



UNIVERSITI PUTRA MALAYSIA

***FACTORS CONTRIBUTING TO MUSCULOSKELETAL DISORDER
AMONG LICENSED MOUNTAIN PORTERS OF SABAH PARK***

'AIN FARISYA BINTI AHMAD FUA'AD

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BY

'AIN FARISYA BINTI AHMAD FUA'AD

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FACTORS CONTRIBUTING TO MUSCULOSKELETAL DISORDER AMONG LICENSED MOUNTAIN PORTERS OF SABAH PARK

'Ain Farisya Bt Ahmad Fua'ad and Ng Yee Guan

¹Department of Environmental and Occupational Health, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia

ABSTRACT

Introduction: Mount Kinabalu is one of the main attractions for extreme sports enthusiasts especially hikers. The number of climbers that registered for the mountaineering expedition expands from year to year, resulting in increment of demand for porters' services. Licensed mountain porters of Sabah Park are prone to develop Musculoskeletal Disorder (MSD) symptoms due to their nature of job which involves prolonged heavy load carrying up to Mount Kinabalu. Porter service includes carrying food supplies and amenities for hotels and rest houses located at Panalaban. Hotels and rest houses are important facilities provided by Sabah Park for hikers and climbers to have a one night rest before continuing their journey up to the summit of Mount Kinabalu the next day. **Objective:** The purpose of this research is to study the association between factors contributing to Musculoskeletal Disorder among licensed mountain porters of Sabah Park. **Methodology:** 44 licensed mountain porters were acquired to answer a set of Nordic Musculoskeletal Questionnaires that consists of few parts such as socio-demographic, lifestyle and occupational information. **Results and Discussion:** Study showed that factors such as smoking history ($p=0.049$), rest break inadequacy ($p=0.034$) and duration of working in years ($p=0.043$) have a significant associations with Musculoskeletal Disorder (MSD) prevalence. **Conclusion:** Socio-demographic background, lifestyle and occupation are factors that contributes to Musculoskeletal Disorder symptoms in licensed mountain porters of Sabah Park.

Keywords: Musculoskeletal Disorder, Nordic, mountain porters, Mount Kinabalu

FAKTOR-FAKTOR PENYUMBANG KEPADA GEJALA OTOT DALAM KALANGAN PORTER GUNUNG BERLESEN DI TAMAN SABAH

'Ain Farisya Bt Ahmad Fua'ad and Ng Yee Guan

¹Jabatan Alam Sekitar dan Kesihatan Pekerjaan, Fakulti Perubatan dan Sains Kesihatan, Universiti Putra Malaysia

ABSTRAK

Pengenalan: Gunung Kinabalu adalah salah satu tarikan utama untuk peminat sukan lasak terutama pendaki gunung. Bilangan pendaki yang berdaftar untuk ekspedisi mendaki gunung bertambah dari tahun ke tahun, menyebabkan kenaikan permintaan untuk perkhidmatan porter. Porter gunung berlesen di bawah pengurusan Taman Sabah cenderung untuk terdedah kepada Gejala Otot disebabkan tugas yang melibatkan pengangkutan bebanan berat yang berpanjangan dan memerlukan mereka untuk mendaki naik ke Gunung Kinabalu. Perkhidmatan porter termasuk membawa bekalan makanan dan kemudahan untuk hotel dan rumah rehat yang terletak di Panalaban. Hotel dan rumah rehat adalah kemudahan terpenting disediakan oleh Taman Sabah untuk pendaki. Adalah penting untuk para pendaki berehat satu malam sebelum meneruskan perjalanan ke puncak Gunung Kinabalu pada keesokan harinya. **Objektif:** Tujuan kajian ini adalah untuk mengkaji hubungan antara faktor yang menyumbang kepada Gejala Otot dalam kalangan porter gunung berlesen di Taman Sabah. **Metodologi:** 44 porter gunung berlesen telah dikehendai untuk menjawab satu set borang soal selidik Gejala Otot *Nordic* yang terdiri daripada beberapa bahagian seperti sosio-demografi, gaya hidup dan maklumat pekerjaan. **Keputusan dan Perbincangan:** Kajian menunjukkan bahawa faktor-faktor seperti sejarah merokok ($p=0.049$), kurang masa berehat ($p=0.034$) dan tempoh tahun bekerja ($p=0.043$) mempunyai hubungan yang signifikan dengan Gejala Otot. **Kesimpulan:** Latar belakang sosio-demografi, gaya hidup dan pekerjaan adalah faktor-faktor yang menyumbang kepada Gejala Otot dalam kalangan porter gunung berlesen di Taman Sabah

Kata kunci: Gejala Otot, *Nordic*, porter gunung, Gunung Kinabalu

TABLE OF CONTENTS

DECLARATION	ii
SIGNATURE OF SUPEVISOR/ INTERNAL EXAMINER	iii
ACKNOWLEDGEMENT	iv
ABSTRACT	v
ABSTRAK	vi
CONTENTS	vii-x
LIST OF TABLES	xi
LIST OF FIGURES	xii
LIST OF ABBREVIATIONS	xiii
CHAPTER 1: INTRODUCTION	
1.1 Background	1-3
1.2 Problem Statement	4-5
1.3 Research Justification	6
1.4 Conceptual Framework	6-7
1.5 Research Question	8
1.6 Objectives	8
1.7 Hypothesis	9
1.8 Definition of Terms	9-10

CHAPTER 2: LITERATURE REVIEW

2.1	Porters of Sabah Park	11-12
2.2	Musculoskeletal Disorder	13-17

CHAPTER 3: METHDOLOGY

3.1	Study Design	18
3.2	Study Location	18
3.3	Sampling Study Population	19
3.4	Sampling Size	20
3.5	Study Instruments and Data Collection	21-23
3.6	Quality Control	24-25
3.7	Data Analysis	25-26
3.8	Ethical Consideration	27

CHAPTER 4: RESULTS

4.1	Socio-demographic Background	28-29
4.2	Lifestyle Information	30-31
4.3	Occupational Information	32-34
4.4	Prevalence of Musculoskeletal Disorder	34-36
4.5	Association between socio-demographic background, lifestyle information and occupational information with MSD	36-45

CHAPTER 5: DISCUSSION

5.1	Prevalence of Musculoskeletal Disorder	46
5.2	Association between socio-demographic, lifestyle and occupational information with prevalence of Musculoskeletal Disorder	47-50

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1	Conclusion	51
6.2	Study Limitations	52
6.3	Recommendations	52

REFERENCES

53-57

APPENDICES

LIST OF TABLES

Table 3.1	Data analysis for this study	26
Table 4.1	Distribution of socio-demographic data among licensed mountain porters	28-29
Table 4.2	Distribution of lifestyle information data among licensed mountain porters	30-31
Table 4.3	Occupational and medical information data	32-33
Table 4.4	Musculoskeletal Disorder prevalence	35
Table 4.5	Association between socio-demographic backgrounds with MSD for the past 12 months	37-38
Table 4.6	Association between lifestyle information with MSD for the past 12 months	38-39
Table 4.7	Association between occupational information with MSD for the past 12 months	39-40
Table 4.8	Association between socio-demographic backgrounds with MSD for the past 7 days	40-41
Table 4.9	Association between lifestyle information with MSD for the past 7 days	42
Table 4.10	Association between lifestyle information with MSD for the past 7 days	43-44
Table 4.11	Significant association data of socio-demographic, lifestyle and occupational information with prevalence of MSD for the past 12 months and 7 days	44-45

LIST OF FIGURES

Figure 1.1	Conceptual Framework	7
Figure 3.1	Kinabalu Park main entrance	18
Figure 3.2	OMRON BF508 Body Composition and Body Fat Monitor	22
Figure 3.2	SECA 213 Portable Stadiometer	23
Figure 4.1	The percentage of previous type of job done by licensed mountain porter	34
Figure 4.2	Distribution of MSD according to body parts for the past 12 months	36
Figure 4.3	Distribution of MSD according to body parts for the past 7 days	36

LIST OF ABBREVIATIONS

MSD	Musculoskeletal Disorder
NIOSH	National Institute of Occupational Safety and Health
BMI	Body Mass Index
NMQ	Nordic Musculoskeletal Questionnaires

CHAPTER 1

INTRODUCTION

1.1 Background

Sabah Park is a statutory body which plays a vital role in conserving the national heritage of Malaysia. They are also mandated to provide facilities with tourism-friendly concept and accommodate tourist arrivals to Sabah national parks. The main inclusion in the park system is Mount Kinabalu which has been designated as World Heritage Site by UNESCO.

Mount Kinabalu, height at 4095 meters above sea level is the highest mountain of Malaysia. It is under the care of Kinabalu Park which was gazetted in 1964 for its magnificent and outstanding values. The park plays an important role in conserving Mount Kinabalu which is the most valuable biological site in the world with more than 4500 species of flora and fauna. Kinabalu Park is the first national park in Malaysia that was established. Up until today, it remains the most popular spot for tourists and visitors in Malaysia and Sabah generally.

One of the main attractions in Kinabalu Park is the opportunity to climb Mount Kinabalu. Climbers and adventurers came from all over the world to experience the thrilling journey of reaching Malaysia's highest mountain summit, named Low's Peak. It can be hiked by any person with good physical condition, stamina and endurance. The journey will take two days and one night in average depending on the individual ability and readiness. Every climber will be required to rest one night at Panalaban also known as Laban Rata, located at 3272 meters above sea level.

Porter is a job specialized to carry items or objects for Laban Rata Resthouse and restaurant, Pendant Hut and Lemaing Hut located at Panalaban. They carry food supplies, drinks, hotel amenities such as blankets and pillows and even carry down garbage to be disposed at wasteland areas in Ranau. Licensed mountain porter of Sabah Park bears the loads by carrying them on their back during mountaineering expeditions of hiking Mount Kinabalu. Most of the porters are locals that live at Ranau and Kundasang villages.

Previously, there were two routes with different level of toughness provided to climb up Mount Kinabalu. Those are Mesilau trek and Timpohon trek. (Anfraix, 2005; Fritsch and Bush, 2011). However, a published newspaper article by Berita Harian (2015) states that earthquake incident in 2015 had caused Mesilau trek to be closed for safety purposes. The only route used by porters and climbers ever since is Timpohon trek. It promises an easier trail as to be compared with Mesilau trek. Porters do their job according to demands by Kinabalu Park and Panalaban resthouse. During an interview, management staff of Kinabalu Park mentioned that the maximum number of times porters hike up the mountain is 4 days per week typically and other days are considered as a rest day to get their body prepared for the next task.

According to an interview made with 2019 president of Kinabalu Park Porters Association, Daved Simpat said, porter starts their journey to Panalaban as early as 8 a.m. The items to be brought up are collected by porters at the centre point in Kinabalu Park. They need to first register themselves and weigh the load before they start ascending the mountain. Porters take up 3 to 4 hours on average to arrive Panalaban and they usually descend the same day after they finish delivering items to the resthouse. Porters are expected to prepare mentally and physically before doing the task. However, some of the porters started off their career as a mountain guide which makes it easy for them to be familiarize with the trails and routes. Porters are mostly experienced and well prepared for their responsibilities of carrying loads for others' convenience.

1.2 Problem Statement

Repetitive task of prolonged load carrying may lead to musculoskeletal disorders. Musculoskeletal disorder (MSD) is a type of injury to the musculoskeletal system which composed of bones, joints, tendons, ligaments, nerves, blood vessels and muscles. Due to nature of tasks of mountain porter, upper limb is the most vulnerable as shoulder, neck, upper back and lower back are the parts which are highly intact with objects carried. The external exertion from the object to those parts at a very long period of time may cause traumatic injury. This traumatic injury can be episodic where it subsides and will then recur. Besides that, the injury can also be persistent and irreversible that will cause permanent injury to the system (European Agency for Safety and Health at Work, 2018).

According to National Institute of Occupational Health (NIOSH), MSD cases in Malaysia has been reportedly increases since 2008. Based on the statistics made by Social Security Organization (SOCSO) on MSD, 14 cases were recorded in 2006. However, in 2010, MSD cases increased up to 238 cases and inclining to 268 cases in 2011. The increment of MSD cases had caused more absenteeism at workplace and disability comparing to other group of disease, thus resulting in declination of work productivity (Badley, Rasooly and Webster, 1994).

World Health Organization (WHO) also acknowledged that MSD is the second largest contributor to the global disability and low back pain is the top cause. MSD attacks individual regardless age and usually the young ones are diagnosed with MSD at their peak of earning income age. MSD impacted most to low and middle income country on the MSD treatment cost especially on Orthopedic Surgery which has the highest expenditure (Woolf and Pfeleger, 2010).

Many studies had shown effect of load carriage to the musculoskeletal system. Such deterioration in workers' health will lower the performance of their job task. This will also contribute to the declination of Sabah Park income as well as affecting the economy of Malaysia in tourism sector. Based on the previous study, load carriage has been associated with an increased risk of musculoskeletal disorders in both the upper and lower limbs in recreational and working populations (Twombly and Schussman, 1995; Miranda et al., 2001, and Bentley et al., 2004). This is related to the origin of porters' job which includes several number of times to carry heavy items for a living.

In addition, previous research had shown that female hikers that carry load has significantly higher injury rate compared to men (Twombly and Schussman, 1995; Leemon and Schimelpfenig, 2003). Safe backpack loads guidelines has been implemented to reduce the injury for female hikers. However, other physical factors contributing to musculoskeletal disorder should be taken into consideration to reduce the prevalence of musculoskeletal among both male and female porter.

1.3 Research Justification

This study will identify the prevalence MSD among mountain porters. Hence, the result from this study can be useful for the management of Sabah Park on limitations and guidelines for the porters before, during and after doing their task. This study will provide insights and contribute some useful information regarding factors that contribute to MSD and its association.

Furthermore, this study can be a baseline for study on mountain porters in Malaysia as there is no study conducted to highlight this type of job. Hence, this study is crucial to minimize adverse health effect at an early stage among these porters. Preventive measures and interventions can be implemented to reduce health impact to the porters.

1.4 Conceptual Framework

Figure 1.1 illustrates the conceptual framework of this study. Sabah Park is the organization responsible in creating job opportunity for mountain porters. Mountain porter were licensed by the organization as a permit for them to undergo the task. Among the various hazards faced by porters, ergonomic hazard is one of them. There are six listed ergonomic risk factors according to Malaysia Guideline of Ergonomic Risk Assessment at Workplace 2017. These risk factors might contribute to the development of MSD. Other factors that might contribute to MSD, to be evaluated in this study are socio-demographic background, lifestyle and occupational history of mountain porter. Load mass, total distance and frequency of hike done by mountain porters are occupational risk factors that might as well cause the development of MSD.

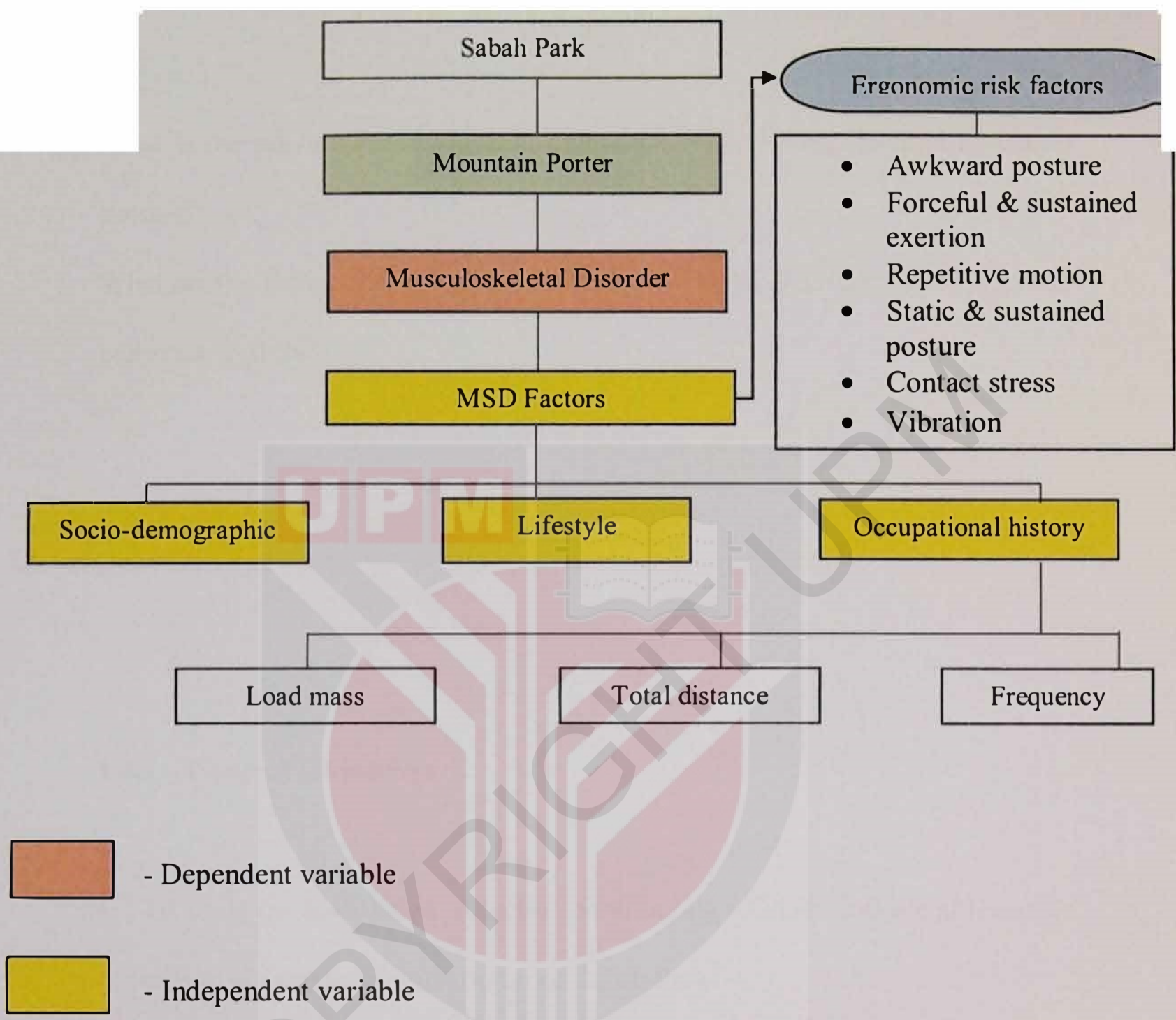


Figure 1.1 Conceptual framework

1.5 Research Questions

1. What is the prevalence of Musculoskeletal Disorder among licensed mountain porters?
2. What are the factors that contribute to Musculoskeletal Disorder among licensed mountain porters?

1.6 Objectives

1.4.1 General Objectives

1. To study the association of factors contributing to Musculoskeletal Disorder among licensed mountain porter of Sabah Park.

1.4.2 Specific Objectives

1. To determine socio-demographic information, lifestyle and occupational history of mountain porter.
2. To determine the prevalence of mountain porter with Musculoskeletal Disorder.
3. To determine the association between socio-demographic, lifestyle and occupational history with MSD.

1.7 Hypothesis

1. There is a significant association between socio-demographic, lifestyle and occupational history with prevalence of MSD

1.8 Definition of Terms

1.7.1 Conceptual Definition

Musculoskeletal Disorder

“Musculoskeletal disorder” include a wide range of inflammatory and degenerative condition affecting the muscles, tendons, ligaments, joints, peripheral nerves and supporting blood vessels (Punnett *et al.*, 2004)

Body Mass Index (BMI)

Body Mass Index (BMI) is a type of calculation by using individuals' weight and height. It is used to classify health range of a person. However, it is not suitable to be used for pregnant woman, body builder, long distance athletes and elderly or young children. The formula to calculate BMI is as below:

$$\text{Body Mass Index (BMI)} = \text{Weight (kg)} / \text{Height (m)} \times \text{Height (m)}$$

(Standard guideline by World Health Organization (WHO), 2000)

1.7.3 Operational Definition

Musculoskeletal Disorder

Musculoskeletal Disorder (MSD) is any discomfort, pain or injury to the human musculoskeletal system such as tendon, joint, ligaments, muscles, spinal disc, bursa sacs and nerves. Body structures that acts as a support to the limb, neck and back are also included. MSD arises from many contributing factors. The factors that might affect the musculoskeletal system are biomechanical factor such as forceful exertion, repetitive motion, awkward or static posture and heavy load. Next is individual variances such as gender and Body Mass Index (BMI). Other factor contributing to MSD is Psychosocial such as high job demands with low social supports that will increase muscle tension, blood pressure, body sensitivity and pupil dilation. Factors such as extreme weather condition and vibration might as well cause an individual to have MSD.

Body Mass Index (BMI)

Body Mass Index is calculated by dividing weight in kilogram (kg) and height (m²). The readings will be classified as according to the following table:

BMI	CATEGORY
<18.5	Underweight
18.5-24.9	Normal
25.0-30.0	Overweight
>30.0	Obese

(Clinical Practice Guidelines, Standard Guideline by MOH (BMI), 2004)

CHAPTER 2

LITERATURE REVIEW

2.1 Porter of Sabah Park

Mountains are often seen as a high potential recreational destination (Nepal and Chipeniuk, 2005). The increasing amount of tourists each year contributes to creation of socioeconomic opportunities (Nepal and Chipeniuk, 2005). Mount Kinabalu is the highest mountain in Malaysia as well as Malay Archipelago. The existence of Mount Kinabalu as a famous recreational place for adrenaline junkies and adventurers provides employment for the locals as a mountain porter.

Sabah Park is a body which responsible for hiring process, division of task and welfare of Mount Kinabalu porters. Mountain porter duty is to carry equipments and rucksacks up the mountain and carry their items back down (Law and Rodway, 2008). According to an online article by Adityo (2016), it states that rucksacks used by mountain porters are handmade and being called as '*Salabit*' by them. Generated from Kadazan Dusun language, '*Salabit*' is also used as vegetables carrier by locals lived in the foot of Mount Kinabalu,

A report by Sabah Park management (2017) stated an age limit to become a porter. Individuals aged 16 years old and above are allowed to work as a porter. However, during school days, they are not allowed to work. Besides that, there are no gender limitations as a porter. Both men and women are allowed to work. In addition, physical fitness and good health condition is mainly required and prioritized. These porters have different background and possess variety of skill sets and most of them are locals who is a Sabah born.



2.2 Musculoskeletal Disorder

The increase of mountain adventure tourism will as well increase the incidence of mountaineering related injuries (Windsor, Firth, Grocott, Rodway, & Montgomery, 2009). Although recreational hiking has been associated with positive health benefits (Ainslie et al., 2005), these benefits can be negated by the occurrence of injury or discomfort (Blake and Ferguson, 1993). Musculoskeletal Disorder (MSD) is defined as conditions of muscle, tendon, ligaments, joints, nerves and blood vessels which is inflammatory and degenerative. Common body regions that are affected are shoulder, neck, lower back, hand and forearm (Punnet & Wegman, 2004).

MSD have multiple risk factors which are occupational and non-occupational factors. Daily routine such as house chores and sports and presence of systemic diseases such as gout, diabetes, rheumatoid arthritis and lupus will contribute to MSD. On top of that, other factors are age, gender, socioeconomic factors and ethnicity. Smoking and obesity are also suspected risk for MSD (Punnet & Wegman, 2004). At an early stage of development, MSD are often episodic and intermittent where the symptoms subsides for a certain duration of time and recurs. Also, the symptoms might subside when resting or changing of activity or routine is done. However, MSD can also be irreversible and persistent.

According to National Research Council of Europe (2001), MSD can be categorized into specific and non-specific. Specific MSD is when they have transparent and clear clinical features such as lumbosacral syndrome in the low back, carpal tunnel syndrome in the wrist, and patellar tendonitis in the low extremities. Meanwhile, non-specific MSD has no clear evidence on specific disorder but the pain can be felt. However, this type of MSD cannot be considered as trivial and prevention steps need to be taken to reduce and control the incidence of MSD.

2.2.1 Risk Factors of Musculoskeletal Disorder

Simpson *et al.*, (2010) study on muscle discomfort of a female hiker shows a significant association with the presence of increased load mass as well as walking distance. Ratings of perceived exertion (RPE) of the population were reported to experience “discomfort” as they carried load of 40% body weight, comparing to load mass of 20% and 30% body weight. Further study by Simpson *et al.*, (2011) also shows the effect of prolonged hiking and load mass to the lower limb muscle activity. This study suggests load mass of 30% body weight to minimize the risk of injury and maintain the stability of lower limb muscle to absorb shock absorption. In addition, a study by Kim (2016) shows a significant difference between the load and backpack loading conditions where backpack shows significant factor that can affect erector spinae muscle force.

According to Cuoto *et al.*, (2019), individual factors such as age and gender were not associated with MSD. However, previous study by Viester. L *et al.* (2013) reported that BMI, a socio-demographic factor has an association with musculoskeletal symptom. Those who are overweight with (BMI > 25) are easier to develop symptoms as compared with individuals of normal BMI (18.5-24.9) and has less probability of recovery from symptoms. On top of that, the symptoms is specially stronger for overweight or obese (BMI > 30) individuals with low physical activity. As for the body parts involved, the symptoms are often shown in the lower extremity such as hip, knees and ankles. Besides, a review study from Butterworth P. A *et al.* (2012) also states that 25 papers reviewed shows a significant association between BMI and MSD. The symptom of MSD become strongly associated as BMI increases.

Besides, a study by Palmer *et al.* (2003) shows an association between one of the lifestyle factors; smoking with MSD. Smoking increases pain and discomfort of a smoker at particular body parts such as neck, upper limb, lower limb and legs. Also, an article published online by Musculoskeletal Australia (2018) suggests an average sleep of 7-9 hours for an adult to promote and enhance quality muscle recovery. Lifestyle of an individual plays important role in an individual daily physical activity involving locomotion of muscle activity.

Occupational factor imposes a role in MSD development. A study by Finnish Occupational Health (2017) suggests that MSD increases with the number of years a person work. This is because of increment of age of the workers itself that causes degeneration of muscles to occur. Furthermore, as worker's seniority and job experience increase they tend to have fixed shift, so fixed shift is associated with increased years of employment and increased age (Carusso & Waters, 2008). It was found that the

development of any MSD were significantly higher among those who perceived that they had to work for long periods with the body in awkward positions. Sufficient rest during work to individual may reduce MSD symptoms and pain (Masri *et al.*, 2017). According to a previous study on Behaviours of Mount Kinabalu Climbers by Esfahani (2011), which took the same place as this study, it is reported that injury rate of climbers shows increment from year 2009 which is 24 to year 2012 which is 34. MSD is also included as one of the many types of injuries classified in the study mentioned. The nature of porters' job that requires climbing might increase the risk to muscle injury. Thus, making occupational duration as one of the risk of MSD development.

2.2.2 Prevalence of Musculoskeletal Disorder

64.2% is the prevalence of MSD found among tea pluckers (Hadi, 2016). The nature of job of tea pluckers and mountain porter has a few similarities making them compatible to be compared. Masri *et al.* (2017) in a study of MSD prevalence among tea pluckers found that neck, lower back and knee are among body parts with high prevalence for the past 12 months. Besides, a study on tea plantation workers by Hadi (2016) also shows a high prevalence of low back pain as compared to other body parts. This prevalence implies for workers who undergo task of lifting and carrying load at the back of their body. Gender wise, a study by Troussier *et al.* (1999) found that MSD for back pain are more common among female (25.4%) than in male (15.2%). Another similar findings proven by Shamsul *et al.* (2009) on bag pack carrying among students where higher prevalence of MSD reported pain occur more frequent among female than the male students.

AUTHOR	FINDINGS
Simpson <i>et al.</i> (2010)	Load mass and distance had a significant effect on posture, heart rate and ratings of perceived exertion.
Simpson <i>et al.</i> (2011)	Load mass and walking distance shows effect to muscle burst interactions.
Kim (2014)	There is a significant difference between the load and backpack loading conditions where backpack shows significant factor $p < 0.001$ which will affect erector spinae muscle force.
Viestter <i>et al.</i> (2013)	Socio-demographic factor, BMI has an association with musculoskeletal symptom
Palmer <i>et al.</i> (2003)	Smoking increases pain and discomfort of a smoker at particular body parts
Musculoskeletal Australia (2018)	7-9 hours of sleep is adequate for an adult to promote and enhance muscle recovery
Finnish Occupational Health (2017)	MSD development symptoms increases with number of working years
Esfahani (2011)	Climbers reported to have injury that shows increment from year 2009 which is 24 to year 2012 which is 34
Hadi (2016)	Prevalence of MSD found among tea pluckers is 64.2%

CHAPTER 3

METHODOLOGY

3.1 Study Design

This study is a cross sectional study which is conducted on 50 licensed mountain porters working under Sabah Park. The study was done for approximately a month. Data was collected every day for 30 days. It started on from 18th January 2019 and ended on 18th February 2019.

3.2 Study Location

This study took place in Kinabalu Park located at Ranau, Sabah.



Figure 3.1. Kinabalu Park main entrance

3.3 Sampling Study Populations

The sampling method used for this study is purposive sampling. A total of 50 licensed mountain porters of Sabah Park were selected for this research as the targeted population. The list of 50 licensed mountain porters were obtained at the Kinabalu Park main office to be included in this research.

3.3.1 Inclusive Criteria

1. Respondents aged between 16-50 years old
2. Hiked actively for the past 12 months

3.3.2 Exclusive Criteria

1. Musculoskeletal disorder not caused by occupational factors but other external factor such as road accidents.

3.4 Sampling Size

From the main office of Kinabalu Park, there are only 50 licensed mountain porters registered under Sabah Park. Using the formula of finite population correction:

$$n' = \frac{N \times Z^2 \times P(1 - P)}{d^2 \times (N - 1) + Z^2 \times P(1 - P)}$$

$$n' = \frac{50 \times (1,96)^2 \times (0,642)(1 - 0.642)}{(0,05)^2 \times (50 - 1) + (1.96)^2 \times 0.642(1 - 0.642)} = 44$$

The sample size calculated is 44. However, to reduce the likelihood of refusal, all 50 mountain porters were taken as respondents.

3.5 Instruments and Data Collection

3.5.1 Questionnaires

A set of modified Nordic Musculoskeletal Questionnaires (NMQ), divided into five parts is distributed to the respondents before they start their job. Part A is Socio-demographic part such as age, gender, income, education level and Body Mass Index (BMI). Part B is Lifestyle part such as smoking habit and status, hobby and rest information. Part C is separated into five parts; Part C, Part C (i), Part C (ii), Part C (iii) and Part C (iv). Part C is on Occupational History such as previous job type, hours and duration, Current Job Information as well as Medical History. Part C (i) and Part C (ii) is the Occupational Information section consisting of Nordic Body Map of previous 12 months and seven days discomfort respectively. Part C (iii) and Part C (iv) is the Occupational Information consisting of Nordic Body Map of Before and After porters start their job respectively as well as hiking information which are date of last hike, track used and load mass. Questionnaires were distributed to the respondents at the main office of Kinabalu Park. Upon their registration at the office in the morning, respondents were required to answer questionnaires before starting their job. In the evening, respondents reported in to the main office and were asked to fill in the questionnaires after they finished the task.

3.5.2 OMRON BF508 Body Composition and Body Fat Monitor

This instrument is used to weigh respondents' body mass and calculate Body Mass Index (BMI). The instrument is placed on the flat surface to avoid errors. After gender and age data were entered in the monitor by researcher, respondent were required to stand straight on the sensors step and grip the sensors holder 90° to their body with their arms horizontally raised for a minute to get an accurate reading of their body mass and BMI reading. The instrument were first calibrated before data collection starts. This is to ensure the validity of the body mass and BMI reading.



Figure 3.2. OMRON BF508 Body Composition and Body Fat Monitor

Source: <https://www.omron-healthcare.com/en/products/weightmanagement>

3.5.3 SECA 213 Portable Stadiometer

This instrument is used to measure heights of respondent. It is leaned on the wall surface and the platform were placed on the flat floor to ensure stability of the instrument. Respondent were required to stand firm on their knees and back, then looked straight for an accurate reading. Readings were recorded by researcher.

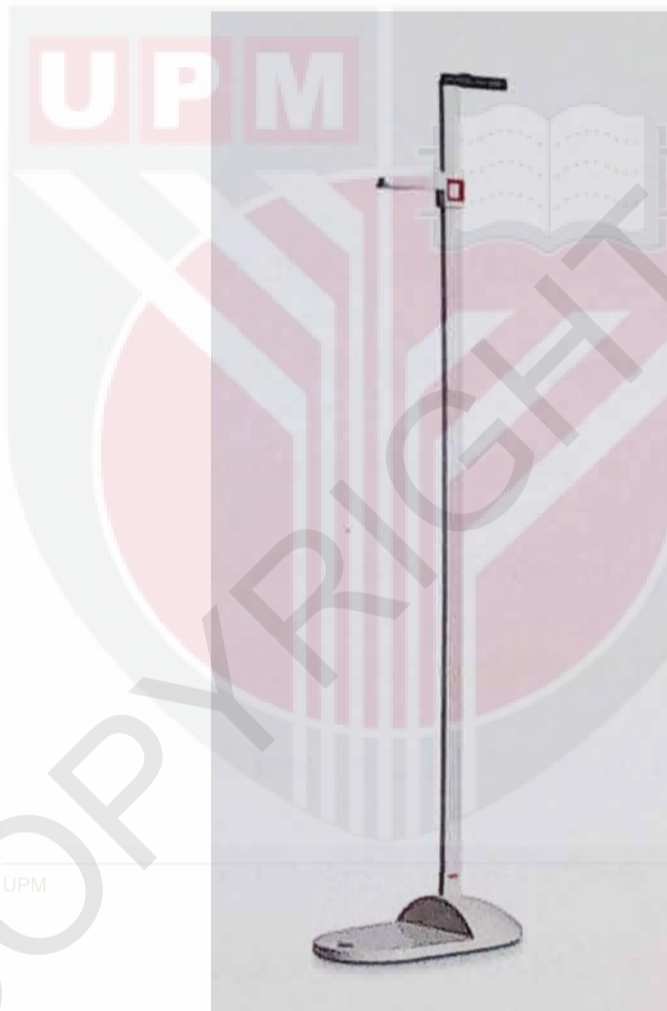


Figure 3.3. SECA 213 Portable Stadiometer

Source: [https://www.seca.com/en_ee/products/all-products/product-
details/seca213.html](https://www.seca.com/en_ee/products/all-products/product-details/seca213.html)

3.6 Quality Control

To ensure data collection was reliable and valid, quality control on the instrument and procedure during data collection were taken as following:

3.6.1 Pre Test of Questionnaire

A pre-test questionnaire was distributed randomly to ten mountain porters in Peninsular Malaysia. It is done to test the understandings of the porters regarding the questions given. Number of respondents for pre-test is 10% of the total targeted respondents which is 50 licensed mountain porters altogether. Cronbach's Alpha reliability test is done to check the internal consistency of the data. The results of Cronbach's Alpha reliability coefficient test, $\alpha=0.833$. A minimum standard of 0.8 indicated good internal consistency for each questionnaire (Santos, 1999). A set of questionnaire was also given to an ergonomics expert to be assessed by the panel, this is to test the validity of construct.

3.6.2 Standard Operating Procedure for Weight and Height Measurement

The weight of respondents were taken by using OMRON BF508 Body Composition and Body Fat Monitor while their height was measured using SECA 213 Portable Stadiometer. The measurements were repeated three times to get an accurate average reading.

3.7 Data Analysis

In this study, univariate and bivariate statistical analyses were carried out using SPSS version 21. Univariate analysis were used to determine the descriptive statistics including frequencies, means and standard deviation of socio-demographics, lifestyle information, occupational information and prevalence of musculoskeletal disorder. Bivariate analyses were used to test the hypothesis on the association between socio-demographic factors such as age, ethnicity, marital status, education level, household numbers, income and BMI, lifestyle; smoking status, hobby and rest break and occupational history; previous job type, hours and duration with MSD, Chi square test was used. In this study, coding was used to determine the result of MSD, i.e. 1=yes and 0=no for all categorical questions such as prevalence of lifetime MSD, having MSD at any part of body or not having any at all. Table 3.1 shows the summary of statistical analysis used for each objectives and corresponding hypothesis.

Table 3.1 Data analysis for this study

OBJECTIVES	HYPOTHESIS	DESCRIPTIVE ANALYSIS
To determine socio-demographic information, lifestyle and occupational history of mountain porter	-	Descriptive analysis
To determine the prevalence of mountain porter with Musculoskeletal Disorder	-	Descriptive analysis
To determine the association between socio-demographic, lifestyle and occupational history with MSD	There is a significant association between socio-demographic, lifestyle and occupational history with prevalence of MSD	Chi-square test

3.8 Ethical Consideration

The approval from the Ethic Committee of Faculty of Medicine and Health Sciences, University of Putra Malaysia was obtained before the study being conducted. (JKEUPM Ref No: JKEUPM-2018-369). A written consent was also obtained from all respondents and confidentiality was maintained throughout the study since this study involved human responds in terms of their feedback regarding questions asked. The purpose, objectives, rights, benefits and risks of this study was fully explained to the respondents.

CHAPTER 4

RESULTS

4.1 Socio Demographic Background

There were total of 44 out of 50 licensed mountain porters listed by Kinabalu Park main office, involved in the completion of questionnaires all of whom were Malaysian. Table 4.1 reveals the socio-demographic characteristics of porters where majority of them (95.5%) are male, have a normal BMI (79.5%) and 93.2% of porters are Kadazandusun. Their age ranging from 18-59 years old and most of them (79.6%) got an average of RM1000-RM2000 for their monthly income. Majorly, 68.2% of them are already married and a breadwinner of maximum five family members (68.2). On top of that, 36.4% of married porters have a last child aged above four years. In terms of education, 54.5% of them are secondary school leavers.

Table 4.1: Distribution of socio-demographic data among licensed mountain porters

Variables	Frequency (N)	Percentage (%)
Age		
Below 25	6	13.6
26-35	16	36.4
36-45	16	36.4
Above 45	6	13.6

Ethnicity		
Suluk	3	6.8
Kadazandusun	41	93.2
Gender		
Male	42	95.5
Female	2	4.5
Education		
None	2	4.5
Primary	12	27.3
Secondary	24	54.5
Tertiary	6	13.6
Monthly income		
Less than 1000	3	6.8
1000-2000	35	79.6
More than 2000	6	13.6
Marital status		
Single	14	31.8
Married	30	68.2
Family dependency		
None	6	13.6
1-5	30	68.2
More than 5	8	18.2
Age of last child		
No children	17	38.6
Less than 1 year (infant)	-	-
1-4 years (toddler)	11	25.0
More than 4 years	16	36.4
BMI		
Normal	35	79.5
Overweight	9	20.5

N=44

4.2 Lifestyle Information

Table 4.2 describes the lifestyle information of the porters. Most of them are former smokers (68.2%) and 61.4% out of all 44 porters are still smoking. Half of them invested more than four times a month for their hobby (95.5%) which is farming. Porters are mostly residing in areas where small farming is actively practiced among villagers. Other than that, 34.1% of them reported on having sleeping difficulty at night due to exhaustion and faced disturbance in delegating their task the next day (15.9%). Meanwhile, most of them (54.5%) have an average of four to five proper rest hours at night and had no difficulties of doing job during the day.

Table 4.2: Distribution of lifestyle information data among licensed mountain porters

Variables	Frequency (N)	Percentage (%)
Smoking history		
Yes	30	68.2
No	14	31.8
Smoking status		
Yes	27	61.4
No	17	38.6
Hobby		
Gardening	22	50.0
Sports	20	45.5
Others: Reading, Online Gaming	2	4.5
Hobby frequency (More than 4 times per month)		
Yes	42	95.5
No	2	4.5

Variables	Frequency (N)	Percentage (%)
Sleep problem		
Yes	15	34.1
No	29	65.9
Average sleeping hours		
Less than 4 hours	2	4.5
5-6 hours	24	54.5
7-8 hours	12	27.4
More than 8 hours	6	13.6
Disturbance in doing work caused by sleeping inadequacy		
Yes	7	15.9
No	8	18.2
No problem at all	29	65.9

N=44

4.3 Occupational Information

Table 4.3 describes that all of the porters involved in the research are working full time under Kinabalu Park. Almost half of them (45.5%) worked as a licensed mountain porter for more than six years. However, 88.6% have experienced working at other place beforehand. The previous job done by them before becoming a porter shows an average of eight to nine hours of working per day (56.8%). Most of them (47.7%) worked for three years maximum in their previous job.

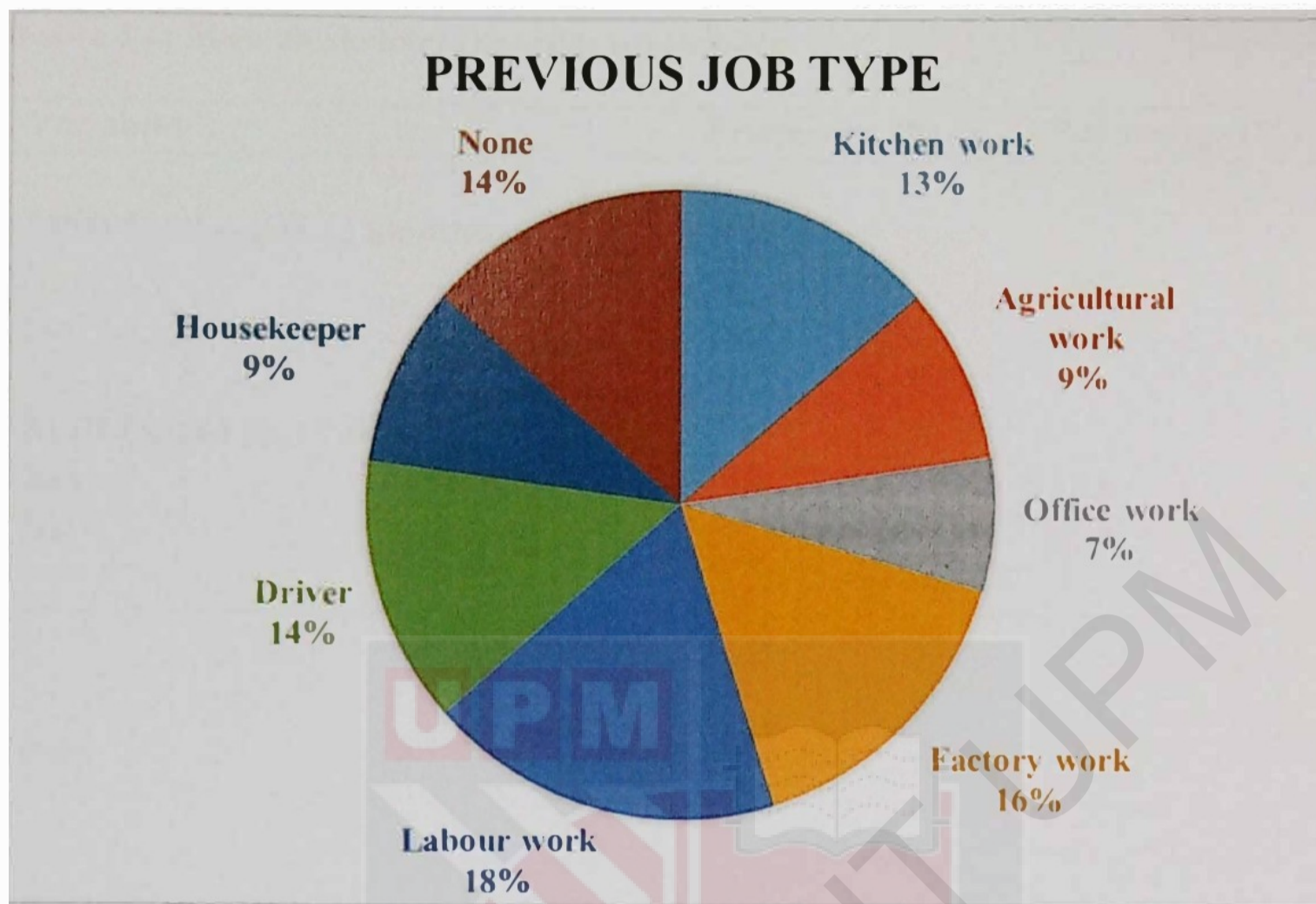
Table 4.3: Occupational and medical information data

Variables	Frequency (N)	Percentage (%)
Worked at other place previously		
Yes	39	88.6
No	5	11.4
Current work status		
Part time	-	
Full time	44	100
Duration as a licensed mountain porter		
Less than a year	2	4.5
1-3 years	14	31.8
4-6 years	8	18.2
More than 6 years	20	45.5
Accident history		
Yes	17	38.6
No	27	61.4
If Yes, type of medical treatment		
Treatment from hospital/clinic	15	34.1
Traditional massage	2	4.5

Variables	Frequency (N)	Percentage (%)
Previous job hours		
Less than 8 hours	6	13.6
8-9 hours	25	56.8
More than 9 hours	8	18.2
None	5	11.4
Previous job duration (years)		
Less than a year	-	
1-3 years	21	47.7
4-6 years	9	20.5
More than 6 years	9	20.5
None	5	11.4

N=44

Figure 4.1 shows the previous job type done by the respondents before they started off career as a mountain porter in Kinabalu Park. There are seven different field of work and 18% of them used to work as labours, followed by factory work (16%) such as operator and technician, 14% of them used to become tourist guide and driver while 13% of them experienced working as chef and waiters. Some of them (9%) do agricultural works such as rubber tapping and small farming. Besides, 9% of them previously worked as a housekeeper in hotels and lodgings. 14% of them reported on having no experience of working at other place before since they started off their career as a mountain guide and few others had just finish school.



N=44

Figure 4.1: The percentage of previous type of job done by licensed mountain porter

4.4 Prevalence of Musculoskeletal Disorder

Table 4.4 shows the prevalence of MSD among licensed mountain porters. For the past 12 months, 26 out of 44 mountain porters reported having MSD symptoms. Meanwhile, for the past 7 days, 17 out of 44 mountain porters experienced MSD symptoms. Thus, the prevalence of MSD among licensed mountain porter of Sabah Park for the past 12 months and 7 days is 59.1% and 38.6% respectively.

Table 4.4: Musculoskeletal Disorder prevalence

Variables	Frequency (N)	Percentage (%)
MSD for the past 12 months		
Yes	26	59.1
No	18	40.9
MSD for the past 7 days		
Yes	17	38.6
No	27	61.4

N=44

4.4.1 Distribution of Musculoskeletal Disorder according to body parts

Figure 4.2 and 4.3 displays the distribution of MSD according to body parts, for the past 12 months and 7 days respectively. Parts with prevalence of 50% and above is marked with red colour, yellow coloured parts has the prevalence below 50% and body parts with green colour reported no MSD at all.

For the past 12 months, body part that has the highest prevalence of MSD is knee, 61.5% for both right and left knee. Followed by feet and calves which shared the same prevalence, 53.8% for right and left side of the body parts.

As for the past 7 days, knee has the highest prevalence, 64.7%, equal for both right and left parts. Lower back as well as ankles scored 52.9% and 58.8% respectively. There is no difference in the prevalence for right and left ankle.

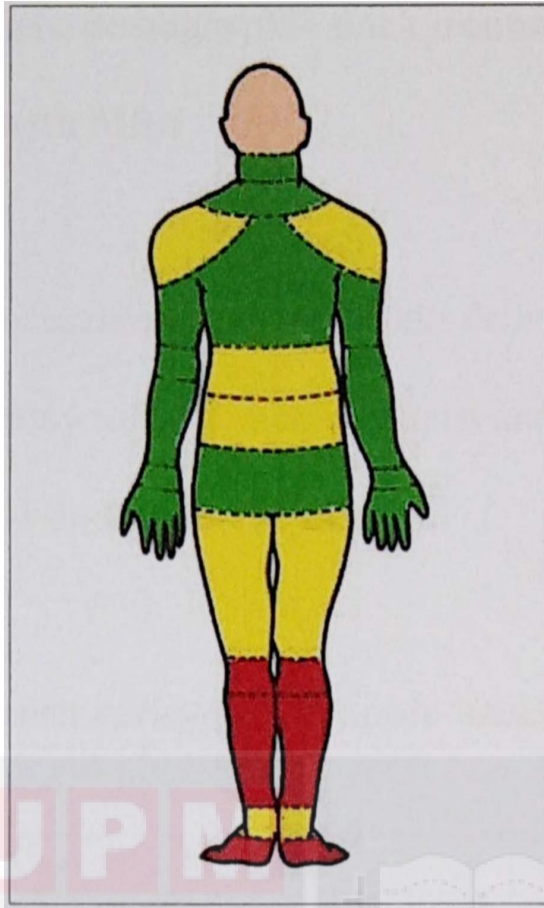


Figure 4.2 Distribution of MSD according to body parts for the past 12 months

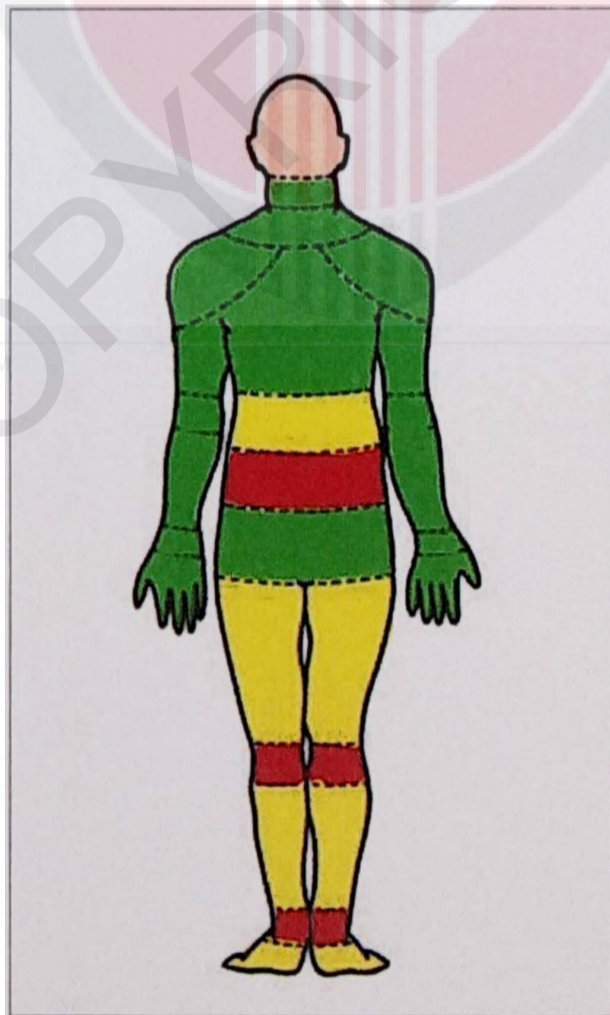


Figure 4.3: Distribution of MSD according to body parts for the past 7 days

4.5 Association between socio-demographic background, lifestyle information and occupational information with MSD

Table 4.5 shows the association between socio-demographic information such as age, gender, education, monthly income, marital status and family dependency, age of last child and BMI with MSD for the past 12 months.

Table 4.5 Association between socio-demographic backgrounds with MSD for the past 12 months

Variables	Yes	No	X²	p
Age				
Below 25	1	5	6.597	0.086
26-35	11	5		
36-45	9	7		
Above 45	5	1		
Gender				
Male	24	18	1.451	0.228
Female	2	-		
Education				
None	2	-	2.115	0.549
Primary	8	4		
Secondary	13	11		
Tertiary	3	3		
Monthly income				
Less than 1000	3	-	2.554	0.279
1000-2000	19	16		
More than 2000	4	2		
Marital status				
Single	6	8	2.239	0.135
Married	20	10		

Variables	Yes	No	X²	p
Family dependency				
None	4	2		
1-5 people	16	14	1.391	0.499
More than 5	6	2		
Age of last child				
No children	7	10		
Less than 1 year old (infant)	-	-	8.445	0.015
1-4 years old (toddler)	5	6		
More than 4 years old	14	2		
BMI				
Normal	17	18	7.833	0.005
Overweight	9	-		

Table 4.6 shows the association of lifestyle information such as smoking history and status, hobby type and frequency as well as rest-break information for the past 12 months.

Table 4.6 Association between lifestyle information with MSD for the past 12 months

Variables	Yes	No	X²	p
Smoking history				
Yes	21	9	4.642	0.049
No	5	9		
Smoking status				
Yes	19	8	3.678	0.550
No	7	10		
Hobby				
Gardening	15	5		
Sports	11	11	5.735	0.057
Others: Reading, Online Gaming	-	2		

Hobby frequency (More than 4 times per month)				
Yes	25	17	0.072	1.000
No	1	1		
Sleep problem				
Yes	5	10	6.246	0.023
No	21	8		
Average sleeping hours				
Less than 4 hours	2	-		
5-6 hours	13	11		
7-8 hours	10	2	9.010	0.029
More than 8 hours	1	5		
Disturbance in doing work caused by inadequate rest				
Yes	3	4		
No	2	6	6.739	0.034
No problem at all	21	8		

Table 4.7 shows the association between occupational information such as previous and current job type, hours and duration with MSD for the past 12 months.

Table 4.7 Association between occupational information with MSD for the past 12 months

Variables	Yes	No	X ²	p
Worked at other place previously				
Yes	23	16	0.002	1.000
No	3	2		
Duration as a licensed mountain porter				
Less than a year	2	-		
1-3 years	8	6	2.928	0.403
4-6 years	6	2		
More than 6 years	10	10		

Accident history				
Yes	10	8	0.157	0.761
No	16	10		
Previous job hours				
Less than 8 hours	3	3		
8-9 hours	15	10	0.254	0.968
More than 9 hours	5	3		
None	3	2		
Previous job duration (years)				
None	3	2		
1-3 years	12	9	2.133	0.545
4-6 years	7	2		
More than 6 years	4	5		
Previous job type				
Kitchen work	-	6		
Agricultural work	2	2		
Office work	2	1		
Factory work	6	1		
Labour work	4	4	13.221	0.067
Driver	5	1		
Housekeeper	3	1		
None	4	2		

Table 4.8 shows the association between socio-demographic information such as age, gender, education, monthly income, marital status and family dependency, age of last child and BMI with MSD for the past 7 days.

Table 4.8 Association between socio-demographic backgrounds with MSD for the past 7 days

Variables	Yes	No	X ²	<i>p</i>
Age				
Below 25	2	4		
26-35	6	10	0.415	0.937
36-45	6	10		
Above 45	3	3		

Gender				
Male	15	27	3.328	0.068
Female	2	-		
Education				
None	2	-		
Primary	4	8	6.215	0.102
Secondary	7	17		
Tertiary	4	2		
Monthly income				
Less than 1000	1	2		
1000-2000	14	21	0.134	0.935
More than 2000	2	4		
Marital status				
Single	4	10	0.877	0.349
Married	13	17		
Family dependency				
None	2	4		
1-5 people	12	18	0.099	0.952
More than 5	3	5		
Age of last child				
No children	4	13		
Less than 1 year (infant)	-	-	2.724	0.256
1-4 years (toddler)	5	6		
More than 4 years	8	8		
BMI				
Normal	11	24		
Overweight	6	3	3.570	0.050

Table 4.9 shows the association of lifestyle information such as smoking history and status, hobby type and frequency as well as rest-break information for the past 7 days.

Table 4.9 Association between lifestyle information with MSD for the past 7 days

Variables	Yes	No	X²	p
Smoking history				
Yes	4	10	0.877	0.349
No	13	17		
Smoking status				
Yes	4	13	2.667	0.102
No	13	14		
Hobby				
Gardening	9	11		
Sports	8	14	1.649	0.438
Others: Reading, Online Gaming	-	2		
Hobby frequency (More than 4 times per month)				
Yes	17	25	1.319	0.515
No	0	2		
Sleep problem				
Yes	3	12	3.334	0.104
No	14	15		
Average sleeping hours				
Less than 4 hours	2	-		
5-6 hours	9	15	4.458	0.216
7-8 hours	5	7		
More than 8 hours	1	5		
Disturbance in doing work caused by inadequate rest				
Yes	2	5		
No	1	7	3.741	0.154
No problem at all	14	15		

Table 4.10 shows the association between occupational information such as previous and current job type, hours and duration with MSD for the past 7 days.

Table 4.10 Association between occupational information with MSD for the past 7 days

Variables	Yes	No	X²	p
Worked at other place previously				
Yes	15	24	0.004	0.947
No	2	3		
Duration as a licensed mountain porter				
Less than a year	2	-		
1-3 years	2	12		
4-6 years	5	3		
More than 6 years	15	5	8.133	0.043
Accident history				
Yes	7	11	0.001	0.977
No	10	16		
Previous job hours				
Less than 8 hours	2	4		
8-9 hours	8	17		
More than 9 hours	5	3	2.461	0.482
None	2	3		
Previous job duration (years)				
None	2	3		
1-3 years	6	15		
4-6 years	6	3	3.991	0.262
More than 6 years	3	6		

Previous job type				
Kitchen work	-	6		
Agricultural work	2	2		
Office work	3	-		
Factory work	3	4	10.056	0.185
Labour work	2	6		
Driver	3	3		
Housekeeper	2	2		
None	2	4		

Table 4.11 shows a significant association between lifestyle factors; smoking history and rest-break such as sleeping difficulty, sleeping hours and rest hours inadequacy also revealed a significant difference with the occurrence of MSD. Duration of an individual working as a licensed mountain porter also proves an association with MSD prevalence. However, socio-demographic data shows no significant association at all.

Table 4.11 Significant association data of lifestyle and occupational information with prevalence of MSD for the past 12 months and 7 days

Variables	Yes	No	X²	p
Lifestyle				
Smoking history				
Yes	21	9	4.642	0.049
No	5	9		
Sleeping problem				
Yes	5	10	6.246	0.023
No	21	8		
Average sleeping hours				
Less than 4 hours	2	-		
5-6 hours	13	11	9.010	0.029
7-8 hours	10	2		
More than 8 hours	1	5		

Inadequate rest

Yes	3	4		
No	2	6	6.739	0.034
No problem at all	21	8		

Occupational**Duration as a licensed mountain porter**

Less than a year	2	-		
1-3 years	6	8		
4-6 years	5	3	8.133	0.043
More than 6 years	4	16		



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CHAPTER 5

DISCUSSION

5.1 Prevalence of Musculoskeletal Disorder

There were no previous studies on prevalence of MSD among mountain porters found. As such, a comparison was made to Hadi (2016); a similar nature of work to the mountain porter. The prevalence of tea pluckers with MSD for the past 12 months is 64.2%. There are few similarities in both mountain porters and tea pluckers' nature of job. Both job required them to carry load on their back where porters are made to transport needs such as food up to hotels and resthouses while tea pluckers carry tea leaves product down the hill. Other than that, they need to hike up to a different altitude zone since both jobs take place at hilly area with low temperature. Thus, it is suitable to refer and compare the prevalence of MSD among tea pluckers with the current results of mountain porters with MSD prevalence.

5.2 Association between socio-demographic, lifestyle and occupational information with prevalence of Musculoskeletal Disorder

Based on this study, socio-demographic information were not identified as significant factors of MSD. There were no actual reasons to determine for this observation. However, it seemed that MSD among mountain porters were not exclusively dependent on socio-demographic characteristics. According to a review study by Malchaire *et al.* (2001) shows that factors such as weight, height and age did not directly play role in the development of musculoskeletal symptom. This study was also unable to find the association between Body Mass Index and MSD although previously, it has been shown as a significant risk factor of MSD in a study done by Punnet and Wegman (2004). Thus, additional studies are needed to determine the indirect socio-demographic factors that influence MSD development among mountain porters.

The results from this study revealed that history of smoking has an association with MSD (p -value= 0.049). A study in Britain also proves that history of smoking is associated with regional pain. Palmer *et al.* (2003) states that a consistent association was found between smoking and musculoskeletal pain, apparent to all body parts considering neck, upper limb, lower limb and legs. Ex-smokers and current smokers have a higher risk of developing muscle pain than lifetime non-smokers with Prevalence Rate up to 1.6. Besides, a study done by Ahmad *et al.* (2018) also indicates negative effects from smoking to the musculoskeletal system where it increased risk fracture of bones with frequency of 132 out of 243, joint problems (54 of 243) and shows poor response to treatments as well as decrease musculoskeletal system function. According to a research done by Leonardo *et al* (2018), cigarette smoke directly damages muscles by reducing the number of blood vessels. Blood vessels are vital in supplying oxygen and nutrient to

the muscles. Inflamed and less number of blood vessels caused the muscle function to become weaker and limit a person's ability to do physical activity. Hence, smoking history may have an effect on MSD development among licensed mountain porters.

This study also shows that sleep problem has an association with MSD, given that $p=0.023$. A systematic review done by Andreucci *et al.* (2017) verifies that sleep problem is not a risk factor for MSD in children and adolescent. However, a prospective cohort study done by Harrison *et al.* (2014) shows an association between sleep problems during adolescence and musculoskeletal pain at the time given with prevalence of approximately 4% to 40% of musculoskeletal chronic pain, proving that the effect is long termed. In his study also found that problematic sleep was associated with greater pain severity in participants with both Chronic Regional Pain ($n=115$) where Odd Ratio is 2.78 (given 95% Confident Interval: 1.23 to 6.29) and Chronic Widespread Pain ($n=100$) with Odd Ratio of 2.46 (given 95% Confident Interval: 1.03 to 5.88). Those who are characterized as poor sleeper has a greater association with severity of MSD. Thus, sleep problem may have causes mountain porters to develop MSD symptoms.

Next, sleeping hours (5-6 hours) shows a significant association with MSD in this study (p -value= 0.029). In an online paper published by Musculoskeletal Australia (2018), the average of sleeping hours needed by an adult is between 7-9 hours. Quality sleep will help body to recharge mentally and physically alongside supporting muscle recovery. Dotillo *et al.* (2011) states that sleep enhances the synthesis of protein and promote the secretion of Human Growth hormone by pituitary gland. 40% of total sleep time is accounted for oxygen distribution to the muscles. During the time, body is most relaxed causing breathing become slower and deeper. Blood supply to the muscle increases at this state, delivering extra oxygen and nutrients to muscles, facilitating in its

healing and growth. Inadequate sleep hours will increase vulnerability of an individual to muscle pain caused by the sharp decline of Human Growth hormone secretion. Besides, a survey by Min *et al.* (2015) conducted for 3 months suggested that individuals with sleeping hours of 5 hours and less as well as 9 hours and above are significantly associated with musculoskeletal pain. These individuals experienced MSD symptoms for more than 30 days during the period. In addition, the respondents who slept less than 7 hours, and range hours of sleep are as per stated as above, has a higher association of multi-site MSD compared to those who slept more than 7 hours. Thus, inadequate sleep hours may have an effect on mountain porter MSD development.

The next factor associated with MSD is rest inadequacy (p -value=0.034), where respondents feel disturbed during day time while doing work due inadequate rest. Previous survey done by Wang *et al.* (2016) also shows Work Related Musculoskeletal Disorders (WMSDs) association with psychosocial factors such as enough rest time. Inadequate rest increase the probability of MSD development. Also, a study conducted in West Bengal, India by Sabarni Chakrabarty *et al.* (2016) resulted in inadequate rest during working day as one of the significant predictors of muscle discomfort among embroiderers ($n=400$), where Odd Ratio is 6.20 (given 95% Confident Interval: 3.12-12.33). However, as number of rest time increases with shorter rest hours, the severity of discomfort in muscle improves. Hence, it is determined that inadequate rest has a strong association with MSD prevalence.

The duration of years working as a licensed mountain porter also indicates a significant relationship with MSD (p -value=0.043) in this study. Using a different study population, Hua *et al.* (2015) states in their study that number working years are the influencing factors of MSD development among oil workers in Xinjiang, China where p -value=0.002. The incidence of MSD increases as number of working years and age increases. Also, previous research by Finnish Institute of Occupational Health (2017), claimed that MSD increases with age. This is due to degeneration of muscles. To relate with the results of this study, the longer the duration of a porter works, alongside the increment of their age, the higher the probability of getting MSD.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

In summary, there are few factors which were significantly contributing to musculoskeletal disorder for mountain porters. Lifestyle information shows a significant association with the occurrence of MSD. Porters who have a history of smoking have a higher risk to develop symptoms. Other contributors to MSD among licensed mountain porter are sleeping problems, inadequate sleep hours and rest inadequacy. Individuals who often experience inadequate or poor rest quality have a higher chance to develop MSD. Occupational information also shows significant relationship with MSD prevalence and is another causative factor to muscle discomfort among licensed mountain porters of Sabah Park, where duration of years an individual works as a porter affects MSD development. This cross-sectional study provides the baseline for elaborative studies in the future.

6.2 Study limitation

There were only 44 respondents out of all 50 who worked during the time. Data of the remaining 6 licensed mountain porters at Kinabalu Park especially those who are 20 years and below could not be collected. This is because some of the porters are still in school and do not fulfill the inclusive criteria of this study. Besides, during the data collection, it was a non-holiday season, thus the number of hikers are limited. This caused porters on duty per day become lesser due to lower demand from Panalaban hotel and rest house management. However, the number of respondents (n=44) still fulfilled the sampling size calculated previously.

6.3 Recommendation

Findings from this study would suggest Kinabalu Park to conduct a program promoting healthy lifestyle for porters, emphasizing on healthy diet and eating, smoking consequences to health and importance of enough sleep. Also, one day break interval is suggested for porters working schedule. Meaning to say, porters who work on a particular day, hiking up and carrying items up the mountain, have to take a break the next day by having an off day or do other light work rather than climbing up. This is to ensure they get enough mental and physical rest before the next task.

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Appendix 1

Respondent's Consent Form

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

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

Faktor-faktor yang Menyumbang Kepada Gejala Muskuloskeletal ke atas Porter Berlesen di Sabah Perh.

2. PENGENALAN

Kajian ini adalah mengenai faktor-faktor yang menyumbang kepada gejala muskuloskeletal yang dijalankan keatas porter yang bertugas untuk Sabah Park dalam kerja membawa bebanan.

3. APAKAH YANG PERLU ANDA LAKUKAN?

Anda perlu menjawab beberapa soalan yang berkaitan dengan diri dan pekerjaan anda yang akan dibantu oleh pengkaji. Selain itu, responden juga perlu melakukan kerja rutin seperti biasa bagi membolehkan pengkaji menjalankan kajian ini.

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?

Pekerja yang mempunyai masalah muskuloskeletal yang bukan berpunca dari faktor pekerjaan seperti kemalangan jalan raya.

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

KEPADA ANDA SEBAGAI PESERTA ?

Anda akan mendapat pengetahuan tentang faktor-faktor yang boleh menyumbang kepada kondisi kesihatan anda iaitu dari segi muskuloskeletal. Responden juga akan diberi cenderung sebagai tanda penghargaan.

KEPADA PENYELIDIK?

Penyelik akan dapat mengkaji dan berpengetahuan akan faktor yang menyumbang kepada penyakit muskuloskeletal kepada porter yang bertugas dalam membawa bebanan untuk Sabah Park.

6. ADAKAH IA BERISIKO?

Kajian ini tidak mendatangkan risiko kepada responden kerana tidak melibatkan pengambilan penentu kesihatan yang invasif kepada responden.

7. ADAKAH MAKLUMAT DAN IDENTITI SAYA KEKAL RAHSIA?

Identiti responden akan disimpan dan dijaga sebaiknya dan tidak akan diberikan kepada mana-mana pihak yang tidak sepatutnya.

Responden boleh menghubungi talian yang tertera:

Penyelidik:

'AIN FARISYA BINTI AHMAD FUJA'AD

011-23245206

ainfarisya96@yahoo.com

Penyelia:

NG YEE GUAN

019-2771103

shah86zam@upm.my

9. PERSETUJUAN

Saya..... No Kad Pengenalan.
beralamat.....
.....dengan ini bersetuju untuk mengambil bahagian secara sukarela dalam penyelidikan yang tersebut di atas *(kajian klinikal/percubaan ubat-ubatan/rakaman video/kumpulan sasaran/memuduga/ 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 imej/gambar/rakaman video/ rakaman suara digunakan dalam apa jua bentuk penerbitan atau pembentangan. (sekranya berkaitan).

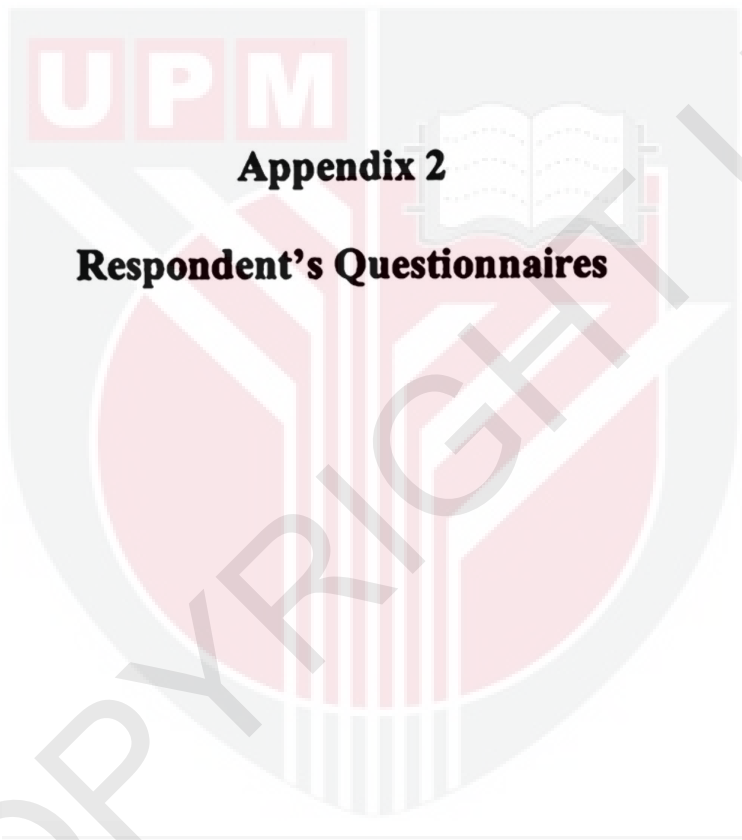
*potong yang tidak berkenaan

Tandatangan Tandatangan
(Responden) (Seks)

Tarikh : Nama :
No. KP:

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

Tarikh Tandatangan
(Penyelidik)



Appendix 2

Respondent's Questionnaires

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BAHAGIAN A: MAKLUMAT SOSIODEMOGRAFI

RESPONDEN ID

Umur : _____ tahun

Jantina : Lelaki Perempuan

Warganegara : Warganegara Bukan warganegara

Bangsa : Bajau Kadazandusun Suluk Lain-Lain: _____

Status : Bujang Berkahwin Bercera

FAKTOR-FAKTOR YANG MENYUMBANG KEPADA GEJALA MUSKULOSKELETAL KE ATAS PORTER DI SABAH PARK

2019

ADALAH DIMAKLUMKAN BAHAWA ANDA TELAH TERPILIH UNTUK MENYERTAI KAJIAN INI. SILA JAWAB SEMUA SOALAN DENGAN TEPAT DAN LENGKAP

TERIMA KASIH DI ATAS KERJASAMA ANDA

Gejala muskuloskeletal ialah sebarang kesakitan, kecederaan atau ketidakselesaan pada bahagian otot, ligamen, sendi, saraf dan tendon serta tulang belakang yang boleh menyebabkan pergerakan dan aktiviti harian individu terganggu.

Bilangan anak : _____ orang

Umur anak bongsu : _____ tahun

Pendidikan : Tidak bersekolah Sekolah Rendah (7-12 thn) Sekolah Menengah (13-17 thn) Universiti (>18 thn)

Pendapatan keluarga : RM _____

sebulan (RM)

Jumlah tanggungan : _____ orang

Jisim berat badan : _____ kg / _____ m² (minuk diisi Penyelidik)

BAHAGIAN B: MAKLUMAT GAYA HIDUP

a) Tabiat penggunaan nikotin

- Adakah anda pernah merokok? Ya Tidak
- Jika Ya, adakah anda masih merokok? Ya Tidak
- Jika jawapan anda Ya, berapakah anggaran bilangan puntung rokok yang dihisap dalam sehari?
 - 2 batang atau kurang 3-5 batang
 - 6-9 batang 10 batang atau lebih

b) Aktiviti masa lapang

- Apakah hobi anda pada masa lapang?
 - Berkebun Memburu
 - Memancing Lain-lain, sila nyatakan: _____
- Adakah anda melakukan hobi tersebut secara kerap? (Kerap ialah lebih 4 kali sebulan)
 - Ya Tidak

c) Maklumat istirehat

- Adakah anda mengalami masalah sukar untuk tidur?
 - Ya Tidak
- Berapakah purata jam anda tidur pada waktu malam?
 - 4 jam atau kurang 5-6 jam
 - 7-8 jam 8 jam atau lebih
- Jika jawapan anda 4 jam atau kurang, adakah anda mengalami kesukaran untuk melakukan aktiviti keesokan harinya?
 - Ya Tidak

BAHAGIAN C: MAKLUMAT PEKERJAAN

a) Maklumat pekerjaan terdahulu

- Pernakah anda bekerja di tempat lain sebelum ini? Ya Tidak
- Jika Ya, nyatakan seperti di bawah:

Jenis pekerjaan	Waktu bekerja (jam)	Tempoh bekerja (tahun)

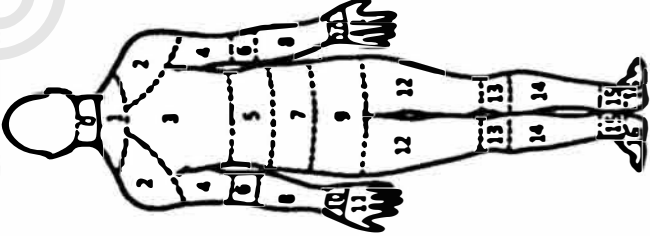
***pilih hanya 2 pekerjaan yang paling lama (jika ada)**

b) Maklumat pekerjaan sekarang

- Nyatakan status pekerjaan anda
 - Sepenuh masa Sepenuh masa
- Jika anda bekerja separuh masa, nyatakan pekerjaan anda selain Porter.
 - _____
- Berapa lamakah tempoh anda bekerja sebagai Porter di sini?
 - Kurang setahun 1-3 tahun 4-6 tahun Lebih 6 tahun
- Adakah anda pernah mengalami sebarang kecederaan atau kemalangan sepanjang hidup?
 - Ya Tidak
- Jika Ya, apakah tindakan yang diambil?
 - Mendapatkan rawatan daripada doktor
 - Berurut secara tradisional
 - Mengambil ubat-ubatan tradisional
 - Lain-lain, sila nyatakan: _____

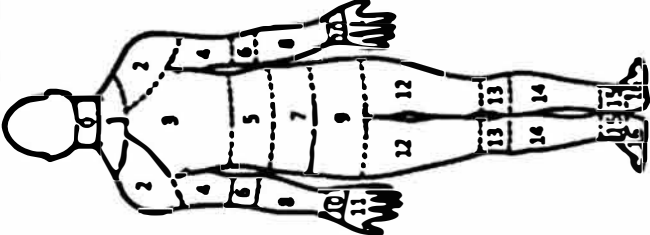
BAHAGIAN C (i): MAKLUMAT PEKERJAAN

Sila bulatkan bahagian tubuh badan yang menyebabkan anda berasa tidak selesa atau sakit dalam tempoh 12 bulan yang lepas pada gambar di bawah. Jawapan anda boleh melebihi satu bahagian tubuh badan.

Otot Skeletal	NBM	Otot Skeletal
0 Leher Atas		1 Leher Bawah
3 Belakang Atas		5 Pinggang
7 Belakang Bawah		9 Punggung
L2 Bahu Kiri		R2 Bahu Kanan
L4 Lengan Atas Kiri		R4 Lengan Atas Kanan
L6 Siku Kiri		R6 Siku Kanan
L8 Lengan Bawah Kiri		R8 Lengan Bawah Kanan
L10 Pergelangan Tangan Kiri		R10 Pergelangan Tangan Kanan
L11 Tangan Kiri		R11 Tangan Kanan
L12 Peha Kiri		R12 Peha Kanan
L13 Lutut Kiri		R13 Lutut Kanan
L14 Betis Kiri		R14 Betis Kanan
L15 Pergelangan Kaki Kiri		R15 Pergelangan Kaki Kanan
L16 Kaki Kiri		R16 Kaki Kanan

BAHAGIAN C(ii): MAKLUMAT PEKERJAAN

Sila bulatkan bahagian tubuh badan yang menyebabkan anda berasa tidak selesa atau sakit dalam tempoh 7 hari yang lepas pada gambar di bawah. Jawapan anda boleh melebihi satu bahagian tubuh badan.

Otot Skeletal	NBM	Otot Skeletal
0 Leher Atas		1 Leher Bawah
3 Belakang Atas		5 Pinggang
7 Belakang Bawah		9 Punggung
L2 Bahu Kiri		R2 Bahu Kanan
L4 Lengan Atas Kiri		R4 Lengan Atas Kanan
L6 Siku Kiri		R6 Siku Kanan
L8 Lengan Bawah Kiri		R8 Lengan Bawah Kanan
L10 Pergelangan Tangan Kiri		R10 Pergelangan Tangan Kanan
L11 Tangan Kiri		R11 Tangan Kanan
L12 Peha Kiri		R12 Peha Kanan
L13 Lutut Kiri		R13 Lutut Kanan
L14 Betis Kiri		R14 Betis Kanan
L15 Pergelangan Kaki Kiri		R15 Pergelangan Kaki Kanan
L16 Kaki Kiri		R16 Kaki Kanan

RESPONDEN ID

RESPONDEN ID

BAHAGIAN C(iii): MAKLUMAT PEKERJAAN

BAHAGIAN C(iv): MAKLUMAT PEKERJAAN

Perkara di bawah perlulah diisi **SEBELUM** pendakian bermula:Perkara di bawah perlulah diisi **SELEPAS** pendakian selesai:

1. Maklumat pendakian

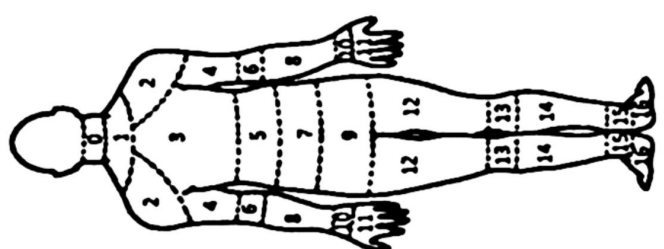
- a) Tarikh: _____
- b) Laluan perjalanan: Trek Mesilau Trek Timpothon
- c) Berat beban yang dibawa untuk diri sendiri: _____ kg
- d) Berat beban yang dibawa untuk *client*: _____ kg
- e) Tarikh pendakian terakhir: _____

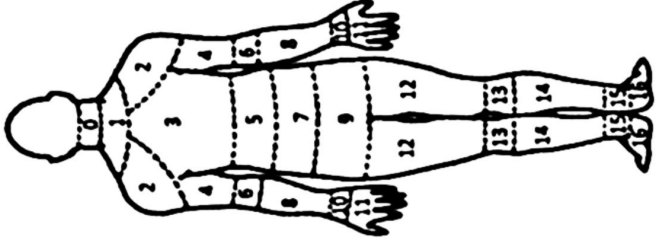
1. Maklumat pendakian

- a) Tarikh: _____
- b) Laluan perjalanan: Trek Mesilau Trek Timpothon
- c) Berat beban yang dibawa untuk diri sendiri: _____ kg
- d) Berat beban yang dibawa untuk *client*: _____ kg
- e) Tempoh mendaki: _____ jam

2. Sila bulatkan bahagian tubuh badan yang menyebabkan anda berasa tidak selesa atau sakit **SEBELUM** mendaki pada gambar di bawah. Jawapan anda boleh melebihi satu bahagian tubuh badan.

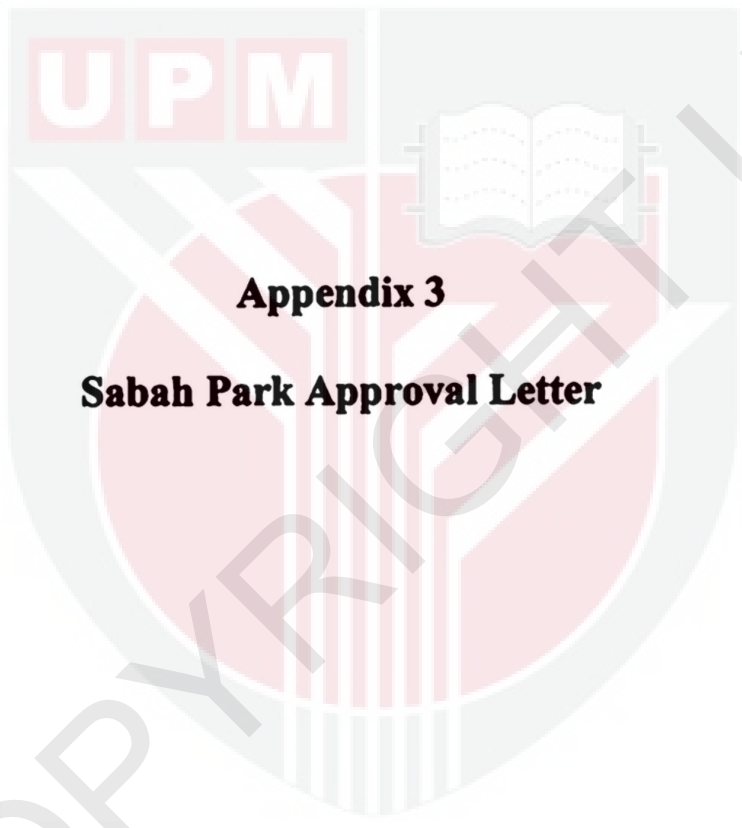
2. Sila bulatkan bahagian tubuh badan yang menyebabkan anda berasa tidak selesa atau sakit **SELEPAS** mendaki pada gambar di bawah. Jawapan anda boleh melebihi satu bahagian tubuh badan.

Otot Skeletal	NBM	Otot Skeletal
0 Leher Atas		1 Leher Bawah
3 Belakang Atas		5 Pinggang
7 Belakang Bawah		9 Punggung
L2 Bahu Kiri		R2 Bahu Kanan
L4 Lengan Atas Kiri		R4 Lengan Atas Kanan
L6 Siku Kiri		R6 Siku Kanan
L8 Lengan Bawah Kiri		R8 Lengan Bawah Kanan
L10 Pergelangan Tangan Kiri		R10 Pergelangan Tangan Kanan
L11 Tangan Kiri		R11 Tangan Kanan
L12 Peha Kiri		R12 Peha Kanan
L13 Lutut Kiri		R13 Lutut Kanan
L14 Betis Kiri		R14 Betis Kanan
L15 Pergelangan Kaki Kiri		R15 Pergelangan Kaki Kanan
L16 Kaki Kiri		R16 Kaki Kanan

Otot Skeletal	NBM	Otot Skeletal
0 Leher Atas		1 Leher Bawah
3 Belakang Atas		5 Pinggang
7 Belakang Bawah		9 Punggung
L2 Bahu Kiri		R2 Bahu Kanan
L4 Lengan Atas Kiri		R4 Lengan Atas Kanan
L6 Siku Kiri		R6 Siku Kanan
L8 Lengan Bawah Kiri		R8 Lengan Bawah Kanan
L10 Pergelangan Tangan Kiri		R10 Pergelangan Tangan Kanan
L11 Tangan Kiri		R11 Tangan Kanan
L12 Peha Kiri		R12 Peha Kanan
L13 Lutut Kiri		R13 Lutut Kanan
L14 Betis Kiri		R14 Betis Kanan
L15 Pergelangan Kaki Kiri		R15 Pergelangan Kaki Kanan
L16 Kaki Kiri		R16 Kaki Kanan

SEBELUM MENDAKI

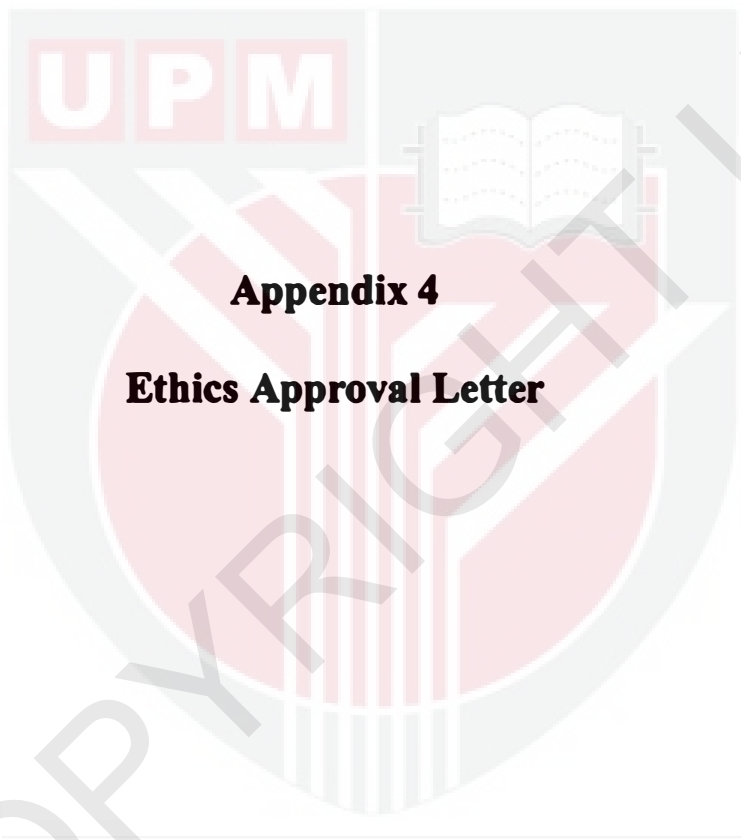
SELEPAS MENDAKI



Appendix 3

Sabah Park Approval Letter

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Appendix 4

Ethics Approval Letter

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