SYSTEMATIC REVIEW

From Duty to Discomfort: A Systematic Review Unveiling the Current Landscape of Musculoskeletal Disorders (MSDs) Among Police Officers

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ABSTRACT

Introduction: There are many occupational diseases and injuries including MSDs cases reported year by year globally. The cases are alarming, especially for police officers' population which is exposed to many hazards. Furthermore, there are no ergonomics guidelines specially tailored for police officers. This review is meant to provide insight into the current trends of MSDs among police officers globally from the year 2018 to 2023. **Materials and methods:** Research paper was reviewed using PRISMA methods which is a guideline that useful to report systematic review transparently and comprehensively. Online databases such as Scopus and Google Scholar were used to choose articles relevant to this study. **Results:** The review found that risk factors associated with prevalence of MSDs are age, gender, BMI, duration of working, years of experiences, wearing mandatory equipment, prolonged sitting and standing, awkward posture and vibration. Meanwhile, the body part with the highest prevalence of MSDs is lower back, followed by lower extremities and neck and upper back. Overall police officers are exposed to many risks and hazards that lead to prevalence of MSDs. **Conclusion:** High prevalence of MSDs among police officers, highlighting risk factors such as age, gender, BMI, work duration, years of experience, mandatory equipment, and ergonomics issues. The lower back was identified as the most affected area. However, further investigation into different police tasks is needed to better understand these risk factors and implement proactive measures to reduce MSDs.
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INTRODUCTION

Estimated there are around 2.78 million workers lose their lives from work-related diseases and occupational accidents beside 374 million more workers suffer non-fatal occupational accidents (1). According to US Bureau of Labour Statistics (2023) the in Workplace and Illness Report 2021-2022 stated that there are 976,090 cases of musculoskeletal disorders (MSD) resulting in Days Away from Work (DAFW) were reported (2).

Great Britain reported that there were 473,000 workers affected by MSDs in 2022/2023 (3). In Singapore, the rate of occupational diseases is increasing from 2021 (659 cases) to 2022 (1,052 cases) with MSDs as the top two contributors after noise-induced deafness (4). According to statistics from the Institute of Labour Market Information and Analysis (2021), the trend of occupational diseases in Malaysia increased from 4,754 cases in 2020 to 5,289 in 2021. Among these, occupational musculoskeletal disorders were one of the top three contributors, alongside occupational noise-related hearing disorders and disease caused by biological agent (5).

Musculoskeletal disorders (MSDs) are characterized by abnormalities in the muscles, bones, joints, and surrounding connective tissues, leading to temporary or permanent restraint in one's ability to function and participate in activities (6). It typically takes years to develop and is influenced by a variety of factors, including individual, organizational, psychological, physical, and biomechanical aspects (7).

Occupational diseases, particularly MSDs significantly

impacts all sectors. Police officers are remarkably affected due to their nature of work which exposed them to many hazards. These include physical hazards such as temperature, noise and vibration (8), chemical hazards from vehicles emission, ergonomics hazards that lead to MSDs (9) and also psychosocial hazards and violence threat (10).

Globally, many countries developed special standards and guideline for ergonomics to be used as references to identify workplace ergonomics risk and reduce the factors that can lead to health problems including MSDs. Countries like United Stated of America, United Kingdom, Canada, Mexico, South Africa, Singapore and Malaysia are the countries that already developed their own ergonomics guideline (11 – 17).

Additionally, there is also guideline developed by International Organization for Standardization (ISO) and International Ergonomics Association (IEA) that can be used to assess and control the ergonomics problem at the workplace (18, 19). However, none of these ergonomics guidelines are specifically tailored for work task such as police officers.

Therefore, this paper aims to discover and acknowledge the prevalence of MSDs among police officers and the significant risk factors that increase the prevalence of MSDs. This review will be focused on the current articles that being published from 2018-2023 to understand more about the current trends of MSDs among police officers and the risk factors that associated with it.

MATERIALS AND METHODS

The review and writing process for this article was carried out following the guidelines of the Preferred Reporting Items for Systematic Review and Meta-Analyzes (PRISMA). Studies and article were identified using Google Scholar and Scopus databases on articles that were published on 2018 to 2023. The following search terms were used: (cops OR police OR police officer) AND musculoskeletal disorders AND prevalence.

From the searched databases, 556 articles were identified. From these, 156 articles were removed due to the duplication and 20 were removed because they are review articles. The remaining 380 were screened to ensure the eligibility of the articles. One hundred and ninety articles were removed after first screening due to the population of the studies were not specific to police officer. Some of the articles are conducted among the fire fighters, law enforcers, food riders and others that have different job scope than police officers. A total of 173 articles were removed during the final screening due to the content of the articles does not measure the prevalence of musculoskeletal disorders. Instead, the articles discuss about the intervention, other risk factors such as stress and posture analysis. The flow of the

screening was shown in Figure 1.
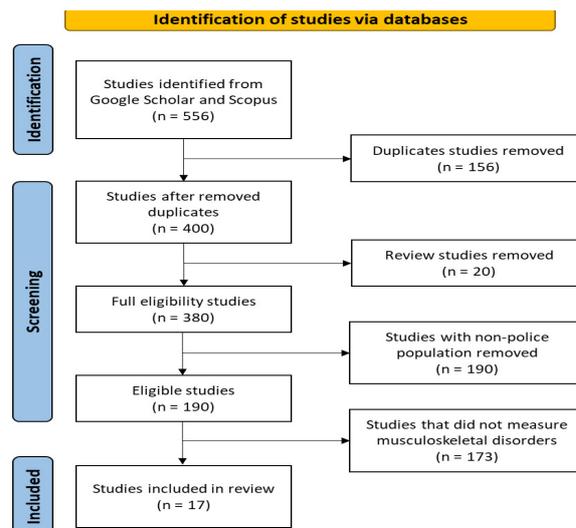
Figure 1: Methodology for paper review. A methodology that being used to review all articles that were found from database such as Google Scholar and Scopus using specific keywords.

Ethics Declaration
This study was reviewed and approved by the UTM Research Ethics Committee (UTM REC), with the approval number: UTMREC-2023-24. All participants provided informed consent to participate in the study.

RESULTS

A total of 17 studies that were eligible were successfully extracted for this review. The studies were conducted in 8 different countries varied from Pakistan (20 – 23), Brazil (24 – 26), Malaysia (27 – 30), Nigeria (31, 32), India (33), Bangladesh (34), Sweden (35) and Canada (36).

Sample sizes varied from 28 to 4,114 respondents. The studies included a variety of police types, including traffic police, which included samples from 82 to 384 respondents (20 – 23, 32, 34); car patrol police, which included 2208 respondents (36); operation or military police, which included samples from 97 to 142 respondents (25, 26, 29); motorbike ride police, which included 28 to137 respondents (24, 27, 28); and mixed departments of police officers, which included samples from 40 to 4114 respondents (29 – 31, 33).

Common Instrumentation Used

There are 3 different questionnaires that commonly used for musculoskeletal studies in this review.

Nordic Musculoskeletal Questionnaire (NMQ)
Nordic Musculoskeletal Questionnaire (NMQ) is the questionnaire that been used by majority of the studies about 65% of the study (21, 23, 27, 31 – 34, 36). NMQ was originally a project that been supported by Nordic Council of Minister (37). This questionnaire has two

purposes which are as an instrument for screening musculoskeletal disorders that related to ergonomics, and used for health care services occupation.

This questionnaire asked respondents if they have musculoskeletal symptoms at nine different body parts. These body parts were determined as the common body parts with musculoskeletal symptoms. The body parts are neck, shoulder, upper back, elbows, low back, wrist/hands, hips/thighs, knees and ankles/feet.

There are two sections for this questionnaire which are general and specific questions. For general questions, respondents will be asked about the present of any discomforts for all 9 body parts for the past 12 months and 7 days. Meanwhile for specific questions are additional questions for respondents if they have any discomfort from any of the body parts such as if the discomforts interfere their activity and if the respondents ever seek treatment or take medications for the discomfort.

This questionnaire aiming for screening the musculoskeletal disorders and have no mean to be the clinical diagnosis. The results from this questionnaire can be used to improve the work station and work environment to reduce the musculoskeletal symptoms that related to ergonomics work settings.

Visual Analogue Scale (VAS)

Visual Analogue Scale (VAS) is a questionnaire that usually used along with self-structured questionnaire or other discomforts questionnaire to describe the pain that experience by respondents in a visual form (20, 28, 34). Respondents will mark their pain rating in a line that span from "no pain" to "pain as bad as it could be" (38). The VAS is consisted of 100 uniform consecutive measurement that later will have cut point to categories the level of pain experienced by respondents.

The cut-point for chronic musculoskeletal pain was suggested by Boonstra et al. (2014) to define the level of pain severity (39). Out of 10cm or 100mm of line in VAS, rating ≤3.4cm considered as mild pain, rating 3.5cm to 7.4cm as moderate pain and rating ≥7.5cm as severe pain. This instrument was used by 25% of the studies in this review.

Oswestry Disability Index (ODI)

Oswestry Disability Index (ODI) is used to identify disability that related to low back pain and the pain affect daily activities (25, 34). It has 10 questions including pain intensity, personal care, lifting, walking, sitting, standing, sleeping, social life, travelling and employment/home making with 6 different choices of answers (40). Each answer has point that range from 0 to 5. The points will then be added to identify the disability level.

The scoring has five different categories which are 0-4 with no disability, 5-14 with mild disability, 15-24 with moderate disability, 25 – 34 with severe disability and 35-50 with completely disabled (41). This instrument is a reliable tool to identify low back patient functional abilities and to evaluate the effectiveness of certain intervention.

Musculoskeletal Disorders (MSDs)

Prevalence of MSDs

Majority of the studies mention the prevalence of MSDs despite having different type of instrumentation used. The lowest prevalence of MSDs was recorded in study by Prasoon & Subramanian (2023) with 39.02% from 246 traffic police officers reported low back pain using NMQ (34). The studies also used VAS that resulting 53.1% of the population reported moderate pain level and moderate level for disability using ODI.

The highest prevalence of MSDs was reported in study by (32) among 177 traffic control police with 95.5% using NMQ. Study by Athirah et. al. (2020) that used VAS reported that police officer that ride high-powered motorcycle have moderate pain level (28). Studies that reported the prevalence of MSDs were mention in the Table I.

Table I: Review on the prevalence of Musculoskeletal Disorders among police officers from 2018 to 2023. (CONT.)

Author (Year)	Country	Sample Size (Population)	MSDs Instrumentation	Findings	Risk Factors	Study Highlight
Braga et al. (2018)	Brazil	28 police Ostensive Motorcycle Patrol Group of Military Police of Pernambuco	• Nordic Musculoskeletal Questionnaire • Visual Analogue Scale	Top three body parts with discomfort are lower back (50.0%), knees (43.0%) and upper back (36.0%).	Sitting for extended period, carrying equipment and physical demands related to occupation.	Multidisciplinary intervention needed to reduce the stress level and encourage physical activities beside reducing prevalence of MSDs.
Fiaz et al. (2018)	Pakistan	204 police Traffic Police Warden of Lahore	Nordic Musculoskeletal Questionnaire	Prevalence of MSDs is 65.7%. Top three body parts with MSDs are leg (38.8%), lower back (38.1%) and shoulder (33.6%).	Common risk factors for MSDs are heavy lifting, awkward posture and excessive repetition.	High prevalence of MSDs can be lowered by implementation of health education programme that emphasizes exercise, posture correction, and safe lifting procedures.

Table I: Review on the prevalence of Musculoskeletal Disorders among police officers from 2018 to 2023. (CONT.)

Author (Year)	Country	Sample Size (Population)	MSDs Instrumentation	Findings	Risk Factors	Study Highlight
Douma et al. (2018)	Canada	2208 Car-patrol officer	Nordic Musculo-skeletal Question-naire	Prevalence of low back pain (LBP) is 54.5%. From those, 38.5% have acute or subacute LBP and 16.0% have chronic LBP.	The prevalence of LBP is increased by seniority and sitting in a police car; however, the prevalence is decreased by regular posttraumatic psychologic intervention.	A better intervention especially for car patrol police comfort and special attention for police with greater seniority.
Ahmad et al. (2018)	Pakistan	384 Traffic police	• Visual Analogue Scale • Self-structures questionnaire	Prevalence of upper extremity discomforts is 68.5%.	Working hours more than 11 hours increased the prevalence of upper extremity discomforts.	Ergonomics improvement at workplace and reduce working hours may reduce the prevalence of upper extremity discomforts.
Cardoso et al. (2018)	Brazil	97 8th Military Police Battalion	• Modified Oswestry Disability Index • Pain and intensity rating scale	Prevalence of MSDs before work shift is 58.8%, after work shift is 89.7% and interference of low back pain to daily activities is 82.5%	Age, postural disorders and level of pain after work shift.	Inclusion of physical exercise to reduce the age-related factors on musculoskeletal health on employee.
Rufai et al. (2019)	Nigeria	253 Police officers from different department	Nordic Musculo-skeletal Question-naire	Prevalence of MSDs id 81.0%. Top three body parts with MSDs are lower back (74.1%), shoulder (49.7%) and neck (48.3%).	Age, duration of working hours per day and years of experience.	Ergonomics education, improving working condition and adapting good ergonomics practice are expected to reduce the prevalence.
Bilal et al. (2019)	Pakistan	82 police traffic Rawalpindi and Islamabad	Self-administered questionnaire	Prevalence of MSDs is 50.0%	Long duration of working	Intervention to highlight the risk factors that related to environment to reduce the health risks.
Athirah Diyana et al. (2019)	Malaysia	137 Male police riding High-powered motorcycle	Nordic Musculo-skeletal Question-naire	Prevalence of MSDs is 67.9%. Top three body parts with MSDs are neck (35.8%), shoulder (35.8%) and lower back (34.3%)	Duration of riding, years of experience and hands-arm vibration.	Develop a better helmet's design and provide lumbar support or vest for the riders.
Serra et al. (2020)	Brazil	142 male Brazilian Military Police	Nordic Musculo-skeletal Question-naire	Top three body parts with MSDs are lower back (47.0%), dorsal region (33.0%) and hip/thighs/knees (32.0%).	Stress and physical activity.	Interventions that can encourage physical activity and reduce the stress level are important to lower the prevalence.
Nur Athirah et al. (2020)	Malaysia	137 Male police riding High-powered motorcycle	• Discomfort scale • Visual Analogue Scale (VAS)	Top three body parts with highest mean of discomfort are lower back, upper back and right hand.	Duration of riding motorcycle, riding experience and lack of back support.	Improving the design of the motorcycle's seat will improve the comforts, performance and productivity.
Sheikh Muhammad Aiman & Siti Nor Ismalina (2022)	Malaysia	101 8th Battalion of General Operations Force	Nordic Musculo-skeletal Question-naire	Prevalence of MSDs at lower back is 18.8%.	Strong correlation with age, gender, education level, marital status, ranks, duration of working per week and duration of break.	Police should be educated about low back pain and the risk factors of it to decrease the prevalence.
Musa & Musa (2022)	Nigeria	177 Traffic Control Personnel	Nordic Musculo-skeletal Question-naire	Prevalence of MSDs is 95.5% All respondents (100%) have MSDs at ankles/feet and wrist/hand	Awkward posture, prolonged sitting and standing, gender, BMI, smoking habit, alcohol intake, duration of working and years of experience.	Health examination, ergonomics improvement and encourage physical exercise are predicted to reduce the prevalence of MSDs.

Table I: Review on the prevalence of Musculoskeletal Disorders among police officers from 2018 to 2023. (CONT.)

Author (Year)	Country	Sample Size (Population)	MSDs Instrumentation	Findings	Risk Factors	Study Highlight
Naz et al. (2022)	Pakistan	320 traffic policemen Rawalpindi and Islamabad	Nordic Musculoskeletal Questionnaire	Prevalence of MSDs is 70.0%. Top three body parts with MSDs are lower back (43.0%), neck (31.0%) and upper back (26.0%).	Prolonged standing, wearing heavy equipment, abnormal posture and duration of working hours.	Modifications and ergonomics interventions especially in physical exercise to reduce the prevalence of MSDs.
Prasoon and Subramaniam et. al. (2023)	Bangladesh	246 traffic police personnel	• Nordic Musculoskeletal Questionnaire • Modified Oswestry Disability Index (ODI) • Visual Analogue Scale (VAS)	Prevalence of MSDs at lower back is 39.20%	Awkward posture, prolonged standing and duration of riding motorcycle.	Acknowledge the risk factors and increase the awareness of proper posture and ergonomics education.
Tiong et. al. (2023)	Malaysia	165 police	La Trobe Musculoskeletal Disorders Questionnaire	Top three body parts with MSDs are neck/shoulder (62.5%), middle to lower back (57.6%) and lower extremity (54.5%)	Gender	Impact and risk factors of MSDs should be informed to the relevant authorities.
Kamble et.al. (2023)	India	40 police force	Nordic Musculoskeletal Questionnaire	Prevalence of MSDs is 87.5%. Top three body parts with MSDs are upper back (45.0%), lower back (45.0%) and knees (45.0%)	Years of experience and duration of working.	Increase ergonomics education, improve working environment and create physical exercise program to reduce prevalence of MSDs.

Body Parts with MSDs

Thirteen out of 17 studies (76%) reported prevalence of MSDs at lower back region in top three body parts. The prevalence is not limited to a single task type; rather, it is present in a variety of tasks. The highest prevalence reported in study by Cardoso et al. (2018) with 82.5% from 97 military police present with MSDs at lower back (25). It is however quite low in Sheikh Muhammad Aiman & Siti Nor Ismalina (2022) which have only 18.8% from 101 general operation force reported MSDs at lower back (29). The significant prevalence can also be seen in car patrol police population (36) and motorcycle police patrol (35) with prevalence 54.5% and 50.0% respectively.

The second body part with the highest documented prevalence of MSDs among the top three body parts is the lower extremities, which comprises the ankles, feet, legs, and knees (41% of studies in the review). High prevalence of MSDs at this part is usually associated with traffic police officer which have task to control the traffic especially during peak hours. It can be seen in study by Musa & Musa (2022) which have all of the respondents (177 traffic police) with MSDs at lower extremity specifically at ankles feet (32).

Musa & Musa (2022) also reported that all of their respondents have prevalence of MSDs at hands (32). Hands which one of the upper extremity parts along with shoulder, elbows and wrist are the third body parts that many studies reported as top three body parts with

MSDs. This body parts are also specifically related to certain task especially in traffic police task. It can be supported by Waqas Fiaz et al. (2018) which have traffic police population with 33.6% of them have MSDs at shoulder (21).

Another significant top three body parts with MSDs that identify in the review are neck and upper back. While prevalence of lower extremity and upper extremity can be seen accumulate around traffic police, prevalence of neck and upper back can be seen among police officer with general task. These can be seen in study by Kamble et al. (2023) and Tiong et al. (2023) which study in general police population and have prevalence of MSDs at upper back (45%) and neck (62.5%) respectively (30, 33).

Risk Factors of MSDs

Sociodemographic and lifestyle factors

There are five out of 17 studies (29%) in this review address that sociodemographic have a association as the risk factors for MSDs in police population. Several studies mention this in their studies which age does influence the prevalence of MSDs among police officer (25, 29, 31). Gender is also important factors in prevalence of MSDs as proved by three studies (29, 30, 32).

Others sociodemographic factors such as body mass index (BMI), educational level, marital status, smoking habit and alcohol intake have only small portion in

influencing prevalence of MSDs. They are only be mentioned in two study which in Malaysia and Nigeria (29, 32).

Occupational factors

Another crucial factors that can increase the prevalence of MSDs is occupational factors which include duration of working, years of experience, used of mandatory equipment and physical demands task. The primary risk factor in occupational factors, which is significant for 11 out of 17 workers, is the duration of working. Duration of working in a day influence the prevalence of MSDs in many studies (20, 21, 31). Meanwhile in Nur Athirah et al. (2019) reported duration of working as one of the predictors of MSDs (27).

Other than that, years of experience in serving as a police officers is also significant factors of developing MSDs as study by Rufai et al. (2019) found out that 94.9% of police with experience more than 20 years have MSDs compared to police with experience less than 10 years (76.2% developing MSDs) (31). Larsen et al. (2018) also found out that seniority in police cause them to higher prevalence of chronic low back pain (35). Wearing mandatory equipment such as duty belt and body armour is also a significant factors of MSDs (35).

Ergonomics Risk Factors

Ergonomics risk factors are the significant role in developing MSDs especially among police officers (eight from 17 studies). Ergonomics risk factors such as prolonged sitting/standing, awkward posture, repetitive movements, vibration and heavy lifting are the risk factors that mention in the studies in this review. Prolonged sitting/ standing risk factors are depending on the task conducted by the police officers. For example, police officers that drive fleet vehicles or car patrol which have prolonged sitting and higher prevalence of MSDs (36) while for traffic police it is prolonged standing to control the traffic that increase the prevalence of MSDs (32).

Another significant risk factor is awkward posture or practicing posture that different from neutral posture during the working hour. Study by Cardoso et al. (2018) discover that police with postural disorders have significant relationship with level of disability that related to ODI scoring (25). Besides posture, vibration is also significant risk factors in study by Athirah Diyana et al. (2019) indicate that the odds of having MSDs is three times higher when the police officers are expose to high level of hands-arm vibration (27).

Lastly, although risk factors such as repetitive motion and heavy lifting are not common in this review, it is important for us to address that these factors may have impact to prevalence of MSDs if the exposure to the risk factors is prolonged.

All results can be seen in Table 1 below.

DISCUSSION

In context of country of the studies, this review showed that most of the country are in Asia (Pakistan, India, Bangladesh and Malaysia) which is contrast the review study conducted by other review papers (20 – 23, 27 – 30, 33, 34). Review by Marins et al. (2020) which have review paper dated mostly before 2018 reported that many studies were conducted in South and North America continents (Brazil and Canada).

This variation suggests that only recently researchers in Asias have awareness about risk of developing musculoskeletal disorders among police officers. It is supported by a study by Maakip et al. (2017), which suggests that the difference in the prevalence of WMSDs between workers in Australia and Malaysia is caused by the Australia's government taking significant steps to reduce WMSDs risks and hazards as early as 1980s, while Malaysia's government is still developing similar measures (42).

From this review, several risk factors studied by researchers are sociodemographic factors such as age, gender and BMI; occupational factors such as duration of work, years of experience and wearing mandatory equipment; and ergonomics risk factors such as prolonged sitting and standing, awkward posture and vibration (20, 22, 25, 27, 29 – 32, 35, 36). Meanwhile, lower back was reported as the body parts with highest prevalence of MSDs in majority of the studies (76% of the studies) (21, 23, 24, 26, 28, 29, 31, 34, 36).

It can be concluded that age are important risk factors in police officer. As one ages, the prevalence of MSDs and pain intensity increase as well as difficulty of performing tasks of daily living gets worse (25). Highest prevalence of MSDs (93.3%) can be seen among police officers with age more than 55 years old compared to younger police officer (31). Deterioration of bone, muscle and joints with increasing in age is the plausible explanation why ageing increase the prevalence of MSDs.

It is also found that female police officers are prone to have MSDs than male officers (32). It is may be due to women may pay more attention to and take better care of their health due compared to male. For BMI, although majority of the respondents have normal level of BMI, it has significant association with MSDs among traffic police in Nigeria (32). However, it is contradicted with military police in Malaysia that majority of them have

obese BMI but have no association with MSDs (29). The study conducted by Alangari et al. (2022) provided evidence for the disparity by indicating that WMSDs are not changed by BMI categories (43).

Duration of working hours may have it effect on the prevalence of MSDs. Police officers that work for longer period of hours such as for 11 hours or more than 12 hours have higher prevalence of MSDs compared to police officers that work less than that (20, 22, 31). Meanwhile, police officers that ride motorcycle more than 4 hours per day have high prevalence of MSDs (27). It is may be due to the posture or working demands that practiced by police officers during their work shift.

In some countries police officers have a mandatory order to wear their weapon either it is mounted to the belt or have thigh holster. They also need to wear body armour for their safety which reduce their discomforts during conducting their task. A study reported that police officer that wear duty belt has chance more than 5 times to develop MSDs while wearing body armour have more than 2 times chance (35).

In this review paper, body part with most frequency MSDs is the lower back pain region. Lower back pain can be considered as the common body part with MSDs as the other review paper also reported the same. A review conducted by Chavda et al. (2020) among traffic police in Asian countries showed that most police officer suffers pain at lower back beside upper parts of the body such as neck and shoulder (44). Similar with review by Marins et al. (2020) which indicated that majority of police officer have discomforts at lower back region despite having different work task (45).

Plausible explanation is the awkward and prolonged posture practiced by police officers during completing their work shift. For example, for police traffic they need to stand for most of the time during work shift so most of their body weight have been supported by their hips which cause muscle fatigue and resulting to muscle pain at their back and hips (21). Interesting experiment studies among officer workers by Baker et al. (2018) indicate that mean of discomfort is highest at ankles/feet after 120 minutes of standing which suggest that prolonged standing will affect all workers in any occupations (45).

Prolonged sitting during work shift for police officers who have administrative task and driving cars or motorcycle also considered as risk factors for MSDs. The intervertebral discs' ability to cushion the spine is known to be diminished by prolonged sitting and vibration exposure when driving because of the fluids that are expelled from them (36). Prolonged sitting also decreases the muscle mobility and flexibility as well as wear the spinal extensor muscles (25).

However, there is study that found other risk factors to MSDs beside posture. Other possible risk that increases the MSDs among police officer is the exposure to vibration. Police officers that ride motorcycle without any back support cause them to absorbs more energy and increase the vertical vibration and affect the prevalence of MSDs (27). For car patrol police is the rating of seats discomforts may have effect on the development of MSDs (36).

From this review, it is undeniable that police officer has high risk of developing MSDs which come from many hazards that are exposed to them during work shift. There are many effects of MSDs to the police organization which include stress, absenteeism, regular medical leave, burnout and many more. Due to that, we must solve this issue by having a realistic plan that will improve the quality of life for police officer and also increase the efficiency and respectable reputation of law enforcers.

Limitation
Several limitations occurred during the process of this review. First is the selection bias that could happen during the determination of inclusion and exclusion studies criteria for this review. Next is the variability of the sample size and instrumentation tools used across all selected studies that lead to difficulties in generalizing and comparing the results between the studies. Additionally, certain studies rely purely on self-reported data, which may introduce errors because of underreporting or recall bias. Lastly, most of the studies focused on the physical factors that cause MSDs instead of adding psychological factors and social factors such as stress, anxiety and job demand that can also influence the prevalence of MSDs.

Recommendation
Using this review, researchers can have in-depth research by collaborating with police departments to discover the specific hazards that are exposed to police officers. This is because different job tasks among police officers could yield different hazard and consequences such as musculoskeletal injury, stress, fatigue and accidents. For example, patrol police officers are exposed more to prolonged sitting compared to prolonged standing hazards exposed to traffic control police. Long-term research about the effect of MSDs on police officers' physical and mental well-being is also a great research to start to discover the significant impact of MSDs on police officers.

Additionally, the body parts with the highest frequency of MSDs were revealed by this research. Considering that, ergonomics interventions aimed at lowering the prevalence of MSDs have to be carried out. For instance, evaluating the back belt support for traffic and patrol police and observing its efficacy in lowering the prevalence of MSDs in the back area. Subsequently, the results should be shared with the police department

along with necessary recommendations to reduce the risk such as ergonomics training sessions and awareness campaigns. Pre- and post-intervention research to identify and determine the effectiveness of specific ergonomics interventions to police population is another outstanding study to be conducted in the future.

CONCLUSION

This paper review proved the prevalence of MSDs among police officers. Researchers identify many risk factors of MSDs including sociodemographic factors such as age, gender, BMI; occupational factors such as duration of work, years of experience, wearing mandatory equipment; and ergonomics risk factors such as prolonged sitting and standing, awkward posture and vibration. Lower back was reported as the part with the most prevalence of MSDs than the other part. However, there is still need to have further investigation in various work task among police officers to explore more on the risk factors of MSDs so that proactive measure can be implemented to reduce the prevalence of MSDs among police officers.

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