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ASSOCIATION OF RISK FACTORS WITH MUSCULOSKELETAL DISORDERS AMONG FOOD DELIVERY RIDERS

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BY

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ABSTRACT

ASSOCIATION OF RISK FACTORS WITH MUSCULOSKELETAL DISORDERS AMONG FOOD DELIVERY RIDERS

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Introduction: Musculoskeletal disorders is one of injuries or disorders of the muscles that can be caused by the work environment and performance of the work that contribute to work-related musculoskeletal disorders and can be worst with addition of the conditions. Food delivery riders are one of group of people that are exposed to the risk of getting musculoskeletal disorders. **Objective:** The objective in this study is to determine the association of risk factors with musculoskeletal disorders (MSDs) among food delivery riders. **Methodology:** This study was conducted among food delivery riders that taking order around the Klang Valley. Snowball sampling had been used in this study to select the respondents. Self-administered questionnaires had been distributed through online method to 97 respondents needed. Nordic musculoskeletal disorders questionnaires also been used to determine the prevalence of musculoskeletal disorders among food delivery riders. **Result and Discussion :**In this study, it found that there was high prevalence of musculoskeletal disorders among food delivery riders which was about 84.5% and the highest musculoskeletal disorders reported for the pas 12-months by body parts were shoulder and upper back (51.5%), followed by neck (50.5%) lower back (48.5%) and hip (37.1%) respectively. Also, in this study, it found that there were few risk factors that significantly associated with musculoskeletal disorders at $p<0.05$ such as BMI ($x^2=4.515$), smoking habit ($x^2=7.555$), feeling tired ($x^2=8.663$) regular exercise ($x^2=9.973$) and working experiences ($x^2=3.919$). **Conclusion:** Food delivery riders was one of susceptible group that can easily get musculoskeletal disorders. So, from the finding in this study, recommendation had been given to help the food delivery rider reduce the risk of getting musculoskeletal disorders in the future.

Keywords: Musculoskeletal disorders, Food delivery riders**,** Prevalence, Nordic musculoskeletal disorders questionnaire

ABSTRAK

HUBUNGAN DI ANTARA FAKTOR RISIKO YANG AKAN MENYEBABKAN PENYAKIT MUSCULOSKELETAL DALAM KALANGAN PENGHANTAR MAKANAN

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Pengenalan: Gangguan muskuloskeletal adalah salah satu kecederaan atau gangguan otot yang boleh disebabkan oleh persekitaran kerja dan prestasi kerja yang menyumbang kepada gangguan muskuloskeletal dan boleh menjadi semakin teruk mengikut keadaan. Penghantar makanan adalah salah satu kumpulan yang terdedah kepada risiko mendapat gangguan muskuloskeletal. **Objektif:** Objektif dalam kajian ini adalah untuk mengetahui perkaitan faktor risiko dengan gangguan muskuloskeletal (MSD) dalam kalangan penghantar makanan. **Metodologi:** Kajian ini dilakukan dalam kalangan penghantar makanan yang menghantar pesanan di sekitar Lembah Klang. Soal selidik yang diubahsuai sendiri telah diedarkan melalui kaedah dalam talian kepada 97 responden yang diperlukan. Borang soal selidik gangguan muskuloskeletal Nordik juga telah digunakan untuk menentukan kadar gangguan muskuloskeletal dalam kalangan penghantar makanan. **Keputusan dan Perbincangan:** Dalam kajian ini, terdapat kadar gangguan muskuloskeletal yang tinggi dalam kalangan penghantar makanan iaitu sekitar 84.5% dan gangguan muskuloskeletal tertinggi yang dilaporkan selama 12 bulan pada bahagian badan adalah di bahagian bahu dan belakang badan atas (51.5%), diikuti oleh leher (50.5%) belakang badan bawah (48.5%) dan pinggul (37.1%) Tambahan pula, di dalam kajian ini, didapati bahawa terdapat beberapa faktor risiko yang secara signifikan berkaitan dengan gangguan musculoskeletal di mana nilai $p < 0.05$ seperti BMI ($x^2=4.515$), habit merokok ($x^2=7.555$), merasa penat ($x^2=8.663$) aktiviti bersenam ($x^2=9.973$) dan pengalaman bekerja ($x^2=3.919$). **Kesimpulan:** Penghantar makanan adalah salah satu kumpulan yang mudah mendapat gangguan muskuloskeletal. Oleh itu, dari dapatan kajian ini, cadangan yang bersesuaian telah diberikan untuk membantu mengurangkan risiko mendapat gangguan muskuloskeletal dalam kalangan penghantar makanan di masa hadapan.

Kata kunci: Gangguan muskuloskeletal, Penghantar makanan, Kadar, Borang soal selidik gangguan muskuloskeletal Nordik

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MSDs	-	Musculoskeletal disorders
MIROS	-	Malaysian Institute of Road Safety Research
CDC	-	Centres for diseases control and prevention
WRMSDs	-	Work-related musculoskeletal disorders
OHSCO	-	Occupational Safety and Health Ontario
NIOSH	-	National Institute of safety and Health
WHO	-	World Health Organization

CHAPTER 1

INTRODUCTION

1.1 STUDY BACKGROUND

According to the Department of Statistics Malaysia, there were approximately 43,705,000 registered motorcycles in Malaysia in September 2018. According to a four-day study conducted by the Malaysian Institute of Road Safety Research (MIROS) at 11 intersections, approximately 3500 motorcycles are used for deliveries including food and package deliveries. The majority of food deliveries in Malaysia are made on motorcycles and the riders are typically freelancers who own the motorcycles.

The use of motorcycles in delivery services is because of a few factors, such as they are more cost-effective, which is 50% cheaper than delivery by car in terms of fuel costs, insurance, tax and maintenance, easier to navigate through traffic to make delivery on time especially during pick hour and also very suitable for short journeys which related food delivery services (Chelsea Motorcycles Group, 2019). Bicycles and motorbikes can also go faster than vehicles in congested city areas (Sydney Bicycle Messenger Association, 2007). Furthermore, motorcycles are a mode of transportation that allows riders to reach their destination in a short amount of time, allowing them to easily avoid and pass heavy traffic (Katadata, 2016). With the advancement of technology, many manufacturers are now designing motorcycles that are simple to operate for riders, as there is no common

transmission for the motorcycle, especially while riding (Amron, 2018).Because company rivalry is fierce, buyers have a lot of options when it comes to selecting the type of motorcycle that will be used (Zhao, 2017) as well as riders using a motorcycle as their mode of transport in delivery services. In Malaysia, there are numerous food delivery companies that offer online food delivery services, such as FoodPanda, which was the first delivery company that started aggressively in Malaysia (Chai & Ching Yat, 2019). According to Grabfood Malaysia, food delivery has never been as popular as it is now and the delivery trend will definitely continue to grow in 2020 and beyond. Although there are numerous benefits to using motorcycles as a mode of transportation, there are also numerous risks to which riders may be exposed. According to the Malaysian Institute of Road Safety Research, 65% of people are killed in road accidents in Malaysia and there are always headlines in the news involving food delivery riders.

Motorcycles can be more than just a source of transportation. They can be a part of the rider's personal lifestyle and other factors that contribute to risky behaviour and increased traffic accident involvement (Stanojević, Stanojević, Jovanović, & Lipovac, 2019). Besides, motorcycle riders are exposed to the risk of getting injured if they are involved in road traffic that will lead to road accidents due to the time pressure where riders feel pressure to get the delivery just in time, bad weather and lack of protective clothing (Kudasz, Liddle, Makowski, & Schmitz-Felten, 2010). Also, the danger of angry, inebriated or drugged clients or customers, the risk of exposure to high noise levels that come from vehicles, as well as the risk of being robbed by people when working at night

or working alone. Musculoskeletal disorders (MSDs) are an issue that requires special attention among people who are involved in the transportation sector (Gowling WLG - Elizabeth Rankin, 2007), where musculoskeletal disorders (MSDs) such as Carpal Turner's syndrome, tendonitis, thoracic outlet syndrome and tension neck syndrome are examples of a group of uncomfortable muscles, tendons and nerves (Canadian Centre for Occupational Health and Safety).

1.2 PROBLEM STATEMENTS

According to the Social Security Organization's (Socso) statistics, 694 cases of ergonomics were reported out of 2630 cases of disease in 2013, which suggests that one out of every four cases reported to Socso was related to musculoskeletal problems. In 2009, 40 cases out of 121 occupational disease cases were chronic musculoskeletal cases paid by Socso, and these cases continued to arise over the years; in 2014, 153 cases were related to ergonomics issues out of 605 occupational disease cases paid by Socso. In food delivery services, riders are exposed to the risk of getting musculoskeletal disorders and when it comes to ergonomics, a motorbike poses a unique challenge because it involves a constricted workplace with limited adjustability options to meet the needs of diverse riders (Robertson, 1996) and is also exposed to sitting posture hazards compared to car drivers (Arunachalam, Mondal, Singh, & Karmakar, 2019).

Although there are many studies in Malaysia on riders who use motorcycles for work, such as the Malaysian Journal of Ergonomics Volume 1, December 2011, which studies

motorcycle police officers and mail delivery, there are no studies on food delivery services. Food delivery services are an example of an occupational motorcycle (OMC), in which riders use motorcycles to do their jobs and complete their tasks. Another example of OMC that is very limited in terms of study are policemen and postal delivery regarding their health conditions and problems (Mohd Hafzi MI, Rohayu S, Faradila PN, Shaw VW, December, 2011). Furthermore, Mohd Hafzi et al. study states that they are concerned about the motorcycle in the riding process as many people are involved in crashes and the worst case scenario can result in death. As a result, it is critical to learn and study about the risk factors that can arise simply from riding a motorcycle, as it involves many important aspects of a person's life that can be jeopardized if no action is taken, particularly for people who have shown signs of MSDs.

Karmegam et al. found that the overall prevalence of discomfort during riding a motorcycle among motorcyclists in Malaysia is 52.9%, including 50.3% for males and 55.5% for females. In food delivery services, the motorcycle is a common type of transportation used to deliver food. From the few studies that have been conducted, Rufal et al. have stated that there is a high prevalence of work-related musculoskeletal disorders (WRMSDs) that have been reported among drivers in different parts of the world. Work-related musculoskeletal disorders (WMSDs) are one of the leading types of occupational injury and always contribute to the greatest costs to the industry and employers, which are related to compensation (Kim, 2015). The high prevalence of musculoskeletal disorders among occupational motorcyclists (OMCs) is also being reported (Mohd Hafzi MI,

Rohayu S, Faradila PN, Shaw VW, December, 2011). 90% of motorcyclists in Nigeria's Ibadan North Local Government Area have work-related musculoskeletal disorders (WRMSDs).In one study, it was found that the occurrence of MSDs in occupational motorcyclists is more prevalent. Approximately 55 percent of those who drive automobiles for a living reported having much more low back pain than those who drive for pleasure, domestic, or social reasons (45 percent) (Mohd Hafzi MI, Rohayu S, Faradila PN, Shaw VW, December, 2011).

1.3 STUDY JUSTIFICATION

This study may aid in determining the prevalence of musculoskeletal disorders (MSDs) among food delivery riders, particularly in the Klang Valley area. The collected data can serve as a baseline for delivery companies to plan preventive measures to help their workers reduce the risk of developing musculoskeletal disorders as a result of their work as delivery riders. Furthermore, the study demonstrates some lessons that have proven that the study of this musculoskeletal disorder problem among riders of food delivery services must be done appropriately.

The findings of this study hope to raise awareness of musculoskeletal disorders among Malaysian food delivery riders as well as the Malaysian population that is not involved in delivery services. Also, it can be used as the baseline data for the food delivery company to ensure their riders' safety, health and well-fare accordingly. The statistical analysis also

reveals the prevalence of musculoskeletal disorders (MSDs) among food delivery riders, particularly Foodpanda riders.

Despite the fact that there are many motorcycles being used as transportation in Malaysia, only little research on motorbike ergonomics has been undertaken in Malaysia, particularly in regards to the comfortability of motorcycle riders. Then, it leads to a lack of research that can be used as guidance and reference as well as motorcycles that have constrained workstations and limited adjustment to improve the comfortability of the various sizes of motorcyclists (Robertson & Minter 1996,). As a result, the findings of this study may aid in future research into risk factors related to motorcyclists, particularly those who frequently use motorcycles as part of their daily activities.

1.4 RESEARCH QUESTIONS

The research question for this study are:

1. What is the prevalence of musculoskeletal disorders (MSDs) among food delivery riders?

2. What could be the risk factors that are associated with musculoskeletal disorders (MSDs) among food delivery riders?

1.5 RESEARCH OBJECTIVES

1.5.1 GENERAL OBJECTIVE

To determine the association of risk factors with musculoskeletal disorders (MSDs) among food delivery riders.

1.5.2 SPECIFIC OBJECTIVE

i. To determine the socio-demographic characteristics of food delivery riders.

ii. To determine the prevalence of musculoskeletal disorders.

iii. To determine the musculoskeletal disorders risk factor among food delivery riders.

1.6 RESEARCH HYPOTHESIS

- There is association of risk factors with musculoskeletal disorders among food delivery riders and it is significantly associate.

1.7 CONCEPTUAL DEFINITION

1.7.1 Musculoskeletal Disorders

Musculoskeletal disorders (MSDs) are injuries or disorders of the muscles, nerves, tendons, joints, cartilage and spinal disc (Centers for Disease Control and Prevention).

1.7.2 Work-Related Musculoskeletal Disorders

Work-related musculoskeletal disorders (WMSD) are condition which the work environment and performance of work contribute significantly to the condition and the condition is made worse or longer due to the work conditions (Centers for Disease Control and Prevention, 2020).

1.7.3 Risk Factor

Risk factor is one type of correlation that associate with an increased probability of an outcome usually an unpleasant one (Offord & Kraemer, 2000).

1.8. OPERATIONAL DEFINITION

1.8.1 Musculoskeletal Disorders

Musculoskeletal disorders symptom are identified by using Nordic Musculoskeletal Questionnaires adopted from Crawford, & O., J. (2007) through 'Yes' or 'No' question. The prevalence of Musculoskeletal Disorders symptoms where identified from 9 body parts which are neck, shoulder, elbows, arms, upper back, lower back, thigh, knees and legs.

1.8.2 Risk Factor

Risk factors are any factors that can contribute to the occurrence of musculoskeletal disorders such as posture during riding, period of riding motorcycle, sociodemographic factors and length of breaks.

1.8.3 Work-Related Musculoskeletal Disorders

Work-related musculoskeletal disorders can be due to physiological illness that are begin or started from consistent pressure on the musculoskeletal system. (LIoyd, 1996).

1.9 CONCEPTUAL FRAMEWORK

This study is to determine the association of risk factors with musculoskeletal disorders (MSDs) among food delivery riders. In Figure 1.1, food delivery riders can have a risk of getting musculoskeletal disorders. The state of the roads, the persistent usage of the shoulder, neck, upper and lower back and legs, whole body vibration with prolonged sitting and static posture with the addition of stress are all risk factors for musculoskeletal problems. Food delivery riders use motorcycles as part of their transportation, so it can cause consistent use of their shoulders, neck, upper back, lower back and legs for riding. Age, marital status, educational qualifications, and work experience are all sociodemographic factors that have been studied to determine the sociodemographic characteristics of delivery riders.

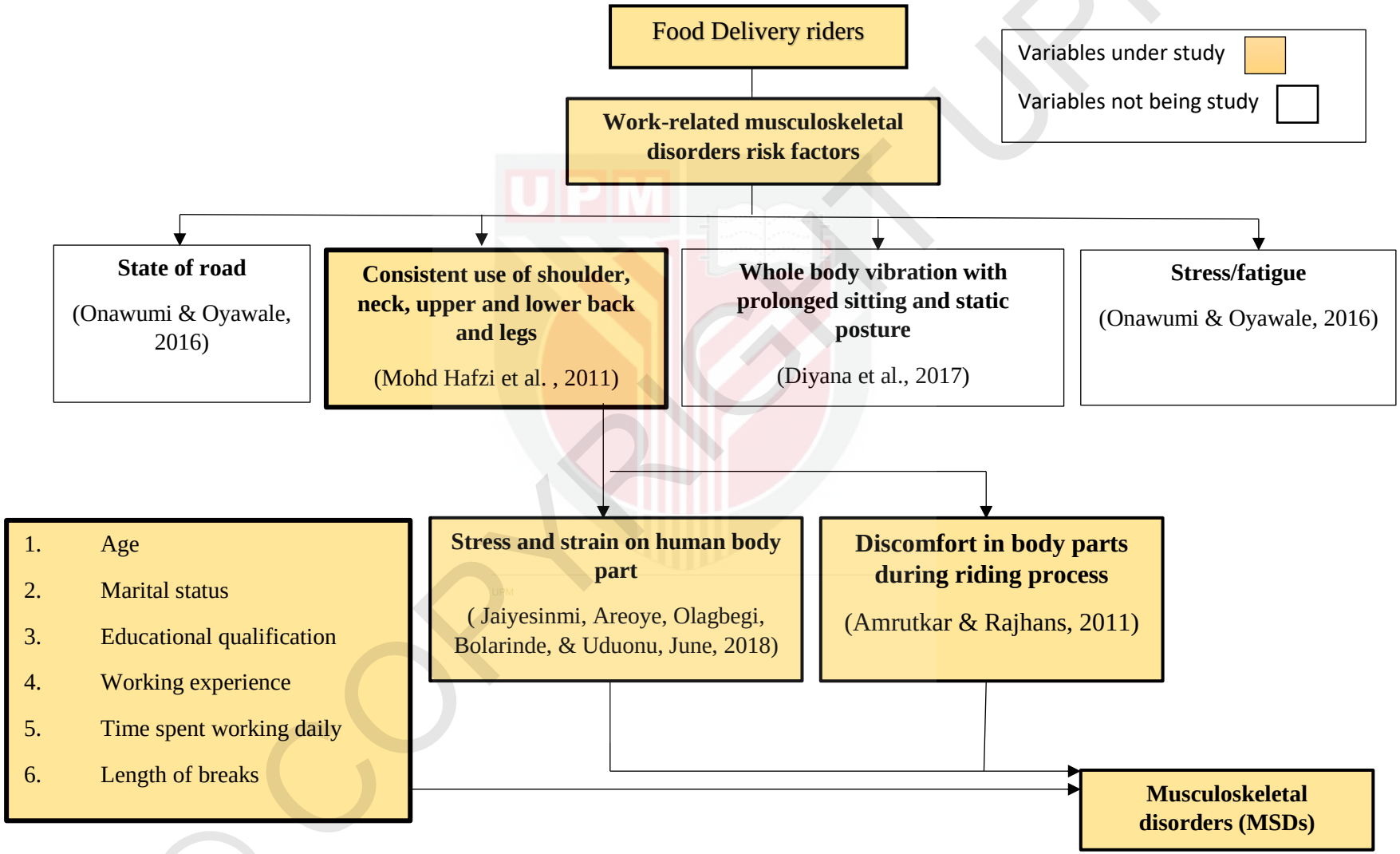

Figure 1.1

CHAPTER 2

LITERATURE REVIEW

2.1 OVERVIEW OF MUSCULOSKELETAL DISORDER

Musculoskeletal disorders include injuries or disorders of the muscles, nerves, tendons, joints, cartilage and spinal discs. Factors such as work environment and job performance can contribute to work-related musculoskeletal disorders and make them worse (CDC,2020). Musculoskeletal disorders (MSDs), also known as injuries or disorders of the musculoskeletal system, result from repeated exposure to various hazards or risk factors that can come from the workplace (OHSCO, 2007). Moreover, musculoskeletal disorders can also begin due to spontaneous action that is continuously done, for example by lifting heavy objects, having repetitive actions and stress from the same exposure that increases vibrations and having unusual postures (NIOSH, 2015). Musculoskeletal disorder systems include bones, muscles, tendon health, intervertebral discs, and ligaments (Rostykus & Mallon, 2013).Other terminology used to describe MSDs, according to Lipscomb et al. (2004), includes repetitive strain injury, musculoskeletal injury, cumulative trauma disorder, occupational overuse syndrome, and strain or sprain. The term musculoskeletal disorder covers very heterogeneous symptoms and illnesses. There can be anatomical or physiological causes due to known pathologic mechanisms and they can be clearly distinguished from each other (Manek & Mac, 2005).

Every disorder is related to the work process, the tolls that are used, and the work that surrounds them (WHO, 1985).In a few studies conducted by a few researchers, such as Szero & Lam (2000), Walker, Bone & Almer (2002), found there are many workers in various occupations that affected by work-related musculoskeletal disorders. Work-related musculoskeletal disorders (WMSDs) can arise from arm and hand movement, such as bending, straightening, gripping, holding, twisting, clenching and reaching. Such activities are not harmful, but if they are repeated, they can be considered harmful. WMSDs are associated with work patterns that have fixed or constrained body positions, continuous repetition of movements, force concentrated on small parts of the body, such as the hand or wrist, and a pace of work that does not allow sufficient recovery between movements, according to the Canadian Centre for Health and Safety. For riders, when they ride a motorcycle, the posture or position during riding is important to measure. In general, WMSDs are caused by a combination of risk factors and their interactions. Heat, cold and vibration can also contribute to the development of MSDs (Canadian Centre for Health and Safety). Musculoskeletal disorders can also involve soft tissues such as muscles, tendons, ligaments and joints and can affect nearby tissue and frequently involve the arms and back (Jaffar, Abdul-Tharim, Mohd-Kamar, & Lop, 2011).

2.2 ERGONOMICS

According to the International Ergonomics Association, ergonomics is a type of discipline that is used to help make the interaction between humans and products safe, as well as the workers' well-being (Amrutkar, A. S., & Rajhans, N. R., 2011). Then, it was discovered that the basic purpose of ergonomics is to reduce the symptoms of pain that lead to job dissatisfaction, activity restrictions and long-term impairment (Karmegam et al., 2009). Also, the word ergonomics covers a broad discipline that mixes a number of fields, including industrial and non-industrial applications (Ayuni Nabilah et al., 2016). Meanwhile, Kroemer KHE (2005) International Ergonomics Association defines ergonomics as a scientific discipline concerned with the knowledge of human-system interactions and a profession that uses theory, concepts, data and methods to create human well-being and overall performance.

2.3 ERGONOMICS RISK FACTOR

Overall, five risk factors were found and linked to each other that may lead to muscular soreness among motorcyclists during the riding process. These categories include biological, environmental, vehicle, physiological and life activity components (Ayuni Nabilah et al., Jan 2016). For musculoskeletal disorders, the risk factors can be due to the manipulation of heavy loads, work with high force exertion, working in

unfavorable body postures, monotonous repetitive tasks, long-lasting loadings and physical environmental conditions (Luttmann, 2003).

One of the aspects that all workers have always been concerned about is ergonomic risk factors. In the Health Effects section of OSHA, it discusses the growing amount of research that suggests workplace exposure to ergonomic risk factors might cause or contribute to the development of MSDs. Awkward posture, cold temperatures, contact stress, force, static posture, and vibration are the risk factors that contribute the most. Health Effects chapter, it mentions that force, repetition and awkward postures are the most frequently linked to the incidence of MSDs. Acting on a combination of hazards is also a common risk factor. According to the Health Effects section, multiple risk factors can increase the likelihood that they will cause MSD. However, it is dependent on the duration, frequency, and magnitude of exposure to each individual. As a result, it is critical to consider all of the risk factors that can be linked to MSDs, even if they are only minor risk factors, because the combination of risk factors can cause the disease to be severe. In addition, fatigue, pollution from other vehicles, and physical harm due to noise, motion and vibration can also be some of the biomechanical and ergonomic risk factors.

The nature of the surroundings for motorcycle riders is primarily related to a few risks that are technically concerned or overlooked, resulting in pain, limitations in movement, and prolonged pressure from the extensive journey of driving on bad or rough roads, which not only cause MSDs but can also lead to incidents, injury, and, eventually, death. According to one of the literature reviews, motorcyclists are more

vulnerable to personal injury than car drivers. The following factors can influence a comfortable sitting posture while riding a motorcycle (Arunachalam, Mondal, Singh, & Karmakar, 2019);

- The sitting posture of the riders
- The body dimensions of the riders
- The quality of the cushion use for the sitting
- The weight and pressure force by the riders
- The duration of the riding by using the same positions?
- The feeling of the riders about the comfort of the motorcycle

The risk factors that are related to musculoskeletal disorders can vary depending on the environment and the type of population that will be studied. Musculoskeletal disorders can progressively develop with constant overexertion. It can be caused by work, daily activities, or old age, and it affects the joints, muscles, and tendons. According to the WHO, age is not the only factor associated with musculoskeletal conditions and injuries; it also includes or involves the life-course. Furthermore, WHO discovered that poor musculoskeletal health can lead to lower back pain and, as a result, disability worldwide. Lower back pain is an incredibly well-engineered structure that interconnects bones, joints, nerves, ligaments and muscles that all work together to provide support, strength and flexibility. Lower back pain can happen suddenly and in unexpected conditions as it develops slowly from time to time because of repetitive movements. For example, when strains occur when the muscle is

stretched too hard, tears then damage the muscle itself. Sprains and strains are commonly caused by lifting heavy loads and twisting the spine while lifting, performing a sudden movement that puts too much pressure on the low back, such as during falls, poor posture for long periods of time, or sports injuries.

2.3.1 Postures

Postures adopted by motorcycle riders are one of the important factors that can influence the risks of someone getting musculoskeletal pain or disorders and have become one of the significant ergonomic risk factors found to have a decisive impact on the operator's comfort and performance (Onawumi & Oyawale, 2016). The weight of the body (head, neck, upper arm and thoracic) passes to supporting areas such as the spinal-tuberosities of the pelvis and their surrounding tissues, causing lower back difficulties. This is exacerbated by vibration and long-term static positions (Akinbo et al. 2008, Onawumi, and Lucas, 2012). The differences in the design of features that make contact with the operators of various motorbike models frequently impose unnatural postures that cause tension and strain on human body parts. Riding a motorbike, especially a two-wheeled variety, for business purposes is not comfortable, since the amount of time and frequency of exposure causes severe postural injury (Onawumi & Oyawale, 2016).

Dimensions and some physical properties of human body posture are measured. Anthropometry is one of the methods of ergonomics that can be used (Amrutkar, A. S., & Rajhans, N. R., 2011). Anthropometric data can be utilised in ergonomics to describe workplace, workstation and equipment physical dimensions, as well as applied to relevant product design. From an ergonomic point of view, the motorcycle working posture or the

riding posture can be treated as a sitting posture (Ma'arof, Omar, Mahmud & Senin, 2016). Also, in general, a motorcyclist has to operate a more complex system of controls such as throttle, brake and gear levers where human operators need to be effective, efficient and in control of the motorcycle with the use of synchronized fluid body motion (Ma'arof et al., 2012).

The rider will sit in the same posture from the start of the journey until he or she arrives at the destination on a motorcycle. The angle of the foot, seat, handle bars, and physical dimensions of the riders will all play a role in determining the posture (Alias A.N et al, 2016).

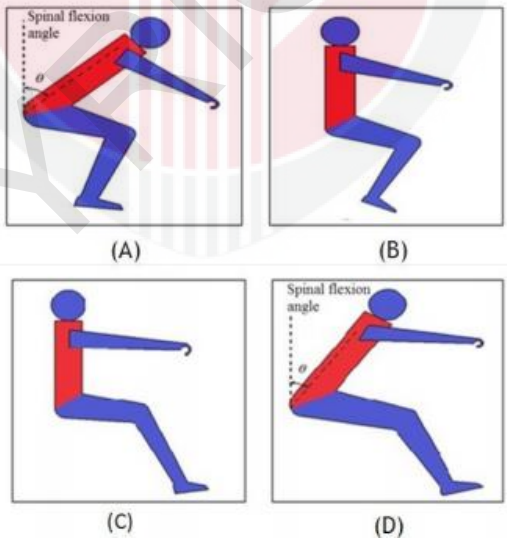

Figure 2.1: The four motorcycling riding postures (Ma'arof and Ahmad, 2012)

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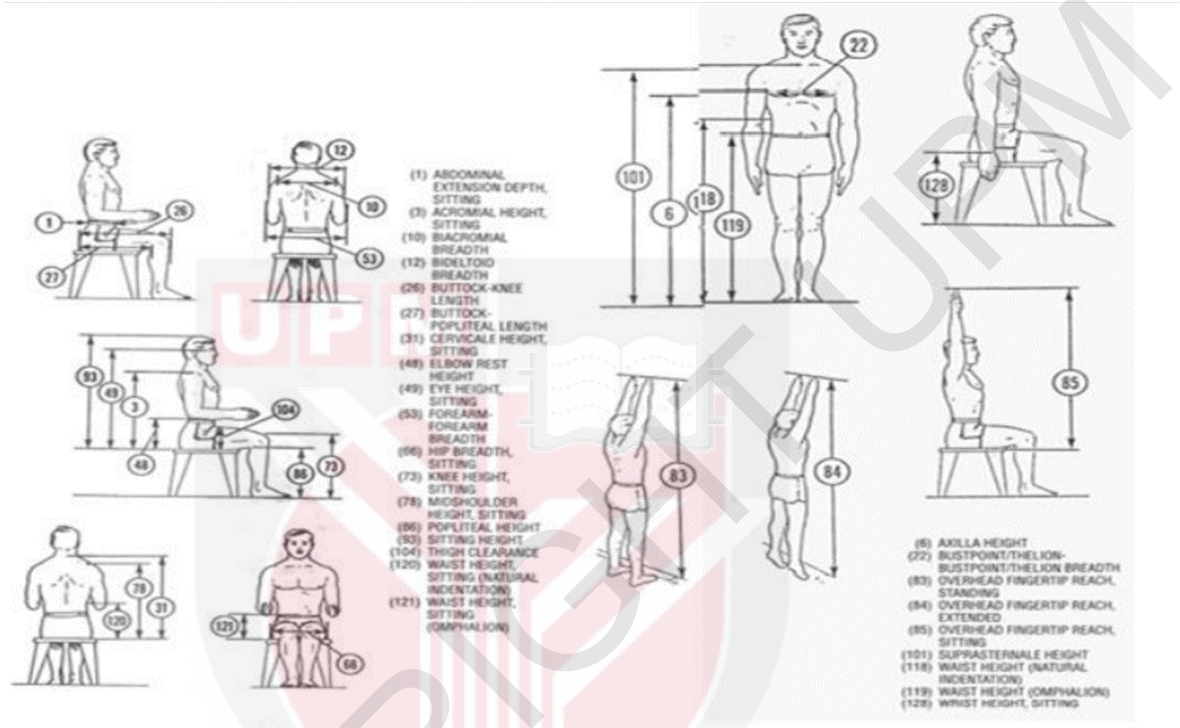


Figure 2.2 Anthropometric dimensions

2.4 LOW BACK PAIN

Every job has its own challenges and difficulties. As the number of food delivery services has grown, so has the concern and awareness of the riders who are always prepared to deliver the food. This is due to the fact that the riders must also protect their health from diseases, particularly those that cause problems with their work. Strains and sprains, most commonly in the lower back, shoulders, and upper limbs, are common musculoskeletal disorders (MSDs) that are always associated with riders. Muscle, nerves, tendon, joint, cartilage and spinal disc injuries and diseases are also mentioned. In contrast, the conditions of work-related musculoskeletal disorders

(WMSDs) are when the work environment and performance of work play a substantial role in making the condition worsen with the addition of work conditions. It is defined as an injury of the muscles, nerves, cartilage, ligaments and joints that function to support the upper and lower limbs, the neck and the lower back. There are also a few musculoskeletal disorders to consider, such as Carpal Turner Syndrome, Ligament Sprain, lower back pain, and lumbar pain. WMSDs are also known as repetitive motion injuries, repetitive strain injuries, cumulative trauma disorders, occupational cervicobrachial disorders, overuse syndrome, regional musculoskeletal disorders, or soft tissue disorders, according to the Canadian Centre for Occupational Health and Safety.

According to the National Institute of Neurological Disorders and Stroke (NINDS), low back pain is one of the most common causes of job-related disabilities, where people lose their full ability to do their job or do it in an uncomfortable manner. Most low back pain cases are due to injuries such as muscle sprains or strains that can occur because of sudden movement or poor body mechanisms while lifting heavy objects. Students who carry heavy bags can also get low back pain. However, low back pain can also result from other factors like cancer of the spinal cord, ruptured discs, arthritis and kidney infections and also getting little exercise followed by tough work or activities after that. Also, for low back pain, there are two types, which are acute and chronic back pain. Acute back pain is short-term back pain that can last one or two days and can last up to two weeks. The majority of lower back pain issues are self-resolving and do not require medication, but there are a few cases of back pain that require a few months for the symptoms to improve. Next, the second type is

chronic back pain where, for this type, the pain will continue for 12 weeks or longer. The pain can come even after an initial injury or underlying cause of acute low back pain has disappeared. According to the National Institute of Neurological Disorders and Stroke (NINDS), approximately 20% of people have chronic back pain that develops from acute back pain. Even though there is medication and treatment on-going, the pain cannot disappear fully. The intensity of back pain can range from a dull, constant ache to a sudden, sharp, or shooting pain.

There are many risk factors that can relate to the development of low back pain. Age is one of the sociodemographic factors that is associated with low back pain. People between the ages of 30 and 50 are at a higher risk of developing low back pain. As people get older, osteoporosis causes a loss of bone strength, which can lead to fractures, decreased muscular suppleness and loss of tone. In addition, the fluid and flexibility of the intervertebral discs will begin to deteriorate.Another risk factor is the individual's level of fitness. Back pain typically affects people who engage in little physical activity and are not in good physical shape. This is because the back and abdominal muscles are weak and the spine is not properly supported. But, the pain of back pain will increase if we practice by doing vigorous activities after relaxing our body or being inactive after a week. As a result, our bodies will become tense and stressed. Weight gain or obesity can also raise the risk of back pain because we put greater stress on our backs, which can lead to low back discomfort.

Job related factors are one of the common risk factors that will be found in the case of low back pain. Jobs or activities like heavy lifting, pushing or pulling will involve twisting or vibration of our spine, thus leading to injury and back pain. There are also low-risk activities

that can result in low back pain, such as working at a desk all day, which involves poor posture from sitting all day and lacks adequate back support.

Mental health is another risk factor that has only recently been identified. Anxiety and depression can influence how much we focus on the pain and how we express its severity. Stress is one of the psychological factors that can increase low back pain. There is one behavior that can also lead to low back pain, which is smoking. Smoking can reduce blood flow and oxygen to the discs, causing them to degenerate more quickly. Besides that, there are also genetic factors such as ankylosing spondylitis, which is a form of arthritis that involves fusion of spinal joints, leading to immobility of the spine. According to one study of low back pain among motorcyclists at Dow University of Health Sciences in Karachi, Pakistan, low back pain was found to be higher among students who spent more time on motorcycles per day compared to students who spent less time on motorcycles per day.

2.5 IMPLICATIONS OF MUSCULOSKELETAL DISORDERS AMONG MOTORCYCLE RIDERS

For workers who work for food delivery services, the riders will experience some effects or consequences, like discomfort in their body parts during the riding process. They will ride motorcycles, which are much less comfortable, especially as riders on food delivery services. The upper body (neck or head, shoulder, upper back, arm and hand and lower back) will feel discomfort more compared to the lower part of the body (knee, calf legs below the knee and the ankle and feet). Furthermore, the discomfort will increase as the rider's age and years of riding increase, as the body's healing power decreases as age increases, if an injury is sustained.

As riders, the primary concern that must be addressed is the diseases that riders can contract after only a short period of time riding a motorcycle. The most common diseases associated with cancer are musculoskeletal disorders (MSDs).There are numerous effects of MSD on riders, such as WHO stating that if musculoskeletal, it significantly reduces mobility or movement and also contributes to the person's wealth and participation in social environment. Following that, musculoskeletal conditions are linked to mental issues such as depression, which increases the risk of developing other chronic health problems.

2.6 NORDIC MUSCULOSKELETAL QUESTIONNAIRE (NMQ)

The type of questionnaire that is always used is the Nordic musculoskeletal questionnaire. The Nordic Musculoskeletal Questionnaire (NMQ) was developed as a project funded by the Nordic Council of Ministers. It begins when there are many musculoskeletal disorders reported in the working population, especially involving low back pain, which was shown in a study conducted by (Troup & Edwards, 1985) and mechanical factors that have been involved in the growth of musculoskeletal disorders and their indicators (Kilborn et al.1986). So, a standardized questionnaire is needed to boost attention by assisting in the definition of the problem and its relationship to work factors as one of the methods of collecting necessary data, as well as to help in the analyzing and recording of musculoskeletal symptoms. Consideration was made by the Nordic group to start developing standardized questionnaires for the analysis of musculoskeletal symptoms. Before the standardized questionnaire was used, the methods employed in earlier studies were easily comparable. The individual

questions varied in minor ways from one study to the next (Kuorinka et al., 1987). A study to design and evaluate standardized questionnaires on general, low back and neck or shoulder parts was performed with the cooperation of the Nordic Council of Ministers.

The questionnaire is more adaptable, as it can be used as a questionnaire or as a structured interview. Basically, the questionnaire contains two parts, which are section 1 and section 2. In section 1, it includes a comprehensive questionnaire with 40-forced choice questions to assist identify body areas that are producing musculoskeletal problems. The body map is included to help finish section 1 by indicating the nine symptom sites, which include the neck, shoulders, upper back, elbows, lower back, wrists/hands, hips/thighs, knees, and ankles/feet. Respondents will be asked if they have had any symptoms of a musculoskeletal condition in the previous 12 months, as well as any condition that has prevented them from performing normal activities in the previous 7 days., in section 2, it contains additional questions that are related to the neck, shoulders and lower back, further detailing the relevant issues. 25 forced choice questions elicit any accidents affecting each area, functional impact at home and work, duration of the problem, assessment by a health professional and musculoskeletal problems in the last 7 days.

2.7 CONCLUSION

In conclusion, severe long-term pain and physical disability are also the effects of musculoskeletal conditions that have affected hundreds of millions of people across the world. A career as a driver is frequently associated with muscular effort, awkward sitting postures, and exposure to whole-body vibration. There have been a few studies that have looked at the prevalence of MSD in specific populations, such as one conducted among Malaysian male commercial bus drivers, who had an 81.8% prevalence, with the majority of people having a lower back (58.5%).Despite the fact that motorcycles are widely used in Malaysia, studies involving motorcycles in the context of an ergonomics issue are still scarce. Despite the fact that motorcycles are widely used in Malaysia, studies involving motorcycles in the context of an ergonomics issue are still scarce. However, there are numerous studies involving musculoskeletal disorders that can be cited because the factors and content are similar and much related. Musculoskeletal diseases were the largest cause of global disability, accounting for 16 percent of all years living with disability in the 2017 Global Burden of Disease (GBD) research, and lower back pain has remained the single leading cause of disability since 1990. Furthermore, the prevalence of musculoskeletal diseases varies by age and diagnosis, with 20 percent to 33 percent of people living with musculoskeletal problems around the world.

CHAPTER 3

METHODOLOGY

3.1 STUDY DESIGN

The type of study design that been used in this research was cross-sectional study design.

3.2 STUDY LOCATION

The study location for this research was at Klang Valley.

3.3 STUDY DURATION

In this study, it conducted from January 2021 until July 2021.

3.4 SAMPLING

The study population were food delivery riders in Klang Valley. However, the study sample was among Foodpanda and Grabfood delivery riders.

3.4.1 SAMPLING METHOD

Snowball sampling was the sample method utilized in this study. Snowball sampling is one type of non-probability sampling method that is used when the characterization of the participants as samples is difficult to find. As a result, the recruitment technique used is one in which participants will be asked to assist researchers in identifying other potential participants. Snowball sampling was chosen because it is relevant to the participants' condition, as food delivery riders are usually mobile and not stuck in one place to make food deliveries. As a result, it is preferable to use snowball sampling to assess their own condition.

3.4.2 SAMPLE SIZE DETERMINATION

In this study, the sample size calculator (Naing et al. 2006) was used to determine the appropriate sample size. For sample size calculation, the formula (DANIEL 1999) is utilized in the calculator.

$$n=\frac{Z^2 p(1-p)}{d^2}$$

Where n is the sample size, Z is the statistic that corresponds to the level of confidence, P is the expected prevalence that can be derived from similar studies or a pilot study conducted by other researchers, and d is precision that corresponds to the effect size. Thus, the calculation is:

$$=\left(\frac{(1.96\ )2(0.74)(1-0.74)}{0.10^2}\right)$$

= 96.04

n= 96 respondents

For the increasing the sample size, 61% respond rate will be included (Jaiyesinmi, Areoye, Olagbegi, Bolarinde, & Uduonu, June, 2018) as below:

n = 96 + 61% $respond\ rate$

So, the sample are 154 respondents for this study.

Confidence level = 95% (Z=1.96)

P (previous prevalence from other studies) = 0.5 (Karmegam et al. 2009)

Precision, d = ± 0.10 (due to the high prevalence and the limitation of resources (Naing et al. 2006))

So, after calculation, sample size needed is, n = 154 .Therefore, a total of 154 riders will be selected in this study.

Table 3.1: Inclusion and exclusion criteria of respondents

Inclusion criteria	Exclusion criteria
• Still working as food delivery riders at least one month • Age 18 to 50 years old • Able to read, write and response well • Malaysian	• Not able to read, write and response well • Had history of any musculoskeletal disorders before working as food delivery riders.

3.5 STUDY INSTRUMENTATION

A cross-sectional study was conducted to determine the prevalence of musculoskeletal disorders among food delivery service riders. The questionnaire was modified and translated into the Malay language. The questionnaire consisted of two parts, which were Section A that was adopted and modified by Jaiyesinmi et al. (2018) and Section B that covers the prevalence of musculoskeletal disorders among food delivery riders, which was evaluated using the Nordic Musculoskeletal Questionnaire that was

adopted by Crawford, & O., J. (2007). The use of the Malay language can aid in better understanding of the respondents and Malaysian motorcyclists. The modified questionnaire consist of two parts.

1) **Section A Sociodemographic and job characteristics information**

This section includes sociodemographic data such as name, age, height, weight, race, and gender. Job characteristics such as work experience, working hours per day, and job type, whether part-time or full-time, are also requested.

2) **Section B Nordic Musculoskeletal Questionnaire**

In this section, a modified Nordic questionnaire will be used to help them identify whether they have pain in certain areas of their body at a certain time. The Nordic Musculoskeletal Questionnaire (NMQ) was developed as a project funded by the Nordic Council of Ministers. The questionnaire is more adaptable, as it can be used as a questionnaire or as a structured interview. But, for the modified Nordic questionnaire, it consists of nine body regions with specific questions in four sections. The first section of the questionnaire is intended to identify the occurrence of work-related musculoskeletal disorders (WMSDs). If the response to the first section is negative, then the subject need not go to the other sections of the same body part related questions. The second section identifies whether the particular WMSD is causing work interference. The third section helps in evaluating whether the subject has consulted a medical practitioner due to the persistence of the problem. The severity of the WMSDs is evaluated in the fourth section.

3.5.1 QUALITY ASSURANCE AND QUALITY CONTROL FOR QUESTIONNAIRE

Prior to data collection, a pre-test questionnaire was administered. The pre-test was conducted among delivery riders from various types of companies that also offer food delivery services, in order to see if they could understand the questionnaire and to avoid any unfamiliar terms for them. Data from 15 respondents has been collected to help in running the face validity and reliability test. All comments and recommendations from the pre-test questionnaire were considered and corrections were made before the actual questionnaires were distributed to the actual respondents. After the pre-test was done, the Cronbach alpha value for the pre-test was 0.70. The result is acceptable as Nunnally (1978) derived that a Cronbach alpha value of 0.7 and above is under an acceptable range. Moreover, according to George and Mallery (2003), there was a tiered approach to the Cronbach alpha value, as follow:

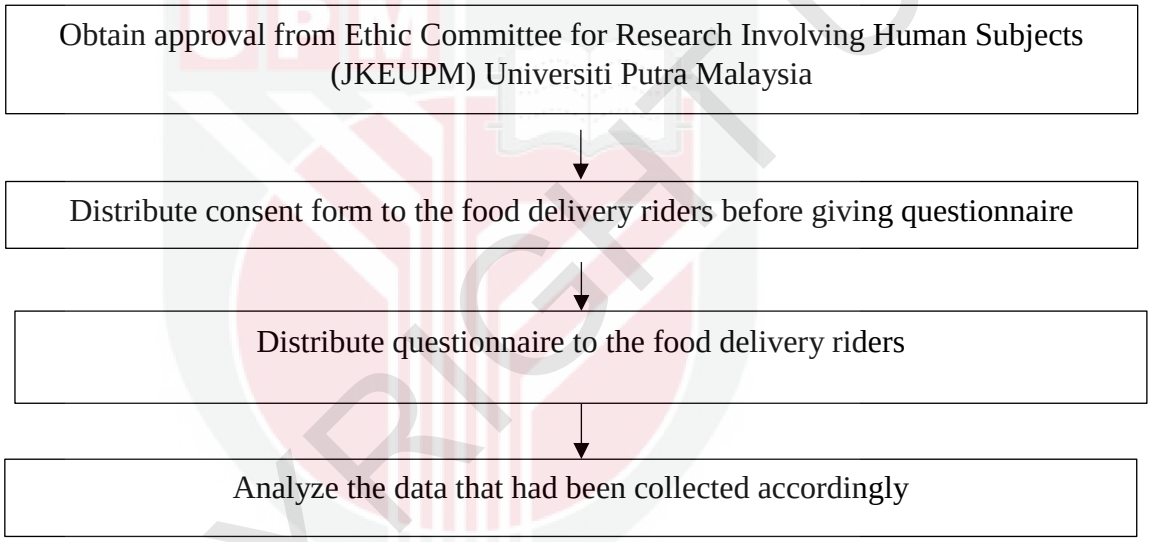
Table 3.2 Cronbach alpha value

Value	Interpretation
$\alpha \geq 0.9$	Excellent
$\alpha \geq 0.8$	Good
$\alpha \geq 0.7$	Acceptable
$\alpha \geq 0.6$	Questionable
$\alpha \geq 0.5$	Poor
Less than 0.5	Unacceptable

3.6 DATA COLLECTION

After ethics had been approved, the questionnaire will be distribute to the food delivery riders that take orders around the Klang Valley area. Consent form need to be filled by all respondents before answering the questionnaire given.

Figure 3.2: Data Collection Process



3.7 DATA ANALYSIS

SPSS (Statistical Package for Social Science) version 25 was used to compute and evaluate all of the data collected from the questionnaire.

3.7.1 Univariate analysis

After completing my entry into SPS, descriptive analysis was used to obtain the frequency, mean, standard deviation and percentage of sociodemographic and work-related characteristics of the food delivery riders. Descriptive analysis has also been used to determine the prevalence of musculoskeletal disorders among food delivery riders.

3.7.2 Bivariate analysis

Next, bivariate analysis was used to analyze the association of two categorical variables. Pearson Chi- square test was test that been used to determine the association of risk factors with musculoskeletal disorders among food delivery riders.

3.8 ETHICAL CONSIDERATION

For ethics in this research, approval from the Ethic Committee for Research Involving Human Subjects of Universiti Putra Malaysia (JKEUPM) needs to be obtained before starting the data collection. (Appendix 3).The consent letter also needs to be given to all respondents before the respondents can take part in the study (Appendix 1). Before answering the questionnaire, the respondents will be briefed on how to answer the questions and the duration that will be given for the respondents to answer the questionnaire.

CHAPTER 4

RESULT

4.1 Socio-demographic characteristics of the food delivery riders

The first objective of the study is to determine socio-demographic characteristics information of the food delivery riders. Table 4.1 shows the information of the food delivery riders. Overall, the mean ages for all respondents was 27 years old. Majority of the respondents were male (94.8%) and Malay (94.8%). The marital status of the respondents were majority single (69.1%) and married (28.9%). Their BMI lies on average 24.3±5.5. Moreover, for education level, most of them receive higher education (60.8%). Majority (53.6%) of the riders work for more than 8 hours per day.

Table 4.2 shows the work-related characteristics of the food delivery riders. The mean riding hours for the riders in a day is 8.52 hours and the mean for riding distance for the food delivery riders is 100 kilometers in a day. Most of the riders spend less than 30 minutes (46.4%) to break during their working hours and majority (84.5%) of the riders will rest during their brake.

Table 4.1 Socio-demographic characteristics of food delivery riders

Variable		Frequency(N)	%	Mean(SD)
Age (years)				27.38(6.868)
Gender	Male	92	94.8	
	Female	5	5.2	
BMI (kg/m^2)				24.38(5.496)
Race	Malay	92	94.8	
	Others	5	5.5	
Marital status	Single	67	69.1	
	Married	28	28.9	
	Single parent	2	2.0	
Level of education	Secondary School	38	39.2	
	High education	59	60.8	
Work experiences (years)	Less than 1	37	38.1	
	1-2	37	38.1	
	2-4	7	7.2	
	4-6	16	16.5	
Working hours(hours)	2-4	5	5.2	
	4-6	12	12.4	
	6-8	28	28.9	
	8 and above	52	53.6	
Smoking habits	Never smoked	42	43.3	
	Formerly smoked	23	23.7	
	Currently smoked	32	33.0	

n=97 respondents

Table 4.2 Work-related characteristics of food delivery riders

Variable		Frequency (N)	%	Mean(SD)
Riding hours (hour/day)				8.52(3.244)
Riding distance (km)				100.85(72.738)
Duration of break(minutes)	Less than 30	45	46.4	
	30 -60	33	34.0	
	60-120	15	15.5	
	More than 120	4	4.1	
Frequency of tiredness	Often	13	13.4	
	Sometimes	65	67.0	
	Rarely	17	17.5	
	Never	2	2.2	
Action taken when tired	Rest	82	84.5	
	Continue working	9	9.3	
	Other	6	6.2	

n=97 respondents

4.2 Prevalence of musculoskeletal disorders among food delivery riders

The second objective is to determine the prevalence of musculoskeletal disorders among food delivery riders. As shown in Table 4.3, the twelve months prevalence of musculoskeletal disorders studied was 84.5%. The study shows that shoulder and upper back have the highest twelve month prevalence (51.5%) of musculoskeletal disorders complaint followed by neck (50.5%), lower back (48.5%) and hip (37.1%) respectively. The seven days prevalence of musculoskeletal disorders have similar trend but was lower than twelve months prevalence of musculoskeletal disorders at 56.7%. Shoulder and lower back recorded as highest complaint of body parts, 29.9% followed by upper back (28.9%) and neck (19.6%).

Table 4.3 Prevalence of musculoskeletal disorders among food delivery riders

Body parts	Twelve months prevalence Frequency (n)	%	Seven days prevalence Frequency(n)	%
Neck	49	50.5	19	19.6
Shoulder	50	51.5	29	29.9
Upper back	50	51.5	28	28.9
Elbow	6	6.2	4	4.1
Hands wrist/hands	23	23.7	9	9.3
Lower back	47	48.5	29	29.9
Hip	36	37.1	13	13.4
Knee	16	16.5	11	11.3
Ankle/leg	18	18.6	13	13.4
At any body parts	**82**	**84.5**	**55**	**56.7**

n=97 respondents

4.3 Association of risk factors with musculoskeletal disorders among food delivery riders

The third objective in this study is to determine the risk factors of musculoskeletal disorders (MSDs) among food delivery riders. Chi-square test was done to determine whether there is association of risk factors with musculoskeletal disorders as overall and at specific body parts among food delivery riders. Significant association was at $p<0.05$ and $p<0.01$.

Firstly, Table 4.4 shows the association of risk factors with musculoskeletal disorders as overall. There are 18 items that been test in Chi-square test. The risk factors involved were age, BMI, gender, race, marital status, level of education, working experiences, riding hours, rising distance, break during work, past accident, medical history, smoking habit, frequency of tiredness, action taken during brake and duration of break. The Chi-square test result revealed and it was found that there is no risk factors that significantly associated with MSDs symptoms reported.

Next, Chi-square also been test between risk factors and MSDs at specific body parts. So, in Table 4.5, it shows the association of risk factors with MSDs symptoms at specific body part which is neck. The Chi-Square test reported that there was significant association of MSDs with feeling tired ($x^2=12.998$, $p=0.000$). While, Table 4.6 shows the association of risk factors with MSDs specifically at shoulder. Feeling tired also been found significantly associate with MSDs ($x^2=8.663$, $p=0.003$) and working experiences ($x^2=3.919$, $p=0.048$).

In addition, Table 4.7 shows association of risk factors with MSDs specifically at upper back. Study found that there were significant association of MSDs with feeling tired (x^2=8.663, p=0.003), regular exercise (x^2=9.973, p=0.002) and smoking habit (x^2=7.555, p=0.023).

Table 4.8 shows association of risk factors with MSDs specifically at elbow. No risk factors that had significant association with MSDs. Table 4.9 shows association of risk factors with MSDS specifically at hand wrist or hand. It also shows that there is no significant risk factors associate with MSDs. Table 4.10 shows association of risk factors with MSDs specifically at lower back. Only BMI (x^2=4.515, p=0.034) had significant association with MSDs.

Table 4.11, Table 4.12 and Table 4.13 shows association of risk factors with MSDs specifically at hip, knee and ankle respectively. Study show that there are no risk factors that significantly associated with MSDs in all three table.

Overall, Table 4.14 shows the summarization of risk factors that are significantly associate with musculoskeletal disorders.

Table 4.4 Association of risk factor with MSD among food delivery riders

Variables		Musculoskeletal disorder			
		Yes	No	X^2	p-value
Age (years)	18-25	43	8	0.004	0.949
	26-48	39	7		
BMI (kg/m^2)	Normal	41	9	0.508	0.476
	Not normal	41	6		
Gender	Male	78	14	-	0.577[b]
	Female	4	1		
Race	Malay	77	15	-	1.000[b]
	Others	5	0		
Marital status	Single	57	10	0.503	0.777
	Married	23	5		
Level of education	Secondary school	30	8	1.493	0.222
	High education	52	7		
Working experiences(years)	Less than 2	61	13	-	0.510[b]
	2-6	21	2		
Riding hours (hour/day)	Less than 8	52	8	0.546	0.460
	More than 8	30	7		
Riding distance(km)	Less than 50	27	4	-	0.768[b]
	More than 50	55	11		
Feeling tired	Yes	51	26	-	0.001[b]
	No	3	11		
Regular exercise	Yes	27	50	2.440	0.118
	No	8	6		
Break during work	Yes	63	14	2.204	0.138
	No	9	5		
Past accident	Yes	37	40	0.128	0.720
	No	6	8		
Duration of break(minutes)	Less than 60	65	13	-	0.728[b]
	60-120	17	2		

Table 4.4 Association of risk factors with MSSD among food delivery riders (continue)

Variables		Musculoskeletal disorders			
		Yes	No	X^2	p-value
Medical history	Yes	13	1	-	0.689[b]
	No	69	14		
Smoking habit	Never smoked	31	9	-	0.332[b]
	Formerly smoked	19	2		
	Currently smoked	27	3		
Frequency of tiredness	Often	13	0	-	0.002[b]
	Sometimes	57	8		
	Rarely	12	5		
	Never	0	2		
Action taken when tired	Rest	68	14	-	0.203[b]
	Continue working	9	0		
	Other	5	1		

[b]: Fisher Exact Test

Table 4.5 Association of risk factor with MSD (Neck) among food delivery riders

Variables Body parts		**MSD** Neck			
		Yes	No	X^2	p-value
Age (years)	18-25	28	23	0.828	0.363
	25-48	21	25		
BMI (kg/m^2)	Normal	22	28	1.752	0.186
	Not normal	27	20		
Gender	Male	46	46	-	1.000[b]
	Female	3	2		
Race	Malay	45	47	-	0.362[b]
	Others	4	1		
Marital status	Single	36	31	0.934	0.627
	Married	12	16		
Level of education	Secondary school	18	20	0.248	0.619
	High education	31	28		
Working experiences(years)	Less than 2	36	38	4.789	0.188
	2-6	13	10		
Riding hours (hour/day)	Less than 8	30	30	0.017	0.897
	More than 8	19	18		
Riding distance(km)	Less than 50	18	13	1.039	0.308
	More than 50	31	35		
Feeling tired	Yes	38	20	12.998	**0.000**[**]
	No	11	28		
Regular exercise	Yes	17	21	0.835	0.361
	No	32	27		
Break during work	Yes	40	37	0.307	0.580
	No	9	11		
Past accident	Yes	23	24	0.091	0.763
	No	26	24		
Medical history	Yes	11	3	-	0.040[b]
	No	38	45		

Table 4.5 Association of risk factor with MSD (Neck) among food delivery riders (continue)

Variables		MSD			
Body parts		Neck			
		Yes	No	X^2	p-value
Smoking habit	Never smoked	24	18	5.059	0.080
	Formerly smoked	14	9		
	Currently smoked	11	21		
Frequency of tiredness	Often	11	2	-	0.066[b]
	Sometimes	31	34		
	Rarely	7	10		
	Never	0	2		
Action taken when tired	Rest	40	42	-	0.027[b]
	Continue working	6	3		
	Other	3	3		
Duration of break(minutes)	Less than 60	41	37	0.669	0.717
	60-120	8	11		

Significant at $p<0.01^{**}$
[b]: Fisher Exact Test

Table 4.6 Risk factor associated with MSD (Shoulder) among food delivery riders

Variables Body parts		**MSD** Shoulder			
		Yes	No	X^2	p-value
Age (years)	18-25	23	28	1.790	0.181
	25-48	27	19		
BMI (kg/m^2)	Normal	24	26	0.520	0.471
	Not normal	26	21		
Gender	Male	47	45	-	1.000[b]
	Female	3	2		
Race	Malay	46	46	-	0.363[b]
	Others	4	1		
Marital status	Single	33	34	0.494	0.781
	Married	16	12		
Level of education	Secondary school	20	18	0.029	0.864
	High Education	30	29		
Working experiences(year)	Less than 2	34	40	3.919	**0.048**[*]
	2-6	16	7		
Riding hours (hour/day)	Less than 8	29	31	0.650	0.420
	More than 8	21	16		
Riding distance(km)	Less than 50	16	15	0.000	0.993
	More than 50	34	32		
Feeling tired	Yes	37	21	8.663	**0.003**[**]
	No	13	26		
Regular exercise	Yes	17	21	1.160	0.281
	No	33	26		
Break during work	Yes	39	38	0.120	0.729
	No	11	9		
Past accident	Yes	24	23	0.009	0.927
	No	26	24		
Medical history	Yes	10	4	-	0.108[b]
	No	40	43		

Table 4.6 Risk factor associated with MSD (Shoulder) among food delivery riders (continue)

Variables Body parts		MSD Shoulder			
		Yes	No	X^2	p-value
Smoking habit	Never smoked	19	23	1.181	0.554
	Formerly smoked	13	10		
	Currently smoked	18	14		
Frequency of tiredness	Often	10	3	-	0.006[b]
	Sometimes	36	29		
	Rarely	4	13		
	Never	0	2		
Action taken when tired	Rest	39	43	-	0.133[b]
	Continue working	6	3		
	Other	5	1		
Duration of break(minutes)	Less than 60	39	39	0.381	0.537
	60-120	11	8		

Significant at $p<0.05^{*}$
Significant at $p<0.01^{**}$
[b]: Fisher Exact Test

Table 4.7 Risk factor associated with MSD (Upper back) among food delivery riders

Variables Body parts		MSD Upper back			
		Yes	No	X^2	p-value
Age (years)	18-25	23	28	1.790	0.181
	25-48	27	19		
BMI (kg/m^2)	Normal	24	26	0.520	0.471
	Not normal	26	21		
Gender	Male	48	44	-	0.671[b]
	Female	2	3		
Race	Malay	46	46	-	0.363[b]
	Others	4	1		
Marital status	Single	35	32	0.042	0.979
	Married	14	14		
Level of education	Secondary school	23	15	2.017	0.156
	High education	27	32		
Working experiences(year)	Less than 2				
	2-6				
Riding hours (hour/day)	Less than 8	30	30	0.151	0.698
	More than 8	20	17		
Riding distance(km)	Less than 50	13	18	1.685	0.194
	More than 50	37	29		
Feeling tired	Yes	37	21	8.663	**0.003**[**]
	No	13	26		
Regular exercise	Yes	12	26	9.973	**0.002**[**]
	No	38	21		
Break during work	Yes	42	35	1.345	0.246
	No	8	12		
Past accident	Yes	22	25	0.819	0.365
	No	28	22		
Medical history	Yes	10	4	-	0.150[b]
	No	40	43		

Table 4.7 Risk factor associated with MSD (Upper back) among food delivery riders

(continue)

Variables Body parts		**MSD** Upper back			
		Yes	No	X^2	p-value
Smoking habit	Never smoked	15	27	7.555	**0.023***
	Formerly smoked	14	9		
	Currently smoked	21	11		
Frequency of tiredness	Often	10	3	-	0.066[b]
	Sometimes	33	32		
	Rarely	7	10		
	Never	0	2		
Action taken when tired	Rest	38	44	-	0.027[b]
	Continue working	8	1		
	Other	4	2		
Duration of break(minutes)	Less than 60	38	40	1.276	0.259
	60-120	12	7		

Significantly at $p<0.05^{*}$
Significantly at $p<0.01^{**}$
[b]: Fisher Exact Test

Table 4.8 Risk factor associated with MSD (Elbow) among food delivery riders

Variables Body parts		MSD Elbow			
		Yes	No	X^2	p-value
Age (years)	18-25	2	49	-	0.418[b]
	25-48	4	42		
BMI (kg/m^2)	Normal	3	47	-	1.000[b]
	Not normal	3	44		
Gender	Male	6	86	-	1.000[b]
	Female	0	5		
Race	Malay	6	86	-	1.000[b]
	Others	0	5		
Marital status	Single	3	64	1.458	0.482
	Married	3	25		
	Single parent				
Level of education	Secondary school	2	36	-	1.000[b]
	High education	4	55		
Working experiences (year)	Less than 2	4	70	-	0.625[b]
	2-6	2	21		
Riding hours (hour/day)	Less than 8	4	56	-	1.000[b]
	More than 8	2	35		
Riding distance(km)	Less than 50	2	29	-	1.000[b]
	More than 50	4	62		
Feeling tired	Yes	5	53	-	0.396[b]
	No	1	38		
Regular exercise	Yes	3	35	-	0.676[b]
	No	3	56		
Break during work	Yes	5	72	-	1.000[b]
	No	1	19		
Past accident	Yes	4	43	-	0.426[b]
	No	2	48		
Medical history	Yes	3	11	-	0.037[b]
	No	3	80		

Table 4.8 Risk factor associated with MSD (Elbow) among food delivery riders (continue)

Variables Body parts		**MSD** Elbow			
		Yes	No	X^2	p-value
Smoking habit	Never smoked	1	41	-	0.357[b]
	Formerly smoked	2	21		
	Currently smoked	3	29		
Frequency of tiredness	Often	2	11	-	0.284[b]
	Sometimes	4	61		
	Rarely	0	17		
	Never	0	2		
Action taken when tired	Rest	5	77	-	0.584[b]
	Continue working	1	8		
	Other	0	6		
Duration of break(minutes)	Less than 60	4	74	-	0.334[b]
	60-120	2	17		

[b]: Fisher Exact Test

Table 4.9 Risk factor associated with MSD (Hand wrist/hand) among food delivery riders

Variables Body parts		MSD Hand wrist/hand			
		Yes	No	X^2	p-value
Age (years)	18-25	10	41	1.001	0.317
	25-48	13	33		
BMI (kg/m^2)	Normal	11	39	0.167	0.683
	Not normal	12	35		
Gender	Male	22	70	-	1.000[b]
	Female	1	4		
Race	Malay	20	72	-	0.085[b]
	Others	3	2		
Marital status	Single	11	56	-	0.047[b]
	Married	11	17		
	Single parent	1	1		
Level of education	Secondary school	11	27	0.947	0.331
	High education	12	47		
Working experiences(year)	Less than 2	16	58	0.753	0.385
	2-6	7	16		
Riding hours (hour/day)	Less than 8	13	47	0.364	0.547
	More than 8	10	27		
Riding distance(km)	Less than 50	8	23	0.111	0.740
	More than 50	15	51		
Feeling tired	Yes	16	42	1.197	0.274
	No	7	32		
Regular exercise	Yes	8	30	0.244	0.621
	No	15	44		
Break during work	Yes	18	59	-	1.000[b]
	No	5	15		
Past accident	Yes	15	32	3.392	0.066
	No	8	42		
Medical history	Yes	6	8	-	0.090[b]
	No	17	66		

Table 4.9 Risk factor associated with MSD (Hand wrist/hand) among food delivery riders (continue)

Variables Body parts		MSD Hand wrist/hand			
		Yes	No	X^2	p-value
Smoking habit	Never smoked	7	35	-	0.208[b]
	Formerly smoked	5	18		
	Currently smoked	11	21		
Frequency of tiredness	Often	5	8	-	0.085[b]
	Sometimes	17	48		
	Rarely	1	16		
	Never	0	2		
Action taken when tired	Rest	16	66	-	0.099[b]
	Continue working	4	5		
	Other	3	3		
Duration of break(minutes)	Less than 60	19	59	-	1.000[b]
	60-120	4	15		

Significantly at $p<0.05^{*}$
[b]: Fisher Exact Test

Table 4.10 Risk factor associated with MSD (Lower back) among food delivery riders

Variables Body parts		MSD Lower back			
		Yes	No	X^2	p-value
Age (years)	18-25	28	23	1.790	0.181
	25-48	19	27		
BMI (kg/m^2)	Normal	19	31	4.515	**0.034***
	Not normal	28	19		
Gender	Male	45	47	-	1.000[b]
	Female	2	3		
Race	Malay	47	45	-	0.057[b]
	Others	0	5		
Marital status	Single	36	31	-	0.114[b]
	Married	11	17		
	Single parent	0	2		
Level education	Secondary school	17	21	0.346	0.557
	High education	30	29		
Working experiences(year)	Less than 2	37	37	1.105	0.639
	2-6	10	13		
Riding hours (hour/day)	Less than 8	29	31	0.001	0.976
	More than 8	18	19		
Riding distance(km)	Less than 50	15	16	0.000	0.993
	More than 50	32	34		
Feeling tired	Yes	32	26	2.607	0.106
	No	15	24		
Regular exercise	Yes	16	22	1.008	0.315
	No	31	28		
Break during work	Yes	38	39	0.120	0.729
	No	9	11		
Past accident	Yes	24	23	0.249	0.618
	No	23	27		
Medical history	Yes	9	5	1.642	0.200
	No	38	45		

Table 4.10 Risk factor associated with MSD (Lower back) among food delivery riders (continue)

Variables Body parts		MSD Lower back			
		Yes	No	X^2	p-value
Smoking habit	Never smoked	18	24	5.416	0.067
	Formerly smoked	16	7		
	Currently smoked	13	19		
Frequency of tiredness	Often	7	6	-	0.223[b]
	Sometimes	34	31		
	Rarely	6	11		
	Never	0	2		
Action taken when tired	Rest	40	42	-	0.967[b]
	Continue working	4	5		
	Other	3	3		
Duration of break(minutes)	Less than 60	39	39	5.292	0.614
	60-120	8	11		

Significantly at $p<0.05^*$
[b]: Fisher Exact Test

Table 4.11 Risk factor associated with MSD (Hip) among food delivery riders

Variables Body parts		MSD Hip			
		Yes	No	X^2	p-value
Age (years)	18-25	19	32	0.001	0.976
	25-48	17	29		
BMI (kg/m^2)	Normal	15	35	2.237	0.135
	Not normal	21	26		
Gender	Male	34	58	-	1.000[b]
	Female	2	3		
Race	Malay	32	60	-	0.062[b]
	Others	4	1		
Marital status	Single	25	42	-	0.922[b]
	Married	10	18		
	Single parent	1	1		
Level education	Secondary school	16	22	0.667	0.414
	High education	20	39		
Working experiences(year)	Less than 2	28	46	0.070	0.791
	2-6	8	15		
Riding hours (hour/day)	Less than 8	23	37	0.100	0.751
	More than 8	13	24		
Riding distance(km)	Less than 50	10	21	0.460	0.498
	More than 50	26	40		
Feeling tired	Yes	25	33	2.218	0.136
	No	11	28		
Regular exercise	Yes	14	24	0.002	0.965
	No	22	37		
Break during work	Yes	30	47	0.546	0.460
	No	6	14		
Past accident	Yes	19	28	0.429	0.513
	No	17	33		
Medical history	Yes	8	6	2.812	0.094
	No	28	55		

Table 4.11 Risk factor associated with MSD (Hip) among food delivery riders (continue)

Variables Body parts		**MSD** Hip			
		Yes	No	X^2	p-value
Smoking habit	Never smoked	13	29	1.816	0.403
	Formerly smoked	11	12		
	Currently smoked	12	20		
Frequency of tiredness	Often	7	6	-	0.024[b]
	Sometimes	27	38		
	Rarely	2	15		
	Never	0	2		
Action taken when tired	Rest	29	53	-	0.496[b]
	Continue working	5	4		
	Other	2	4		
Duration of break(minutes)	Less than 60	30	48	0.310	0.578
	60-120	6	13		

[b]: Fisher Exact Test

Table 4.12 Risk factor associated with MSD (Knee) among food delivery riders

Variables Body parts		MSD Knee			
		Yes	No	X^2	p-value
Age (years)	18-25	9	42	0.104	0.747
	25-48	7	39		
BMI (kg/m^2)	Normal	8	42	0.018	0.892
	Not normal	8	39		
Gender	Male	15	77	-	1.000[b]
	Female	1	4		
Race	Malay	14	78	-	0.189[b]
	Others	2	3		
Marital status	Single	10	57	1.788	0.409
	Married	5	23		
	Single parent				
Level education	Secondary school	12	26	-	0.002[b]
	High education	4	55		
Working experiences(year)	Less than 2	8	66	17.728	0.639
	2-6	8	15		
Riding hours (hour/day)	Less than 8	9	51	0.255	0.613
	More than 8	7	30		
Riding distance(km)	Less than 50	8	23	2.868	0.090
	More than 50	8	58		
Feeling tired	Yes	12	46	-	0.175[b]
	No	4	35		
Regular exercise	Yes	8	30	0.942	0.332
	No	8	51		
Break during work	Yes	13	64	-	1.000[b]
	No	3	17		
Past accident	Yes	10	37	1.514	0.219
	No	6	44		
Medical history	Yes	4	10	-	0.239[b]
	No	12	71		

Table 4.12 Risk factor associated with MSD (Knee) among food delivery riders (continue)

Variables		MSD			
Body parts		Knee			
		Yes	No	X^2	p-value
Smoking habit	Never smoked	4	38	-	0.201[b]
	Formerly smoked	4	19		
	Currently smoked	8	24		
Frequency of tiredness	Often	5	8	-	0.106[b]
	Sometimes	10	55		
	Rarely	1	16		
	Never	0	2		
Action taken when tired	Rest	12	70	-	0.421[b]
	Continue working	3	6		
	Other	1	5		
Duration of break(minutes)	Less than 60	13	65	-	1.000[b]
	60-120	3	16		

[b]: Fisher Exact Test

Table 4.13 Risk factor associated with MSD (Ankle) among food delivery riders

Variables Body parts		MSD Ankle			
		Yes	No	X^2	p-value
Age (years)	18-25	9	42	0.059	0.808
	25-48	9	37		
BMI (kg/m^2)	Normal	12	38	2.023	0.155
	Not normal	6	41		
Gender	Male	18	74	-	0.580[b]
	Female	0	5		
Race	Malay	18	74	-	0.580[b]
	Others	0	5		
Marital status	Single	11	56	-	0.506[b]
	Married	6	22		
	Single parent	1	1		
Level education	Secondary school	6	32	0.317	0.574
	High education	12	47		
Working experiences(year)	Less than 2	11	63	2.815	0.093
	2-6	7	16		
Riding hours (hour/day)	Less than 8	12	48	0.217	0.641
	More than 8	6	31		
Riding distance(km)	Less than 50	4	27	-	0.409[b]
	More than 50	14	52		
Feeling tired	Yes	14	44	-	0.112[b]
	No	4	35		
Regular exercise	Yes	7	31	0.001	0.978
	No	11	48		
Break during work	Yes	16	61	-	0.349[b]
	No	2	18		
Past accident	Yes	9	38	0.021	0.884
	No	9	41		
Medical history	Yes	3	11	-	0.720[b]
	No	15	68		

Table 4.13 Risk factor associated with MSD (Ankle) among food delivery riders (continue)

Variables Body parts		MSD Ankle			
		Yes	No	X^2	p-value
Smoking habit	Never smoked	6	36	1.371	0.504
	Formerly smoked	6	17		
	Currently smoked	6	26		
Frequency of tiredness	Often	3	10	-	0.032[b]
	Sometimes	15	50		
	Rarely	0	17		
	Never	0	2		
Action taken when tired	Rest	16	66	-	0.274[b]
	Continue working	2	7		
	Other	0	6		
Duration of break (minutes)	Less than 60	15	63	-	1.000[b]
	60-120	3	16		

[b]: Fisher Exact Test

Table 4.14 Summarize of significant risk factor associate with musculoskeletal disorders (MSD) among food delivery riders

Variables		MSD			
		Yes	No	X^2	p-value
Body mass index (BMI)	Normal	19	31	4.515	**0.034***
	Not normal	28	19		
Feeling tired	Yes	37	21	8.663	**0.003****
	No	13	26		
Smoking habit	Never smoked	15	27	7.555	**0.023***
	Formerly smoked	14	9		
	Currently smoked	21	11		
Regular exercise	Yes	12	26	9.973	**0.002***
	No	38	21		
Working experience(year)	Less than 2	34	40	3.919	**0.048***
	2-6	16	7		

Significantly at $p<0.05^{*}$
Significantly at $p<0.01^{**}$

CHAPTER 5

DISCUSSION

5.1 Socio-demographic characteristics of the food delivery riders

The first objective is to determine the socio-demographic characteristics of the food delivery riders. Most of the delivery riders is male and Malay. From the study, it shows that delivery services is nominated by male gender and motorcycle related job are very common for male and not for female due to its unsuitability.

5.2 Prevalence of musculoskeletal disorders among food delivery riders

Second objective in this study is to determine the prevalence of musculoskeletal disorders (MSD) among food delivery riders. The study shows a high prevalence of MSD among food delivery riders which is 84.5% based on complaint by riders at nine body parts. The result can be compared with previous study conducted by Jaiyesinmi, ,Areoye ,,Olagbegi ,,Bolarinde & Uduonu (2018) which found that there also high percentage of motorcyclist that reported with work-related musculoskeletal disorders. However, there is also study that only look at specific body parts such as back pain such as study conducted by Akinbo et al (2008) which found that prevalence of back pain is 60%. The difference in prevalence rate also can be found if compared with other studies that not specifically related with motorcycle. Other motor vehicle also reported high prevalence rate such as study conducted by Akinpelu, Oyewole, Odole & Olukoya (2011) found that majority (89.3%) of the occupational drivers in that study reported musculoskeletal discomfort in at least one region of body in the 12 months leading up to the research.

Next, in this study, it found that from nine body parts, there is high prevalence at shoulder and upper back followed by neck and lower back among food delivery riders. The difference between each body parts are not very far in percentage as shoulder and upper back are 51.5%, neck is 50.5% and followed by lower back 40.5%. Symptoms reported based on nine body parts in this study had shown some difference with other study such as study conducted by (Mohd Hafzi MI, Rohayu S, Faradila PN, Shaw VW, December, 2011), where the study shows that the highest percentage of discomfort report was at low back (82.3%), followed by neck (74.2%), shoulders (72.8%) and upper back (62.6%) compared to percentage discomfort reported in this study. But, overall there was high percentage reported in four common body parts like neck, upper back, shoulder and lower back. While, study from Mirbod et al. (1997) found that among two groups of traffic policeman, complaint regarding shoulder stiffness and lower back pain were the most frequent reported. The different outcome in this study may be due to the type of work which have different scope and environment. In a previous study conducted in China in 2004, it was discovered that there are differenced in occupational stress and strain among police officers, doctors and teachers (Yang et al., 2004).

5.3 Association of risk factors with musculoskeletal disorders among food delivery riders

The next objective in this study is to identify the risk factors that associate with the musculoskeletal disorders among food delivery riders. All contributing factors were collected from the questionnaire that being given to all respondents. Overall, risk factor that had association with MSDs as overall or at specific body parts were sign of feel tired by all the food delivery riders, the frequency of tiredness, work experiences, smoking habit, action taken by the riders if they tired, medical history, level of education and body mass index (BMI) of the food delivery riders.

5.3.1 Feeling tired

In this study, it found that there are association of riders feeling tired and the frequency of tiredness with musculoskeletal disorders. Also, study shows more than 50% riders feel fatigue and will experienced tiredness few times during the past 12 months. Ma et al (2003) reported that there was approximately 70% riders in Sydney experienced fatigue while riding and 90% of them will experienced fatigue after longer rides and majority of riders state that factors that contribute to the fatigue were insufficient breaks, long riding hours and monotonous road.

5.3.2 Work experiences

In this study, it was found that as early one year experience as food delivery riders, the riders can have symptoms of musculoskeletal disorders. Previous study found that there is significant association between work-related musculoskeletal disorders and

work experiences, hours spent at work per day and number of days spent at work in a week (Jaiyesinmi, Areoye ,Olagbegi ,Bolarinde & Uduonu ,2018). There was only one study conducted among minibus drivers in Accra, Ghana conducted by Abledu et al (2014) found association between work-related musculoskeletal disorders and driving more than 12 hours per day and driving at least five days per week.

5.3.3 Body Mass Index (BMI)

From CDC (2013), it state that there was possibilities of association between BMI and the occurrence of musculoskeletal symptom for a worker. In this study, it shown that BMI is significantly associate with MSDs specifically at lower back body part. For overweight riders, they experienced symptoms at upper and lower limbs, as well as symptoms in the neck, shoulder, back, and upper and lower limbs in obese people (Paudel et al., 2018).

5.3.4 Smoking habit

Study shown there is association of smoking habit with MSDs. There were 27 riders that had experienced symptoms of MSDs and were currently smoking in this study. Paudel et al.,(2018) state that by smoking cigarette, it had progressive effect on the musculoskeletal system and decrease the absorption of calcium from the diet which necessary for the bone mineralization, thus making the smokers prone to develop fragile bone or bone fractures.

5.3.5 Regular exercise

One review had been conducted in study by Dean & Söderlund (2015) where it founds that there are evidence related with lifestyle factors such as not smoking, practice healthy lifestyle, having normal weight, optimal sleep and manage to able stress and musculoskeletal health with reference to chronic pain. Physical activity and fruit and vegetables intake are found associated with the lower risk of musculoskeletal pain while smoking has higher risk of musculoskeletal pain and it is recommended to have physical activity more than 5 hours per week as it associated with lower risk of low back pain, neck and shoulder pain (Kirsch Micheletti et al., 2019).

Overall, in this study there is significant association of risk factors with musculoskeletal disorders. So, the hypothesis for this study is accepted.

CHAPTER 6

CONCLUSION

6.1 Conclusion

Finding from this study shows that:

1. The prevalence of musculoskeletal disorders for the past 12 months among food delivery riders shown shoulder and upper back pain as the highest (51.5%) symptoms reported followed by neck (50.5%) and lower back pain (48.5%).
2. There is significant association between risk factors and musculoskeletal disorders among food delivery rider. Risk factor that are significantly associate are feeling tired, smoking habit, regular exercise and body mass index (BMI).

6.2 Limitations

There are some limitations in this study that cannot be avoided by the researcher such as the information gathered in this study only based on the questionnaire given to the food delivery riders and there is no physical examinations being made by the researcher as there is restriction due to Covid-19 pandemic to confirm the complaints that being made by the food delivery rider related with musculoskeletal disorders symptoms. The recall information from the respondents can be bias as the questions asked in the questionnaire related with symptoms experienced by the respondents for the past 12 months.

6.3 Recommendations

1. It is recommended for the riders to avoid smoking as smoking can increase the developing of osteoporosis which means the bone become weak and easily break or cause fractures.
2. Moreover, riders also can practice on healthy diet and healthy lifestyle. Although a healthy lifestyle is not easily done by the riders, it is important to all riders to exercise and stretch on a daily basis so that can help maintain their bones, joints and make muscles strong (Kristeen, 2018).
3. In addition, the use of lumbar support also can be use by the riders as the application of lumbar support towards the riders can help them reducing the discomfort during riding the motorcycle and also prevent them from getting muscle fatigue due to long journey of riding (Mohd Shafiei et al., 2015).

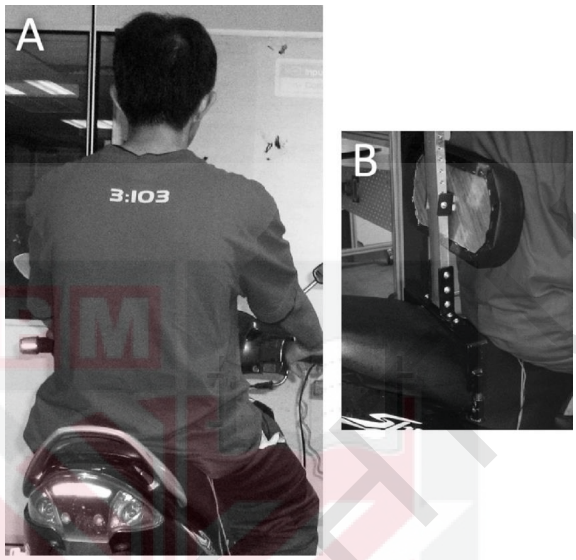


Figure 6.1 Prototype of lumbar support

Source: Karuppiah et al. (2012)

Figure 6.2 Example of lumbar support in the market

(Source: Back-A-Line, n.d)

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APPENDICES

Appendix 1: Respondent information and Informed Consent (Malay and English language)

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

FORM2.4: 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 :

Association Of Risk Factors With Musculoskeletal Disorders Among Food Delivery Riders In Serdang, Selangor.

2. INTRODUCTION:

For your information, I would like to clarify that all information provided in this questionnaire will only be used as research material and will not be shared to the public. As you already know, food delivery service has become a latest trend and common in urban areas. This is due to the increasing in number of restaurants and food

stall in our country and also due to the high demand from local residents.Furthermore, now our country is being hit by the Covid-19 epidemic which leads to some rules that all Malaysians must follow. The Movement Control Order (MCO) has affected several sectors such as the economic sector. Through food delivery services, food stalls or restaurants that are also affected can still operate as usual. With the increasing demand and food stalls that provide delivery services, the number of delivery riders has also increased. Therefore, the importance of conducting this study is due to the increase in the number of food delivery riders in our country. With that, there will also be an increase in the number of those at risk for diseases such as musculoskeletal disorders . Musculoskeletal disorders is one of the disease that get low attention from people and always being forget due to the low knowledge and information given. However, this disease is one of the diseases that are often faced by those who drive vehicles such as buses, cars and even motorcycles. This is because, based on several studies, musculoskeletal disorders is caused by several factors such as body posture while driving and also the duration of driving. Therefore, in this study, the main objective is to determine the relationship of risk factors with musculoskeletal disorders (MSD) among food delivery riders, especially in the Serdang area.

You are asked to answer the questions in this questionnaire honestly and it only takes about 15 to 30 minutes to answer this questionnaire. Furthermore, for this study, there is no risk that you will receive because the questions given are only related to your personal information, as well as some questions related to musculoskeletal disorders. Thank you.

3. WHAT WILL YOU HAVE TO DO?

As a respondent, you are asked to answer the online questionnaire that will be given honestly.

4. WHO SHOULD NOT PARTICIPATE IN THE STUDY?

Anyone who does not work as a food delivery rider and had a history of accidents involving limbs such as the neck, shoulders, back of the body and waist are not encourage to participate in this study.

5. WHAT WILL BE THE BENEFITS OF THE STUDY:

(a) TO YOU AS THE SUBJECT?

You can find out a little bit about musculoskeletal disorders that you may lack information about and then find out if you are at risk for getting the disease.

(b) TO THE INVESTIGATOR?

As researchers, we can identify the risks and factors that cause you as a respondent to have musculoskeletal disorders and can help in providing some enlightenment on how to reduce those risks.

6. WHAT ARE THE POSSIBLE RISKS?

This study does not have any risk because in this study we only use the questionnaire to collect the required data and do not required any physical study on the respondents.

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

Yes, your information will be kept confidential and will not be shared with the public.

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

If you have any questions or doubts, you can contact me as an individual who conducting the study at 013-7712565 (Nisa) or can email to nurkhairunnisazakri@gmail.com

*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 *(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 ……..…… Signature ……..……

(Respondent) (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)

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

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

Kajian berkaitan hubungan di antara faktor risiko yang akan menyebabkan penyakit musculoskeletal dalam kalangan penghantar makanan di kawasan Serdang, Selangor.

2. PENGENALAN

Untuk makluman, saya ingin menjelaskan bahawa segala maklumat yang diberikan di dalam borang soal selidik ini hanya akan digunakan sebagai bahan kajian sahaja dan tidak akan dikongsikan kepada masyarakat umum. Seperti yang anda sedia maklum, servis menghantar makanan sudah menjadi satu trend terkini dan perkara biasa di kawasan bandar. Hal itu kerana, disebabkan pertambahan gerai makanan dan juga permintaan yang tinggi daripada penduduk setempat. Tambahan pula, sekarang negara kita sedang dilanda wabak Covid-19 yang membawa kepada beberapa peraturan yang perlu diikuti oleh semua rakyat Malaysia. Perintah Kawalan Pergerakan (PKP) telah menyebabkan beberapa sektor terjejas seperti sektor ekonomi. Melalui servis penghantaran makanan, gerai makanan yang juga terjejas masih boleh beroperasi seperti biasa. Dengan bertambahnya permintaan dan gerai makanan yang menyediakan servis penghantaran, jumlah pengahantar makanan juga turut bertambah.

Oleh itu, pentingnya untuk menjalankan kajian ini adalah disebabkan pertambahan bilangan penghantar makanan di dalam negara kita, maka akan bertambah juga bilangan mereka yang berisiko untuk mandapat penyakit seperti penyakit musculoskeletal. Penyakit musculoskeletal adalah salah satu penyakit yang kurang diketahui umum dan kurang mendapapat perhatian. Walaubagaimanapun, penyakit ini merupakan salah satu penyakit yang sering dihadapi oleh mereka yang memandu kenderaan seperti bas, kereta dan juga motosikal. Hal ini kerana, berdasarkan beberapa kajian, penyakit musculoskeletal disebabkan oleh beberapa faktor seperti postur badan semasa memandu dan juga tempoh memandu. Oleh itu, di dalam kajian ini, objektif utama ialah ingin menentukan hubungan faktor risiko dengan gangguan muskuloskeletal (MSD) di kalangan penunggang penghantaran makanan terutama di kawasan Serdang.

Anda diminta untuk menjawab soalan di dalam borang soal selidik ini secara jujur dan hanya memerlukan lebih kurang 15 ke 30 minit bagi menjawab borang soal selidik ini. Tambahan pula, bagi kajian ini, tiada risiko yang anda akan terima kerana soalan yang diberikan hanya berkaitan maklumat diri anda, serta beberapa soalan berkaitan penyakit musculoskeletal. Terima kasih.

3. APAKAH YANG PERLU ANDA LAKUKAN?

Sebagai responden, anda diminta untuk menjawab soal selidik yang akan diberikan secara atas talian dengan jujur.

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?

Seiapa yang tidak bekerja sebagai penuggang penghantar makanan dan telah mempunyai sejarah kemalangan melibatkan anggota badan seperti di leher, bahu, belakang badan dan pinggang tidak boleh menyertai kajian ini.

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

a) KEPADA ANDA SEBAGAI PESERTA?

Anda dapat mengetahui serba sedikit berkaitan penyakit musculoskeletal yang mungkin anda kurang informasi berkaitan penyakit tersebut dan seterusnya mengetahui jika anda berisiko utntuk mendapat penyakit tersebut.

b) KEPADA PENYELIDIK?

Sebagai penyelidik, kami dapat mengenal pasti risiko dan faktor yang menyebabkan anda selaku responden boleh menghadapi penyakit musculoskeletal dan seterusnya dapat memberikan sedikit pencerahan bagaimana untuk mengurangkan risiko tersebut.

6. ADAKAH IA BERISIKO?

Kajian ini tidak mempunyai apa-apa risiko kerana di dalam kajian ini kami hanya menggunakan borang soal selidik bagi mengumpulkan data yang diperlukan dan tidak memerlukan sebarang kajian secara fizikal terhadap responden.

7. ADAKAH MAKLUMAT DAN IDENTITI SAYA KEKAL RAHSIA?

Ya, maklumat anda akan dirahsiakan dan tidak akan dikongsi kepada masyarakat umum.

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

Sekiranya anda mempunyai apa-apa soalan atau keraguan, boleh hubungi saya selaku individu yang menjalankan kajian di nombor telefon 013-7712565 (Nisa) atau boleh email kepada nurkhairunnisazakri@gmail.com

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 *(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 2: Questionnaire (Available in Malay language only)

ID Responden : Tarikh:

BORANG KAJI SELIDIK

NO.	TAJUK KAJIAN	NAMA PENGKAJI
1.	KAJIAN BERKAITAN HUBUNGAN DI ANTARA FAKTOR RISIKO YANG AKAN MENYEBABKAN PENYAKIT MUSCULOSKELETAL DALAM KALANGAN PENGHANTAR MAKANAN.	NUR KHAIRUNNISA BINTI ZAKRI

Arahan:
Borang soal selidik ini mengandungi 2 bahagian :

1) Bahagian A: Socio-demografik dan ciri pekerjaan
2) Bahagian B: Borang kaji selidik Nordic

BAHAGIAN A: SOCIO-DEMOGRAFIK DAN CIRI PEKERJAAN

ARAHAN: Sila isi jawapan di ruangan yang disediakan dan tandakan jawapan anda di tempat yang disediakan.

1. Umur: _____
2. Tinggi (cm): _____
3. Berat (kg): _____
4. Jantina:
   - ☐ A. Lelaki
   - ☐ B. Perempuan
5. Bangsa:
   - ☐ A. Melayu
   - ☐ B. Cina
   - ☐ C. India
   - ☐ D. Lain-lain
     Sila nyatakan:
6. Status perkahwinan *:*
   - ☐ A. Bujang
   - ☐ B. Sudah berkahwin
   - ☐ C. Bercerai

7. Tahap pendidikan:

☐ A.Tiada

☐ B. Sekolah rendah

☐ C. Pendidikan menengah

☐ D. Pengajian tinggi

8. Pengalaman bekerja:

☐ A. Kurang dari 1 tahun

☐ B. 1-2 tahun

☐ C. 2-4 tahun

☐ D. 4-6 tahun

9. Jumlah jam bekerja dalam sehari:

☐ A. 2-4 jam

☐ B. 4-6 jam

☐ C. 6-8 jam

☐ D. 8 jam ke atas

10. Jenis pekerjaan:

☐ A. Bekerja sepenuh masa

☐ B. Bekerja sambilan

11. Jumlah masa tunggangan motorsikal dalam sehari (jam)?

_____

12. Jumlah jarak perjalanan dalam sehari (km)?

_____

13. Adakah anda ada waktu berehat semasa bekerja?

☐ Ya ☐ Tidak

14. Berapa lamakah anda berehat semasa bekerja (jam)?

☐ A. Kurang 0.5

☐ B. 0.5- 1

☐ C. 1-2

☐ D. Lebih besar dari 2

15. Adakah anda kerap bersenam?

☐ Ya ☐ Tidak

16. Adakah anda pernah mengalami kemalangan sebelum ini?

☐ Ya ☐ Tidak

17. Habit merokok:

☐ A. Tidak pernah merokok

☐ B. Sudah berhenti merokok

☐ C. Masih merokok

18. Adakah anda pernah mengalami masalah kesihatan yang telah didiagnosis oleh doktor?

☐ Ya ☐ Tidak

JIka YA, sila tandakan di bawah:

☐ Penyakit Kardiovaskular

☐ Kencing manis

Lain-lain (Sila nyatakan): _____

19. Adakah anda kerap merasa letih?

☐ Ya ☐ Tidak

20. Apakah kekerapan anda merasa letih?

☐ A. Selalu

☐ B. Kadang-kadang

☐ C. Sangat jarang

☐ D. Tidak pernah

21. Apakah tindakan anda jika merasa letih?

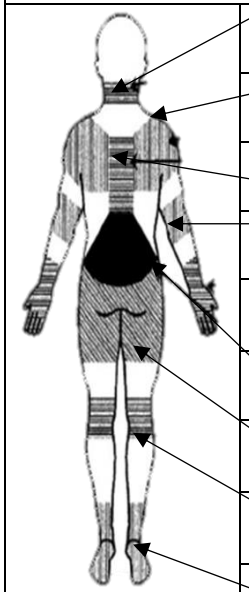
☐ A. Berehat

☐ B. Teruskan bekerja

☐ C. Lain-lain

BAHAGIAN B: BORANG KAJI SELIDIK NORDIC

ARAHAN: Sila isi jawapan di ruangan yang disediakan dan tandakan jawapan anda di tempat yang disediakan.

		Adakah anda pada bila-bila masa dalam 12 bulan terakhir mengalami masalah (seperti sakit,dan rasa tidak selesa) di:		Selama 12 bulan yang terakhir, adakah anda rasa sukar untuk melakukan aktiviti biasa anda (seperti melakukan kerja-kerja rumah, hobi) kerana mengalamai masalah di:		Selama 12 bulan yang terakhir, pernahkan anda berjumpa dengan berjumpa doktor untuk keadaan ini:		Selama 7 hari terakhir, pernahkan anda menghadapi masalah di:	
	Leher	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak
	Bahu	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak
	Belakang badan atas	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak
	Siku	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak
	Pergelangan tangan/ tangan	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak
	Belakang badan bawah	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak
	Pinggul/ paha	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak
	Lutut	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak
	Pergelangan kaki/ kaki	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak	☐ Ya	☐ Tidak

Appendix 3

Rujukan kami : UPM/TNCPI/RMC/1.4.18.2 (JKEUPM)
Tarikh : 19 February 2021

Prof. Dr. Shamsul Bahri Md Tamrin
Department of Occupational and Health Environmental Health
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia Serdang, Selangor

Dear Madam/Sir,

RESEARCH PROJECT: ASSOCIATION OF RISK FACTORS WITH MUSCULOSKELETAL DISORDERS AMONG FOOD DELIVERY RIDERS.

REFERENCE NO: JKEUPM-2020-484

RESEARCHER : NUR KHAIRUNNISA ZAKRI

SUPERVISOR : PROF. DR. SHAMSUL BAHRI MD TAMRIN

The Ethics Committee for Research involving Human Subjects of University Putra Malaysia (JKEUPM) has studied the proposal for the above project and found that there were no objectionable ethical issues involved in the proposed study.

Please find the list of documents received and reviewed with reference to the study and committee members who reviewed the documents (as attached).

Notwithstanding above, we will not be responsible for any misconduct on the part of researcher in the course of carrying out the research.

Ethical approval is required in the case of amendments/ changes to the study documents/ study sites/ study team.

Thank you.

"WITH KNOWLEDGE WE SERVE"

Sincerely yours,

PROF. DR. ZAMBERI SEKAWI

Chair Ethics Committee for Research involving Human Subjects Universiti Putra Malaysia