UNIVERSITI PUTRA MALAYSIA

KNOWLEDGE, ATTITUDE AND PRACTICES (KAP) ON THE PREVENTION OF MUSCULOSKELETAL DISORDERS (MSD) AMONG PRODUCTION LINE WORKERS

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BY

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Thesis submitted in partial requirement for the degree of Bachelor of Science (Environmental And Occupational Health) from Faculty of Medicine and Health Sciences, Universiti Putra Malaysia

ACKNOWLEDGEMENT

Thank Allah SWT, the Almighty, the All-knowing who has given me the time, blessing, assistance, guidance and tenacity to finish this thesis. Foremost, I would like to express my gratitude to my dear supervisor, Prof Dr Shamsul Bahri Mohd Tamrin for his guidance and constant supervision as well as providing a lot of help and assistance regarding to this project. His invaluable help with constructive comments and suggestions throughout the project phase and thesis writing has contributed to the success of this research.

This research would not have been completed within the timeline without the helpful hands of my research team and fellow friends. They have supported me, remind me, helping and easing the burden throughout the process. Also special thanks to the organizations involved in this research, whose provide permission, assistance and help to ease the journey of my research.

I also would like to dedicate this work to my family for the words of encouragement and unwavering supports that made it possible for me to complete my study within time. Last but not least, my sincere appreciation also goes to my lecturers, coursemates and everyone else who contributed ideas and suggestions in making my research successful.

Finally, I would like to thank all tose who have contributed in making this study a success no matter how small your contribution might be. May Allah SWT bless all of us.

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ABSTRACT

Introduction: Musculoskeletal disorders (MSD) are one of the most often reported occupational diseases, with a rising pattern of exposure from manufacturing sector as the workers were exposed to ergonomics risk factor that contribute to development to MSD. Knowledge, attitude and practices (KAP) survey gather information on what workers know, what workers think, and what workers done in MSD prevention to discover misconceptions or misunderstandings that might act as barriers to implement desired activities or interventions. **Objective**: This study aimed to measure the level of knowledge, attitude and practices (KAP) on prevention of MSD among the respondents and its association with prevalence of MSD. **Methodology**: Cross-sectional study was conducted on production line workers at a manufacturing company in Bangi, Selangor. A total of 138 production line workers were enrolled in this study and were required to answer a set of questionnaires adapted from previous study consisting of three sections to assess the level of KAP on prevention of MSD. Then, the data analysis was performed by using SPSS version 25 for descriptive and bivariate analysis. **Result and Discussion**: The result showed that the prevalence of MSD among the production line workers in any body parts is high (88.4%), low back pain reported the highest (79.0%) whereas left thigh pain reported less prevalent of MSD (35.5%) among participants. Also, the results showed majority of the participants have a moderate level of KAP which was 77%, 57% and 68% respectively. Attitude on prevention of MSD was significantly associated with education level (p=0.004). The level of KAP also significantly associated with the prevalence of MSD (χ^2=5.345, p=0.038 for knowledge, χ^2=7.715, p=0.017 for attitude and χ^2=7.496, p=0.020 for practice). **Conclusion**: These findings indicated that KAP of the production workers are important to tackle occupational disease includes MSD. The level of KAP was significantly affecting prevalence of MSD. This study concludes that training and seminar on ergonomics should be conducted in the organization to increase the level of KAP of the workers.

Keywords: Knowledge, attitude, practices, prevention of musculoskeletal disorders, production line workers

PENGETAHUAN, SIKAP DAN PRAKTIS TERHADAP PENCEGAHAN PENYAKIT MUSKULOSKELETAL DI KALANGAN PEKERJA BARISAN PENGELUARAN

NURUL ADILA BINTI MOHAMAD NOR'AINI

ABSTRAK

Pendahuluan: Penyakit muskuloskeletal adalah antara penyakit pekerjaan yang paling kerap dilaporkan, dengan menunjukkan peningkatan dalam sektor pembuatan, di mana pekerja pengeluaran terdedah kepada factor risiko ergonomik yang menyumbang kepada berlakunya penyakit muskuloskeletal. Tinjauan pengetahuan, sikap dan praktis mengumpulkan maklumat mengenai apa yang pekerja tahu, apa yang difikirkan oleh pekerja, dan apa yang dilakukan oleh pekerja dalam pencegahan MSD untuk mengenalpasti kesalahpahaman yang mungkin bertindak sebagai penghalang untuk melaksanakan aktiviti atau intervensi. **Objektif**: Kajian ini bertujuan untuk mengkaji tahap pengetahuan, sikap dan praktis (KAP) mengenai pencegahan penyakit muskuloskeletal dalam kalangan responden dan kaitannya dengan prevalens penyakit muskuloskeletal. **Kaedah**: Kajian keratin rentas yang dilakukan di sebuah kilang pembuatan di Bangi, Selangor. Sebanyak 138 pekerja pengeluaran telah terlibat dalam kajian dan diminta untuk menjawab satu set soal selidik yang diubah suai dari kajian lepas yang terdiri daripada tiga bahagian untuk menilai tahap pengetahuan, sikap dan praktis mengenai pencegahan penyakit muskuloskeletal. Kemudian, analisis data dilakukan dengan menggunakan SPSS versi 25. **Keputusan dan perbincangan**: Hasil dari kajian ini menunjukkan bahawa prevalens penyakit muskuloskeletal dalam kalangan pekerja barisan pengeluaran di mana-mana bahagian badan adalah tinggi (88.4%), sakit belakang dilaporkan paling tinggi (79.0%), manakala sakit peha kiri dilaporkan paling rendah (35.5%) dalam kalangan responden. Keputusan dari kajian ini menunjukkan bahawa sebahagian besar responden mempunyai tahap pengetahuan, sikap dan praktis yang sederhana di mana masing-masing 77%, 57% dan 68%. Sikap terhadap pencegahan penyakit muskuloskeletal dikaitkan secara signifikasi dengan tahap pendidikan ($p=0.002$). Tahap pengetahuan, sikap dan praktis juga mempunyai kaitan yang signifikasi dengan prevalens penyakit musculoskeletal ($\chi^2=5.345$, $p=0.038$ untuk pengetahuan, $\chi^2=7.715$, $p=0.017$ untuk sikap and $\chi^2=7.496$, $p=0.020$ untuk praktis). **Kesimpulan**: Hasil kajian menunjukkan bahawa pengetahuan, sikap dan praktis pekerja pengeluaran untuk mengatasi penyakit pekerjaan termasuk penyakit musculoskeletal. Tahap pengetahuan, sikap dan praktis secara signifikasi mempengaruhi prevalens penyakit musculoskeletal. Kajian ini menyimpulkan bahawa latihan dan seminar mengenai ergonomik harus dijalankan di organisasi untuk meningkatkan tahan pengetahuan, sikap dan praktis responden..

Kata kunci: Pengetahuan, sikap, praktis, penyakit muskuloskeletal, pekerja barisan pengeluaran

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ABBREVIATIONS

BLS	Bureau of Labor Statistics
CMDQ	Cornell Musculoskeletal Discomfort Questionnaire
DOSH	Department of Occupational, Safety and Health
DOSM	Department of Statistics Malaysia
GBD	Global Burden of Disease
KAP	Knowledge, attitude and practices
IPI	Industrial Production Index
MSD	Musculoskeletal Disorders
MSIC	Malaysia Standard Industrial Classification
NIHL	Noise Induced Hearing Loss
SOCSO	Social Security Organization
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Manufacturing sector is all industries under Section C classified in the Malaysia Standard Industrial Classification (MSIC) 2008 Ver. 1.0 prepared by Department of Statistics Malaysia (DOSM) (DOSM, 2020a). Manufacturing industry is a vital sector that contributes to Malaysia economy. The number of employees engage in manufacturing sector also increase from 2 188 520 persons in October 2020 to 2 195 488 persons in November 2020 (DOSM, 2020b). The sales value per employee rose by 4.5 per cent to record RM54 599 in November 2020 as compared with the same month in 2019. Furthermore, the value of gross output rose 5.7 per cent per annum to RM1,275.8 billion in 2017 as compared to 2015 (RM1,142.0 billion). The Industrial Production Index (IPI) contracted 2.2 per cent in November 2020 as compared to the same month in 2019. Meanwhile, the manufacturing index continues to grow 2.0 per cent in November 2020 after recording a growth of 2.4 per cent in October 2020 (DOSM, 2020c). These statistics show that increasing industrial production in manufacturing sectors aligned with the increment number of employees engaged with manufacturing sectors in Malaysia over the years.

In Malaysia, there is an increasing trend of musculoskeletal disorders (MSD) over the years particularly in the manufacturing sectors. MSD refer to injuries and disorders that involve the nerves, tendons, muscles, and supporting structures of the body (Bernard, 1997; Worker Health Chartbook 2004). World Health Organization (WHO) (1985) defined “work-related” diseases as multifactorial, indicating that a

variety of risk factors play a role in the development of the disease. Work-related MSD are conditions in which the work environment and performance contribute significantly to the condition, and the condition is made worse or lasts longer as a result of the work environment (Bernard, 1997).

High prevalence rates of musculoskeletal disorders were discovered in manufacturing sectors. 83.4% of women who work as assembly workers in a semiconductor industry reported having MSD symptoms in the last one year (Chandrasakaran et al., 2004). In another study, 83.3% among core assembly operators at electronic components manufacturing company having MSD (Yahya & Zahid, 2018). These prevalences show that the production line workers were exposed to the risk of MSD. Furthermore, most of the workers having a high prevalence in the neck, shoulders, and wrist (Chee et. al, 2004), in the back, lower leg, and shoulder (Chandrasakaran et al., 2004), and in the lower back, upper back, right shoulder, and right wrist (Fazilah et al., 2017).

Ergonomics is the science of fitting workplace conditions and job demands to the capability of the working population (Bernard, 1997). Ergonomics plays a vital role to reduce stress and eliminate injuries and disorders associated with the overuse of muscles, awkward posture, and repeated tasks. A workplace ergonomics program can aim to prevent or control injuries and illnesses. The prevention of this disorder should be seen as a high priority. However, individual controls for exposure to MSD as well as its development are not easy to execute into effective and long-term MSD prevention programs in the workplace (Wells, 2009).

Vanda et al., (2020) found a broad range of physical, psychosocial, and individual risk factors have been linked to MSD. A previous study performed by Yahya and

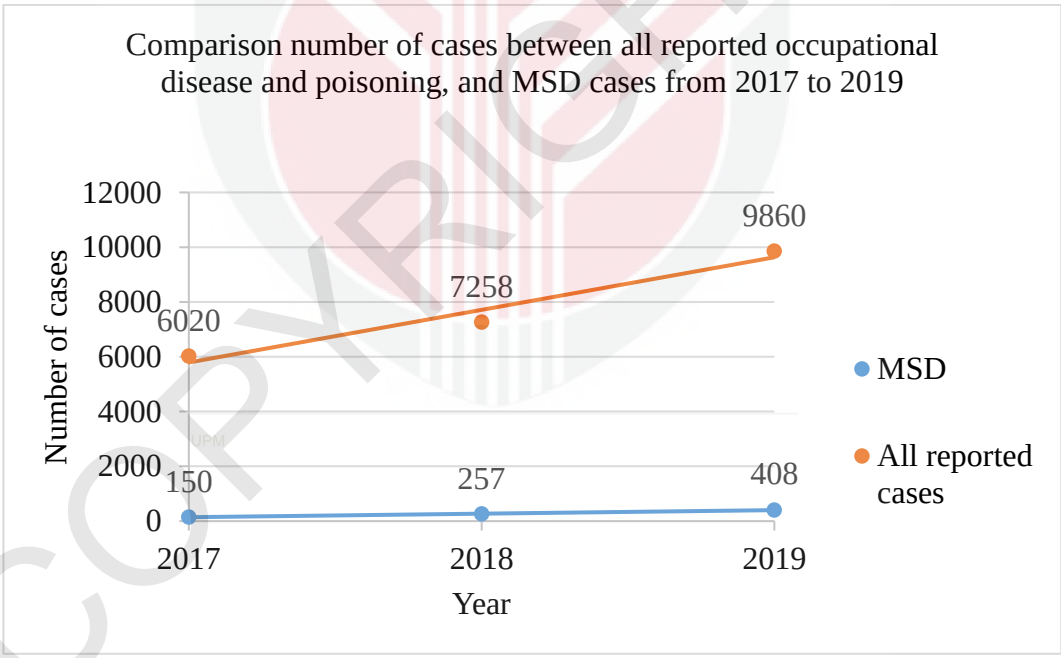
Zahid (2018) showed that operators at electronic components manufacturing company were exposed to extremely high ergonomics risk factors such as awkward postures, forceful exertion, and repetition.

In terms of the financial aspect, occupational accidents have enormous consequences to the company image and quality of life as well as to the employers, employees, and nation. (Jallon et al., 2011). MSD has also been linked to workplace such as absenteeism, turnover, time performance, productivity, morale, work disability, and accidents (Buckle, 2005). As a result, it was vital to analyse the individual factors towards MSD in the manufacturing industry in order to guarantee the effectiveness of intervention or prevention strategies.

A knowledge, attitude and practices (KAP) survey usually is often to gather information on a population's knowledge (i.e., what they know), attitudes (i.e., what they think), and practices (i.e., what they do) on general and/or specific issues (WHO, 2014). Flamm (2006) thought that knowledge and attitude were intertwined, with the attitude was influencing the behavior. According to Doctors of the World (2011), KAP questions disclose not only the KAP attribute but also the assumption that an individual has the problem. These variables are often the origin of misunderstandings that might act as barriers to interventions (Doctors of the World, 2011). Top management, employers and other organization may gain benefits from KAP by focusing on appropriate activities and interventions to reduce MSD related to KAP concerns (Athirah et. al, 2018).

1.2 Problem Statement

MSD in Malaysia has been increasingly reported to the Department of Occupational, Safety and Health (DOSH) from 150 cases in 2017 to 408 cases in 2019 (DOSH Annual Report, 2020). In 2019, approximately 4% of the reported cases of the occupational disease were MSD. Although the proportion of reported MSD seem small in comparison to total occupational diseases, MSD ranked the second highest occupational disease in Malaysia after noise-induced hearing loss (NIHL). On top of that, non-reported cases or high reporting awareness should be considered. Figure 1.1 shows the comparison number of cases between all numbers of reported cases and MSD from 2017 to 2019.



(Source: DOSH Annual Report, 2019)

Figure 1.1 Comparison number of cases between all reported occupational disease and poisoning, and MSD from 2017 to 2019

Other than that, according to Annual Report 2018 Social Security Organization (SOCSO), the number of persons receiving of all sorts of benefits grew by 18,158 or 8.39% bringing the overall total of persons receiving benefits to 616,285 persons. SOCSO spent RM3,706.27 million for payment of all types of benefits within the same period which shows an increase to RM434.50 million or 13.28%. Meanwhile, a study from Abidin et. al (2018) summarized the claims from 23 different industries, including manufacturing, administration, services, civil, agricultural, education and others industry from 2009 to 2014. The manufacturing industry accounted for over half of all total direct cost claims (Abidin et al., 2018). These statistics show that manufacturing industries should pay attention on occupational disease as it keeps increasing.

Other than that, studies from Deros et al., (2015) and Amenze et al., (2020) found that the workers have lack of knowledge on ergonomics and occupational hazards respectively. Furthermore, there was only one available KAP study on prevention of MSD that was conducted on health care sector.

1.3 Study Justification

Nowadays, MSD have become a growing concern in population, especially in industrial sectors. Knowing what caused something, understanding what caused it, and then systematically eliminate those causes are the way to prevent it from happen (Middlesworth, 2020). By assessing the level of KAP among the workers, the findings will help in determining its association to the prevalence of MSD. The findings of this study can act as an evaluation to see the effectiveness and efficiency of workplace intervention for the existing preventive measures of MSD. This study

will supply evidence regarding level of KAP of the workers in the organization. This could help top management or employers to pay attention in improving employees' KAP level, which indirectly could reduce MSD among them. Plus, as stated in Section 15 Occupational Safety and Health Act 1974, the employer needs to ensure health, safety and welfare of the workers which also applied to the manufacturing workers.

This study was formulated to fill the gap of small sample size from Athirah et. al (2018) by increasing the number of respondents. Other than that, this study will cover the limited study for KAP on prevention of MSD in Malaysia manufacturing workers and act as a baseline study in manufacturing industries especially for production line workers. With a good understanding on employees' KAP level, it is possible to propose relevant improvements or interventions toward ensuring a greater success of implementation at workplace.

1.4 Research Questions

The research questions for this study are:

i. What is the prevalence of MSD of the production line workers?
ii. What is the level of knowledge, attitude, and practices of the production workers in order to prevent MSD?
iii. Is there relationship between socio-demographic and occupational information, with the level of knowledge, attitude, and practices on prevention of MSD?
iv. Does level of KAP of an individual in manufacturing industries contribute to the occurrence of MSD in workplace?

1.5 Research Objectives

1.5.1 General objective

The aim of this study is to assess the level of KAP on prevention of MSD among production line workers and its association with prevalence of MSD.

1.5.2 Specific objectives

i. To determine the socio-demographic characteristics and occupational information of the respondents.

ii. To determine prevalence of musculoskeletal disorders among the respondents.

iii. To determine the level of knowledge, attitude and practices on prevention of musculoskeletal disorders among respondents

iv. To determine association between socio-demographic and occupational information, with the level of knowledge, attitude and practices.

v. To determine the association between the level of knowledge, attitude, and practice on the prevention of MSD and the prevalence of MSD.

1.6 Hypothesis

i. There is a significant association between knowledge on prevention of MSD and socio-demographic as well as occupational information.

ii. There is a significant association between attitude on prevention of MSD and socio-demographic as well as occupational information.

iii. There is a significant association between practice on prevention on MSD and socio-demographic as well as occupational information.

iv. There is a significant association between prevalence of MSD and level of KAP.

1.7 Conceptual Definition

1.7.1 Knowledge

Knowledge defined as the understanding of or information about subject from experience or study, either known by one person or by people generally (Cambridge Dictionary, 2020).

1.7.2 Attitude

Attitude defined as the opinion and feeling that someone usually has about something or how someone will behave in a particular situation (Longman dictionary, 2020).

1.7.3 Practices

On the other hands, practices defined as the actual applications or uses an idea, belief, or method, as opposed theory to the theory relating to it. It is the customary, habitual, or expected procedure or way doing something (Longman dictionary, 2020).

1.7.4 Musculoskeletal disorders (MSD)

Merriam-webster.com (2020) defined 'musculoskeletal' as relating to or involving both musculature and skeleton. The function of the musculoskeletal system is to support and protect the body and its organ, and also provide motion. Other than that, 'disorder' is defined as an abnormal physical or mental condition (Merriam-webster.com, 2020). Generally, MSD represent a set of pathological conditions that impair the normal functions of the soft tissues of the musculoskeletal system which occur 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.

1.8 Operational Definition

1.8.1 Knowledge

Knowledge is a strong understanding on how to prevent MSD that the study participants acquired during their employment. The knowledge level were measured as low, moderate and high through the questionnaire.

1.8.2 Attitude

Attitude is the behaviour and personality of the workers to response in a situation occur in the workplace especially in preventing the occurrence of MSD. The questionnaire were used in order to determine the level of attitude on prevention of MSD of the study participants classified as low, moderate or high.

1.8.3 Practices

Practices defined as individual actions in response to how they done their job or task. The level of practice were determined through the questionnaire and classified as low, moderate or high.

1.8.4 Musculoskeletal disorders (MSD)

MSD refer to self-reported complaints of discomfort or pain on any 20 body parts; neck, one or both shoulder(s), upper back, one or both upper arm(s), lower back, one or both forearm(s), one or both wrist(s), hip/buttocks, one or both thigh(s), one or both knee(s), one or both lower leg(s), one or both foot(s) over 7 days due to working environment or conditions. The MSD was reported using Cornell Musculoskeletal Discomfort Questionnaire (CMDQ).

1.9 Conceptual Framework

Figure 1.2 shows a conceptual framework for this study. The framework shows factor of socio-demographic and occupational can affect the knowledge, attitude and practices of an individual. Level of KAP of production workers could be influenced by several characteristics such as age (Amenze et al., 2017; Athirah et al., 2018), gender (Athirah et al., 2018), race (Selvarajoo et al., 2020), education level (Athirah et al., 2018; Ghofranipour et al., 2009), marital status (Amenze et al., 2017; Selvarajoo et al., 2020), and years of employment (Ghofranipour et al., 2009). The independent variable for this study is knowledge, attitude and practices on prevention of MSD while the dependent variable is prevalence of MSD. Hence, the

relationship between KAP factors in preventing MSD and the prevalence of MSD will be determined in this study.

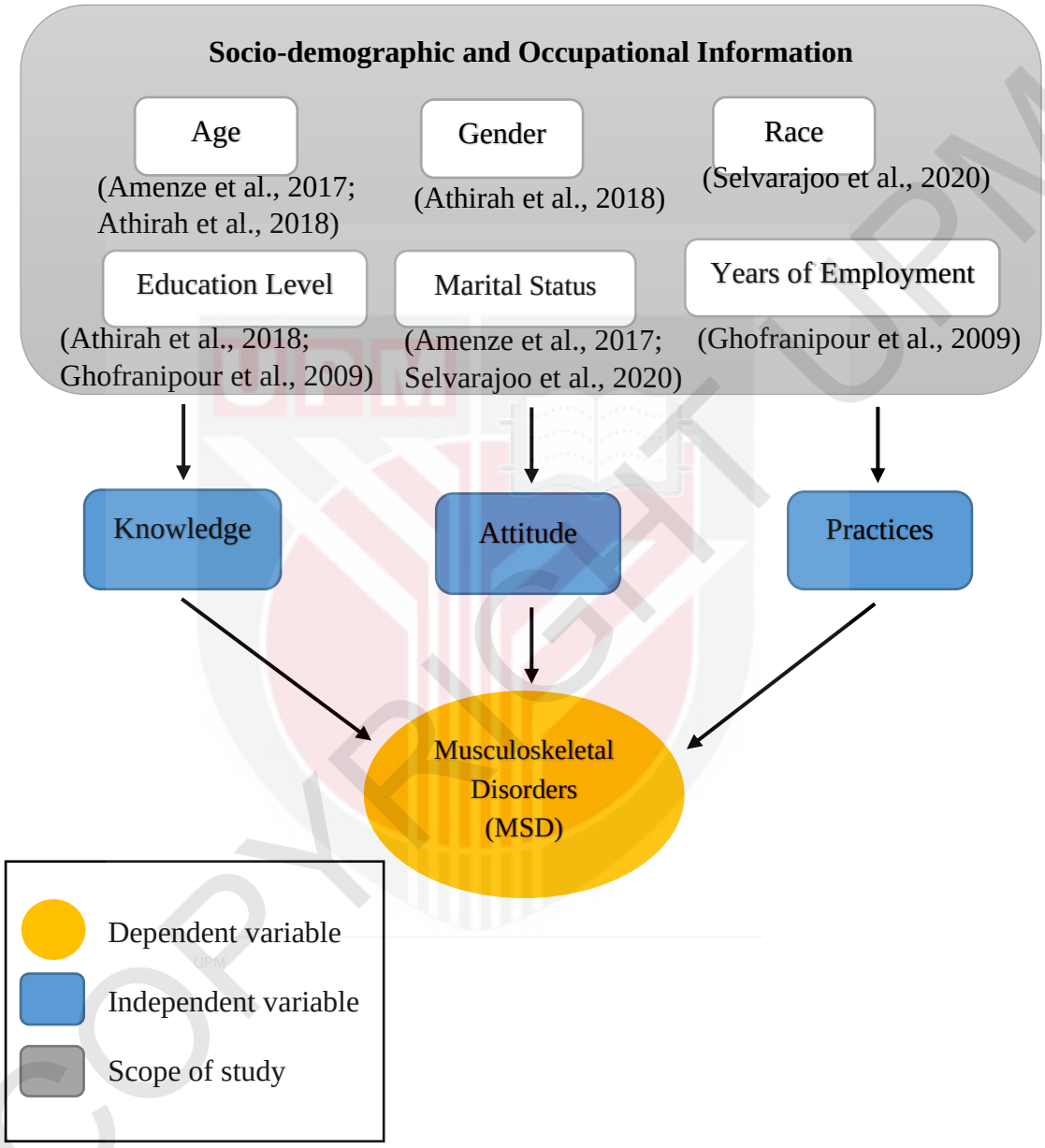


Figure 1.2 Conceptual Framework

CHAPTER 2

LITERATURE REVIEW

This chapter discusses on past literatures that relates with this study as source of references. This chapter discusses the background study that explains in depth about ergonomics, musculoskeletal disorders (MSD), the risk factors of MSD, preventive measures of MSD, Cornell Musculoskeletal Discomfort Questionnaire (CMDQ), KAP questionnaire and previous KAP studies analysis.

2.1 Ergonomics

Ergonomics is derived from Greek words which are "ergon" that means work and "nomos" that means rule or law (Cornell University Ergonomics Web, 2020). International Ergonomics Association Executive Council (2000) defined ergonomics as "the scientific field concerned with the understanding of the interactions among human and other elements of a system, and the profession that uses theory, principles, data and tools to design in order to improve human well-being and overall system performance". Workplace ergonomics is the science of designing the workplace, keeping in mind the capabilities and limitations of the worker (Middlesworth, 2021). The purpose of ergonomics is to avoid soft tissue injuries and MSD caused by exposure to force, vibration, repetitive motion, and awkward posture (United State National Institute for Occupational Safety and Health, 2018).

2.2 Musculoskeletal Disorders (MSD)

One of the striking topics in ergonomics was MSD. According to Bernard (1997) and Worker Health Chartbook (2004), MSD was defined as injuries or disorders that involve the nerves, tendons, muscles, and supporting structures of the body. MSD occur when has exposure of physical reaction, overexertion, or repetitive motion.

Bernard (1997) published a review of evidence for work-related MSD to investigate the epidemiologic evidence of the link between certain MSD of the upper extremity and the low back and the workplace exposure. Routine lifting of heavy objects, daily exposure to whole body vibration, routine overhead work, work in chronic flexion position, or performing repetitive forceful tasks are examples of work conditions that may contribute to work-related MSD. From the report, work conditions have relationships with the occurrence of MSD at neck, shoulder, elbow, hand or wrist, and low back.

The development of MSD could appear from the feeling of pain at musculoskeletal system that have been developed for a longer period of time with lack of recovery period from related risk factors either occupational risk factor or individual risk factor (World Health Organization (WHO), 2019). Middlesworth (2020) found that individual-related risk factors such as poor work practices, poor fitness and poor health habits, and work-related ergonomics risk factors such as force, repetition and posture are the risk factors that could lead to the occurrence of MSD.

MSD cases accounted for 33% of all worker injury and illness cases, according to the Bureau of Labor Statistics (BLS) (2013). Furthermore, according to a recent

study of Global Burden of Disease (GBD) data showed that approximately 1.71 billion (15%) people worldwide suffer from musculoskeletal disorders.

In Malaysia, MSD is one of occupational disease that listed in Third Schedule of Occupational Safety and Health (Notification Of Accident, Dangerous Occurrence, Occupational Poisoning And Occupational Disease) Regulations 2004. According to occupational diseases statistics by DOSH in 2019, occupational musculoskeletal disorder shows the second highest cases in workplace. Then, from 2009 to 2014, a study on demographic analysis of MSD among industrial workers in Malaysia found that MSD is highest among manufacturing workers (Jafri et. al, 2015).

A study done by Chee et al., (2004) to determine the ergonomics risk factors for semiconductor workers who perform repetitive tasks and work in awkward posture, the most prevalence MSD was neck or shoulder (61.5%) and wrist (30.8%). Workers at the assembly end of line work section had more prevalence in the neck or shoulders (54.8%) and upper back (43.5%). In another study performed by Chandrasakaran et al., (2004), 83.4% of women who works as assembly workers in a semiconductor industry has reported having MSD symptoms at back (57.8%), lower leg (48.4%) and shoulder (44.8%) MSD of the neck, shoulders and upper back were significantly associated with repetitive tasks, psychosocial factors, job dissatisfaction and poor physical fitness workers (Rita et al., 2010). These studies show that there is high prevalence on MSD among manufacturing workers, which significantly affect body part such as shoulder, neck, upper back, and lower leg.

2.3 Musculoskeletal Disorder Risk Factors

According to WHO (2004), risk factors are situations or variables related with a lower probability of positive outcomes and a higher probability of negative outcomes. In Guidelines on Ergonomics Risk Assessment at Workplace (2017), an ergonomics risk factor is any trait or exposure that may lead to a musculoskeletal injury; the simple existence of a risk factor may not result in an injury. Identifying risk factors in the workplace, identifying symptoms as soon as they appear and intervening it quickly are the key in preventing MSD (Sokunbi et. al, 2015). Ergonomics principles should be applied to all of the workers to prevent the occurrence of MSD.

2.3.1 Ergonomics Risk Factors

2.3.1.1 Force exertion

Forceful exertion is defined as a load of effort produced by muscles and a load of pressure put to one's physical which are resulted from different occupational strains. According to Tamene (2020), force exertion is one of the risk factors that lead to MSD as workers who used the equipment were 2.4 times more likely to develop MSD than those who did not.

2.3.1.2 Postures

Awkward posture is one of the common risk factors that may affect MSD. Posture refers to the position of various parts of the body during any activity. A neutral posture for most joints indicates that they are being utilize in the middle of their complete of motion (Clarkson, 2000). The awkward posture is exposed when the joints are moves towards either end of its range of motion, or the away from the neutral posture (Sharma et al., 2016).

2.3.1.3 Repetitive

Pushing, pulling, drawing, reaching, turning, raising, gripping or hitting are examples of repeated tasks in the manufacturing industry (Hughes, 2003). Tamene (2020) also found that exposure to repetitive tasks are more likely to develop MSD than those whose tasks did not involve repetitive motions. When the same parts of the body are utilized repeatedly with minimal movements, the risk of developing an MSD increases (Sommerich et al., 1993). A study from Gallager et al. (2013) found that even if the degree of force is minimal and the postures are particularly awkward, repetitive tasks can lead to fatigue, tissue damage, and eventually pain and discomfort.

2.4 Preventive Strategies for MSD

Musculoskeletal disorder is fortunately can be prevented effectively with proper management. According to U.S. Centers for Disease Control and Prevention (CDC, 2020), company's ergonomics program could eliminate or reduce worker exposure to MSD risk factors which aim to prevent or control injuries and illnesses by

implementing suitable engineering and appropriate administrative controls. Engineering controls are the most effective intervention approach because, unlike administrative controls, its effectiveness is not dependent on individual worker or employer behavioural compliance (Konz & Johnson, 2004). Examples of engineering controls were such as using mechanical assist devices to relieve heavy load lifting and carrying tasks (CDC, 2020). Administrative controls can be helpful as temporary measures until engineering controls can be implemented or when engineering controls are not technically feasible. Some examples include job rotation, scheduling more breaks, and reducing shift length (CDC, 2020).

For the best prevention results, implement a comprehensive MSD prevention process including ergonomics, education, and early intervention (Middlesworth, 2020). Examples of education for MSD is ergonomics training. In a study from Susan et al., (2003) found that participants who completed the ergonomics training indicated that the pain or discomfort was reduced after made ergonomic changes based on the training. Early reporting of fatigue and discomfort allow time for early intervention to correct the causative risk factors and reduce fatigue and discomfort (Middlesworth, 2020).

2.5 Theory on Knowledge, Attitude and Practices (KAP)

A KAP survey is a representative study of a specific population to collect information on what is known, believed, and done in relation to a particular topic (Doctors of the World, 2011). It is a quantitative approach, in which questions are pre-define and format in standardised questionnaires, allowing access to both

quantitative and qualitative data. KAP surveys discover misconceptions or misunderstandings that might act as barriers to implement desired activities or interventions, as well as barriers to behaviour change (United State Agency International Development, 2011). KAP questionnaire is a suitable instrument to be applied in accessing, evaluating, and recording the level of KAP for sample in this study.

2.6 Factors affecting Knowledge, Attitude and Practices

2.6.1 Age

A cross sectional study in Iran found that there is significant relationship between the mean of attitudes and behavior with age, where increasing the age of employees will increase their attitudes(Ghofranipour et al., 2009). The attitude attribute has a strong correlation with age group (Athirah et al., 2018).

2.6.2 Gender

Gender is associated with knowledge and attitude attribute, but there is no evidence for an association with practice scores on MSD (Athirah et al., 2018).

2.6.3 Education level

The mean of knowledge percentage score shows a significant association with education level (Ghofranipour et al., 2009). Athirah et al., (2018) found that practices attribute on prevention MSD has good correlation with education level.

2.6.4 Working period

Ghofranipour et al., (2009) discovered that employees had worked for more than three years had more positive attitudes than those who had worked for less time.

2.7 Knowledge, Attitude and Practices on MSD

A cross sectional study conducted in Nigeria to determine KAP on preventing occurrence of MSD among 223 doctors. Most of the respondents had good knowledge and positive attitude on prevention of MSD. The practice for prevention MSD was poor. In the same study, the prevalence of MSD was significantly associated with the knowledge and practice on prevention of MSD (Ephraim-Emmanuel et al., 2019).

(Athirah et al., 2018) conducted a study to assess the level KAP on MSD from employer perspectives in Malaysia industries. The majority items in the knowledge and attitude sections are scored well by most employers. However, good practices are still lacking, since half of the items have poor ratings.

Parimalam et al., (2007) performed a study on assessment of awareness level of health problems among 216 garment workers and their attitude and practices to prevent it. The result from three work sections were high level of knowledge of

health problem but low on personal protective equipment (PPE). Wide gap between knowledge level and practice with protective device was found.

From these studies, it shows that there is limited number of studies for KAP on prevention MSD especially in manufacturing industry in Malaysia. Previous studies (Parimalam et al., 2007 and Ephraim-Emmanuel etal., 2019) were conducted among garment and doctors respectively.

2.8 Cornell Musculoskeletal Discomfort Questionnaire (CMDQ)

Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) was developed by Dr. Alan Hedge and graduate students at Cornell University. CMDQ was used to determine prevalence of musculoskeletal disorders among participants (Hedge et al. 1999). These questionnaires are for research screening purposes and not for diagnostic purposes. CMDQ considered suitable for the studies that intend to evaluate work execution results as well as the degree of musculoskeletal disorders among workers (Erdinc et al., 2011). The CMDQ contain a body map diagram in 20 regions of the body during the previous week. The questionnaire was designed to assess the frequency of discomfort, severity of discomfort and interference of discomfort to work. Total discomfort score was calculated by using the following formula:

Discomfort score = frequency x discomfort x interference

CHAPTER 3

METHODOLOGY

This chapter explains the study design, the method of data collections, the population as well as the sample of this study and data analysis of the data.

3.1 Study Design

The study design is a descriptive cross-sectional study that aims to assess the knowledge, attitude, and practices level on prevention of MSD at a specific point in time. Thus, all data including personal information obtained from the respondents were directly use within the study period.

3.2 Study Location

This study was carried out at a manufacturing factory in Bangi, Selangor. The company's name was not disclosed due to private and confidential agreements. This is a manufacturing company of electronic products consisting of two operational production line, which were Room Air Conditioning (RAC) line and Compressor line.

3.3 Sampling

3.3.1 Sampling Procedure

The study was started after receiving approval from The University Ethics Committee Involving Human Subjects of Universiti Putra Malaysia (JKEUPM) and from a selected manufacturing company. The data of the respondents was collected by using questionnaire, which has four (4) parts. The first sampling method were done by purposive sampling, where only the production line workers were invited to participate in this study. Then, the questionnaire was distributed to the workers via the supervisor.

The samples were given two days to answer the questionnaire and then, the researcher collected the questionnaire.

3.3.2 Study Population

The population of this study focused on both male and female production line workers who never diagnosed MSD within study location.

3.3.3 Study Sample

Study sample is the production workers in RAC production line.

3.3.4 Sampling Unit

The sampling unit for this study the RAC production line workers that meet the respondents' characteristics. Respondents were asked to participate voluntarily in this study and signing an informed consent prior to their participation. A respondent must meet the inclusive and exclusive criteria as below: -

Inclusion criteria:

i. who had working for one year and above,
ii. local workers, and
iii. aged between 18 years old and 54 years old.

Exclusion criteria:

i. had chronic disease, and
ii. had musculoskeletal disorders or injuries for past of 12 months due to non-occupational risk.

The inclusion and exclusion criteria of this study is important to find the true association between the exposure and outcomes. The respondents were chosen from18 years old as the legal age of consent. Plus, the local workers were chosen to avoid misunderstanding because Yazdani & Wells (2018) mentioned that foreign workers

had language barrier or communication barrier. In addition, de Santana Vilasboas Dantas & Cardoso (2020) proved that chronic disease such as hypertension and diabetes can cause MSD.

3.3.5 Sampling Method

The samples were selected by convenience sampling through the supervisor as the company's administration unable to provide the list of the workers.

3.3.6 Sample Size

Before calculating the sample size, the objectives, study design, and dependent variable have been identified. The sample size for the association between knowledge, attitude, and practices with prevalence of MSD were based on previous study by Ephraim-Emmanuel (2019). The sample size will be calculated using two proportion formula by Lwanga and Lemeshow (1990). The formula was as below:

$$n = \frac{Z^2\left(P_1\,(1-P_1)\right) + \left(P_2\,(1-P_2)\right)}{d^2}$$

Where,

n = Sample size

Z^2 =Standard errors associated with confidence

P_1 = Prevalence of good knowledge having MSD (91.6 % from Ephraim-Emmanuel (2019).

P_2 = Prevalence of good attitude having MSD (90.7 % from Ephraim-Emmanuel (2019)

d^2 = Desired precision

The prevalence of good knowledge having MSD and good attitude having MSD were obtained from Ephraim-Emmanuel (2019). At 95% of confidence interval which has 1.96 of standard errors and 5% of desired precision, the sample size was calculated as below:

$$N = \frac{(1.96^2 \times [0.916(1-0.916)] + [0.907(1-0.907)]}{0.05^2}$$

$$= \frac{(1.96^2 \times [0.916(0.084)] + [0.907(0.093)]}{0.05^2}$$

$$= 151.98$$

$$N \approx 152$$

The sample size is increased to 10% for non-response rate, missing data or refusal to participate.

$$\text{Attrition rate} = 10/100 \times 152$$

$$= 16$$

$$n = 152 + 16$$

$$n = 168 \text{ respondents}$$

The sample for this study is 168 respondents.

3.4 Study Instrumentation

Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) adopted from Hedge et al., (1999) and Shariat et al., (2016) and questionnaire adopted from Ephraim-Emmanuel et al. (2019) were used in this study. The questionnaire aims to determine the prevalence of MSD of the workers and workers' KAP level. The questionnaire consisted of three parts; Part A, Part B, and Part C. Part A consisted of the

sociodemographic and occupational data of the respondents. Part B was CMDQ while Part C was KAP elements.

The items included in socio-demographic and occupational information such as age, render, race, education level, height, weight, marital status, and years of employment. Respondents need to tick or fill in the blank on the relevant answer. The age of the respondents was categorized into four different groups (Athirah et al., 2018). Education was grouped into six different categories in reference to Athirah et al., (2018). The BMI in this study was calculated based on the weight in kilograms divided by height in metres squared. Based on previous study (Karthik et al., 2017), BMI was categorized into four different categories, underweight (<18.5kg/m^2), normal weight (18.5 – 24.95kg/m^2), overweight (25 – 29.95kg/m^2), and obesity (≥305kg/m^2). As for years of employment, it was divided into six groups in reference to a previous study (Athirah et al., 2018).

To obtain information on musculoskeletal disorders, CMDQ was used in Part B of the questionnaire. The questionnaire consisted of body mapping of neck, shoulder, upper back, upper arm, lower back, forearm, wrist, hip/buttocks, thigh, knee, lower leg, and foot to assist the samples in identifying the correct body parts in answering the questions. The outcome measure was pain in the last one week, which was derived from respondents ticking the sites where they experienced pain on the body. In contrast to diagnostic aims, research screening purposes are the reasons why this questionnaire was implemented. The score was analyzed as follows: never = 0; 1-2 times/week =1.5; 3-4 times/week =3.5; once a day= 5; several times a day=10. The results of the questionnaire are determined by way of multiplying both the scores for levels of discomfort (1-3) and interference (1-3) with the frequency scores stated above (0-10). “0” was use in classifying missing values that have been detect whilst computing the

analysis. The frequency, discomfort and interference is reduce to zero if the frequency score was a missing value. This, on the other hand, does not apply if the missing value was detected in either the discomfort or the interference scores.

Discomfort Score = Frequency X Discomfort X Interference

Level of KAP were measure based on Part C of the questionnaire. Knowledge level was measured by 15 categorical responses, where 12 positive responses and 3 questions having negative responses. The correct answer was given a score of 1 and wrong answer was given score of 0, with a total score of 15. Attitude level was measured by 10 categorical responses with answer option of agree or disagree. The correct answer was given a score of 1 and wrong answer was given score of 0. The total score for this section is 10. Practice level was measured by 15 categorical responses based on Likert scale from 1 to 4; 1 for never, 2 for rarely, 3 for sometimes and 4 for always; thus, the total score for this section is 60. According to Ajit & Chapman (2011), the scoring method are as below:

i) Low level = Score < Mean – Standard deviation

ii) High level = Score > Mean + Standard deviation.

if neither low nor high, falls to Moderate level.

Table 3.1 Category of KAP level according to the scoring method

Variable	Minimum	Maximum	Mean±SD	Low	Moderate	High
Knowledge	4	15	11.61±2.59	4.0-9.01	9.02-14.20	14.21-15.00
Attitude	1	10	6.87±1.74	1.00-5.12	5.13-8.61	8.62-10.0
Practices	32	60	47.98±6.55	32.0-41.42	41.43-54.53	54.54-60.0

3.5 Statistical Analysis

Data analysis is the interpretation to test the proposed hypothesis. Data were analysed using the Statistical Package for Social Science Program (SPSS) version 25.0. The completed questionnaire was collected, and the resulting data was tabulate and enter into a spreadsheet in SPSS software. All numerical data was test for normality. The data were analysed using descriptive analysis, and statistical analysis.

According to Stevens (2012), before using any statistical method, especially for inferential statistics, it is necessary to determine the normality of all continuous variables. Normality was described by means of the normal distribution of the value of the variables. Since the number of participants is more than 50 participants, thus the Kolmogorov-Smirnov was being applied to assess the normality of the study variable. The result in Table 3.2 indicated that the study variables (age, knowledge, and attitude) were not normally distributed as $p<0.05$. BMI and practices were normally distributed as p-value was >0.05. Thus, data are categorized.

Table3.2 Test of normality

Variables	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.
Age	0.148	138	<0.001	0.920	138	<0.001
BMI	0.062	138	0.200*	0.976	138	0.017
Knowledge	0.198	138	<0.001	0.864	138	<0.000
Attitude	0.177	138	<0.001	0.946	138	<0.000
Practices	0.078	138	0.038	0.978	138	0.028

*. This is a lower bound of the true significance

a. Lilliefors Significance Correction

Descriptive analysis used to measure the value of data from the questionnaires such as its frequency, percentage, and mean. Apart from that, the data were measure for its variability of standard deviation.

Next, the numerical data representing knowledge, attitude, and practices on prevention of MSD move to the next step of data analysis, i.e., bivariate analysis. The knowledge, attitude and practices score were scale into high, moderate, and low. Chi-square test was used to determine the association between KAP and socio-demographic as well as occupational information and to determine the association between KAP and the dependent variable (prevalence of MSD). Table 3.3 shows the summary for statistical analysis according to its objectives.

Table 3.3 Statistical analysis according to its objective

No.	Objective	Statistical analysis
1	To determine socio-demographic and occupational information of the respondents	Descriptive analysis (mean, Standard Deviation, frequency and percentage)
2	To determine the prevalence of musculoskeletal disorders among production line workers	Descriptive analysis (frequency and percentage)
3	To determine the level of knowledge, attitude and practices on prevention of MSD	Descriptive analysis (frequency and percentage)
4	To determine the association between level of KAP and socio-demographic as well as occupational information	Bivariate analysis (Chi-square)
5	To determine the association between the level of KAP and the prevalence of MSD among the production line workers	Bivariate analysis (Chi-square)

3.6 Quality Control

Before the data collection process for this study was carried out, a pre-test was conducted on manufacturing workers with similar work process. The pre-test helped to observe whether the questionnaire can be understand by them and to avoid any unfamiliar terms to them. The questionnaire was tested for its reliability using IBM Statistical Package for Social Science (SPSS) Version 25 whereby the alpha Cronbach value were obtained to indicate its internal consistency. From the pre-test, the Cronbach alpha value were 0.923, 0.813, and 0.909 for knowledge, attitude, and practices respectively. It indicates acceptable for the internal consistency for the questions.

3.7 Ethical Consideration

3.7.1 Institutional Approval

3.7.1.1 JKEUPM

In collecting the real data using the intend samples, researcher got an approval from Ethic Committee UPM (Ref No: UPM/TNCPI/RMC/JKEUPM/1.4.18.2). Then, information that explains the purpose and significant of the study was attached together with the questionnaire.

3.7.1.2 Manufacturing Company

Researcher submit an application letter to conduct a study in the manufacturing company. The manufacturing company agreed the application.

3.7.2 Individual Consent

Respondent of this study will have an individual consent as attached in Appendix 1 and were attached together with the questionnaire during data collection.

CHAPTER 4

RESULT

4.1 Response rate

The study was conduct at a manufacturing factory in Bangi from 1 April 2021 to 30 April 2021. From the calculation of sample size, 168 respondents shall be recruit from the study but through convenience sampling at the factory, 138 respondents were recruit with 82.1% response rate.

4.2 Socio-demographic and Occupational Information of the Production Line Workers

The first objective of this study is to determine the socio-demographic and occupational information of the production line workers. Table 4.1 shows the information of the workers. Majority of the respondents are Malay (97.8%), male (76.8%) and have normal BMI (55.1%). The youngest age of the respondents was 20 years old while the oldest was 54 years old with mean age 35.85 years ± (SD) 9.87 years. Majority (35.5%) of the respondents fall into the age category of 25 to 34 years old. Other than that, 55.8% respondent holds SPM as the highest education level. As for working experience, 34.1% and 36.2% have worked for 1 to 3 years and more than 15 years respectively while the other respondents show fewer percentage of their working experienced.

Table 4.1 Socio-demographic and occupational information of the production line workers (n=138)

Variable	Frequency (n)	%	Mean±SD
Age			35.85±9.87
<25	20	14.5	
25-34	49	35.5	
35-44	29	21.0	
45-54	40	29.0	
Gender			
Male	106	76.8	
Female	32	23.2	
Race			
Malay	135	97.8	
Non-malay	3	2.2	
BMI			24.06±3.89
Underweight	10	7.2	
Normal	76	55.1	
Overweight	41	29.7	
Obesity	11	8.0	
Highest education level			
SPM	77	55.8	
STPM/Matriculation/Pre-university	6	4.3	
Technical/ Vocasional	14	10.1	
Diploma	27	19.6	
Bachelor's Degree	12	8.7	
Others	2	1.4	
Marital status			
Single	54	39.1	
Married	84	60.9	
Years of employment			
1-3	39	34.1	
4-6	20	14.5	
7-9	10	7.2	
10-12	3	2.2	
13-15	8	5.8	
>15	50	36.2	

n= 138

4.3 Prevalence of musculoskeletal disorders (MSD) among production line workers

Table 4.2 presents the prevalence of musculoskeletal disorders among study participants during past seven days, overall prevalence reported was 88.4% in any part of the body. The most prevalent MSD among the 20 body parts was reported for lower back (79.0%) followed by neck, upper back, and right foot (65.9% respectively). Left thigh (35.5%) shows the lowest prevalence of MSD among participants.

Table 4.2 Prevalence of musculoskeletal disorders among production line workers (n=138)

Part of the body	MSD prevalence	
	Frequency (n)	%
Neck	91	65.9
Shoulder (Right)	83	60.1
Shoulder (Left)	90	65.2
Upper back	91	65.9
Upper arm (Right)	81	58.7
Upper arm (Left)	82	59.4
Lower back	109	79.0
Forearm (Right)	50	36.2
Forearm (Left)	53	38.4
Wrist (Right)	70	50.7
Wrist (Left)	70	50.7
Hip/Buttocks	61	44.2
Thigh (Right)	51	37.0
Thigh (Left)	49	35.5
Knee (Right)	78	56.5
Knee (Left)	74	53.6
Lower leg (Right)	65	47.1
Lower leg (Left)	69	50.0
Foot (Right)	91	65.9
Foot (Left)	88	63.8
MSD in any part of the body	**122**	**88.4**

n=138

4.4 Level of knowledge, attitude, and practices on prevention of musculoskeletal disorders

The third objective is to determine the level of knowledge, attitude, and practices on prevention of musculoskeletal disorders among the respondents.

4.4.1 Level of knowledge on prevention of musculoskeletal disorders

Table 4.3 shows the distribution of true and false percentage of the respondents for questions related to knowledge on prevention of musculoskeletal disorders. For most of the questions, the respondents fared well. Most of the respondents (94.2%) answered correctly for question on stretching exercises be useful in preventing musculoskeletal disorders. The respondents tend to perplexed for the questions 24 and 30. Those questions were fairly rates for the statement flexing the upper back contribute to MSD and consideration of ergonomics in acquisition of manufacturing equipment or machineries play a vital role in preventing MSD.

Table 4.3 Knowledge on prevention of musculoskeletal disorders among respondents (n=138)

Item	Questions	Correct, n(%)	Wrong, n(%)
Q16	Does grasping small instruments for long periods prevent musculoskeletal disorders?	112 (81.2)	26 (18.8)
Q17	Can forceful hand exertions while working contribute to the occurrence of musculoskeletal disorders?	101 (73.2)	37 (26.8)
Q18	Can abnormally positioning the hand or wrist prevent musculoskeletal disorders?	100 (72.5)	38 (27.5)
Q19	Will rest while working contribute to musculoskeletal disorders?	121 (87.7)	17 (12.3)
Q20	Does taking adequate breaks between work procedures prevent the occurrence of musculoskeletal disorders?	107 (77.5)	31 (22.5)
Q21	Can frequent lifting of heavy equipment/materials at work contribute to musculoskeletal disorders?	122 (88.4)	16 (11.6)

Item	Questions	Correct, n(%)	Wrong, n(%)
Q22	Will flexing the wrist between 100° and 120° prevent musculoskeletal disorders?	106 (76.8)	32 (23.2)
Q23	Does bending the neck beyond 20° while working contribute to musculoskeletal disorders?	87 (63.0)	51 (37.0)
Q24	Can flexing the upper back contribute to musculoskeletal disorders?	81 (58.7)	57 (41.3)
Q25	Does keeping the shoulders relaxed prevent musculoskeletal disorders?	101 (73.2)	37 (26.8)
Q26	Does avoiding prolonged working hours be useful in preventing musculoskeletal disorders?	105 (76.1)	33 (23.9)
Q27	Can stretching exercises be useful in preventing musculoskeletal disorders?	130 (94.2)	8 (5.8)
Q28	Does having good access to instruments, visibility and comfort during work be useful in preventing musculoskeletal disorders?	114 (82.6)	24 (17.4)
Q29	Does taking regular breaks and achieving optimal work posture play a vital role in preventing musculoskeletal disorders?	128 (92.8)	10 (7.2)
Q30	Can the consideration of ergonomics in acquisition of manufacturing equipment or machineries play a vital role in preventing musculoskeletal disorders?	70 (50.7)	68 (49.3)

n=138

4.4.2 Level of attitude on prevention of musculoskeletal disorders

The distribution of answers by the respondents regarding attitude on prevention of musculoskeletal disorders was tabulate as shown in Table 4.4. For statement on workplace adjustment while working in order to avoid musculoskeletal disorders is a difficult task, only 30.4% of the respondents answered correctly for this negative response statement. In the meantime, numerous of respondents (92.8%) belief that engaging in physical activities or exercise are ideal for maintaining good health. 91.3% of the respondents also agreed on applying ergonomic principles at work to avoid musculoskeletal disorders is an achievable task.

Table 4.4 Attitude on prevention of musculoskeletal disorders among respondents (n=138)

Item	Questions	Correct, n(%)	Wrong, n(%)
Q31	For better viewing of my workspace, it is preferable to bend my head forward instead of adjusting the workspace.	86 (62.3)	52 (37.7)
Q32	I need to bend my body while working because it makes my work easier.	86 (62.3)	52 (37.7)
Q33	In order to finish my work on time, I prefer to attain the same position (e.g. sitting) for long periods while working instead of changing positions while working.	101 (73.2)	37 (26.8)
Q34	Taking breaks while performing my duties at work is a mere waste of time.	102 (73.9)	36 (26.1)
Q35	Forceful hand movements while working enables me get work done on time regardless of the consequences that may occur.	90 (65.2)	48 (34.8)
Q36	Engaging in physical activity/exercise e.g. stretching, walking etc. are ideal for maintaining good health.	128 (92.8)	10 (7.2)
Q37	Keeping my back supported while working is always considered whenever I am working.	107 (77.5)	31 (22.5)
Q38	Workplace adjustment while working in order to avoid musculoskeletal disorders is a difficult task.	42 (30.4)	96 (69.6)
Q39	In a bid to avoid musculoskeletal disorders, neck bending while working must be avoid.	96 (69.6)	42 (30.4)
Q40	Applying ergonomic principles at work to avoid musculoskeletal disorders is an achievable task.	126 (91.3)	12 (8.7)

n=138

4.4.3 Level of practices on prevention of musculoskeletal disorders

Table 4.5 shows the distribution of responses by the respondents on practices that the respondents applied in response to prevent musculoskeletal disorders. The score shows that the respondents applied at most of the practices on prevention on musculoskeletal disorders such as 70.3% on changing positions while working, 62.3% on adjusting

workspace for better viewing, and 60.3% on ensuring orderliness of work instruments while working. Contradict to these practices that scored satisfactory practices, but 27.5% and 12.3% not practicing ensuring or advocate for ergonomically-considered shift duties and to consider ergonomic principles when purchasing work materials, tools or equipment respectively.

Table 4.5 Practices on prevention of musculoskeletal disorders among respondents (n=138)

Item	Practices	Frequency (%)			
		1	2	3	4
Q41	Gentle hand movements	8 (5.8)	23 (16.7)	64 (46.4)	43 (31.2)
Q42	Changing positions while working	1 (0.7)	6 (4.3)	34 (24.6)	97 (70.3)
Q43	Placing feet flat on the floor	3 (2.2)	13 (9.4)	40 (29.0)	82 (59.4)
Q44	Taking intermittent breaks while working	6 (4.3)	19 (13.8)	65 (47.1)	48 (34.8)
Q45	Good posture of standing while working	2 (1.4)	19 (13.8)	64 (46.4)	53 (38.4)
Q46	Working with assistance when necessary	9 (6.5)	31 (22.5)	64 (46.4)	34 (24.6)
Q47	Ensuring my shoulders relaxed while working	4 (2.9)	23 (16.7)	54 (39.1)	57 (41.3)
Q48	Keeping my neck forward only within safe limits	6 (4.3)	15 (10.9)	56 (40.6)	61 (44.2)
Q49	Ensuring and/or advocating for ergonomically-considered shift duties	38 (27.5)	21 (15.2)	53 (38.4)	26 (18.8)
Q50	Adjusting workspace for better positioning	2 (1.4)	10 (7.2)	40 (29.0)	86 (62.3)
Q51	Engaging in physical activity while working. E.g. stretching etc.	2 (1.4)	25 (18.1)	57 (41.3)	54 (39.1)
Q52	Positioning my body within safe ergonomic limits while working	4 (2.9)	12 (8.7)	53 (38.4)	69 (50.0)
Q53	Consideration of ergonomic principles when purchasing work materials, tools and/or equipment.	17 (12.3)	29 (21.0)	53 (38.4)	39 (28.3)
Q54	Stopping work activity for a while when discomfort arises	1 (0.7)	18 (13.0)	55 (39.9)	64 (46.4)
Q55	Ensuring orderliness of work instruments while working	1 (0.7)	13 (9.4)	41 (29.7)	83 (60.1)

n=138

Notes: 1 Never; 2 Rarely; 3 Sometimes; 4 Always

4.4.4 Level of KAP on prevention of musculoskeletal disorders among the respondents

Figure 4.1, 4.2 and 4.3 shows the level of KAP on prevention of musculoskeletal disorders among the respondents. Majority (77%) of the respondents have a moderate level of knowledge while respondents with poor and high level of knowledge accounts for 17% and 6% respectively. For attitude, 57% of the respondents scored moderate level while respondents having poor attitude and high attitude was 21% and 22% respectively. Then, 68% of the respondents have shown a moderate practices on prevention of musculoskeletal disorders. 16% of the respondents have shown both high practices and poor practices.

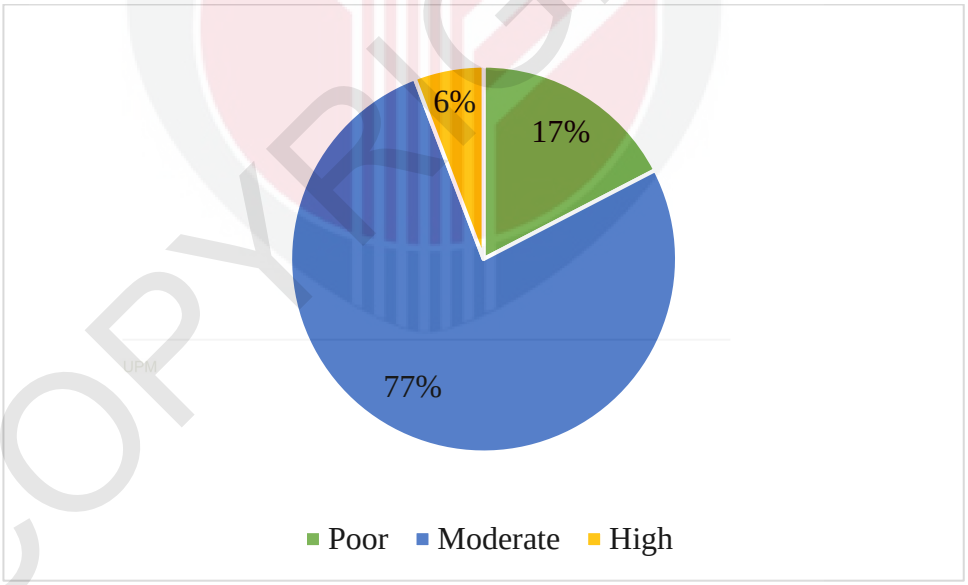


Figure 4. 1 Level of Knowledge on Prevention of Musculoskeletal Disorders (n=138)

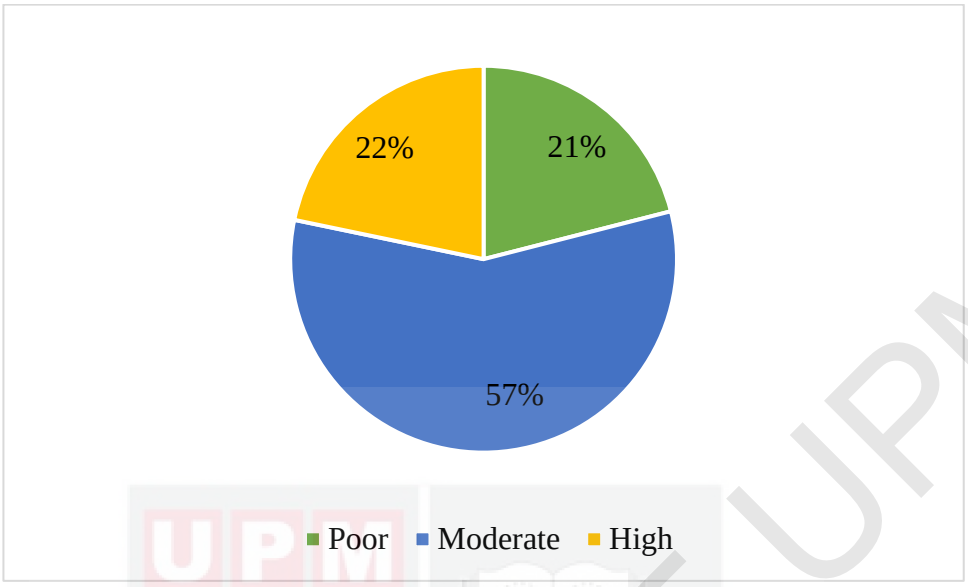


Figure 4. 2 Level of Attitude on Prevention of Musculoskeletal Disorders (n=138)

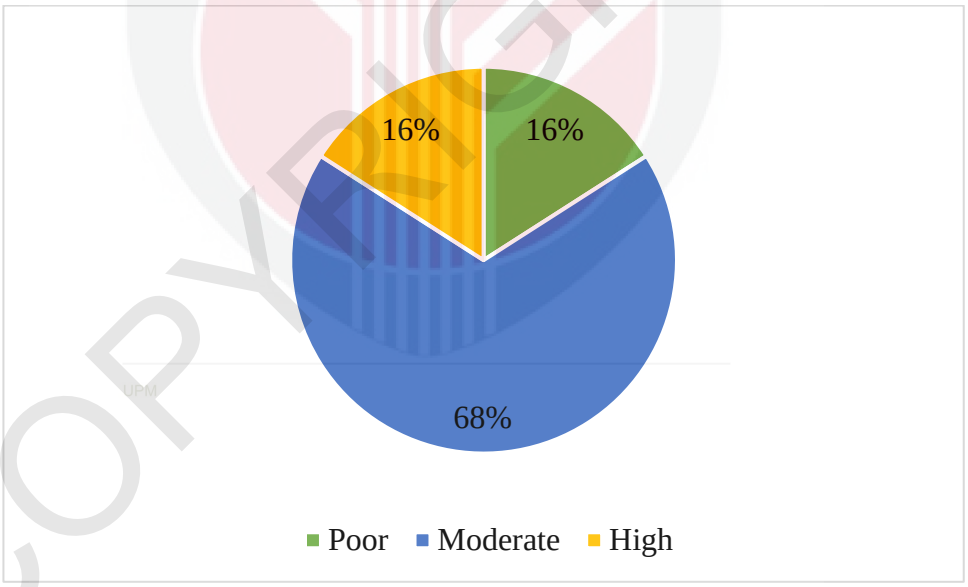


Figure 4. 3 Level of Practices on Prevention of Musculoskeletal Disorders (n=138)

4.5 Association between the socio-demographics and occupational information, and the level of knowledge, attitude and practices on prevention of musculoskeletal disorders among the respondents

The fourth objective of this study is to determine the association between socio-demographics and occupational information, and the level of knowledge, attitude and practices among the respondents.

4.5.1 Association between socio-demographics and occupational information, and the level of knowledge on prevention of musculoskeletal disorders among the respondents

Table 4.6 shows the association between the socio-demographic and occupational information, and the level of knowledge of the respondents. The result shows that there is no significant association between socio-demographics and occupational information, and the level of knowledge on prevention of musculoskeletal disorders among the respondents since the p-value is >0.05.

Table 4.6 Association between socio-demographic and occupational information, and level of knowledge on prevention of musculoskeletal disorders (n=138)

	Knowledge			
	Low, n(%)	Moderate, n(%)	High, n(%)	χ^2(p-value)
Age (years old)				0.568
<35	12 (8.7)	54 (39.1)	3 (2.2%)	(0.859)
≥35	12 (8.7)	52 (37.7)	5 (3.6%)	
Gender				2.288
Male	21 (15.2)	78 (56.5)	7 (5.1)	(0.340)
Female	3 (2.2)	28 (20.3)	1 (0.7)	
Highest education level				1.853
Secondary level	19 (14.0)	71 (52.2)	7 (5.1)	(0.416)
Tertiary level	5 (3.7)	33 (24.3)	1 (0.7)	
Marital status				0.686
Single	10 (7.2)	42 (30.4)	2 (1.4)	(0.733)
Married	14 (10.1)	64 (46.4)	6 (4.3)	
Years of employment (years)				2.632
	11 (8.0)	63 (45.7)	3 (2.2)	(0.298)
1-<10	13 (9.4)	43 (31.2)	5 (3.6)	
≥10				

n=138

4.5.2 Association between socio-demographics and occupational information, and the level of attitude on prevention of musculoskeletal disorders among the respondents

Table 4.7 shows the association between socio-demographics and occupational information, and the level of attitude on prevention of musculoskeletal disorders among the respondents. This study found that education level has significant association with attitude on prevention of musculoskeletal disorders (p=0.003). There is no significant difference between other socio-demographics and occupational information, and the level of attitude on prevention of musculoskeletal disorders among the respondents since the p-value is >0.05.

Table 4.7 Association between socio-demographics and occupational information, and level of attitude on prevention of musculoskeletal disorders (n=138)

	Attitude			
	Low, n(%)	Moderate, n(%)	High, n(%)	χ^2(p-value)
Age (years old)				1.855 (0.396)
<35	15 (10.9)	36 (26.1)	18 (13.0)	
≥35	14 (10.1)	43 (31.2)	12 (8.7)	
Gender				2.557
Male	23 (16.7)	57 (41.3)	26 (18.8)	(0.271)
Female	6 (4.3)	22 (15.9)	4 (2.9)	
Highest education level				11.578
Secondary level	23 (16.9)	61 (44.9)	13 (9.6)	(0.003)*
Tertiary level	6 (4.4)	17 (12.5)	16 (11.8)	
Marital status				2.055
Single	14 (10.1)	27 (19.6)	13 (9.4)	(0.358)
Married	15 (10.9)	52 (37.7)	17 (12.3)	
Years of employment (years)	18 (13.0)	39 (28.3)	20 (14.5)	3.224 (0.199)
1-<10	11 (8.0)	40 (29.0)	10 (7.2)	
≥10				

*Statistically significant at $p<0.05$

4.5.3 Association between socio-demographics and occupational information, and the level of practices on prevention of musculoskeletal disorders among the respondents

The association between socio-demographics and occupational information, and the level of practices on prevention of musculoskeletal disorders among the respondents was shown in Table 4.8. It shows that the practice of the respondents was not significantly associated with age, gender, marital status, education, and years of employment.

Table 4.8 Association between socio-demographic and occupational information, and practices on prevention of musculoskeletal disorders (n=138)

	Practices			
	Low, n(%)	Moderate, n(%)	High, n(%)	χ^2(p-value)
Age (years old)				2.019
<35	11 (8.0)	50 (36.2)	8 (5.8)	(0.397)
≥35	11 (8.0)	44 (31.9)	14 (10.1)	
Gender				0.008
Male	17 (12.3)	72 (52.2)	17 (12.3)	(1.000)
Female	5 (3.6)	22 (15.9)	5 (3.6)	
Highest education level				3.060
Secondary level	17 (12.5)	63 (46.3)	17 (12.5)	(0.225)
Tertiary level	3 (2.2)	31 (22.8)	5 (3.7)	
Marital status				4.877
Single	9 (6.5)	41 (29.7)	4 (2.9)	(0.090)
Married	13 (9.4)	53 (38.4)	18 (13.0)	
Years of employment (years)				0.417 (0.813)
1-<10	12 (8.7)	54 (39.1)	11 (8.0)	
≥10	10 (7.2)	40 (29.0)	11 (8.0)	

*Statistically significant at $p<0.05$

4.6 Association between level of KAP and the prevalence of musculoskeletal disorders

The last objective of this study is to determine the association between the level of KAP and the prevalence of MSD among the production line workers.

4.6.1 Association between level of knowledge and prevalence of musculoskeletal disorders

This study found that respondents with a moderate level of knowledge reported more complaints on musculoskeletal disorders than those with good knowledge. Table 4.9 shows the association between knowledge on prevention of musculoskeletal disorders and prevalence of musculoskeletal disorders. There was significant association

between level of knowledge and prevalence of musculoskeletal disorders (χ^2=5.345, p-value=0.038).

Table 4.9 Association between knowledge on prevention of musculoskeletal disorders and prevalence of musculoskeletal disorders

Variable	Prevalence of musculoskeletal disorders			χ^2(p-value)
	Yes, n(%)	No, n(%)	Total, n(%)	
Knowledge				5.345 (0.038)*
Low	23 (16.7)	1 (0.7)	24 (17.4)	
Moderate	94 (68.1)	12 (8.7)	106 (76.8)	
High	5 (3.6)	3 (2.2)	8 (5.8)	
Total	122 (88.4)	16 (11.6)	138 (100.0)	

*Statistically significant at p<0.05

4.6.2 Association between level of attitude and prevalence of musculoskeletal disorders

Table 4.10 shows the association between attitude and prevalence of musculoskeletal disorders. In total, 72 (52.2%) of respondents with moderate attitude reported complaints on musculoskeletal disorders while 22 (15.9%) and 28 (20.3%) respondents with high and low attitude respectively reported musculoskeletal discomfort complaints. This finding shows a significant association between level of attitude and prevalence of musculoskeletal disorders (χ^2=7.715, p-value=0.017).

Table 4.10 Association between level of attitude on prevention of musculoskeletal disorders and prevalence of musculoskeletal disorders

Variable	Prevalence of musculoskeletal disorders			χ^2(p-value)
	Yes, n(%)	No, n(%)	Total, n(%)	
Attitude				7.715 (0.017)*
Low	28 (20.3)	1 (0.7)	29 (21.0)	
Moderate	72 (52.2)	7 (5.1)	79 (57.2)	
High	22 (15.9)	8 (5.8)	30 (21.7)	
Total	122 (88.4)	16 (11.6)	138 (100.0)	

*Statistically significant at $p<0.05$

4.6.3 Association between level of practices and prevalence of musculoskeletal disorders

Table 4.11 shows the association between level of practices and prevalence of musculoskeletal disorders. Out of 122 respondents having musculoskeletal disorders, 60.9% had a moderate practice on prevention of musculoskeletal disorders compared to 11.6% and 15.9% of those with high and low practices respectively. There was significant association between level of practices and prevalence of musculoskeletal disorders (χ^2=7.924, p-value=0.020).

Table 4.11 Association between level of practices on prevention of musculoskeletal disorders and prevalence of musculoskeletal disorders

Variable	Prevalence of musculoskeletal disorders			χ^2(p-value)
	Yes, n(%)	No, n(%)	Total, n(%)	
Practices				7.496 (0.020)*
Low	22 (15.9)	0 (0.0)	22 (15.9)	
Moderate	84 (60.9)	10 (7.2))	94 (68.1)	
High	16 (11.6)	6 (4.3)	22 (15.9)	
Total	122 (88.4)	16 (11.6)	138 (100.0)	

*Statistically significant at $p<0.05$

CHAPTER 5

DISCUSSION

5.1 Socio-demographic and occupational information of respondents

The mean age (SD) of the respondents in this study was 35.85 (9.87) years old. The majority were between the ages of 25 and 34 years old (35.5%), 45 and 54 years old (29.0%), and 35 and 44 years old (21.0%). This indicates that majority of the participants were 25 to 34 years old. This is the age group for majority of working age (15 to 64 years old) as defined by DOSM. In addition, in terms of category, Athirah et al., (2018) also found that majority of the respondents were aged between 25 and 54 years old, which shows 31.1% for each age category; 25 to 34 years old, 35 to 44 years old, and 45 to 54 years old. There were no respondents aged 18 and below and only 14.5% of the respondents aged from 19 to 24 years old.

Regarding the gender of the respondents in this study, 76.8% were male and 23.2% were female, which was slightly (71.1% for male and 28.9% for female) different compared to the findings of another study in Malaysia (Athirah et. al, 2018).

Moreover, majority of the respondents are Malay (97.8%) while only 2.2% for non-Malay. Foreign workers were exclude to participate in this study as language barrier has been a problem amongst foreign workers in Malaysia (Wong & Yazdanifard, 2015).

In addition, most of the respondents in this study holds SPM (55.8%) followed by Diploma (19.6%). This value was slightly lower than Foong et al., (2014) but similar in that most of the respondents had secondary education level (Chandrasakaran et al., 2004).

Regarding the years of employment of the respondents in this study, 36.2% has experienced more than 15 years followed by 34.1% has experienced for 1 to 3 years, which was slightly higher (16.5% and 11.4% respectively) compared to study from Athirah et. al, (2018).

5.2 Prevalence of MSD among production line workers

The results of this study show a high prevalence (88.4%) of MSD among the production line workers, which reported experiencing pain in any part of the body for past seven days. The result is similar with the findings from Chandrasakaran et al., (2004) and Yahya and Zahid, (2018). However, if compared with the present study, the findings of Chandrasakaran et al., (2004) and Yahya and Zahid, (2018) were much lower which was 83.4% and 83.3% respectively.

This study found that from the 20 body parts, the most prevalent MSD reported for lower back (79.0%), followed by neck, upper back and right foot (65.9% accordingly). The finding of this study is relevant with similar study that showed lower back as the main complaint with regards to MSD (Aziz et al., 2017; Chandrasakaran et al., 2004; Foong et al., 2014). In other study done by Chee (2004) found that semiconductor workers had high prevalence in the neck/shoulder (61.5%), while workers at assembly end of line had high pain prevalence in the neck/shoulders (54.8%) and upper back (43.5%). Since the body part reported having pain in this study are similar to previous studies findings, this study shows that there is high prevalence on MSD among production line workers, which make it comparable to other studies.

5.3 Knowledge on prevention of musculoskeletal disorders

A total of 9 questions out of 15 questions acquired more than 75%, indicating good knowledge score frequency. Based on the questions regarding knowledge on prevention of musculoskeletal disorders provided in the questionnaire, the highest frequency of correct answer were demonstrated for stretching exercise be useful in preventing musculoskeletal disorders (94.2%). Koo & Kim, (2006) proved that the level of KAP of the workers increase after 11 weeks implementing stretching exercise education. The respondents also show high understanding on taking regular breaks and achieving optimal work posture play a vital role in preventing MSD (92.8%), and rest while working contribute to MSD (87.7%). Work breaks had been proved can reduce discomfort of the body parts (Hoe et al., 2018).

There was also considerable confusion regarding prevention of musculoskeletal disorders. This may be because of they do not have information on those issues. The respondents tend to perplexed for the questions 24 and 30. Those questions were fairly rates for the statement flexing the upper back contribute to MSD and consideration of ergonomics in acquisition of manufacturing equipment or machineries play a vital role in preventing MSD. According to Adam (2017), employers should meet operating requirements, which include ergonomics criteria, to provide safe and healthy working conditions for their employees.

5.4 Attitude on prevention of musculoskeletal disorders

For the attitude on prevention of musculoskeletal disorders, numerous of respondents (92.8%) belief that engaging in physical activities or exercise are ideal for maintaining good health. Other than that, 91.3% of the respondents also agreed on applying ergonomic principles at work to avoid musculoskeletal disorders is an achievable task.

In the meantime, only 30.4% of the respondents disagree that workplace adjustment while working in order to avoid musculoskeletal disorders is a difficult task. Having this unfavorable attitude may lead to unsuccessful interventions to reduce MSD. However, in another study by Athirah et al., (2018), the respondents believed that changes aimed to reduce MSD are probably to be successful. Age, working period and race of the respondents were the observed factors to contribute this attitude. As discussed by Stack et al.,(2016), workplace adjustment is the main elements need to be taken to reduce ergonomics risk factors.

5.5 Practices on prevention of musculoskeletal disorders

The score shows that the respondents applied most of the practices of prevention for MSD such as 70.3% on changing positions while working, 62.3% on adjusting workspace for better viewing, and 60.3% on ensuring orderliness of work instruments while working. These findings were supported by previous literature, in which these practices were vital to ensure that MSD were prevented from occurring (Stack et al., 2016; World Health Organization, 2003)

Contradict to these practices that scored satisfactory practices, but 27.5% and 12.3% not practicing to ensure or advocate for ergonomically-considered shift duties and to consider ergonomic principles when purchasing work materials, tools or equipment respectively. These might be due to low knowledge or skills of the employees. Good knowledge and attitude can contribute to actual practices to prevent MSD (Launiala, 2009). Thus, if the employees have a good knowledge on how to prevent MSD and positive attitude toward preventing MSD, preventive practices will be applied by the employees at workplace.

5.6 Level of KAP on prevention of musculoskeletal disorders among the respondents

This data can provide an overview regarding knowledge, attitude and practice on prevention of musculoskeletal disorders since no KAP study regarding prevention of MSD has been found previously among production workers. Majority of the respondents have moderate level of knowledge (77%), attitude (57%) and practices (68%). Only 6%, 22% and 16% of the respondents managed to obtain high level of knowledge, good attitude, and good practices respectively.

Based on the result, most of the respondents had a moderate level of knowledge regarding the prevention of musculoskeletal disorders among production line workers. This finding is similar with a study done by Amenze et al. (2017), which showed that majority of the respondents had fair knowledge on occupational hazards. However, the findings contrasted with another study conducted by Athirah et al., (2018), which revealed that majority of the employers had a good knowledge on MSD, however most of the respondents admitted that their knowledge on prevention MSD was inadequate. The level of knowledge was observed at moderate level due to no ergonomics training for them. Level of knowledge can be improve by providing education related with prevention of musculoskeletal disorders such as stretching exercise education (Koo & Kim, 2006).

Besides, the attitude of the respondents also at moderate level and this is associated with education level. Moderate attitude observed in this study might because majority of the respondents had secondary level of education. Since the practices on prevention of MSD were also moderate, Siddiqui et al., (2016) showed that when years of employment were combined with training, it will provide better knowledge and

practices of ergonomics. Plus, when the level of knowledge and attitude are high, the actual practices of ergonomics principles must be assured if MSD are to be prevented.

5.7 Association between the socio-demographics and occupational information, and the level of knowledge, attitude, and practices on prevention of musculoskeletal disorders among the respondents

There was no significant association in level of knowledge according to socio-demographics (age, gender, education level and marital status) and occupational information (years of employment).

The level of attitude on prevention of musculoskeletal disorders among the respondents had a significant association with their education level. Low level of attitude among participants in this study who had secondary level of education (16.9%) higher compared to those with tertiary education. The association between higher education and higher attitude level found in this study might be influenced by the academic achievement, meaning they were more resourceful to prevent MSD. Other than that, this could be due to a better work commitment expressed by workers with tertiary education compared to workers with secondary education. As suggested by Choudhry et al. (2007), employee engagement, ownership and sentiments of self-worth and belonging are crucial aspects that encourage workers to cooperate in any workplace safety measures.

This study showed that the socio-demographics (age, gender, education level and marital status) and occupational information (years of employment) of the respondents had no significant influence on their level of practices on prevention of MSD.

5.8 Association between level of KAP and the prevalence of musculoskeletal disorders

This study found that knowledge, attitude, and practice on prevention of musculoskeletal disorders had significant association with the prevalence of musculoskeletal disorders. However, the findings from Ephraim-Emmanuel (2019) only showed knowledge and practices associated with prevalence of work-related MSD, in which the study was conducted among the doctors.

The result shows that the production line workers have a moderate knowledge of MSD's prevention presented with more cases of MSD than those having high knowledge of how to prevent MSD. Only 3 (2.2%) of respondents had high knowledge regarding prevention of MSD at workplace with no complaints on MSD. 16.7% of respondent having MSD had low knowledge of prevention of MSD at workplace. Hence, the level of knowledge is significant associated with the prevalence of MSD. This high proportion of study respondents having moderate knowledge is the overview of the level of knowledge of the production line workers. A previous study showed that the knowledge, attitude, and practices on MSD was significantly changed, however, the complaint rates of musculoskeletal symptoms after 11-week exercise program were not significantly changed (Koo & Kim, 2006).

In this study, out of 122 respondents having MSD, nearly half of them has moderate level of attitude on prevention of MSD. Only 8 (5.8%) of respondents had high attitude regarding prevention of MSD at workplace with no complaints on MSD. 20.3% of respondent having MSD had low attitude on prevention of MSD at workplace. The high prevalence of MSD in this study could also be a result of the attitude on MSD prevention.

The production line workers have a moderate practice of MSD's prevention reported more cases of MSD than those having low and high practices to prevent MSD. Only 6 (4.3%) of respondents had high practices regarding prevention of MSD at workplace with no complaints on MSD. 15.9% of respondent having MSD had low practices of prevention of MSD at workplace. The high prevalence of MSD in this study might be due to moderate practices of preventives to MSD.

CHAPTER 6

CONCLUSION

6.1 Conclusion

In conclusion, the findings of this research were as below:

i. There was a high prevalence of MSD among the production line workers in manufacturing industry.

ii. There was a moderate level of KAP on prevention of MSD among the production line workers.

iii. There was a significant association between attitude on prevention of MSD and education level of the respondents.

iv. There was a significant association between prevalence of MSD and level of KAP.

6.2 Strength of the Study

One of the strengths of this study used production line workers. KAP about prevention of musculoskeletal disorders. Furthermore, KAP are important factors in solving problems such as MSD at workplace. This study also provides an overview related to prevention of MSD since there was limited studies focusing onto this issue. Other than that, it may assist employers to focus on appropriate preventive measures respect to KAP elements.

6.3 Study limitation

Throughout the process of completion of this study, one of the limitations of this study was the selection of respondents was left to the supervisors, as the management did not permit researcher to randomly approach the respondents physically. Prior to that, the researcher had explained the information regarding this study to the supervisor. However, to increase the likelihood to find true association between the factors and its outcomes; the respondents were with at least one year working experience in the factory and had no injuries or MSD history.

Besides, the study could be improved its study design. This was a cross-sectional study where only the association between KAP and MSD at a particular point in time be determined. Other than that, this study also not cover the relationship between MSD and other risk factor, which might confound the prevalence of MSD among production workers in this industry.

6.4 Recommendation

The recommendations to be considered for this study are as the following:

i. Enhancing intervention program at the factory such as training on ergonomic principles to all the workers in order to inculcate good knowledge and attitude towards the prevention of MSD, which will lead to organization's good safety practices.

ii. The researcher would like to recommend that future investigators follow up the study (intervention after KAP survey) to determine whether the proportion of workers having MSD will decrease after training.

iii. Widen the zone of study to other industries in Malaysia; either manufacturing or non-manufacturing or to all other countries to have wider global reach.

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APPENDICES

APPENDIX A

RESPONDENT INFORMATION AND INFORMED CONSENT

JAWATANKUASA ETIKA UNIVERSITI UNTUK PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)
UNIVERSITI PUTRA MALAYSIA, 43400 UPM

FORM 2.4:

RESPONDENT'S INFORMATION SHEET AND INFORMED CONSENT FORM

Please read the following information carefully and do not hesitate to discuss any questions you may have with the researcher.

1. STUDY TITLE : Knowledge, Attitude and Practices (KAP) in Preventing Musculoskeletal Disorders among Manufacturing Workers in Bangi, Selangor.

2. INTRODUCTION:

You have been invited to participate in this study because you are at risk of having musculoskeletal disorders due to working. Musculoskeletal disorders are conditions that interfere the normal functioning of soft tissues of the musculoskeletal system that occurs in many parts of the human body including the neck, upper limbs such as hands, wrists, elbows and shoulders, lower limbs including legs, hips, ankles and feet , and back. It is very important that you understand why this research is done and what is being done in this research. Please take sufficient time to read and carefully consider the information provided before you agree to participate in this research. If you have any doubts or further information you would like to know, you can ask the researcher of this study. Once you are satisfied that you understand this research, and you are interested in participating, you are required to sign the Participant Consent Form or Consent Form, on the last page of this brochure. To participate in this research, you need to answer a pre survey questionnaire; if you are not honest you may cause problems in this study. Your participation in this study is voluntary. You do not have to participate in this research if you do not want to.

3. WHAT WILL YOU HAVE TO DO?

If you agree to participate in this research, a set of questionnaire will be given to you and you will need to complete it within the allocatted time and give it back to the researcher. This questionnaire consists of 4 parts: Part A (Socio-demographic and Cornell Musculoskeletal Discomfort Questionnaire (CMDQ)); Part B (Knowledge of muscle-bone problem prevention); Part C (Attitude on prevention of muscle-bone problems); and Part D (Practices on practices practiced while doing work).

4. WHO SHOULD NOT PARTICIPATE IN THE STUDY?

You should not participate in this study if you have been working for less than a year, age under 18 years old, foreigner workers, have a chronic illness and work as a part timer.

5. WHAT WILL BE THE BENEFITS OF THE STUDY:

(a) TO YOU AS THE SUBJECT?

This study may be beneficial or not at all beneficial to you at all. All the information obtained from this study will be able to assist in the individual improvements of ergonomics intervention which can tackle MSD. You will be able to know your level of knowledge, attitude and practice on how to prevent muscle-bone problems. In addition, you are also given the choice of whether to know the results of this study or not at the end of the research.

(b) TO THE INVESTIGATOR?

All the information obtained from this study will be used to measure the respondents' level of knowledge, attitude and practice on the prevention of musculoskeletal disorders. The result can be used as a reference in the KAP study for the prevention of musculoskeletal disorders in the manufacturing sector.

6. WHAT ARE THE POSSIBLE RISKS?

This study is not risky because it is not invasive.

7. WILL THE INFORMATION THAT YOU PROVIDE AND YOUR IDENTITY REMAIN CONFIDENTIAL?

All your information obtained in this research will be kept and handled confidentially, in accordance with applicable regulations and / or laws. If the results of this research are published or presented to the public, your identity will not be disclosed without your prior permission.

8. WHO SHOULD YOU CONTACT IF YOU HAVE ADDITIONAL QUESTIONS DURING THE COURSE OF THE RESEARCH?

Anda boleh menghubungi penyelidik kajian ini jika anda mempunyai soalan tambahan mengenai kajian ini.

1. Nurul Adila binti Mohamad Nor'aini
   017-3773692
   adila.noraini@gmail.com

2. Prof Dr Shamsul Bahri Mohd Tamrin
   017-3134792
   shamsul_bahri@upm.edu.my

*Please initial here if you have read and understood the contents of this page*_____

9. CONSENT

I …… Identity Card No. …… address…… ……... ……..hereby voluntarily agree to take part in the research stated above *(clinical /drug trial/video recording/ focus group/interview-based/ questionnaire-based).

I have been informed about the nature of the research in terms of methodology, possible adverse effects and complications (as written in the Respondent's Information Sheet). I understand that I have the right to withdraw from this research at any time without giving any reason whatsoever. I also understand that this study is confidential and all information provided with regard to my identity will remain private and confidential.

I* wish / do not wish to know the results related to my participation in the research

I agree/do not agree that the images/photos/video recordings/voice recordings related to me be used in any form of publication or presentation (if applicable)

* delete where necessary

Signature ……..…… (Respondent)

Signature ……..…… (Witness)

Date:……

Name:……...
I/C No. :…….…...

I confirm that I have explained to the respondent the nature and purpose of the above-mentioned research.

Date ……..……

Signature ……..…… (Researcher)

BORANG 2.4:
PENERANGAN DAN PERSETUJUAN RESPONDEN

Sila baca maklumat berikut dengan teliti. Sekiranya anda mempunyai sebarang pertanyaan, sila kemukakan kepada penyelidik.

1.TAJUK KAJIAN : Pengetahuan, Sikap dan Praktis (KAP) Mengenai Pencegahan Masalah Otot-Tulang dalam kalangan Pekerja Pengilangan di Bangi, Selangor.

2. PENGENALAN
Anda telah dijemput untuk menyertai penyelidikan ini kerana anda mempunyai risiko mengalami masalah otot-tulang disebabkan oleh pekerjaan. Masalah otot-tulang adalah keadaan yang mengganggu fungsi normal tisu lembut sistem otot-tulang yang berlaku di banyak bahagian tubuh manusia termasuk leher, anggota badan atas seperti tangan, pergelangan tangan, siku dan bahu, anggota bawah termasuk kaki, pinggul, pergelangan kaki dan kaki, dan belakang. Amat penting anda memahami mengapa penyelidikan ini dilakukan dan apa yang dilakukan dalam penyelidikan ini. Sila ambil masa yang secukupnya untuk membaca dan mempertimbangkan dengan teliti penerangan yang diberi sebelum anda bersetuju untuk menyertai penyelidikan ini. Jika ada sebarang kemusykilan ataupun maklumat lanjut yang anda ingin tahu, anda boleh bertanya dengan penyelidik kajian ini. Setelah anda berpuashati bahawa anda memahami penyelidikan ini, dan anda berminat untuk turut serta, anda dikehendaki untuk menandatangani Borang Persetujuan atau Keizinan Peserta, pada muka surat akhir risalah ini. Untuk menyertai penyelidikan ini, anda perlu menjawab soal selidik tinjauan awal; jika anda tidak berterus terang anda mungkin boleh menimbulkan masalah pada kajian ini. Penyertaan anda dalam kajian ini adalah secara sukarela. Anda tidak perlu menyertai penyelidikan ini jika anda tidak mahu.

3. APAKAH YANG PERLU ANDA LAKUKAN?
Sekiranya anda bersetuju untuk menyertai penyelidikan ini, satu set borang kaji selidik akan diberikan kepada anda dan anda perlu melengkapkannya dalam tempoh masa yang telah diberikan dan memberikannya semula kepada penyelidik. Borang kaji selidik ini mengandungi 4 bahagian: Bahagian A (Sosio-demografik dan Cornell Musculoskeletal Discomfort Questionnaire (CMDQ)); Bahagian B (Pengetahuan mengenai pencegahan masalah otot-tulang); Bahagian C (Sikap mengenai pencegahan masalah otot-tulang); dan Bahagian D (Praktis mengenai amalan yang dipratikkan ketika melakukan kerja).

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?
Anda tidak boleh menyertai kajian ini sekiranya anda baru bekerja kurang dari setahun, berumur di bawah 18 tahun, bukan Warganegara Malaysia, mempunya penyakit kronik dan bekerja sebagai pekerja sementara.

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

a) KEPADA ANDA SEBAGAI PESERTA?

Kajian ini mungkin akan mendatangkan manfaat ataupun langsung tiada memberi apa-apa manfaat kepada anda. Segala maklumat yang diperolehi daripada kajian ini akan dapat membantu dalam penambahbaikan untuk langkah pencegahan melibatkan masalah otot-tulang. Anda akan dapat mengetahui tahap pengetahuan, sikap dan praktis anda mengenai cara mencegah masalah otot-tulang. Selain itu, anda juga diberi pilihan samada untuk mengetahui hasil daripada kajian ini ataupun tidak di akhir penyelidikan.

b) KEPADA PENYELIDIK?

Segala maklumat yang diperoleh dari kajian ini akan digunakan untuk mengukur tahap pengetahuan, sikap dan praktis anda mengenai pencegahan masalah otot-tulang. Maklumat tersebut boleh digunakan sebagai rujukan dalam kajian KAP untuk pencegahan masalah otot-tulang di dalam sektor pengilangan.

6. ADAKAH IA BERISIKO?

Kajian ini tidak berisiko kerana ianya tidak invasif.

7. ADAKAH MAKLUMAT DAN IDENTITI SAYA KEKAL RAHSIA?

Segala maklumat anda yang diperolehi dalam penyelidikan ini akan disimpan dan dikendalikan secara sulit, bersesuaian dengan peraturan-peraturan dan/ atau undang-undang yang berkenaan. Sekiranya hasil penyelidikan ini diterbitkan atau dibentangkan kepada orang ramai, identiti anda tidak akan didedahkan tanpa kebenaran anda terlebih dahulu.

8. SIAPA YANG SAYA PERLU HUBUNGI SEKIRANYA SAYA MEMPUNYAI SOALAN TAMBAHAN SEMASA MENGIKUTI PENYELIDIKAN INI?

Anda boleh menghubungi penyelidik kajian ini jika anda mempunyai soalan tambahan mengenai kajian ini.

1. Nurul Adila binti Mohamad Nor'aini
   017-3773692
   adila.noraini@gmail.com

2. Prof Dr Shamsul Bahri Mohd Tamrin
   017-3134792
   shamsul_bahri@upm.edu.my

Sila tandatangan di sini sekiranya anda telah membaca dan memahami kandungan halaman ini _____

9. PERSETUJUAN

Saya…… No Kad Pengenalan. ……

beralamat……

……..dengan ini bersetuju untuk mengambil bahagian secara sukarela dalam penyelidikan yang tersebut di atas *(kajian klinikal/percubaan ubat-ubatan/rakaman video/kumpulan sasaran/temuduga/ soal selidik).

Saya telah diberi penjelasan secara menyeluruh mengenai penyelidikan ini dari segi metodologi, risiko dan komplikasi (seperti tertulis pada Helaian Penerangan Responden). Saya memahami bahawa saya berhak menarik diri dari penyelidikan ini pada bila-bila masa tanpa memberi sebarang alasan. Saya juga memahami bahawa sebarang maklumat yang berkaitan identiti saya akan dirahsiakan.

Saya* berminat / tidak berminat untuk mengetahui keputusan kajian yang melibatkan saya.

I setuju/tidak bersetuju untuk imei/gambar/rakaman video/ rakaman suara digunakan dalam apa jua bentuk penerbitan atau pembentangan. (sekiranya berkaitan).

*potong yang tidak berkenaan

Tandatangan ……..…… Tandatangan ……..…….....
(*Responden*) (*Saksi*)

Tarikh :…….….. Nama :…….…..

No. K/P: …….……..

Saya mengesahkan bahawa saya telah menerangkan kepada responden ini sifat dan tujuan penyelidikan yang tersebut di atas.

Tarikh ……..…… Tandatangan ……..…….
(*Penyelidik*)

APPENDIX B

QUESTIONNAIRE

Tarikh/ Date: | | ID No.: | |

UNIVERSITI PUTRA MALAYSIA
BERILMU BERBAKTI

BORANG KAJI SELIDIK/ QUESTIONNAIRE

TAJUK KAJIAN/ RESEARCH TITLE	*NAMA PENGKAJI*/ RESEARCHER NAME
Pengetahuan, Sikap dan Amalan terhadap Pencegahan Masalah Otot-tulang dalam Kalangan Pekerja Pengeluaran Knowledge, Attitude And Practices On Prevention Of Musculoskeletal Disorders (MSD) Among Production Workers	Nurul Adila Binti Mohamad Nor'aini

***Arahan*/ Instruction**

Soal selidik ini terdiri daripada 3 bahagian; ***Bahagian A- Maklumat Latar Belakang dan Pekerjaan, Bahagian B- Borang Kaji Selidik Ketidakselesaan Muskuloskeletal Cornell (CMDQ), Bahagian C- Pengetahuan, Sikap, & Amalan Pencegahan MSD****.*

This questionnaire consists of 3 parts: **Part A- Background and Occupational Information, Part B- Cornell Musculoskeletal Discomfort Questionnaire (CMDQ), and Part C- Knowledge, Attitude and Practices on Prevention of MSD.**

Sila baca soalan dengan teliti sebelum menjawab.
Please read the questions carefully before answering.

BAHAGIAN A – MAKLUMAT LATAR BELAKANG DAN PEKERJAAN

PART A – BACKGROUND AND OCCUPATIONAL INFORMATION

Sila tandakan (/) di dalam kotak yang sesuai atau isikan tempat kosong.
Please tick (/) in the appropriate box or fill in the blank.

1.Umur/ Age: _____

2.*Jantina/ Gender:*

a. ☐ Male / *Lelaki* b. ☐ Female / *Perempuan*

3.Kewarganegaraan/ Nationality:

a. ☐ Malaysian b. ☐ Non-malaysian

4. *Bangsa*/ Race:

a. ☐ Melayu/ Malay b. ☐ Cina/ Chinese

c. ☐ India/ Indian d. ☐ Lain-lain/ Others:_____

5.*Tinggi/* Height (in m): _____

6.*Berat badan/* Body weight (in kg): _____

7.*Tahap pendidikan tertinggi/* Highest education level:

a. ☐ SPM
b. ☐ STPM / Matriculation / Pre-university
c. ☐ Technical / Vocasional
d. ☐ Diploma
e. ☐ Bachelor's Degree
f. ☐ Others: _____

8.Status perkahwinan/ Marital status:

a. ☐ *Bujang*/ Single
b. ☐ *Berkahwin/* Married
c. ☐ *Bercerai*/ Divorce

9. *Adakah anda telah disahkan secara klinikal mengalami masalah kecederaan muskuloskeletal atau kecederaan lain dalam tempoh 12 bulan yang lalu yg bukan disebabkan oleh pekerjaan?*
Have you been clinically diagnosed with musckuloskeletal disorders or any injuries in the past 12 months caused by non-occupational factors?

a. ☐ Ya/ *Yes* b. ☐ *Tidak/ No*

10. *Adakah anda telah disahkan secara klinikal mengalami masalah tekanan darah tinggi, sakit jantung dan strok, kencing manis, kanser?*
Have you been clinically diagnosed with hypertension, heart attack and stroke, diabetes, cancer?

a. ☐ Ya/ *Yes* b. ☐ *Tidak/ No*

11. Jenis pekerjaan/ Employment type:

a. ☐ *Separuh masa/* Part-time b. ☐ *Sepenuh masa/* Full-tin

12. *Tempoh bekerja/* Years of employment:

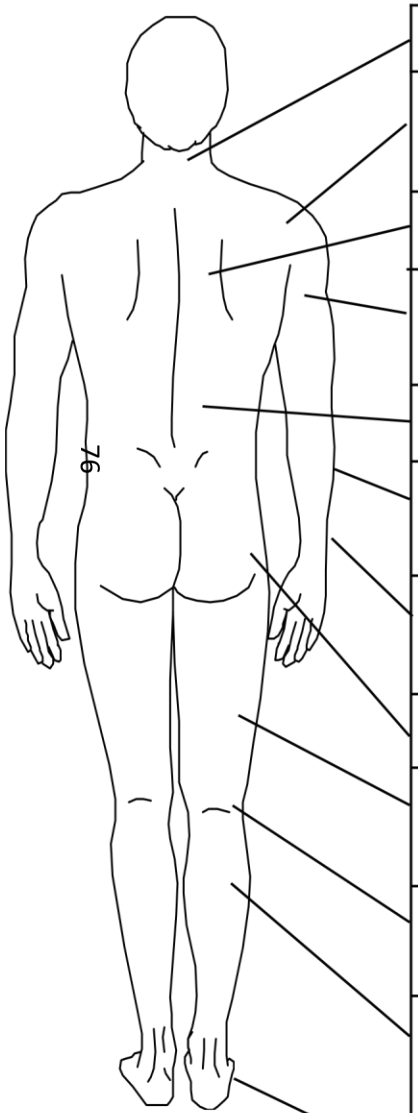
a. ☐ < 1 *tahun*/ < 1 year
b. ☐ 1-3 *tahun* / *1-3* years
c. ☐ 4-6 *tahun* / *4-6* years
d. ☐ 7-9 *tahun* / *7-9* years
e. ☐ 10-12 *tahun* / *10-12* years
f. ☐ 13-15 *tahun* / *13-15* years
g. ☐ >15 *tahun* / *>15* years

BAHAGIAN B – BORANG SOAL SELIDIK KETIDAKSELESAAN MUSKULOSKELETAL CORNELL (CMDQ)
PART B- CORNELL MUSCULOSKELETAL DISCOMFORT QUESTIONNAIRE (CMDQ)

Untuk setiap bahagian badan berdasarkan rajah di bawah, sila jawab dengan menandakan pada kotak yang bersesuaian. (rujuk lampiran)
For each part of the body based on the diagram below, please answer by marking in the appropriate box. *(refer the attachment)*

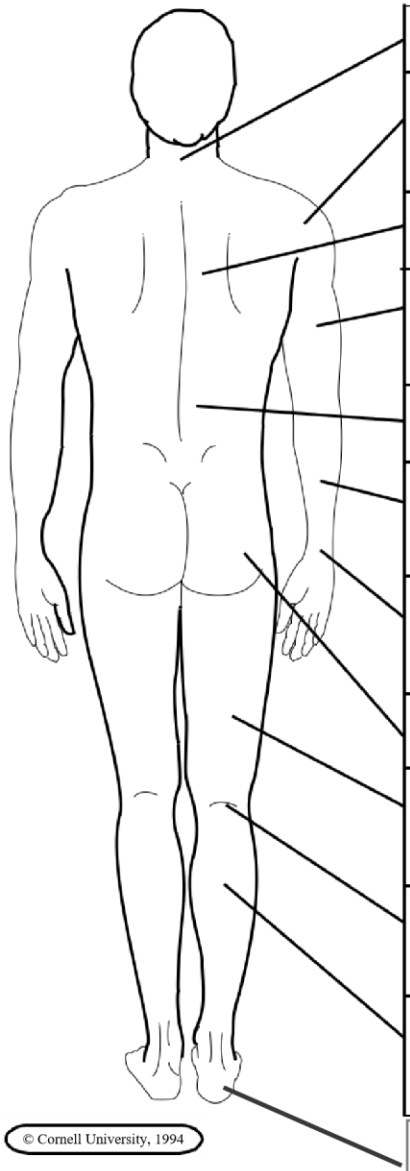
Anda boleh memilih untuk menjawab versi Bahasa Inggeris atau Bahasa Melayu.
You can choose either to answer in English or Malay version of the questionnaire.

The diagram below shows the approximate position of the body parts referred to in the questionnaire. Please answer by marking the appropriate box.



		During the last work week how often did you experience ache, pain, discomfort in:					If you experienced ache, pain, discomfort, how uncomfortable was this?			If you experienced ache, pain, discomfort, did this interfere with your ability to work?		
		Never	1-2 times last week	3-4 times last week	Once every day	Several times every day	Slightly uncomfortable	Moderately uncomfortable	Very uncomfortable	Not at all	Slightly interfered	Substantially interfered
Neck		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Shoulder	(Right)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	(Left)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Upper Back		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Upper Arm	(Right)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	(Left)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Lower Back		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Forearm	(Right)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	(Left)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Wrist	(Right)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	(Left)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Hip/Buttocks		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Thigh	(Right)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	(Left)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Knee	(Right)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	(Left)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Lower Leg	(Right)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	(Left)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Foot	(Right)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	(Left)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Gambarajah di bawah menunjukkan kedudukan bahagian badan seperti dirujuk dalam soalan. Sila jawab dengan menandakan kotak yang bersesuaian.



	Sepanjang minggu bekerja yang lepas, berapa kerapkah anda mengalami kesakitan atau ketidak selesaan di:					Jika anda mengalami kesakitan atau ketidak selesaan, bagaimanakah tahapnya?			Jika anda mengalami kesakitan atau ketidak selesaan, adakah ia mengganggu kebolehan anda untuk bekerja?		
	Tidak pernah	1-2 kali lepas	3-4 kali lepas	Sekali setiap hari	Beberapa kali setiap hari	Sedikit kurang menyenangkan	Agak tidak menyenangkan	Sangat tidak menyenangkan	Tidak sama sekali	Sedikit mengganggu	Sangat mengganggu
Leher	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Bahu (kanan)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Bahu (kiri)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Belakang atas	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Lengan (kanan)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Lengan (kiri)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Belakang bawah	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Lengan bawah (kanan)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Lengan bawah (kiri)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Pergelangan tangan (kanan)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Pergelangan tangan (kiri)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Pinggul/Punggung	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Peha (kanan)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Peha (kiri)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Lutut (kanan)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Lutut (kiri)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Betis (kanan)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Betis (kiri)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Kaki (kanan)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Kaki (kiri)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

BAHAGIAN C– BAHAGIAN PENGETAHUAN, SIKAP DAN AMALAN
PART C- KNOWLEDGE, ATTITUDE AND PRACTICES SECTION

Bahagian Pengetahuan/ Knowledge Section

Sila tandakan (/) pada pilihan jawapan anda.
Please tick (/) on your choice of answer.

NO.	SOALAN/ QUESTION	YA/ *YES*	TIDAK/ *NO*
16.	Adakah **memegang instrumen kecil untuk tempoh yang lama** menghalang sakit sendi dan otot? Does **grasping small instruments for long periods** prevent musculoskeletal disorders?		
17.	*Bolehkah **pemaksaan tangan semasa bekerja** menyumbang kepada berlakunya sakit sendi dan otot?* Can forceful hand exertions while working contribute to the occurrence of musculoskeletal disorders?		
18.	*Bolehkah **meletakkan tangan atau pergelangan tangan secara tidak normal** dapat mencegah sakit sendi dan otot?* Can abnormally positioning the hand or wrist prevent musculoskeletal disorders?		
19.	*Adakah **berehat semasa bekerja** menyumbang kepada sakit sendi dan tulang?* Will **rest while working** contribute to musculoskeletal diorders?		
20.	*Adakah **rehat yang cukup antara prosedur kerja** dapat mencegah berlakunya sakit sendi dan otot?* Does **taking adequate breaks between work procedures** prevent the occurrence of musculoskeletal disorders?		
21.	*Bolehkah **mengangkat alat/bahan berat di tempat kerja dengan kerap** menyumbang kepada sakit sendi dan otot?* Can **frequent lifting of heavy equipment/materials at work** contribute to musculoskeletal disorders?		
22.	*Adakah **melenturkan pergelangan tangan antara 100^0 dan 120^0** mencegah sakit sendi dan otot?* Will **flexing the wrist between 100^0 and 120^0** prevent musculoskeletal disorders?		

NO.	SOALAN/ QUESTION	YA/ *YES*	TIDAK/ *NO*
23.	*Adakah **membengkokkan leher melebihi** **20^0** **semasa bekerja** menyumbang kepada sakit sendi dan otot?* Does **bending the neck beyond 20^0 while working** contribute to musculoskeletal disorders?		
24.	*Bolehkah **melenturkan bahagian belakang atas** menyumbang kepada sakit sendi dan otot?* Can **flexing the upper back** contribute to musculoskeletal disorders?		
25.	*Adakah **melonggarkan bahu** dapat mengelakkan sakit sendi dan otot?* Does **keeping the shoulders relaxed** prevent musculoskeletal disorders?		
26.	*Adakah **mengelakkan waktu bekerja yang panjang** berguna untuk mencegah sakit sendi dan otot?* Does **avoiding prolonged working hours** be useful in preventing musculoskeletal disorders?		
27.	*Bolehkah **senaman regangan** berguna dalam mencegah sakit sendi dan otot?* Can **stretching exercises** be useful in preventing musculoskeletal disorders?		
28.	*Adakah mempunyai **akses yang baik ke instrumen, penglihatan dan keselesaan semasa bekerja** berguna dalam mencegah sakit sendi dan otot?* Does having **good access to instruments, visibility and comfort during work** be useful in preventing musculoskeletal disorders?		
29.	*Adakah **berehat secara teratur dan mencapai postur kerja yang optimum** memainkan peranan penting dalam mencegah sakit sendi dan otot?* Does **taking regular breaks and achieving optimal work posture** play a vital role in preventing musculoskeletal disorders?		
30.	*Bolehkah **pertimbangan ergonomik dalam pemerolehan peralatan pembuatan atau mesin** memainkan peranan penting dalam mencegah sakit sendi dan otot?*/ Can the **consideration of ergonomics in acquisition of manufacturing equipment or machineries** play a vital role in preventing musculoskeletal disorders?		

Bahagian Sikap/ Attitude Section

Sila tandakan (/) pada pilihan jawapan anda.
Please tick (/) on your choice of answer.

NO	PERNYATAAN/ STATEMENT	*SETUJU* AGREE	*TIDAK SETUJU* DISAGREE
31.	*Untuk melihat ruang kerja saya dengan lebih baik, lebih baik menundukkan kepala ke hadapan daripada menyesuaikan ruang kerja.* For better viewing of my workspace, it is preferable to bend my head forward instead of adjusting the workspace.		
32.	*Saya perlu membongkokkan badan semasa bekerja kerana ini memudahkan kerja saya.* I need to bend my body while working because it makes my work easier.		
33.	*Untuk menyelesaikan kerja saya tepat pada waktunya, saya lebih suka mencapai kedudukan yang sama (contohnya duduk) untuk jangka masa yang panjang semasa bekerja dan bukannya menukar posisi semasa bekerja.* In order to finish my work on time, I prefer to attain the same position (e.g. sitting) for long periods while working instead of changing positions while working.		
34.	*Mengambil rehat semasa menjalankan tugas di tempat kerja hanyalah membuang masa.* Taking breaks while performing my duties at work is a mere waste of time.		
35.	*Pergerakan tangan yang kuat semasa bekerja membolehkan saya menyelesaikan kerja tepat pada waktunya tanpa mengira akibat yang mungkin berlaku*. Forceful hand movements while working enables me get work done on time regardless of the consequences that may occur.		
36.	*Melibatkan diri dalam aktiviti/senaman fizikal seperti regangan, berjalan kaki dan lain-lain sangat sesuai untuk menjaga kesihatan.*		

NO	PERNYATAAN/ STATEMENT	*SETUJU* AGREE	*TIDAK SETUJU* DISAGREE
	Engaging in physical activity/exercise e.g. stretching, walking etc. are ideal for maintaining good health.		
37.	*Menyokong bahagian belakang saya semasa bekerja selalu dipertimbangkan setiap kali saya bekerja.* Keeping my back supported while working is always considered whenever I'm working.		
38.	*Penyesuaian tempat kerja semasa bekerja untuk mengelakkan penyakit otot-tulang adalah tugas yang sukar.* Workplace adjustment while working in order to avoid musculoskeletal disorders is a difficult task.		
39.	*Dalam usaha untuk mengelakkan sakit sendi dan otot, membengkokkan leher semasa bekerja mesti dielakkan.* In a bid to avoid musculoskeletal disorders, neck bending while working must be avoid.		
40.	*Menerapkan prinsip ergonomik di tempat kerja untuk mengelakkan penyakit otot-tulang adalah tugas yang dapat dicapai.* Applying ergonomic principles at work to avoid musculoskeletal disorders is an achievable task.		

Bahagian Amalan/ Practices Section

Sila tandakan (/) berdasarkan kekerapan amalan anda semasa bekerja.
Please tick (/) based on your frequency of practices during working.

NO.	AMALAN/ PRACTICES	TIDAK PERNAH/ NEVER	JARANG/ RARELY	KEKADANG/ SOMETIMES	SELALU/ ALWAYS
41.	*Pergerakan tangan yang lembut* Gentle hand movements				
42.	*Menukar kedudukan semasa bekerja* Changing positions while working				

NO.	AMALAN/ PRACTICES	TIDAK PERNAH/ NEVER	JARANG/ RARELY	KEKADANG/ SOMETIMES	SELALU/ ALWAYS
43.	*Meletakkan kaki rata di atas lantai* Placing feet flat on the floor				
44.	*Mengambil waktu rehat seketika semasa bekerja* Taking intermittent breaks while working				
45.	*Postur berdiri yang baik semasa kerja* Good posture of standing while working				
46.	*Bekerja dengan bantuan apabila perlu* Working with assistance when necessary				
47.	*Memastikan bahu saya sentiasa santai semasa bekerja* Ensuring my shoulders relaxed while working				
48.	*Memastikan leher saya ke hadapan hanya dalam had yang selamat* Keeping my neck forward only within safe limits				
49.	*Memastikan dan / atau menganjurkan tugas shift yang ergonomik* Ensuring and/or advocating for ergonomically-considered shift duties				

NO.	AMALAN/ PRACTICES	TIDAK PERNAH/ NEVER	JARANG/ RARELY	KEKADANG/ SOMETIMES	SELALU/ ALWAYS
50.	*Menyesuaikan ruang kerja untuk kedudukan yang lebih baik* Adjusting workspace for better positioning				
51.	*Melibatkan diri dalam aktiviti fizikal semasa bekerja. Contoh. regangan dll.* Engaging in physical activity while working. E.g. stretching etc.				
52.	*Meletakkan badan saya dalam had ergonomik yang selamat semasa bekerja.* Positioning my body within safe ergonomic limits while working.				
53.	*Pertimbangan prinsip ergonomik semasa membeli bahan, alat dan / atau peralatan kerja.* Consideration of ergonomic principles when purchasing work materials, tools and/or equipment.				
54.	*Menghentikan aktiviti kerja sebentar apabila timbul rasa tidak selesa*. Stopping work activity for a while when discomfort arises.				
55.	*Memastikan instrumen kerja*				

NO.	AMALAN/ PRACTICES	TIDAK PERNAH/ NEVER	JARANG/ RARELY	KEKADANG/ SOMETIMES	SELALU/ ALWAYS
	sentiasa teratur semasa bekerja. Ensuring orderliness of work instruments while working.				

- *TERIMA KASIH*/ THANK YOU -

APPENDIX C

ETHICAL APPROVAL

APPENDIX D

GANTT CHART

No.	Activities	2020			2021						
		Oct	Nov	Dec	Jan	Feb	Mac	April	May	June	July
1.	Discussion with supervisor to finalise the topic of FYP										
2.	Submission of FYP registration form to coordinator										
3.	Writing FYP proposal										
3.	Development of questionnaire										
4.	Submission of research proposal to ethics committee										
5.	Proposal presentation										
6.	Questionnaire pre-test										
7.	Data collection										
8.	Data analysis										
9.	Writing thesis										
10.	Viva presentation										
11.	Thesis review										
12.	Submission of thesis										