Original Article

Posture Analysis by OWAS Method and Prevalence of Musculoskeletal Disorders among Workers of Sourak Tobacco Factory in 2013

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Abstract

Background and purpose: Work-related Musculoskeletal Disorder are the most prevalent work-related disorders and are the main cause of disability among workers. Also these disorders are the main cause of absence from work and lost work hours. These lead to reduction in productivity too.

Materials and Methods: This cross – sectional study was done on 100 workers of Sourak tobacco factory selected randomly. Posture analysis was evaluated by OWAS method and prevalence of musculoskeletal disorders by Nordic questionnaire. The data were analyzed using excel and Spss software version 18.

Results: The mean age of workers was (43±3.97) year and work experience was 12 years. The prevalence of MSDs was 75% in the last year .the lumber region (55%), knee (45%) and shoulders (37%) were the most regions of workers complaints. OWAS posture analysis showed that the most postures are critical or need the modification intervention.

Conclusion: The prevalence of musculoskeletal disorders in Sourak tobacco factory is high and the postures are inappropriate. Ergonomic interventional programs as well as workers education are recommended. *[Etemadinezhad S. *Ranjbar F. Gorji M.* **Posture analysis by OWAS method and prevalence of Musculoskeletal Disorders among workers of Sourak tobacco factory in 2013**. *IJHS 2013; 1(2):89-94] http://jhs.mazums.ac.ir*

Key words: Musculoskeletal Disorders, Nordic questionnaire, OWAS method

1. Introduction

Work-related musculoskeletal disorders are the most prevalent work-related disorders and injuries and the leading cause of disability (1). Despite increasing of mechanization, many occupational activities and work tasks are done by workers which can lead to musculoskeletal disorders. It is the main cause of absence from the work, loss of working hours (2, 3), reduction in productivity, increase in costs and workers incapacitation (4). It is one of the main problems of occupational health, worldwide (5).The main causes of WMSDs are inappropriate body postures, manual material handling, repetitive movements and inappropriate design of work stations (4). Most workers have the body posture which can lead to pain/damage in some parts of the body (6). The health ministry of Iran estimates that 76% of workers have inappropriate body postures (7). 44% of work-related disorders in America are musculoskeletal disorders (8). Social insurance organization of Iran reported the musculoskeletal disorders as the most cause of medical commission referral in 2000, also, the cause of 14.4% of total disability from 1991 to 1994(9). These are related to nature of the work as well as old technology and insufficiency of administrative controls the aim of this study was determination the prevalence of musculoskeletal disorders, by Nordic method and the risk factors of them by owas method. These are the first steps for ergonomic interventions and modifications.

2. Materials and Methods

The descriptive study was proposed in Sourak tobacco factory which have 247 workers. 100 workers were selected randomly and the prevalence of musculoskeletal disorders was determined by Nordic questionnaire. This questionnaire has been designed by Kurika and his colleague in Scandinavian industrial hygiene institute in 1987and is used for epidemiologic studies worldwide. In this questionnaire the musculoskeletal system is divided to 9 regions as neck, shoulders, elbows, wrists/hands, upper back, low back, knees, and ankles/foots. The researcher completed the questionnaires by interview with workers. Posture analysis was done using OWAS (Ovako Working Posture Analyzing System) method which was designed by Finish occupational health and safety in 1992 and is used worldwide since that time. In this method 4 codes are determined, according to the body postures and movements and the amounts of material handling, these codes shows the amount of musculoskeletal risk level and the priority of ergonomic interventions and modifications. Researcher completed the forms and determined the codes by observation of 97 work stations. Data were analyzed by excel and Spss version 18 software.

3. Results

The mean age of the workers was (40±3.9) years and the mean of the work experience in tobacco factory was 10(+-2) years. According to the Nordic questionnaire 75% of workers declared that they have had the symptoms of musculoskeletal disorders in at least one mentioned body regions in the past year. The most prevalent symptoms were in the low back (55%), knees (45%) and shoulders (37%). Table 1 shows the prevalence of the musculoskeletal symptoms in nine body regions of workers in the past year. Posture analysis by OWAS method in 97 work station showed that 30 body postures(30.9%) got the code number 1(normal), and there is no need to modification. 36 body postures (37.1%) got the code number 2(stressful), and have to be modified in the future. 26 body postures (26.8%) got the code number 3(harmful) and must be modified as soon as possible. 5 body postures (5.1%) got the code number 4(very harmful) and the work must be ceased and the modification must be done immediately. Table 2 shows the results of posture analysis of 97 work station in Sourak tobacco factory. The leading causes of the inappropriate postures were heavy lifting, inappropriate height of work level which leads to lumbar flexion and inappropriate lower extremity postures.

Table 1. The prevalence of musculoskeletal disorders of Sourak tobacco factory workers In the past year (n=100)

Neck	Shoulder	Elbow	Wrist/hand	Upper back	Lumbar	One or both hips/thighs	One or both knees	One or both ankle/feet
31	37	24	20	23	55	26	45	25
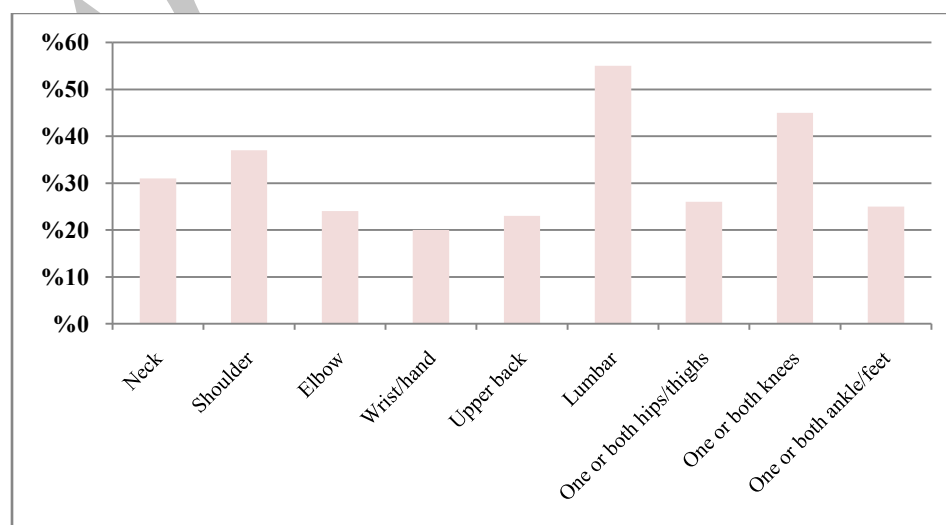
Graph1. Frequency of musculoskeletal disorders in 9 areas of the body in the last year

Table 2. Frequency and action Categories different postures of body

	posture	Frequency	Action Categories
Lumbar	straight	26	1
	Bending	53	2
	Twisting	7	3
	Bending & Twisting	11	4
Upper Extremities	Both Arms below shoulder level	70	1
	One Arm above shoulder level	15	2
	Both Arms above shoulder level	12	3
	sitting	13	1
	Standing with straight lower limbs	31	1
Lower Extremities	Standing with one straight lower limb	22	2
	Standing with flexed knee	14	3
	squatting	6	3
	Kneeling	1	4
	walking	10	2

4. Discussion

This study revealed that the prevalence of musculoskeletal disorders among Sourak tobacco factory workers is high and 75% of workers have had the symptoms in at least one of their body region in the past year. The results of this study are close to the many studies that have been done in other industries, although there are some differences in prevalence and regions of the complaint. In Sourak tobacco factory, the most prevalent regions of musculoskeletal complaints were in low back (55%), knees (45%) and shoulders (37%) by Nordic questionnaire. In Mostaghasi study on the 70 agricultural tools producing workers in 2011, the prevalence of musculoskeletal disorders was 40.3% and low back (12.8%), knees (8.7%) and hands (7.8%) were the most prevalent regions (11). In Choobineh study on 116 workers of Shiraz sugar factory in 2009 the prevalence of low

back pain was 54.3% and shoulders pain was 48.3 % (12). The results of the study performed by Ismail on the montage workers in Malaysia in 2009 determined the prevalence of the symptoms in low back (32.9%), in knees (26.4%) and in shoulders (18.8%) (13). In aghilinezhad study on 1439 steel industry workers in Tehran in 2011, the prevalence of musculoskeletal disorders was 61% and the low back (63.8%), knees (45.3%) and neck (39.7%) were the most regions of complaint investigated by Nordic questionnaire (14). In The study of Spallak performed on 209 professional computer users in Germany in 2010.The prevalence of musculoskeletal disorders was estimated 67%. The most prevalent regions of symptoms were low back (40%), shoulders (40%) and knees (15%).According to our study and the mentioned studies the most prevalent disorder

is low back pain. Posture analysis by owas method in 97 work station In sourak tobacco factory showed that 30.9% body postures were normal, 37.1% body postures were stressful, 26.8% body postures were harmful and 5.1% body postures were very harmful .Owas posture analysis in 20 welders of oil industry performed by Soltani in 2010 showed that 58.5% of welders were in normal posture, 34.7% were in stressful posture, 4% were in harmful posture and 2.5% were in very harmful posture (16). In the other similar study performed by Habibi in Mahyaman factory in Isfahan, 72.2% of the workers were in normal posture, 21.2% in stressful posture, 2.7% in harmful posture and 3.5% in very harmful posture (17). Comparing these results to our investigation shows that the workers of Sourak tobacco factory are at higher risk for developing musculoskeletal disorders. According to our results, ergonomic interventional programs seem to be necessary. We recommend provide and use of ergonomic chairs, frequent rests, modification in manual material handling, workers education as well as engineering controls.

Acknowledgement

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