Original Research Article

Psychosocial and Work-Related Factors Associated with Musculoskeletal Pain among Office Workers in Gorgan, North of Iran

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ABSTRACT

Introduction: Mental health refers to emotional and psychological well-being, impairment of which may adversely affect an individual's cognitive or social functioning, making it harder to cope with the demands of daily life. According to the biopsychosocial model, common psychological symptoms such as low mood significantly influence the occurrence and prognosis of musculoskeletal pain. The aim of this study was to determine psychosocial and work-related factors associated with musculoskeletal pain among office workers. **Materials and Methods**: This descriptive and analytical study was performed on office workers in Gorgan, in 2016. Overall, 675 workers were selected by cluster sampling. Data were collected on individual factors, negative affectivity, workplace factors, workstation and task demand, psychosocial risk factors, work environment and experience of pain during the past 12 months. Data were analysed in SPSS (version 16) using logistic regression analysis. **Results:** Based on the results, the subjects reported pain and discomfort in the neck (17.3%), shoulder (8.4%) and low back (20%). Moreover, 6.4% of the subjects had pain in more than one body area. The presence of neck pain was significantly associated with factors including adjusting the backrest on chair, working with bent head, working hours per week, supervisor support and gender. Factors including staring at the screen, forearm parallel to the floor while working, sitting at workstation before taking a break, awkward working postures, gender, age and negative affectivity remained significant for the low back pain. **Conclusions:** Excessive use of computers, poorly designed workstations, lack of work breaks, as well as individual factors such as age, gender, and lack of awareness of the dangers of environmental and psychosocial factors in workplace are associated with musculoskeletal disorders. Thus, it is necessary to identify these factors and eliminate their role in development of musculoskeletal disorders if possible.

KEYWORDS: Musculoskeletal Disorders, Psychosocial Disorders, Pain

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INTRODUCTION

Pain is the most important reason for seeking medical care in the United States. More than 160 billion dollars are spent annually for issues related to pain [1]. In addition, 600 million workdays are lost for low back pain, compensating financial payment of the wounded labors, lost productivity, and training and recruitment of substitute staff [2]. Pain, rigidity, cramp and deadness of the fingers are the most common subjective symptoms described by office-workers in many countries [3]. Pain is associated with various neuropsychiatric disorders [4]. Chronic pain causes considerable psychological and physical distress, and affects social performance and responsibilities [5,6]. The annual prevalence of pain in the lower back, neck, shoulder, and forearm/hand has been reported to be 23-38% among office worker. Epidemiological study of musculoskeletal disorders has provided information on the

prevalence and risk factors of pain in the neck, shoulder (upper limb) and low back pain [7]. The aim of this study was to investigate the association of musculoskeletal pain (neck, shoulder and low back pain) with risk factors including workstation and task demand, work environment, body posture, and lifestyle and psychosocial factors.

MATERIALS AND METHODS

The present cross-sectional study was performed on public and private sector office workers in Gorgan, north of Iran. We selected 700 office workers from 20 organizations via cluster sampling method. Inclusion criteria included willingness to participate in the study and having at least two years of work experience. Overall, 675 office workers from 18 organizations agreed to be participate. The subjects (63% male) were interviewed during one or two days. All subjects were interviewed by a trained interviewer to avoid inter-observer bias. Due to the large number of questions, the subsequent long filling time and low response rate, interviews were performed rather than distribution of questionnaire. Information related to factors associated with the neck, shoulder and low back pain including workstation and task demands, work environment, body posture, and lifestyle and psychosocial factors were collected and assessed using the Nordic Musculoskeletal Questionnaire**.**

Measurements

Demographic information was collected to assess the association between individual factors and musculoskeletal pain. Negative affectivity (NA) was measured for 11 items utilizing an abbreviated version of the Multidimensional Personality Index [8]. This personality characteristic is a diffuse, nonspecific measure of subjective distress and negative feelings [9]. NA was assessed due to its potential confounding effect on self-reported physical and mental well-being [10].

Workplace factors

Workstation and task demands related to musculoskeletal pain were assessed by 19 questions, which were derived from the standardized Dutch Musculoskeletal Questionnaire [11]. Evaluation of workstation for exposure occurrence was not possible due to time limitation and security policies. Validity and reliability of the questionnaire have been confirmed previously [12, 13].

Psychosocial risk factors

Distributed control system model and job content questionnaire were used to assess psychosocial factors [14]. Johnston et al. used psychological domains separately which were used in early survey [15-17]. This questionnaire has been reported to be suitable for cross-sectional studies [18].

Work environment

Four questions with a Cronbach's alpha coefficient of 0.84 were used to evaluate the work environment factors associated with musculoskeletal pain [11].

Body posture

Nine questions with a Cronbach's alpha coefficient of 0.81 were used to evaluate the association between body posture and musculoskeletal pain [11].

Outcomes

The Nordic Musculoskeletal Questionnaire has been developed for assessing musculoskeletal pain in occupational healthcare services. Reliability and validity of this self-reported questionnaire are acceptable for office worker, and Iranian version of this questionnaire has been used in previous studies. Numeric pain rating scale was used in the present study to determine pain intensity. Subjects who reported pain in more than one area were divided into a separate group. Logistic regression and p-value cut-off point of 0.25

were considered in the statistical analysis [19]. Backward elimination (likelihood ratio) with exit criteria of P<0.1 was used to determine the factors related to musculoskeletal pain. All statistical analyses were performed in SPSS (version 16).

Ethical considerations

Ethical issues have been completely observed by the authors.

RESULTS

The subjects reported pain in the neck (17.3%), shoulder (8.4%) and low back (20%). Moreover, 6.4% of the subjects reported pain in more than one body area (Supplementary Table 1).

According to the results, neck pain was significantly associated with factors including adjusting the backrest on chair, working with bent head, working hours per week, supervisor support and gender. In the multiple logistic regression analysis, factors including staring at the screen, forearm parallel to the floor while working, sitting at workstation before taking a break, awkward working postures, gender, age and NA remained significant for the low back pain. No variable was associated with shoulder pain except for gender and age. Having enough working space at the office, awkward working postures, gender and age remained significant in the multiple logistic regression analysis for those who had pain in more than one area (Table 1).

Table 1. Odds ratios (OR) with 95% CI for the factors remaining in the multiple regression model

Neck pain	**β**	**SE**	**Wald**	**P-value**	**OR (95%CI)**
Gender	0.96	0.27	12.96	0.0001	2.63 (1.55-4.44)
Adjustable backrest on a chair	0.62	0.26	5.48	0.01	1.86 (1.11-3.12)
When I work my head is bent					
Usually or often	1.12	0.46	5.96	0.02	3.07 (1.25-7.56)
Sometimes	0.91	0.49	3.38	0.06	2.48 (0.94-6.57)
Rarely or never			6.009	0.05	Reference
Supervisor	0.09	0.04	4.41	0.03	1.09 (1.01-1.19)
Hours worked per week	0.57	0.27	4.53	0.03	1.77 (1.05-3.01)
Shoulder pain	**β**	**SE**	**Wald**	**P-value**	**OR (95%CI)**
Gender	0.92	0.39	5.31	0.02	2.5 (1.15-5.46)
Age (years)					
<30				0.03	Reference
30-39	-0.26	0.59	0.2	0.65	0.76 (0.24-2.44)
40-49	0.39	0.57	0.45	0.5	1.47 (0.48-4.55)
50≥	1.35	0.62	4.74	0.03	3.86 (1.14-13.08)
Low back pain	**β**	**SE**	**Wald**	**P-value**	**OR (95%CI)**
Gender	0.68	0.68	7.11	0.008	1.98 (1.19-3.26)
Age (years)					
<30			9.62	0.02	
30-39	0.81	0.38	4.65	0.03	2.25 (1.07-4.72)
40-49	0.79	0.39	4.03	0.04	2.22 (1.02-4.85)
50≥	-0.88	0.81	1.17	0.28	0.41 (0.08-2.04)
NA	0.02	0.01	3.56	0.05	1.02 (1-1.04)
I stare at the screen	0.57	0.27	4.55	0.03	1.77 (1.05-2.99)
Forearms parallel to the floor while working	0.46	0.25	3.35	0.06	1.59 (0.97-2.62)
Sitting at work station before taking a break	-0.64	0.26	6.31	0.01	1.9 (1.15-3.14)
I sit in awkward postures while working					

Very often or often	0.55	0.35	2.47	0.11	1.73 (0.87-3.44)
Sometimes	0.89	0.32	7.81	0.005	2.43 (1.3-4.53)
Rarely or never			7.93	0.01	Reference
Pain in multiple areas	**β**	**SE**	**Wald**	**P-value**	**OR (95%CI)**
Gender	1.42	0.38	14.21	0.0001	4.15 (1.98-8.71)
Age (years)					
<30			9.68	0.02	
30-39	-0.005	0.54	0.000	0.99	0.99 (0.34-2.89)
40-49	1.22	0.53	5.11	0.02	3.38 (1.18-9.73)
50≥	1.05	0.75	1.99	0.15	2.87 (0.66-12.36)
I have enough space to work at my office	1.27	0.37	11.94	0.001	3.57 (1.74-7.35)
I sit in awkward postures while working					
Usually or often	1.34	0.55	6.006	0.01	3.83 (1.31-11.21)
Sometimes	0.51	0.59	0.76	0.38	1.67 (0.53-5.27)
Rarely or never			7.8	0.02	Reference

DISCUSSION

The results of this study showed that back pain is the most prevalent musculoskeletal pain among office workers. Factors including gender (female), BMI, improper distance of body with the computer and the consequent asymmetric working position, seat with non-adjustable back support, sitting for long time without rest, negative attitude and staring at the screen with bent head were the factors affecting back pain. Poor working posture is one of the main causes of musculoskeletal pain. Choobineh et al. reported the prevalence of neck and low back pain among office workers to be 49% and 47%, respectively [20]. Consistent with our findings, they reported that posture and improper design of workstation are the main risk factors for musculoskeletal pain.

Back pain was associated with gender (female), weight, BMI, age (old), poor posture, poor working conditions, poor ergonomic tables and chairs and psychological factors. Psychosocial factors including high working expectations, job dissatisfaction, low decision-making power, time pressure, high workload and lack of social support from colleagues and managers are significantly associated with prevalence of low back pain among workers [21]. We found that neck pain was associated with social psychological factors including gender (female), poor working posture, seat with non-adjustable back support, working with bent head, working hour and lack of support from managers.

Neck and shoulder disorders are common in the employees working with computers [22]. Poor physical posture causes imbalance in the neck, back and chest muscles. It seems that working with forward head posture exerts more pressure on the neck muscles, causing discomfort and pain in the neck. In addition, muscle imbalance is associated with pain and fatigue in the neck [23]. Caruogno et al. reported static posture as the main factor associated with neck and shoulder disorders [24]. Similar to our findings, in study of Shan et al., neck pain was poorly correlated with age and working hours, but associated with bent head and inappropriate position of the neck and the body [25]. Study of Naderi showed that increased workload and long working hours are related to neck pain. There was a significant correlation between work experience and pain in neck, buttocks and

lower back. Moreover, they found that looking straight ahead while working increases the risk of neck disorders [26], which is in agreement with our findings.

Studies have shown that repetitive tasks, working problems, shortage of personnel, degree of interaction and relationships with other colleagues and employment protection are among the psychological factors affecting the incidence of work-related neck pain [27].

Seat height, worktable and distance from the monitor could affect the risk of neck pain. There was no significant relationship between age and history of neck pain. Abedini et al. indicated that the risk of musculoskeletal disorders increases with aging [1]. Overall, 6.4% of the participants had pain in more than one area, which was significantly associated with female gender, age and asymmetric working posture. These factors are also risk factors for musculoskeletal disorders. There was a significant relationship between gender and musculoskeletal disorders of the back, waist and wrist in a way that women experienced more pain in these organs compared to men [25]. This could be due to females' smaller body size that does not match with requirements of many occupations. Moreover, women are at higher risk of biomechanical stress compared to men [28]. Aging is associated with a decrease in the body's physiological capacity and ability to cope with work-related musculoskeletal disorders. Study of Mirhosseini and Gholizdeh demonstrated a significant relationship between age, experience, research activities and work-related musculoskeletal disorders [29].

Poor posture is another common cause of work-related disorders. It has been assumed that poor physical posture such as more body flex can be damaged because the ergonomic factors may leading to tension, mental stress, reduces productivity and quality of work. Therefore, providing suitable equipment in the workplace including monitors, tables and chairs with adjustable height can play an important role in prevention or reduction of work-related pain [30].

Although environmental factors such as physical activity, repetitive tasks and non-ergonomic workspace have been long associated with musculoskeletal disorders, the role of psychological factors has not been known until recently [31]. Due to the rapid technological advancements and the use of electronic and digital equipment, work conditions and environment have changed notably [32], which could affect the incidence of work-related musckoskeletal disorders.

CONCLUSION

Excessive use of computers, poorly designed workstations, lack of work breaks, as well as individual factors such as age, gender, and lack of awareness of the dangers of environmental and psychosocial factors in workplace are associated with musculoskeletal disorders. Thus, it is necessary to identify these factors and eliminate their role in development of musculoskeletal disorders if possible.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest.

AUTHORS' CONTRIBUTIONS

MA, FB and KM designed the model and the computational framework, and analyzed the data. SK and SH collected the data. AH performed the calculations. ZY and FB wrote the manuscript with input from all authors. SYJ and DB conceived the study and were in charge of overall direction and planning.

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