Research Journal of Biological Sciences 5 (12): 793-797, 2010
ISSN: 1815-8846

Work-Related Musculoskeletal Disorders among Pathologists in Isfahan: A Cross-Sectional Study

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Abstract: Workload imposition is an important factor in the occurrence of musculoskeletal symptoms among the working groups. The purpose of this study is to determine the 12 months prevalence of musculoskeletal symptoms among pathologist and workload factors with occurrence of symptoms. In a cross-sectional study, pathologist population in Isfahan determined by using Medical Council Information Center. We took a photograph using digital camera when they were working with microscope. Data analyzed using Quick Exposure Check (QEC) for assessing exposure to WMSDs related risk factors. Among 51 pathologists, 37 (72.5%) of them was male and (27.5%) of them was female. The mean age, total work hours per week and working hours with medical instruments per week were 43.0±14.4, 46.5±17.9 and 36.9±18.6, respectively. The 12 months prevalence rates of WMSDs were highest in the neck (33.3%) and neck (21.6%) followed by the arm, shoulder (9.8%) and then elbow (7.8%) but least in the leg, wrist and wrist (5.9%). Among all of cases, 27.5, 41.2 and 31.4% had low, moderate and high working hours, respectively. Individual anatomical prevalence rate was high in the cases who were >30 years old compared with <30 that is not significant statistically ($p = 0.1$). Also, there were no significant relation between anatomical regions pain and sex ($p = 0.2$), total working hours ($p = 0.03$) and working hours with medical instruments ($p = 0.08$). The only statistically significant relation is relation between types of shoulder exposure risks and age groups ($p = 0.08$). These findings suggest that the 12 months prevalence of WMSDs among pathologist in Isfahan is similar to prevalence reported in other study but values are lower than their values. Also, there was no significant relation between anatomical regions pain and most of risk factors. We recommend performing further studies with more cases on pathologists particularly in whom working for long hours with medical instrument (microscope).

Key words: Musculoskeletal disorders, pathologist, quik exposure check, values, working hours, Iran

INTRODUCTION

Work-related musculoskeletal disorders (WRSDs) are a common health problem and a major cause of disability (Smith *et al*., 2001; Bernard, 1997). Workload imposition is an important factor in the occurrence of musculoskeletal symptoms among the working groups (Hildebrandt, 1995; Ryden *et al*., 1989). Three groups of risk factors associated with the development of WMSDs include workplace, individual and psychosocial risk factors.

The annual prevalence of neck pain varied from 27.1% in Norway to 47.8% in Quebec, Canada. Each year between 11 and 14.1% of workers were limited in their activities because of neck pain. Risk factors associated with neck pain in workers include age, previous musculoskeletal pain, high quantitative job demands, low social support at work, job insecurity, low physical capacity, poor computer workstation design and work posture, sedentary work position, repetitive work and precision work (Cote *et al*., 2008). Now-a-days, psychosocial work characteristics are recognized as important risk factors (Bongers *et al*., 2006).

Musculoskeletal symptoms among physicians have been considered a consequence of the workload of their practice depending on their specialty. The purpose of this study is to determine the 12 months prevalence of musculoskeletal symptoms among pathologist and workload factors with occurrence of symptoms.

MATERIALS AND METHODS

In a cross-sectional study, pathologist population in Isfahan determined by using Medical Council Information Center. From 65 pathologists, only 51 pathologists

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registered to the study. We went to their work place (hospital or clinic or office) and took a photograph using digital camera during work. Then, photographs data analyzed using Quick Exposure Check (QEC) for assessing exposure to risk factors for work-related musculoskeletal disorders. A questionnaire was used for sociodemographic information such as age, sex, duration of total work per week, duration of working hours with medical instruments per week and musculoskeletal complaints depending on anatomical regions (back, neck, shoulder, arm, elbow, forearm and wrist).

Cases were asked whether they had experienced WMSDs that we defined as discomfort or pain secondary to their work and lasting >2 days in the last 12 months in any part of body. Then subjects who indicated experience of WMSDs symptoms in any of body regions were asked to choose the regions of disorder that they considered as the most significant and asked further questions about their disorder.

All of subjects categorized in three groups depending on working hours per week: low working hours (≤35 h), moderate working hours (between 36 and 54 h) and high working hours (≥55 h). Also, depending on exposure percentage, all subjects categorized in low risk, moderate and high risk; risk levels calculated by QEC software.

RESULTS AND DISCUSSION

Among 51 pathologists entered to the study, women and men accounted for 37 (72.5%) and 14 (27.5%) of the sample population, respectively. The mean age, total work hours per week and working hours with medical instruments per week were 43.0±14.4, 46.5±17.9 and 36.9±18.6, respectively. Table 1 shows that the 12 months prevalence rates of WMSDs were highest in the neck (33.3%) and neck (21.6%) followed by the arm, shoulder (9.8%) and then elbow (7.8%) but least in the leg, wrist and wrist (5.9%). Of all affected cases, no one reported that they had sought treatment from other health practitioners for WMSDs. Among all of cases, 27.5, 41.2 and 31.4% had low, moderate and high working hours, respectively. Table 1 shows the association between 12 months percentage of WMSDs and age, sex and working hours (total and with microscope) among all affected cases. Individual anatomical prevalence rate was high in the cases who were >30 years old compared with <30 that is not significant statistically (p = 0.1).

Also there were no significant relation between anatomical regions pain and sex (p = 0.2), total working hours (p = 0.03) and working hours with medical instruments (p = 0.08). Table 2 shows relation between anatomical regions of pain exposure risk and sex, total working hours, age groups and working hours with working hours with medical instruments. The only statistically significant relation is relation between types of shoulder exposure risks and age groups (p = 0.08).

Studies have shown that WMSDs are particularly common in health care workers who are in direct contact with patients (Holder *et al*., 1999; Lipscomb *et al*., 2004; Hansson *et al*., 2001). In this study we used direct technical measurement (Digital camera and QEC software) due to low validity of the questionnaire-assessed exposure data.

We found a high prevalence of body pain among 17 participants. We believe this is the 1st study to evaluation of WMSDs among pathologists using QEC tool. In this cross-sectional study, we found high prevalence not only for back pain but also for neck complaints (33.3%).

The most frequent percentage of reported regions pain and discomfort among men and women were neck (33.3%) and back (21.6%), respectively. Arm and shoulder pain was another common region that cases reported (9.8%). In comparison with the study of Hoozemans *et al*. (1998) on back and shoulder complaints, the report rate of 20% is comparable to their result of 21% for back pain. However, there was a higher prevalence of neck pain (41%) in their group compared with the rate of 20% (Hoozemans *et al*., 1998).

In a study performed on hospital nurses, neck pain was higher than the study (34 vs. 20%) (Smedley *et al*., 2003). Also in a study performed on medical staff in a radiology department, neck pain was significantly higher

Table 1: Association between 6 months percentage of WRSDs and age, sex and working hours

		Groups		Sex		Working hours with medical instruments			Working hours			Ages groups	
Pain sites	Total frequency	Resident	Professor	Man	Female	>14	15-30	>30	Low >25	Moderate 25-30	High <30	>30	<31
Neck	33.3	23.50	9.8	19.6	13.7	2.00	13.7	17.60	13.70	3.9	15.70	15.7	17.6
Back	21.6	7.80	13.7	17.6	3.9	3.90	7.8	9.80	3.90	7.8	9.80	2.0	19.6
Arm	9.8	7.80	2.0	9.8	.0	.00	9.8	0.00	5.90	2.0	2.00	3.9	5.9
Elbow	7.8	5.90	2.0	3.9	3.9	.00	7.8	0.00	0.00	5.9	2.00	3.9	3.9
Forearm	5.9	0.00	5.9	5.9	.0	.00	5.9	0.00	0.00	5.9	0.00	0.0	5.9
Leg	5.9	0.00	5.9	2.0	3.9	.00	3.9	2.00	0.00	5.9	0.00	0.0	5.9
Wrist	5.9	0.00	5.9	5.9	.0	.00	.0	5.90	0.00	5.9	0.00	0.0	5.9
Shoulder	9.8	2.00	7.8	7.8	2.0	2.00	2.0	5.90	3.90	3.9	2.00	2.0	7.8
Total	100.0	47.10	52.9	72.5	27.5	7.80	51.0	41.20	27.50	41.2	31.40	27.5	72.5
p-value	-	0.01	-	0.2	-	0.08	-	-	0.03	-	-	0.1	-

Table 2: Association between 6 months mean of WRSDs and age, sex and working hours

Variables	Age	p-value	Working hours	p-value	Working hours with medical instruments	p-value
Sex						
Man	47.0±14.8	0.001	44.0±16.1	0. 090	34.0±17.10	0.060
Female	32.4±5.00		53.3±21.1		44.7±20.70	
Different age groups						
<31 year	29.42±0.7	0.001	48.8±21.4	0.500	38.28±26.1	0.700
>31 year	48.16±1.3		45.6±16.5		36.43±15.2	
Different load work						
With low working hours >25	45.7±15.5	0.001	28.3±2.80	0.001	24.00±7.00	0.001
With moderate working hours 25-30	49.5±14.5		41.3±6.70		30.90±14.0	
With high working hours <30	32.1±3.20		69.4±9.80		56.30±15.7	
Groups						
Resident	30.6±1.60	0.001	53.9±21.2	0.004	42.30±23.4	0.050
Professor	54.1±11.2		40.0±11.2		32.20±11.5	
Pain situation						
Neck	35.5±7.90	0.004	50.2±21.0	0.800	44.20±21.3	0.100
Back	46.9±15.7		49.5±14.6		35.50±18.2	
Arm	37.2±12.9		39.6±23.5		24.80±5.00	
Elbow	39.5±20.4		45.8±22.8		24.50±4.10	
Forearm	70.0±0.00		35.0±0.00		20.00±0.00	
Leg	43.3±5.80		40.0±8.70		36.70±11.5	
Wrist	48.0±1.70		43.3±5.80		43.30±5.80	
Shoulder	49.4±16.5		48.0±20.5		44.00±26.1	
Different working hours with medical instruments						
>14	49.5±23.7	0.030	40.0±11.5	0.001	7.50±2.90	0.001
15-30	46.9±15.7		35.9±13.9		26.30±4.30	
>30	37.0±7.70		61.0±12.9		55.70±12.3	
Total mean						
Age	43.0±14.4					
Working hours	46.5±17.9					
working hours with medical instruments	36.9±18.6					

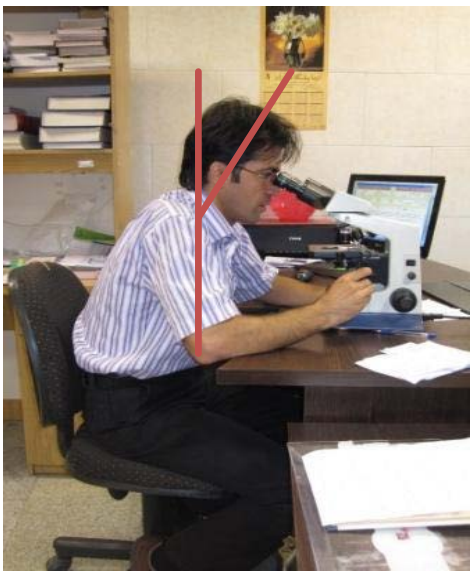

Fig. 1: Neck occasionally bent or twisted

Fig. 2: Shoulder and arm: at about chest height

than the group (61 vs. 20%) (Kao *et al*., 2009). In a Ratzon study on dentists, reported WMSDs symptoms in the last 12 months were predominately localized in the back and neck (55 and 38.3%, respectively) that both of them was higher than this study (Schierhout *et al*., 1995). In this study, photographs analysis revealed that pathologists during working hours with medical instruments their neck and sit with their neck and shoulders bent laterally (Fig. 1 and 2); on the other hand, they moderately flexed or twisted or side bent their back (Fig. 3) and their wrist and hand were a deviated or bent position (Fig. 4). The low prevalence rate of pain reports in forearm, leg and wrist compared with similar regions in other studies suggests that pathologist, neck and back are exposed to

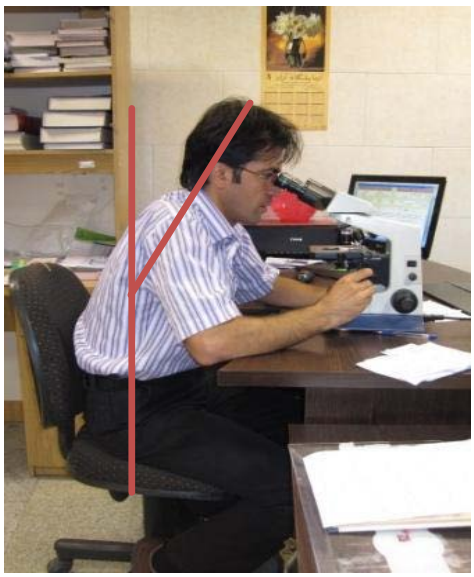

Fig. 3: Back: Moderately flexed or twisted or side bent

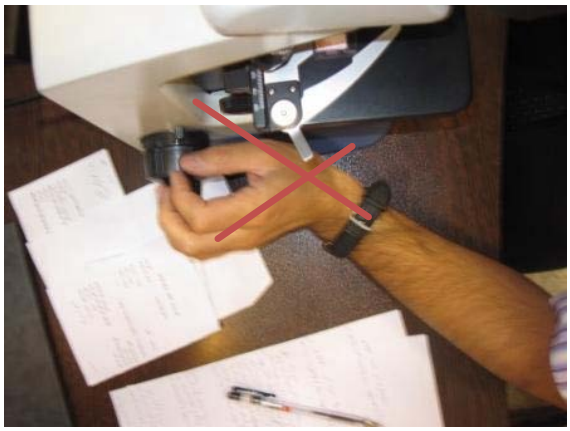

Fig. 4: Wrist: A deviated or bent position

a low or moderate levels of stress during working hours with medical instruments compared with radiology staff, dentists and nurses however in all of groups mentioned above, the most common affected anatomical regions were back and neck suggesting that common affected regions are identical despite of different levels of stress on neck and back among them. Eventually, it is difficult to make comparisons due to the different measurement methods used and widely varying study population. The relationship between neck/shoulder pain and sitting posture has been examined for workers from seven manufacturing industries in South Africa (Chiang *et al*., 1993). Chiang found that shoulder-girdle (neck, shoulder, upper arm) pain was significantly higher among workers performing tasks with repetitive movements (Jin *et al*., 2000). In the study relationship between shoulder exposure risk and age groups was significant (p = 0.04). We found no significant association between wrist exposure risk and other risk factors. In Hung-Wen Nao as well as Jin study also the results for wrist were similar to the study (Kao *et al*., 2009; Moeini *et al*., 2008). The pathologists in the study complained most frequently of neck pain but there was no significant association between back exposure risk and other risk factors (p>0.05).

During working hours with medical instruments, they spent prolonged periods of sitting and it is appear back pain is associated with twisting and bending the trunk. In Jin *et al*. (2000)'s review of two studies, the incidence of back pain among sedentary workers was higher than for w orkers with free posture (Moeini *et al*., 2008). Moeini study on ophthalmologists' sitting position showed significant association between lower back pain and total working hours (Frymoyer and Cats-Baril, 1991). In othe study, we found no association between anatomical regions pain including lower back pain and total or microscope practice hours (p>0.05). Also, no significant association was found between time workload and back pain in study on dentists (Ratzon *et al*., 2000). In the study, relationship between shoulder pain and age groups was significant (p = 0.05).

Studies note an association between WMSDs and age (Rundcrantz *et al*., 1990; Adegoke *et al*., 2008). In study on dentists no significant association was found between age and workload (Ratzon *et al*., 2000).

CONCLUSION

These findings suggest that the 12 months prevalence of WMSDs among pathologist in Isfahan is similar to prevalence reported in other study but values are lower than their values. Also, there was no significant relation between anatomical regions pain and most of risk factors. We recommend performing further studies with more cases on pathologists particularly in whom working for long hours with medical instrument (microscope).

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