Analysis of Muscloskeletal symptom among workers in rubber industry

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ABSTRACT

Although Musculoskeletal Disorders (MSDs) represents a common occupational problem, few epidemiological studies have investigated MSDs among industrial workers. MSDs are a common industrial health problem throughout the world and a serious cause of disability among the industrial workers.The goal of the study was to investigate the prevalence of musculoskeletal symptoms (ache, pain, or discomfort) among rubber workers in Iran, using the standard Cornell Musculoskeletal Discomfort Questionnaire (CMDQ). The study population consisted of 100 males with mean age 31.73. Out of every 10 workers, in the last work week, seven reported complaints in the lower legs. The results are also indicated age and experience were significantly associated with musculoskeletal symptoms in the different body regions.

Key words*:* Musculoskeletal Symptoms; CMDQ; Risk Factors; Rubber Industry

INTRODUCTION

Work-related musculoskeletal disorders are continued to be of interest to workers, researchers and organizations. This is due to the significant temporary or permanent disability of workers, symptoms such as pain; numbness and tingling time lost from work, reduced productivity, increasing worker`s compensable cost [1, 2, 3]. By definition, work-related musculoskeletal disorders (WMSDs (are an aggregation of disorders of muscles, tendons, and nerves which are caused or aggravated by work [4]. They include specific disorders such as tendinitis or nerve compression as well as more general syndromes or disorders characterized by pain in the upper extremities [5]. Prevalence rates in cross-sectional surveys are highly variable due to differences in the criteria used for case as certain men [6-7]. Musculoskeletal disorders are a worldwide concern and distributed among both Industrialized Countries (ICs) and Industrially Developing Countries (IDCs). In IDCs, the problems of workplace injuries are extremely serious [8]. Poor working conditions and the absence of an effective work injury prevention program in IDCs have given rise to a very high rate of musculoskeletal symptoms. Musculoskeletal disorders (MSDs) represent one of the leading causes of occupational injury and disability in developed and industrially developing countries [9, 10- 12].

Work-related musculoskeletal disorders affect a large number of employees every year [13]. In 1999, 35,440 incidents were reported in the Canadian Province of Alberta which required recuperation away from work, culminating in a lost-time claim rate of 3.2per 100 person-years worked [14].

In the case of Iran, ergonomic considerations have not been taken into account yet and no statistics exist, implying ergonomic disorders' prevalence and productivity deficiencies caused by neglecting workplace ergonomics [15-16].

The objective of this study was to investigate the prevalence of musculoskeletal disorders among rubber industry workers. We believed that the results of the current study could be an appropriate base for planning interventional ergonomics programs in the workplace and improving worker`s health in the Iranian rubber factory. This industry is located in Kerman city. The province of Kerman is located at the south-east of Iran. This research represents the first study of MSDs in the rubber industry in the region.

MATERIALS AND METHODS

Subjects

The study was carried out in the city of Kerman in the south-east part of Iran. The sample included one hundred males, randomly selected from four production lines of the factory. The age range was from 23 to 46 years (mean).

Procedures

The prevalence of MSDs was determined by a cross-sectionalsurvey using the Cornell Musculoskeletal Discomfort Questionnaire(CMDQ). The validity and reliability of the questionnaire have been investigated and approved in different studies and several languages, including the Farsi language [17, 18, and 19]. A version of the standard Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) translated into Farsi was used in this study. Each subject was interviewed individually in a private one-on-one interview. The CMDQ is a 57-item questionnaire containing a body map diagram and questions about the prevalence of musculoskeletal ach, pain, or discomfort in 20 regions of the body during the previous work week, See Fig 1. Respondents indicate frequency of discomfort on a scale from 0 (none) to 4 (daily) and severity of discomfort from 1 (slightly) uncomfortable to 3 (very uncomfortable). The level at which the discomfort interfered with work was taken from 0 (no interference) to 2 (substantial interference).

In Iranian rubber factories, workers are directly involved in the production process. In these factories, physical activities such as material handling, heavy load lifting, and carrying, pulling, pushing and awkward working postures are very common. In this situation, high rates of MSDs occurrence are expected (Fig.s 2 and 3).

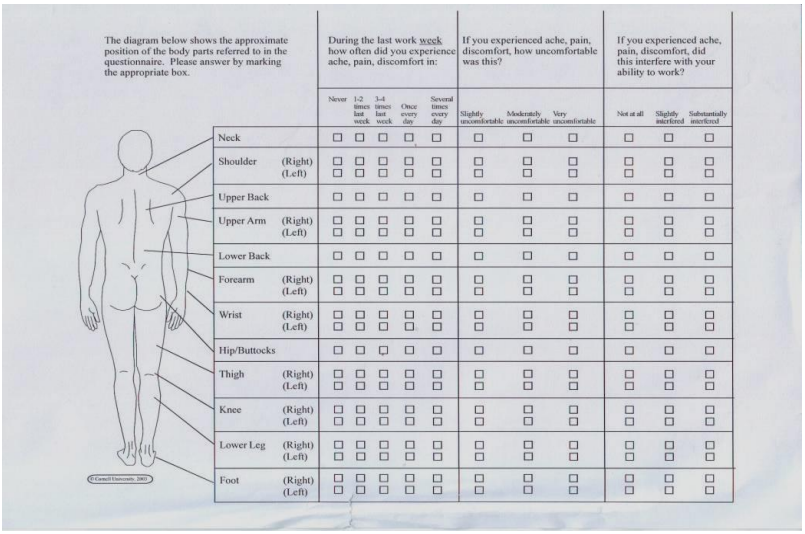

Fig. 1: Cornell musculoskeletal discomfort questionnaire (Reproduced with permission from Professor Alan Hedge (http://ergo.human.cornell.edu/ahmsquest.html).

The questionnaire included demographic items such as age, gender, smoking, educational level, job category, number of the working year in current position and hours of work per day.

Fig. 2. Posture of upper limb and back are deviated from neural.

Statistical analysis

All statistical analyses and calculation were performed using of Statistical Package for the Social Science (SPSS) software for Windows (version 18.0). Mean and standard deviation was used to describe the demographic items.

Fig. 2: Posture of upper limb and back are deviated from neural.

Fig. 3:A production worker holding heavy tires.

RESULTS

Table 1. Summarizes personal details of the workers who participated in the study.Table 2 presents the prevalence of MSDs symptoms in the different body regions of the workers during the last work week. One week prevalence rate of CMDQ indicated that eighty nine percent of the respondents reported at least one complaint in body regions. From the interviewed workers, 65%, 45% 38% and 38% reported that they had some time trouble (ache, pain, or discomfort) in the lower leg, lower back, upper back and neck, respectively. There was a significant positive association between age and experience with reported musculoskeletal problems ($p<0.05$). There was no significant association between height and weight with reported MSDs.Table 3 shows Comparison of the results of the current study with the results of the National Health Survey of Iran. Majority of workers (96.7%) reported that they have moderate severity pain.

Table 1: personal details of the workers

Personal characteristics	Mean
Age(yr)	31.73
Weight (kg)	81.15
Height (Cm)	178.4
Right handed (%)	71.15
Left handed (%)	28.4

Figure 4 present the frequency of pain/ discomfort interfere with their ability to work. As shown in Fig 5, problems of the lower back, lower legs and upper back were the causes of the highest rates of interfering with workers able to work.

Table 2: The prevalence of musculoskeletal symptoms workers

Variables	Musculoskeletal problem		
	Reported Mean (SD)	Not reported Mean (SD)	ρ
Age (Yr.)	32.11 (4.94)	28.33 (4.06)	0.03
Weight (Kg)	81.18 (10.70	80.89 (9.02)	0.94
Height (Cm)	178.44 (7.11)	178.00 (5.24)	0.86
Experience (Yr.)	3.81 (0.58)	3.33 (1.12)	0.04
BMI	25.26 (3.02)	27.57 (2.85)	0.03

Table 3: Comparison of point prevalence of MSDs in upper and lower back and neck in general Iranian male population and the rubber workers studied.

Body region	Rubber workers (age=20-60)	General Iranian male population (age=20-60)
Upper and lower back	41%	15.27%
Neck	5%	4.72%

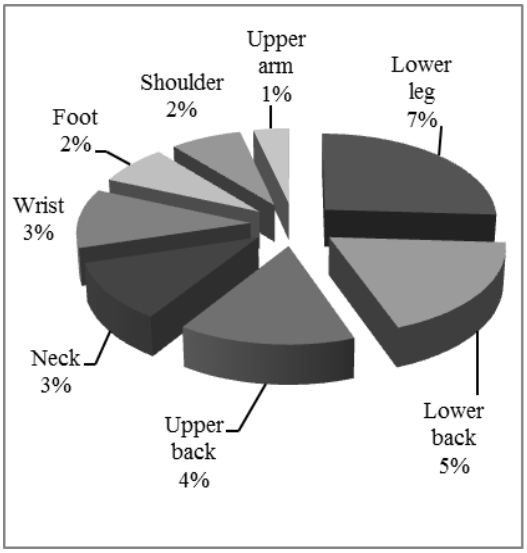

Fig. 4: Percentage of interfere with ability to work due to musculoskeletal problems in different body regions in the last work week

DISCUSSION

The main purpose of this study was to investigate work-related musculoskeletal problems experienced by rubber workers. Using the standard Cornell Musculoskeletal Discomfort Questionnaire, a validated instrument, the prevalence of musculoskeletal symptoms was described among a random sample of 100 rubber workers from Kerman in the south-east part of Iran. The CMDQ showed that symptoms from the musculoskeletal system were common

among the rubber workers in this study. The majority of the study workers (89%) had experienced some kind of musculoskeletal disorders during the last week. Comparison of the results of this study with the results of the National Health Survey of Iran revealed that the differences between the prevalence of musculoskeletal disorders were significant [20].

Musculoskeletal symptoms, particularly low back pain, are common in the general population. Prevalence of low back pain as high, or higher, has been reported among other occupational groups using the same questionnaire including warehouse personnel [21]; Nursing personnel [19]; Information Technology professionals [22]; Production assembly workers [23]; Dental students [24]; notebook computer users [25].

The findings indicated that lower legs trouble is a major health problem and that there is clearly a high frequency of pains in the lower back, upper back and neck. Out of every 10 rubber workers, in the last work week, seven had complaints in the lower legs area, five in lower back, four in upper back and three in the neck.This is in agreement with the findings of other researchers [26, 27, 28 , 29]. The results are also indicated age and experience were significantly associated with musculoskeletal symptoms in the different body regions. This is in agreement with the findings of other researchers [30, 31, 32, 33, 34]. No association was found between weight and height and the prevalence rate of MSDs.

The finding that nearly two-thirds of the workers were working with the pain of at least moderate severity may have implication quality of production lines.

This study revealed that the problem of musculoskeletal symptoms in the factory was serious and needed appropriate attention. This indicates that the rubber factory should be considered a high-risk industry for developing musculoskeletal disorders.

This study indicated that there is an association between CMDQ and the prevalence rate of reported symptoms. This implies that CMDQ was an appropriate questionnaire for determining levels of exposure to mus-culoskeletal risks in this factory and provided reliable results.

COMPETING INTERESTS

Author of this manuscript declare that has no significant competing financial, professional; or personal interests that might have influenced the performance or presentation of the work described in the manuscript.

AUTHOR CONTRIBUTION

This is to declare that author of this manuscript wrote the main manuscript text. Also author reviewed the manuscript.

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