INTI JOURNAL | eISSN:2600-7320
Vol.2019:22

Prevalence of Musculoskeletal Disorders and Associated Risk Factors among Selected Factory Workers in Penang, Malaysia

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Abstract

Background: Musculoskeletal Disorders (MSDs) described as the major work-related health issue among the industrial workers by exposing to physical factors like overuse, poor posture and heavy lifting in the work setting.
Objective: To determine the prevalence of MSDs and associated risk factors among factory workers of a selected company in Penang, Malaysia.
Methodology: A detailed validated questionnaire contributed to MSDs were administrated to 626 workers in the company. The participants were 403 female and 223 male workers volunteers to participate in this study. Data analyzed with the use of SPSS Window Version 21.0, Pearson $\chi 2$ used to identify the relationship between musculoskeletal pain and the participants risk factors.
Results: The result showed that the highest prevalence rate was 45.4% of cases musculoskeletal disorders by the factory workers. The most common MSDs among the workers are shoulder (21.8%) followed by lower back (18.7%), upper back (14%) and neck region (13.6%). Among all the workers, Chinese ethnicity workers those who work in the 12-hour shift (71.4%) likely to get MSDs compared to workers in 8 hours shift (28.6%). The Chi-square statistics showed a significant association between the working hours and the pain symptoms (χ^2 (1), N = 17) = 4.496, $p < .05$). Whereas the participant's age, gender, work performance, and sleep patterns were not associated with the MSDs in this study.
Conclusion: This study concluded the prevalence rate is moderately high and recommends establishing MSDs intervention at workplaces and awareness training as an integral part to reduce the risk factors.

Keywords

Factory workers, Disability, Musculoskeletal Disorders, Pain

International Conference on Innovation and Technopreneurship 2019
Submission: 1 June 2019; Acceptance: 20 June 2019

Introduction

Musculoskeletal Disorders (MSDs) are injuries and disorders that affect the human body's movement or musculoskeletal system (i.e. muscles, tendons, ligaments, nerves, discs, blood vessels) (Middles worth, 2015). MSDs reported as the major work-related health concern among the industrial workers (Waters, 2004). There are varieties of efforts engaged in controlling the incidence of workers suffer from MSDs and accompanied by other healthcare problems which include equipment handling and design. According to the National Institute for Occupational Safety and Health (NIOSH) report the upper and lower extremities, neck and low back areas affected frequently exposure to prolonged standing or sitting in the working environment. Likewise exposure to physical factors like repetition movement, faulty posture and lifting heavy weight during work.

The work-related MSDs problems are the major concern from the workers performing a repetitive task (Nur, Dawal, & Dahari, 2014). As stated by Middles worth (2015), the MSDs actually classified into two categories as work-related and individual related. Work-related MSDs are commonly reported by involving in repetitive activities in an industrial setup. However, individual related would include health status, lifestyle habits of the person. Although physically heavy jobs have decreased in number, work-related MSDs and symptoms have increased continuously in most industrialized countries (Bullock, 1990). The official statistics of Sweden reported the MSDs to constitute about 74% of all reported occupational diseases (Bao, Winkel, & Shahnavaz, 2000).

On the other hand, the Canadian Centre for Occupational Health and Safety (CCOHS) stated that different kinds of injuries having a different pattern of pain. In line with the nature of pain, it is easy to classify the types of pain of the workers (Melzer, & Iguti, 2010). A study by Yu et al., (2012) addressed the long working hours, high mental stress and previous injury history also the risk factors for work-related MSDs. The Malaysia Employment Act set a maximum of 8 hours of work per day and 6 working days per week, at the most, the employees have to spend about 1/3 hours per day in the working environment (Messenger, Lee, & McCann, 2007). In general, the factory workers need a lot of endurance comparing with those works in the field such as repairing and maintenance. Therefore, the chance for the workers to develop musculoskeletal pain or discomfort would be higher.

The Department of Occupational Safety and Health Malaysia in the year 2009 reported 161 cases who claimed Social Security Organization (SOCSO) compensation for their musculoskeletal injuries while working (Wahab, 2017). Since the work-related MSDs are gradually increasing 32.3 times comparing the 1995 SOCSO data, the research on this area is limited among factory workers in Malaysia presently. Therefore, this study aimed to determine the prevalence of Musculoskeletal Disorders and associated risk factors among factory workers of a selected company in Penang, Malaysia.

Methodology

This Exploratory study recruited 626 workers from selected manufacturing industry located on the northwest coast of Peninsular Malaysia. The participants were enrolled voluntarily with signed informed consent. The recruited participants were full-time workers below 55 years old; those with a history of fracture and surgery excluded. A validated Musculoskeletal Disorders Questionnaire in English and Bahasa Malay language were used which includes demographic data, working experience, work duration, nature of work, area of pain, the severity of pain, and the job disturbance due to the pain. The obtained data were analyzed by using descriptive analysis and the Pearson Chi-square test to identify the relationship between the demographic data such as ethnicity, working hours, nature of work and prevalence of MSDs.

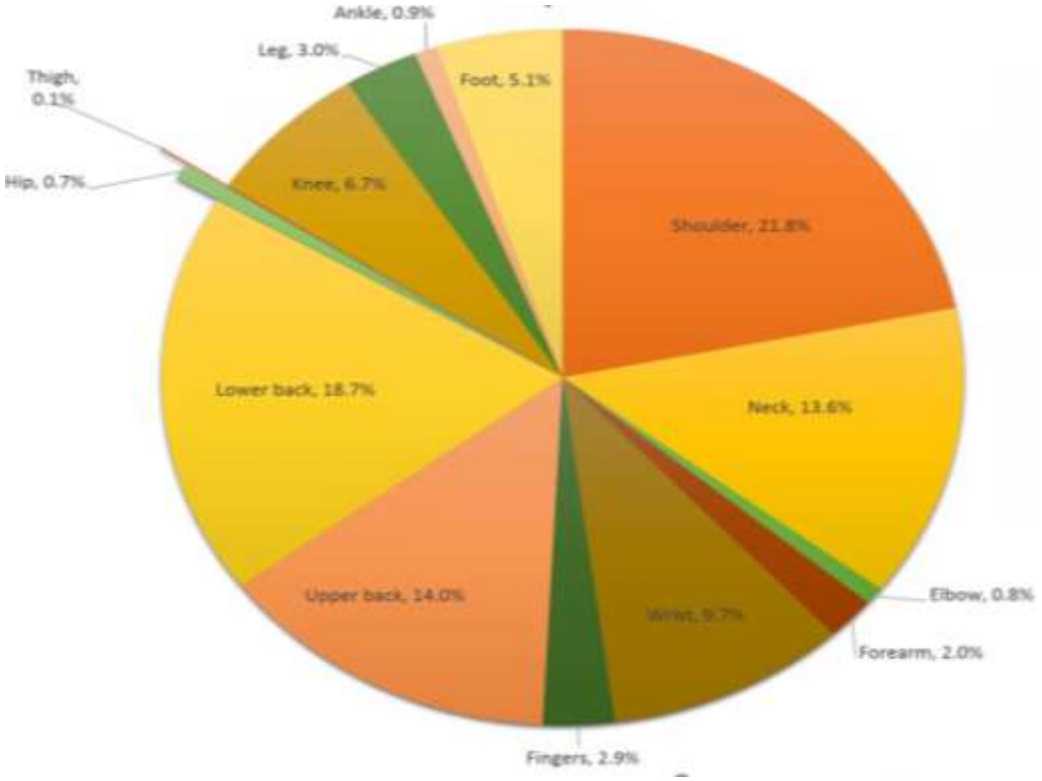

Figure 1.Participants overall pain

Results and Discussion

This study finds the prevalence of MSDs among factory workers from the selected company northwest coast of Peninsular Malaysia. The overall prevalence of MSDS among the factory workers was at the rate of 45.4% in total numbers of 626 participants (403 females and 223 males). The majority of the participants experienced pain or discomfort following with the work, in their shoulder (21.8%), lower back (18.7%), upper back (14%) and followed with neck pain (13.6%) as shown in Figure. 1. Similarly, industry workers in China and Swedish reported shoulder pain is the major health concerned among manual weight handlers (Bao, Winkel, & Shahnavaz, 2000).

Another study by Mehlum, Kjuus, Veiersted, & Wergeland (2006) reported back pain as one of the leading causes of time lost in industry related work. Besides, back pain associated with high costs in medical management and leads to psychosocial dysfunctions (Punnett et al., 2005 & Morken et al., 2003). In Turkey, the study by Ulu and Cakmak (2009) among gun factory workers reported the back pain prevalence rate is slightly high 22.0% comparing with this study result.

In this study, the participant's nature of work where different from each other such as machine operation, manual handling and the desk job work with 8 hours and 12 hours shift. The majority of participants in this study were from Malay, Chinese, Indian, Indonesian and Nepalese ethnicity those who work in 12 hours shift (94.9%) and only (5.1%) in the 8 hours shift. A significant association was found between the working hours and the pain symptoms (X2 (1), N = 17) = 4.496, $p < .05$) among the Chinese ethnicity. Workers in 12-hour shift 71.4% likely to get MSDs compared to workers in 8 hours shift (28.6%). However, the participant from the Malay, Chinese, Indian, Indonesian and Nepalese ethnicity showed no significant result among the study participants as shown in Table. 1. This findings regarding the working hours aligned with a reported study on migrated workers in Malaysia those work 12-hours and more will come across MSDs (Santos et al., 2015 & Yu et al 2012). Remarkably, the study participants were not having an association with age, gender, working experience with MSDs.

Table 1. Relationship between working hours and pain symptoms

Characteristics	% Pain symptoms	% No pain symptoms	χ^2	Cramer's V
Ethnicity				
Malay			0.385	0.073
8 hours work	10(58.8)	7(41.2)		
12 hours work	59(47.6)	65(52.4)		
Chinese			0.034*	0.514
8 hours work	2(20)	8(80)		
12 hours work	5(71.4)	2(28.6)		
Indian			0.667	0.068
8 hours work	2(50)	2(50)		
12 hours work	22(61.1)	14(38.9)		
Indonesia			-	-
8 hours work	0	0		
12 hours work	103(42.4)	140(57.6)		
Nepalese			0.252	0.087
8 hours work	1(100)	0		
12 hours work	74(43)	98(57)		
Others			-	-
8 hours work	0	0		
12 hours work	6(50)	6(50)		

*P<0.05

Another study by Shariat, et al., (2016) among Malaysian office workers reported neck, low back, and shoulder pain were significantly associated with sitting jobs rather than standing jobs. Further study by Chandrasakaran et al., (2003) reported forward neck position in a static

position, with excessive use of the hands in sitting posture reproduces shoulder pain among industry workers. However, in this study, no significant associations between shoulder pain and repetitive work or lifting task were observed.

More than 50% of participant's presents with MSDs in this study claim the pain disturbs their normal routine working performance as well as sleep patterns. Hence, employers and health regulators consider these factors as they play a significant role in the overall well-being of the workers (Lang et al., 2012). Future studies to be conducted to investigate more relationship on the risk factors that could relate to their specific ethnicity and job description.

Conclusions

The results of this study concluded the overall prevalence of MSDs among factory workers was moderately high and different among the worker's ethnicity. Besides long working hours likely to produce a higher rate of developing MSDs among the workers that recommend healthcare intervention at workplaces and early awareness training as an integral part to reduce the risk factors.

Acknowledgments

Authors acknowledge the company managers and participants support to carry out this study.

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