Prevalence of Musculoskeletal Problems among Manual Handling Workers in Courier Service Industry

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Abstract -**Manual handling workers are exposed to various hazards such as ergonomic. Exposure to ergonomic hazards poses several health effects to workers especially to the musculoskeletal system including aches, pain or discomfort on neck, elbow, wrist, upper back, lower back, hip/thigh, knees or feet. The main objective of this study was to determine the prevalence of musculoskeletal problems among manual handling workers in courier service industry. A cross-sectional study was conducted involving 79 workers in a courier service provider that located in Selangor. Socio-demographic information, job characteristics and musculoskeletal symptoms for the past 7 days and 12 months were collected by using self-administered questionnaire adapted from Nordic Standardized Questionnaire. Prevalence of musculoskeletal symptoms among manual handling workers is 69.6 %. The most common site of musculoskeletal problems among manual handling workers is lower back followed by upper back. Bivariate analysis showed significant associations between education level and duration of employment with musculoskeletal. Preventive and control action should be taken to control the risk factors. This is crucial as musculoskeletal problems can give negative impact to workers' quality of lives, lost time of work due to absenteeism, reduction of employees' productivity and increase medical compensation.**

Index terms – Musculoskeletal problems, Nordic Standardized Questionnaire, Manual handling

I.   INTRODUCTION

International Labour Organization (ILO) defines ergonomics as the application of the human biological sciences in conjunction with the engineering sciences to the worker and which at the same time enhances productivity. This definition emphasizes the important triad of ergonomics elements namely comfort, health and productivity. Injuries can occur if ergonomics is not taken into account while performing any task. There are two types of ergonomics injuries that are acute injuries that caused by something that happens as a result of one event and cumulative trauma disorders (CTDs) that build up over time due to repeated exposure to various risk factors.

Work-related diseases, including musculoskeletal problems have been characterized by the World Health Organization [1] as multifactorial. This indicates that a number of risk factors contribute to the causing of these diseases. Musculoskeletal problems typically affect the back, neck, shoulder and upper limbs. Health problems range from discomfort, minor aches and pains, to more serious medical conditions that require time off work and medical treatment. The impact of musculoskeletal problems on the workers and their ability to work varies significantly from person to person. Worker has to bear with the pain, mental stress and loss of income for those on daily salary. In chronic cases, the result from treatment and recovery could be permanent disability and worse come to worst a worker could loss his job. On the other hand, the employer has to bear the treatment cost, loss of man power and reduce productivity. Bureau of Labor Statistics of the U.S Department of Labor reports that in 1995, 62% of all illness cases were due to disorders associated with repeated trauma, which is the musculoskeletal problem. Busch et.al [2] stated that from their research on musculoskeletal problems in Sweden, sick absenteeism has increased dramatically over the past decade. Based on the statistics in the Health and Safety Executive website, 11.6 million working days a year are lost to work-related musculoskeletal problems.

Musculoskeletal problems are a significant public health problem due to their high impact on disability, personal suffering, absence from work, disability and their direct and indirect costs to the health care system [3]. According to Malmgren-Olsson et.al [4] the number of patients in primary care with prolonged musculoskeletal problem has increased during the last decade, causing significant

medical, social and economic problems to society. There are a wealth of information on musculoskeletal problems in health care workers, especially nurses and physicians, and blue-collar workers. However, there is still a lack of information on the musculoskeletal problems among workers that involve in manual handling especially in Malaysia. The purpose of this study is to found out the prevalence of musculoskeletal problems among manual handling workers.

II. METHODOLOGY

A. Subjects

This study had been conducted at one of the largest courier service provider company that located in Selangor. This company is one of the most preferred courier company in Malaysia that handle up to 70 000 pieces of packages daily in one of its main hub in Selangor. This company also consist more than hundred workers that sufficient to conduct this study. The study population for this survey comprised of all workers that involve with handling the package manually in their job activity. Sixty three workers that meet the inclusion criteria have been chosen as respondents in this study.

B. Questionnaire

The study was carried out using a set of questionnaire that were given to the respondents to be answered. The questionnaire was adapted from the Standardized Nordic Questionnaire for the analysis of musculoskeletal symptoms [5] based on the study needs. It was translated to national language before distributed to the respondents. The questionnaire was divided into three parts:

Part I – respondents' socio-demographic information (age, gender, race, marital status, education level and monthly income)

Part II – respondents' current job information (work posting, currently work in which department, types of job routine, duration of working hour and total duration of employment)

Part III - musculoskeletal symptoms information (occurrence of musculoskeletal symptoms in the past 12 months on the neck, upper limb, low back and lower limb)

Ninety questionnaires were distributed to randomly selected workers, who had been identified earlier based on the inclusion criteria. The inclusive criteria were man from 25 to 50 years old, work more than 1 year, Malaysian citizen and not having any medical problem or past history of injury. The response rate for the study is 87.8 % as only 79 respondents completed the questionnaires and returned them to the researcher. The number of respondent is acceptable as the required sample size for the study is 70 respondents.

C. Data Analysis

Data collected in this study was analysed by using Statistical Package for Social Science (SPSS). Univariate and bivariate testing were used to analyse different variables in this study. Univariate analysis was done to analyse single variable like respondents background and bivariate analysis was done to study the relationship between two variables.

III. RESULTS AND DISCUSSION

A. Socio-Demographics Characteristics

The result in Table 1 showed that the minimum age for the respondents was 18 years old and the maximum age was 49 years old. Majority (45.6%) of the workers were more than 30 years old.

Almost all (91.1%) of them were Malay. Most (44.3%) of the respondents were single (44.3 %) and 78.5% had education till SijilPelajaran Malaysia.

Table 1 Socio-demographic Characteristics

Variables	Frequency	Percentage (%)
Age (years)		
≤ 25	27	34.2
26 – 29	16	20.3
≥ 30	36	45.6
Race		
Malay	72	91.1
Indian	7	8.9
Marital Status		
Single	44	55.7
Married	35	44.3
Education Level		
UPSR	3	3.8
PMR	14	17.7
SPM	62	78.5

N = 79

B. Occupational Characteristics

According to Table 2, majority (67.1%) of the workers had been working as manual handler in the company more than 24 months, followed by workers that work 12 to 18 months (19 %) and workers that work 19 – 24 months (13.9 %) at the company. The mean and standard deviation for length of service were 72 months and 4.72 respectively.

Table 2 Occupational Characteristics

Variables	Frequency	Percentage (%)
Length of service (month)		
12 – 18	15	19
19 – 24	11	13.9
≥ 24	53	67.1
Total hours of working in a day (hours)		
8	31	39.2
9	38	48.1
10	3	3.8
12	7	8.9

N = 79

C. Prevalence of Musculoskeletal Problems

Table 3 shows the prevalence of musculoskeletal problems according to eight specific parts of the body. The most common body part with musculoskeletal problems was the lower back part (60.8 %), followed by upper back (39.2 %), neck (21.5 %), knees (16.5 %), hip/thigh (11.4 %), ankles (11.4 %), and wrist (7.6 %). The body part with the less musculoskeletal problems was the elbow (3.8 %). This finding was similar to the study done by Devereux et al. [6] where the lowest prevalence of musculoskeletal problems among sedentary office workers was elbow (17 %). Overall, the prevalence of musculoskeletal problems among manual handling workers at the company was 69.6 %.

Lower back or lumbar area of the body carries out several functions from support and movement of the body organs to protection of specific body tissues. While standing, it supports the entire body weight. Therefore, any kind of pain felt in the lower back can be extremely hurt and dangerous. This was also due to the workers that need to standing for a long time period when handling the package for the entire shift period. Movement that include turning and twisting when handling package also contributed to musculoskeletal problems at the lower back. The study by Punnett et al.[7] revealed that awkward posture like turning and twisting was associated with back pain.

Table 3 Prevalence of Musculoskeletal Problems

Body parts	Musculoskeletal Problems	
	Frequency	Percentage (%)
Neck	17	21.5
Elbow	3	3.8
Wrist	6	7.6
Upper back	31	39.2
Lower back	48	60.8
Hip/thigh	9	11.4
Knees	13	16.5
Ankles	9	11.4
Musculoskeletal problems (Overall)	55	69.6

N = 79

D. Prevalence of Musculoskeletal Problems That Cause Work Disruption

According to Table 4, musculoskeletal problems on the lower back (26.6 %) is the most frequently interfere with workers normal work for the past 7 days followed by upper back (16.5 %), knees (7.6 %), hip/thigh (5.1 %), ankles (3.8 %), neck (2.5 %) and wrist (2.5 %). For the past 12 months, musculoskeletal problems on the lower back (55.7 %) also the most frequent body part that cause disruption on normal work followed by upper back (31.6 %), neck (13.9 %), knees (10.1 %), hip/thigh (8.9 %), ankles (7.6 %), wrist (3.8 %) and elbow (2.5 %).

Table 4 Prevalence of Musculoskeletal Problems That Cause Work Disruption According to the Body Parts

| Body Part | Musculoskeletal Problems | | | |
| | 7 days | | 12 months | |
	Frequency	Percentage (%)	Frequency	Percentage (%)
Neck	2	2.5	11	13.9
Elbow	0	0	2	2.5
Wrist	2	2.5	3	3.8
Upper back	13	16.5	25	31.6
Lower back	21	26.6	44	55.7
Hip	4	5.1	7	8.9
Knee	6	7.6	8	10.1
Ankle	3	3.8	6	7.6

N = 79

E. Prevalence of Musculoskeletal Problems and Socio-demographic Characteristics

Chi square test was used to determine the relationship between musculoskeletal problems and socio-demographic characteristics. Prevalence of musculoskeletal problems among workers who were more than 26 years old (75 %) was higher than prevalence of musculoskeletal problems of workers less than 25 years old (59.3 %). However, there is no significant relationship between age and musculoskeletal problems with p value 0.149. There was supportive evidence on study conducted among taxi drivers in Malaysia showing that age group did not have significant relationship with occurrence of low back pain [8]. Newell et al. [9] also reported that musculoskeletal problems were not associated with the age of respondents in the study among orthodontists in Alberta.

Prevalence of musculoskeletal problems among workers with education level of SPM (74.2 %) was higher than prevalence of musculoskeletal problems among workers with education level UPSR and PMR (52.9 %). There is significant relationship between education levels of the workers with prevalence of musculoskeletal problems among manual handling workers (p value = 0.036). For the relationship of musculoskeletal problems with education level, it showed similarity with the study done by Habib et al. [11]. In the study, it is revealed that the prevalence of musculoskeletal problems was higher among respondents with lower educational level when compared with worker with higher education level.

Table 5 Relationship of Musculoskeletal Problems and Socio-demographic Factors

Variables	Musculoskeletal problems		x^2	p value
	Yes (%)	No (%)		
Age (years)				
≤ 25	16 (59.3)	11 (40.7)	2.082	0.149
≥ 26	39 (75)	13 (25)		
Race				
Malay	48 (66.7)	24 (33.3)	3.352	0.067
Indian	7 (100)	0 (0)		
Marital Status				
Single	29 (65.9)	15 (34.1)	0.647	0.421
Married	26 (74.3)	9 (25.7)		
Education Level				
UPSR /PMR	9 (52.9)	8 (47.1)	6.663	0.036*
SPM	46 (74.2)	16 (25.8)		

N = 79, *Significant at p-value < 0.05

F. Prevalence of Musculoskeletal Problems and Occupational Characteristics

Chi square test was used to determine the association between musculoskeletal problems and occupational factors (length of service and total hours of working in a day) as shown in Table 6. Prevalence of musculoskeletal problems among workers who works more than 18 months (75%) at the company is higher as compared to the workers who work in duration of 12 to 18 months (46.7 %). There is significant relationship between duration of service at the company and musculoskeletal symptoms (p value = 0.032). This shows that the longer the duration of service as manual handling workers, the higher the prevalence of musculoskeletal problems among the respondents.

These findings are consistent with the study done by Masoud [12] among physiotherapist that shows workers who worked more than 18 months had higher prevalence of musculoskeletal problems than those workers whose working less than 18 months. The result from the study conducted by Chiu et al.[13] also reported that academic staffs who worked more than 8 years had the highest prevalence of neck pain. This significant relationship between these two variables also consistent with the study made by Caicoya and Declos (2010) [14]. A study by Nurhidayah[15] on cashier workers also found that the workers that work more than 18 months 265 times more likely to experience musculoskeletal problems. A study by Keyserling[16] has shown that ergonomic stressor such as duration of work may be related to the development of upper extremity discomfort and musculoskeletal disorders.

Table 6 Relationship of Musculoskeletal Problems and Occupational Characteristics

Variables	Musculoskeletal problems		χ^2	p value
	Yes (%)	No (%)		
Length of service (month)				
12 – 18	7 (46.7)	8 (53.3)	4.612	0.032*
≥ 18	48 (75)	16 (25)		
Total hours of working in a day (hours)				
8 – 9	47 (68.1)	22 (31.9)	0.583	0.445
10 – 12	8 (80)	2 (20)		

N = 79, *Significant at p-value < 0.05

Prevalence of musculoskeletal problems among workers that work more than 10 hours a day (80%) is higher than prevalence of musculoskeletal problems among workers that work less than 10 hours a day (68.1 %). However, there is no significant relationship between duration of hours working a day with musculoskeletal problems (p value = 0.445).

CONCLUSION

The prevalence of musculoskeletal problems among manual handling workers was high, with 69.6 % of the workers complaint about having musculoskeletal problems at different part of the body. The most common body parts with musculoskeletal problems among the workers were lower back followed by upper back. This was due to their nature of works that give strain and repetitive movement on the upper and lower back. The results proved that there was significant relationship between duration of employment and education level of workers with musculoskeletal problems.

Musculoskeletal problems were multi-factorial in nature. From all the factors that had been studied, a part of it could be modified like duration of work. Prevention and control measures should be done to control the risk factors because these musculoskeletal problems could lower the quality of life, contribute to absenteeism, reduce productivity, and increase the medical cost. Ergonomic problems at the workplace were things that can be controlled if there was cooperation between employers and employee.

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