

Prevalence of Musculoskeletal Disorders Among Office Workers

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Background: Musculoskeletal disorders are among common occupational diseases in the world, which have high prevalence not only among hard and hurtful jobs, but also in office works.

Objectives: The purpose of this study was to describe the prevalence of musculoskeletal disorders (MSDs) among office workers of Ahvaz Jundishapur University of Medical Sciences.

Patients and Methods: This study carried out intermittently among 392 individuals of Ahvaz Jundishapur University of Medical Sciences office workers by Nordic questionnaire from October 2013 to December 2013. Study population included office workers of different departments as well as central organization and library. We use descriptive statistic, t test and chi-square test for data analysis.

Results: The mean and standard deviation of participants' age was 35.4 ± 6.7 years and their work experience was 9.7 ± 6.65 years, respectively. Most signs (51%) were in back region, which forced 18.9% of individuals to withdraw from daily activities. Statistical analysis also showed 36.7% neck disorders in office workers, which demonstrated significant association with age and work experience ($P < 0.001$).

Conclusions: Significant association of work experience and age with musculoskeletal disorders shows that individual's education and knowledge improvements with regard to ergonomics risk factors and correction of work postures are very important and ought to follow management and technical practices in the organization.

Keywords: Musculoskeletal Disorders; Posture

1. Background

Occupational diseases and disorders are among common problems in society (1). Studies show that feeling pain in different parts of musculoskeletal systems is one of major reasons for absence from workplaces (2). Musculoskeletal disorders related to work are among health problems in work places of industrially developed and developing countries, which are caused by work cumulative trauma disorders (WCTDs) during exposure to stressful biomechanical and social-psychological agents in work places for a long period of time (3). Most causes of these disorders include long sitting and excessive leaning (4). According to researchers and in spite of increase in automatic and mechanized processes, occupational musculoskeletal disorders are still the major factor in losing work hours, increase of costs, and human damages (5). Epidemiologic studies show clues of relation between work factors and musculoskeletal disorders and also some studies demonstrate that pain prevalence, pain location, and other signs maybe related to standing posture, work habit, and other demographic factors (6). Muscular pains, weaknesses, and pain due to work, arthritis, need for change in body posture during work and prolonged muscular stiffness are signs of

joints inflammation during work (7). Office works are among jobs that have high prevalence of musculoskeletal disorders. Prolonged sitting, work with computer, repetitive works, static postures, and bad environmental conditions are some of the causes for musculoskeletal disorders (8). Studies about causes of musculoskeletal disorders in hand, wrist, arm, shoulders, and neck of office workers was among most prominent projects during 1980 to 1990 in developed countries (9). In past decades, prevalence of musculoskeletal disorders increased very much, for example in the United States of America, musculoskeletal disorders were responsible for 13% of work-day losses till 1994 (10). Musculoskeletal disorders comprise 7% of all of diseases in population, 14% of physician attendance, and 19% of hospital admitted individuals. In addition, 62% of people with musculoskeletal disorders have some sort of limitation in movements (11). Economic losses due to musculoskeletal disorders affect not only individuals but also organizations and society (12). Increase in musculoskeletal disorders results in decrease in quantity and quality of work, increase in work-hour losses and early work hindrance. Comparison of musculoskeletal disorders in men and

women are difficult, so doesn't exposure to equal risks but in women have high prevalence, besides old people in comparison with young individuals are more at risk of these disorders (13, 14). Musculoskeletal disorders have great and direct economic burden on health systems and indirectly affect and decrease work efficiency (7). According to National Institute for Occupational Safety and Health (NIOSH) in 1997, musculoskeletal disorders have the second rank among health problems. In the United States of America, about 1 million individuals per year become absent from work places for treatment and freedom from pains due to musculoskeletal disorders and government pay compensation to 2% of work forces due to backache every year (15). Nowadays with regard to vastness of musculoskeletal disorders that leads to a lot of compensation paid to work forces, prevention and control of work disorders have high priority (5). Thus, based on these reasons and the responsibility of Ministry of Health, the best available services need to be presented to healthy workforce (6). This study conducted to determine quantity of prevalence of musculoskeletal disorders among office workers of Ahvaz Jundishapur University of Medical Sciences in 2013.

2. Objectives

The purpose of this study was to describe the prevalence of musculoskeletal disorders (MSDs) among office workers of Ahvaz Jundishapur University of Medical Sciences.

3. Patients and Methods

In this descriptive-analytical research, 392 office workers of Ahvaz Jundishapur University of Medical Sciences took participated. Study population comprised office workers of different faculties (Health, Dentistry, Pharmacy, Nursery, Midwifery, Paramedicine, and Rehabilitation Schools) and office workers of head office and library. This study carried out intermittently by Nordic questionnaire. This questionnaire gives useful and reliable information about musculoskeletal disorders, which could be used for corrective actions. Validity and reliability of this questionnaire is assessed and certified by experts. Necessary data collected by optional interview with office workers after taking permission from Ahvaz Jundishapur University of Medical Sciences. Some of the variables in this questionnaire comprise sex, age, job duration, education level, work shift, pain existence, ailment and numbness in neck, shoulder, elbow, wrist, thigh, hips, knee, ankle, job hindrance (disabling attack) during previous 12 months due to musculoskeletal disorders in one of mentioned parts. To examine the prevalence of musculoskeletal disorders, we used frequency tables and charts and for evaluation of prevalence of these disorders according to age, sex and other factors we use related tables and charts. Data analysis carried out by descriptive statistical methods, t test, and chi-square test by SPSS 16 program.

4. Results

Out of 392 individuals who participated in this study, 207 participants (52.8%) were female and 185 (47.2%) were male. The mean and standard deviation for female age and male age were 35.3 ± 6.7 and 35.6 ± 6.8 y, respectively and the mean and standard deviation of job duration for males and females were 9.8 ± 6.8 and 9.6 ± 6.4 y, respectively. According to education level, 7.9% of individuals had doctorate degree, 17.9% of individuals had Master of Science degree, 53.1% had Bachelor of Science degree, and 21.2% had diploma or higher degree. Sixty-seven percent of individuals were working in the morning shift and 32.4% of individuals were working in both morning and afternoon shift. Results of this study showed that during previous 12 months, and also previous 7 days, signs of disorders in some regions of different body parts have been seen, which were demonstrated in Table 1. Most signs were in back region by 51% frequency and then in neck region by 36.7% and in these two regions which showed in Table 1. Disabling attack from daily activity were also reported. According to Table 2, prevalence of musculoskeletal disorders in women and men is a significant difference only seen in wrist and in other body regions don't have any significant difference.

Table 1. Prevalence of Musculoskeletal Disorders (MSDs) in Different Body Parts During the Previous Week or Year and Prevalence of Disabling Disorders ^{a,b}

Body Part Affected by MSD	Previous 7 days	Previous 12 Months	Disabling Disorders
Upper Back			
Yes	147 (37.5)	200 (51)	35 (8.9)
No	245 (62.5)	192 (49)	357 (91.1)
Lower Back			
Yes	54 (13.8)	74 (18.9)	5 (1.3)
No	338 (86.2)	318 (81.1)	387 (98.7)
Shoulder			
Both	45 (11.5)		
Left	24 (6.1)	35 (8.9)	
Right	31 (7.9)	40 (10.2)	
No	292 (74.5)	263 (67.1)	100 (100)
Neck			
Yes	98 (25)	144 (36.7)	7 (1.8)
No	294 (75)	248 (63.3)	385 (98.2)
Wrist			
Both	8 (2)	14 (3.6)	
Left	8 (2)		
Right	63 (16.1)	91 (23.2)	4 (1)
No	313 (79.8)	277 (70.7)	388 (99)
Elbow			
Both	3 (0.8)	2 (0.5)	
Left	2 (0.5)	4 (1)	1 (0.3)
Right	9 (2.3)	15 (3.8)	
No	378 (96.4)	371 (64.6)	391 (97.7)

^a All Values are presented as No. (%).

^b n=392.

In addition, according to work location in different faculties shown in Table 3, there were not any significant difference in most body parts, except in back region, which significant differences were seen among faculties. The mean and standard deviation of age were 35.4 ± 6.7 year and for work experience were 9.7 ± 6.65 years, respectively. Most signs (51%) were in back region, which forced 18.9% of individuals to withdraw from daily activities. Statistical analysis showed 36.7% disorders were in neck

region, which demonstrated significant association with age and work experience ($P < 0.01$). Table 4 shows the results related to job duration and prevalence of the musculoskeletal disorders and illustrates significant relationship between work duration and the pain in the back and neck area, also with longer job duration, complains also increases. Table 5 shows the relationship between age and job duration with the frequency of signs in different body parts.

Table 2. Musculoskeletal Disorders (MSDs) Among Women and Men During Previous 12 Months^a

Body parts	Male ^a	Female ^a	P Value	χ^2
Upper back	97 (50.5)	95 (49.5)	0.196	1.67
Lower back	30 (40.5)	44 (59.5)	0.203	1.62
Neck	61 (42.4)	83 (57.6)	0.144	2.13
Shoulder	52 (40.3)	77 (59.7)	0.056	3.65
Wrist	44 (38.3)	71 (61.7)	0.022	5.211
Elbow	13 (68.4)	6 (31.6)	0.07	5.32

^a Values are presented as No. (%).

Table 3. Comparison of Prevalence Musculoskeletal Disorders During Previous 12 Months at Different Faculties^a

Body Parts Faculties	Upper Back	Lower Back	Shoulder	Neck	Wrist	Elbow
Health	24 (49)	8 (16.3)	10 (20.4)	13 (26.5)	13 (26.5)	3 (6.1)
Medicine	20 (54.1)	16 (43.2)	12 (32.7)	13 (35.1)	9 (24.3)	3 (8.1)
Pharmacy	19 (45.2)	8 (19)	16 (38.1)	14 (38.5)	11 (26.2)	0
Dentistry	16 (41)	1 (2.6)	9 (23.1)	15 (38.5)	13 (26.5)	3 (7.7)
Nursery and Midwifery	22 (57.9)	6 (15.8)	13 (34.2)	16 (44.4)	9 (23.7)	3 (7.9)
Paramedicine	15 (53.6)	3 (10.7)	8 (28.6)	11 (39.3)	6 (21.5)	0
Rehabilitation	16 (51.6)	5 (16.1)	8 (25.8)	12 (38.7)	5 (16.2)	0
Central Organization	46 (50)	17 (18.5)	35 (38)	35 (38)	36 (39.1)	6 (6.5)
Central Library	22 (61.1)	10 (27.8)	18 (50)	16 (44.4)	18 (50)	3 (8.3)
P Value	$P > 0.05$	$P < 0.05$	$P > 0.05$	$P > 0.05$	$P > 0.05$	$P > 0.05$

^a All Values are Presented as No. (%).

Table 4. Comparison of Participants' Ages in Parts of Body with High Prevalence of Musculoskeletal Disorders

Disorders	Previous 12 Months			Previous 7 Days		
	No.	Age, y	Significance ^a	No.	Age, y	Significance ^a
Neck			0 ^b			0
Yes	144	37 ± 6.9		98	37.6 ± 7.34	
No	248	34 ± 6.49		294	34.7 ± 6.43	
Back			0.001			0.001
Yes	200	36.6 ± 7.2		147	36.8 ± 7.45	
No	192	34.25 ± 6		245	34.6 ± 6.22	

^a P Value.

^b Independent t test for Comparison of two Body Parts with Highest Prevalence.

Table 5. Comparison of Prevalence of Musculoskeletal Disorders During Previous 12 Months Among Employee According to Job Duration

Disorders Job duration, y	Upper back		Lower back		Shoulder		Neck		Wrist		Elbow	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
<1	4	7	2	9	1	10	2	9	1	10	0	11
1-5	58	75	25	108	39	94	35	98	34	99	99	18
5-10	48	51	18	81	35	64	34	65	30	69	9	99
10-20	69	52	21	100	39	82	60	61	38	83	3	118
>20	21	7	8	20	15	13	13	15	12	16	2	26
P value	$P < 0.01$		$P > 0.05$		$P > 0.05$		$P < 0.001$		$P > 0.05$		$P > 0.05$	

Table 6. Odds Ratio among Different Parts of Body During Previous 12 Months

Body Parts	Upper Back	Lower Back	Neck	Shoulder	Wrist
Job Duration^a					
OR ^b	1.85	1.06	2.33	0.7	0.72
CI ^c	1.27-2.79	1.78-0.63	3.55-1.52	0.7-1.2	0.46-1.12
P Value ^d	0.004	0.8	0.0001	0.27	0.15
Age^e					
OR ^a	1.5	0.9	1.7	0.88	0.85
CI ^b	1.001-2.23	0.54-1.5	1.13-2.57	0.57-1.34	0.55-1.32
P Value ^c	0.049	0.7	0.012	0.55	0.49

^a Year < 10 and > 10.^b Odds Ratio.^c Confidence Interval.^d Chi-square Tests for Comparison age and job Duration between Groups with and Without Disorders.^e Year < 35 and > 35.

5. Discussion

This study carried out among office workers of Ahvaz Jundishapur University of Medical Sciences by Nordic questionnaire to investigate musculoskeletal disorders. Results showed the prevalence of 51% and 36.5% of backache and neck ache among them, respectively, which is high prevalence among office workers and most of other studies also demonstrate this too (16-18). Meanwhile findings of this study showed that desk jobs are at high risk for development of musculoskeletal disorders. Chubineh study showed prevalence of back and neck signs were 49% and 47%, respectively in office workers (8). Prevalence of developing disorders at least in one region of the body during previous 12 months and even in previous 7 days were reported by office workers, which were consistent with similar studies (4, 15, 19, 20). In addition, results showed a significant relationship between job duration and age of individuals with musculoskeletal disorders in all studied body parts ($P < 0.05$), which other studies reported as significant factor too (21). In this study, the mean of age and job duration were 35.4 and 9.7 y, respectively, which demonstrate a young population having disorders in all body parts. These disorders even in most occasions cause problems and absence from daily works, which are presented in For For example, backache are shown by 51% of prevalence of disorders among office workers, which forced 18.9% of individuals to hinder and become absent from daily works. According to our results, people with job duration higher than 10 years, in comparison to people with job duration lower than 10 years have 1.85 times more back disorders ($P < 0.004$, OR = 1.85) and people with job duration longer than 10 years, have 2.33 times more chance for developing neck disorders ($P < 0.004$, OR = 2.33) (22). Meanwhile as shown in Table 6 for other parts of body, no statistical significance with job duration was seen ($P > 0.05$). All cases, which mentioned in relation

with job duration have agreement with age factor and people, which have back and neck disorders in comparison to people who do not these disorders show high level of statistical significance ($P < 0.0001$). Nevertheless, sex of the people showed no statistical significance with age and job duration ($P > 0.05$). Besides degree of education, work shift and faculties of work location do not show statistical significance with disorders in different parts of body, which demonstrates that bad work conditions, and education in proper doing of actions and neglecting the right postures and lack of proper work stations gradually cause disorders in people and in long run create irrecoverable effects on them (23, 24).

According to our results and comparison of them with other studies, we conclude that office works have high risks in the development of musculoskeletal disorders and perhaps in the long run become source of job hindrance and other serious problems for people. For these reasons having both a short- and long-term programs for control of risk factors of job situations and continuous education of office workers for taking care of ergonomic principles is a crucial subject. Moreover, managers are needed to create programs for work posture assessments, periodic examinations of work conditions, modification of wrong postures, and designing proper work stations in relation to individuals.

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References

1. Wegner S, Jull G, O'Leary S, Johnston V. The effect of a scapular postural correction strategy on trapezius activity in patients with neck pain. *Man Ther*. 2010;**15**(6):562-6.
2. Mohebi GH, Nikooravesh A, Shaabani J. [Prevalence of musculoskeletal disorders in special force of Iran police staff]. *J police med*. 2011;**1**(1):19-22.
3. Choobineh AR. [Methods of assessment Posture in occupational Ergonomic]. Tehran: Fanavaran; 2003.
4. Akrouf QA, Crawford JO, Al-Shatti AS, Kamel MI. Musculoskeletal disorders among bank office workers in Kuwait. *East Mediterr Health J*. 2010;**16**(1):94-100.
5. Helander M. *A guide to the ergonomics of manufacturing*. Tehran: Sanaye danesh; 2013.
6. Khosroabadi A, Razavi S, Fallahi M, Akaberi A. [The prevalence of musculoskeletal disorders in health- treatment employees at Sabzevar University of medical sciences in Iran, 2008]. *Quarterly J Sabzevar Uni Med Sci*. 2010;**17**(3):218-23.
7. Kangarlo HR, Malekzadeh SH, Alizadeh K, Shamshiri. B. . [The prevalence of musculoskeletal disorders causes of disability retirement among Air Force personnel during 1992-2003]. *J Army Uni Med Sci*. 2006;**4**:813-8.
8. Choobineh AR, Rahimi fard H, Jahangiri M, Mahmood khani S. [Musculoskeletal injuries and their associated risk factors in office work places]. *Iran Occupat Health*. 2012;**8**(4):70-80.
9. Ijmker S. *Risk factors for arm-wrist-hand and neck-shoulder symptoms among office workers. A longitudinal perspective [thesis] Enschede*. The Netherlands: Print Partners Ipskamp BV; 2008.
10. Khani-Jazani R, Fallah H, Barkhordari A, Hokmabadi RA. [The prediction of the incidence rate of upper limb musculoskeletal disorders, with CTD risk index method on potters of Meybod city]. *Zahedan J Res Med Sci*. 2012;**13**(9):48-51.
11. Moosavi Najarkala SA. [Effect of age on Upper limb musculoskeletal disorders prevalence among Ghaemshahr textile workers]. *J Payesh*. 2007;**2**:109-17.
12. Mohammadfam I, Kianfar A, Afsartala B. [Assessment of musculoskeletal disorders in a manufacturing company using QEC and LUBA methods and comparison of results]. *Iran Occupational Health*. 2010;**7**(1):54-60.
13. Jafari nodoushan R, Halvani G, Vatani shoa'a J, Salmani Nodoushan Z. . [Survey of Musculoskeletal disorders among bank staff in Yazd]. *Occupat Med Quarterly J*. 2011;**3**(1):1-7.
14. Choobineh AR, Mohammad Beigi A, Solaymani E. Musculoskeletal Symptoms among Workers of Metal Structure Manufacturing Industry in Shiraz, 2005. *Iranian J epidemiol*. 2009;**5**(3):35-43.
15. Habibi E, Gharib S, Shakerian M, Hasanzadeh A. [Musculoskeletal disorders and ergonomics of workers involved with analyzing the situation manually carrying goods in the dairy industry]. *Health Syst Res*. 2010;**6**(4):649-56.
16. Chaiklieng S, Suggaravetsiri P, Boonprakob Y. Work ergonomic hazards for musculoskeletal pain among university office workers. *Walailak J*. 2010;**7**(2):169-76.
17. Banibrata D, Tirthankar G. Assessment of ergonomical and occupational health related problems among VDT workers of west Bengal, india. *Asian J Med Sci*. 2010;**1**(2):26-31.
18. Chaiklinc S, suggestaravetsiri P, boonprakob Y. Work ergonomic hazards for musculoskeletal pain among University Office Workers. *Walailak J Sci Techno (WJST)*. 2011;**7**(2):169-76.
19. Eltayeb S, Staal JB, Kennes J, Lamberts PH, de Bie RA. Prevalence of complaints of arm, neck and shoulder among computer office workers and psychometric evaluation of a risk factor questionnaire. *BMC Musculoskelet Disord*. 2007;**8**:68.
20. Janwantanakul P, Pensri P, Jiamjarasrangsi V, Sinsongsook T. Prevalence of self-reported musculoskeletal symptoms among office workers. *Occup Med (Lond)*. 2008;**58**(6):436-8.
21. Rahimabadi S, Khanjani N, Mardi H. The Prevalence of Musculoskeletal Disorders and their Related Factors in Workers of a Dairy Factory, Nishabur, Iran. *J Health Develop*. 2012;**1**(2):121-9.
22. Lemasters GK, Atterbury MR, Booth-Jones AD, Bhattacharya A, Ollila-Glenn N, Forrester C, et al. Prevalence of work related musculoskeletal disorders in active union carpenters. *Occup Environ Med*. 1998;**55**(6):421-7.
23. Veselkov AG, Malkov VA, Frank-Kamenetskl MD, Dobrynin VN. Triplex model of chromosome ends. *Nature*. 1993;**364**(6437):496.
24. Amick B3, Robertson MM, DeRango K, Bazzani L, Moore A, Rooney T, et al. Effect of office ergonomics intervention on reducing musculoskeletal symptoms. *Spine (Phila Pa 1976)*. 2003;**28**(24):2706-11.