

# THE PREVALENCE RATE OF MUSCULOSKELETAL DISORDERS AMONG POLICE PERSONNEL IN WEST COAST, SABAH: A PRELIMINARY INVESTIGATION

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**Abstract:** *Musculoskeletal disorders (MSDs) are one of the most serious work-related ailments. Among all the occupations, policing identified as one of the most dangerous occupations and with the highest prevalence rate of musculoskeletal disorders (MSDs). This study examined the prevalence rate and the experience of MSD based on bodily region among police officers in west coast Sabah (n=165). The questionnaires used in this study consist of demographical factors and La Trobe Musculoskeletal Disorder Questionnaire. The data was collected and analysed with the use of SPSS version 22.0. The prevalence rate of MSDs among police officers was 34.81% with male officers (25.95%) having a higher prevalence rate than females (8.86%). Among the body parts, the neck and shoulder reported the highest frequency of prevalence of MSDs, while the middle to lower back reported the highest severity of pain.*

**Keywords:** *Musculoskeletal disorders (MSDs), Police, Sabah*

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## Introduction

In recent years, there has been an increase in the number of reports of occupational dangers to work-related (International Labour Organization (ILO), 2016). According to the ILO over 150,000 employees worldwide have been involved in work-related accidents. Furthermore, there were around 6300 deaths and 2.3 million cases due to industrial accidents and infections. Musculoskeletal illnesses are one of the most serious workplace ailments (Umer et al., 2018). Soreness and degradation of muscles, ligaments, tendons, joints, nerves, and blood vessels are examples of musculoskeletal illnesses (Punnett et al., 2004). When this disorder occurs at work, it is referred to as a work-related musculoskeletal disorder (MSD).

MSDs are frequently associated with other technical concerns in the workplace, such as absenteeism, loss of productivity, and others (CDC, 2020). Carpal tunnel syndrome, which is caused by pressure on the median nerve and causes numbness, tingling, and paralysis in the hand and arms, was one of the most serious MSD illnesses in the United States. This condition affects 1.9 million people in the United States, and more than 500,000 procedures are required each year.

Among all occupations, policing is identified as one of the most dangerous and has the highest incidence rates of musculoskeletal illnesses (MSDs). This is because a police officer's job is typically performed in unergonomic postures, such as long-term use of high-powered motorcycles (Diyana et al., 2019) that has resulted in lower back pain, dislocations, and even spine injury (Ramasamy et al., 2017). Police officers around the world face the same risk factors as a result of high workload density, such as violence, drugs, death, and an uncountable number of risky and stressful activities that require a high intensity of physical and psychological demands (McGill, 2015). Other characteristics like as gender, age, and BMI may also be related to the occurrence of MSDs among police personnel.

Based on the issues related to MSDs among police personnel, the present study aimed at investigating the prevalence rate and the experience of MSD based on bodily region among police personnel in Kota Kinabalu, Sabah. The outcome of the study could be used to inform relevant authorities concerning the impact of this occupational disease concerning the productivity and performance of the police force in Malaysia.

## Methodology

This is a quantitative study that employs a questionnaire survey. A collection of questionnaires was supplied to the respondents, who were asked to complete all of the questions based on the instructions provided. This study focused on police personnel from Sabah's west coast district. The sample was calculated using the Chen et al., (2003) approach. The sample used in this study was calculated by using the web-based sample size determination formula from <https://www.surveysystem.com/sscalc.htm>. The formulas used to calculate the sample size are:

$$\text{Sample size} = \frac{Z^2 p(1-q)}{\varepsilon^2}$$

Where:

Z= 95% confidence level

p=population proportion

$\varepsilon$ = margin error

**Table 1: Sample Size Calculation**

<b>Determine Sample size</b>	
Confidence Level	95%
Confidence Interval	5
Population	1984
Sample size required	322

From the web-based calculation, the sample size required is 322 respondents. A simple random sampling method was applied in this study for purposes of data collection. The simple sampling method defines as the selection of populations that are highly similar to participate in the research (Bhardwaj, 2019). This sampling method ensures that every individual from the population has an equal probability to be chosen to become a respondent.

### Research Instruments

There were 2 sections in the questionnaire which consisted of demography, risk factors, and the prevalence of musculoskeletal disorders (MSDs). Section A is the demography section which consisted of gender, age, height, and body mass. The height and body mass of the respondents was used to calculate the body mass index by using IBM SPSS Statistics version 22 with the formula  $BMI = \frac{weight (kg)}{height (m)^2}$

Section B tests the prevalence rate of musculoskeletal disorders with the use of the La Trobe Musculoskeletal Disorder Questionnaire (Macdonald et al., 2006). This scale is used to measure the prevalence of MSDs among the respondents. This scale consists of 2 parts, the frequency of musculoskeletal discomfort across five body parts: 1) neck and shoulder, 2) hand and fingers, 3) arms, 4) middle to lower back, and 5) hips, bottom, legs, and feet with the scale 0-4 (0=never to 4=almost always), and the severity of musculoskeletal discomfort with the scale 1 to 3 (1=mild to 3 severe). To find the prevalence of MSDs, by computing the score for each body region by multiplying frequency and severity and then adding the totals to come out with a total score out of a maximum of 60.

### Data Analysis

The relationship between the demography factor and the prevalence of musculoskeletal disorders was analyzed by Pearson correlation and t-test. The prevalence and percentages of MSDs based on bodily regions were analyzed using percentages. The data was recorded and analyzed by using IBM SPSS Statistics version 22.

### Results

A total of 322 sets of questionnaires were distributed to the respondents and 165 of the questionnaires were valid and used for the final analysis. The following shows the demographic (Gender, Age, Year of Service, and BMI) information of the respondents.

**Table 2: Summary of respondents' demographic**

<b>Detail</b>		<b>Frequency</b>	<b>Percentage (%)</b>
Gender	Male	132	80.6
	Female	32	19.4
Age Group	21-30	24	14.5
	31-40	91	55.2
	41-50	38	23
	51-60	12	7.3

Year of Service	<5 years	15	9.1
	5-10 years	40	24.2
	>10 years	110	66.7

Table 2 shows 80.6% were males while females were only 19.4%. This result shows that police officers on the West Coast, Sabah are dominated by males. Among the respondents, there were 55.2% of them aged between 31 to 40 years old and there were only 12 (7.3%) aged between 51 to 60 years. Most of these respondents (66.7%) served more than 10 years as police officers, while there were only 9.1% served less than 5 years.

### Respondents' Body Mass Index (BMI)

**Table 3: BMI of the respondents**

Detail	Frequency	Percentage (%)
BMI		
11-20	12	7.2
21-30	126	76.4
31-40	26	15.8
>41	1	0.6

From the results, 126 (76.4%) of the respondents are in normal condition while there were 7.2 % and 26% of them were underweighted and overweighted respectively. There was only 1 among 165 respondents who has a BMI >41 which is extremely obese.

### Analysis of Demographic Factors and Prevalence of MSDs

**Table 4: Relationship between Demographic factors and prevalence of MSDs**

	Gender	Age	BMI	Prevalence of MSDs
Gender	-			
Age	-0.24	-		
BMI	.072	.107	-	
Prevalence of MSDs	.014	-.153	.123	-

\*\* Correlation is significant at 0.01 level. Sig. (2-tailed)

Table 4 shows Pearson's correlation between demographic factors (Gender, Age, and BMI) with the prevalence of MSDs among the respondents. The results show that the demographic factors were not correlated with the prevalence of MSDs. BMI did not associate with the prevalence of MSDs ( $r=.123, p>0.05$ ); age ( $r= -.153, p> 0.05$ ) and gender ( $r=.014, p>0.05$ ).

## Analysis of Prevalence of Musculoskeletal Disorder

**Table 5: The prevalence of MSDs among gender**

Variable	Mean	df	t	p
	Male Female			
Prevalence of MSDs	22.42	156	-.177	.88
	22.94			

Table 5 shows the result of the independent t-test for the gender differences between the prevalence of MSDs. The results show that there is no significant gender difference in the prevalence of MSDs among male and female police officers ( $t = -.177, p > 0.05$ ). This study found that the mean for females in MSDs is 22.94 and for males is 22.42 suggesting that female police officers experienced a higher prevalence of MSDs than males; however, it is not statistically significant.

## Frequency of MSDs based on body Regions.

**Table 6: Frequency of MSDs**






Body Region	Frequency (%)
 Neck/ Shoulder	62.5
 Hands/ fingers	47.3
 Arms	50.3
 Middle to lower back	57.6
 Hips, bottom, leg & feet (Lower extremity)	54.5

Table 6 shows the frequency of MSDs based on the body regions. The results show the highest frequency of disorders reported by the respondents was neck/ shoulder (62.5%), followed by middle to lower back (57.6%), hips, bottom, legs, and feet (54.5%), arms (50.3%), and lastly hands/ fingers (47.3%).

## The Severity of MSDs Based on Body Regions

**Table 7: Severity of MSD**






Body Region	Mild (%)	Moderate (%)	Severe (%)
 Neck/ Shoulder	46.8	45.6	7.6
 Hands/ fingers	58.9	36.1	5.1
 Arms	57.6	38.6	3.8
 Middle to lower back	45.6	44.3	10.1
 Hips, bottom, leg & feet (Lower extremity)	51.3	41.1	7.6

Table 7 shows the severity of MSDs based on the body regions among the respondents. The most severe part reported among the respondents was the middle to lower back (10.1%). Most of the respondents reported that they were experiencing a mild level of discomfort in their hands/ fingers. 45.6% of respondents reported that they were experiencing moderate levels of discomfort at their neck/ shoulder.

### Discussion

This study investigated the prevalence of musculoskeletal disorders among police officers of different gender in West Coast Sabah as well as the frequency and severity of musculoskeletal pain from different body parts. The rate of prevalence of MSDs among both male and female officers was 34.81%. However, most of the previous studies (Diyana et al., 2019; Nazmul, 2013; Cho et al., 2014) found that more than 50% of the police population suffers from musculoskeletal disorders (MSDs). For example, Diyana et al., (2019) stated that 67.9% of traffic police riders in Kuala Lumpur, Malaysia experienced MSDs, and Cho et al., (2014) show that 76.8% of the Korean police officers reported MSDs.

The highest frequency of MSDs based on the bodily region in this study was neck/ shoulder (62.5%) also in line with Diyana et al., (2019) and Cho et al., (2014). Andrew (2010) stated the pain in the neck and shoulder of the police officer is usually caused by an awkward position like overtime extending reaching posture which leads to shoulder injuries like thoracic outlet syndrome.

The second-highest frequency of body parts that suffered from MSD was the middle to lower back (57.6%) that consistent with Larsen (2018) that reported 33.7% and 43.2% of Canadian

police officers are reporting upper back pain and lower pain respectively. The causes of this pain are long periods of wearing mandatory equipment. Larsen (2018) also stated that the Canadian officer experienced two times musculoskeletal pain from the long hour of wearing a duty belt than wearing body armor. The present study and Larsen (2018) were reported to be contrasted with the study of Brown et al (1998) that found a low percentage of police officers experienced lower back pain. Moreover, studies from different countries like the United Kingdom, Korea, and Iran also supported the present study in which the studies reported that there was a high prevalence rate of lower back pain among police officers (Cho et al.,2014; Gyi et al., 1998; Jahani et al., 2002). The reasons police officers experience lower back pain due to excessive workload, long-hour sitting in vehicles wearing equipment like the ballistic vest, and lethal and non-lethal weapons.

This is one of the few studies that investigated the prevalence rate of MSDs among police personnel in Sabah. However, the study has some drawbacks. Firstly, the sample selecting technique in this study was simple random sampling as it might be biased when the sample set is not big enough to equally represent the full population. Moreover, this study was conducted between the post-movement order and pre-general election period, therefore the respondents (police officers) are occupied with their missions and task. Next, there was a lack of past research studying the severity of MSDs based on the body part of police officers.

### Conclusions

This research was one of the few to study the prevalence of musculoskeletal disorders among police officers on the West Coast, Sabah. From the study, it was found that the prevalence of MSDs among male police officers is higher than that of female officers. The neck and shoulders are reported to have the highest frequency of musculoskeletal disorders as reported by police personnel in West Coast, Sabah. Whilst, the middle to lower back was reported to have the highest severity of discomfort and pain among police personnel in this present study. Future studies should be conducted in other parts of Sabah in determining not only the prevalence rate of MSDs but also the bodily regions/parts that are affected by MSDs. In addition, it is also recommended that relevant authorities should be informed regarding the impact of MSDs on police personnel and other uniformed types of occupations such as military, firemen, and others.

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