



PREVALENCE OF MUSCULOSKELETAL PAIN AND ASSOCIATED RISK FACTORS IN MSRTC BUS DRIVERS WORKING FOR LONG HOURS.

Physiotherapy

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ABSTRACT

Background: Musculoskeletal pain is defined as pain perceived in a region of the body with muscular, ligament, bone or joint origin. MSDs are arguably the most common cause of occupational morbidity globally affecting individuals of all ages, sexes, socio economic classes and ethnicities. Long-distance driving involves repetitive tasks, such as handling, bending and prolonged sitting, which may place excessive stress along the kinetic chain and affect the driver's personal and social life. The purpose of this study is to find the most affected area of the body by musculoskeletal pain and to determine the risk factors in driving bus for long hours. **Methods:** This is a cross-sectional study involving participants employed as MSRTC Bus drivers with the age between 22-58 years and who drives minimum 6 hours a day recruited by convenience sampling. The participants will be interviewed through standardized Nordic questionnaire for musculoskeletal disorder and a self-administered questionnaire were filled by therapist of each driver. The data collected was analysed using descriptive statistics and graphical representation. **Result:** Data was analysed by self-reported Questionnaire. Out of the 99 bus drivers, 24% reported no pain. Prevalence of musculoskeletal pain was 76%, in that most affected area was Low back (94%), neck (45%), knee pain (43%) & then foot & shoulder pain. The highest risk factors for back & neck pain were smoke, absence of spare driver, driving for long hours & uncomfortable seat position. **Conclusion:** Prevalence of musculoskeletal pain was 76%, in that most affected area was Low back, neck, knee, foot pain & shoulder pain. Extrinsic factors do play a significant role in the causation of work-related musculoskeletal pain in bus drivers and is a leading cause for affecting health of bus drivers.

KEYWORDS

Musculoskeletal pain, risk factors, lower back, long distance, bus drivers.

INTRODUCTION

Musculoskeletal pain is defined as pain perceived in a region of the body with muscular, ligament, bone or joint origin.^[1] Since MSDs are multi-causal in nature, they can present challenges in clinical diagnoses in the absence of a single specific causative factor.^[1] Similarly, MSDs are arguably the most common cause of occupational morbidity globally affecting individuals of all ages, sexes, socio economic classes and ethnicities.^[1]

Professional bus drivers form a major occupational group in transportation sector worldwide. Professional bus drivers are involved in an occupation that requires them to operate and drive buses for public transport over longer period of time.^[2] Another recent finding published by the US Bureau of Labor Statistics in 2017 indicates that bus drivers are one of the top three occupations prone to have musculoskeletal disorders with highest incidence rates (206 per 10,000 full-time workers).^[2]

WRMSDs are induced by postural defects, repetitive tasks, environmental factors, prolonged stresses and strains experienced in long-distance driving.^[3] Particularly in developing nations, WMSDs are a significant cause of employee disability, lost wages, and decreased work competence among employees and public vehicle drivers. These issues have significant economic ramifications because of worker compensation, health care costs, and efficiency losses.^[4]

Additional risk variables include poor decision-making, social isolation, rigorous driving schedules, car mechanical problems, inadequate rest periods, poor cabin comfort, working shifts frequently, bad weather, traffic jams, the sedentary nature of the job, exposure to other vehicles' pollutants, the need to guarantee passenger safety, and difficult passenger behavior.^[9]

Review of literature

Apirati Kasemsan, et al. (2021) conducted a study on Prevalence of musculoskeletal pain and associated disability among professional bus drivers. A cross-sectional study was conducted among 83 professional bus drivers. The prevalence rate of MSP was evaluated using a standardized Nordic musculoskeletal questionnaire. The bus drivers reported a high prevalence rate of MSP in the neck, back and shoulder regions with mild to moderate disabilities.

Anuj S. Mehta, et al.(2019) conducted a study on prevalence of work related musculoskeletal disorders in truck drivers and its associated risk factors. A self-administered closed-ended validated questionnaire was prepared by the researcher incorporated with Nordic

musculoskeletal questionnaire. It can be concluded from the results of this study that extrinsic factors do play a significant role in the causation of work-related musculoskeletal pain in truck drivers.

N Rugbeer, et al.(2016) conducted a study on the prevalence of work-related musculoskeletal disorders in long distance bus drivers. A cross-sectional survey study was conducted among male long distance bus drivers. Eighty-nine participants were selected in the study. The greatest proportion of pain was experienced along the axial skeleton in long-distance bus drivers. Upper back pain was the most prevalent of the WRMSDs reported in these drivers.

Need Of Study

Long-distance driving involves repetitive tasks, such as handling, bending and prolonged sitting, which may result in enormous stress along the kinetic chain and affect the driver's personal and social life. There are many studies available in international level on musculoskeletal problems faced by bus drivers but only few studies are available in India. Thus, there is need to study prevalence among bus drivers working for long hours.

Methodology

A descriptive cross-sectional study was conducted among bus drivers in Panvel Bus depot. The sample included 99 bus drivers who drive more than 6 hours daily selected through convenience sampling from MSRTC Panvel Bus depot. The sample size was calculated using the OpenEpi Version3 calculator. A validated questionnaire with 4 sections set and consent forms were used. The study received approval from the institution's scientific research committee. The survey was conducted through standardized Nordic questionnaire for musculoskeletal disorder and a self-administered questionnaire were filled by therapist after the personal interview of each driver. The inclusion criteria was bus drivers willing to participate, age between 22-58 years old, minimum 1 year of experience, and who drives minimum 6 hours daily. Exclusion criteria was bus drivers with pre-existing musculoskeletal condition before joining the job, pre-existing neurological condition, and not willing to participate. Response meeting the inclusion and exclusion criteria were analyzed after data coding and tabulation.

RESULT AND DISCUSSION

In our study, we surveyed 99 bus drivers. Data is analysed in MS Excel using pie charts and bar diagrams.

1) Age distribution

Table 1 shows distribution of bus drivers according to the age.

Age	Frequency	Percentage
<40 years old	54	54.5%
40-50 years old	31	31.3%
>50 years old	14	14.1%

Among 99 responses 54 (54.5%) study subjects were < 40 years old, 31 (31.3%) study subjects were 40-50 years old and 14 (14.1%) study subjects were >50 years old.

2) Daily driving distance

Table 2 shows distribution of bus drivers according to daily driving distance.

Daily distance(kms)	Frequency	Percentage
300-500 km	45	45.5%
500-700 km	54	54.5%
700-900 km	0	0%
More than 900 km	0	0%

Among 99 responses 54(55%) study subjects were driving 500-700 km per day. 45(45%) study subjects were having daily driving 300-500 km.

3) Duration of current employment

Table 3 shows distribution of bus drivers according to duration of current employment.

Duration of current employment	Frequency	Percentage
1-4 years	11	11.1%
4-8 years	29	29.3%
8-12 years	26	26.3%
12-16 years	14	14.1%
More than 16 years	19	19.2%

Among 99 responses 29 (29.3%) study subjects were having duration of service between 4-8 years, 26 (26.3%) were having duration of service between 8-12 years, 19(19.2%) were having duration of service more than 16 years, 14(14.1%) were having duration service between 12-16 years and 11(11.1%) were having duration service between 1-4 years.

4) Driving during night hours

In present study all the study subjects have to drive during night hours as per rules and regulations of MSRTC.

5) Presence of pain

Table 5 shows the distribution of bus drivers according to prevalence of pain.

Presence of pain	Frequency	Percentage
Yes	75	75.8%
No	24	24.2%

Among 99 responses only 75(75.8%) study subjects have prevalence of pain.

6) Area of musculoskeletal pain during last 12 month

Table 6 shows distribution of bus drivers according to area of musculoskeletal pain during last 12 months.

Area of musculoskeletal pain	Frequency	Percentage
Neck	30	44.8%
Right shoulder	2	3%
Left shoulder	3	4.5%
Right elbow	2	3%
Left elbow	1	1.5%
Right wrist and hand	5	7.5%
Left wrist and hand	6	9%
Upper back	3	4.5%
Lower back	63	94%
Right hip/thigh	3	4.5%
Left hip/thigh	12	17.9%
Right knee	12	17.9%
Left knee	29	43.3%
Right foot/ankle	9	13.4%
Left foot/ ankle	21	31.3%

Among 67 responses lower backache was the most common presenting complaint, present among 63(94%) bus drivers followed by

neck pain, which was present among 30(44.8%) bus drivers; 29(43.3%) experienced left knee pain; 21(31.3%) experienced left foot/ankle; 12(17.9%) experienced left hip and right knee pain; 9(13.4%) experienced right foot/ ankle pain.

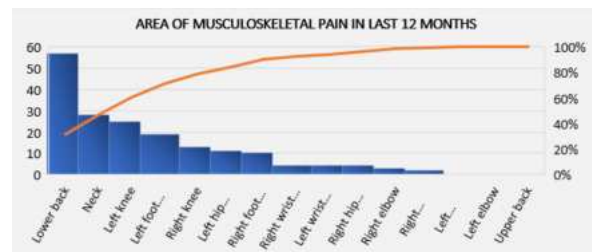


Fig.1

7) Area of musculoskeletal pain in last 7 days

Table 7 shows the distribution of bus drivers according to musculoskeletal pain in last 7 days.

Area of musculoskeletal pain	Frequency	Percentage
Neck	28	44.4%
Right shoulder	2	3.2%
Left shoulder	1	1.6%
Right elbow	3	4.8%
Left elbow	0	0%
Right wrist and hand	4	6.3%
Left wrist and hand	4	6.3%
Upper back	0	0%
Lower back	57	90.5%
Right hip/thigh	4	6.3%
Left hip/thigh	11	17.5%
Right knee	13	20.6%
Left knee	25	39.7%
Right foot/ankle	10	15.9%
Left foot/ ankle	19	30.2%

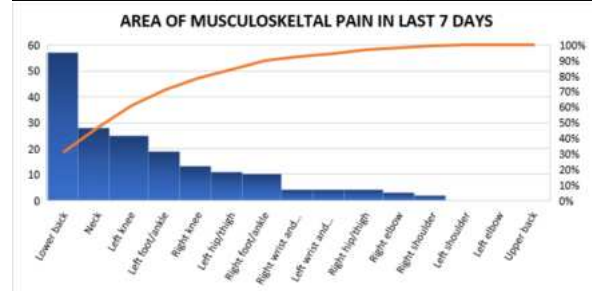


Fig.2

Among 63 responses, 57(90.5%) study subjects reported lower back pain; 28(44.4%) reported neck pain; 25(39.7%) reported left knee pain; followed by left foot/ankle pain, right knee pain, left hip, right foot/ankle, right and left wrist and hand, right hip, right elbow, right shoulder and left shoulder.

12) Association of pain with duration of current employment

Table 8 depicts the relationship between pain and bus driving experience.

Driving experience	Yes	No
1-4 years	4	7
4-8 years	19	10
8-12 years	21	5
12-16 years	12	2
More than 16 years	19	0

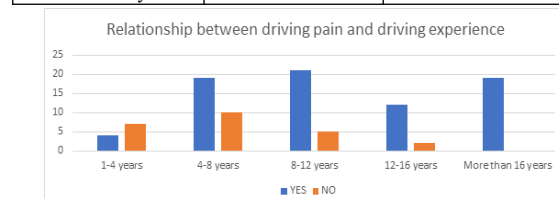


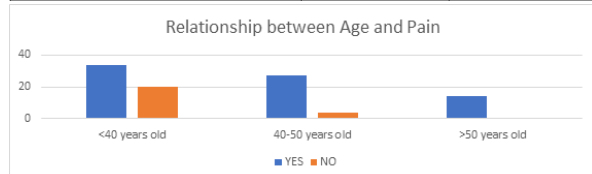
Fig.3

Among the responses bus driver having experience of 8-12 years have higher rate of presence of pain followed by bus drivers having experience of more than 16 years.

13) Association of pain with the age of bus drivers.

Table 9 depicts the association of pain with the age of bus drivers.

Age	Yes	No
<40 years old	34	20
40-50 years old	27	4
>50 years old	14	0

**Fig.4**

Among the responses, presence of pain was higher in the age group less than 40 years old followed by 40-50 years old and more than 50 years old.

14) Association of pain with the daily driving distance

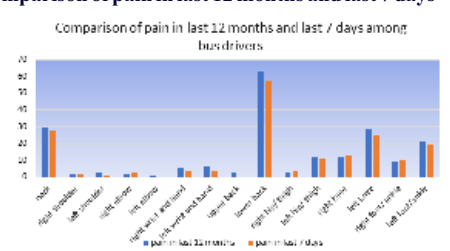
Table 10 depicts the association of pain with the daily driving distance.

Daily driving distance(km)	Yes	No
300-500 km	38	7
500-700 km	37	17

**Fig.5**

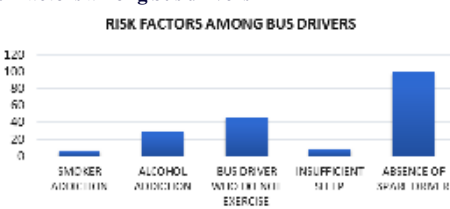
Among the responses, prevalence of pain was almost similar in the bus drivers driving the distance between 300-500 kms and 500-700 kms.

15) Comparison of pain in last 12 months and last 7 days

**Fig.6** comparison of pain in last 12 months and last 7 days among bus drivers

On comparison of pain in last 12 months and pain in last 7 days, the prevalence of pain in last 12 months was higher as compared to the pain in last 7 days.

16) Risk factors among bus drivers

**Fig.7.** Risk factors among bus drivers

Among 99 responses, 99(100%) have absence of spare driver, 46(47%) are not exercising, 30(30%) are alcohol drinker, 7(7%) are smoker and 9(9%) have insufficient sleep.

DISCUSSION

The study was conducted on total 99 participants who were MSRTC Bus drivers. The participants included in study were from Navi Mumbai and the purpose of the study was to find the most affected area of the body by musculoskeletal pain and determine the risk factors in long distance bus drivers. A self-made questionnaire was designed which incorporated the Nordic questionnaire. The questionnaire included questions regarding demographic data, occupational profile, risk identification and site of pain.

The first finding of this study was that the most prevalent musculoskeletal pain were lower back followed by neck, left knee, left foot/ankle, right knee, left thigh/hip, right foot/ankle, upper back, wrists, shoulders and elbows. Uncomfortable sitting positions have been identified as risk factors for low back discomfort during driving. Knee pain from repeatedly using the clutch and accelerator, followed by neck ache from sitting with the neck unsupported for extended periods of time^[4]. This finding is similar to that found in a study conducted in Nagpur on MSRTC Bus drivers^[9], which concluded the most prevalent musculoskeletal pain were lower back and knee. Therefore, the current study creates an awareness that lower back disorder and neck disorder are highly prevalent among MSRTC Bus drivers.

Most of the bus drivers who were driving distance between 300-500km and 500-700km reported prevalence of pain. Ergonomic factors like uncomfortable seat and steering wheel position, vibration, bad road condition and psychosocial factors such as inadequate rest period, tiredness, less time for family, time pressure may be responsible for musculoskeletal pain^[7].

Duration of current employment having 8-12 years and >12 years were significantly associated with musculoskeletal pain. However in the study conducted by Snehal Chavhan et al (2018)^[9] where driving duration >20 years was significantly associated with musculoskeletal disorder.

In the present study, the daily duration of driving was 8 hrs which was according to the norms set under Motor Transport Workers Act, 1961 (48 hrs/wk). However higher daily driving duration was found in other studies carried out by N Rugbeer et al (2016)^[3] who found that 38 % drive for more than 12 hours at a time.

Several bus drivers were alcohol drinker and smoker which predisposes to increase risk of cardiovascular disease and also leads to decrease in perfusion and malnutrition of the para vertebral soft tissues & inter vertebral disc and hence interferes with the tissue healing. Nicotine, released as a result of smoking, influences the central nervous system altering the perception of pain, which would explain MSK pain in other region of the body^[7].

All the bus drivers were not accompanied by spare drivers while moving from one place to another which reduces the chances of taking breaks, many hours in an unchanged posture while driving.

Among 99 responses 47% participants reported lack of physical exercise and 76% have presence of pain. Therefore, lack of physical exercise is one of the contributing risk factor.

Shoulder pain which was reported by 3% of the participants and neck pain which was reported by 44.8% of the participants which can be caused by rounded shoulders and forward head posture. Thus, it appears that all the above-mentioned factors seem to play a role in the contribution of work-related musculoskeletal disorders in bus drivers.

The current study considered reporting MSP at 12 months period prevalence in addition to an acute prevalence of 7 days. In current study the drivers reported a higher prevalence of MSP in 12 months than 7 weeks (Fig.6). This finding is similar to the study carried out by Apirati Kasemsan et al (2020)^[2]. In order to comprehend the drivers' experience with MSP and how it affects their day-to-day activities, the disability related to the back, neck, and leg regions was also assessed. However, the MSP caused minor to moderate handicap, according to the bus drivers, and the majority of them were still working in discomfort. This raises questions about the safety and well-being of drivers and their passengers, which should be brought to light and addressed with suitable MSP management and prevention measures.

CONCLUSION

In this study the prevalence rate of work-related musculoskeletal disorders in bus drivers was found to be 76%. The most commonly affected joints are lower back followed by neck and knee. The factors which are found to be responsible for work related musculoskeletal pain in bus drivers are age, years of driving, number of driving days in a week, number of driving hours in a day, number of work experience, rest duration and posture.

Smoking, alcohol addiction, insufficient sleep, absence of spare driver and lack of exercise are some of the risk factor among long distance bus drivers.

It can be concluded from the results of this study that extrinsic factors do play a significant role in the causation of work-related musculoskeletal pain in bus drivers and is a leading cause for affecting health of bus drivers.

Limitations

The sample size of the study might be insufficient due to the limited time of collecting data. No ergonomic evaluation such as job analysis and job site analysis was done. The Study was only limited to Panvel Bus Depot. Pain level for musculoskeletal pain was not questioned.

Recommendation for future study

Further studies can be done on a larger sample size. Study should be conducted to incorporate job analysis and job site analysis to identify and determine the exact ergonomic risk factors responsible for occurrence of MSDs along with quality of life in order to plan their preventive and therapeutic measures.

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