

Work-Related Musculoskeletal Disorders in Truck Drivers and Official Workers

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Abstract- Work-related musculoskeletal disorders (WMSDs) are common among drivers and official workers. Musculoskeletal disorders are frequent causes of absenteeism in many countries. The aim of this study was to determine the prevalence of musculoskeletal disorders and risk factors associated with these symptoms. A total of 346 workers and truck drivers were participated in this case-control study. All the participants were interviewed using a self-administered questionnaire containing demographic data and a Nordic questionnaire about presence site and characteristics of pain. Then the data were gathered, and the prevalence of the mentioned parameters and the relationship between variables in the questionnaire were analyzed statistically. The results of this study revealed that 78.6% out of truck drivers and 55.5% out of official workers had musculoskeletal disorders in on-year and there was a significant difference between two groups in this regard ($P < 0.001$). On the whole, the most common symptoms were neck 47 (27.2%), followed by lumbar pain 42 (24.3%) in truck drivers and knee 63 (36.4%) and lumbar symptom 21 (12.1%) in one-year in official workers. In this study, musculoskeletal disorders showed statistically significant association with work duration, age and BMI ($P < 0.001$). Within the limits of this study, it can be concluded that the musculoskeletal troubles have a high frequency among the drivers and official workers. Both groups usually remain on a prolonged uncomfortable postures and high static muscle load which may imply a risk for development of the troubles.

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Introduction

Work-related musculoskeletal disorders (WMSD) are the class of musculoskeletal disorders that include damage to tendons, tendon sheaths, and synovial lubrication of tendon sheaths, and related to bones, muscles, and nerves of hands, wrists, elbows, shoulders, neck and back. These musculoskeletal disorders belong to a collection of health problems that are more prevalent among the working class than the general population (1).

WMSDs are a major source of employee disability and lost wages and reduced work competence of workers and Public vehicle drivers with considerable economic consequences due to workers' payment, health expenses, and efficiency losses particularly in developing countries (2-5). It affects approximately 29.7

to 32.6% of the population of the United States, and low back pain is the most frequent disorder to be involved. The incidence of neck disorders as a source of musculoskeletal impairment or disability is second to lower back disorders (6). A number of earlier studies evaluated the occurrence of musculoskeletal disorders amongst Iranian workers (7-9). As an example, we can make a note of Alipour *et al.*, survey on over than 14,000 workers of Iranian automobile factory (10).

Bureau of Labor Statistics 2006 data on injury and illness show that the drivers of heavy trucks and tractor-trailers in the US are associated with a second highest number of occupational illnesses and injuries for the past three years. It has been estimated that the indirect costs of one workday lost due to sickness absence amount to over than five hundred dollars (11). Another study in Japan that inspected the risk factors of back

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pain reported that the prevalence of back pain among 285 taxi drivers was 45.8% which is consistent with other studies (12). Some investigation showed risks of WMSDs in drivers are very high in Iran (13).

A variety of epidemiologic studies has established that specific work-related risk factors may cause musculoskeletal complaints. The association between job type and the specific activities within jobs that predispose to the risk of developing such disorders is well documented. It is obvious that the drivers and official employees apply workplace activities such as manual handling, prolonged sitting and standing, bending and repetitive tasks, so WMSDs are gradually shaped over time; which may have substantial effects on their personal and social life (14,15). The evidence illustrated that the people are driving at least half of working hours each day endure three times more than other workers (16). High prevalence of spinal disorders observed among the official worker, truck and bus drivers, particularly back and neck pain, frequently lead to invariable suffering and disease and possibly pre-retirement (17,18).

The assessment of musculoskeletal disorders among truck drivers followed three main purposes: identifying of prevalence of musculoskeletal disorders in drivers and official workers and its association with some risk factors in these profession and comparison WMSDs between cases of control.

Materials and Methods

This case-control study was performed from September 2012 to May 2013. There were 34 Transportation Company in Qom province which we selected nine companies by means of cluster method and then randomly picked up 192 male official workers as control and 181 male truck driver as cases.

Official workers were chosen as a control group since they had a varied physical workload, but the similar socioeconomic background and comparable career knowledge. We considered past medical history of office workers in Transportation Company and truck drivers and excluded theirs with previous non-work related musculoskeletal disorders in their health folders or any health conditions or disorders which might have effect on musculoskeletal system except their job. Inclusion criteria comprise of age over than 20 years, career duration more than five years and people without a history of the rheumatologic disease and the traumatic event causing a fracture in spinal column or extremities. Finally, after elimination of exclusion criteria and

incomplete questionnaires and according to other studies (19), 173 truck drivers compared with 173 official workers.

Musculoskeletal disorders related complaints were defined as pain or discomfort experienced in the different body regions that continued for at least two to three work days during the past week or year (20). All medical examination and questionnaire filling were supervised by the research team (intern physician). He explained how to complete the questionnaire for each participant individually. Each of the participants completed a self-administered, anonymous data-gathering sheet. We applied Iranian version of modified standardized Nordic Questionnaire (SNQ) for detection of MSDs in official workers and drivers. We modified the original questionnaire by omitting the column related to "be visited by a physician". Many studies have utilized a modification of the Standardized Nordic Questionnaire in their surveys (21,22) and it seems to be an accepted method of musculoskeletal complaints assessment (23).

The SNQ was developed by a team of Nordic researchers organized to create a simple standardized questionnaire that could be used for the screening of musculoskeletal disorders as a part of ergonomic programs and for epidemiological studies of musculoskeletal disorders (24). This questionnaire contains nine screening questions, covering One-year prevalence of musculoskeletal problems in different body areas (neck, shoulders, back, lumbar, elbows, wrist and hands, buttock, knee and ankle), point prevalence (seven days) and pain severity of the same body areas (limitation of motion), and 27 detailed Data on daily working hours were obtained by the time spent in the workplace. The validity and reliability of the questionnaire were investigated and approved in different studies and several languages, including the Persian language (25,26). The NMQ was used in several studies for evaluating musculoskeletal problems, including computer and call center workers (27), car drivers (28) and forestry workers (29). Informed consent was implied when questionnaires were voluntarily completed and returned. The *chi-square* test and fisher's exact test were used to compare demographic variables between case and control with musculoskeletal disorders. Also *t*-test was used to compare mean age, BMI and work duration in both groups. Calculations were done using the SPSS software (SPSS Inc., version 16, Chicago IL, USA) and *P*-value less than 0.050 was considered significant.

Results

A total of 373 questionnaires were distributed to participants, from whom 173 truck drivers and 173 official workers contributed in this study (95.5% and 90.1% response rate respectively). All respondents were

male workers with more than five years experience in their jobs. Mean \pm SD age of both groups was 37.3 \pm 7.15 years and mean \pm SD period of employment was 8.83 \pm 5.28 years. Details of demographic variables describe in table 1.

Table 1. Mean \pm SD of age, BMI and work duration among drivers and official workers

Group categories	Truck driver		Official worker		<i>P</i>
	Mean	SD	Mean	SD	
Age (years)	37.94	5.96	36.82	8.60	0.17
BMI (kg/m ²)	26.02	2.87	25.78	3.31	0.47
Work duration (years)	8.85	5.4	8.81	6.5	0.95

It was established that over 56.6%, 78.6% and 23.2% of the surveyed drivers experienced WMSDs in last week, one-year and limitation of function in last year respectively. There was significant association among

on-year musculoskeletal disorders in truck drivers with official workers ($P<0.001$). The detailed list of MSDs reported in the study group is presented in table 2.

Table 2. comparison of percent total MSDs between drivers and official workers

Group category	Last week			One-Year			Limitation of function		
	n	%	<i>P</i>	n	%	<i>P</i>	n	%	<i>P</i>
Drivers	98	56.6	0.15	136	78.6	0.001	40	23.1	0.60
Official workers	88	50.9		96	55.5		48	27.7	

Our study was established over 63(36.4%) of official workers experienced discomfort in the knee and another 21(12.1%) of workers reported lumbar disorder in one-year. The same presentation in the knee and lumbar

(32.4% and 10.4% respectively) described in last week WMSDs. In others, 42(24.3%) and 47(27.2%) of truck drivers had lumbar and neck problems in one-year respectively (Table 3).

Table 3. Prevalence of musculoskeletal symptoms experienced by drivers and official workers during the past 7 days, One-year and limitation of function by body site

Disorders	Last week			One-year			limitation		
	Drivers	Official workers	<i>P</i>	Drivers	Official workers	<i>P</i>	Drivers	Official workers	<i>P</i>
Neck	14(8.1%)	12(6.9%)	0.68	47(27.2%)	14(8.1%)	0.001	2(1.2%)	3(1.7%)	0.65
Shoulder	20(11.5%)	5(2.9%)	0.001	25(14.5%)	6(3.5%)	0.001	8(4.6%)	4(2.3%)	0.04
Back	23(13.3%)	7(4%)	0.002	27(15.6%)	7(4%)	0.001	15(8.7%)	3(1.7%)	0.004
Lumbar	35(20.2%)	18(10.4%)	0.010	42(24.3%)	21(12.1%)	0.003	19(11%)	12(6.9%)	0.19
Buttock	4(2.3%)	10(5.8%)	0.10	10(5.8%)	12(6.9%)	0.66	1(0.6%)	4(2.3%)	0.18
Knee	14(8.1%)	56(32.4%)	0.001	33(19.1%)	63(36.4%)	0.001	6(3.5%)	28(16.2%)	0.001
Ankle	6(3.5%)	13(7.5%)	0.10	7(4%)	17(9.8%)	0.034	1(0.6%)	4(2.3%)	0.18
Elbow	2(1.2%)	10(5.8%)	0.037	9(5.2%)	8(4.6%)	0.12	0(0%)	6(3.5%)	0.015
Wrist/hand	14(8.2%)	9(5.3%)	0.41	14(8.2%)	8(4.6%)	0.28	1(0.6%)	4(2.4%)	0.30

Data are given as number (percent)

We analyzed the relationships of musculoskeletal symptoms in both groups. No statistically significant association was found between the development of WMSDs in last week, one-year and limitation of function in buttock and wrist/hand region between official workers with truck drivers. However, it was found that statistically significantly more drivers experienced back and shoulder

pain ($P<0.05\%$). Nevertheless, knee disorder in last week, one-year and limitation of function in official workers was statistically more significant ($P<0.001$). Other findings related to the prevalence of WMSDs and comparison of these symptoms among official workers with truck drivers are shown in table 3.

This finding revealed a certain degree of association

among WMSDs in one-year in truck drivers with age and work duration ($P<0.001$). Moreover, our study declared more drivers and workers significantly experienced musculoskeletal problems with higher BMI ($P<0.001$). Between detailed WMSDs in one-year and group

categories, there are prominent associations among shoulder and lumbar pain with more work duration and age in drivers ($P<0.001$). The detailed prevalence of musculoskeletal symptom in drivers according to age, BMI and work duration described in table 4.

Table 4. Prevalence of musculoskeletal symptoms experienced by drivers during One-year by body site

Group categories		Work-related musculoskeletal disorders								
		neck	shoulder	back	lumbar	buttock	knee	ankle	elbow	Wrist/hand
Age (years)	20-35	15 (22.7%)	0 (0%)	14 (21.2%)	6 (9.1%)	2 (3%)	11 (16.7%)	2 (3%)	4 (6.1%)	1 (1.5%)
	35-50	23 (30.7%)	11 (2%)	6 (8%)	20 (26.7%)	4 (5.3%)	17 (22.7%)	4 (5.3%)	4 (5.3%)	7 (9.3%)
	>50	9 (28.1%)	14 (34.4%)	7 (21.9%)	16 (50%)	4 (12.5%)	5 (15.6%)	1 (3.1%)	1 (3.1%)	6 (18.8%)
	<i>P</i>	0.57	0.001	0.54	0.001	0.17	0.57	0.75	0.83	0.01
	<25	10 (18.5%)	6 (11.1%)	8 (14.8 %)	10 (18.5%)	2 (3.7%)	11 (20.4%)	3 (5.6%)	4 (7.4%)	5 (9.3%)
BMI (kg/m2)	25-30	35 (31.8%)	17 (15.5%)	18 (16.4%)	30 (27.3.4%)	7 (6.4%)	20 (18.2%)	4 (3.6%)	3 (2.7%)	9 (8.2%)
	>30	2 (22.2%)	2 (22.2%)	1 (11.1%)	2 (22.2%)	1 (11.1%)	2 (22.2%)	0 (0%)	2 (22.2%)	0 (0%)
	<i>P</i>	0.19	0.60	0.90	0.46	0.62	0.92	0.67	0.03	0.64
	<10	34 (28.6%)	13 (10.9%)	18 (15.1%)	21 (17.6%)	5 (4.2%)	25 (21%)	6 (5%)	5 (4.2%)	7 (5.9%)
	10-15	4 (13.3%)	4 (13.3%)	4 (13.3%)	11 (36.7%)	2 (6.7%)	5 (16.7%)	0 (0%)	3 (10%)	5 (16.7%)
Work duration (years)	>15	9 (37.5%)	8 (33.3%)	5 (20.8%)	10 (41.7%)	3 (12.5%)	3 (12.5%)	1 (4.2%)	1 (4.2%)	2 (8.3%)
	<i>P</i>	0.11	0.02	0.73	0.01	0.27	0.58	0.46	0.43	0.15

Data are given as number (percent)

Table 5. Prevalence of musculoskeletal symptoms experienced by official workers during One-year by body site

Group categories		Disorders								
		neck	shoulder	back	lumbar	buttock	knee	ankle	elbow	Wrist/hand
Age (years)	20-35	3 (3.1%)	1 (1%)	3 (3.1%)	6 (6.1%)	4 (4.1%)	36 (36.7%)	6 (6.1%)	4 (4.1%)	2 (2%)
	35-50	5 (10%)	1 (2%)	3 (6%)	8 (16%)	5 (10%)	18 (36%)	9 (18%)	0 (0%)	2 (4.1%)
	>50	6 (24%)	4 (16%)	1 (4%)	7 (28%)	3 (12%)	9 (36%)	2 (8%)	4 (16%)	3 (12%)
	P	0.002	0.001	0.69	0.007	0.23	0.92	0.07	0.007	0.08
	<25	5 (6.3%)	2 (2.5%)	2 (2.5%)	4 (5.1%)	5 (6.3%)	27 (34.2%)	7 (8.9%)	3 (3.8%)	1 (1.3%)
BMI (kg/m2)	25-30	7 (9.3%)	3 (4%)	4 (5.3%)	12 (16%)	6 (8%)	26 (34.7%)	7 (9.3%)	3 (4%)	5 (6.8%)
	>30	2 (10.5%)	1 (5.3%)	1 (5.3%)	5 (26.3%)	1 (5.3%)	10 (52.6%)	3 (15.8%)	2 (10.5%)	1 (5.3%)
	P	0.73	0.80	0.65	0.015	0.88	0.30	0.65	0.43	0.22
	<10	5 (4.3%)	2 (1.7%)	4 (3.4%)	9 (7.8%)	6 (5.2%)	44 (37.9%)	10 (8.6%)	4 (3.4%)	2 (1.7%)
	10-15	6 (18.2%)	2 (6.1%)	1 (3%)	7 (21.2%)	1 (3%)	8 (24.2%)	5 (15.2%)	2 (6.1%)	0 (0%)
Work duration (years)	>15	3 (12.5%)	2 (8.3%)	2 (8.3%)	5 (20.8%)	5 (20.8%)	11 (45.8%)	2 (8.3%)	2 (8.3%)	5 (20.8%)
	P	0.025	0.18	0.52	0.04	0.014	0.21	0.52	0.53	0.001

Data are given as number (percent)

Our survey showed according to comparison of group categories and WMSDs in one-year in official workers,

there were significant associations between neck, shoulder, lumbar, ankle and elbow disorders with rising

age ($P<0.05\%$). In addition, the same prominent relationship was seen among further work duration with neck, lumbar, buttock and wrist/hand problem (Table 5).

Discussion

The aim of the current study was to determine the frequency of musculoskeletal disorders in truck drivers and official workers and its association with some risk factors in this profession. The results of this study indicated that the prevalence of musculoskeletal disorders in both groups are very high and more than half of participants within last week and one-year experienced these problems. The most common involving body regions within one-year were neck (27.2%), lumbar (24.3%), back (15.6%), shoulder (14.5%) and knee pain (19.1%) in drivers and knee 63(36.4%), lumbar 21 (12.1%) and ankle pain 17(9.8%) in official workers.

Our findings were mostly like to those reported from other articles from overseeing. In a study of Backman, about 70% of the drivers had suffered from musculoskeletal pain during the last month. In all, 40 % of the drivers had often had back trouble (30). Nettepson in a study in Denmark reported the prevalence of frequent low back pain was 57% among bus drivers (31). This result is in agreement with other observations in drivers and official workers (32-34).

High prevalence of musculoskeletal disease particular low back pain is possible due to prolong sitting position and absence of enough exercise among truck drivers (35). Another point is a form of seats. Patterson *et al.*, found that musculoskeletal disorders were the most prevalent health problem in bus drivers. This study showed that back pain is more prevalent among the bus drivers who complain about their seats (36). Furthermore, frequent distribution of pain in porter tractor drivers in Zahedan city reported 56.8% and 29.5% in waist and wrist respectively and showed that vibration of whole body is one of the reasons for the pain in the organs (37).

Our study demonstrated that working duration is so important in the prevalence of MSDs in both groups ($P<0.001$). Also this investigation illustrated that age and weight are significant in the expression of musculoskeletal disease ($P<0.001$).

In a study of Mrs. Sadeghi about the relation between Musculoskeletal Disorders and Anthropometric Indices in the bus drivers in Isfahan, there were a significant correlation between MSD with height, age and BMI (38). Furthermore, in a number of studies,

there were a significant correlation between age and WMSDs prevalence in workers ($P<0.05$) (39). In addition, there was relationship among work length and duration of sitting position with prevalence of musculoskeletal disorders, the group of ≤ 5 years had the lowest prevalence and the prevalence of low-back, neck and shoulder increased with service years (31,40).

The cross-sectional and cohort studies showed that overweight and obesity were associated with back, neck/shoulder, upper and lower limbs in workers (41-43). Multiple hypotheses might explain the link between overweight and obesity and musculoskeletal symptoms including, amongst others, increased mechanical demands and metabolic factors associated with obesity. Increased forces across the joints are likely to play a larger role in the relationship between a high BMI and weight-bearing joints (lumbar area and lower extremities), compared to symptoms in non-weight-bearing joints (in the shoulder/neck and upper extremities) (44).

Our finding showed truck drivers experienced more WMSDs than official workers in the last one-year. It seems more work-related musculoskeletal injury in drivers are due to repetitive movements, forceful exertions, heavy physical and prolonged static load, whole-body vibration, and psychological work stress. In addition, upper limb disorders are the result of the posture of arms and neck, repetitive upper-limb activity, force, and hand-arm vibration (39,45).

In order to protect their health, all official workers and drivers should receive education about all aspects of ergonomics, including rest breaks. Regular rest breaks, physical exercise and decrease weight are recommended to prevent the accumulation of harmful agents. Furthermore, Proper identification and assignment of costs of work-related diseases would result in significant savings for the National Health System, would provide an incentive for the prevention of these avoidable causes of illness and thus contribute to the sustainability of social systems.

This investigation has some limitation. Our study was a questionnaire-based self-reported survey; thus, reflecting the attitude and perception of staffs and drivers regarding ache, pain and discomfort. Therefore, the prevalence of WMSDs among employees and drivers working in different regions with those exposed to the same level of hazards may be very different due to their different attitudes and perception.

The result of this study highlighted the importance of frequent musculoskeletal disorders in workers and drivers in different body regions. Among these, a lumbar

area in drivers and knee region in workers in one-year were the most frequent. Any interventional plan for prevention or decreasing musculoskeletal problems should focus on the recommendation of daily exercise, decreasing weight and early detection and management of these problems.

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