KNOWLEDGE, ATTITUDE AND PRACTICES (KAP) OF MUSCULOSKELETAL DISORDERS (MSDs) INJURIES IN MALAYSIA ELECTRONICS MANUFACTURING INDUSTRY

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ABSTRACT

Musculoskeletal disorders (MSDs) are among the most frequently reported occupational disease and have depicted increasing exposure trend from electronics manufacturing sector. There are limited studies about Knowledge, Attitude and Practices (KAP) on MSDs from employer and employee perspectives. Hence, it is necessary to discover the underlying KAP factors in order to provide interventions to prevent MSDs. This study aims to develop an appropriate KAP instrument, identify the pattern of KAP on MSDs from employee and employer perspective, and to compare the level of KAP on MSDs among employee and employer. The instrument were developed in four phases; literature review, pilot test, expert review and reliability test. A total of 79 employee data was compared and validated with 164 SOCSO claims data. The highest frequency of employee self-reported body pain shows lower back, hip, shoulder and upper back are among the top. Of 88 employer, majority shows higher level of good knowledge, attitude and practice scores compared to employee. From employee perspective, Spearman's correlation test shows education level correlate with knowledge and practice, gender and attitude, and age group and practice. From employer perspective, the correlation exist between education level and knowledge, and years of experience and practice. Multivariate analysis between KAP components for employee shows no correlation while for employer, there are relationship between attitude and practice, and knowledge and attitude. This study successfully developed an instrument to assess the current KAP levels of MSDs and compare them between employee and employer perspectives.

ABSTRAK

MSDs adalah antara penyakit pekerjaan yang kerap dilaporkan dan telah menunjukkan trend peningkatan dari sektor pembuatan elektronik. Terdapat hanya beberapa kajian tentang KAP terhadap MSDs dari perspektif majikan dan pekerja. Oleh itu, penting untuk mengetahui tahap KAP untuk langkah pencegahan MSDs. Objektif kajian ini adalah untuk menghasilkan instrumen KAP yang sesuai, mengenal pasti trend dan membandingkan tahap KAP dalam konteks MSDs antara perspektif pekerja dan majikan. Proses membangunkan instrumen melalui empat fasa; kajian lepas, ujian awal, maklum balas pakar dan ujian kebolehpercayaan. Sebanyak 79 data pekerja dibanding dan disahkan dengan 164 data pampasan PERKESO. Kekerapan aduan kesakitan yang tertinggi terdiri daripada tulang belakang, pinggul, bahu dan bahagian atas belakang. 88 orang majikan dan majoriti daripadanya menunjukkan skor baik KAP lebih tinggi berbanding pekerja. Dari perspektif pekerja, ujian korelasi Spearman menunjukkan tahap pendidikan berkaitan dengan pengetahuan dan amalan, jantina dan sikap, dan kumpulan umur dan amalan. Dari perspektif majikan, korelasi wujud antara tahap pendidikan dan pengetahuan, dan durasi bekerja dan amalan. Analisis multivariate antara komponen KAP menunjukkan tiada hubungan bagi perspektif pekerja, manakala dari perspektif majikan terdapat hubungan antara sikap dan amalan, dan pengetahuan dan sikap. Kajian ini berjaya membangunkan instrument mengenalpasti tahap terkini KAP mengenai MSDs dan membandingkannya di antara perspektif pekerja dan majikan.

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LIST OF ABBREVIATIONS

CI	- Confidence Interval
DOSH	- Department of Safe and Health
GDP	- Gross Domestic Product
KAP	- Knowledge, Attitude and Practices
LBP	- Low Back Pain
MIDA	- Malaysian Investment Development Authority
MSDs	- Musculoskeletal Disorders
NIHL	- Noise-Induced Hearing Loss
NIOSH	- National Institute for Occupational Safety and Health
NPD	- Non-Permanent Disability
OHS	- Occupational, Health and Safety
PD	- Permanent Disability
PPE	- Personal Protective Equipment
SHO	- Safety and Health Officer
SOCSO	- Social Security Organization
WHO	- World Health Organization

LIST OF SYMBOLS

α	- Cronbach's Alpha coefficient
d_i	- Difference between the ranks
k	- Items considered
r	- Mean of inter-item correlations
ρ	- Spearman rank correlation

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Musculoskeletal disorders (MSDs) are disorders of the muscles, tendons, joints, nerves, cartilage, and supporting structures of upper and lower limbs, neck, and lower back which were caused or worsened by extended exposure or abrupt exertion to physical factors such as awkward posture, force recurrence, or vibration (Bernard *et al*., 1997). MSDs take place when mechanical workload is higher than the physical capacity of the human body. This is a deep-rooted occupational illness occurring as a result of repeated trauma, rather than through a single accident or injury (Washington State Department of Labor and Industries, 2007). Generally, MSDs occurs in many parts of the human body including neck, upper limbs such as hands, wrists, elbows and shoulders, lower limbs including legs, hips, ankles and feet and lastly, back. Discomfort, fatigue and pain are the most common early symptoms of MSDs (Hagberg *et al*., 1995). These disorders will not cause death of workers but they will bring about a catastrophic impact on worker's lives such as constant pain during work or spare time, and maybe permanent disability.

MSDs are among the most frequently reported occupational diseases globally. The disease are not only a dominant occupational health issue internationally but they are also identified as an economic situation on community (Amell and Kumar, 2001). Furthermore, there are two category of costs usually associated to occupational illness which are direct costs and indirect costs. Direct cost commonly related to medical care, rehabilitation, and employees reimbursement while indirect costs comprise of sick leave, decreased productivity, re-training cost, work disablement, dropped work

quality, and declined morale (Deborah, 2003). The direct and indirect costs emerged from MSDs have been estimated at around US$100 million in Taiwan (Wei, 2000), US$254 billion in America (Kassi, 2004; Silverstein and Adams, 2005), and around $40 billion in the United Kingdom (Health and Safety Commision, 2006). 40% of the world's worker compensation claims are from MSDs approximately (Takala, 2002).

Malaysia is a middle-income in process to be a high-income country that counting on trade heavily, especially on the products of manufacturing industry. Manufacturing industry had chip in almost 28% of Malaysia Gross Domestic Product (GDP) and 16.8% of total Malaysia workforce in 2013 (Prime Minister's Department Malaysia, 2014). The electronics manufacturing industries in Malaysia are among the leading manufacturing sector in Malaysia, which contributing significantly to the country's exports (33.4%) and employment (27.3%) in 2014 (MIDA, 2015). A previous study performed by Abdullah and Abdul Rahman (2009) showed that operators in semi-conductor industries were exposed to extremely high ergonomics risk factors. MSDs has also been closely connected to organization where absenteeism, turnover, time performance, productivity, morale, work disability and accidents occasionally occurs (Buckle, 2005). Hence, it is necessary to discover the factors of MSDs in the manufacturing industry before implementing any intervention or prevention strategies.

1.2 Problem Statement

Manufacturing sector especially electronics industry are few of the vital contributors to Malaysian economy. Within the electronic components sub-sector, the semiconductor devices have been the leading contributor in the performance of exports for the electronics industry. In 2014 alone, the electronic components sub-sector became the largest sub-sector with approved investment of RM5.8 billion. Meanwhile, the industrial electronics sub-sector is the second largest sub-sector, comprising 28% of the total investments approved in the electronics sector for 2014 (MIDA, 2015). To date, there are more than 50 big electronics companies in Malaysia such as Intel, AMD, Infineon, STMicroelectronics, Silterra, Texas Instruments, Unisem and so on. Hence,

high occupational accidents certainly will give impact to the companies' production and productivity. Decreased workers productivity will absolutely cause an adversarial effect to the economy. Occupational accident would definitely causes significant implications to the employers, employees and even to the nation as a whole in term of financial aspect, company image and quality of life. For employers, they shall not only expect lower productivity but also loss of profit due to force closure or stop work order that being issued by enforcement agency (Jallon *et al*., 2011).

While many of past literatures have discovered extensive information of MSDs injuries, physical risk factors and prevalence rate, the underlying reasons or hazards of MSDs psychological risk factors occurrence among electronic manufacturing workers especially in Malaysia have not yet been in a clear picture. As physical risk factors interventions such as reengineering is important to MSDs studies, we must also focus on personal or behavioral intervention such as through knowledge, attitude and practice enhancement. The blurry status of psychological risk factors and MSDs is possible due to absence of standardized methods and means of assessment. Unfortunately, there is no specific instrument to examine causes of MSDs in term of knowledge, attitude and practices in Malaysia electronics manufacturing industries from employee and employer perspective for the time being.

With a clear picture of knowledge, this could help both workers and employers to change or upgrade their attitude and comply with safe practices. Most of the workers in electronics manufacturing industries have a perceived concept about occupational injuries. They may be aware that there are consequences associated with not working in a friendly environment but the technical power of their intelligent quotient cannot allow them to sense danger due to lack of knowledge or awareness on repercussion or even if they are aware of a particular hazard, some of them tend to take risk due to attitude differences among workers leading to poor practice.

1.3 Objectives of Study

The objectives of the study are as follows:

1. To develop an instrument appropriate for assessing KAP on MSDs in Malaysia electronics industries

2. To assess the pattern of KAP on MSDs with respect to employee and employer perspective

3. To compare the level of KAP on MSDs between employee and employer perspectives

1.4 Scope of Study

There are several scopes and limitations covered in this study in order to guarantee it will be carried out in compact and relevant means. The scopes and limitations are as follows:

i. Cover on electronics manufacturing industries
ii. Covers Malaysian workers only
iii. Employee data from sample are validated with SOCSO database of past MSDs permanent disability cases during year 2009 to 2014
iv. Includes four cases among accidents cases which showed high compensation claims:
    a) Strenuous movements,
    b) Over-exertion in lifting objects,
    c) Over-exertion in pushing or pulling objects,
    d) Over-exertion in handling or throwing objects.
v. Consider MSDs caused by work nature only
vi. Descriptive and statistical analysis were done using SPSS software version 22

1.5 Significance of Study

MSDs have become a subject of growing concern among populations in the industrialized countries during the last two to three decades. MSDs are still common in the working populations although mechanization, automation and the concepts of intensive safety campaigns have contributed to a safer working environment. These disorders may cause considerable human suffering and result in a lower work capacity and reduced production (Lee *et al*., 2005). Workplace accidents remain as the number one issue in Occupational, Health and Safety (OHS) that needs extra and urgent attention in Malaysia especially in electronic manufacturing industries. Injured workers not only suffers from pain or discomfort, but there are possibilities for them to experience temporary or permanent disabilities. This will surely effect their daily routine and work productivity alongside the loss of household income.

Statistics provided by DOSH and past literatures have revealed that electronics manufacturing sector had become one of the main contributors in occupational injury in past years. Although number of reported cases had reduced significantly, the electronic manufacturing sector still appears at the top of the chart. Reduction in term number of reported cases does not mean MSDs cases are smaller but there are high possibilities they are not being reported by workers due to many reasons.

As both physical evidence and psychosocial association should be taken into account when treating this problem, the increased level of awareness will aid in better management of MSDs. Understanding the KAP on MSDs will increase the awareness level of industry workers, which is often overlooked by most organization. On the other hand, awareness should not only come from the employee side only, but the management or the employers also should take part to enhance good work practices and administer better preventive measures in the work area. Thus, it is important to study the extent of KAP from the employee and employer perspective on MSDs in order to evaluate and provide suitable interventions to increase the awareness of MSDs. When both parties strive together to provide safer working environment and preventing the occurrence of MSDs, the problem could be prevented and avoided.

The aim of this study is not only to increase level of awareness, but also to encourage employee and the management to invest more in preventive measures. According to Dorman (2000), workplace accident cost can be reduced effectively through accident prevention approach. Relating to Malaysia perspective, this study will assist the Safety and Health Officer (SHO) to enhance their role in an organization by understanding in depth of knowledge, attitude and practice of MSDs from their employee perspective. As the saying goes, prevention is better than cure. Other than that, several studies on the KAP of both employee and employer engaged in different industries have been published but in the context of electronics manufacturing in Malaysia are still limited. Therefore, the purpose of this study is to assess the level of KAP on MSDs in Malaysia electronics manufacturing industry from employee and employer perspective.

1.6 Document Organization

This document contains five chapters altogether which is Chapter 1 (Introduction), Chapter 2 (Literature Review), Chapter 3 (Methodology), Chapter 4 (Results and Discussions) and Chapter 5 (Conclusion). The chapters' summaries are as follows:

i. Chapter 1 discusses about the basic of MSDs alongside its effects in electronics manufacturing industries. We also discuss about the problem statement, objectives of study, scope and significance of the study.

ii. Chapter 2 discusses about the background study that explains more in depth about MSDs, KAP instrument and related past literatures.

iii. Chapter 3 explains about the research methodology. How the research were conducted in order to collect data, analyze and to achieve the objectives of study mentioned.

iv. Chapter 4 explains about the result and discussion based on past literatures. This chapter will cover on the descriptive and statistical analysis from the database, and the KAP questionnaire of employee and employer perspectives.

v. Chapter 5 discusses about the objectives fulfillment at the end of this study, study limitations and possible future works.

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