

Original Research Article

A cross sectional study on pattern and associated risk factors of musculoskeletal morbidities among government bus drivers in Mangalore, Karnataka

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ABSTRACT

Background: Absenteeism, turnover and disability among the drivers appeared to be high. The main conditions leading to disablement among drivers are related to cardiovascular diseases, psychological problems and musculoskeletal disorders. This study was planned to determine the pattern of musculoskeletal morbidities among government bus drivers in Mangalore, the associated risk factors of musculoskeletal morbidities.

Methods: A cross sectional study was conducted at Mangalore KSRTC Bus Depot among 310 bus drivers over a period of 18 months from 2014 to 2016 yr. The study was conducted in three depots of KSRTC division Mangalore in Mangalore city.

Results: In our study all drivers were males, the mean age 44.88 years. Out of the 310 bus drivers who participated in the study 298 belonged to upper middle class indicating that the KSRTC drivers are financially stable. The common morbidities were musculoskeletal problems especially low back ache 84.8% followed by neck pain 46.8%, about 32.3% had shoulder pain 15.8% had knee joint involvement. The proportion of bus drivers with hypertension and diabetes mellitus was 35.8% and 7.7% respectively. Out of the 310 bus drivers 239 (77.1%) consumes alcohol. The prevalence of smoking was (85.5%) and tobacco chewing was 14.5%.

Conclusions: During our study we found that there is an increased prevalence of chronic conditions like diabetes mellitus and hypertension, this is attributable to the increase stress faced by the drivers in terms of the responsibility they carry to transport the public of all age groups. This unnoticed stress plays a very important part in development of the chronic conditions.

Keywords: Bus drivers, Occupational environment, Musculoskeletal disorders, Standardized nordic questionnaire

INTRODUCTION

Transport or transportation is the movement of people and goods from one place to another. The term is derived from the Latin words Trans (across) and portare (to carry). In India, many forms of public transportation are available for passengers. Among them, buses play a significant role. The safety of the general public both

within the bus and on the road is given little priority.¹ Bus drivers must successfully balance the competing demands of safety, customer-focused service and company operating regulations.² Driving frequently involve many risk factors such as prolonged sitting and motor vehicle driving, tight running schedules, reduced rest breaks, rotating shift patterns, traffic congestion, the sedentary nature of job etc.³ Musculoskeletal system gives the body

free movement and independent function in the body.⁴ Work-related musculoskeletal disorders affect workers in many occupations including drivers of large vehicles. Urban bus drivers have been found to have high prevalence rates of back problems in many countries.⁵

Musculoskeletal disorders (MSDs) cover a wide range of conditions (e.g., tendonitis, tenosynovitis, epicondylitis, bursitis, carpal tunnel syndrome, sciatica, osteoarthritis, myalgia, low back pain, and other idiopathic pain syndromes) that cause inflammation and degeneration of the musculoskeletal system and neurovascular structures.⁶ They are a major public health problem worldwide, affect the quality of life and cause substantial morbidity and disability with consequent economic loss in terms of sickness absence and cost of treatment.⁶⁻⁸ MSDs are multifactorial in terms of etiology; the risk factors include awkward posture, manual handling, heavy lifting, strenuous tasks, and repetitive activities, while demographics, workload, and psychosocial factors are known to play parts in the pathogenesis

Drivers are exposed to a number of health problems as a direct result of the posture adopted in driving. Sitting in the driving position exerts considerable forces on the spine and can cause a number of problems with the musculoskeletal system in particular backaches, neck problems, pulled muscles, and general stiffness. The driving posture a study of low back trouble among urban bus drivers in Denmark demonstrated that 57% of the 2045 bus drivers studied suffered from this health problem.⁹ Psychological problems (fatigue, tension, mental overload) cancers, gastro intestinal, Sleeping problems, and musculo-skeletal problems (lower part of the back, neck, shoulders, upper part of the back, knees).^{11,12}

Hypertension accounts for 20-50% of all-cause mortality.¹³ Among urban-dwelling men and women in India, the prevalence of hypertension is 25.5% and 29.0%, respectively, whereas it is 14.0% and 10.8% respectively, in rural communities.¹⁴ Hypertension doubles the risk of cardiovascular diseases, including coronary heart disease (CHD), congestive heart failure (CHF), ischemic and hemorrhagic, renal failure, and peripheral arterial disease.

India currently has the largest number of diabetic subjects in the world and has earned the dubious distinction of being branded the “diabetes capital of the world”. The prevalence is further rising rapidly and the age at diagnosis of diabetes is reducing progressively. The prevalence of abnormal glucose tolerance in bus drivers was found to be 14.6%.

Low back pain is usually classified as either acute or chronic.

- Acute low back pain lasts for less than a month and is not caused by serious medical conditions. Most

cases improve in a few days without medical attention, although recurrence after a first attack is common.

- Chronic low back pain persists beyond six months. It constitutes only 1% to 5% of all low back pain cases.

Aim

- To study the pattern of musculoskeletal morbidities among Government bus drivers, Mangalore.

Objectives

- To determine the pattern of Musculoskeletal morbidities among government bus drivers in Mangalore.
- To assess the associated risk factors of musculoskeletal morbidities among government bus drivers in Mangalore.
- To assess the health seeking behavior of government bus drivers regarding musculoskeletal morbidities in Mangalore.

METHODS

Study design: Cross sectional study

Study setting

The study was conducted in three depots of KSRTC division Mangalore. At the time of the study in Mangalore city there were three depots located in the city; depot 1 was adjacent to the main bus stand at Bejai, Mangalore, depot 2 and 3 were located 1 to 1.5 km from depot 1.

Study duration: October 2014 to April 2016.

Study population: All bus drivers working for KSRTC Mangalore division.

Selection method

Convenient sampling method

The study was a cross sectional study conducted at Mangalore KSRTC Bus Depot among 310 bus drivers over a period of 18 months from 2014 to 2016 using convenient sampling method.

Sample size

Sample size was calculated using the formula:

$$\text{Sample size: } n = \frac{4pq}{d^2} = 322$$

Where p (prevalence) = 28%,
q = (100-p) = 72%,
r = 5% (relative precision)

As there were 310 drivers available at the time of data collection the sample size was approximated to 310.

Study procedure

Permission to conduct the study was obtained from the Depot Manager KSRTC Mangalore. The data was collected by interview method at the Mangalore KSRTC depot after taking written informed consent from the subjects. A pre structured questionnaire containing details like basic demographic data (age, gender, occupation-number of hours of work, the nature of the work and his experience as a bus driver) was collected. The standardized nordic questionnaire (enclosed) was implicated to the subjects to know the pattern of distribution of the musculoskeletal disorders.

To know the feasibility and validity of the questionnaire before the main study, a pilot study was conducted and necessary changes were made in the questions accordingly. Prior to study, permission was obtained from head of the depot. List of all bus drivers was obtained from depot manager. A time schedule was prepared, so that they could participate in the study conveniently without disturbing their duty pattern.

The interview technique was used as a tool for data collection followed by thorough clinical examination. Confidentiality of the study subjects was assured and maintained throughout the study. Before personal interview and physical examination, objective of the study was explained to participants such filled formats were collected on the same day. The data so obtained was fed into Excel sheet and analyzed using SPSS software.

The following were the pre-defined inclusion and exclusion criteria.

Inclusion criteria

Inclusion criteria were bus drivers between 20-60 years of age; bus drivers who spend minimum four hours a day driving.

Exclusion criteria

Exclusion criteria were bus drivers who are not willing to participate in the study; bus drivers who have met with accident or undergone any surgery after joining the profession.

Ethical clearance

Ethical clearance was taken from institutional ethical committee.

Ethical considerations

- Anonymity was maintained

- No physical harm was done as there were no invasive procedure
- Informed written consent was taken

Data and statistical analysis

The collected information was summarized by using frequency, and percentage for qualitative data. Mean and standard deviation for quantitative data was used. To identify the prevalence of MSD frequency and percentage were obtained. The inferential statistics such as chi square and Likelihood ratio test were used to find the association between duration of work and pattern of MSD.

Statistical analysis was done by using SPSS software version 21.0. A ‘p’ value less than 0.05 (p<0.05) was considered significant.

RESULTS

The study entitled a cross sectional study on pattern and associated risk factors of musculoskeletal morbidities among Government bus drivers in Mangalore, Karnataka, conducted at the Mangalore Government Bus Depot on 310 bus drivers in the KSRTC bus Depot Mangalore over a period of 18 months from 2014 to 2016 chosen by convenient sampling method these were our results and observations.

The mean age in our study was 44.88 years SD 7.905 years. The most common age group of drivers in our study was 45-54 years with 128 cases 41%.

In our study 298 case 96% belonged to upper middle class indicating that the KSRTC drivers are financially stable.

Table 1: Socioeconomic classification of study population based on modified B G Prasad’s socioeconomic classification.

| Class | Frequency (n=310) | Percentage (%) |
|-------|-------------------|----------------|
| 1 | 0 | 0 |
| 2 | 2 | 1 |
| 3 | 298 | 96 |
| 4 | 10 | 3 |
| 5 | 0 | 0 |

Most of our cases in our study were in the BMI range 19.5-25 which is normal range.

Table 2: Distribution of study population based on body mass index.

| BMI | Frequency (n=310) | Percentage (%) |
|---------|-------------------|----------------|
| <19.5 | 2 | 0.6 |
| 19.5-25 | 295 | 95.2 |
| >25 | 13 | 4.2 |

Assessment of pattern of musculoskeletal pain according to Nordic questionnaire

*More than one response was allowed. Among the 310 subjects majority (85%) had back pain followed by 47% had cervical pain, 13 cases had wrist pain.

Table 3 shows a positive relation between hours at work and with presence of musculoskeletal disorders.

Table 4 show a positive relation between the number of days a week the drivers drive and the presence of musculoskeletal disorders.

There is a significant association between years of driving for more than ten years and occurrence of pain in the back, neck and shoulder (p<0.05) but there was no any association seen between wrist and knee pain with years of driving.

92% of the bus drivers agreed that at some point of time in their life as drivers they did have to help in load handling and lifting at work, most often to help women, children and elderly while boarding the bus.

Table 3: Pattern of musculoskeletal pain according to hours of work per day.

| Hours a day you drive | Site | | | | |
|-----------------------|------|------|----------|-------|------|
| | Back | Neck | Shoulder | Wrist | Knee |
| Greater than 12 hrs | 168 | 70 | 58 | 10 | 31 |
| Less than 12 hrs | 95 | 75 | 42 | 3 | 18 |
| Total | 263 | 145 | 100 | 13 | 49 |

Table 4: Association between days per week of driving and pattern of musculoskeletal pain.

| Site | Response | | | | | | | | | |
|-------------------------|----------|----|--------|-----|----------|-----|--------------------------|-----|------|-----|
| | Back | | Neck | | Shoulder | | Wrist | | Knee | |
| Number of days per week | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No |
| Less than 5 days | 168 | 31 | 70 | 129 | 58 | 141 | 10 | 189 | 31 | 168 |
| 5-7 days | 95 | 16 | 75 | 36 | 42 | 69 | 3 | 108 | 18 | 93 |
| Chi square | 0.075 | | 30.03 | | 2.46 | | 1.022 (likelihood ratio) | | 0.22 | |
| P value | 0.78 | | <0.01* | | 0.117 | | 0.3 | | 0.88 | |

(*Indicates significant).

Table 5: Association between years of driving and pattern of musculoskeletal pain.

| Site | Response | | | | | | | | | |
|------------------|----------|----|--------|-----|----------|-----|-------|-----|-------|-----|
| | Back | | Neck | | Shoulder | | Wrist | | Knee | |
| Years of driving | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No |
| <10 years | 79 | 44 | 41 | 124 | 28 | 174 | 6 | 200 | 19 | 89 |
| >10 years | 184 | 3 | 104 | 41 | 72 | 36 | 7 | 97 | 30 | 172 |
| Chi square | 67.34 | | 68.117 | | 89.799 | | 2.508 | | 0.397 | |
| P value | <0.001 | | <0.001 | | <0.001 | | 0.113 | | 0.518 | |

Table 6: Distribution of study population based on load handling and lifting at work.

| Load handling and lifting at work | Frequency (n=310) | Percentage (%) |
|-----------------------------------|-------------------|----------------|
| Present | 287 | 92.6 |
| Absent | 23 | 7.4 |

In our study 239 cases (77.1%) had history of alcohol consumption regularly. In our study 265 cases 85.5% had history of smoking. In our study 45 cases 14% had history of tobacco chewing.

Table 7: Personal habits of study subjects.

| Habits | Frequency (n=310) | Percentage (%) |
|-----------------|-------------------|----------------|
| Alcohol | 239 | 77.1 |
| Smoking | 265 | 85.5 |
| Tobacco chewing | 45 | 14.5 |

*More than one response was allowed.

Out of total population 111, 24 and 6 drivers had respectively diabetes mellitus, hypertension and bronchial asthma.

Table 8: Associated co morbidities among study population.

| Comorbidities | Frequency (n=310) | Percentage (%) |
|-------------------|-------------------|----------------|
| Hypertension | 111 | 35.8 |
| Diabetes mellitus | 24 | 7.7 |
| Bronchial asthma | 6 | 1.9 |

Job details

In our most of the drivers had an experience of 6-10 years, 35.8% of the drivers had more than 10 years of experience in driving.

Hours of driving per day of study population

In our study most of the driver’s 199 drivers 64.2% had a 12 hour shift which ended up them to drive more than 12 hours due to other factors like traffic, climatic conditions, and bad roads. In our study 199 drivers 64.2% drove 5-7 days of the week.

199 drivers 64.2% said they had job satisfaction despite long hours of work. 308 drivers 99.4% when interviewed said that they felt that the rest breaks were not enough and they needed more rest time.

Table 9: Number of not working days in a year due to musculoskeletal morbidity.

| Number of days | Frequency (n=310) | Percentage (%) |
|-------------------|-------------------|----------------|
| 1-7 days | 25 | 8.1 |
| 8-30 days | 9 | 2.9 |
| More than 30 days | 17 | 5.5 |

83.5% had no work trouble during last twelve months. 32.25% of the drivers had reduced their work activity due to musculoskeletal pain.

98% agreed that due to hectic work timings the leisure time was less in their life. 16.5% had work related injuries that prevented from doing routine work.

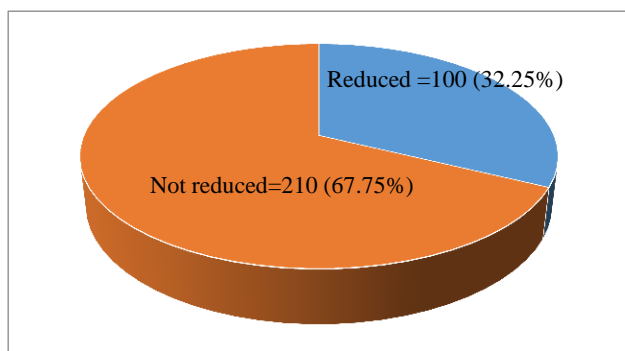


Figure 1: Reduced work activity due to musculoskeletal pain.

DISCUSSION

Public transports form an important part of travel to the common man. The public transport vehicles need to be in the hands of healthy and capable individuals, as daily most of the public sector use them without knowing how much they are risking their life. For the safety of the common man it is needed that the personnel handling the public transport are themselves healthy and have a mentally balanced life.

A total of 310 bus drivers in K.S.R.T.C division Mangalore city were included in this study. The study was conducted in three depots. In our study sample mean age group of the study population was 44. 88 years SD 7.905 years. Similar study results were found in a study carried out at four depots of M.S.R.T.C drivers in Nagpur city conducted by Borle et al among 581 drivers.¹¹ Where in their study group show mean age was 46.90 years which is similar to our study population.

In our study we found that all drivers were males. as driving busses is tedious job, involves a lot of concentration, technique and driving experience the females usually don’t prefer this job that is why the discrepancy in Sex distribution in the study by Aslam all were males.¹⁵

In our study prevalence of back pain was 84.8% which is similar to Borle among 587 drivers showed that commonest morbidity was backache which was present in site being lower back in 318 (85.5%) which also similar to Tamrin.¹¹

In our study population 46.8% drivers reported neck pain 32% wrist pain these findings almost similar to study conducted by Onawumi and Lucas.¹⁶ Babajide a study conducted among occupational taxicabs drivers with a sample 1406, in Nigeria were they found out showed neck (67%), right and left wrists (18%, 20%), upper, middle and lower back (29%, 29%, 30%), and buttock (19%) of the operators.

In a study conducted by Mansfield, Marshall among 118 rally drivers found out that 70% of drivers complained of lower back pain, neck 54% and shoulders 47% which is almost similar to the findings in our study.¹⁷

In our study the most common habit among drivers were smoking 85.5% followed by alcohol consumption 77.7%, our result consistent with previous research by Oblenis which showed 46% of them are smoking, 83% are drinking alcohol.¹⁸

In our study 64.2% of the drivers faced stressful condition while working which is inconsistent with the previous results by Oblenis were in their study showed 27% are everyday suffering from stressful situations it might be due to driving policy and schedules of study population.¹⁸

In our study health seeking behavior among study population was not good and most of the drivers 48.4% takes self-medication, 25.8% takes rest and only 38.7% visit government health services results were inconsistent Vasanth et al were in their study 82% of the people visit health care services for their complaints and only 12% of drivers take self-medication.

Limitations

This study examined a sample of 310 bus drivers and it does not actually represent the true characteristics of the larger population of bus drivers on the whole.

Recommendations

Based on the observations and conclusion of the present study the following recommendations are made for transport organizations small or large to improve the health and well-being of bus drivers.

- There has to be an active effort to educate this sector of society by imparting relevant health education material for prevention of alcohol, smoking, chewing, DM, hypertension.
- Good postures reduce the stress applied to soft tissue surrounding the spine. Maintaining the normal S-curve of spine can reduce low back pain.
- Stretching and strengthening regimen for the muscles of trunk is a way to stabilize the spine and increase flexibility.

CONCLUSION

The findings of the studies cited in this thesis, show clearly that bus drivers are at a continuous risk of developing health problems from the effect of long hours of driving.

These risk factors have been implicated in most of the studies as the cause of the following common health problems of bus drivers: (a) hypertension, cardiovascular disease and stroke, (b) musculoskeletal disorders (c) obesity, and (d) sleep disorders and psychological distress. It is expected that elimination of the risk factors will greatly safeguard bus drivers and improve the quality of the services they run.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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