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Musculoskeletal disorders among Truck and taxi drivers: A retrospective study

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ABSTRACT

Musculoskeletal disorders (MSD) are the most common cause of work-related disability with significant financial and medical costs. Drivers have the highest prevalence of MSDs in comparison with other jobs. According to high prevalence of MSDs among drivers especially truck and taxi drivers along with limited available information in the region; we aimed to evaluate MSDs among truck and taxi drivers and compare the results of these two groups. This was a cross-sectional descriptive study of truck and taxi drivers referred to a private occupational health clinic in Kermanshah (West of Iran). A total of 734 participants including366 Truck drivers and 368 taxi drivers, were enrolled in the study consecutively. MSDs were evaluated by means of Nordic questionnaire, a self-administered questionnaire for evaluation of MSDs. Chi square test was used for comparison between two qualitative variables and finally multivariate regression was performed for further data analysis. Among 734 drivers participated in the study, 366 ones were truck driver. Truck drivers were significantly older than taxi drivers ($p<0.05$). Low back pain was the most observed MSD in both study groups. In the univariate analysis, the knee and neck pain were the only more prevalent symptoms in truck drivers. After adjusting for other variables, vehicle type was significantly associated with MSDs and spinal column pain in addition to knee and neck pain. Truck drivers are more susceptible to develop musculoskeletal symptoms in spine, knee and neck pain than taxi drivers. Improving vehicle structure and lowering vibration, educating truck drivers about correct methods of load handling and obesity prevention may decrease musculoskeletal disorders among truck drivers.

Key words: Musculoskeletal Disorder, Occupational, Truck Driver, Taxi driver

INTRODUCTION

Musculoskeletal disorder (MSD) is one the most common causes of disability in developing countries[1] and the most common cause of work-related disability due to financial and medical costs[2]. And as a physical dysfunctions Can also affect Mental health and Adaptation to normal life[21-22]. In the National Institute for Occupational Safety and Health (NIOSH) classification for the diseases and complications of the work, musculoskeletal disorders are second cause of disabilities after occupational respiratory diseases.[3] In Iran, musculoskeletal disorders are the fourth cause of general disabilities.[4]Injuries of muscle, tendon, ligament, nervous system, blood vessel, joint, cartilage and bone are different types of musculoskeletal disorders. In the past, these disorders had other names such as recurrent trauma and stress injuries[5]. MSDs are disorders with different etiologies. Physical and mechanical risk factors leading to increased severity of these disorders include: inappropriate body posture, local vibration or whole body

vibration, implementing great force, movement repetition.[6] Drivers have the highest prevalence of MSDs, in comparison with other jobs.[5] Drivers are in fixed? postures for long time t, therefore they would suffer from musculoskeletal disorders because of the forces on their joints such as lumbar vertebra, knees, neck, shoulders, wrists, elbows, ankles, and almost all the joints of body. Low back pain has different prevalence in different occupations and the majority of researchers relate this complication with different occupations.[7] Driving, especially truck vehicles' driving is associated with long stay in one posture with high frequency vibration.[8]

Professional drivers retire in lower ages because of high prevalence of spine disorders especially low back pain and neck pain.[9]Inter vertebral disc herniation is four times greater in truck drivers and anterior protrusion of vertebral disc is also more than other groups.[10]Although several studies have indicated the prevalence of MSDs among different vehicle drivers, little attention has been paid to prevalence difference and the comparison of disease patterns between different vehicles. According to high prevalence of MSDs among drivers especially truck and taxi drivers who drive between two cities; we aimed to evaluate MSDs among truck and taxi drivers and compare the results of these two groups.

MATERIALS AND METHODS

This study was across-sectional study. The study participants were truck and taxi drivers referred to a private occupational health clinic in Kermanshah during 1391- 1392. Informed consent was obtained from all participants. Sample size was calculated with 5% α and 20% β. Inclusion criteria of the study included: negative history of surgery related to MSDs, negative history of trauma leading to severe injury or fracture in lumbar, neck, elbow and arm, and at least one year history of professional driving. The exclusion criteria were: osteoarthritis, rheumatoid arthritis, lupus erythematosis, gout, diabetes mellitus, and thyroid dysfunction which affect musculoskeletal system or joints. Data was collected using Nordic questionnaire (MSDs questionnaire) in which participants should clarify that which one of nine joints (neck, shoulders, elbows, wrists/hands, upper segment of low back, hip/femur, knees, ankle/feet) was painful in the past 12 months. The questionnaire is the accepted self-administered form for evaluating musculoskeletal symptoms in different body parts Assessed demographic characteristics included age, sex, marital status, educational status, smoking, Body Mass Index (BMI) (Weight (Kg)/ Height (m^2) , the type of vehicle. Using length-meter with 0.5 centimeter accuracy, participants' height was measured in upright position without shoes. Using digital scale with 0.1 kilogram accuracy, participants' weight wasmeasured without shoes and with little cloths. Data were analyzed with SPSS V.16 statistical software and the quantitative results were shown as mean and standard deviation and the qualitative results were shown as frequency and percentage. Chi square test was used for comparison between two qualitative data and T test was used for comparison between two quantitative data. Finally, multivariate regression and logistic regression analyses were performed.

RESULTS

A total of 734 drivers participated in this study, 366 persons of them were truck drivers. In comparison to truck drivers, taxi drivers were significantly older (truck drivers: 39.8(9.3) years; taxi drivers: 41.9(9.9) years p=0.004). 89.1% of truck drivers and 88.3% of taxi drivers were married. No significant association was observed between the two groups in terms of education level (p=0.95) and Body Mass Index (BMI) (p=0.70). Truck drivers were more likely to be smokers (Table 1).

Association between site of experienced pain and vehicle type was assessed by chi-squared test. As shown in Table 2, the number of truck drivers suffered from neck pain was significantly more than taxi drivers (i.e. OR=4.64, CI 95%: [2.3-9.4]). Furthermore, the Odds of incidence of disorder in one or two knees in truck drivers were about 5.5 times more than taxi drivers (CI: [2.3-12.1]). Low back pain was the most reported symptom in both study groups (19.5% in truck drivers and 14.4% in taxi drivers, Figure 1) but no significant association was observed between the two groups (p>0.05,OR=1.4,CI95%:[0.9-2.1]). Only 2.2% of truck drivers and 0.5% of taxi drivers experienced pain in one or both feet. A total of 225 (61%) of truck drivers and 273 (74%) of taxi drivers did not suffer from any side entrance. Only pain in the Hip region was slightly higher in taxi drivers (Figure 1).

Table 1: General characteristics of participants

Characteristics		Truck Drivers	Taxi Drivers	P
N		366	368	
Age (mean ±SD), years		39.83 ± 9.3	41.88 ± 9.9	0.004*
BMI (mean ±SD)		26.59 ± 3.8	26.48 ± 3.9	0.695
Work experience (mean ±SD)		13.22 ± 9.0	15.73 ± 9.8	0.000*
Shift work (%)		64.2	15.5	0.000*
Work hours per week (mean ±SD)		48.72 ± 21.5	36.23 ± 15.8	0.000*
Marital status				
	Married (%)	326 (89.1)	325 (88.3)	0.746
	Unmarried (%)	40 (10.9)	43 (11.7)	
Education				
	Illiterate (%)	6 (1.6)	6 (1.6)	0.954
	Under diploma (%)	233 (63.7)	236 (64.5)	
	Diploma (%)	111 (30.3)	111 (30.3)	
	Higher than diploma (%)	16 (4.4)	13 (3.6)	
Smoking				
	Yes (%)	75 (20.5)	52 (14.1)	0.025*
	No (%)	291(79.5)	316 (85.9)	

**Statistical significant level was considered 0.05*

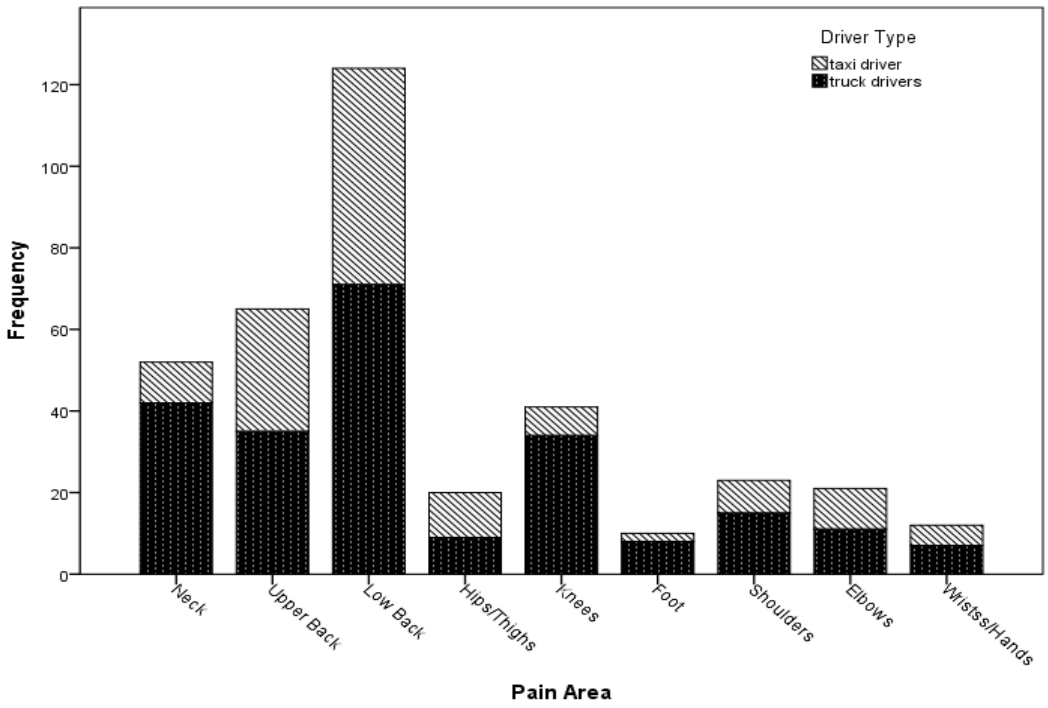

Figure 1. Distribution of drivers in terms of pain area

To investigate the association between the type of vehicle and pain in the presence of the other covariates, multiple logistic regression models were fitted to the data for all kind of pains.

Table 2: crosstabs of vehicle type and each pain area

Pain area		Truck Drivers	Taxi Drivers	Odds Ratio (%95 CI)
Neck (%)				
	Yes	42 (11.5)	10 (2.7)	4.64 (2.29—9.40)*
	No	324 (88.5)	358 (97.3)	
	Total	366	368	
Upper Back (%)				
	Yes	35 (9.6)	30 (8.2)	1.19 (0.72—1.99)
	No	331 (90.4)	338 (91.8)	
	Total	336	368	
Low Back (%)				
	Yes	71 (19.5)	53 (14.4)	1.44 (0.97—2.12)
	No	294 (80.5)	315 (85.6)	
	Total	365	368	
Hips/Thighs (%)				
	Yes	9 (2.5)	11 (3.0)	0.82 (0.34—2.00)
	No	357 (97.5)	357 (97.0)	
	Total	366	368	
Knees (%)				
	Yes	34 (9.3)	7 (1.9)	5.28 (2.31—12.08)*
	No	332 (90.7)	361 (98.1)	
	Total	366	368	
Foot (%)				
	Yes	8 (2.2)	2 (0.5)	4.09 (0.86—19.39)
	No	358 (97.8)	366 (99.5)	
	Total	366	368	
Shoulders (%)				
	Yes	15 (4.1)	8 (2.2)	1.92 (0.81—4.59)
	No	351 (95.9)	360 (97.8)	
	Total	366	368	
Elbows (%)				
	Yes	11 (3.0)	10 (2.7)	1.11 (0.47—2.65)
	No	355 (97.0)	358 (97.3)	
	Total	366	368	
Wrists/Hands (%)				
	Yes	7 (1.9)	5 (1.4)	1.42 (0.45—4.50)
	No	359 (98.1)	363 (98.6)	
	Total	366	368	

**P value 0.05 was considered as statistical significant level .*

In multiple regression analysis, the neck and the knee pain were significantly higher in truck drivers (OR=2.96, CI:[1.23,7.13], OR=4.95, CI:[1.81,13.54] ,respectively for neck and knee pain). However, the results of logistic regression were different from of chi-squared test ones and we observed that truck drivers had greater chance to suffer from MSDs and low back pain (respectively OR=1.63, CI: [1.08-2.44] and OR=2.35, CI: [1.12-4.93]). High weight and low height increased the risk of Knee pain with OR 1.4 and 0.7, respectively. With increasing work hours per week, the risk of neck pain increased (p=0.049 CI:[1.00-1.03]). Also low back pain increased in older age (OR=1.7, p=0.006) and odds of occurrence of it was more less in taller drivers OR=0.77, p=0.045).

In addition to influence of age on low back pain, it is an effective risk factor for MSDs (OR=1.05, p<0.001). The weekly work hours only affected neck pain significantly (p=0.049) and it had not significant association with pain in other body parts (Table 3).

Table 3: Odds ratio, confidence intervals and significant levels based on multiple logistic regression

		Knees Pain	Lumbar Pain	Neck Pain	MSD	Low Back	Upper Back	Spinal Pain
Age	Odds Ratio	1.05	1.03	1.03	1.05	1.07	1.05	1.03
	%95 CI	(0.99—1.12)	(1.00—1.07)	(0.98—1.09)	(1.02—1.09)	(1.02—1.12)	(1.00—1.11)	(1.001—1.07)
	P value	0.089	0.071	0.282	<.001*	0.006*	0.054	0.045*
Height	Odds Ratio	0.70	0.97	1.37	0.95	0.77	1.26	0.89
	%95 CI	(0.52—0.93)	(0.78—1.21)	(0.95—1.98)	(0.79—1.14)	(0.60—0.99)	(0.87—1.84)	(0.73—1.09)
	P	0.015*	0.810	0.093	0.545	0.045*	0.227	0.273
Weight	Odds Ratio	1.40	1.00	0.69	1.04	1.13	0.76	1.11
	%95 CI	(1.03—1.91)	(0.79—1.27)	(0.46—1.03)	(0.86—1.27)	(1.00—1.72)	(0.51—1.13)	(0.89—1.38)
	P	0.034*	0.978	(0.072)	0.670	0.051	0.180	0.351
Education	Odds Ratio	0.66	1.20	0.78	1.01	0.78	2.07	1.03
	%95 CI	(0.33—1.31)	(0.82—1.74)	(0.43—1.43)	(0.74—1.38)	(0.45—1.35)	(1.18—3.61)	(0.72—1.46)
	P	0.239	0.350	0.424	0.963	0.373	0.011*	0.889
Marital Status	Odds Ratio	1.05	1.26	1.27	1.00	0.58	0.64	1.22
	%95 CI	(0.28—3.95)	(0.55—2.84)	(0.35—4.65)	(0.54—1.86)	(0.22—1.55)	(0.20—2.08)	(0.58—2.56)
	P	0.947	0.588	0.717	0.996	0.273	0.460	0.598
Smoking	Odds Ratio	0.91	1.22	0.72	0.93	1.15	0.67	1.24
	%95 CI	(0.39—2.12)	(0.69—2.14)	(0.34—1.52)	(0.60—1.44)	(0.553—2.41)	(0.31—1.45)	(0.74—2.08)
	P	0.831	0.490	0.387	0.736	0.703	0.305	0.415
Vehicle [a]	Odds Ratio	4.95	1.07	2.96	1.63	2.35	1.17	1.16
	%95 CI	(1.81—13.54)	(0.64—1.78)	(1.23—7.13)	(1.08—2.44)	(1.12—4.93)	(0.52—2.63)	(0.73—1.85)
	P	0.002*	0.800	0.016*	0.019*	0.025*	0.705	0.527
working hours per week	Odds Ratio	1.02	1.00	1.02	1.01	1.01	1.01	1.00
	%95 CI	(1.00—1.03)	(1.00—1.02)	(1.00—1.03)	(1.00—1.02)	(1.00—1.03)	(1.00—1.03)	(0.99—1.02)
	P	0.093	0.536	0.049*	0.221	0.111	0.144	0.385
Work History	Odds Ratio	0.96	1.01	1.01	1.00	0.97	1.02	1.01
	%95 CI	(0.90—1.01)	(0.98—1.05)	(0.96—1.07)	(0.97—1.03)	(0.93—1.02)	(0.97—1.07)	(0.98—1.04)
	P	0.119	0.465	0.628	0.983	0.255	0.476	0.481
driving between 7pm & 6am	Odds Ratio	0.34	0.91	1.97	0.73	0.29	0.56	1.04
	%95 CI	(0.03—3.56)	(0.31—2.66)	(0.53—7.31)	(0.28—1.90)	(0.04—2.28)	(0.06—5.13)	(0.38—2.83)
	P	0.366	0.863	0.311	0.513	0.238	0.611	0.940
BMI	Odds Ratio	0.364	0.98	3.20	0.89	0.44	2.50	0.72
	%95 CI	(0.14—0.93)	(0.48—2.01)	(0.96—10.66)	(0.49—1.63)	(0.19—1.01)	(0.74—8.41)	(0.37—1.40)
	P	0.035*	0.948	0.058	0.708	0.052	0.140	0.335
shift works per month	Odds Ratio	1.01	0.99	0.98	1.00	1.01	1.01	0.99
	%95 CI	(0.98—1.04)	(0.98—1.00)	(0.97—.999)	(0.99—1.01)	(0.99—1.03)	(0.98—1.04)	(0.98—1.01)
	P	0.451	0.198	0.033*	0.897	0.483	0.501	0.237

**Significant at level 0.05*

[a] Trucks were considered as reference category

BMI: Body Mass Index

DISCUSSION

The present study showed that the neck and knee pain were more prevalent among truck drivers Truck drivers had greater chance to suffer from MSD and low back pain in comparison with taxi drivers . Increased work hours per week was associated with more neck pain.

Along with previous studies, neck and knee pain in truck drivers were significantly more than taxi drivers. Silverstein et al. studied the MSDs in different occupations in USA from 1990 to 1999 and found that truck drivers had the most common neck musculoskeletal disorders.[11] In ROBB study on professional truck drivers, the most common reported disorders were low back, knee and neck pain.[12]A study about nonfatal injuries among truck and taxi drivers in 1995, has reported that 9% of truck drivers complain of knee pain and 25% of complications were in lower limb. While in taxi drivers, these problems were 4% and 19%, respectively.[13] Also, in this study significant association was found between neck pain and work hours per week and shift work. In Apostolopoulos study, the risk factors of truck drivers' health were long time working and consecutive shifts.[14] In Miyamoto study it has been found that long driving time in one day is a risk factor for low back pain with odds ratio of 2.[15] The difference of spine pain between truck drivers and taxi drivers can be related to the difference of vehicle vibration. Studies show that the vibration dose of taxi is lower than truck.[16,17]Handling loads in long time is one of the main risk factors for knee and lower limb pain.[18]Because of transporting loads, truck drivers may carry loads themselves and if it reoccurs can result in knee damages. While, this problem is lower in taxi drivers because they only transport people and they're less likely to handle loads.

In the present study, significant correlation was observed between aging, increased BMI and lower limb and knee pain. Consistent with current results relationship between knee pain and lower limb complications with aging, increased BMI, and obesity are reported in previous studies.[19] Obesity is an independent risk factor for work-related knee osteoarthritis.

According to the results of this study, truck drivers are more likely to develop back, knee and neck disorders than taxi drivers. Improving vehicle structure and lowering vibration can decrease musculoskeletal disorders among truck drivers. Educating truck drivers about correct handling of loads and prevention of obesity may decrease musculoskeletal symptoms . This could be considered for future studies.[20]

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