Neck and Back Pain Prevalence in Workers of Iranian Steel industries in 2015

Mohammad Hassan Nassiri- Kashani[1], Mashallah Aghilinejad[1], Amir Bahrami Ahmadi[2], Mohammad Kazem Nouri[3], Behzad Biglari[1], Elaheh Kabir-Mokamelkhah*[1]

1) Occupational Medicine Research Center (OMRC) & Faculty of medicine of Iran University of medical sciences and health services (IUMS)
2) Occupational Medicine Research Center (OMRC) of Iran University of medical sciences and health services (IUMS).
3) Occupational Medicine Research Center (OMRC) of Iran university of medical sciences and health services and manager of Safety, Health & Environment of IMIDRO (Iranian Mines and mining Industries Development and Renovation Organization)

*Author for Correspondence: kabir.e@iums.ac.ir

ABSTRACT

Work related musculoskeletal disorders (WMSDs) are considered as the main cause of occupational complications and disability in developing countries. In Iranian steel companies, workers commonly are directly involved in the production process and physical activities such as manual material handling and awkward postures. Present study was performed for assessment of neck and back pain prevalence among workers of four Iranian steel industries.

Study participants in our cross sectional study, were randomly selected from workers of four Iranian steel industries. Data of neck and back pain were gathered by Nordic questionnaire. Logistic regression was used for controlling confounding variables and determining independent predictors of neck and back pain among study workers.

Among study workers, prevalence of neck and back pain in a recent year were 18.40% and 13.90% respectively. Age ($p \leq 0.02$) and job experience ($p \leq 0.00$) had significant association with neck pain. Age, sex, BMI, and job duration were not known as an independent predictor of neck or back pain.

Neck and back pain prevalence in steel industries were happened whit higher rate compared to most of other countries. Next studies will suggest for determining work related risk factors of WMSDs in workers and designing preventive strategies.

Keywords: Back pain; Neck pain; Nordic questionnaire; Occupational Medicine; Worker

INTRODUCTION

Work related musculoskeletal disorders (WMSDs) had been transformed to a common problem on the world in the past decades and had been known as common cause of disability among workers [1]. For example, in the USA as a developed and industrialized country, one of each four workers had been advocated claims for back pain [2, 3] and one third of them must be paid money for their claims [4]. It is estimated that between 50$ and 100$ billion dollars were considered as cost of back pain and near to 22.4 million workers suffered from back pain in the USA [5]. Previous studies reported that in developing countries, we have similar and often more severe situations for MSDs and especially for neck and back pain [6-8].

Work related and economic burdens of neck and back pain more than workers had impact on organization and society in general view. In industrially developing countries, we have serious problems about workplace injuries. In these countries, we have poor working condition and had no effective local or national preventive program for MSD in general and specially for neck and back pain [9]. Heavy load lifting, repetitive tasks and awkward working postures are known as working place neck and back pain risk factors [10]. In adding with noted factor, demographic and psychological factors must not neglect as one of the important predictors of MSDs in workers [11, 12].

In Iranian steel companies, usually workers are directly involved in the production process and physical activities such as manual material handling and awkward postures. According to our search on the literature, there is no epidemiological study in Iranian steel industries to assess the neck and back pain prevalence. We design present study for assessment of the neck and back pain prevalence among workers of Iranian four steel industries.

MATERIALS AND METHODS

Present study was an epidemiological study that was performed by cross sectional method in 2015. Our study participants were randomly selected from workers of four Iranian steel industries. These steel industries had 8377 workers and were prepared 1737

questionnaires for workers and finally 1439 questionnaires come back to us and our response rate was 82.86%.

Study data were gathered from one national study for assessment of WMSDs prevalence among Iranian workers. They collected their data by means of Standardized Nordic self-reporting questionnaire [13]. The questionnaire included questions such as age, work experience, weight of carried loads, daily working hours and musculoskeletal complaints in each of the following body regions: neck, shoulder, elbow, wrist/hand, upper back, lumbar, one or both hips/thighs, one or both knees and one or both ankle/feet. Data on daily working hours were obtained by the time spent in the workplace. Musculoskeletal complaint was defined as pain or discomfort experienced in the different body regions, that had continued for at least a few hours during the past week or 12 months. The questionnaire was administered by the first author.

After approving study in ethical research committee of Iran University of medical sciences and health services, a cover sheet was attached to the front of NMQ and we demonstrated our study and instruction for completion of forms. Our forms were distributed and collected during one month. We had no penalties or rewards for participations to the study participants and researchers were ready to answer all of their questions. Informed consent was implied when questionnaires were voluntarily completed and returned.

Nordic questionnaire

The Nordic Musculoskeletal Questionnaire (NMQ) was developed from a project funded by the Nordic Council of Ministers [13]. The aim was to develop and test a standardized questionnaire methodology allowing comparison of low back, neck, shoulder and general complaints for use in epidemiological studies. The tool was not developed for clinical diagnosis. This questionnaire can be used as a questionnaire or interview device [14].

The NMQ has been used in several studies for evaluating musculoskeletal problems, including computer and call center workers [15], car drivers [16], coopers in the whisky industry [17], and forestry workers [18]. Previous studies reported that the NMQ is repeatable, sensitive and useful as a screening and surveillance tool. However, medical examination is essential to establish a clinical diagnosis [19, 20].

Statistical analysis

Data were entered into the SPSS software and stratified by MSD subcategory (neck and back). We used Chi-square for comparison of qualitative and student t-test for quantitative variables. Probability values below 0.05 were regarded as statistically significant throughout all analyses. Finally logistic regression was used for controlling confounding variables and determining independent predictors of neck and back pain among study workers.

RESILTS

The result showed that mean of age in study workers was 37.33±8.07 and 1398 (97.2%) workers were male. Study samples weekly work 56 (at least one working shift) hours in their industries and mean of their work experience was 13.50±8.09 years (range: 1-40 years). Mean of their BMI was 25.68±3.60 and among our workers 1317 (91.5%) were right-handed. Prevalence of neck pain among different age and work duration groups of study workers were presented in the Fig. 1 and Fig. 2.

According to results of Nordic MSD questionnaire, neck pain was reported in 394 (27.40%) and 265 (18.40%) workers at one week and 12-month period respectively. Among study workers, 312 (21.70%) and 200 (13.90%) workers in recent week and year had back pain respectively. In our study, 166 (11.50%) and 155 (10.80%) workers believed that neck and back pain respectively limit their functions in recent year.
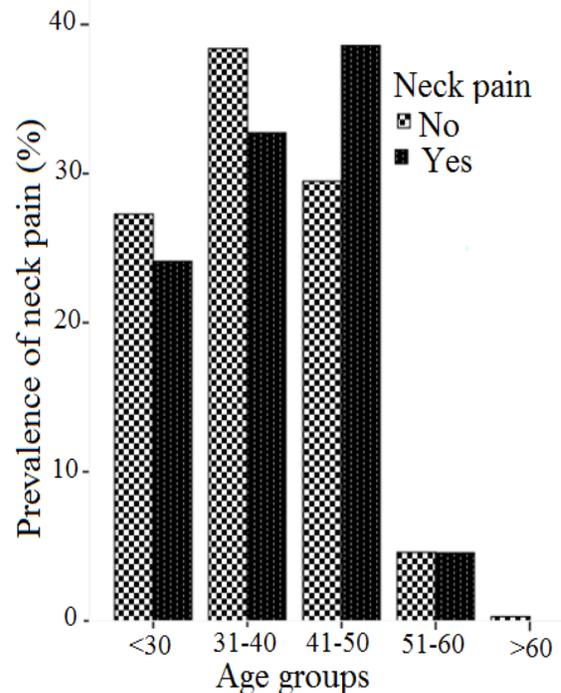

Fig. 1. prevalence of neck pain among different age groups of study workers
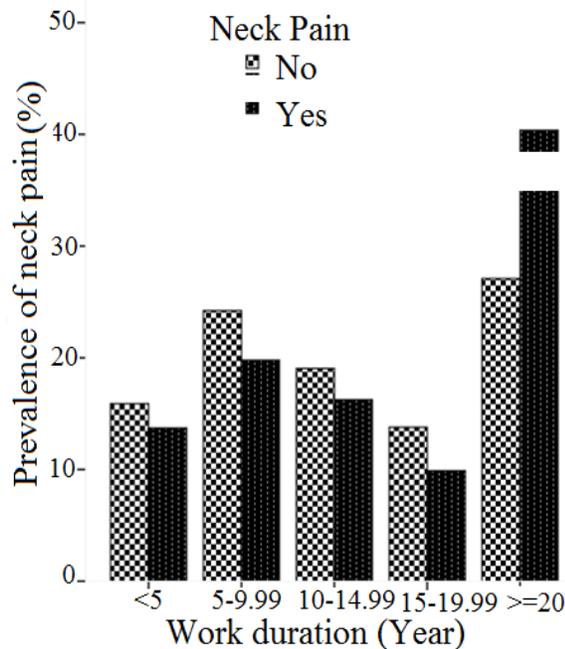
Fig. 2. Prevalence of neck pain among different work duration groups of study workers

We compared study variables between workers with and without neck pain during recent year and found that their age (P≤0.02) and work experience (P≤0.001) had significant association and BMI (P≥0.11) and sex (P≥0.82) had not significant association between workers with and without neck pain during recent year. Age, work duration, BMI and sex of workers had no significant association with their back pain in recent year. Comparing study variables between study workers with and without neck and back pain were presented in table 1 and table 2

Table 1. Comparing study variables between study workers with and without neck pain

Study variable	With neck pain	Without neck pain	P-value
Mean of age	38.16±7.91	37.01±8.12	0.02
Mean of work experience	14.74±8.37	13.03±7.93	0.01
Mean of BMI	25.78±3.13	25.64±3.71	0.50
Gender	Male 380	1018	0.32
	female 14	27	

Table 2. Comparing study variables between study workers with and without back pain

Study variable	With back pain	Without back pain	P-value
Mean of age	38.03±7.76	37.21±8.11	0.18
Mean of work experience	14.38±8.61	13.34±7.99	0.09
Mean of BMI	26.06±3.51	25.63±3.59	0.12
Gender	Male 196	1167	0.41
	female 4	37	

In binary logistic regression, we entered all of study variables into the model and finally none of variable was remained into the model and none of workers variable such as age, BMI, work experience and sex didn't known as independent predictor of neck and back pain. Details of the logistic regression model were presented in Table 3.

Table 3- results of regression analysis in participants

Variables	Beta	Standard Error	P-value	95.0% C.I.for EXP(B)	
				upper	lower
Neck pain					
Constant	0.05	0.75	0.00	-	-
Age	1.01	0.02	0.53	0.98	1.04
Sex	1.08	0.46	0.87	0.44	2.62
Job duration	1.01	0.02	0.40	0.98	1.05
Body mass index	1.04	0.02	0.07	0.99	1.08
Back pain					
Constant	0.06	0.86	0.00	-	-
Age	0.99	0.02	0.60	0.96	1.03
Sex	1.34	0.54	0.59	0.47	3.83
Job duration	1.02	0.02	0.25	0.99	1.06
Body mass index	1.03	0.02	0.17	0.99	1.07

DISCUSSION

Finding of the present study showed that neck pain was reported in 27.40% and 18.40% of workers at one week and 12-month period respectively. Among study workers 21.70% and 18.40% workers suffered at recent week and year of back pain respectively. More old workers with higher job duration had a significantly higher prevalence of neck pain among study workers. BMI and sex in workers suffered from neck pain and age, sex, BMI and job duration in workers suffered from back pain had no significant association with their pain. None of workers of properties were not independent predictor of neck or back pain in studying workers.

Neck pain was known as a source of disability in the working population [21]. International survey reported that the prevalence of activity limitation related to neck pain varies from 11.0% in the UK to 14.1% in Quebec, Canada [22, 23]. Noted statistics as sample, were lower than reported neck pain (18.40%) in our study. The discrepancy between international and our statistics might be due to some factors; firstly some epidemiological and methodological differences between other studies and our study for case selection and definition and neck pain [24, 25]. I guess that some neck pain in our workers was not reported due to some fears about lowering their efficacy or monthly salary. Secondly, Nordic was subjective and self-reporting questionnaire and due to lack of physical examination or imaging studies for pain confirmation, we have might underestimation

for neck pain reporting between workers. Thirdly, if we control noted factors, work environment and related factors such as humidity, temperature, ventilation had role in neck pain among workers.

In comparison with these studies of prevalence of neck and back pain in our workers was higher than other studies. Substandard work places and inattention of workers to the caution instructions without national and effective preventive strategies or programs might be responsible for this higher rate. One of the other explanations of this difference comes back to sample size and selection method of workers.

In our searching the literature, Ford *et al.* in their study on 1566 ironworkers in United States reported back rejoin (56%) as highest MSDs prevalence [26]. Choi WJ *et al.* reported that regardless of body part, the prevalence of MSDs among 2093 aging male steel workers was 25.5% [27].

Back pain is one of the most common pain complaint and millions of peoples in the world suffer from back pain at least in one episode of their life. Back pain and especially low back pain have more importance in active population such as workers and in heavy industries such as steel industries. Previous studies reported that 50-80% of peoples suffered from idiopathic lower back pain at least once in their lifetime [28] and had 15% to 45% annual prevalence [29, 30]. Although definitive mechanisms of back pain had not been understood, several studies found that psychological factors and work environment are associated with development of work related back pain [31-33].

This high prevalence might be due to awkward working postures, manual material handling and long hours of standing at work, which was common at almost all workstations and job activities observed. More complain in lumbar and back were accompanied with the highest rates of sick leave. We suggested that next interventional programs for prevention of occupational injuries in workplaces of workers of steel companies must be focused on reducing physical exposure to the musculoskeletal disorders risk factors of these regions.

We need careful evaluations of steel workers and their workplaces for gathering more information to support or reject this idea.

CONCLUSION

It was concluded that in our steel industries, neck and back pain had a higher prevalence rate that most of the other countries. Next studies must focus on determining WMSDs for designing ergonomic interventions strategies into the workplaces for elimination of environmental hazards such as apposition on the time of work, manual handling of heavy loads.

ETHICAL ISSUES

Present study had been approved in research ethical committee of Iran University of medical sciences and health services.

CONFLICT OF INTERST

Author of the manuscript didnot have any conflict of interest.

AUTHORS' CONTRIBUTION

Mohammad Hassan Nassiri-Kashani and Mashallah Aghilinejad revised the final draft of the manuscript and did statistical analysis. Elaheh Kabir-Mokamelkhah designed the study and supervised that. Amir Bahrami-Ahmadi performed statistical analysis and reviewing final version of manuscript. Mohammad Kazem Nouri cordinated study data and data mining. Behzad Biglari drafting this report.

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