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Work-Related Musculoskeletal Disorders Among a sample of Iranian Computer Users

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ABSTRACT

Aims: Recently, there has been an increasing attention in workplace health-related issues. The issue of MusculoSkeletal Disorders (MSDs) has obtained considerable critical attention. In this regard,work station has a pivotal role in prevention of MSDs. This study was conducted to assess Work-Related Musculoskeletal Disorders (WMSDs) among a sample of Iranian computer users.

Method and Instruments: A cross-sectional study was conducted on office computer users of a university in Tehran. The sample size of 435 people were randomly selected from the university employees. A standardized questionnaire was used to collect data. The data were analyzed using Spss.

Findings: The results revealed that the pain was frequently felt in the region of neck (64.4%), shoulder (60.9%) and wrist complaints (52.4%). The current study showed a high prevalence of MSDs among computer users. In addition, according to workstation questions, it was reported that there were no support device in for supporting lower back and arm in the workstation equipments.

Conclusion: Workstation is one of the essential factors for the prevention of occupational damages in MSDs. This study recommends that there is a need to investigate office equipments as a crucial element not only for promoting performance abalities, health, safety, and efficiency improving but also in reducing complaints and pain caused by MSDs.

Keywords: MusculoSkeletal Disorders (MSDs), Work Station, Computer Users.

Introduction

Work-related MusculoSkeletal Diseases (WMSDs) are major causes of occupational disability and injury that are commonly reported by office workers. WMSDs and can have bad effects on workers' health and efficiency [1-3]. Numerous studies have revealed that WMSDs are common among computer users [4-8]. Office workers are risky individuals for WMSDs because they spend a lot of their time working in front of a computer. Long-term use of computer, working at a desk, and sitting in a chair for long time play an important role in developing WMSDs among office workers[2]. Ergonomic risk factors including workstation situation, repetitive movements, awkward posture, static postures working without any position change, psychological factors and etc., are related with WMSDs [9]. One of the most important aspects of job ergonomics is about designing a workstation where workers have to spend considerable time for doing daily activities in theit workplace [10]. Therefore, the main purpose of workstation design is to minimize the stress imposed on users [11].

Creating a well-designed workstation not only promotes workers' health and well-being, but also increases productivity and product quality. Nevertheless, a poorly designed workstation can cause health complaints as well as product quality problems [10, 12]. Working in unpleasant conditions can cause various discomforts in organs such as the musculoskeletal system

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and ultimately cause occupational burnout. Therefore, the existence of inappropriate working conditions and non-compliance with the criteria is one of the most important factors in the study of occupational diseases[1, 13]. In addition, achieving a healthy workplace not only improves the health and well-being of individuals but also brings economic benefits to the organization[14]. A study on computer users in Kaunas county verified that improvement in ergonomic work environment, workload optimization and education can prevent WMSDs[15].

For planning and implementation of workplace education program among computer users, it is essential to know the current prevalence of WMSDs among computer users and the importance of ergonomic design of their workstation. Therefore, due to this important issue, this study was conducted with the aim of assessing the prevalence of WMSDs and evaluate the status of the workstation among office computer users in a university in Tehran.

Method and Instruments

A cross-sectional study was carried out in a university in Tehran. Participants consisted of 435 computer users with at least 2 year of job experience at the university, which was located in Tehran, Iran. A simple random sampling technique was applied to select the samples.The Cochran's formula was used to estimate the sample size. In this study inclusion criteria consisted ofwere as: 1) being a worker with job experience more than 2 years, and 2) being satisfied to participate in this study voluntarily. Exclusion criteria included: 1) refusing to be studied.

There are several tools for exploring WMSDs in workplaces, one of which is the Maastricht Upper Extremity Questionnaire (MUEQ). The MUEQ is a tool for assessment the Complaints of Arm, Neck, and Shoulder (CANS) among computer users [16]. The first part of the MUEQ includes socio-demographic characteristics (age, gender, and employment status). MUEQ consists of seven main parts of workstation, posture during work, job control, job demands, quality of break time, work environment and social support . Workstation as one of the important areas in this questionnaire has seven questions[16, 17].

Seven items of Maastricht Upper Extremity Questionnaire related to work station with *a* 2-point Likert was used. Translated versions of MUEQ into Arabic, Brazilian-Portuguese and Sinhalese languages were reviewed and each of them had internal consistency and reliability[8, 16, 18, 19]. Cronbach's alpha coefficient was obtained 0.89 in the present study.

Data were inserted into the SPSS program and analysis was done through descriptive analysis. The collected data was analyzed using IBM SPSS version 22 statistical package. All ethical principals were considered in this study.

Findings

Out of 500 recruited people, 435 office computer user responded to the questionnaire. The results of demographic characteristics showed that 134 males (30.8%) and 301 females (69.2%) participated in the study, of which 304 people were married (69.9%) and 131 people were single (30.1%).In addition, most of the subjects had 15 to 20 years of work experience (44.1%) and only 15 people were employed for less than 5 years (3.4%) (Table1).

According to Table 2, the prevalence of CANS lasting for at least one week during the previous year showed that complaints of pain in the neck, shoulders, and wrists were highest, respectively. On the other hand, computer users had fewer complaints of pain in the upper arm and elbowTable 2: One-year prevalence of CANS lasting for at least one week during the previous year

Table 3 reports the descriptive statistics of the scale across different questions. Accordingly, 66.69 % and 64.4% of the participants declared that during working their lower back and arm were not supported in this workstation.

Table 1. Descriptive characteristics of study Population (n=435)

Characteristic		Number	Percent
Gender	Male	134	30.8
	Female	301	69.2
Marital status	Married	304	69.9
	Single	131	30.1
Number of working years	Under 5	15	3.4
	5 t0 10	61	14
	10 to 15	146	33.6
	15 to 20	192	44.1
	20 to 30	21	4.8

Table 2. Distribution of pain complain in different parts of body.

Localization of complaints		Number	Percent
Neck complaints	Yes	280	64.4
	No	155	35.6
Shoulder complaints	Yes	265	60.9
	No	170	39.1
Upper arm complaints	Yes	76	17.4
	No	359	82.5
Elbow complaints	Yes	76	17.4
	No	359	82.5
Wrist complaints	Yes	228	52.4
	No	207	47.6

Table 3. The status of workstation component

Workstation component	Yes		No	
	Number	Percent	Number	Percent
Desk at work has suitable height	275	63.2	160	36.8
I can adjust my chair height	322	74	113	26
When I use the mouse, my arm is supported	155	35.6	280	64.4
The chair I use during work supports my lower back	144	33.1	291	66.9
Keyboard is placed directly in front of me	312	71.7	123	28.3
Screen is placed directly in front of me	302	69.4	133	30.6
I have enough space to work at my desk	256	58.9	179	41.1

Discussion

It is clear that the computer has become an essential part of our daily lives and causes symptoms of MSDs. Ergonomic principles can be used to enhance human-computer interaction, safety, health and comfort. The aim of this study was to explore the frequency of MSDs and workstation conditions of computer users. For this purpose, 435 participants were selected from a university in Tehran. In this study, participants reported CANS more frequently in the neck, shoulders, and wrists over the past year.

According to previous studies, neck pain is in the main place and its prevalence is between 19% and %70 in the population of office workers [5, 6, 20-22]. Neck pain is associated with a high or low computer screen, while shoulder symptoms are associated with a high mouse position and poor keyboard placement [9, 23, 24]. Complaints about pain in the shoulders, neck, and upper back can be reduced by increasing computer users' knowledge of sitting posture and standardized workstation modification [25, 26]. Regarding the workstation in this study, the participants reported that when working with the mouse as well as sitting on a chair, the arm and lower back are not well supported, respectively. Ergonomic optimization is achieved through the well designing of workstations, work demands, tools and equipments tailored to human capabilities. The workstation should be designed in accordance with the anthropometric dimensions measured by the employees in order to increase performance, health, safety and efficiency in addition to reducing complaints and pain caused by MSDs.To reduce complaints about WMSDs, it is essential to improve the workstation so that the height of the chair, the angle of the chair and the height of the table are properly adjusted. Using pads and arm supports, adjusting the height of the computer screen so that it does not cause pain in the neck area are also so important. In addition, the necessary training should be

given on how to properly deploy employees in the workstation.

Although this study has strong points of larg sample size and important isuue as MSDs in workplaces, but self reporting and sapling from one university could be a kind of bias in results. Thus it is recommended to continue this study in future with larger multicenteral sample.

Conclusion

Poor ergonomic workstations can lead to the prevalence of WMSDs among computer users. The use of management and engineering controls in a workstation can significantly reduce these disorders' risks.

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