Original Article

Rehabilitation Section

Prevalence of Work-Related Wrist and Hand Musculoskeletal Disorders (WMSD) among Computer Users, Karnataka State, India

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ABSTRACT

Background: Work-related musculoskeletal (WMSD) disorders of the wrist and hand have been reported among computer users. Data on estimates of prevalence of computer users in India are limited.

Aim: To Find prevalence of self-reported WMSD of the wrist and hand among computer users.

Method: A survey using questionnaire distributed to 783 computer users, employed at two workplaces in Karnataka, India.

Result: Prevalence of self-reported WMSD of the wrist and hand was 58%. Women were more to report symptoms than men (69% vs. 53%). Computer users between 21 to 30 years of age were more to report symptoms than those between 40 to 55 years (76% vs. 9 %).

Conclusion: The prevalence of WMSD of wrist and hand is high and dependent on gender and age. There is a need to develop specific strategies in workplace to reduce the occurrence of WMSD of the wrist and hand.

Key Words: WMSD, Computer users, Prevalence, Wrist and Hand symptoms

INTRODUCTION

In an age dominated by technology, computers have become a vital tool to keep pace with time and progress. A variety of sectors including banks, government offices, private entities, autonomous institutions etc have computerized their data systems for smooth and faster flow of information [1]. Consequently, the proliferation of computers in the modern office setting has generated concern related to potential health hazards associated with their use. There have been numerous operator complaints of a wide range of symptoms with work-related musculoskeletal disorders (WMSDs) being among them [1].

WMSDs account for approximately one-third of all lost workday illnesses. WMSDs of the wrist and hand are associated with the longest absences from work and are therefore, associated with greater loss of productivity and wages than those of any other anatomical region [2-3]. WMSDs of the wrist and hand arise in many forms and the symptoms are frequently non-specific. Some disorders exhibit “well defined” signs and symptoms (e.g. carpal tunnel syndrome, tenosynovitis), while others are less defined such as myalgic conditions involving pain and discomfort, numbness and tingling sensations in the wrist and hand [4-5].

The risk factors for the occurrence of WMSDs of wrist and hand in computer users are “multi factorial” in origin including improper interaction of computer users with the tool, workstation and task performed [6]. Key board typing force is another risk factor. To ensure optimal performance, it is necessary that the work places and work station provide effective support to prevent discomfort or injury.

Although the use of computers in India is on the rise with the fast growing software industry, data on WMSDs are limited. Therefore, we undertook to determine the prevalence of WMSDs of the wrist and hand among computer users in a local setting in India.

METHODS

The Manipal University ethical committee clearance was obtained before the study. We conducted a cross-sectional survey of computer workers of either gender sex from two workplaces in Karnataka State, India, one located in Manipal and the other at Bangalore. For the purpose of this study, we adapted the US Department of Labor’s definition of WMSD - as injuries or disorders of the muscles, nerves, tendons, joints, cartilage, and spinal discs associated with exposure to risk factors in the workplace [7]. Our inclusion criteria included: age between 20-55 years of age employed for at least six months on computer work stations and worked for at least four hours a day for at least five days a week. We excluded subjects with recent injury such as disorders caused by slips, trips, falls, motor vehicle accidents or similar accidents [7]. We also excluded subjects with diabetes.

Subjects selected by convenience sampling, viewed a 20-minute video presentation on WMSDs of wrist and hand. An informed consent was obtained from the subjects willing to participate in the study. Subjects then received a self-administered questionnaire that elicited responses on demographic information and on musculoskeletal symptoms pertaining to the wrist and hand. Respondents who reported symptoms were asked to specify the site.

We used the chi-square test to evaluate gender and age differences of the prevalence of WMSD. The level of significance was set at $p<0.05$. Data were analyzed using SPSS version 11.5.

RESULTS

Of a total of 783 subjects included in the study, 723 completed the questionnaire yielding a response rate of 92.3%. The final study group was comprised of 498 men (68.9%) and 225 women (31.1%) [Table/Fig-1] with mean ages of 37 ± 6.8 and 34 ± 7.3, respectively.

Overall, 417 (57.7%) of 723 subjects reported work-related WMSD of the wrist and hand during the previous six months. The prevalence

was significantly higher in women than men (68.9% vs. 52.6%, p <0.0001). Computer users between 21 and 30 years of age were more likely to report symptoms than those subjects between 40 to 55 years (76.5% vs. 8.5% p < 0.0001). With regard to sites of symptoms, the right side (42%) was affected the most followed by involvement of both sides (34%).

DISCUSSION

We found a high prevalence of WMSD of the wrist and hand among computer users in an Indian setting. Women were more likely to report symptoms than men and younger employees more than older employees. With regard to site, the right side was affected the most followed by symptoms in both sides.

The overall WMSD prevalence of 57.7% noted in our study is almost two-fold higher than the prevalence of 33% reported from a Netherlands survey of neck and upper extremity symptoms among computer users [6]. Job characteristics, such as high quantitative job demands, having little influence on one's work situation, poor workstation ergonomics, limited rest break and repetitive typing with low or high force have been found to be predictors of WMSDs of wrist and hand [7]. Other factors found to be associated with an increase in the prevalence rates are improved recognition and reporting [8]. All of the above factors may be operational in our study.

It has been proposed that mechanical exposure to computer use should be described by three main dimensions: level (intensity of the force), repetitiveness (the frequency of shifts between force levels) and duration (the time the physical activity is performed) [4]. Available evidence suggests that, the forces applied to the computer mouse and keyboard may be a risk factor for musculoskeletal symptoms. It has been observed that three to four hours of computer mouse work could leads to fatigue in the muscles of the wrist and hand and this lead to wrist and hand problems [9,10].

Our finding of a higher prevalence of WMSDs in women compared to men is consistent with other studies which report a two to three fold increase. Several explanations have been suggested for these sex differences. One study reports that women tend to perform more repetitive work on average than men and that men were less likely to sit for prolonged periods compared to women [11,12]. Women are also exposed to additional physical household work such as housekeeping and child care, habits that are more prevalent in the Indian culture, that may contribute to additional stress for the wrist and hand. Another study reports that women work in more extreme positions and use greater force on the keyboard than men, factors that predispose to WMSDs [13,12].

In this study, we found that younger employees were more likely to report symptoms than older employees. Other studies have reported similar findings. It is plausible that the hours of computer use may be more for younger employees compared to the older age group, due to job hierarchy. In addition, the younger age groups may spend more time with computers that is unrelated to work. Other factors such as inappropriate working conditions and first employment to the job may also be contributing factors in the younger age group. Another factor that could influence the higher response rate in the younger population it is a fact that this population is likely to be better informed and thus have a higher awareness (since they are more computer literate, and do more internet surfing) than their older counterparts, who were not born in the computer era but had to learn and adapt to the computerization of the workplace.

The reported WMSDs of wrist and hand occurring most on the right side may be attributable to the use of right hand while typing as well as the use of mouse on the right side.

Our study suggests that WMSDs of the wrist and hand are very prevalent among computer users in our setting. It is therefore crucial to develop strategic programs to reduce the burden of disease due to WMSDs among computer users in the workplace. In the light of this, we have begun a study to identify personal, physical and psychosocial factors that may be associated with WMSDs. Other similar studies are warranted in other parts of India and the region.

CONCLUSION

We found a high prevalence of wrist and hand WMSDs among computer users with most experiencing symptoms on the right side. Women were more likely to report symptoms than men and younger employees more than older employees. There is a need to develop specific strategies in the workplace to reduce the occurrence of WMSD of the wrist and hand among computer users.

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	Male N/T* (%)	Female N/T* (%)	Total N/T* (%)
Total	262/498 (52.6)	155/225 (68.9)	417/723 (57.7)
Age (years)			
21–30	188/251 (74.9)	124/157 (78.9)	312/408 (76.5)
31–40	68/169 (40.2)	29/52 (55.8)	97/221 (43.9)
40+	6/78 (7.7)	2/16 (12.5)	8/94 (8.5)
Duration of employment(years)	6±3	5±6	
Site (hand and wrist)			
Right	42.8%		
Left	34.0%		
Right and left	33.2%		

[Table/Fig-1]: Prevalence of self-reported musculoskeletal symptoms of wrist and hand attributable to computer work during the previous six months, according to gender sex

*N/T = number of subjects with self-reported musculoskeletal symptoms of wrist and hand/number of subjects at risk in the category.

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