

Prevalence of Musculoskeletal Disorders and Their Relationship with Some Work-Related Factors among of faculty members of Shahid Sadoughi university of medical sciences of Yazd in 2015

Mozhgan Modarresi¹, Ali Mohammad Fallah Tafti², Mohammad Karim Touri², *Arezoo Aghakoochak³

¹Department of Community Medicine, School of Medicine, Health Monitoring Research Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran ²Shahid Sadoughi University of Medical Sciences, Yazd, Iran ³Health Monitoring Research Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

ABSTRACT

Introduction: Nowadays, musculoskeletal disorders (MSDs) are one of the most common work-related problems in the world. The aim of this present study was to determine the prevalence of MSDs and their relationship with work-related factors among faculty members at Shahid Sadoughi University of Medical Sciences in Yazd, Iran. **Materials and Methods:** This cross sectional study was conducted on 113 faculty members at the Shahid Sadoughi University of Medical Sciences in 2015. Data were collected by a standard self-administered questionnaire consisting of three major parts: demographic and work-related variables, musculoskeletal symptoms, and a modified version of the Standard Nordic Questionnaire. Data were analyzed by SPSS (version 16) using appropriate statistical tests. P-values less than 0.05 were considered statistically significant. **Results:** Pain in the low back (27.9%) and neck (25%) was the most common complaint among the subjects. Overall, 80 subjects (70.79%) had symptoms of pain in at least one part of the body in the past year. The highest rate of complaints was related to laboratory technicians (94.73%). There was a statistically significant association between prevalence of MSDs and teaching time. **Conclusions:** The prevalence of MSDs among faculty members of the Shahid Sadoughi University of Medical Sciences is high and more than the general population of Iran. The musculoskeletal complaints are significantly associated with teaching time.

KEYWORDS: Work-related complaints, Musculoskeletal disorders, Medical teachers

*Correspondence: Arezoo Aghakoochak, Address: Health Monitoring Research Center, Shahid Sadoughi University of Medical Sciences, Telephone: +98-3538203410, Email: a.aghakoochak@yahoo.com

INTRODUCTION

Nowadays, following the advances in industry and technology, the prevalence of musculoskeletal disorders (MSDs) has changed [1,2]. MSD is defined as feeling of discomfort, difficulty or pain in the musculoskeletal system (joints, muscles, tendons) or soft tissues of the body, due to repetitive and intermittent movement or long-term poor body postures [3]. Such disorders are among the most common causes of disability and chronic pain that affect millions of people throughout the world. MSDs are also considered as the most important cause of occupational injury and disability in the world [4]. According to the National Institute for Occupational Safety and Health in United States, MSDs are among the most important and common work-related diseases, and the main cause of absenteeism [5].

Every occupation has its own health risks. Healthcare workers are at risk of developing MSDs [6-8]. Statistics show that about one third of healthcare workers sick leaves are related to MSDs [9]. Physical, emotional, and social conditions are some of the risk factors associated with MSDs, but stress is known as the most important risk factor [10]. Physicians are constantly exposed to work-related stressors. Although work-related disorders may vary in physicians depending on their specialty, MSDs can be seen in all medical workers. Faculty members of universities are also at risk for MSDs [11]. According to previous studies, waist, neck, shoulder and knee are the most common areas affected in medical students, dentists and nurses [12-14]. Most of these studies have focused on the prevalence of MSDs among

dentists, nurses and physiotherapists, and little information is available regarding this issue among faculty members and physicians [14-17]. Therefore, this study aimed to determine the type and frequency of work-related MSDs among faculty members of Shahid Sadoughi University of Medical Sciences in Yazd.

MATERIALS AND METHODS

This cross sectional study was performed on 131 faculty members working at the Shahid Sadoughi University of Medical Sciences in Yazd between spring and summer 2015. The subjects were selected via convenience sampling. Study protocol was approved by the ethics committee of the Shahid Sadoughi University of Medical Sciences, Iran. Inclusion criterion consisted of having at least one year of teaching experience. Exclusion criteria included history of having diseases that affect the musculoskeletal system and musculoskeletal injury caused by accidents. Overall, 122 subjects were enrolled in the study. First, objectives and importance of the study were described for each participant. Then, a questionnaire was provided for each subject after obtaining written consent. All participants completed the questionnaire. The questionnaire used consisted three parts. The first part of the questionnaire assessed demographic characteristics and work-related information including age, gender, body mass index (BMI), marital status, dominant hand, type of work, work experience, working hours, and body posture. The second part of the questionnaire consisted of the Nordic standard questionnaire for assessment of MSDs. The validity and reliability of the questionnaire has been confirmed in Iran (SEM=0.56-1.76,

ICC>0.7) [18-19]. The symptoms of disorders were determined and severity of pain was assessed using the verbal scale [20]. In the questionnaire, body has been divided into nine anatomical sites (neck, shoulder, elbow, wrist and hand, back, waist, hips and thighs, knees, feet and ankles). The subjects were questioned if they felt any pain or discomfort in these anatomical sites within the past seven days and 12 months, and whether such inconveniences have caused difficulty in performing their work responsibilities and daily activities. After collecting the completed questionnaires, data were analyzed in SPSS (Version 20) using descriptive statistics, t-test, chi-square test and Fisher's exact test.

RESULTS

Demographic profile and characteristics of the participants are shown in tables 1 and 2. Among the subjects, 84.1% had experienced discomfort or pain. The most common musculoskeletal complaints were related to the waist (27.9%), neck (25%), and wrist and fingers (16.3%). According to the results, MSDs were caused by work-related factors in 55.8% of the participants. The frequency and duration of MSDs in the study population are shown in figures 1 and 2, respectively. We found that 31 (25.4%) faculty members visited a doctor or sought treatment in the past year because of MSDs. Among these individuals, 22.6% went to the hospital and 16.1% underwent physiotherapy for waist and then neck discomfort. Moreover, feelings of discomfort in at least one body area caused by MSDs prevented 20 subjects (22.95%) from performing daily activities during the past year.

Table 1. Characteristics of faculty members at the university

| | Number | Percentage |
|--------------|------------|------------|
| Male | 91 | 74.6 |
| Female | 31 | 25.4 |
| Total | 122 | 100 |
| Single | 6 | 4.9 |
| Married | 116 | 95.1 |

| | | |
|--|------------|------------|
| Total | 122 | 100 |
| Right-hander | 109 | 89.3 |
| Left-hander | 13 | 10.7 |
| Total | 122 | 100 |
| Teaching while standing | 74 | 60.7 |
| Teaching while sitting | 4 | 3.3 |
| Teaching while standing and sitting | 44 | 36.1 |
| Total | 122 | 100 |
| Work at Faculty of Medicine | 36 | 29.5 |
| Work at Faculty of Laboratory Sciences | 23 | 18.9 |
| Work at Faculty of Surgery | 26 | 21.3 |
| Work at Faculty of Non-invasive Medicine | 37 | 30.3 |
| Total | 122 | 100 |

Table 2. Characteristics of the study population

| | Mean | Standard Deviation |
|--|--------|--------------------|
| Age | 45.43 | 8.38 |
| Height | 171.35 | 7.84 |
| Weight | 75.81 | 12 |
| BMI | 25.78 | 3.12 |
| Work experience | 13.96 | 9.44 |
| Work hours per week in the office / laboratory (hours) | 29.03 | 14.4 |
| Teaching hours per week (hours) | 13.65 | 10.04 |
| Exercise per week (hours) | 3.18 | 1.84 |

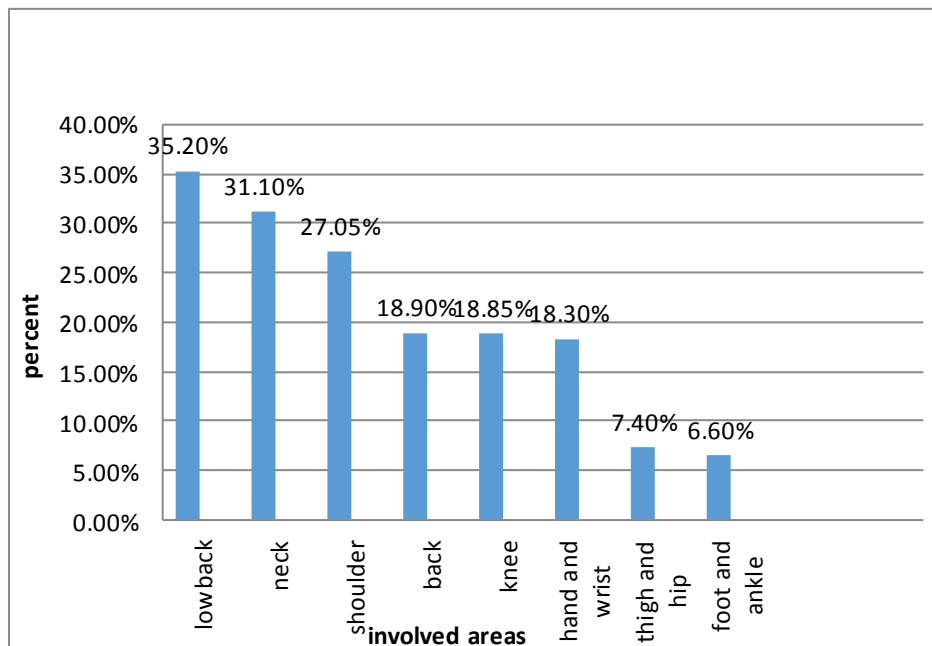


Figure 1. . Ffrequency of MSDs among faculty members during the past year

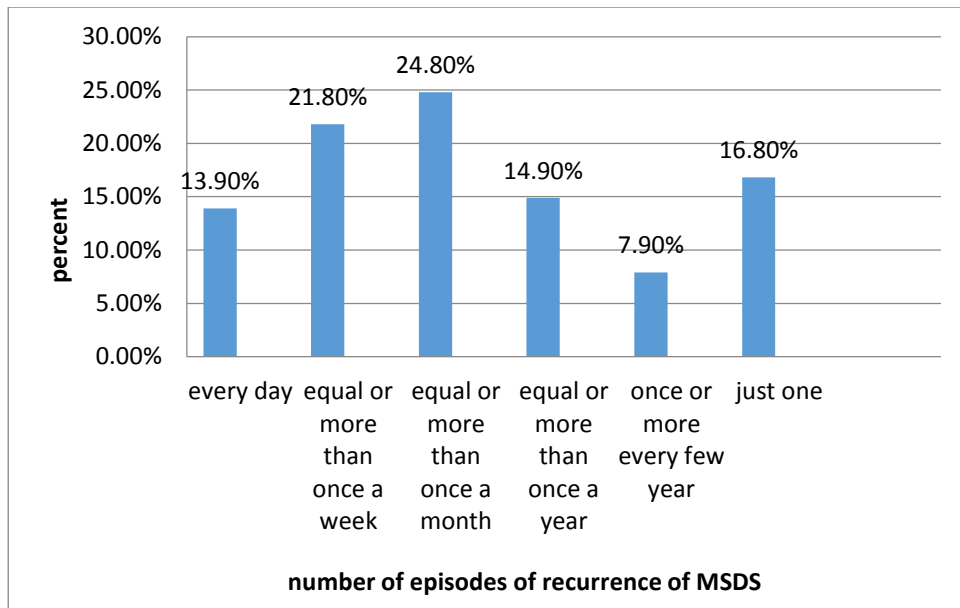


Figure 2. Frequency of repetitive MSDs among faculty members during the past year

Frequency of MSDs in different body areas and its related disabilities are shown in Table 3. Lower back pain was the most common type of MSD with prevalence of 35.2% in the last year, while neck pain was the most common symptom (31.1%). The least common symptom over the past year was pain in wrist and fingers (6.6%) (Figure 1). We also found that 13.9% of the

participants constantly experienced pain in over the past year (Figure 2). No statistical relationship was found between MSDs and gender, type of work and body posture during teaching (Table 4). MSDs had no significant correlation with BMI, age, working hours, and duration of weekly exercise (Table 5).

Table3. Frequency of MSDs in different body areas among the study population

| | MSDs in the past 12 months | | | | MSDs in the past seven months | | | | Activity in the past 12 months | | | |
|-----------------------|----------------------------|-------|--------|-------|-------------------------------|-------|--------|-------|--------------------------------|-------|--------|-------|
| | YES | | NO | | YES | | NO | | YES | | NO | |
| | Number | % | Number | % | Number | % | Number | % | Number | % | Number | % |
| Neck | 38 | 31.1% | 84 | 68.9% | 21 | 17.2% | 101 | 82.8% | 6 | 4.9% | 116 | 95.1% |
| Shoulder | 23 | 27% | 89 | 73% | 17 | 14% | 105 | 86.1% | 3 | 2.4% | 119 | 97.5% |
| Elbow | 12 | 9.8% | 110 | 90.2% | 6 | 4.9% | 116 | 95.1% | 2 | 1.6% | 120 | 98.4% |
| Wrist and hand | 22 | 18.1% | 100 | 82% | 15 | 12.2% | 107 | 87.7% | 8 | 6.5% | 114 | 93.4% |
| Back | 23 | 18.9% | 99 | 81.1% | 13 | 10.7% | 109 | 89.3% | 6 | 4.9% | 116 | 95.1% |
| Low back | 43 | 35.2% | 79 | 64.8% | 25 | 20.5% | 97 | 79.5% | 14 | 11.5% | 108 | 88.5% |
| Thigh | 9 | 7.4% | 113 | 92.6% | 9 | 7.4% | 113 | 92.6% | 5 | 4.1% | 117 | 95.9% |

| | | | | | | | | | | | | |
|-----------------------|----|-------|-----|-------|----|-------|-----|-------|---|------|-----|-------|
| and hip | | | | % | | | | % | | | | % |
| Knee | 23 | 18.9% | 99 | 81.1% | 14 | 11.4% | 108 | 89.5% | 6 | 4.9% | 116 | 95.1% |
| Ankle and foot | 8 | 6.6% | 114 | 93.4% | 6 | 5% | 116 | 95.1% | 1 | 0.8 | 121 | 99.2% |

Table 4. The relationship between frequency of MSDs and study variables based on results of the Chi-Square test

| MSDs | | + | | - | | Total | | P-value |
|------------------------------------|---------------------|--------|---------|--------|---------|--------|---------|---------|
| | | Number | percent | number | percent | number | percent | |
| Gender | Male | 67 | 81.7 | 15 | 18.3 | 82 | 100 | 0.56 |
| | Female | 28 | 90.32 | 3 | 9.68 | 31 | 100 | |
| Body posture while teaching | Standing | 59 | 86.76 | 9 | 13.24 | 68 | 100 | 0.43 |
| | Sitting | 3 | 75 | 1 | 25 | 4 | 100 | |
| | Sitting/Standing | 33 | 80.49 | 8 | 19.51 | 41 | 100 | |
| Occupation | Basic Sciences | 29 | 90.63 | 3 | 9.38 | 32 | 100 | 0.2 |
| | Laboratory Sciences | 18 | 94.74 | 1 | 5.26 | 19 | 100 | |
| | Surgeon | 20 | 76.92 | 6 | 23.08 | 26 | 100 | |
| | Clinician | 28 | 77.78 | 8 | 22.22 | 36 | 100 | |

Table 3. Association of MSDs with work-related factors based on results of the independent sample t-test

| Variable | Age | BMI | Work hours spent in clinic/laboratory | Weekly exercise hours | Weekly teaching hours |
|----------------|------------|-----------|---------------------------------------|-----------------------|-----------------------|
| MSDs | Mean ± SD | Mean ± SD | Mean ± SD | Mean ± SD | Mean ± SD |
| Yes | 45.05±8.53 | 25.62±3.9 | 27.78±14.18 | 3.08±1.67 | 14.12±9.64 |
| No | 47.22±7.21 | 26.67±3.9 | 34.14±15.15 | 2.77±1.54 | 8.72±7.83 |
| P-value | 0.31 | 0.2 | 0.15 | 0.61 | 0.02 |

DISCUSSION

This study aimed to determine the prevalence of MSDs among faculty members of a medical university. Due to increased prevalence of work-related disorders, there is a need for identification of high-risk individuals and better planning to reduce or prevent the incidence of such disorders. According to the study, 55.8% of the faculty members studied stated that MSDs are caused by work-related factors. The results showed that 84.1% of the faculty members experienced pain and discomfort in their body. However, the type of work had no significant association with

the prevalence of MSDs. Study of Mehrdad et al. on 405 Iranian physicians working in teaching hospitals revealed that 41.7% of the participants suffered from MSDs in at least one body area within the past few years. However, the prevalence of these disorders in the mentioned study is lower than that in our study [21]. In another study, 72.4% of laboratory technicians experienced MSDs in at least one body, which is similar to our findings [22]. We found that back pain (35.2%) and neck pain (31.1%) were the most common MSDs among the faculty members of the university. Discomfort in the ankles and

toes had the lowest prevalence rate (6.6%) in our study.

Study of Cromie et al. in Australia and Adegoke et al. in Nigeria reported that majority of MSDs were related to waist [23-24]. In a study on nurses in Japan, the prevalence of MSDs in the waist area was reported to be 82.6%, which was mainly due to high physical activity required for this profession [25]. Back pain was reported as the most common complaint among ophthalmologists in the Northeastern United States [26]. In a study by Leggat et al. on Australian dentists, neck was the most commonly affected body area with prevalence of 24.6% [27].

The prevalence of MSDs in our subjects is more than that of Iran's general population. In study of Noorbala et al., the prevalence of back pain and neck pain was reported to be 18% and 7%, respectively. However, we found that the prevalence of back pain and neck pain was 27.9% and 25%, respectively [28].

We found a significant relationship between weekly teaching duration and frequency of MSDs. Poor body posture while teaching could be another factor that influences the prevalence of such disorders among faculty members. According to our study, only 3.5% of professors teach while in a sitting position, whereas 60.2% of them teach while standing. However, we found no significant association between body posture during teaching and the prevalence of MSDs.

In office workers and laboratory technicians, there was a significant relationship between duration of work hours and the frequency of back pain, which could be due to long sitting periods. Moreover, the prevalence of lower back pain was significantly higher in subjects who exercised more frequently. This could be due to the lack of knowledge on how to exercise properly since heavy and inappropriate exercises can increase the incidence of back pain.

CONCLUSION

We found that waist and neck are the most common body areas affected in MSDs among the faculty members of the university. The prevalence of these disorders is higher than the general population of Iran. In addition, there is a significant relationship between weekly teaching time and the frequency of MSDs.

CONFLICT OF INTEREST

There is no conflict of interest

ACKNOWLEDGMENTS

This article has been derived from a thesis approved by the Shahid Sadoughi University of Medical Sciences. We would like to thank the Vice Chancellor of Research at the Shahid Sadoughi University of Medical Sciences and all faculty members who helped in the study.

REFERENCES

- 1-Vanwonderghem k. Work-related musculoskeletal problems: Some ergonomic considerations. *J Hum Ergol.* 1996; 25(1):5-13.
- 2-Santos AC, Bredemeier M, Rosa KF, Amantea VA, Ricardo MX. Impact on the quality of life of an educational program for the prevention of work-related musculoskeletal disorders: a randomized controlled trial. *BMC public health.* 2011; 11: 60.
- 3-Pollack R. Dental office ergonomics: how to reduce stress factors and increase efficiency. *J Can Dent Assoc.* 1996; 62(6):508-10.
- 4-Shahnavaz H. Workplace injuries in the developing countries. *Ergonomics* 1987; 30(2): 397-404
- 5-National Research Council and Institute of Medicine. *Musculoskeletal disorders and the workplace; low back and upper Extremities.* Washington, DC: National Academy Press; 2001.
- 6-Campo M, Weiser S, Koenig KL, Nordin M. Work-related musculoskeletal disorders in physical therapists: a prospective cohort study with 1-year follow-up. *PhysTher.* 2008; 88(5): 608 – 619.
- 7-Lorusso A, Bruno S, L'Abbate N. Musculoskeletal complaints among Italian X-ray technologists. *Ind Health.* 2007; 45(5): 705 – 708.

- 8-Ylipaa V, Szuster F, Spencer J, Preber H, Benko SS, Arnetz BB. Health, mental well-being, and musculoskeletal disorders: a comparison between Swedish and Australian dental hygienist. *J Dent Hyg.* 2002; 76(1): 47 – 58.
- 9-Meijssen P, Knibbe HJ. Work-related musculoskeletal disorders of perioperative personnel in the Netherlands. *AORN J.* 2007; 86(2): 193 – 208.
- 10-Putz-Anderson V, Bernard BP, Burt SE, Cole LL, Estill CF, Fine LJ, et al. Musculoskeletal disorders and workplace factors. National Institute for Occupational Safety and Health (NIOSH); 1997.
- 11-Fisher T, Gibson t, Measure of university employees' exposure to risk factors for work-related musculoskeletal disorders. *AAOHNJ.* 2008;56(3): 107-14
- 12-Smith DR, Wei N, Ishitake T, Wang RS. Musculoskeletal disorders among Chinese medical students. *Kurume Med J.* 2005; 52: 139 – 146.
- 13-Thornton LJ, Barr AE, Stuart-Buttle C, Gaughan JP, Wilson ER, Jackson AD, et al. Perceived musculoskeletal symptoms among dental students in the clinic work environment. *Ergonomics.* 2008; 51(4): 573 – 586.
- 14-Smith DR, Leggat PA. Musculoskeletal disorders among rural Australian nursing students. *Aust J Rural Health.* 2004; 12(6): 241 – 245.
- 15-Alexopoulos EC, Stathi IC, Charizani F. Prevalence of musculoskeletal disorders in dentists. *BMC MusculoskeletDisord.* 2004; 5: 16.
- 16-Salik Y, Ozcan A. Work-related musculoskeletal disorders: a survey of physical therapists in Izmir-Turkey. *BMC MusculoskeletDisord.* 2004; 5: 27.
- 17-Alexopoulos EC, Burdorf A, Kalokerinou A. A comparative analysis on musculoskeletal disorders between Greek and Dutch nursing personnel. *Int Arch Occup Environ Health.* 2006; 79: 82 – 88.
- 18-Choobineh A, Rahimifard H, Jahangiri M, Mahmoodkhani S. Musculoskeletal injuries and their associated risk factors in office workplaces. *Iran Occupational Health Journal* 2012; 8(4): 70-81.
- 19- Mokhtarinia H, Shafei A, Pashmdarfard M. Translatio, Localization , Validity and Reliability of Nordic musculoskeletal Questionnaire in Iran. *Journal of ergonomi* 2015; 3(3): 21-28.
- 20-Von Korff M, Ormel J, Keefe FJ, Dworkin SF, Grading the severity of chronic pain. *Pain.* 1992; 50(2); 133-49.
- 21-Mehrdad R, TighDennerlein J, Morshedizadeh M. Musculoskeletal Disorders and Ergonomic Hazards among Iranian Physicians. *Arch Iran Med.* 2012; 15(6): 370 – 374.
- 22-Sadeghian F, Kasaeian A, Noroozi P, vatani J, Taiebi SH. Psychosocial and Individual Characteristics and Musculoskeletal Complaints Among Clinical Laboratory Workers. *International J Occupational Saf Ergon.* 2014; 20(2), 355–361
- 23-Cromie JE, Robertson VJ, Best MO. Work-related musculoskeletal disorders in physical therapists: prevalence, severity, risks, and responses. *PhysTher.* 2000; 80(4): 336 – 351.
- 24-Adegoke BO, Akodu AK, Oyeyemi AL. Work-related musculoskeletal disorders among Nigerian physiotherapists. *BMC MusculoskeletDisord.* 2008; 9: 112.
- 25-Smith DR, Kondo N, Tanaka E, Tanaka H, Hirasawa K, Yamagata Z. Musculoskeletal disorders among hospital nurses in rural Japan. *Rural Remote Health.* 2003; 3(3): 241.
- 26-Dhimitri KC, McGwin G, Jr, McNeal SF, Lee P, Morse PA, Patterson M, et al. Symptoms of musculoskeletal disorders in ophthalmologists. *Am J Ophthalmol.* 2005; 139(1): 179 – 181.
- 27-Leggat PA, Smith DR. Musculoskeletal disorders self-reported by dentists in Queensland, Australia. *Aust Dent J.* 2006; 51(4): 324 – 327.
- 28-Noorbala AA, Mohammad K. Health and disease in Iran. Research Project, Final Report. 2001; 42 – 50.