAL	141325	16.7	141440	16.2	136575	15.2

** data suppressed because relative standard error is greater than 50%
Financial year from 1 July – 30 June
Source: The ASCC Online Statistics Interactive National Workers' Compensation Statistics Databases

Table 2.3: Occupational Health and Safety Statistics Report – Number of Incidence: FY1997/98 – FY 2006/07

Year	**FY2006/07**	
Industries	No. of Claims	No. of Incidence (per 1000 employees)
Agriculture, Forestry and Fishing	4625	25.3
Mining	2445	19.0
Manufacturing	26695	27.6
Electricity, Gas and Water Supply	750	9.1
Construction	14130	22.1
Wholesale Trade	6665	15.5
Retail Trade	12495	9.2
Accommodation, Cafes and Restaurants	6270	12.4
Transport and Storage	10765	25.7
Communication Services	1185	7.2
Finance and Insurance	1160	3.1
Property and Business Services	8955	7.6
Government Administration and Defence	5155	10.8
Education	6430	9.0
Health and Community Services	16030	15.2
Cultural and Recreational Services	2550	9.7
Personal and Other Services	5290	16.1
Not Stated	460	**
TOTAL	132055	14.2

** data suppressed because relative standard error is greater than 50%
Financial year from 1 July – 30 June
Source: The ASCC Online Statistics Interactive National Workers' Compensation Statistics Databases

Table 2.4: Occupational Health and Safety Statistics Report – Number of Frequency: FY1997/98 – FY 2006/07

Year	**FY1997/98**		**FY1998/99**		**FY1999/00**	
Industries	Number of Claims	No. of Frequency (per million hrs worked)	Number of Claims	No. of Frequency (per million hrs worked)	Number of Claims	No. of Frequency (per million hrs worked)
Agriculture, Forestry and Fishing	5980	16.5	6135	16.3	6205	16.3
Mining	3380	19.6	2500	14.4	2350	13.9
Manufacturing	37250	18.9	35135	18.3	33955	17.2
Electricity, Gas and Water Supply	1465	12.2	1250	9.8	1145	9.4
Construction	13990	18.4	13565	16.4	14005	15.2
Wholesale Trade	8275	9.4	7710	8.7	7755	8.9
Retail Trade	14320	9.8	13800	9.0	15395	9.5
Accommodation, Cafes and Restaurants	6515	12.0	6755	12.3	7020	11.8
Transport and Storage	12030	18.2	11560	16.9	11510	16.6
Communication Services	2895	11.5	2190	8.5	1860	6.1
Finance and Insurance	1570	2.9	1520	2.7	1335	2.3
Property and Business Services	8905	6.3	9885	6.5	9895	6.1
Government Administration and Defence	4725	7.7	4635	7.5	4940	8.4
Education	6130	6.3	6105	6.0	6655	6.6
Health and Community Services	15800	14.0	16555	14.2	16425	13.9
Cultural and Recreational Services	3455	13.1	3300	11.9	3085	10.2
Personal and Other Services	5700	12.8	5690	13.1	5660	12.1
Not Stated	645	np	1210	np	610	np
Total	153030	12.2	149495	11.6	149810	11.2

** data suppressed because relative standard error is greater than 50%
np data not available due to confidentiality restrictions
Financial year from 1 July – 30 June
Source: The ASCC Online Statistics Interactive National Workers' Compensation Statistics Databases

Table 2.4: Occupational Health and Safety Statistics Report – Number of Frequency: FY1997/98 – FY 2006/07

Year	**FY2000/01**		**FY2001/02**		**FY2002/03**	
Industries	Number of Claims	No. of Frequency (per million hrs worked)	Number of Claims	No. of Frequency (per million hrs worked)	Number of Claims	No. of Frequency (per million hrs worked)
Agriculture, Forestry and Fishing	5880	15.4	5765	13.6	5565	15.7
Mining	2240	13.0	2320	13.5	2300	12.0
Manufacturing	31405	15.9	29675	15.8	29280	15.0
Electricity, Gas and Water Supply	980	8.0	930	7.4	805	6.0
Construction	13630	15.9	12395	14.8	12865	14.6
Wholesale Trade	7045	9.2	6625	8.8	6305	8.2
Retail Trade	15330	9.5	14105	8.4	13880	7.9
Accommodation, Cafes and Restaurants	6835	10.9	6705	11.0	6695	11.0
Transport and Storage	11580	16.5	11640	17.2	11385	16.4
Communication Services	1665	5.7	1545	6.0	1530	5.8
Finance and Insurance	1395	2.4	1455	2.5	1390	2.3
Property and Business Services	9985	5.8	10005	5.7	10565	5.9
Government Administration and Defence	4750	7.1	5400	7.5	5850	7.8
Education	6615	6.5	6430	6.2	6780	6.2
Health and Community Services	16175	13.2	16225	13.0	16340	12.6
Cultural and Recreational Services	3135	11.0	3090	10.2	2895	9.5
Personal and Other Services	5880	13.1	5840	12.6	5785	11.6
Not Stated	205	np	165	np	125	**
Total	144740	10.7	140320	10.4	140345	10.1

** data suppressed because relative standard error is greater than 50%
np data not available due to confidentiality restrictions
Financial year from 1 July – 30 June
Source: The ASCC Online Statistics Interactive National Workers' Compensation Statistics Databases

Table 2.4: Occupational Health and Safety Statistics Report – Number of Frequency: FY1997/98 – FY 2006/07

Year	**FY2003/04**		**FY2004/05**		**FY2005/06**	
Industries	Number of Claims	No. of Frequency (per million hrs worked)	Number of Claims	No. of Frequency (per million hrs worked)	Number of Claims	No. of Frequency (per million hrs worked)
Agriculture, Forestry and Fishing	5150	14.9	4940	14.3	4705	14.3
Mining	2380	11.7	2415	10.7	2340	8.6
Manufacturing	28430	15.4	28565	15.1	27770	15.2
Electricity, Gas and Water Supply	820	5.9	905	6.4	705	4.6
Construction	14090	14.3	14365	13.5	14200	12.9
Wholesale Trade	6435	8.5	6615	8.8	7025	9.3
Retail Trade	13940	8.0	13500	7.2	12865	6.9
Accommodation, Cafes and Restaurants	6560	10.8	6550	9.8	6345	9.9
Transport and Storage	11485	15.5	11225	14.6	11180	14.5
Communication Services	1515	5.7	1365	5.0	1315	4.5
Finance and Insurance	1365	2.3	1220	2.0	1220	1.9
Property and Business Services	10665	5.9	11005	5.9	10335	5.3
Government Administration and Defence	5620	7.5	5530	7.1	4910	6.3
Education	6865	6.1	6740	6.2	6565	5.7
Health and Community Services	17280	13.3	17635	13.0	16475	11.4
Cultural and Recreational Services	2715	9.1	2695	8.2	2750	8.3
Personal and Other Services	5930	12.1	6045	11.7	5535	10.8
Not Stated	75	**	115	np	330	np
Total	141325	10.1	141440	9.7	136575	9.2

** data suppressed because relative standard error is greater than 50%
np data not available due to confidentiality restrictions
Financial year from 1 July – 30 June
Source: The ASCC Online Statistics Interactive National Workers' Compensation Statistics Databases

Table 2.4: Occupational Health and Safety Statistics Report – Number of Frequency: FY1997/98 – FY 2006/07

Year	**FY2006/07**	
Industries	Number of Claims	No. of Frequency (per million hrs worked)
Agriculture, Forestry and Fishing	4625	13.7
Mining	2445	8.6
Manufacturing	26695	14.9
Electricity, Gas and Water Supply	750	4.9
Construction	14130	11.5
Wholesale Trade	6665	8.3
Retail Trade	12495	6.9
Accommodation, Cafes and Restaurants	6270	9.5
Transport and Storage	10765	13.7
Communication Services	1185	3.9
Finance and Insurance	1160	1.7
Property and Business Services	8955	4.5
Government Administration and Defence	5155	6.3
Education	6430	5.7
Health and Community Services	16030	10.9
Cultural and Recreational Services	2550	7.6
Personal and Other Services	5290	10.5
Not Stated	460	np
TOTAL	132055	8.8

** data suppressed because relative standard error is greater than 50%
np data not available due to confidentiality restrictions
Financial year from 1 July – 30 June
Source: The ASCC Online Statistics Interactive National Workers' Compensation Statistics Databases

Table 2.5: Occupational Health and Safety Statistics Report – Median Total Compensation Payment: FY2000/01 – FY 2005/06

Year	**FY2000/01**		**FY2001/02**		**FY2002/03**	
Industries	Number of Claims	Median Total Compensation Payment	Number of Claims	Median Total Compensation Payment	Number of Claims	Median Total Compensation Payment
Agriculture, Forestry and Fishing	5880	$4,200	5765	$4,300	5565	$4,500
Mining	2240	$10,000	2320	$10,300	2300	$9,400
Manufacturing	31405	$5,700	29675	$6,100	29280	$5,900
Electricity, Gas and Water Supply	980	$6,000	930	$7,800	805	$7,500
Construction	13630	$6,800	12395	$7,100	12865	$6,900
Wholesale Trade	7045	$5,500	6625	$5,900	6305	$5,800
Retail Trade	15330	$4,100	14105	$4,400	13880	$4,400
Accommodation, Cafes and Restaurants	6835	$3,700	6705	$3,600	6695	$3,500
Transport and Storage	11580	$5,000	11640	$5,400	11385	$5,400
Communication Services	1665	$7,500	1545	$9,100	1530	$9,400
Finance and Insurance	1395	$8,200	1455	$8,200	1390	$8,100
Property and Business Services	9985	$5,300	10005	$5,600	10565	$5,600
Government Administration and Defence	4750	$6,000	5400	$6,100	5850	$6,300
Education	6615	$5,300	6430	$6,400	6780	$7,200
Health and Community Services	16175	$4,700	16225	$5,000	16340	$4,900
Cultural and Recreational Services	3135	$4,900	3090	$5,300	2895	$5,300
Personal and Other Services	5880	$6,700	5840	$6,600	5785	$7,400
Not Stated	205	$28,300	165	$16,800	125	$12,400
Total	144740	$5,300	140320	$5,700	140345	$5,700

Financial year from 1 July – 30 June

Source: The ASCC Online Statistics Interactive National Workers' Compensation Statistics Databases

Table 2.5: Occupational Health and Safety Statistics Report – Median Total Compensation Payment: FY2000/01 – FY 2005/06

Year	FY2003/04		FY2004/05		FY2005/06	
Industries	Number of Claims	Median Total Compensation Payment	Number of Claims	Median Total Compensation Payment	Number of Claims	Median Total Compensation Payment
Agriculture, Forestry and Fishing	5150	$4,700	4940	$4,800	4705	$5,100
Mining	2380	$10,600	2415	$10,200	2340	$10,400
Manufacturing	28430	$6,300	28565	$6,300	27770	$6,100
Electricity, Gas and Water Supply	820	$8,000	905	$8,200	705	$7,900
Construction	14090	$7,100	14365	$7,200	14200	$7,300
Wholesale Trade	6435	$6,000	6615	$6,200	7025	$5,900
Retail Trade	13940	$4,700	13500	$4,900	12865	$5,100
Accommodation, Cafes and Restaurants	6560	$3,600	6550	$3,900	6345	$3,500
Transport and Storage	11485	$6,000	11225	$6,400	11180	$6,300
Communication Services	1515	$8,500	1365	$8,100	1315	$8,300
Finance and Insurance	1365	$9,000	1220	$9,100	1220	$9,500
Property and Business Services	10665	$5,600	11005	$5,600	10335	$5,300
Government Administration and Defence	5620	$7,200	5530	$6,800	4910	$7,700
Education	6865	$7,600	6740	$7,600	6565	$7,800
Health and Community Services	17280	$4,900	17635	$4,900	16475	$5,200
Cultural and Recreational Services	2715	$5,600	2695	$5,700	2750	$5,200
Personal and Other Services	5930	$7,200	6045	$7,000	5535	$8,100
Not Stated	75	$11,300	115	$9,300	330	$2,600
Total	141325	$6,000	141440	$6,100	136575	$6,100

Financial year from 1 July – 30 June

Source: The ASCC Online Statistics Interactive National Workers' Compensation Statistics Databases

Some of the benefits given by the compensation offices are income replacement payments (also known as weekly payments), medical treatment benefits, permanent impairment entitlements, and death benefits.

There are three types of scheme funding manage by each jurisdiction as to meet liabilities (Comcare, 2004):

- centrally funded (government agency): Queensland, South Australia, and Commonwealth (Comcare and MRCS)

- Hybrid (involves both the public and private sector): New South Wales, and Victoria

- privately underwritten (insurer functions are provided by the private sector, through approved insurance companies and self-insuring employers): Western Australia, Tasmania, Northern Territory , Australian Capital Territory, and Commonwealth (Seacare)

Australian Safety and Compensation Council (ASCC) (2008) described occupational disease as: "All employment-related diseases which result from repeated or long-term exposure to an agent(s) or event(s) or which are the results of a single traumatic event where there was a long latency period". There are eight priority disease groups: musculoskeletal disorders, mental disorders, noise induced hearing loss, infectious and parasitic diseases, respiratory disease, contact dermatitis, cardiovascular diseases and occupational cancers. The following are some findings about the diseases:

- Musculoskeletal disorders - the compensated claims declined

- Mental disorders - overall incidence of compensated claims went up over the time period assessed with a slight reduction in 2004–05

- Noise induced hearing loss - the incidence of compensated deafness claims decreased significantly over the time period assessed. An increase was observed between 2002–03 and 2004–05

- Infectious and parasitic diseases - the amount of compensated claims for infectious disease showed a declining trend

- Respiratory disease - compensated claims increased

- Contact dermatitis - the amount of compensated claims declined significantly

- Cardiovascular disease - the amount of compensated claims showed a decreasing trend

- Occupational cancer - the amount of compensated claims for cancer went up

Table 2.6 shows the work-related injury and illness by location of workplace. It was found that New South Wales incurred the highest cost and the lowest cost incurred by Northern Territory. The overall cost for Australia was $57,400 million in 2005-2006. Table 2.7 shows the work-related injury and illness by industry. Manufacturing sector incurred the highest cost of $9,300 million and Electricity, Gas and Water Supply sector incurred the lowest in 2005-2006.

Table 2.6: The cost ($ million) of work-related injury and illness, by location of workplace, 2005-06

Jurisdiction	Injury	Disease	Total
	Total cost ($ millions)		
Australian Capital Territory	1 400	700	2 100
Tasmania	1 200	400	1 600
South Australia	2 900	1 500	4 400
Queensland	8 100	4 000	12 100
Northern Territory	600	200	800
New South Wales	13 700	5 500	19 200
Western Australia	4 300	1 500	5 800
Victoria	6 000	5 400	11 400
Australia	**38 200**	**19 200**	**57 400**

Units are rounded to the nearest $100 million
Source: ABS State Accounts (Catalogue No. 5220.0), November 2007

Table 2.7: The cost ($ million) of work-related injury and illness, by industry of workplace, 2005-06

Jurisdiction	Injury	Disease	Total
	Total cost ($ millions)		
Manufacturing	6 100	3 200	9 300
Health and Community Services	4 300	2 400	6 700
Construction	4 200	2 100	6 300
Retail Trade	3 600	1 700	5 300
Transport and Storage	3 000	1 400	4 400
Property and Business Services	2 800	1 300	4 100
Education	2 000	1 200	3 200
Government Admin and Defence	1 600	1 000	2 600
Personal and Other Services	1 600	900	2 500
Wholesale Trade	1 700	800	2 500
Accommodation, Cafes and Restaurants	1 700	600	2 300
Agriculture, Forestry and Fishing	1 600	700	2 300
Mining	1 200	500	1 700
Cultural and Recreational Services	1 000	400	1 400
Finance and Insurance	600	400	1 000
Communication Services	700	300	1 000
Electricity, Gas and Water Supply	500	300	800
Australia	**38 200**	**19 200**	**57 400**

Units are rounded to the nearest $100 million
Source: ABS State Accounts (Catalogue No. 5220.0), November 2007

iii. Discussion of the Occupational Accidents, Diseases and Compensation

In the early years, accidents and diseases statistic showed a fluctuation amount. This might be due to the increase of industrial development where more technological innovations are being used in the workplace. In addition, new types of occupational diseases have increased through the usage of new chemical substances. The increased activities in the industrial sectors give workers with real health hazards.

Furthermore, many of the global safety and health issues are associated with the globalization of economic, political, social, and cultural forces. According to ILO (2001b), globalization contribute vital effect to the working life and the conditions of work, where some countries are capable to take advantage of market economy, while others have become more marginalized, disintegrated, and impoverished. As such, market forces and economic growth have not been able to guarantee social justice, employment, and development to all (ILO, 2001b). This will lead to occupational safety and health impacts and ergonomic impacts on workers in particular and on the local community in general (ILO, 2001b).

The socio-cultural forces in both countries have multi-cultural society where there are various ethnics performing work in various industries. Each ethnic has their own cultures and believes on how to perform their work although there might be a working culture in an organization to be compliance by all workers. This has lead to work-related accidents and diseases, which cause higher economic costs as public awareness of occupational safety and health tends to be low. This must be changed and action needs to be promoted and accelerated collaboratively between government and other players in various industries as to enhance working environment to encourage productivity improvement. Moreover, the rights of workers to work in a safe and healthy working environment are the core principles of occupational safety and health that must be abided by employers. This is stated under Article 23 of United Nations Universal Declaration of Human Rights 1948 where "Everyone has the right to work, to free choice of employment, to just and favorable conditions of work ….." (Alli, 2001, p. 20). Therefore, employers must prevent and protect workers from occupational risks. However, workers also have the duty to ensure their safety and other persons' safety while at work. This can be done through proper education, training and information on occupational safety and health. Hence, these duties of cares of both employers and employees are stated under the Occupational Safety and Health Act.

Government plays vital role in ensuring appropriate legislation and enforcement to ascertain improvement in working conditions and working environments as to protect workers for their well-being. Government intervention will help improve workers' quality of life and thus, maintain the standard of occupational safety and health practices among all companies whether it is manufacturing or services. Furthermore, self-regulation philosophy of the safety and health legislation will ensure every workers and employers know their responsibilities to improve workplace conditions and safety of themselves from the risk of work. There also should be a tripartite collaboration between government, union and employers to enforce and further enhance this self-regulation legislation.

Appendix 2

List of Accredited Hospitals for the Malaysian Society for Quality in Health (MSQH) Standards as at 31 December 2009 (74 Hospitals)

State	No.	Hospital
Perlis	1.	Hospital Tengku Fauziah, Kangar
Kedah	2.	Hospital Baling
	3.	Hospital Langkawi
	4.	Hospital Jitra
	5.	Hospital Yan
Pulau Pinang	6.	Lam Wah Ee Hospital
	7.	Loh Guan Lye Specialist Centre
	8.	Pantai Mutiara Hospital
	9.	Hospital Seberang Jaya
	10.	Hospital Kepala Batas
	11.	Gleneagles Medical Centre Penang
	12.	Penang Adventist Hospital
Perak	13.	Hospital Bahagia
	14.	Hospital Changkat Melintang
	15.	Ipoh Specialist Hospital
	16.	Hospital Parit Buntar
	17.	Hospital Fatimah Ipoh
	18.	Hospital Sungai Siput
	19.	Hospital Grik
	20.	Hospital Batu Gajah
	21.	Hospital Kuala Kangsar
Selangor	22.	Assunta Hospital
	23.	Hospital Tengku Ampuan Jemaah
	24.	KPJ Selangor Specialist Hospital
	25.	Subang Jaya Medical Center
	26.	Sunway Medical Centre
	27.	KPJ Damansara Specialist Hospital
	28.	Hospital Kuala Kubu Baru
	29.	KPJ Ampang Puteri Specialist Hospital
Wilayah Persekutuan	30.	Gleneagles Intan
	31.	Hospital Kuala Lumpur
	32.	Pantai Medical Centre
	33.	Pantai Hospital Cheras
Negeri Sembilan	34.	Hospital Jelebu
	35.	Hospital Port Dickson
	36.	Hospital Tuanku Ja'afar Seremban
	37.	Columbia Asia Medical Centre
	38.	KPJ Seremban Specialist Hospital

State	No.	Hospital
Melaka	39.	Hospital Melaka
	40.	Mahkota Medical Centre
	41.	Pantai Medical Centre Ayer Keroh
	42.	Hospital Jasin
Johor	43.	Hospital Batu Pahat
	44.	Hospital Kluang
	45.	Hospital Pontian
	46.	KPJ Johor Specialist Hospital
	47.	Hospital Segamat
Pahang	48.	Hospital Muadzam Shah
	49.	Hospital Sultan Hj Ahmad Shah, Temerloh
	50.	Hospital Jengka
	51.	Hospital Tengku Ampuan Afzan
Kelantan	52.	Hospital Machang
	53.	Hospital Tengku Anis
	54.	Hospital Jeli
Terengganu	55.	Hospital Besut
	56.	Hospital Hulu Terengganu
	57.	Hospital Kemaman
	58.	Hospital Setiu
Sabah	59.	Hospital Kudat
	60.	Hospital Kunak
	61.	Hospital Mesra Bukit Padang
	62.	Hospital Sipitang
	63.	Hospital Ranau
	64.	Hospital Kota Belud
	65.	Hospital Papar
	66.	Hospital Tambunan
	67.	Hospital Tenom
	68.	Hospital Lahad Datu
Sarawak	69.	Normah Medical Specialist Hospital
	70.	Hospital Miri
	71.	Hospital Serian
	72.	Hospital Sarikei
	73.	Hospital Kanowit
	74.	Hospital Sibu

Appendix 3

List of hospitals in the northern region of Malaysia

No.	State	Types of hospital	Name of hospital	No. of bed
1.	Kedah	State hospital	Hospital Alor Setar KM 6, Jalan Langgar 05460 Alor SetarKedah Darul Aman	812
2.		District hospital with expertise	Hospital Sultan Abdul Halim Jalan Lencungan Timur Bandar Aman Jaya 08000 Sungai Petani Kedah Darul Aman	498
3.			Hospital Kulim Jalan Mahang 09000 Kulim Kedah Darul Aman	274
4.			Hospital Langkawi Bukit Teguh 07000 Langkawi Kedah Darul Aman	110
5.		District hospital without expertise	Hospital Baling Jalan Hospital 09100 Baling Kedah Darul Aman	160
6.			Hospital Sik 08200 Sik Kedah Darul Aman	93
7.			Hospital Jitra Jalan Changlun 06000 Jitra Kedah Darul Aman	103
8.			Hospital Kuala Nerang 06300 Kuala Nerang Kedah Darul Aman	72
9.			Hospital Yan 06900 Yan Kedah Darul Aman	89

No.	State	Types of hospital	Name of hospital	No. of bed
10.	Perlis	State hospital	Hospital Tuanku Fauziah Jalan Kolam 01000 Kangar	404
11.	Pulau Pinang	State hospital	Hospital Pulau Pinang Jalan Residensi 10990 Pulau Pinang	1090
12.		District hospital with expertise	Hospital Seberang Jaya Bandar Baru Jalan Tun Hussein Onn 10450 Seberang Jaya Pulau Pinang	314
13.			Hospital Bukit Mertajam Jalan Kulim 14000 Bukit Mertajam Pulau Pinang	242
14.		District hospital without expertise	Hospital Balik Pulau 11000 Balik Pulau Pulau Pinang	71
15.			Hospital Kepala Batas Jalan Bertam 2, 13200 Kepala Batas Seberang Perai Utara Pulau Pinang	108
16.			Hospital Sungai Bakap 14200 Sungai Jawi Seberang Perai Selatan Pulau Pinang	105

Appendix 4

HEALTH AND SAFETY SURVEY FOR PILOT STUDY

Please be informed that I, Nor Azimah Chew Abdullah, am currently pursuing my doctoral study in the field of health and safety at Curtin University of Technology, Australia. For this purpose, I am now conducting a survey to solicit views of employees in medical services on safety culture at workplace, specifically those that being practiced at various public hospitals in Malaysia.

The questionnaire is anonymous and your participation is completely voluntary and you are free to withdraw at any time. Individual responses will only be seen by the researcher. It will eventually be no specific names of individual respondents to be mentioned in the final analysis of the survey.

Your individual participation is vital to the success of this survey and also critical to the completion of my doctoral study. Please return your completed questionnaire in a self -addressed envelope provided, possibly not later than 30 July 2007.

Should there be any clarifications needed, please contact Nor Azimah Chew Abdullah at Faculty of Human and Social Development, Universiti Utara Malaysia, 06010 Sintok, Kedah or at 04-9283863/017-5465620.

Please be acknowledged that your views and opinions on the matter would be highly appreciated. Thank you for participating.

BACKGROUND DETAILS

This section is about some of your background details. This will enable me to compare the views of different groups of staff, and it will help in the analysis of the survey results.

1. About you

1.1 Gender:

Male ☐ Female ☐

1.2 Age:

Less than 20 years ☐ 20 – 24 years ☐ 25 – 29 years ☐

30 – 34 years ☐ 35 – 39 years ☐ 40 years and above ☐

1.3 Ethnicity

Malay ☐ Chinese ☐ Indian ☐

Others : ____________ (Please specify)

1.4 Highest level of education

Std 6 ☐ SRP/PMR/LCE ☐ SPM/MCE ☐

STPM/STP/HSC ☐ Diploma ☐ Degree ☐

Others: ____________________ (Please specify)

1.5 Your salary scale:

Below RM500	☐	RM500 – RM1,500	☐
RM1,501 – RM2,500	☐	RM2,501 – RM3,500	☐
RM3,501 – RM4,500	☐	RM4,501 and above	☐

1.6 Do you manage other people as part of your job?

Yes ☐ No ☐

1.7. Indicate your present department/unit.

____

1.8. Indicate your present job position.

Administration/Clerk	☐	Physician	☐	Radiographer	☐
Ambulance/Paramedic	☐	Pharmacists	☐	Technicians	☐
Respiratory Therapist	☐	Nurse	☐	Dietician	☐

Others (please state): ________________________________

1.9. Length of your service at this hospital.

________ years _________ months
(Please fill)

1.10. Indicate the length of your service at present department/unit/ward.

________ years _________ months
(Please fill)

1.11 Indicate whether your job requires you to follow shift work arrangements.

Yes ☐ No ☐

1.12 Indicate number of hours you are required to work in a week.

____

1.13 On average, how many additional hours do you work per week above your contracted hours?

COMMUNICATION ABOUT HEALTH AND SAFETY

To what extent do you agree or disagree with the following statements about communication **in your current department / unit / ward?** Please circle one number on each line.

		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1.	Health and safety issues that may affect me are well communicated.	1	2	3	4	5
2.	I know the person who represents me in the Health and Safety Committee.	1	2	3	4	5
3.	Staff will freely speak up if they see something that may negatively affect health and safety at work.	1	2	3	4	5
4.	Staff have the freedom to question the decisions or actions of those with more authority.	1	2	3	4	5
5.	Staff are afraid to ask questions when something that does not seem right has happen.	1	2	3	4	5
6.	Problems often occur in the exchange of information across hospital departments / units.	1	2	3	4	5
7.	Important health and safety information is often lost during shift changes.	1	2	3	4	5

COMPETENCE & TRAINING IN HEALTH AND SAFETY

To what extent do you agree or disagree with the following statements about competence and training **in your current department / unit / ward?** Please circle one number on each line.

		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1.	I am clear about my responsibility for health and safety.	1	2	3	4	5
2.	I understand the health and safety procedures for my job.	1	2	3	4	5
3.	I understand the health and safety risks in my job.	1	2	3	4	5
4.	My training has covered the risks I face in my job.	1	2	3	4	5
5.	I am always certain what to do to ensure high standards of health and safety in my work.	1	2	3	4	5
6.	I am involved in health and safety initiatives at work such as health and safety committee.	1	2	3	4	5

REPORTING ON HEALTH AND SAFETY MATTERS

To what extent do you agree or disagree with the following statements about reporting **in your current department / unit / ward?** Please circle one number on each line.

		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1.	All health and safety incidents are reported here.	1	2	3	4	5
2.	I am encouraged to report health and safety incidents.	1	2	3	4	5
3.	I think that reporting incidents makes a difference to safety here.	1	2	3	4	5
4.	People are willing to report incidents here.	1	2	3	4	5
5.	All errors/near misses are reported here.	1	2	3	4	5
6.	I am encouraged to report errors/near misses.	1	2	3	4	5
7.	I think it is a waste of time reporting errors/near misses because nothing gets done about it.	1	2	3	4	5
8.	People are willing to report errors/near misses here.	1	2	3	4	5

WORK DUTIES AND HEALTH AND SAFETY

To what extent do you agree or disagree with the following statements about work duties **in your current department / unit / ward?** Please circle one number on each line.

		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1.	Health and safety issues are never sacrificed to get more works done.	1	2	3	4	5
2.	We have enough staff to handle the workload.	1	2	3	4	5
3.	Staff work longer hours than what is considered to be best for their health and safety.	1	2	3	4	5
4.	We use more staff for health and safety issues in the hospital.	1	2	3	4	5
5.	We work in "crisis mode" when trying to do too much, too quickly.	1	2	3	4	5
6.	If I didn't take a risk now and again, I wouldn't get my work done.	1	2	3	4	5
7.	I am able to take scheduled rest breaks and still get my work done.	1	2	3	4	5
8.	I am satisfied with my current work schedule.	1	2	3	4	5
9.	There is pressure from other hospital departments / units to get more work done.	1	2	3	4	5

SAFETY SATISFACTION

How satisfied are you with the following aspects of the safety system? Please circle one number on each line.

		Highly Dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Highly Satisfied
1.	Disposable personal protective equipment (e.g. gloves, masks).	1	2	3	4	5
2.	Uniforms and aprons.	1	2	3	4	5
3.	Lead coats (for x-ray).	1	2	3	4	5
4.	Personal alarms.	1	2	3	4	5
5.	Police presence.	1	2	3	4	5
6.	Security guard presence.	1	2	3	4	5
7.	Controlled entry to department/unit/ ward.	1	2	3	4	5
8.	Hospital safety induction.	1	2	3	4	5
9.	Department/unit/ward safety induction.	1	2	3	4	5
10.	Safety audits/inspections.	1	2	3	4	5
11.	Hospital Health and Safety Committee.	1	2	3	4	5
12.	Department/unit/ward Health and Safety Committee.	1	2	3	4	5
13.	Workplace design.	1	2	3	4	5

		Highly Dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Highly Satisfied
14.	Housekeeping/cleaning.	1	2	3	4	5
15.	Competency of co-workers.	1	2	3	4	5
16.	Occurrence/incidence reporting system.	1	2	3	4	5
17.	Investigation and follow-up measures after injuries and accidents have taken place.	1	2	3	4	5

SENIOR HOSPITAL MANAGERS

To what extent do you agree or disagree with the following statements about **Senior Managers of this Hospital (i.e. the Chief Executive and his team)?** Please circle one number on each line.

		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1.	I know who the Senior Managers are.	1	2	3	4	5
2.	Senior Managers seem interested in health and safety only after an adverse event happens.	1	2	3	4	5
3.	The actions of Senior Managers show that health and safety is a top priority.	1	2	3	4	5
4.	Senior Managers seem interested in worker safety only after an adverse event happens.	1	2	3	4	5
5.	The actions of Senior Managers show that worker safety is a top priority.	1	2	3	4	5
6.	Senior Managers have set out a clear vision for health and safety in this hospital.	1	2	3	4	5
7.	I receive no communication about health and safety in any form from Senior Managers.	1	2	3	4	5
8.	Senior Managers put their budget before safety.	1	2	3	4	5
9.	I trust Senior Managers.	1	2	3	4	5
10.	Senior Managers genuinely care about the health and safety of people at this hospital.	1	2	3	4	5

		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
11.	I know who is in charge of the Hospital's Health and Safety Committee.	1	2	3	4	5
12.	The hospital's procedures are only there to cover the backs of Senior Managers.	1	2	3	4	5
13.	I trust Senior Managers to act on safety concerns.	1	2	3	4	5

ERRORS AND INCIDENTS
(KESILAPAN DAN INSIDEN)

To what extent do you agree or disagree with the following statements about errors and incidents **in your current department / unit / ward?** Please circle one number on each line.
(Setakat mana anda bersetuju atau tidak bersetuju dengan pernyataan berikut mengenai kesilapan dan insiden di jabatan/unit/wad anda sekarang? Sila bulatkan satu nombor pada setiap barisan)

		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1.	We are informed about errors/mistakes that happen in this department/unit/ward.	1	2	3	4	5
2.	In this department/unit/ward, we discuss ways to prevent errors/mistakes from happening again.	1	2	3	4	5
3.	We are given feedback about changes put into place based on event/incident reports.	1	2	3	4	5
4.	Staff feel mistakes are held against them.	1	2	3	4	5
5.	When an event is reported, it feels like the person is being written up, not the problem.	1	2	3	4	5
6.	Mistakes have led to positive changes here.	1	2	3	4	5
7.	Staff worry that mistakes they make are kept in their personnel file.	1	2	3	4	5

For the following questions, please **circle the response** which best describes the answer for each question.

8.	In the last month, how many incidents did you see that inadvertently harmed STAFF?	None	1 - 2	3 - 5	6 - 10	More than 10
9.	In the last month, how many errors or near misses did you see that could have harmed STAFF?	None	1 - 2	3 - 5	6 - 10	More than 10

10. During the last year how many times have you been injured or felt unwell as a result of the following problems at work?
(Sepanjang tahun lepas, berapa kali anda mendapat kecederaan atau merasa kurang sihat akibat masalah berikut di tempat kerja seperti berikut:

a.	Moving and handling.	None	1 - 2	3 - 5	6 - 10	More than 10
b.	Needlestick and sharp injuries.	None	1 - 2	3 - 5	6 - 10	More than 10
c.	Slips, trips or falls.	None	1 - 2	3 - 5	6 - 10	More than 10
d.	Exposure to dangerous substances (including radiation.)	None	1 - 2	3 - 5	6 - 10	More than 10
e.	Work related stress.	None	1 - 2	3 - 5	6 - 10	More than 10

SUPERVISOR AND HEALTH AND SAFETY ISSUES

To what extent do you agree or disagree with the following statements about your Supervisor? Please circle one number on each line.
Please answer with respect to the person to whom you directly report.

		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1.	My supervisor says a good word when he/she sees a job done according to established safety procedures.	1	2	3	4	5
2.	My supervisor is well qualified.	1	2	3	4	5
3.	I trust my supervisor.	1	2	3	4	5
4.	I never have to wonder whether my supervisor will stick to his/her word.	1	2	3	4	5
5.	My supervisor seems interested in health and safety only after an adverse event happens.	1	2	3	4	5
6.	My supervisor is very concerned about my welfare.	1	2	3	4	5
7.	My supervisor seriously considers staff suggestions for improving health and safety for workers.	1	2	3	4	5
8.	I feel very confident about my supervisor's skills.	1	2	3	4	5
9.	The actions of my supervisor show that worker safety is a top priority.	1	2	3	4	5
10.	My needs and desires are very important to my supervisor.	1	2	3	4	5

		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
11.	Sound principles seem to guide my supervisor's behaviour.	1	2	3	4	5
12.	My supervisor is very capable of performing his/her job.	1	2	3	4	5
13.	I trust my supervisor to act on workers' health and safety concerns.	1	2	3	4	5
14.	Whenever pressure builds up, my supervisor wants us to work faster, even if it means taking shortcuts.	1	2	3	4	5
15.	My supervisor would not knowingly do anything to hurt me.	1	2	3	4	5
16.	The actions of my supervisor show that health and safety is a top priority.	1	2	3	4	5
17.	My supervisor tries hard to be fair in dealings with others.	1	2	3	4	5
18.	My supervisor is known to be successful at the things he/she tries to do.	1	2	3	4	5
19.	I trust my supervisor to act on health and safety concerns.	1	2	3	4	5
20.	My supervisor will go out of his/her way to help me.	1	2	3	4	5
21.	My supervisor's actions and behaviours are not very consistent.	1	2	3	4	5

		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
22.	My supervisor knows about the work that needs to be done.	1	2	3	4	5
23.	My supervisor overlooks health and safety problems that happen over and over.	1	2	3	4	5
24.	My supervisor has specialized capabilities that can increase our performance.	1	2	3	4	5
25.	My supervisor has a strong sense of justice.	1	2	3	4	5
26.	My supervisor really looks out for what is important to me.	1	2	3	4	5
27.	My supervisor seems interested in workers' safety only after an adverse event happens.	1	2	3	4	5
28.	I like my supervisor's values.	1	2	3	4	5

SAFETY RULES

To what extent do you agree or disagree with the following statements about safety rules **in your current department / unit / ward?** Please circle one number on each line.

		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1.	The written safety rules and instructions are easy for people to understand and implement.	1	2	3	4	5
2.	The rules are too strict and I can work better without them.	1	2	3	4	5
3.	The rules always describe the safest way of working.	1	2	3	4	5

SUPERVISOR'S LEADERSHIP STYLE

Judge how frequently each statement fits your Supervisor. Please circle one number on each line.
Please answer with respect to the person to whom you directly report.

	My Supervisor ……	Not at all	Once in a while	Sometimes	Fairly often	Frequently if not always
1.	Provides me with assistance in exchange for my efforts.	0	1	2	3	4
2.	Instills pride in me for being associated with him/her.	0	1	2	3	4
3.	Discusses in specific terms who is responsible for achieving performance targets.	0	1	2	3	4
4.	Talks enthusiastically about what needs to be accomplished.	0	1	2	3	4
5.	Specifies the importance of having a strong sense of purpose.	0	1	2	3	4
6.	Spends time teaching and coaching.	0	1	2	3	4
7.	Makes it very clear what one can expect to receive when performance goals are achieved.	0	1	2	3	4
8.	Acts in ways that build my respect.	0	1	2	3	4
9.	Articulates a compelling vision of the future.	0	1	2	3	4
10.	Gets me to look at problems from many different angles.	0	1	2	3	4

	My Supervisor ……	Not at all	Once in a while	Sometimes	Fairly often	Frequently if not always
11.	Helps me to develop my strengths.	0	1	2	3	4
12.	Suggests new ways of looking at how to complete assignments.	0	1	2	3	4
13.	Emphasizes the importance of having a collective sense of mission.	0	1	2	3	4
14.	Expresses satisfaction when I meet expectations.	0	1	2	3	4

1. Please use the space below to make any comments on occupational health and safety practices at your workplace.

Please place your completed questionnaire in the envelope provided and return to: XXX

YOUR PARTICIPATION IN THIS SURVEY IS VERY MUCH APPRECIATED. THANK YOU.

Appendix 5

HEALTH AND SAFETY SURVEY (REVISED FOR FINAL SURVEY)

Please be informed that I, Nor Azimah Chew Abdullah, am currently pursuing my doctoral study in the field of health and safety at Curtin University of Technology, Australia. For this purpose, I am conducting a survey to solicit views of employees in medical services on safety culture at workplace, specifically those that being practiced at various public hospitals in Malaysia.

The questionnaire is anonymous and your participation is completely voluntary and you are free to withdraw at any time. You can be assured that your answers will remain strictly confidential and no names will be published.

Your individual participation is vital to the success of this survey and also critical to the completion of my doctoral study. Please return your completed questionnaire in a self -addressed envelope provided, possibly not later than 15 September 2007.

Should there be any clarifications needed, please contact Nor Azimah Chew Abdullah at Faculty of Human and Social Development, Universiti Utara Malaysia, 06010 Sintok, Kedah or at 04-9283863/017-5465620.

Please be acknowledged that your views and opinions on the matter would be highly appreciated. Thank you for participating.

KAJIAN MENGENAI KESIHATAN DAN KESELAMATAN

Sila maklum bahawa saya, Nor Azimah Chew Abdullah, sedang melanjutkan pengajian di peringkat ijazah doktor falsafah dalam bidang kesihatan dan keselamatan pekerjaan di Curtin University of Technology, Australia. Bagi tujuan itu, kini saya menjalankan satu kajian bertujuan mendapat pandangan staf dalam perkhidmatan perubatan tentang budaya keselamatan pekerjaan, khususnya yang diamalkan oleh hospital kerajaan di Malaysia.

Soal-selidik ini tidak memerlukan identiti responden secara spesifik dan anda berhak untuk menarik diri pada bila-bila masa. Nama dan identiti responden tidak akan dinyatakan dalam analisis kajian ini.

Penyertaaan anda amat penting terhadap kejayaaan kajian ini dan ianya kritikal bagi melengkapkan pengajian ijazah doktor falsafah saya. Pohon kembalikan soal-selidik yang telah lengkap dengan menggunakan sampul beralamat sendiri yang disertakan secepat yang mungkin, pada/sebelum 15 September 2007.

Sekiranya anda memerlukan sebarang penjelasan, sila hubungi Nor Azimah Chew Abdullah di Fakulti Pembangunan Sosial dan Manusia, Universiti Utara Malaysia, 06010 Sintok, Kedah atau di talian 017-5465620 atau e-mail: norazimah@uum.edu.my.

Pandangan dan buah fikiran anda dalam kajian ini amatlah dihargai. Penyertaan anda diucapkan jutaan terima kasih.

BACKGROUND DETAILS (MAKLUMAT LATAR BELAKANG)

This section is about some of your background details. This will enable me to compare the views of different groups of staff, and it will help in the analysis of the survey results.

(Bahagian ini adalah mengenai maklumat latar belakang anda. Ini membolehkan saya membuat perbandingan mengenai pandangan pelbagai kumpulan staf dan membantu analisis dapatan kajian)

1. About you (Berkenaan diri anda)

1.1 Gender (Jantina):

Male (Lelaki) ☐ Female (Perempuan) ☐

1.2 Age (Umur):

Less than 20 years (Kurang drpd 20 tahun) ☐	20 – 24 years (20 – 24 tahun) ☐	25 – 29 years (25 – 29 tahun) ☐
30 – 34 years (30 – 34 tahun) ☐	35 – 39 years (35 – 39 tahun) ☐	40 years and above (40 tahun dan ke atas) ☐

1.3 Ethnicity (Bangsa)

Malay (Melayu) ☐ Chinese (Cina) ☐ Indian (India) ☐

Others (Lain-lain): ____________ (Please specify) (Sila nyatakan)

1.4 Highest level of education (Tahap pendidikan tertinggi)

Std 6 (Darjah 6) ☐ SRP/PMR/LCE ☐ SPM/MCE ☐

STPM/STP/HSC ☐ Diploma ☐ Degree (Ijazah) ☐

Others (Lain-lain): ____________________ (Please specify) (Sila nyatakan)

1.5 Your salary scale per month (Tangga gaji jawatan anda setiap bulan) :

Below (Kurang) RM500	☐	RM500 – RM1,500	☐
RM1,501 – RM2,500	☐	RM2,501 – RM3,500	☐
RM3,501 – RM4,500	☐	RM4,501 and Above (dan Lebih)	☐

1.6 Do you manage other people as part of your job?
(Apakah mengurus orang lain sebahagian daripada tugas jawatan anda ?)

Yes (Ya) ☐ No (Tidak) ☐

1.7. Indicate your present department/unit.
(Nyatakan jabatan/unit anda berkhidmat sekarang.)

____

1.8. Indicate your present job position (Nyatakan pekerjaan anda sekarang)

Administrator (Pentadbir)	☐	Physician (Doktor)	☐	Radiographer (Jururadiografi)	☐
Ambulance/Paramedic (Ambulans/Paramedik)	☐	Pharmacists (Ahli Farmasi)	☐	Technicians (Juruteknik)	☐
Supporting staff (e.g. clerk) (Staf sokongan)	☐	Nurse (Jururawat)	☐	Dietician (Pakar Diet)	☐
Respiratory Therapist (Ahli Terapi Respiratori)	☐	Physician (specialist) (Doktor Pakar)	☐		

Others (please state): ____________________
(Lain-lain – sila nyatakan)

1.9. Length of your service at this hospital. (Tempoh perkhidmatan anda di hospital ini.)

________ years (tahun) _________ months (bulan)
(Please fill) (Sila isikan)

1.10. Indicate the length of your service at present department/unit/ward.
(Nyatakan tempoh perkhidmatan anda di jabatan/unit/wad sekarang.)

________ years (tahun) _________ months (bulan)
(Please fill) (Sila isikan)

1.11 Indicate whether your job requires you to follow shift work arrangements. (Nyatakan sama ada jawatan anda memerlukan anda bekerja mengikut syif.)

Yes (Ya) ☐ No (Tidak) ☐

1.12 Indicate number of hours you are required to work in a week.
(Nyatakan jumlah jam yang ditetapkan anda perlu bekerja dalam seminggu.)

____

1.13 On average, how many additional hours do you work per week above your contracted hours?
(Secara purata, berapa jam anda perlu bekerja sebagai tambahan kepada waktu bekerja biasa dalam seminggu?)

____

1. COMMUNICATION ABOUT HEALTH AND SAFETY
(KOMUNIKASI MENGENAI KESIHATAN DAN KESELAMATAN)

To what extent do you agree or disagree with the following statements about communication **in your current department / unit / ward?** Please circle one number on each line.

(Setakat mana anda bersetuju atau tidak bersetuju dengan pernyataan berikut mengenai komunikasi di jabatan/unit/wad anda sekarang? Sila bulatkan satu nombor pada setiap barisan)

		Strongly Disagree (Sangat tidak setuju)	Disagree (Tidak setuju)	Neither agree nor disagree (Neutral)	Agree (Setuju)	Strongly Agree (Sangat setuju)
1.	Health and safety issues that may affect me are well communicated. (Isu-isu kesihatan dan keselamatan yang mungkin memberi kesan terhadap saya dikomunikasikan dengan baik)	1	2	3	4	5
2.	Staff will freely speak up if they see something that may negatively affect health and safety at work. (Staf bebas bersuara jika mereka melihat sesuatu yang negatif yang mungkin mengancam kesihatan dan keselamatan di tempat kerja)	1	2	3	4	5
3.	Staff have the freedom to question the decisions or actions about health and safety of those with more authority. (Staf bebas menyoal keputusan atau tindakan mengenai kesihatan dan keselamatan yang dibuat oleh pihak berautoriti)	1	2	3	4	5
4.	Staff are afraid to ask questions about health and safety when something that does not seem right has happened. (Staf berasa takut untuk bertanya soalan mengenai kesihatan dan keselamatan apabila terdapat sesuatu yang tidak betul telah berlaku)	1	2	3	4	5

		Strongly Disagree (Sangat tidak setuju)	Disagree (Tidak setuju)	Neither agree nor disagree (Neutral)	Agree (Setuju)	Strongly Agree (Sangat setuju)
5.	Problems often occur in the exchange of information about health and safety across hospital departments / units. (Masalah selalu timbul semasa pertukaran maklumat kesihatan dan keselamatan merentasi jabatan/unit di hospital)	1	2	3	4	5
6.	Important health and safety information is often lost during shift changes. (Maklumat penting mengenai kesihatan dan keselamatan kerap tidak sampai kepada pekerja semasa pertukaran syif)	1	2	3	4	5
7.	I receive no communication about health and safety in any form from top management. (Saya tidak menerima sebarang maklumat mengenai kesihatan dan keselamatan daripada pengurusan atasan)	1	2	3	4	5

2. WORKER PARTICIPATION/CONSULTATION
(PENYERTAAN PEKERJA/PERUNDINGAN)

To what extent do you agree or disagree with the following statements about joint consultation in health and safety **in your current department / unit / ward?** Please circle one number on each line.

(Setakat mana anda bersetuju atau tidak bersetuju dengan pernyataan berikut mengenai perundingan kesihatan dan keselamatan di jabatan/unit/wad anda sekarang? Sila bulatkan satu nombor pada setiap barisan)

		Strongly Disagree (Sangat tidak setuju)	Disagree (Tidak setuju)	Neither agree nor disagree (Neutral)	Agree (Setuju)	Strongly Agree (Sangat setuju)
1.	I know the person who represents me in the Health and Safety Committee. (Saya kenal orang yang mewakili saya dalam Jawatankuasa Kesihatan dan Keselamatan)	1	2	3	4	5
2.	I am involved in health and safety initiatives at work such as health and safety committee. (Saya terlibat dalam inisiatif kesihatan dan keselamatan di tempat kerja seperti jawatankuasa kesihatan dan keselamatan pekerjaan)	1	2	3	4	5
3.	I am clear about my responsibilities for health and safety. (Saya memahami tanggungjawab saya terhadap kesihatan dan keselamatan pekerjaan)	1	2	3	4	5

3. COMPETENCE & TRAINING IN HEALTH AND SAFETY (KECEKAPAN & LATIHAN DALAM KESIHATAN & KESELAMATAN)

To what extent do you agree or disagree with the following statements about competence and training **in your current department / unit / ward?** Please circle one number on each line.

(Setakat mana anda bersetuju atau tidak bersetuju dengan pernyataan berikut mengenai kecekapan dan latihan di jabatan/unit/wad anda sekarang? Sila bulatkan satu nombor pada setiap barisan)

		Strongly Disagree (Sangat tidak setuju)	Disagree (Tidak setuju)	Neither agree nor disagree (Neutral)	Agree (Setuju)	Strongly Agree (Sangat setuju)
1.	I understand the health and safety requirements for my job. (Saya memahami prosedur kesihatan dan keselamatan dalam pekerjaan saya)	1	2	3	4	5
2.	I understand the health and safety risks in my job. (Saya memahami risiko kesihatan dan keselamatan dalam pekerjaan saya)	1	2	3	4	5
3.	My training has covered the health and safety risks I face in my job. (Latihan saya meliputi risiko kesihatan dan keselamatan yang saya hadapi dalam pekerjaan saya)	1	2	3	4	5
4.	I am always certain what to do to ensure high standards of health and safety in my work. (Saya pasti apa yang harus dilakukan untuk menentukan piawaian kesihatan dan keselamatan yang tinggi bagi pekerjaan saya)	1	2	3	4	5

4. REPORTING ON HEALTH AND SAFETY MATTERS
(PELAPORAN MENGENAI HAL KESIHATAN DAN KESELAMATAN)

To what extent do you agree or disagree with the following statements about reporting **in your current department / unit / ward?** Please circle one number on each line.

(Setakat mana anda bersetuju atau tidak bersetuju dengan pernyataan berikut mengenai pelaporan di jabatan/unit/wad anda sekarang? Sila bulatkan satu nombor pada setiap barisan)

		Strongly Disagree (Sangat tidak setuju)	Disagree (Tidak setuju)	Neither agree nor disagree (Neutral)	Agree (Setuju)	Strongly Agree (Sangat setuju)
1.	All health and safety incidents are reported here. (Semua insiden kesihatan dan keselamatan yang berlaku di sini dilaporkan)	1	2	3	4	5
2.	I am encouraged to report health and safety incidents. (Saya digalakkan untuk melaporkan insiden kesihatan dan keselamatan)	1	2	3	4	5
3.	I think that reporting health and safety incidents makes a difference to safety here. (Saya fikir dengan membuat laporan tentang insiden yang berlaku akan menambahbaik amalan keselamatan pekerjaan di sini)	1	2	3	4	5
4.	People are willing to report health and safety incidents here. (Pekerja di sini bersedia membuat laporan terhadap semua insiden yang berlaku)	1	2	3	4	5
5.	I think it is a waste of time reporting health and safety errors/near misses because nothing gets done about it. (Saya rasa melaporkan kesilapan/kemalangan nyaris adalah suatu yang membuang masa kerana tiada tindakan terhadap laporan tersebut)	1	2	3	4	5

5. WORK DUTIES WITH HEALTH AND SAFETY (TUGASAN DAN KESIHATAN & KESELAMATAN)

To what extent do you agree or disagree with the following statements about work duties **in your current department / unit / ward?** Please circle one number on each line.

(Setakat mana anda bersetuju atau tidak bersetuju dengan pernyataan berikut mengenai tugasan di jabatan/unit/wad anda sekarang? Sila bulatkan satu nombor pada setiap barisan)

		Strongly Disagree (Sangat tidak setuju)	Disagree (Tidak setuju)	Neither agree nor disagree (Neutral)	Agree (Setuju)	Strongly Agree (Sangat setuju)
1.	Health and safety issues are never sacrificed to get more work done. (Isu kesihatan dan keselamatan tidak pernah diabaikan semata-mata untuk meningkatkan pelaksanaan tugas)	1	2	3	4	5
2.	We have enough staff to handle the workload. (Kami mempunyai pekerja yang mencukupi untuk mengendalikan bebanan kerja)	1	2	3	4	5
3.	Staff work longer hours than what is considered to be best for their health and safety. (Pekerja yang bekerja melampaui jumlah jam yang sepatutnya boleh menjejaskan aspek kesihatan dan keselamatan mereka)	1	2	3	4	5
4.	We work in "crisis mode" when trying to do too much, too quickly. (Kami bekerja dalam "keadaan kegawatan", bila mana cuba melaksanakan terlalu banyak tugasan dalam masa yang singkat)	1	2	3	4	5

		Strongly Disagree (Sangat tidak setuju)	Disagree (Tidak setuju)	Neither agree nor disagree (Neutral)	Agree (Setuju)	Strongly Agree (Sangat setuju)
5.	If I didn't take a risk now and again, I wouldn't get my work done. (Sekiranya saya tidak berani mengambil risiko yang ada di hadapan saya sekarang dan pada masa akan datang, pasti tugasan saya tidak dapat diselesaikan)	1	2	3	4	5
6.	I am able to take scheduled rest breaks and still get my work done. (Saya boleh berehat dalam waktu yang ditetapkan dan masih mampu menyelesaikan tugas saya.)	1	2	3	4	5
7.	I am satisfied with my current work schedule. (Saya berpuashati dengan penjadualan kerja saya sekarang)	1	2	3	4	5
8.	There is pressure from other hospital departments / units to get more work done. (Terdapat tekanan daripada jabatan/unit lain untuk menyelesaikan kerja yang lebih banyak)	1	2	3	4	5

6. SAFETY SATISFACTION
(KEPUASAN DALAM ASPEK SISTEM KESELAMATAN)

How satisfied are you with the following aspects of the safety system? Please circle one number on each line. Do not give a response on item that is not applicable.

(Kepuasan anda terhadap aspek sistem keselamatan yang berikut? Sila bulatkan satu nombor pada setiap barisan. Anda tidak perlu memberi respons kepada item yang tidak berkaitan.)

		Highly Dissatisfied (Sangat tidak berpuashati)	Dissatisfied (Tidak berpuashati)	Neither satisfied nor dissatisfied (Tidak pasti)	Satisfied (Berpuashati)	Highly Satisfied (Sangat berpuashati)
1.	Disposable personal protective equipment (e.g. gloves, masks). [Peralatan perlindungan diri pakai buang (contoh, sarung tangan, topeng)]	1	2	3	4	5
2.	Uniforms and aprons. (Pakaian seragam dan apron)	1	2	3	4	5
3.	Lead coats (for x-ray). [Jaket bersalut plumbum (untuk sinar-x)]	1	2	3	4	5
4.	Personal alarms. (Penggera peribadi.)	1	2	3	4	5
5.	Police presence. (Kehadiran polis)	1	2	3	4	5
6.	Security guard presence. (Kehadiran pengawal keselamatan)	1	2	3	4	5
7.	Controlled entry to department/unit/ward. (Kawalan kemasukan ke jabatan/unit/wad)	1	2	3	4	5
8.	Hospital safety induction. (Induksi keselamatan di hospital)	1	2	3	4	5

		Highly Dissatisfied (Sangat tidak berpuashati)	Dissatisfied (Tidak berpuashati)	Neither satisfied nor dissatisfied (Tidak pasti)	Satisfied (Berpuashati)	Highly Satisfied (Sangat berpuashati)
9.	Department/unit/ward safety induction. (Induksi keselamatan di jabatan/unit/wad)	1	2	3	4	5
10.	Safety audits/inspections. (Pemeriksaan/audit keselamatan)	1	2	3	4	5
11.	Hospital Health and Safety Committee. (Jawatankuasa Kesihatan dan Keselamatan Hospital)	1	2	3	4	5
12.	Department/unit/ward Health and Safety Committee. (Jawatankuasa Kesihatan dan Keselamatan Jabatan/Unit/Wad)	1	2	3	4	5
13.	Workplace design. (Rekabentuk tempat kerja)	1	2	3	4	5
14.	Housekeeping/cleaning. (Kemasan/kebersihan)	1	2	3	4	5
15.	Competency of co-workers. (Kecekapan rakan sekerja)	1	2	3	4	5
16.	Occurrence/incidence reporting system. (Sistem pelaporan insiden/kejadian)	1	2	3	4	5
17.	Investigation and follow-up measures after injuries and accidents have taken place. (Penyiasatan dan tindakan susulan selepas berlakunya kecederaan dan kemalangan)	1	2	3	4	5

7. SENIOR HOSPITAL MANAGERS
(PENGURUS ATASAN HOSPITAL)

To what extent do you agree or disagree with the following statements about **Senior Managers of this Hospital (i.e. the Hospital Director and his team)?** Please circle one number on each line.

(Setakat mana anda bersetuju atau tidak bersetuju dengan pernyataan berikut mengenai Pengurus atasan di hospital ini (contoh, Pengarah Hospital dan pegawai-pegawainya? Sila bulatkan satu nombor pada setiap barisan)

		Strongly Disagree (Sangat tidak setuju)	Disagree (Tidak setuju)	Neither agree nor disagree (Neutral)	Agree (Setuju)	Strongly Agree (Sangat setuju)
1.	I know who the Senior Managers are. (Saya kenal Pengurus atasan di sini)	1	2	3	4	5
2.	Senior Managers seem interested in health and safety only after an adverse event happens. (Pengurus atasan nampak berminat dalam kesihatan dan keselamatan hanya selepas sesuatu kejadian buruk berlaku)	1	2	3	4	5
3.	The actions of Senior Managers show that health and safety is a top priority. (Tindakan Pengurus atasan menunjukkan kesihatan dan keselamatan merupakan suatu prioriti utama)	1	2	3	4	5
4.	Senior Managers put their budget before safety. (Pengurus atasan tidak mengambilkira isu keselamatan dalam belanjawan mereka)	1	2	3	4	5

		Strongly Disagree (Sangat tidak setuju)	Disagree (Tidak setuju)	Neither agree nor disagree (Neutral)	Agree (Setuju)	Strongly Agree (Sangat setuju)
5.	Senior Managers genuinely care about the health and safety of people at this hospital. (Pengurus atasan benar-benar mengambil berat mengenai kesihatan dan keselamatan orang ramai di hospital ini)	1	2	3	4	5
6.	The hospital's procedures are only there to cover the backs of Senior Managers. (Prosedur hospital hanya untuk melindungi Pengurus atasan sahaja)	1	2	3	4	5
7.	I trust Senior Managers to act on safety concerns. (Saya percaya Pengurus atasan mementingkan isu keselamatan)	1	2	3	4	5

8. HEALTH & SAFETY GOALS & OBJECTIVES (MATLAMAT & OBJEKTIF KESIHATAN & KESELAMATAN)

To what extent do you agree or disagree with the following statements about health and safety goals/objectives in your hospital? Please circle one number on each line.

(Setakat mana anda bersetuju atau tidak bersetuju dengan pernyataan berikut mengenai matlamat/objektif kesihatan & keselamatan di hospital ini. Sila bulatkan satu nombor pada setiap barisan)

		Strongly Disagree (Sangat tidak setuju)	Disagree (Tidak setuju)	Neither agree nor disagree (Neutral)	Agree (Setuju)	Strongly Agree (Sangat setuju)
1.	Top management have set out a clear vision for health and safety in this hospital. (Pengurusan atasan menetapkan visi yang jelas mengenai kesihatan dan keselamatan di hospital ini)	1	2	3	4	5
2.	Top management discusses in specific terms who is responsible for achieving performance targets in health and safety. (Pengurusan atasan membincangkan secara khusus tanggungjawab untuk mencapai sasaran prestasi kesihatan dan keselamatan)	1	2	3	4	5
3.	Top management emphasizes the importance of having a collective sense of mission for health and safety. (Pengurusan atasan menekankan tentang mustahaknya mempunyai kesepaduan misi untuk kesihatan dan keselamatan)	1	2	3	4	5
4.	Top management articulates a compelling vision of the future for health and safety. (Pengurusan atasan menzahirkan wawasan masa hadapan untuk kesihatan dan keselamatan yang menyakinkan)	1	2	3	4	5
5.	Top management makes it very clear what one can expect to receive when performance goals for health and safety are achieved. (Pengurusan atasan menjelaskan ganjaran yang boleh diharapkan apabila matlamat prestasi untuk kesihatan dan keselamatan dicapai)	1	2	3	4	5

9. ERRORS AND INCIDENTS
(KESILAPAN DAN INSIDEN)

To what extent do you agree or disagree with the following statements about errors and incidents **in your current department / unit / ward?** Please circle one number on each line.

(Setakat mana anda bersetuju atau tidak bersetuju dengan pernyataan berikut mengenai kesilapan dan insiden di jabatan/unit/wad anda sekarang? Sila bulatkan satu nombor pada setiap barisan)

		Strongly Disagree (Sangat tidak setuju)	Disagree (Tidak setuju)	Neither agree nor disagree (Neutral)	Agree (Setuju)	Strongly Agree (Sangat setuju)
1.	We are informed about errors/mistakes that happen in this department/unit/ ward. (Kami dimaklumkan mengenai kesilapan yang berlaku di jabatan/unit/wad)	1	2	3	4	5
2.	In this department/unit/ward, we discuss ways to prevent errors/mistakes from happening again. (Di jabatan/unit/wad ini, kami berbincang cara untuk mencegah kesilapan daripada berlaku lagi)	1	2	3	4	5
3.	We are given feedback about changes put into place based on event/incident reports. (Kami mendapat maklumbalas mengenai perubahan yang bakal dilakukan berdasarkan laporan insiden)	1	2	3	4	5
4.	Staff feel mistakes are held against them. (Staf merasakan mereka sering dipersalahkan apabila berlaku kesilapan)	1	2	3	4	5

		Strongly Disagree (Sangat tidak setuju)	Disagree (Tidak setuju)	Neither agree nor disagree (Neutral)	Agree (Setuju)	Strongly Agree (Sangat setuju)
5.	When an event is reported, it feels like the person is being written up, not the problem. (Apabila suatu kejadian dilaporkan, dirasakan seolah-olah orang yang melaporkan itu yang diperhalusi, bukan masalah yang dilaporkan itu)	1	2	3	4	5
6.	Mistakes have led to positive changes here. (Kesilapan telah mendorong kepada perubahan positif di sini)	1	2	3	4	5
7.	Staff worry that mistakes they make are kept in their personnel file. (Staf bimbang kesilapan yang mereka lakukan akan dicatatkan dalam fail peribadi mereka)	1	2	3	4	5

For the following questions, please **circle the response** which best describes the answer for each question.
(Untuk soalan berikut, sila bulatkan respons yang benar-benar menjawab soalan yang diberikan.)

8.	In the last month, how many incidents did you see that inadvertently harmed staff? (Dalam bulan lepas, berapa kali anda perhatikan insiden berlaku yang secara tidak disedari telah mengancam keselamatan staf?)	None (Tiada)	1 - 2	3 - 5	6 - 10	More than 10 (Lebih daripada 10)
9.	In the last month, how many errors or near misses did you see that could have harmed staff? (Dalam bulan lepas, berapa kali anda perhatikan berlaku kesilapan atau kemalangan nyaris yang boleh mencederakan staf?)	None (Tiada)	1 - 2	3 - 5	6 - 10	More than 10 (Lebih daripada 10)

10. During the last year how many times have you been injured or felt unwell as a result of the following problems at work?
(Sepanjang tahun lepas, berapa kali anda mendapat kecederaan atau merasa kurang sihat akibat masalah berikut di tempat kerja seperti berikut:)

a.	Moving and handling. (Pergerakan dan pengendalian)	None (Tiada)	1 - 2	3 - 5	6 - 10	More than 10 (Lebih daripada 10)
b.	Needlestick and sharp injuries. (Tertusuk jarum dan benda tajam)	None (Tiada)	1 - 2	3 - 5	6 - 10	More than 10 (Lebih daripada 10)
c.	Slips, trips or falls. (Tergelincir, tersandung atau terjatuh)	None (Tiada)	1 - 2	3 - 5	6 - 10	More than 10 (Lebih daripada 10)
d.	Exposure to dangerous substances (including radiation.) (Pendedahan kepada bahan berbahaya – termasuk radiasi)	None (Tiada)	1 - 2	3 - 5	6 - 10	More than 10 (Lebih daripada 10)
e.	Work related stress. (Tekanan kerja)	None (Tiada)	1 - 2	3 - 5	6 - 10	More than 10 (Lebih daripada 10)

10. SUPERVISOR AND HEALTH AND SAFETY ISSUES (PENYELIA DAN ISU-ISU KESIHATAN & KESELAMATAN)

To what extent do you agree or disagree with the following statements about your Supervisor? Please circle one number on each line.
Please answer with respect to the person to whom you directly report.

(Setakat mana anda bersetuju atau tidak bersetuju dengan pernyataan berikut mengenai Penyelia anda? Sila bulatkan satu nombor pada setiap barisan.
Sila jawab berdasarkan penyelia yang anda lapor diri secara terus)

		Strongly Disagree (Sangat tidak setuju)	Disagree (Tidak setuju)	Neither agree nor disagree (Neutral)	Agree (Setuju)	Strongly Agree (Sangat setuju)
1.	My supervisor says a good word when he/she sees a job done according to established safety procedures. (Penyelia saya memberi pujian apabila beliau melihat sesuatu kerja dilakukan berdasarkan prosedur keselamatan)	1	2	3	4	5
2.	My supervisor is well qualified in health and safety. (Penyelia saya adalah seorang yang berkelayakan dalam kesihatan dan keselamatan)	1	2	3	4	5
3.	My supervisor seems interested in health and safety only after an adverse event happens. (Penyelia saya nampak berminat dalam kesihatan dan keselamatan hanya selepas sesuatu kejadian buruk berlaku)	1	2	3	4	5
4.	My supervisor seriously considers staff suggestions for improving health and safety for workers. (Penyelia saya mempertimbangkan secara serius cadangan staf untuk menambahbaik kesihatan dan keselamatan pekerja)	1	2	3	4	5

		Strongly Disagree (Sangat tidak setuju)	Disagree (Tidak setuju)	Neither agree nor disagree (Neutral)	Agree (Setuju)	Strongly Agree (Sangat setuju)
5.	I feel very confident about my supervisor's skills to deal with health and safety issues. (Saya sangat berkeyakinan terhadap kemahiran penyelia saya untuk menangani isu kesihatan dan keselamatan)	1	2	3	4	5
6.	Whenever pressure builds up, my supervisor wants us to work faster, even if it means taking shortcuts. (Dalam keadaan desakan kerja yang memuncak, penyelia saya mengkehendaki kami bekerja pantas, dan jika perlu, mengambil jalan pintas)	1	2	3	4	5
7.	The actions of my supervisor show that health and safety is a top priority. (Tindakan penyelia saya menunjukkan kesihatan dan keselamatan merupakan suatu prioriti utama)	1	2	3	4	5
8.	My supervisor is known to be successful at the things he/she tries to do. (Penyelia saya sentiasa melakar kejayaan dalam perkara yang dilakukan)	1	2	3	4	5
9.	I trust my supervisor to act on health and safety concerns. (Saya percaya penyelia saya tidak mengabaikan isu kesihatan)	1	2	3	4	5
10.	My supervisor knows about the work that needs to be done. (Penyelia saya mengetahui tugas-tugas yang perlu dilaksanakan)	1	2	3	4	5
11.	My supervisor overlooks health and safety problems that happen over and over. (Penyelia saya sentiasa terlepas pandang terhadap masalah kesihatan dan keselamatan pekerjaan yang berlaku berulangkali)	1	2	3	4	5

11. SAFETY RULES
(PERATURAN KESELAMATAN)

To what extent do you agree or disagree with the following statements about safety rules **in your current department / unit / ward?** Please circle one number on each line.

(Setakat mana anda bersetuju atau tidak bersetuju dengan pernyataan berikut mengenai peraturan keselamatan di jabatan/unit/wad anda sekarang? Sila bulatkan satu nombor pada setiap barisan)

		Strongly Disagree (Sangat tidak setuju)	Disagree (Tidak setuju)	Neither agree nor disagree (Neutral)	Agree (Setuju)	Strongly Agree (Sangat setuju)
1.	The written safety rules and instructions are easy for people to understand and implement. (Peraturan dan arahan bertulis tentang keselamatan pekerjaan akan mudah difahami dan dilaksanakan oleh pekerja)	1	2	3	4	5
2.	The rules are too strict and I can work better without them. (Peraturan terlalu rigid dan tegas dan saya lebih selesa bekerja tanpanya)	1	2	3	4	5
3.	The rules always describe the safest way of working. (Peraturan lazimnya menjelaskan cara bekerja yang paling selamat)	1	2	3	4	5

12. SUPERVISOR'S LEADERSHIP STYLE (GAYA KEPIMPINAN PENYELIA)

Judge how frequently each statement fits your Supervisor. Please circle one number on each line. **Please answer with respect to the person to whom you directly report.**

(Nilai berapa kerap setiap pernyataan menepati Penyelia anda. Sila bulatkan satu nombor pada setiap barisan. Sila jawab berdasarkan penyelia yang anda lapor diri secara terus)

	My Supervisor …… (Penyelia saya …….)	Not at all (Tidak langsung)	Once in a while (Sekali-sekala)	Sometimes (Kadang-kala)	Fairly often (Agak kerap)	Frequently if not always (Sangat kerap)
1.	Provides me with assistance in exchange for my efforts. (Membantu saya sejajar dengan usaha yang saya pamerkan.)	0	1	2	3	4
2.	Instills pride in me for being associated with him/her. (Menanamkan kebanggaan dalam diri saya kerana dikaitkan dengan beliau.)	0	1	2	3	4
3.	Talks enthusiastically about what needs to be accomplished. (Giat berbincang tentang tugasan yang perlu dilaksanakan.)	0	1	2	3	4
4.	Specifies the importance of having a strong sense of purpose. (Menegaskan betapa pentingnya mempunyai sifat keinginan yang kuat untuk menjayakan sesuatu perkara yang dilakukan.)	0	1	2	3	4
5.	Spends time teaching and coaching. (Meluangkan masa mengajar dan melatih.)	0	1	2	3	4
6.	Acts in ways that build my respect. (Melaksanakan tugas dan tanggungjawabnya dengan sedemikian cara, yang menyebabkan rasa hormat saya terhadapnya terus meningkat.)	0	1	2	3	4

	My Supervisor …… (Penyelia saya …….)	Not at all (Tidak langsung)	Once in a while (Sekali-sekala)	Sometimes (Kadang-kala)	Fairly often (Agak kerap)	Frequently if not always (Sangat kerap)
7.	Gets me to look at problems from many different angles. (Mendorong saya menggunakan pendekatan pelbagai sudut dalam menyelesaikan permasalahan kerja.)	0	1	2	3	4
8.	Helps me to develop my strengths. (Membantu membentuk kekuatan saya.)	0	1	2	3	4
9.	Suggests new ways of looking at how to complete assignments. (Menyarankan kaedah baru dalam menyempurnakan tugasan.)	0	1	2	3	4
10.	Has a strong sense of justice. (Memiliki sifat keadilan yang kental.)	0	1	2	3	4

1. Please use the space below to make any comments on occupational health and safety practices at your workplace.
(Sila gunakan ruang di bawah untuk sebarang komen berkaitan amalan kesihatan dan keselamatan pekerjaan di tempat kerja anda.)

Please place your completed questionnaire in the envelope provided
(Sila masukkan soal-selidik yang telah dilengkapkan ke dalam sampul surat yang diberi)

YOUR PARTICIPATION IN THIS SURVEY IS VERY MUCH APPRECIATED.
THANK YOU.

Appendix 6

Letter of Support from the Director General of Health Malaysia

KETUA PENGARAH KESIHATAN MALAYSIA
DIRECTOR GENERAL OF HEALTH MALAYSIA

Kementerian Kesihatan Malaysia,
Aras 12, Blok E7, Parcel E,
Pusat Pentadbiran Kerajaan Persekutuan
62590 Putrajaya.

Tel : 603-88832545
Faks : 603-88895542
E-mail : ismailmerican@moh.gov.my

KKM.KPK.5305.20/11 Jld.8(78)

26 Jun 2006

Prof. Madya Dr. Mohamad Khan Jamal Khan
Timbalan Dekan (Akademik & Pembangunan Pelajar)
Fakulti Pembangunan Sosial dan Manusia
Universiti Utara Malaysia
06010 Sintok, Kedah.

Tuan,

MEMOHON KEBENARAN DAN KELULUSAN UNTUK MENJALANKAN KAJIAN DI HOSPITAL-HOSPITAL SELIAAN KEMENTERIAN KESIHATAN MALAYSIA.

Dengan hormatnya saya merujuk kepada perkara tersebut di atas.

2. Sukacita dimaklumkan bahawa, saya telah menerima permohonan daripada pihak Tuan untuk menjalankan kajian di peringkat doktor falsafah yang bertajuk *"Occupational Health and Safety Management Systems and Their Impact to Malaysian Public Hospitals"*. Setelah meneliti kertas cadangan yang telah dikemukakan oleh pihak Tuan, saya tiada halangan untuk memberi kelulusan kepada pihak Tuan menjalankan kajian tersebut.

3. Sehubungan itu, saya harap satu laporan lengkap hasil kajian tersebut dikemukakan kepada pihak Kementerian Kesihatan Malaysia terlebih dahulu sebelum sebarang bentuk penerbitan atau pembentangan dibuat oleh pihak Tuan.

Sekian, terima kasih.

"BERKHIDMAT UNTUK NEGARA"

(TAN SRI DATUK DR. HJ. MOHD ISMAIL MERICAN)
Ketua Pengarah Kesihatan Malaysia.

English Translation

APPROVAL APPLICATION TO CONDUCT SURVEY AT HOSPITAL UNDER MINISTRY OF HEALTH, MALAYSIA

The above-mentioned subject is referred.

2. I have received your application to do a survey at the PhD level entitled “Occupational Health and Safety Management Systems and Their Impact to Malaysian Public Hospitals”. After reading your proposal, I have no objection to let you conduct the survey.

3. With regards to that, I hope the complete study will be given to the Ministry of Health, Malaysia before you do any publication or presentation.

Thank you.

(TAN SRI DATUK DR. HJ. MOHD ISMAIL MERICAN)
Director General of Health Malaysia

c.c.:
- Deputy Director General of Health (Medical)
- Director of Health Kedah
- Director of Health Kelantan
- Director of Health Terengganu
- Director of Health Perlis

Appendix 7

INFORMATION SHEET

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM: IMPLEMENTATION IN THE MALAYSIAN HOSPITALS

You are being invited to take part in this research project. Please read this information sheet carefully before deciding whether or not to participate. Thank you if you decide to participate. If you decide not to take part there will be no disadvantage to you of any kind and thank you for considering my request.

Please be informed that I, Nor Azimah Chew Abdullah, am currently pursuing my doctoral study in the field of health and safety at Curtin University of Technology, Australia. For this purpose, I am now conducting a survey to solicit views of employees in medical services on safety culture at workplace, specifically those that being practiced at various public hospitals in Malaysia.

Should you agree to take part in this project, you will be asked to answer a survey questionnaire. The questionnaire is anonymous and your participation is completely voluntary. Individual responses will only be seen by the researcher. It will eventually be no specific names of individual respondents to be mentioned in the final analysis of the survey. You may withdraw from participation in the project at any time and without any disadvantage to yourself of any kind. Results of this project may be published but any data included will in no way be linked to any specific participant.

You are most welcome to request a copy of the results of the project should you wish. The data collected will be securely stored in such a way that only the researcher will be able to gain access to it. At the end of the project any personal information will be destroyed immediately except that, as required by the university's research policy, any raw data on which the results of the project depend will be retained in secure storage for five years, after which it will be destroyed.

Should there be any clarifications needed, please contact Nor Azimah Chew Abdullah at Faculty of Human and Social Development, Universiti Utara Malaysia, 06010 Sintok, Kedah or at 04-9283863/017-5465620.

Please be acknowledged that your views and opinions on the matter would be highly appreciated. Thank you for participating.

Appendix 8

CONSENT FORM

I, ____
Given names Surname

have read the information explaining the study entitled **"Occupational health and safety management system: Implementation in the Malaysian Hospitals"**

I, ____
(full name of participant)

agree to participate in the study.

I understand I may withdraw from the study at any stage and withdrawal will not interfere with routine care.

I agree that research data gathered from the results of the study may be published, provided that names are not used.

Signature ______________________________

Dated _________________ day of ____________________ 20

I, ______________________________ have explained the above to the signatories,
(Investigator's full name)

who stated that he/she understood the same.

Signature _____________________________

Appendix 9

Approval from the Human Research Ethics Committee at Curtin University of Technology

MINUTE

Curtin
UNIVERSITY OF TECHNOLOGY

To	Nor Azimah Chew Abdullah
From	Leslie Thompson
Subject	Protocol Approval – **SPH – 0020 - 2007**
Date	June 15th, 2007
Copy	Professor Jeff Spickett

SCHOOL OF PUBLIC HEALTH

TELEPHONE 9266 4346
FACSIMILE 9266 2958
EMAIL l.thompson@curtin.edu.au

Dear Azimah

Thank you for your "Form C Application for Approval of Research with Minimal Risk (Ethical Requirements)" for the project titled "Occupational Health & Safety Management System: Implementation in the Malaysian Public Hospitals". On behalf of the Human Research Ethics Committee I am authorised to inform you that the project has been approved.

Approval of this project is for a period from June 13th, 2007 to June 13th, 2008 .

If at any time during the twelve months changes/amendments occur, or if a serious or unexpected adverse event occurs, please advise me immediately. The approval number for your project is SPH – 0020 - 2007. *Please quote this number in any future correspondence.*

L Thompson

Leslie Thompson
Coordinator
Human Research Ethics Form C
School of Public Health

Please Note: The following standard statement must be included in the information sheet to participants:
This study has been approved by the Curtin University Human Research Ethics Committee. If needed, verification of approval can be obtained either by writing to the Curtin University Human Research Ethics Committee, c/- Office of Research and Development, Curtin University of Technology, GPO Box U1987, Perth, 6845 or by telephoning 9266 2784.

Study's Total of Return

Table 4.2: Total of return from Hospital Sultanah Bahiyah, Alor Setar, Kedah according to post

Post	Population	Sample	Total of Return	%
Doctor	348	45	5	1.51
Nurse	1,186	157	73	22.05
Officer (management)	16	2	2	0.60
Supporting staff (management)	633	84	31	9.37
Officer (medical)	66	9	9	2.72
Supporting staff (medical)	259	34	34	10.27
Total	2,508	331	154	46.52

Table 4.3: Total of return from Hospital Tuanku Fauziah, Kangar, Perlis according to post

Post	Population	Sample	Total of Return	%
Doctor	126	29	13	4.38
Nurse	605	134	100	33.67
Officer (management)	24	6	5	1.68
Supporting staff (management)	131	30	28	9.43
Officer (medical)	53	12	6	2.02
Supporting staff (medical)	388	86	55	18.51
Total	1,327	297	207	69.69

Table 4.4: Total of return from Hospital Pulau Pinang, Georgetown, Pulau Pinang according to post

Post	Population	Sample	Total of Return	%
Doctor	432	48	0	0
Nurse	1287	144	9	2.64
Officer (management)	15	3	1	0.29
Supporting staff (management)	877	98	43	12.61
Officer (medical)	61	7	0	0
Supporting staff (medical)	366	41	4	1.17
Total	3,038	341	57	16.71

Table 4.5: Overall total of return according to post

Post	Population	Sample	Total of Return	%
Doctor	906	122	18	1.86
Nurse	3,078	435	182	18.78
Officer (management)	55	11	11	1.14
Supporting staff (management)	1,641	212	96	9.91
Officer (medical)	180	28	21	2.17
Supporting staff (medical)	1,013	161	90	9.29
Total	6,873	969	418	43.15

Appendix 11

The Demography of Respondents

Table 4.14: Demographic Information

Age in Years (n = 418)	
Age Group	Frequency (Percent)
< 20	4 (1.0)
20 – 24	42 (10.0)
25 – 29	101 (24.2)
30 – 34	66 (15.8)
35 – 39	51 (12.2)
40 & >	154 (36.8)

Gender (n = 418)	
Gender	Frequency (Percent)
Male	89 (21.3)
Female	329 (78.7)

Race (n = 418)	
Race	Frequency (Percent)
Malay	357 (85.4)
Chinese	35 (8.4)
Indian	17 (4.0)
Siamese	5 (1.2)
Punjabi	2 (0.5)
Bidayuh	2 (0.5)

Education Level (n = 418)	
Education Level	Frequency (Percent)
Year 6	3 (0.7)
Lower Certificate of Education (LCE)	19 (4.5)
Malaysian Certificate of Education (MCE)	147 (35.2)
Higher School Certificate (HSC)	37 (8.9)
Diploma	161 (38.5)
Bachelor Degree	45 (10.8)
Certificate	2 (0.5)
Master	4 (0.9)

Table 4.14: Demographic Information

Job Position (n = 418)	
Job position	Frequency (Percent)
Physician	18 (4.3)
Nurse	182 (43.5)
Management Officer	8 (1.9)
Support Staff (Management)	102 (24.4)
Medical Officer	15 (3.6)
Support staff (Medical)	93 (22.2)

Years in Service (n = 418)	
Tenure (year)	Frequency (Percent)
< 1	43 (10.3)
1 – 5	154 (36.8)
6 – 10	60 (14.4)
11 – 15	47 (11.2)
16 - 20	31 (7.4)
21 & >	83 (19.9)

Table 4.15: Work Duration/Mode

Number of Working Hours Per Week (n = 418)	
Hours per week	Frequency (Percent)
21 - 40	220 (52.6)
41 - 60	185 (44.3)
> 60	13 (3.1)

Shift work arrangement (n = 418)	
Shift work	Frequency (Percent)
Yes	214 (51.2)
No	204 (48.8)

Appendix 12

Safety Experts' Feedback and the Pilot Survey

Table 4.16: Safety experts' judgments: Deletion and addition of items in the revised questionnaire

Factor	Number of items in original scale	Description	Number of items in revised scale
Safety communication	7	1 item added into this factor: 1. Item taken from "Management commitment" factor: • "I received no communication about health and safety in any form from top management" Deleted 1 item from this factor: 2. Item moved to "safety responsibility" factor: • "I know the person who represents me in the Health and Safety Committee"	7
Training & competence	6	Deleted 2 items from this factor: 1. Items moved to "safety responsibility" factor: • "I am clear about my responsibility for health and safety" • "I am involved in health and safety initiatives at work such as health and safety committee"	4

Factor	Number of items in original scale	Description	Number of items in revised scale
Health & Safety reporting	8	Deleted 3 items from this factor: • "People are willing to report health and safety errors/near misses here" • "I am encouraged to report health and safety errors/near misses" • "People are willing to report health and safety errors/near misses here" (Justification: Incidents are accidents and near misses)	5
Safety rules	3	Maintain the whole items	3
Safety satisfaction	17	Maintain the whole items	17
Errors and incidents	14	Maintain the whole items	14
Work duties	9	Deleted 1 item from this factor: • "We use more staff for health and safety issues in the hospital"	8
Safety responsibility	-	3 items added into this factor: 1. 2 items taken from "training and competence" factor • "I am involved in health and safety initiatives at work such as health and safety committee • "I am clear about my responsibilities for health and safety" 2. 1 item taken from "safety communication" factor • "I know the person who represents me in the health and safety committee"	3

Factor	Number of items in original scale	Description	Number of items in revised scale
Role of supervisor in health and safety	28	Deleted 17 items from this factor: 1. Item moved to “Supervisor’s leadership style” factor: • “My supervisor has a strong sense of justice” 2. Dropped 16 items from this factor: • “I trust my supervisor” • “I never have to wonder whether my supervisor will stick to his/her word” • “My supervisor is very concerned about my welfare” • “The actions of my supervisor show that worker safety is a top priority” • “My needs and desires are very important to my supervisor” • “Sound principles seem to guide my supervisor’s behaviour” • “My supervisor is very capable of performing his/her job” • “I trust my supervisor to act on workers’ health and safety concerns” • “My supervisor would not knowingly do anything to hurt me” • “My supervisor tries hard to be fair in dealings with others” • “My supervisor will go out of his/her way to help me” • “My supervisor’s actions and behaviours are not very consistent” • “My supervisor has specialized capabilities that can increase our performance” • “My supervisor really looks out for what is important to me” • “My supervisor seems interested in workers’ safety only after an adverse event happens” • “I like my supervisor’s values” (Justification: the item has almost similar meaning as item in the same factor, the term worker safety is included in health and safety” and some items are too general)	11

Factor	**Number of items in original scale**	**Description**	**Number of items in revised scale**
Management commitment	13	Deleted 6 items from this factor: 1. Item moved to “Safety communication” factor: • “I receive no communication about health and safety in any form from top management” 2. Item moved to “Health and Safety goals” factor: • “Top management has set out a clear vision for health and safety in this hospital” 3. Dropped 4 items from this factor: • “Senior Managers seem interested in worker safety only after an adverse event happens” • “The actions of Senior Managers show that worker safety is a top priority” • “I trust Senior Managers” • “I know who is in charge of the Hospital’s Health and Safety Committee” (Justification: the item has almost similar meaning as item in the same factor, the term worker safety is included in health and safety” and some items are too general)	7

Factor	Number of items in original scale	Description	Number of items in revised scale
Supervisor's leadership style	14	1 item added into this factor: 1. Item taken from "role of supervisor" factor: • "My supervisor has a strong sense of justice" Deleted 5 items from this factor: 1. 4 item moved to "health and safety goals" factor: • "Discusses in specific terms who is responsible for achieving performance targets" • "Makes clear what one can expect to receive when performance goals are achieved" • "Articulates a compelling vision of the future" • "Emphasizes the importance of having a collective sense of mission" 2. Dropped 1 item from this factor: • "Expresses satisfaction when I meet expectations"	10

Factor	Number of items in original scale	Description	Number of items in revised scale
Health & safety goals	-	5 items added into this factor: 1. 4 items taken from "supervisor's leadership style" factor • "My supervisor discusses in specific terms who is responsible for achieving performance targets in health and safety" • "Top management emphasizes the importance of having a collective sense of mission for health and safety" • "Top management articulates a compelling vision of the future for health and safe" • "My supervisor makes clear what one can expect to receive when performance goals for health and safety are achieved" 2. 1 item taken from "management safety commitment" factor • "Top management has set out a clear vision for health and safety in this hospital"	5
TOTAL	119		94

Normality test for all variables

Table 4.8: Normality test for dependent variable: Safety satisfaction and feedback (N = 418)

Variable	Skewness			Kurtosis			Test of normality Kilmogorov-Smirnov		Applicable remedies		
	Statistic	Std. Error	z-score (< 2/< 3)	Statistic	Std. Error	z-score (< 7)	Statistic	Significance	Description of distribution	Transformation	z-score after transformation
satisfy1	-1.062	0.119	-8.892	2.171	0.238	9.113	0.328	0.000	>3, -ve skewed	Ref & Ln	-1.711
satisfy2	-0.893	0.119	-7.484	1.788	0.238	7.506	0.340	0.000	>3, -ve skewed	Ref, sqrt & back	-1.759
satisfy3	-0.545	0.119	-4.565	0.773	0.238	3.244	0.256	0.000	>3, -ve skewed	Ref, sqrt	-0.447
satisfy4	-0.264	0.119	-2.215	0.539	0.238	2.264	0.272	0.000	>2, -ve skewed	Ref, sqrt	-2.804*
satisfy5	-0.284	0.119	-2.376	-0.014	0.238	-0.058	0.214	0.000	>2, -ve skewed	Ref, sqrt	-1.850
satisfy6	-0.566	0.119	-4.739	-0.260	0.238	-1.090	0.251	0.000	>3, -ve skewed	Ref, sqrt & back	-1.135
satisfy7	-0.329	0.119	-2.755	-0.738	0.238	-3.097	0.236	0.000	>2, -ve skewed	Ref, sqrt	-0.477
satisfy8	-0.459	0.119	-3.845	-0.111	0.238	-0.465	0.256	0.000	>3, -ve skewed	Ref, sqrt	-0.117
satisfy9	-0.584	0.119	-4.895	-0.083	0.238	-0.348	0.293	0.000	>3, -ve skewed	Ref, sqrt & back	-1.313
satisfy10	-0.570	0.119	-4.778	-0.115	0.238	-0.482	0.281	0.000	>3, -ve skewed	Ref, sqrt & back	-1.290
satisfy11	-0.693	0.119	-5.809	0.461	0.238	1.933	0.292	0.000	>3, -ve skewed	Ref, sqrt & back	-1.662
satisfy12	-0.744	0.119	-6.236	0.640	0.238	2.686	0.291	0.000	>3, -ve skewed	Ref, sqrt & back	-1.998
satisfy13	-0.607	0.119	-5.088	-0.487	0.238	-2.044	0.304	0.000	>3, -ve skewed	Ref, sqrt & back	-2.013*
satisfy14	-1.153	0.119	-9.657	1.387	0.238	5.821	0.390	0.000	>3, -ve skewed	Ref & Ln	-0.947
satisfy15	-1.111	0.119	-9.305	1.808	0.238	7.591	0.376	0.000	>3, -ve skewed	Ref & Ln	-2.074*
satisfy16	-0.739	0.119	-6.188	0.385	0.238	1.615	0.345	0.000	>3, -ve skewed	Ref, sqrt & back	-2.027*
satisfy17	-0.939	0.119	-7.866	0.634	0.238	2.663	0.329	0.000	>3, -ve skewed	Ref & Ln	-1.233

Note: *z-score after transformation for skewness is >2 but < 3

Table 4.9: Normality test for dependent variable: Safety Incidents/accidents (N = 418)

Variable	**Skewness**			**Kurtosis**			**Test of normality Kilmogorov-Smirnov**		**Applicable remedies**		
	Statistic	**Std. Error**	**z-score (< 2/< 3)**	**Statistic**	**Std. Error**	**z-score (< 7)**	**Statistic**	**Signifi-cance**	**Description of distribution**	**Transformation**	**z-score after transformation**
incident1	-1.086	0.119	-9.093	0.721	0.238	3.026	0.367	0.000	>3, -ve skewed	Ref, Ln & back	-1.381
incident2	-1.230	0.119	-10.305	2.180	0.238	9.154	0.391	0.000	>3, -ve skewed	Ref & Ln	-1.570
incident3	-0.894	0.119	-7.488	0.848	0.238	3.558	0.353	0.000	>3, -ve skewed	Ref & Ln	-2.088*
incident4	0.429	0.119	3.591	-0.365	0.238	-1.532	0.264	0.000	>3, +ve skewed	Sqrt & back	0.114
incident5	0.094	0.119	0.789	-0.608	0.238	-2.554	0.198	0.000	o.k.	-	-
incident6	-0.989	0.119	-8.281	1.700	0.238	7.138	0.343	0.000	>3, -ve skewed	Ref & Ln	-2.600*
incident7	0.500	0.119	4.190	-0.269	0.238	-1.129	0.262	0.000	>3, +ve skewed	sqrt	0.398
incident8	1.688	0.119	14.139	2.679	0.238	11.247	0.406	0.000	>3, +ve skewed	Inv & back	7.337#
incident9	1.969	0.119	16.496	4.715	0.238	19.792	0.419	0.000	>3, +ve skewed	Inv & back	8.224#
incident10a	1.609	0.119	13.477	2.422	0.238	10.170	0.385	0.000	>3, +ve skewed	Inv & back	6.084#
incident10b	2.458	0.119	20.587	6.455	0.238	27.097	0.469	0.000	>3, +ve skewed	Inv & back	13.016#
incident10c	1.824	0.119	15.282	3.006	0.238	12.619	0.439	0.000	>3, +ve skewed	Inv & back	9.491#
incident10d	1.603	0.119	13.428	1.605	0.238	6.737	0.355	0.000	>3, +ve skewed	Inv & back	5.609#
incident10e	0.511	0.119	4.280	-0.706	0.238	-2.964	0.216	0.000	>3, +ve skewed	sqrt	1.219

Note: *z-score after transformation for skewness is >2 but < 3
#z-score after transformation for skewness is >3 and is non normal

Table 4.10: Normality test for independent variables: Safety communication, safety involvement, training and competence, and safety reporting (N = 418)

Variable	**Skewness**			**Kurtosis**			**Test of normality Kilmogorov-Smirnov**		**Applicable remedies**		
	Statistic	**Std. Error**	**z-score (< 2/< 3)**	**Statistic**	**Std. Error**	**z-score (< 7)**	**Statistic**	**Significance**	**Description of distribution**	**Transformation**	**z-score after transformation**
comm1	-0.875	0.119	-7.325	1.251	0.238	5.253	0.356	0.000	>3, -ve skewed	Ref, sqrt & back	-2.146*
comm2	-0.925	0.119	-7.746	0.836	0.238	3.509	0.305	0.000	>3, -ve skewed	Ref & Ln	-0.612
comm3	-0.622	0.119	-5.214	0.215	0.238	0.903	0.303	0.000	>3, -ve skewed	Ref, sqrt & back	-0.984
comm4	-0.533	0.119	-4.461	-0.564	0.238	-2.370	0.292	0.000	>3, -ve skewed	Ref, sqrt & back	-1.150
comm5	0.214	0.119	1.795	-0.642	0.238	-2.694	0.219	0.000	o.k.	-	-
comm6	-0.046	0.119	-0.385	-0.857	0.238	-3.598	0.207	0.000	o.k.	-	-
comm7	-0.723	0.119	-6.054	0.087	0.238	0.367	0.305	0.000	>3, -ve skewed	Ref, sqrt & back	-2.049*
consul1	-0.503	0.119	-4.211	-0.727	0.238	-3.052	0.274	0.000	>3, -ve skewed	Ref, sqrt & back	-1.668
consul2	0.036	0.119	0.300	-0.936	0.238	-3.929	0.219	0.000	o.k.	-	-
consul3	-1.012	0.119	-8.479	2.068	0.238	8.682	0.339	0.000	>3, -ve skewed	Ref, sqrt & back	-2.542*
training1	-1.012	0.119	-8.477	2.470	0.238	10.369	0.358	0.000	>3,-ve skewed	Ref, sqrt & back	-2.140*
training2	-0.748	0.119	-6.266	2.411	0.238	10.121	0.340	0.000	>3,-ve skewed	Ref, sqrt & back	-0.133
training3	-0.928	0.119	-7.771	0.529	0.238	2.222	0.350	0.000	>3,-ve skewed	Ref & Ln	-1.479
training4	-0.887	0.119	-7.433	1.016	0.238	4.265	0.337	0.000	>3,-ve skewed	Ref, sqrt & back	-2.535*
report1	-1.087	0.119	-9.101	1.715	0.238	7.200	0.358	0.000	>3,-ve skewed	Ref & Ln	-1.824
report2	-1.075	0.119	-9.001	1.984	0.238	8.331	0.351	0.000	>3,-ve skewed	Ref & Ln	-1.935
report3	-1.087	0.119	-9.106	2.586	0.238	10.857	0.289	0.000	>3,-ve skewed	Ref & Ln	-0.630
report4	-0.719	0.119	-6.019	0.552	0.238	2.315	0.308	0.000	>3,-ve skewed	Ref, sqrt & back	-1.455
report5	-0.961	0.119	-8.053	1.102	0.238	4.628	0.308	0.000	>3,-ve skewed	Ref & Ln	-1.422

Note: *z-score after transformation for skewness is >2 but < 3

Table 4.11: Normality test for independent variables: work pressure and management commitment (N = 418)

Variable	Skewness			Kurtosis			Test of normality Kilmogorov-Smirnov		Applicable remedies		
	Statistic	Std. Error	z-score (< 2/< 3)	Statistic	Std. Error	z-score (< 7)	Statistic	Significance	Description of distribution	Transformation	z-score after transformation
duty1	-0.875	0.119	-7.330	0.593	0.238	2.491	0.348	0.000	>3, -ve skewed	Ref & Ln	-2.167*
duty2	0.444	0.119	3.719	-0.553	0.238	-2.323	0.265	0.000	>3, +ve skewed	sqrt	0.283
duty3	0.927	0.119	7.764	0.689	0.238	2.891	0.306	0.000	>3, +ve skewed	Ln & back	0.451
duty4	0.439	0.119	3.681	-0.585	0.238	-2.454	0.277	0.000	>3, +ve skewed	sqrt	0.306
duty5	0.801	0.119	6.708	0.590	0.238	2.479	0.344	0.000	>3, +ve skewed	sqrt	2.150*
duty6	-0.885	0.119	-7.410	0.088	0.238	0.369	0.343	0.000	>3, -ve skewed	Ref & Ln	-0.597
duty7	-0.610	0.119	-5.113	-0.111	0.238	-0.465	0.310	0.000	>3, -ve skewed	Ref, sqrt & back	-1.377
duty8	0.086	0.119	0.720	-0.775	0.238	-3.254	0.203	0.000	o.k.	-	-
manager1	-1.063	0.119	-8.908	2.366	0.238	9.933	0.336	0.000	>3, -ve skewed	Ref & Ln	-1.892
manager2	0.236	0.119	1.973	-0.701	0.238	-2.944	0.234	0.000	o.k.	-	-
manager3	-0.653	0.119	-5.470	1.068	0.238	4.483	0.312	0.000	>3, -ve skewed	Ref, sqrt & back	-0.516
manager4	-0.073	0.119	-0.610	-0.059	0.238	-0.247	0.238	0.000	o. k.	-	-
manager5	-0.887	0.119	-7.428	0.715	0.238	3.003	0.327	0.000	>3,-ve skewed	Ref & Ln	-1.747
manager6	-0.506	0.119	-4.241	-0.001	0.238	-0.003	0.262	0.000	>3,-ve skewed	Ref, sqrt & back	-0.191
manager7	-0.816	0.119	-6.837	1.352	0.238	5.677	0.327	0.000	>3,-ve skewed	Ref, sqrt & back	-1.740

Note: *z-score after transformation for skewness is >2 but < 3

Table 4.12: Normality test for independent variables: safety objectives, the role of the supervisor and safety rules (N = 418)

Variable	**Skewness**			**Kurtosis**			**Test of normality Kilmogorov-Smirnov**		**Applicable remedies**		
	Statistic	**Std. Error**	**z-score (< 2/< 3)**	**Statistic**	**Std. Error**	**z-score (< 7)**	**Statistic**	**Significance**	**Description of distribution**	**Transformation**	**z-score after transformation**
goal1	-0.952	0.119	-7.976	1.441	0.238	6.048	0.361	0.000	>3, -ve skewed	Ref, sqrt & back	-2.770*
goal2	-0.705	0.119	-5.903	0.396	0.238	1.664	0.325	0.000	>3, -ve skewed	Ref, sqrt & back	-1.775
goal3	-0.842	0.119	-7.050	0.888	0.238	3.728	0.346	0.000	>3, -ve skewed	Ref, sqrt & back	-2.489*
goal4	-0.746	0.119	-6.247	0.763	0.238	3.202	0.327	0.000	>3, -ve skewed	Ref, sqrt & back	-1.986
goal5	-0.387	0.119	-3.244	-0.188	0.238	-0.788	0.225	0.000	>3, -ve skewed	Ref, sqrt & back	-0.103
superv1	-0.695	0.119	-5.825	0.474	0.238	1.989	0.268	0.000	>3, -ve skewed	Ref, sqrt & back	-1.762
superv2	-0.697	0.119	-5.839	0.677	0.238	2.840	0.289	0.000	>3, -ve skewed	Ref, sqrt & back	-1.408
superv3	0.013	0.119	0.106	-0.707	0.238	-2.966	0.195	0.000	o.k.	-	-
superv4	-0.966	0.119	-8.095	1.113	0.238	4.675	0.321	0.000	>3, -ve skewed	Ref & Ln	-1.508
superv5	-0.815	0.119	-6.828	0.663	0.238	2.785	0.320	0.000	>3, -ve skewed	Ref & Ln	-1.784
superv6	-0.285	0.119	-2.388	-0.557	0.238	-2.337	0.242	0.000	>2, -ve skewed	Ref & sqrt	-0.884
superv7	-1.004	0.119	-8.412	1.198	0.238	5.030	0.336	0.000	>3,-ve skewed	Ref & Ln	-0.770
superv8	-0.722	0.119	-6.044	0.438	0.238	1.840	0.285	0.000	>3,-ve skewed	Ref & Ln	-1.286
superv9	-1.145	0.119	-9.593	2.180	0.238	9.154	0.362	0.000	>3,-ve skewed	Ref & Ln	-1.699
superv10	-1.167	0.119	-9.771	2.131	0.238	8.945	0.380	0.000	>3,-ve skewed	Ref & Ln	-1.726
superv11	-0.321	0.119	-2.690	-0.075	0.238	-0.317	0.227	0.000	>2, -ve skewed	Ref & sqrt	-1.386
rule1	-0.880	0.119	-7.372	1.223	0.238	5.135	0.356	0.000	>3,-ve skewed	Ref, sqrt & back	-2.217*
rule2	0.263	0.119	2.207	-0.381	0.238	-1.599	0.205	0.000	>2,+ve skewed	Sqrt & back	1.312
rule3	-1.149	0.119	-9.622	2.338	0.238	9.816	0.364	0.000	>3,-ve skewed	Ref & Ln	-2.574*

Note: *z-score after transformation for skewness is >2 but < 3

Table 4.13: Normality test for independent variable: leadership style (N = 418)

Variable	**Skewness**			**Kurtosis**			**Test of normality Kilmogorov-Smirnov**		**Applicable remedies**		
	Statistic	**Std. Error**	**z-score (< 2/< 3)**	**Statistic**	**Std. Error**	**z-score (< 7)**	**Statistic**	**Significance**	**Description of distribution**	**Transformation**	**z-score after transformation**
style1	-0.380	0.119	-3.187	-0.277	0.238	-1.162	0.211	0.000	>3, -ve skewed	Ref & sqrt	-0.604
style2	-0.042	0.119	-0.353	-1.083	0.238	-4.546	0.220	0.000	o.k.	-	-
style3	-0.405	0.119	-3.391	-0.529	0.238	-2.221	0.245	0.000	>3, -ve skewed	Ref & sqrt	-0.114
style4	-0.567	0.119	-4.752	-0.020	0.238	-0.083	0.252	0.000	>3, -ve skewed	Ref, sqrt & back	-0.592
style5	-0.223	0.119	-1.865	-0.754	0.238	-3.164	0.193	0.000	o.k.	-	-
style6	-0.600	0.119	-5.027	-0.350	0.238	-1.468	0.251	0.000	>3, -ve skewed	Ref, sqrt & back	-1.401
style7	-0.415	0.119	-3.472	-0.476	0.238	-1.998	0.222	0.000	>3, -ve skewed	Ref, sqrt & back	-0.109
style8	-0.339	0.119	-2.838	-0.693	0.238	-2.910	0.198	0.000	>2, -ve skewed	Ref & sqrt	-0.361
style9	-0.306	0.119	-2.559	-0.595	0.238	-2.499	0.202	0.000	>2, -ve skewed	Ref & sqrt	-0.790
style10	-0.355	0.119	-2.973	-0.612	0.238	-2.568	0.201	0.000	>2, -ve skewed	Ref & sqrt	-0.560

Appendix 14

Exploratory Factor Analysis for Dependent Variables and Independent Variables

Table 4.18: Factor analysis for the items in the dependent variables (N = 418)

Item Code	Item	Factor Loading
	Factor 1: Safety Satisfaction & Feedback	
SS12	How satisfied are you with the following aspects of the safety system? Department/unit/ward Health and Safety Committee	0.765
SS9	How satisfied are you with the following aspects of the safety system? Department/unit/ward safety induction	0.761
SS11	How satisfied are you with the following aspects of the safety system? Hospital Health and Safety Committee	0.753
SS10	How satisfied are you with the following aspects of the safety system? Safety audits/inspections	0.741
SS8	How satisfied are you with the following aspects of the safety system? Hospital safety induction	0.689
SS6	How satisfied are you with the following aspects of the safety system? Security guard presence	0.674
SS16	How satisfied are you with the following aspects of the safety system? Occurrence/incidence reporting system	0.662
SS5	How satisfied are you with the following aspects of the safety system? Police presence	0.647
SS17	How satisfied are you with the following aspects of the safety system? Investigation and follow-up measures after injuries and accidents have taken place	0.626
SS7	How satisfied are you with the following aspects of the safety system? Controlled entry to department/unit/ ward	0.604
SI2	In this department/unit/ward, we discuss ways to prevent errors/mistakes from happening again	0.503
SS13	How satisfied are you with the following aspects of the safety system? Workplace design	0.495
SS14	How satisfied are you with the following aspects of the safety system? Housekeeping/cleaning	0.487
SI3	We are given feedback about changes put into place based on event/incident reports	0.473
SS3	How satisfied are you with the following aspects of the safety system? Lead coats (for x-ray)	0.471
SS2	How satisfied are you with the following aspects of the safety system? Uniforms and aprons	0.469
SS15	How satisfied are you with the following aspects of the safety system? Competency of co-workers	0.469
SS1	How satisfied are you with the following aspects of the safety system? Disposable personal protective equipments (e.g. gloves, masks)	0.458
SS4	How satisfied are you with the following aspects of the safety system? Personal alarms	0.448
SI1	We are informed about errors/mistakes that happen in this department/unit/ ward	0.412
SI6	Mistakes have led to positive changes here	0.383
Percentage of variance explained		23.65
Cronbach's Alpha (21 items)		0.910

Item Code	Item	Factor Loading
	Factor 2: Safety Incident/Accident	
SI9	In the last month, how many errors or near misses did you see that could have harmed staff?	0.722
SI8	In the last month, how many incidents did you see that inadvertently harmed staff?	0.698
SI10a	During the last year how many times have you been injured or felt unwell as a result of the following problems at work? Moving and handling	0.692
SI10c	During the last year how many times have you been injured or felt unwell as a result of the following problems at work? Slips, trips or falls	0.653
SI10b	During the last year how many times have you been injured or felt unwell as a result of the following problems at work? Needlestick and sharps injuries	0.635
SI10e	During the last year how many times have you been injured or felt unwell as a result of the following problems at work? Work related stress	0.466
SI10d	During the last year how many times have you been injured or felt unwell as a result of the following problems at work? Exposure to dangerous substances (including radiation)	0.385
	Percentage of variance explained	9.02
	Cronbach's Alpha (7 items)	0.762

Table 4.19: Factor analysis for the items in the independent variables (N = 418)

Item Code	Item	Factor Loading
	Factor 1: Role of Supervisor	
superv10	My supervisor knows about the work that needs to be done	0.805
superv2	My supervisor is well qualified in health and safety	0.753
superv5	I feel very confident about my supervisor's skills to deal with health and safety issues	0.724
superv8	My supervisor is known to be successful at the things he/she tries to do	0.661
superv4	My supervisor seriously considers staff suggestions for improving health and safety for workers	0.644
superv9	I trust my supervisor to act on health and safety concerns	0.561
superv7	The actions of my supervisor show that health and safety is a top priority	0.557
superv1	My supervisor says a good word when he/she sees a job done according to established safety procedures	0.421
	Percentage of variance explained	33.79
	Cronbach's Alpha (8 items)	0.913
	Factor 2: Supervisor's Leadership Style	
Style8	My supervisor helps me to develop my strengths	-0.862
Style7	My supervisor gets me to look at problems from many different angles	-0.824
Style3	My supervisor talks enthusiastically about what needs to be accomplished	-0.803
Style4	My supervisor specifies the importance of having a strong sense of purpose	-0.794
Style5	My supervisor spends time teaching and coaching	-0.786
Style9	My supervisor suggests new ways of looking at how to complete assignments	-0.761
Style1	My supervisor provides me with assistance in exchange for my efforts	-0.756
Style6	My supervisor acts in ways that build my respect	-0.704
Style10	My supervisor has a strong sense of justice	-0.670
Style2	My supervisor instills pride in me for being associated with him/her	-0.639
	Percentage of variance explained	8.23
	Cronbach's Alpha (10 items)	0.945

Item Code	Item	Factor Loading
	Factor 3: Training and Competence	
Train2	I understand the health and safety risks in my job	0.768
Train1	I understand the health and safety requirements for my job	0.766
Train4	I am always certain what to do to ensure high standards of health and safety in my work	0.718
Train3	My training has covered the health and safety risks I face in my job	0.660
consul3	I am clear about my responsibilities for health and safety	0.620
consul2	I am involved in health and safety initiatives at work such as health and safety committee	0.365
	Percentage of variance explained	5.43
	Cronbach's Alpha (6 items)	0.823
	Factor 4: Health and safety objectives	
Goal4	Top management articulates a compelling vision of the future for health and safety	0.813
Goal2	Top management discusses in specific terms who is responsible for achieving performance targets in health and safety	0.770
Goal3	Top management emphasizes the importance of having a collective sense of mission for health and safety	0.654
Goal5	Top management makes clear what one can expect to receive when performance goals for health and safety are achieve	0.629
Goal1	Top management have set out a clear vision for health and safety in this hospital	0.527
	Percentage of variance explained	2.71
	Cronbach's Alpha (5 items)	0.877
	Factor 5: Management Commitment	
manager6	The hospital's procedures are only there to cover the backs of Senior Managers	0.503
manager7	I trust Senior Managers to act on safety concerns	0.481
manager5	Senior Managers genuinely care about the health and safety of people at this hospital	0.477
comm7	I receive no communication about health and safety in any form from top management	0.392
manager3	The actions of Senior Managers show that health and safety is a top priority	0.321
	Percentage of variance explained	2.59
	Cronbach's Alpha (5 items)	0.740

Item Code	Item	Factor Loading
	Factor 6: Safety Reporting	
report4	People are willing to report health and safety incidents here	0.755
report1	All health and safety incidents are reported here	0.636
report3	I think that reporting health and safety incidents makes a difference to safety here	0.478
report2	I am encouraged to report health and safety incidents	0.402
duty1	Health and safety issues are never sacrificed to get more work done	0.311
	Percentage of variance explained	1.65
	Cronbach's Alpha (5 items)	0.764

Appendix 15

Concurrent Validity

Table 4.21: Interscale Correlations of the independent variables and two outcome variables: Safety satisfaction and feedback and Safety incidents/accidents (n = 418)

Variables	RS	LS	TC	SO	MC	SR	SSF	SI
Role of Supervisor (RS)	1							
Leadership Style (LS)	.648**	1						
Training & Competence (TC)	.440**	.338**	1					
Safety Objectives (SO)	.635**	.433**	.439**	1				
Management Commitment (MC)	.563**	.418**	.389**	.583**	1			
Safety Reporting (SR)	.423**	.330**	.569**	.417**	.441**	1		
Safety Satisfaction & Feedback (SSF)	.542**	.389**	.456**	.634**	.559**	.505**	1	
Safety Incident/Accident (SI)	-.156**	-.004	-.073	-.175**	-.225**	-.106*	-.123*	1

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Confirmatory Factor Analysis (CFA)

Table 4.22: Acceptable cutoff values for fit indices

Fit indices	**Recommended Values**
Absolute fit indices:	
Chi-square (χ^2)	-
χ^2 p-level	> 0.05
Goodness-of-Fit Index (GFI)	> 0.90 or 0.95
Root Mean Square Error of Approximation (RMSEA)	< 0.05 to 0.08
Root mean square residual (RMSR)	< 0.05
Population Gamma Index (PGI)	> 0.95
Incremental/comparative fit indices:	
Adjusted GFI (AGFI)	> 0.90
Adjusted PGI (APGI)	> 0.95
Normed fit index (NFI)	> 0.90 or 0.95
Comparative fit index (CFI)	> 0.90 or 0.95
Tucker-Lewis Index (TLI) or Non-normed fit index (NNFI)	> 0.90
Parsimonious fit indices:	
Parsimonious NFI (PNFI)	Closer to 1 (the higher the better)
Parsimonious GFI (PGFI)	Closer to 1 (the higher the better)
chi-square/degrees-of-freedom ratio (cmindf)	< 2.00 or 3.00
Akaike information criterion (AIC)	Small values

Safety Satisfaction and Feedback

Table 4.23: Item parceling for safety satisfaction and feedback

Dimension	Variable	Items
Safety Satisfaction and Feedback	sspar1	SS1, SS5, SS9, SS13, SS17
	sspar 2	SS2, SS6, SS10, SS14
	sspar 3	SS3, SS7, SS11, SS15
	sspar 4	SS4, SS8, SS12, SS16
	feedpar	SI1, SI2, SI3, SI6

The Supervisor's Leadership Style

Table 4.26: Item parceling for a supervisor's leadership style

Dimension	Variable	Items
Supervisor's Leadership Style	STYLE1	S1, S6
	STYLE2	S2, S7
	STYLE3	S3, S8
	STYLE4	S4, S9
	STYLE5	S5, S10

The Role of the Supervisor

Table 4.28: Item parceling for the role of the supervisor

Dimension	Variable	Items
The Role of the Supervisor	PARSUPER1	superv1, superv7
	PARSUPER 2	superv2, superv8
	PARSUPER 3	superv4, superv9
	PARSUPER 4	superv5, superv10

Structural Model of the Instrument

Table 4.36: Standardized Factor loading of variables

Standardized Regression Weights		
		Estimate
Safety incident/accident	The supervisor's leadership style	0.185
Safety incident/accident	The role of the supervisor	-0.132
Safety incident/accident	Training and competence	0.038
Safety incident/accident	Health and safety objectives	-0.067
Safety incident/accident	Management commitment	-0.195
Safety incident/accident	Safety reporting	-0.019
Safety satisfaction and feedback	The supervisor's leadership style	0.010
Safety satisfaction and feedback	The role of the supervisor	0.098
Safety satisfaction and feedback	Training and competence	0.078
Safety satisfaction and feedback	Health and safety objectives	0.347
Safety satisfaction and feedback	Management commitment	0.183
Safety satisfaction and feedback	Safety reporting	0.190

Appendix 17

Relationships between variables using crosstab with chi-square analysis

i. Stage 1 analysis

a. Gender, level of education and safety satisfaction and feedback

Table 4.38: Analysis between level of education and safety satisfaction and feedback with gender as the control variable

Gender	Variable		Safety satisfaction and feedback			Total	Chi-square	p-value
			Dissatisfied	Neither satisfied nor dissatisfied	Satisfied			
Male	Education level	School Level	12	26 (47%)	5	43	4.034 (df=4)	0.401
		Certificate & Diploma	4	16	7	27		
		University Degree	4	13	2	19		
	Total		20	55	14	89		
Female	Education level	School Level	15	116 (50%)	32	163	7.894 (df=4)	0.096
		Certificate & Diploma	21	95	20	136		
		University Degree	7	21	2	30		
	Total		43	232	54	329		

Note: Male: 3 cells (33.3%) have expected count less than 5. The minimum expected count is 2.99.
Female: 2 cells (22.2%) have expected count less than 5. The minimum expected count is 3.92.

b. Gender, level of education and training and competence

Table 4.39: Analysis between level of education and training and competence with gender as the control variable

Gender	Variable		Training & competence			Total	Chi-square	p-value
			Disagree	Neither agree/disagree	Agree			
Male	Education level	School Level	5	23 (50%)	15	43	0.800 (df=4)	0.938
		Certificate & Diploma	2	13	12	27		
		University Degree	2	10	7	19		
	Total		9	46	34	89		
Female	Education level	School Level	16	84	63	163	13.392 (df=4)	0.010
		Certificate & Diploma	4	88 (46%)	44	136		
		University Degree	5	19	6	30		
	Total		25	191	113	329		

Note: Male: 3 cells (33.3%) have expected count less than 5. The minimum expected count is 1.92.
Female: 1 cells (11.1%) have expected count less than 5. The minimum expected count is 2.28.

c. Gender, level of education and health and safety objectives

Table 4.40: Analysis between level of education and health and safety objectives with gender as the control variable

Gender	Variable		Health & safety objectives			Total	Chi-square	p-value
			Disagree	Neither agree/disagree	Agree			
Male	Education level	School Level	10	16	17 (49%)	43	9.214 (df=4)	0.056
		Certificate & Diploma	0	17 (40%)	10	27		
		University Degree	2	9	8	19		
	Total		12	42	35	89		
Female	Education level	School Level	15	80 (45%)	68	163	11.385 (df=4)	0.023
		Certificate & Diploma	20	78	38	136		
		University Degree	4	21	5	30		
	Total		39	179	111	329		

Note: Male: 2 cells (22.2%) have expected count less than 5. The minimum expected count is 2.56.
Female: 1 cells (11.1%) have expected count less than 5. The minimum expected count is 3.56.

d. Gender, level of education and the role of the supervisor

Table 4.41: Analysis between level of education and the role of the supervisor with gender as the control variable

Gender	Variable		The role of the supervisor			Total	Chi-square	p-value
			Disagree	Neither agree/disagree	Agree			
Male	Education level	School Level	11	22 (42%)	10	43	3.036 (df=4)	0.552
		Certificate & Diploma	4	18	5	27		
		University Degree	2	12	5	19		
	Total		17	52	20	89		
Female	Education level	School Level	20	90 (48%)	53	163	6.244 (df=4)	0.182
		Certificate & Diploma	24	77	35	136		
		University Degree	6	20	4	30		
	Total		50	187	92	329		

Note: Male: 2 cells (22.2%) have expected count less than 5. The minimum expected count is 3.63.
Female: 1 cells (11.1%) have expected count less than 5. The minimum expected count is 4.56.

e. Gender, level of education and management commitment

Table 4.42: Analysis between level of education and management commitment with gender as the control variable

Gender	Variable		Management commitment			Total	Chi-square	p-value
			Disagree	Neither agree/disagree	Agree			
Male	Education level	School Level	11	22 (49%)	10	43	3.105 (df=4)	0.540
		Certificate & Diploma	3	14	10	27		
		University Degree	5	9	5	19		
	Total		19	45	25	89		
Female	Education level	School Level	20	77	66	163	7.205 (df=4)	0.125
		Certificate & Diploma	13	84 (48%)	39	136		
		University Degree	5	15	10	30		
	Total		38	176	115	329		

Note: Male: 1 cells (11.1%) have expected count less than 5. The minimum expected count is 4.06.
Female: 1 cells (11.1%) have expected count less than 5. The minimum expected count is 3.47.

f. Gender, level of education and safety reporting

Table 4.43: Analysis between level of education and safety reporting with gender as the control variable

Gender	Variable		Safety reporting			Total	Chi-square	p-value
			Disagree	Neither agree/disagree	Agree			
Male	Education level	School Level	9	16	18 (42%)	43	7.839 (df=4)	0.098
		Certificate & Diploma	1	9	17	27		
		University Degree	1	10	8	19		
	Total		11	35	43	89		
Female	Education level	School Level	6	52	105 (54%)	163	8.269 (df=4)	0.082
		Certificate & Diploma	3	57	76	136		
		University Degree	1	17	12	30		
	Total		10	126	193	329		

Note: Male: 2 cells (22.2%) have expected count less than 5. The minimum expected count is 2.35.

Female: 3 cells (33.3%) have expected count less than 5. The minimum expected count is 0.91.

g. Gender, level of education and the supervisor's leadership style

Table 4.44: Analysis between level of education and the supervisor's leadership style with gender as the control variable

Gender	Variable		The supervisor's leadership style			Total	Chi-square	p-value
			Not at all	Sometimes	Frequently			
Male	Education level	School Level	28 (72%)	11	4	43	20.492 (df=4)	0.000
		Certificate & Diploma	4	21	2	27		
		University Degree	7	9	3	19		
	Total		39	41	9	89		
Female	Education level	School Level	55	91 (52%)	17	163	1.232 (df=4)	0.873
		Certificate & Diploma	51	71	14	136		
		University Degree	13	14	3	30		
	Total		119	176	34	329		

Note: Male: 3 cells (33.3%) have expected count less than 5. The minimum expected count is 1.92.

Female: 1 cells (11.1%) have expected count less than 5. The minimum expected count is 3.10.

h. Gender, level of education and accidents

Table 4.45: Analysis between level of education and accidents with gender as the control variable

Gender	Variable		Accidents		Total	Chi-square	p-value
			None	Yes			
Male	Education level	School Level	24 (45%)	19	43	0.482 (df=2)	0.786
		Certificate & Diploma	17	10	27		
		University Degree	12	7	19		
	Total		53	36	89		
Female	Education level	School Level	106 (52%)	57	163	6.711 (df=2)	0.035
		Certificate & Diploma	84	52	136		
		University Degree	12	18	30		
	Total		202	127	329		

Note: Male: 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.69.

Female: 0 cells (0.0%) have expected count less than 5. The minimum expected count is 11.58.

i. Gender, level of education and injuries

Table 4.46: Analysis between level of education and injuries with gender as the control variable

Gender	Variable		Injuries		Total	Chi-square	p-value
			None	Yes			
Male	Education level	School Level	12	31 (47%)	43	0.283 (df=2)	0.868
		Certificate & Diploma	6	21	27		
		University Degree	5	14	19		
	Total		23	66	89		
Female	Education level	School Level	35	128 (48%)	163	1.462 (df=2)	0.481
		Certificate & Diploma	22	114	136		
		University Degree	5	25	30		
	Total		62	267	329		

Note: Male: 1 cells (16.7%) have expected count less than 5. The minimum expected count is 4.91.

Female: 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.65.

ii. Stage 2 analysis

a. Gender, length of employment and safety satisfaction and feedback

Table 4.47: Analysis between length of employment and safety satisfaction and feedback with gender as the control variable

Gender	Variable		Safety satisfaction and feedback			Total	Chi-square	p-value
			Dissatisfied	Neither satisfied nor dissatisfied	Satisfied			
Male	Length of employment	Less than or equal to 2 years	2	12	4	18	5.297 (df=6)	0.506
		2.1 - 6 years	7	19 (35%)	2	28		
		6.1 - 15 years	3	11	4	18		
		15.1 years and above	8	13	4	25		
	Total		20	55	14	89		
Female	Length of employment	Less than or equal to 2 years	8	56	12	76	2.718 (df=6)	0.843
		2.1 - 6 years	11	54	12	77		
		6.1 - 15 years	12	56	10	78		
		15.1 years and above	12	66 (28%)	20	98		
	Total		43	232	54	329		

Note: Male: 6 cells (50.0%) have expected count less than 5. The minimum expected count is 2.83.

Female: 0 cells (0.0%) have expected count less than 5. The minimum expected count is 9.93.

b. Gender, length of employment and training and competence

Table 4.48: Analysis between length of employment and training and competence with gender as the control variable

Gender	Variable		Training & competence: Disagree	Training & competence: Neither agree/disagree	Training & competence: Agree	Total	Chi-square	p-value
Male	Length of employment	Less than or equal to 2 years	5	9	4	18	16.740 (df=6)	0.010
		2.1 - 6 years	0	17 (37%)	11	28		
		6.1 - 15 years	0	12	6	18		
		15.1 years and above	4	8	13	25		
	Total		9	46	34	89		
Female	Length of employment	Less than or equal to 2 years	7	53 (28%)	16	76	10.372 (df=6)	0.110
		2.1 - 6 years	7	41	29	77		
		6.1 - 15 years	3	47	28	78		
		15.1 years and above	8	50	40	98		
	Total		25	191	113	329		

Note: Male: 4 cells (33.3%) have expected count less than 5. The minimum expected count is 1.82.
Female: 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.78.

c. Gender, length of employment and the role of the supervisor

Table 4.49: Analysis between length of employment and the role of the supervisor with gender as the control variable

Gender	Variable		The role of the supervisor			Total	Chi-square	p-value
			Disagree	Neither agree/disagree	Agree			
Male	Length of employment	Less than or equal to 2 years	4	11	3	18	2.100 (df=6)	0.910
		2.1 - 6 years	4	18 (35%)	6	28		
		6.1 - 15 years	3	11	4	18		
		15.1 years and above	6	12	7	25		
	Total		17	52	20	89		
Female	Length of employment	Less than or equal to 2 years	10	49	17	76	4.584 (df=6)	0.598
		2.1 - 6 years	13	41	23	77		
		6.1 - 15 years	9	47	22	78		
		15.1 years and above	18	50 (27%)	30	98		
	Total		50	187	92	329		

Note: Male: 5 cells (41.7%) have expected count less than 5. The minimum expected count is 3.44.

Female: 0 cells (0.0%) have expected count less than 5. The minimum expected count is 11.55.

d. Gender, length of employment and health and safety objectives

Table 4.50: Analysis between length of employment and health and safety objectives with gender as the control variable

Gender	Variable		Health and safety objectives			Total	Chi-square	p-value
			Disagree	Neither agree/disagree	Agree			
Male	Length of employment	Less than or equal to 2 years	0	12	6	18	14.200 (df=6)	0.027
		2.1 - 6 years	3	17 (40%)	8	28		
		6.1 - 15 years	2	7	9	18		
		15.1 years and above	7	6	12	25		
	Total		12	42	35	89		
Female	Length of employment	Less than or equal to 2 years	5	51 (29%)	20	76	16.196 (df=6)	0.013
		2.1 - 6 years	14	30	33	77		
		6.1 - 15 years	7	49	22	78		
		15.1 years and above	13	49	36	98		
	Total		39	179	111	329		

Note: Male: 4 cells (33.3%) have expected count less than 5. The minimum expected count is 2.43.

Female: 0 cells (0.0%) have expected count less than 5. The minimum expected count is 9.01.

e. Gender, length of employment and management commitment

Table 4.51: Analysis between length of employment and management commitment with gender as the control variable

Gender	Variable		Management commitment			Total	Chi-square	p-value
			Disagree	Neither agree/disagree	Agree			
Male	Length of employment	Less than or equal to 2 years	3	8	7	18	14.614 (df=6)	0.023
		2.1 - 6 years	7	15 (33%)	6	28		
		6.1 - 15 years	1	15	2	18		
		15.1 years and above	8	7	10	25		
	Total		19	45	25	89		
Female	Length of employment	Less than or equal to 2 years	6	45	25	76	5.730 (df=6)	0.454
		2.1 - 6 years	12	44	21	77		
		6.1 - 15 years	8	40	30	78		
		15.1 years and above	12	47 (27%)	39	98		
	Total		38	176	115	329		

Note: Male: 2 cells (16.7%) have expected count less than 5. The minimum expected count is 3.84.

Female: 0 cells (0.0%) have expected count less than 5. The minimum expected count is 8.78.

f. Gender, length of employment and safety reporting

Table 4.52: Analysis between length of employment and safety reporting with gender as the control variable

Gender	Variable		Safety reporting			Total	Chi-square	p-value
			Disagree	Neither agree/disagree	Agree			
Male	Length of employment	Less than or equal to 2 years	2	9	7	18	5.892 (df=6)	0.435
		2.1 - 6 years	4	10	14 (33%)	28		
		6.1 - 15 years	0	9	9	18		
		15.1 years and above	5	7	13	25		
	Total		11	35	43	89		
Female	Length of employment	Less than or equal to 2 years	3	36	37	76	6.509 (df=6)	0.369
		2.1 - 6 years	1	24	52	77		
		6.1 - 15 years	3	31	44	78		
		15.1 years and above	3	35	60 (31%)	98		
	Total		10	126	193	329		

Note: Male: 4 cells (33.3%) have expected count less than 5. The minimum expected count is 2.22.
Female: 4 cells (33.3%) have expected count less than 5. The minimum expected count is 2.31.

g. Gender, length of employment and the supervisor's leadership style

Table 4.53: Analysis between length of employment and the supervisor's leadership style with gender as the control variable

Gender	Variable		The supervisor's leadership style			Total	Chi-square	p-value
			Not at all	Sometimes	Frequently			
Male	Length of employment	Less than or equal to 2 years	6	9	3	18	8.132 (df=6)	0.229
		2.1 - 6 years	16 (41%)	11	1	28		
		6.1 - 15 years	4	11	3	18		
		15.1 years and above	13	10	2	25		
	Total		39	41	9	89		
Female	Length of employment	Less than or equal to 2 years	28	42	6	76	1.735 (df=6)	0.942
		2.1 - 6 years	27	42	8	77		
		6.1 - 15 years	26	44	8	78		
		15.1 years and above	38	48 (27%)	12	98		
	Total		119	176	34	329		

Note: Male: 4 cells (33.3%) have expected count less than 5. The minimum expected count is 1.82.
Female: 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.85.

h. Gender, length of employment and accidents

Table 4.54: Analysis between length of employment and accidents with gender as the control variable

Gender	Variable		Accidents		Total	Chi-square	p-value
			None	Yes			
Male	Length of employment	Less than or equal to 2 years	12	6	18	1.819 (df=3)	0.611
		2.1 - 6 years	14	14	28		
		6.1 - 15 years	12	6	18		
		15.1 years and above	15 (28%)	10	25		
	Total		53	36	89		
Female	Length of employment	Less than or equal to 2 years	40	36	76	6.106 (df=3)	0.107
		2.1 - 6 years	45	32	77		
		6.1 - 15 years	48	30	78		
		15.1 years and above	69 (34%)	29	98		
	Total		202	127	329		

Note: Male: 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.28.

Female: 0 cells (0.0%) have expected count less than 5. The minimum expected count is 29.34.

i. Gender, length of employment and injuries

Table 4.55: Analysis between length of employment and injuries with gender as the control variable

Gender	Variable		Injuries		Total	Chi-square	p-value
			None	Yes			
Male	Length of employment	Less than or equal to 2 years	8	10	18	4.349 (df=3)	0.226
		2.1 - 6 years	5	23 (35%)	28		
		6.1 - 15 years	4	14	18		
		15.1 years and above	6	19	25		
	Total		23	66	89		
Female	Length of employment	Less than or equal to 2 years	19	57	76	9.325 (df=3)	0.025
		2.1 - 6 years	7	70	77		
		6.1 - 15 years	12	66	78		
		15.1 years and above	24	74 (28%)	98		
	Total		62	267	329		

Note: Male: 2 cells (25.0%) have expected count less than 5. The minimum expected count is 4.65.

Female: 0 cells (.0%) have expected count less than 5. The minimum expected count is 14.32.

iii. Chi-Square Analysis Summary

Table 4.56: Relationship between levels of education, nine dimensions of health and safety management, and gender

OBJECTIVE 1	**LEVEL OF EDUCATION**					
	Variables	**Gender**	**Education**	**Total**	**Scale**	**p-value**
to investigate the perception of hospital employees regarding the different elements of OHS management	Safety satisfaction & feedback	Male	School level	26 (47%)	neutral	Non-significant
		Female	School level	116 (50%)	neutral	p = 0.096
	Training and competence	Male	School level	23 (50%)	neutral	Non-significant
		Female	Cert. & diploma	88 (46%)	neutral	p = 0.010
	Health and safety objective	Male	School level	17 (49%)	agree	p = 0.056
		Female	School level	80 (45%)	neutral	p = 0.023
	The role of the supervisor	Male	School level	22 (42%)	neutral	Non-significant
		Female	School level	90 (48%)	neutral	Non-significant
	Management commitment	Male	School level	22 (49%)	neutral	Non-significant
		Female	Cert. & diploma	84 (48%)	neutral	Non-significant
	Safety reporting	Male	School level	18 (42%)	agree	p = 0.098
		Female	Cert. & diploma	105 (54%)	agree	p = 0.082
	Leadership style	Male	School level	28 (72%)	Not at all	p = 0.000
		Female	School level	91 (52%)	sometimes	Non-significant
	Accidents	Male	School level	24 (45%)	none	Non-significant
		Female	School level	106 (52%)	none	p = 0.035
	Injuries	Male	School level	31 (47%)	yes	Non-significant
		Female	School level	128 (48%)	yes	Non-significant

*p-value significant = reject H_o

H_o = there is no relationships/differences between the two variables

Table 4.57: Relationship between length of employment, nine dimensions of health and safety management, and gender

OBJECTIVE 1	**LENGTH OF EMPLOYMENT**					
	Variables	**Gender**	**Length of employment**	**Total**	**Scale**	**p-value**
to investigate the perception of hospital employees regarding the different elements of OHS management	Safety satisfaction & feedback	Male	2.1 – 6 yrs	19 (35%)	neutral	Non-significant
		Female	15.1 & above	66 (28%)	neutral	Non-significant
	Training and competence	Male	2.1 – 6 yrs	17 (37%)	neutral	$p = 0.010$
		Female	Less than or equal 2 years	53(28%)	neutral	Non-significant
	Health and safety objective	Male	2.1 – 6 yrs	17 (40%)	neutral	$p = 0.027$
		Female	Less than or equal 2 years	51 (29%)	neutral	$p = 0.013$
	The role of the supervisor	Male	2.1 – 6 yrs	18 (35%)	neutral	Non-significant
		Female	15.1 & above	50 (27%)	neutral	Non-significant
	Management commitment	Male	2.1 – 6 yrs	15 (33%)	neutral	$p = 0.023$
		Female	15.1 & above	47 (27%)	neutral	Non-significant
	Safety reporting	Male	2.1 – 6 yrs	14 (33%)	agree	Non-significant
		Female	15.1 & above	60 (31%)	agree	Non-significant
	Leadership style	Male	2.1 – 6 yrs	16 (41%)	Not at all	Non-significant
		Female	15.1 & above	48 (27%)	sometimes	Non-significant
	Accidents	Male	15.1 & above	15 (28%)	none	Non-significant
		Female	15.1 & above	69 (34%)	none	Non-significant
	Injuries	Male	2.1 – 6 yrs	23 (35%)	yes	Non-significant
		Female	15.1 & above	74 (28%)	yes	$p = 0.025$

*p-value significant = reject H_o

H_o = there is no relationships/differences between the two variables

Appendix 18

Logistic Regression

i. Safety satisfaction and feedback

Table 4.58: Logistic regression: Enter method for predicting the dependent variable: safety satisfaction & feedback

Dependent variable	Model characteristics	Enter method				
		Predictors Variables	B	p-value	Odds Ratio	95% C. I.
Safety satisfaction & feedback	Goodness of fit Omnibus Tests of Model Coefficients Chi-square = 139.657, df = 18, p-value = 0.000 Hosmer and Lemeshow Test Chi-square = 8.086, df = 8, p-value = 0.425	gender: female	0.501	0.142	1.650	0.846 – 3.216
		age: 25 – 39 years	-0.356	0.450	0.700	0.278 – 1.765
		age: 40 years & above	0.247	0.665	1.280	0.419 – 3.911
		ethnicity: Chinese	0.370	0.457	1.447	0.546 – 3.837
		ethnicity: Indian	0.396	0.541	1.486	0.417 – 5.295
		ethnicity: Others	-0.415	0.598	0.660	0.142 – 3.082
		*education level: School level		0.030		
		education level: Cert. & Diploma	-0.480	0.102	0.619	0.348 – 1.100
		education level: University degree	-1.358	0.016	0.257	0.085 - 0.776
		Job position: non-medical	-0.399	0.236	0.671	0.347 – 1.298

*Reference value

Dependent variable	Model characteristics	Enter method				
		Predictors Variables	B	p-value	Odds Ratio	95% C. I.
Safety satisfaction & feedback	Goodness of fit Omnibus Tests of Model Coefficients Chi-square = 139.657, df = 18, p-value = 0.000 Hosmer and Lemeshow Test Chi-square = 8.086, df = 8, p-value = 0.425	Length of employment: 2.1 - 6 years	-0.003	0.993	0.997	0.453 – 2.192
		Length of employment: 6.1 - 15 years	-0.023	0.955	0.977	0.433 – 2.206
		Length of employment: 15.1 years & above	-0.386	0.435	0.680	0.258 – 1.792
		The role of the supervisor	0.350	0.360	1.419	0.671 - 3.003
		Leadership style	0.031	0.877	1.032	0.696 – 1.530
		Training & competence	0.204	0.487	1.226	0.690 – 2.178
		Health & safety objective	1.627	0.000	5.089	2.533 - 10.226
		Management commitment	0.682	0.032	1.978	1.062 - 3.682
		Safety reporting	0.513	0.097	1.671	0.912 – 3.061
		Constant	-13.316			

Table 4.59: Logistic regression: Forward method for predicting the dependent variable: safety satisfaction & feedback

Dependent variable	Model characteristics	Forward method				
Safety satisfaction & feedback	<u>Goodness of fit</u> <u>Omnibus Tests of Model Coefficients</u> Chi-square = 127.259, df = 5, p-value = 0.000 <u>Hosmer and Lemeshow Test</u> Chi-square = 15.907, df = 8, p-value = 0.044	Predictors Variables	B	p-value	Odds Ratio	95% C. I.
		*education level: school level		0.013		
		education level: Cert. & Diploma	-0.378	0.144	0.686	0.413 - 1.138
		education level: University degree	-1.496	0.005	0.224	0.079 - 0.639
		Health & safety objective	1.669	0.000	5.306	2.812 - 10.012
		Management commitment	0.826	0.005	2.284	1.275 – 4.092
		Safety reporting	0.713	0.010	2.041	1.186 – 3.512
		Constant	-12.523			

*Reference value

Table 4.60: Logistic regression: Backward method for predicting the dependent variable: safety satisfaction & feedback

Dependent variable	Model characteristics	Backward method				
Safety satisfaction & feedback	<u>Goodness of fit</u> <u>Omnibus Tests of Model Coefficients</u> Chi-square = 130.019, df = 6, p-value = 0.000 <u>Hosmer and Lemeshow Test</u> Chi-square = 8.532, df = 8, p-value = 0.383	Predictors Variables	B	p-value	Odds Ratio	95% C. I.
		gender: female	0.540	0.102	1.716	0.898- 3.278
		*education level: school level		0.028		
		education level: Cert. & Diploma	-0.376	0.147	0.686	0.413 – 1.141
		education level: University degree	-1.340	0.013	0.262	0.091 - 0.753
		Health & safety objective	1.736	0.000	5.673	2.974 - 10.824
		Management commitment	0.798	0.008	2.222	1.235 - 3.998
		Safety reporting	0.707	0.012	2.028	1.172 – 3.511
		Constant	-13.097			

*Reference value

Table 4.61: Logistic regression: Final model for predicting the dependent variable: safety satisfaction and feedback

Dependent variable	Model characteristics	Enter method – Final model				
		Predictors Variables	B	p-value	Odds Ratio	95% C. I.
Safety satisfaction & feedback	Goodness of fit Omnibus Tests of Model Coefficients Chi-square = 127.259, df = 5, p-value = 0.000 Hosmer and Lemeshow Test Chi-square = 15.907, df = 8, p-value = 0.044	*education level: school level		0.013		
		education level: Cert. & Diploma	-0.378	0.144	0.686	0.413 - 1.138
		education level: University degree	-1.496	0.005	0.224	0.079 - 0.639
		Health & safety objective	1.669	0.000	5.306	2.812 - 10.012
		Management commitment	0.826	0.005	2.284	1.275 – 4.092
		Safety reporting	0.713	0.010	2.041	1.186 - 3.512
		Constant	-12.523			

*Reference value

ii. Safety incidents/accidents: accidents

Table 4.62: Logistic regression: Enter method for predicting the dependent variable: accidents

Dependent variable	Model characteristics	Enter method				
		Predictors Variables	B	p-value	Odds Ratio	95% C. I.
Accidents	Goodness of fit Omnibus Tests of Model Coefficients Chi-square = 36.604, df = 18, p-value = 0.006 Hosmer and Lemeshow Test Chi-square = 6.810, df = 8, p-value = 0.557	gender: female	0.113	0.671	1.120	0.665 - 1.887
		age: 25 – 39 years	-0.168	0.655	0.846	0.405 – 1.764
		age: 40 years & above	-0.383	0.409	0.682	0.274 – 1.693
		ethnicity: Chinese	0.046	0.909	1.047	0.476 – 2.304
		ethnicity: Indian	-0.401	0.482	0.669	0.219 – 2.051
		ethnicity: Others	-0.813	0.333	0.444	0.086 – 2.301
		education level: Cert. & Diploma	-0.011	0.964	0.989	0.605 – 1.616
		education level: University Degree	0.441	0.223	1.554	0.765 – 3.155
		Job position: Non-medical	0.248	0.356	1.281	0.757 – 2.169
		Length of employment: 2.1 - 6 years	-0.017	0.958	0.984	0.528 – 1.831
		Length of employment: 6.1 - 15 years	-0.097	0.775	0.907	0.465 – 1.771
		Length of employment: 15.1 years & above	-0.292	0.470	0.747	0.338 – 1.650

Dependent variable	Model characteristics	Enter method				
Accidents	Goodness of fit Omnibus Tests of Model Coefficients Chi-square = 36.604, df = 18, p-value = 0.006 Hosmer and Lemeshow Test Chi-square = 6.810, df = 8, p-value = 0.557	Predictors Variables	B	p-value	Odds Ratio	95% C. I.
		The role of the supervisor	-0.631	0.025	0.532	0.307 - 0.923
		Leadership style	0.389	0.020	1.476	1.063 – 2.049
		Training & competence	0.268	0.262	1.308	0.818 – 2.089
		Health & safety objective	0.298	0.218	1.347	0.838 – 2.164
		Management commitment	-0.676	0.006	0.509	0.313 - 0.826
		Safety reporting	-0.368	0.128	0.692	0.431 – 1.112
		Constant	2.474			

Table 4.63: Logistic regression: Forward method for predicting the dependent variable: accidents

Dependent variable	Model characteristics	Forward method				
		Predictors Variables	B	p-value	Odds Ratio	95% C. I.
Accidents	Goodness of fit Omnibus Tests of Model Coefficients Chi-square = 16.360, df = 1, p-value = 0.000 Hosmer and Lemeshow Test Chi-square = 13.089, df = 6, p-value = 0.042	Management commitment	-0.703	0.000	0.495	0.349 – 0.702
		Constant	2.030			

Table 4.64: Logistic regression: Backward method for predicting the dependent variable: accidents

Dependent variable	Model characteristics	Backward method				
		Predictors Variables	B	p-value	Odds Ratio	95% C. I.
Accidents	Goodness of fit Omnibus Tests of Model Coefficients Chi-square = 22.696, df = 4, p-value = 0.000 Hosmer and Lemeshow Test Chi-square = 4.286, df = 8, p-value = 0.830	The role of the supervisor	-0.514	0.037	0.598	0.368- 0.970
		Leadership style	0.369	0.022	1.447	1.055 – 1.985
		Management commitment	-0.643	0.003	0.526	0.344 – 0.803
		Constant	2.470			

Table 4.65: Logistic regression: Final model for predicting the dependent variable: accidents

<table>
<tr><td>Dependent variable</td><td>Model characteristics</td><td colspan="5">Enter method – Final model</td></tr>
<tr><td rowspan="5">Accidents</td><td rowspan="5"><u>Goodness of fit Omnibus Tests of Model Coefficients</u>
Chi-square = 22.696, df = 3, p-value = 0.000

<u>Hosmer and Lemeshow Test</u>
Chi-square = 9.086, df = 8, p-value = 0.335</td><td>Predictors Variables</td><td>B</td><td>p-value</td><td>Odds Ratio</td><td>95% C. I.</td></tr>
<tr><td>The role of the supervisor</td><td>-0.514</td><td>0.037</td><td>0.598</td><td>0.368- 0.970</td></tr>
<tr><td>Leadership style</td><td>0.369</td><td>0.022</td><td>1.447</td><td>1.055 – 1.985</td></tr>
<tr><td>Management commitment</td><td>-0.643</td><td>0.003</td><td>0.526</td><td>0.344 – 0.803</td></tr>
<tr><td>Constant</td><td>2.470</td><td></td><td></td><td></td></tr>
</table>

iii. Safety incidents/accidents: Injuries

Table 4.66: Logistic regression: Enter method for predicting the dependent variable: Injuries

Dependent variable	Model characteristics	Enter method				
		Predictors Variables	B	p-value	Odds Ratio	95% C. I.
Injuries	Goodness of fit Omnibus Tests of Model Coefficients Chi-square = 36.007, df = 18, p-value = 0.007 Hosmer and Lemeshow Test Chi-square = 2.999, df = 8, p-value = 0.934	gender: female	0.553	0.073	1.738	0.949 - 3.184
		age: 25 – 39 years	-0.726	0.165	0.484	0.174 – 1.348
		age: 40 years & above	-1.003	0.103	0.367	0.110 – 1.226
		ethnicity: Chinese	0.497	0.356	1.645	0.572 – 4.727
		ethnicity: Indian	0.399	0.562	1.491	0.387 – 5.743
		ethnicity: Others	1.089	0.316	2.972	0.354 – 24.977
		education level: Certificate & Diploma	0.306	0.320	1.358	0.743 – 2.482
		education level: University degree	0.289	0.521	1.335	0.553 – 3.226
		Job position: non-medical	-0.262	0.414	0.770	0.411 – 1.442
		*Length of employment: Less than or equal to 2 years		0.004		
		Length of employment: 2.1 - 6 years	1.438	0.001	4.211	1.869 – 9.488
		Length of employment: 6.1 - 15 years	0.952	0.020	2.591	1.161 – 5.780
		Length of employment: 15.1 years & above	0.717	0.120	2.049	0.830 – 5.056

*Reference value

<table>
<tr><th>Dependent variable</th><th>Model characteristics</th><th colspan="5">Enter method</th></tr>
<tr><td rowspan="8">Injuries</td><td rowspan="8"><u>Goodness of fit</u>
<u>Omnibus Tests of Model Coefficients</u>
Chi-square = 36.007, df = 18, p-value = 0.007

<u>Hosmer and Lemeshow Test</u>
Chi-square = 2.999, df = 8, p-value = 0.934</td><td>Predictors Variables</td><td>B</td><td>p-value</td><td>Odds Ratio</td><td>95% C. I.</td></tr>
<tr><td>The role of the supervisor</td><td>-0.680</td><td>0.059</td><td>0.506</td><td>0.250 – 1.027</td></tr>
<tr><td>Leadership style</td><td>0.083</td><td>0.669</td><td>1.086</td><td>0.744 – 1.586</td></tr>
<tr><td>Training & competence</td><td>-0.005</td><td>0.986</td><td>0.995</td><td>0.563 – 1.760</td></tr>
<tr><td>Health & safety objective</td><td>0.188</td><td>0.533</td><td>1.207</td><td>0.668 – 2.180</td></tr>
<tr><td>Management commitment</td><td>-0.504</td><td>0.092</td><td>0.604</td><td>0.336 – 1.085</td></tr>
<tr><td>Safety reporting</td><td>0.025</td><td>0.932</td><td>1.026</td><td>0.573 – 1.836</td></tr>
<tr><td>Constant</td><td>4.080</td><td></td><td></td><td></td></tr>
</table>

Table 4.67: Logistic regression: Forward method for predicting the dependent variable: injuries

Dependent variable	Model characteristics	Forward method				
		Predictors Variables	B	p-value	Odds Ratio	95% C. I.
Injuries	Goodness of fit Omnibus Tests of Model Coefficients Chi-square = 20.432, df = 4, p-value = 0.000 Hosmer and Lemeshow Test Chi-square = 7.147, df = 8, p-value = 0.521	*Length of employment: Less than or equal to 2 years		0.022		
		Length of employment: 2.1 - 6 years	1.071	0.005	2.920	1.370 – 6.221
		Length of employment: 6.1 - 15 years	0.699	0.052	2.011	0.994 – 4.070
		Length of employment: 15.1 years & above	0.218	0.487	1.244	0.672– 2.302
		Management commitment	-0.665	0.004	0.514	0.326 – 0.812
		Constant	3.327			

*Reference value

Table 4.68: Logistic regression: Backward method for predicting the dependent variable: injuries

<table>
<tr><th>Dependent variable</th><th>Model characteristics</th><th colspan="5">Backward method</th></tr>
<tr><td rowspan="9">Injuries</td><td rowspan="9">Goodness of fit
Omnibus Tests of Model Coefficients
Chi-square = 27.224, df = 7, p-value = 0.000

Hosmer and Lemeshow Test
Chi-square = 16.039, df = 8, p-value = 0.042</td><td>Predictors Variables</td><td>B</td><td>p-value</td><td>Odds Ratio</td><td>95% C. I.</td></tr>
<tr><td>Gender: female</td><td>0.596</td><td>0.043</td><td>1.816</td><td>1.019 – 3.236</td></tr>
<tr><td>*Length of employment: Less than or equal to 2 years</td><td></td><td>0.012</td><td></td><td></td></tr>
<tr><td>Length of employment: 2.1 - 6 years</td><td>1.184</td><td>0.003</td><td>3.267</td><td>1.512 – 7.059</td></tr>
<tr><td>Length of employment: 6.1 - 15 years</td><td>0.722</td><td>0.047</td><td>2.058</td><td>1.011 – 4.189</td></tr>
<tr><td>Length of employment: 15.1 years & above</td><td>0.227</td><td>0.474</td><td>1.255</td><td>0.674 – 2.338</td></tr>
<tr><td>The role of the supervisor</td><td>-0.501</td><td>0.078</td><td>0.606</td><td>0.347 – 1.058</td></tr>
<tr><td>Management commitment</td><td>-0.443</td><td>0.103</td><td>0.642</td><td>0.377 – 1.094</td></tr>
<tr><td>Constant</td><td>3.834</td><td></td><td></td><td></td></tr>
</table>

*Reference value

Table 4.69: Logistic regression: Final model for predicting the dependent variable: injuries

Dependent variable	Model characteristics	Enter method – Final model				
Injuries	<u>Goodness of fit</u> <u>Omnibus Tests of Model Coefficients</u> Chi-square = 27.224, df = 6, p-value = 0.000 <u>Hosmer and Lemeshow Test</u> Chi-square = 6.877, df = 8, p-value = 0.550	Predictors Variables	B	p-value	Odds Ratio	95% C. I.
		Gender: female	0.596	0.043	1.816	1.019 – 3.236
		*Length of employment: Less than or equal to 2 years		0.012		
		Length of employment: 2.1 - 6 years	1.184	0.003	3.267	1.512 – 7.059
		Length of employment: 6.1 - 15 years	0.722	0.047	2.058	1.011 – 4.189
		Length of employment: 15.1 years & above	0.227	0.474	1.255	0.674 – 2.338
		The role of the supervisor	-0.501	0.078	0.606	0.347 – 1.058
		Management commitment	-0.443	0.103	0.642	0.377 – 1.094
		Constant	3.834			

*Reference value

Table 4.70: Summary of the logistic regression analysis

OBJECTIVE 2		Safety satisfaction & feedback (first to last order)
to examine whether the elements of OHS management are viewed as supportive or preventive factors to the implementation of OHS management system in Malaysian public hospitals	Enter method	1. Education level: university degree 2. Health and safety objectives 3. Management commitment 4. Safety reporting
	Forward method	1. Education level: university degree 2. Health and safety objectives 3. Management commitment 4. Safety reporting
	Backward method	1. Education level: university degree 2. Health and safety objectives 3. Management commitment 4. Safety reporting
	Final model – Enter method	1. Education level: university degree 2. Health and safety objectives 3. Management commitment 4. Safety reporting

OBJECTIVE 2		Accidents (first to last order)
to examine whether the elements of OHS management are viewed as supportive or preventive factors to the implementation of OHS management system in Malaysian public hospitals	Enter method	1. The role of the supervisor 2. Leadership style 3. Management commitment
	Forward method	1. Management commitment
	Backward method	1. The role of the supervisor 2. Leadership style 3. Management commitment
	Final model – Enter method	1. The role of the supervisor 2. Leadership style 3. Management commitment

OBJECTIVE 2		Injuries (first to last order)
to examine whether the elements of OHS management are viewed as supportive or preventive factors to the implementation of OHS management system in Malaysian public hospitals	Enter method	1. Gender: female 2. Length of employment: 2.1 – 6 years 3. Length of employment: 6.1 – 15 years 4. The role of the supervisor 5. Management commitment
	Forward method	1. Length of employment: 2.1 – 6 years 2. Length of employment: 6.1 – 15 years 3. Management commitment
	Backward method	1. Gender: female 2. Length of employment: 2.1 – 6 years 3. Length of employment: 6.1 – 15 years 4. The role of the supervisor
	Final model – Enter method	1. Gender: female 2. Length of employment: 2.1 – 6 years 3. Length of employment: 6.1 – 15 years 4. The role of the supervisor

Appendix 19

Results of the Open-Ended Question

Table 4.73: Results of the open-ended question

No.	Resp. #	Gender	Length of employment	Comments on OHS practices
1.	8	male	2.1 – 6 years	need to change lead gowns. Need lead lines doors and goggles. Need to have HIV cocktail. Need monitoring of radiation. Need better gloves
2.	17	male	6.1 – 15 years	to organize internal training regarding OSH. Create partnership with Fire Brigade & Public Defense Dept for exhibition and safety talk. Poster and brochure of safety awareness
3.	18	female	Less than or equal to 2 years	All hospital staff should be given awareness regarding OSH practices
4.	22	female	6.1 – 15 years	Provide a safe, clean & broader working environment. 2) Provide more staff so that job can be shares and no feeling of stress 3) provide a harmonious working environment by increasing more good facilities
5.	23	female	15 years & above	1) provide a safe working environment 2) Create a harmonious working condition to avoid stress
6.	29	female	2.1 – 6 years	Overall OK
7.	36	male	2.1 – 6 years	Overall OK
8.	37	female	Less than or equal to 2 years	1) Cooperation among staff is necessary 2) information about OSH should be shared to increase performance and protection of staff
9.	45	female	6.1 – 15 years	1) Continuous teaching education must be done every week for paramedic especially who deals directly with patients. 2) The supervisor must participate in brainstorming and considers staff suggestions
10.	48	male	15 years & above	very good and updated
11.	49	male	2.1 – 6 years	1) Workstation design is not wide 2) Small store to accommodate many things 3) Wide workstation is only allocate for critical unit and dept.
12.	55	female	15 years & above	1) PPE usage is practiced here 2) Usage of special chair for seated work

No.	Resp. #	Gender	Length of employment	Comments on OHS practices
13.	57	female	15 years & above	1) Long gloves not provided to be used for washing equipment as solution used to clean equipment is dangerous to skin 2) Safety boot not provided to work in unclean zone 3) Noisy place with vacuum cleaner
14.	63	male	2.1 – 6 years	to be honest, I'm not aware of any health and safety measure, but I do know basic protective gear attire/equipment & universal precaution
15.	78	female	15 years & above	1) Dilute chemo drug is done in the ward and expose to staff and patients 2) safety of workers - big and heavy oxygen cylinder is still being used in ward where workers need to carry and push this cylinder from store to patient. This cause backache
16.	80	male	15 years & above	1) OSH practices is individual affairs & some not even aware of it 2) There is no total approach from management in implementing safety system. Implementation is the responsibility of each dept/unit 3) no compensation for staff who meet with accident at workplace
17.	84	female	Less than or equal to 2 years	The supervisor must provide good welfare and staff be made comfortable
18.	98	male	15 years & above	1) Noisy workplace 2) Workstation not wide 3) Not comfortable and needs new building
19.	104	male	15 years & above	1) Motivation and awareness from management is necessary 2) Courses from time to time is necessary to upgrade knowledge of staff
20.	105	male	15 years & above	1) OSH practices should be implemented in all working places as an on-going program continuously and should be monitored monthly by an appointed committee
21.	106	male	2.1 – 6 years	Our dept is moving towards digital imaging to eliminate staff exposure to chemicals in daily work
22.	189	female	Less than or equal to 2 years	Lower category of staff has to follow the top management instruction even though at times we are not satisfied. We are not given the right to say what we want to say. Only our supervisor keeps on motivating us to do our jobs efficiently.
23.	218	female	2.1 – 6 years	Preparation of cytotoxic medicine is being done in the treatment room and not in special room. This practice is not complying with safety procedure and staff is exposed to this risk.

No.	Resp. #	Gender	Length of employment	Comments on OHS practices
24.	239	female	2.1 – 6 years	Staff still exposed to chemotherapy
25.	242	male	2.1 – 6 years	PPE not given to staff while performing work
26.	245	female	2.1 – 6 years	Staff still exposed to chemotherapy
27.	264	male	15 years & above	OSH practices is satisfactory
28.	268	male	6.1 – 15 years	preparation of chemo drugs is done in the clinic setting for day-care cases. Should be constituted in a proper set-up place for safety
29.	279	female	Less than or equal to 2 years	lack of monitoring on staff vehicle safety
30.	283	male	15 years & above	we have good OSH practices in the workplace
31.	290	female	6.1 – 15 years	organize workshop on OSH issues to increase staff knowledge
32.	294	female	15 years & above	Conduct courses on OSH
33.	295	female	15 years & above	Conduct courses on OSH
34.	303	female	Less than or equal to 2 years	Staff must be motivated and given awareness on the importance of OSH in the workplace. OSH committee members must go from ward to ward to give 5-10 minutes talk on OSH awareness.
35.	304	male	Less than or equal to 2 years	cooperation among staff on OSH issues is important no matter among top management or lower level employees
36.	314	female	15 years & above	training should be given from time to time to ensure everybody get information clearly and to avoid making mistake
37.	317	female	2.1 – 6 years	there's no safety when sending patient from ward to the labour room at night as the distance is far
38.	318	female	6.1 – 15 years	there's no safety when sending patient from ward to the labour room at night as the distance is far
39.	319	female	2.1 – 6 years	there's no safety when sending patient from ward to the labour room at night as the distance is far
40.	329	male	15 years & above	most staff face stress caused by patients who do not want to queue for their turn; ego of patients, patients who do not follow procedures. When reported to Director or Head of Dept, staff was blamed for not entertaining patients accordingly.

No.	Resp. #	Gender	Length of employment	Comments on OHS practices
41.	357	male	15 years & above	management should concentrate on health, safety and welfare of staff especially lower category staff
42.	360	female	15 years & above	Overloaded works cause stress to staff. Action taken for complaints only after bad incident/accident had happened.
43.	367	female	Less than or equal to 2 years	Untidy arrangement of equipment in fixtures and narrow pathway affected our focus to work efficiently
44.	383	female	Less than or equal to 2 years	still at the level of below optimum
45.	393	female	6.1 – 15 years	no special place to wash used equipments and to throw patient's blood
46.	395	female	15 years & above	the structure of the layout is not ideal, no isolation cubicles for ingestion patient, shortage of staff, too many cables lying on the floor, wet floor due to disconnecting pipes for dialysis, fire hazard due to air-condition, no proper storage for equipment
47.	396	female	15 years & above	no proper place for washing instruments, ICU caught fire twice but no proper advice/plan been given to nursing staff, wet floor, cables on the floor, structure of workplace too congested, fire drills training should be given on a rotation basis
48.	399	female	2.1 – 6 years	safety and health rules should be displayed in every unit, organize safety and health workshop from time to time, changes in safety and health practices should be informed as soon as possible
49.	414	female	15 years & above	I was never been brief on OSH practices

Theme

i. Continuous education and training on OSH

ii. Awareness training

iii. Personal protective equipment (PPE) not from good quality

iv. Hospital environment not conducive for working

v. Sharing of OSH information

vi. Workstation design not comfortable

vii. Ergonomics issues

viii. The role of the supervisor

ix. Effective safety communication

x. Exposure to dangerous substance without enough protection

xi. Cooperation among top management and employees

xii. Work stress

xiii. Improper disposal of waste

xiv. Safety rule not display