

Work Related Musculoskeletal Disorder on Various Body Segments in Taxi Drivers

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Abstract: ***Introduction:** Pain discomfort and loss of function in back, neck and extremities are common among taxi drivers. Work – related musculoskeletal disorders affect almost all parts of the body especially the back, neck lower and upper limbs depending upon the physical movement characteristics, and the ergonomics and mechanical design of work task. **Objective:** To investigate the prevalence of work related musculoskeletal disorder on various body segments. **Setting and Participants:** 120 drivers were selected for the study who have a driving experience of above 8 hours per day, in urban areas of the Lucknow district of Uttar Pradesh. **Methodology:** The time taken from the study was one year that is July 2013 to May 2014. In the present study, exploratory cum causal research design was used to obtain and analyze the data. For selection of the respondents' snow ball sampling technique was adopted. Self made checklist was used to investigate the prevalence of work related musculoskeletal disorder on various body segments such as head and neck area, upper extremity link system, thoracic extremity link system and lower extremity link system. **Statistical Analysis:** SPSS 20.0 software was used for statistical processing. The levels of musculoskeletal pain in different body segments were also calculated with the help of ANOVA. **Results and Discussion:** The findings of ANOVA test revealed a highly significant difference between the works related musculoskeletal disorder on various body segments in taxi drivers. **Conclusion:** From the study, it can be concluded that the work of drivers is highly stressful. Many factors make taxi drivers distinct from other professions in terms of exposure to risk of work-related musculoskeletal disorders. They have to work in highly uncomfortable conditions like long length of driving, poor design of work place area etc.*

Keywords: Work Related Musculoskeletal Disorder, body segments, taxi driver, and length of driving.

1. Introduction

Many factors make taxi drivers distinct from other professions in terms of exposure to risk of work-related low back disorders. First is the time factor; previous studies reported that taxi drivers spent longer time in driving than other professions [10]. The design of automobile seat can affect the posture of drivers and posture in turn also can influence both comfort and physical conditions of a driver [1][2][3]. Work-related musculoskeletal disorders (WRMD) and other postural damage may result in physiological illness that may develop over a long period due to prolonged mechanical stresses imposed on the musculoskeletal system [4].

Musculoskeletal pain comprises a major health problem for the general population, affecting their quality of life, demanding increased health care and organization [6]. It has been suggested that people have varying perceptions about their musculoskeletal problem and perceptions about illness may influence health outcomes such as pain and disability directly or indirectly by their effect on coping. [5] If a person considers that musculoskeletal problem is a serious disease that medical care or the health services can do little about, this belief may have an impact on the level of interference in daily life from that disease that the person reports and on their decision to consult or seek treatment for it [5]. This reveals that perceptions may be an important issue to address as part of reducing the impact of disease and encouraging appropriate management.

After headaches and tiredness, back pain is the third most common health problem reported by individuals [7]. The

exact cause of increased prevalence of low back pain (LBP) in populations of professional car drivers is often uncertain. The most frequently reported risk factor for LBP is heavy physical workload such as lifting, awkward posture, and whole body vibration. [8-9]

2. Objectives

Keeping in view the significance of the problems, the present study was taken up to investigate the prevalence of work related musculoskeletal disorder on various body segments and assessment of the same in relation to their working hours per day (length of driving per day)

3. Materials and Methods

- **Study design:** Exploratory cum causal research design
- **Sampling technique:** For selection of the respondents, snow ball sampling technique was adopted. A random sample of 120 were taken after giving due consideration to inclusive & exclusive criteria. The data was collected by General assessment form and general questionnaires. Self made checklist was used to investigate the prevalence of work related musculoskeletal disorder on various body segments such as head and neck area, upper extremity link system, thoracic extremity link system and lower extremity link system.
- **Statistical analysis:** SPSS 20.0 software was used for statistical processing. The levels of musculoskeletal pain in different body segments were also calculated with the help of frequency percentage, mean, standard deviation and ANOVA.

4. Results

Table 1: Occurrence of work related musculoskeletal problems over a period of time at the head and neck body area

| Head/Neck | Adverse effect of work related trouble in the last 12 months | Operator have had work related trouble during the last 7 days | Operator was prevented from carrying out normal activity due to the problem |
|-----------|--|---|---|
| Eye | 58 (48.3) | 39 (32.5) | 48 (40.0) |
| Neck | 69 (57.5) | 79 (65.8) | 74 (61.7) |

(Figures in parenthesis indicate percentage)

Table 2: Occurrence of work related musculoskeletal problems over a period of time at the upper extremity link system

| Upper extremity link system | Adverse effect of work related trouble in the last 12 months | Operator have had work related trouble during the last 7 days | Operator was prevented from carrying out normal activity due to the problem |
|-----------------------------|--|---|---|
| Shoulder Right | 58 (48.3) | 51 (42.5) | 47 (39.2) |
| Shoulder Left | 114 (95.0) | 115 (95.8) | 107 (89.2) |
| Upper arm right | 51 (42.5) | 69 (57.5) | 51 (42.5) |
| Upper arm left | 11 (9.2) | 4 (3.3) | 2 (1.7) |
| Elbow right | 2 (1.7) | 30 (25.0) | 2 (1.7) |
| Elbow left | 118 (98.3) | 19 (15.8) | 2 (1.7) |
| Fore arm right | 2 (1.7) | 51 (42.5) | 47 (39.2) |
| Fore arm left | 116 (96.7) | 39 (32.5) | 81 (67.5) |
| Hand right | 79 (65.8) | 41 (34.2) | 2 (1.7) |
| Hand left | 69 (57.5) | 51 (42.5) | 4 (3.3) |
| Wrist right | 53 (44.2) | 4 (3.3) | 4 (3.3) |
| Wrist left | 69 (57.5) | 4 (3.3) | 2 (1.7) |

(Figures in parenthesis indicate percentage)

Table 3: Occurrence of work related musculoskeletal problems over a period of time at the thoracic extremity link system

| Thoracic extremity link –system | Adverse effect of work related trouble in the last 12 month | Operator have had work related trouble during the last 7 days | Operator was prevented from carrying out normal activity due to the problem |
|---------------------------------|---|---|---|
| Chest | 24 (20.0) | 16 (13.3) | 53 (44.5) |
| Lower back | 103 (85.8) | 104(86.7) | 51 (42.2) |
| Middle back | 48 (40.0) | 79 (65.8) | 55 (45.8) |
| Upper back | 55 (45.8) | 65 (54.2) | 14 (11.7) |
| Stomach | 36 (30) | 17 (14.2) | 12(10.0) |

(Figures in parenthesis indicate percentage)

Table 4: Occurrence of work related musculoskeletal problems over a period of time at the lower extremity link system

| Lower extremity link system | Adverse effect of work related trouble in the last 12 month | Operator have had work related trouble during the last 7 days | Operator was prevented from carrying out normal activity due to the problem |
|-----------------------------|---|---|---|
| Buttock | 58 (48.3) | 107 (89.2) | 39 (32.5) |
| Hip / Thigh | 115(95.7) | 81 (67.5) | 61 (50.8) |
| Knee right | 22 (18.3) | 55 (45.8) | 43 (35.8) |
| Knee left | 40 (33.3) | 7 (5.8) | 8 (6.7) |
| Ankle right | 110 (91.8) | 14 (11.7) | 2 (1.7) |
| Ankle left | 55 (45.8) | 65 (54.2) | 43 (35.8) |
| Feet right | 80 (66.7) | 77 (64.2) | 40 (33.3) |
| Feet left | 43 (35.8) | 61 (50.8) | 39 (32.5) |

(Figures in parenthesis indicate percentage)

Table 5: Assessment of work related musculoskeletal disorder on various body segments according to their working hours.

| Body segments | Working hours. | | | | | | | | F | P value |
|--------------------------------|------------------|------|--------------|------|--------------|------|-------------------|------|--------|---------|
| | 8-12 hours (N=7) | | 12-16 (N=43) | | 16-20 (N=54) | | 20 & above (N=16) | | | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | | |
| Head & Neck area | 2.13 | 2.88 | 2.37 | 2.39 | 3.38 | 1.20 | 4.71 | .488 | 4.27* | .007 |
| Upper extremity link system | 4.81 | 5.32 | 5.47 | 5.65 | 6.44 | 4.41 | 16.43 | 9.27 | 9.02** | .000 |
| Thoracic extremity link system | 4.85 | 5.38 | 6.21 | 5.18 | 6.44 | 4.41 | 16.71 | 9.42 | 9.66** | .000 |
| Lower-extremity | 3.61 | 5.17 | 4.09 | 3.78 | 4.19 | 3.22 | 7.29 | 1.60 | 1.48* | .223 |

** Highly Significant (Significant at 0.01 level)

5. Discussion

The respondents’ opinion about their experience on work related musculoskeletal problems over a period of time (last 12 months and 7 days) is presented in above table. Above table shows adverse effect of work related trouble, in the last 12 months (57.5%) and last 7 days (65.8%), which indicate that they had musculoskeletal problems at both times on their neck though that did not prevent about one and half (57.5%)of them from carrying out their normal activity.

In the case of the effect of the same problem on the eye lesser percentage of respondents (48.3%, 32.5%) experience discomfort in the last 12 months and during the last 7 days respectively. Work related problem on the eye may not be as frequent as it occurs at the neck. Its effect could be more traumatic and disturbing.

Upper extremity link – system consist of twelve body parts and the respondent perceived pain in relation to work related musculoskeletal problems which is presented in table. Most of the respondents agreed that they experienced the problem in the last 12 months. In the last 12 months majority of drivers feel pain in elbow left (98.3), fore arm left (96.7%)

and shoulder left. In last 7 days majority of drivers were affected by left shoulder pain (95.8%) and right upper arm pain (57.5%).

48.3 percent taxi drivers feel pain in shoulder right in the last 12 months and 42.5 percents drivers feel pain in the last 7 days. 9.2 percent taxi drivers feel pain in upper arm right in the last 12 months and 3.3 percent drivers feel pain in the last 7 days. In the last 12 months only 1.7 percent drivers felt work related trouble in forearm right but in last 7 days 42.5 percent drivers felt work related trouble in forearm left.

Thoracic extremity link – system consist of 5 body parts and the respondent perceived pains in relation to work related musculoskeletal problems is presented in table. Above table shows that at the thoracic extremity link system, back pain is recognized as the most prominent musculoskeletal problem experienced by the respondents. This same problem also proved to have highest potential of preventing drivers from normal activity when they occur.

Chest pain is rarely experienced by respondents and where it occurs in lesser percentage (20 percent in last 12 months and 13.3 percent in last 7 days) are prevented from carrying out their normal activity. 40 percent drivers felt work related trouble in middle back in the last 12 months but in the last 7 days 79 percent drivers felt work related trouble in middle back. In the last 12 months, 55 percent drivers felt work related trouble in upper back but during last 7 days 65 percent drivers felt work related trouble in the upper back.

The lower extremity link system which consists of four main joints form a mechanical structure fitted together to carry important tasks. Among the group of body parts under this link-system hip/thigh is considered as the body part on which work related musculoskeletal problem is mostly felt.

As shown in above table, hip/thigh pain is observed to cumulate with time the driver remain seated the consequence of this adversely affects operator's performance and also prevents normal operator's activity. It was also observed that respondents experience work related musculoskeletal problems on the right and left knees as well right and left ankle rank low with percentage of those who had the problem in the last 12 month ranging between 18 percent and 91 percent while the percentage of those with the problem during the last 7 days range between 5.8 percent and 54.2 percent. Higher percentage of the respondents (66.7%) felt work related trouble in last 12 months in right feet but in last 7 days 64.2 percent drivers felt pain in right feet. It is important to observe that last 12 months 35.8 percent driver feel problem in left feet but in last 7 days 50.8 percent driver felt problem in left feet.

The impact of length of driving on the occurrence of musculoskeletal problems on various body segments was tested using F test and the same is presented in **table 5**. It can deduce that highly significant differences were found in the occurrence of musculoskeletal problems across the drivers whose drive ranged from 8 hours to 20 and above hours. Majority ($\mu = 16.71$ and 16.43) of the respondents with work experience of 20 hours and above reported problem in thoracic and upper extremity link system

followed by lower link system. All the groups of drivers have reported maximum problems in thoracic extremity link system closely followed by upper extremity link system. The problem in head and neck area were reported by very few respondents, with a mean value of ($\mu = 4.71$) for the drivers with more than 20 hours of experience followed by the drivers with 16-20 hours experience ($\mu = 3.38$) and few drivers with experience of 8-12 hours ($\mu = 2.13$) reported problem in head and neck area.

It can also be seen that majority ($\mu = 4.81$) of the drivers drive of 8-12 hours reported more problem in upper extremity link system and thoracic link system ($\mu = 4.85$) in comparison to the drivers with work experience of 12-16 hours with mean values of 5.47 and 6.21, respectively.

6. Conclusion

The present study conducted on work related musculoskeletal disorder among taxi drivers revealed that majority of taxi drivers are affected by work related musculoskeletal problem on various body segments like head and neck area, upper extremity link system and lower extremity link system. Various body segments pain of vehicle drivers are main caused by long hours of driving in a restricted posture and poor work space. Taxi drivers are at high risk for musculoskeletal disorders due to prolonged sitting, whole body vibration, and baggage handling. Psychosocial work factors, including perceptions of unfair treatment, job strain, and effort-reward imbalance, may contribute to work-related musculoskeletal disorders in taxi drivers.

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