VOLUME - 15, ISSUE - 09, SEPTEMBER - 2026 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Occupational Health

OCCUPATIONAL DISORDERS AMONG BUS DRIVERS OF PUBLIC TRANSPORT: A CROSS-SECTIONAL STUDY

Dr. Neelam S. Gautam*	Associate Professor, LLRM Medical College, Meerut *Corresponding Author
Dr. Shubhali Batra	Senior Resident, LLRM Medical College, Meerut
Dr. Seema Jain	Professor, LLRM Medical College, Meerut

ABSTRACT

Context: Public transport drivers have to sit for long durations, experience vibrations, and have odd working hours which put them at an increased risk of having various occupational disorders. **Aims:** i) To estimate the prevalence of occupational disorders among bus drivers of public transport; ii) To find out the various associated factors with occupational disorders among them. **Settings and Design:** A cross-sectional survey among public transport drivers in Meerut was carried out involving 220 drivers. **Methods and Material:** Anthropometric, blood pressure, and clinical assessments were done along with using a semi-structured questionnaire. **Statistical Analysis Used:** Data analysis was done using suitable tests and setting p value <0.05 as statistically significant. **Results:** Occupational disorders were found in 78.6% participants. Hypertension (46.5%), lower back ache (24%), and neck pain (17.7%) were the three commonest diseases found. Nearly 49.1% had work-related musculoskeletal disorders (WMSDs) which were significantly associated with years of services as a driver ($p=0.04$). There was no significant association between body mass index and occupational disorders. Tobacco/gutka consumption had a significant relationship with shift work among drivers ($p=0.0009$). **Conclusions:** Musculoskeletal and cardiovascular disorders are very prevalent in bus drivers and are greatly linked to occupational exposure. Rehabilitation and ergonomic measures along with lifestyle modifications are key.

KEYWORDS : Bus Drivers, Hypertension, Occupational Disorders, Work-Related Musculoskeletal Disorders

INTRODUCTION

In the modern urban landscape, especially in a country like India, where public transportation serves as a lifeline for millions, the health of those who operate these vital services often goes unnoticed. Among these essential workers, bus drivers and conductors play a pivotal role, ensuring the smooth functioning of daily commutes. Their profession, long hours behind the wheel, irregular schedules, and exposure to various stressors, can significantly impact their overall health and well-being.[1]. Due to their sedentary lifestyle, many professional drivers remain physically inactive during their leisure time which leads to an increase risk of obesity, hypertension and diabetes, subjecting them to coronary heart disease and other non-communicable diseases.[2] They are also being subjected to the organizational hazards such as long and irregular working hours, work during the weekends, night work, and split shifts and physical demands with repetitive movements, and prolonged seating. The common occupational disorders in this section of the society are lower backache, neck pain and gastritis.[3] Excessive body mass index is due to unscheduled diet, consumption of oily snacks, non-vegetarian foods, use of tobacco related items etc. Among the various potential risk factors, increased adipose tissue accumulation and elevated body mass index (BMI) are associated with the development of non-communicable diseases like hypertension, diabetes mellitus, and coronary heart disease.[4]

However, limited studies have comprehensively assessed the overall morbidity profile and combined occupational and lifestyle-related health risks among public transport bus drivers, particularly in India. The present study addresses this gap by evaluating their general health status and common occupational and lifestyle-related disorders.

Objectives

i) To estimate the prevalence of occupational disorders among bus drivers of public transport;
ii) To find out the various associated factors with occupational disorders among them.

Subjects and Methods

A descriptive cross-sectional study conducted among the bus drivers of public transport at two bus depots of Meerut city in Uttar Pradesh.

Study Duration: October to December 2025

Inclusion Criteria: All the bus drivers of the selected bus depots of Meerut city available on the days of doctor visits made to the depots and those who were willing to give consent.

Exclusion Criteria: Those who did not give consent and not willing to participate were excluded from the study.

Sample size calculation

$$N = \frac{Z^2 pq}{L^2}$$

where,
$Z = 1.96$,
$p = 73.5\%$ (prevalence of musculoskeletal disorders, by Sheth et al)[5],
$q = 1-p$,
$L = 6\%$ absolute precision and 95% Confidence Interval
And 5% non-response rate

$$N = \frac{(1.96)^2 \times 73.5 \times 26.5}{(6)^2}$$

$= 208$, rounded off to **220**.

A pre-tested semi-structured questionnaire containing questions on basic socio demographic characteristics, any addictions, lifestyle factors, past history was used for the study participants along with anthropometric and blood pressure measurement. Height and weight were recorded and BMI was calculated. Blood pressure was measured by using the mercury sphygmomanometer, in sitting position, two times over a period of ten minutes and the lowest reading was recorded. Bus drivers with systolic blood pressure of less than 120 mm of Hg and diastolic blood pressure of less than 80 mm of Hg was considered to have normal blood pressure. Bus drivers with systolic blood pressure of 120-139 mm of Hg and a diastolic blood pressure of 80-90 mm of Hg was considered to be pre-hypertensive. Bus drivers with systolic blood pressure 140-159 mm of Hg and a diastolic blood pressure of 90-99 mm of Hg was considered to be in stage I hypertension. Bus drivers with systolic blood pressure of more than 160 mm of Hg and a

diastolic blood pressure of more than 100 mm of Hg was considered to be in stage II hypertension (JNC-8 criteria).

Data Collection

An informed consent was taken from all the participants after obtaining permission from the bus station incharge. Anthropometric measurements and blood pressure were recorded by the investigator in the premises of the bus depot.

Ethical Considerations: Permission was taken from the ethics committee of the institute No./SC-1/2025/2017

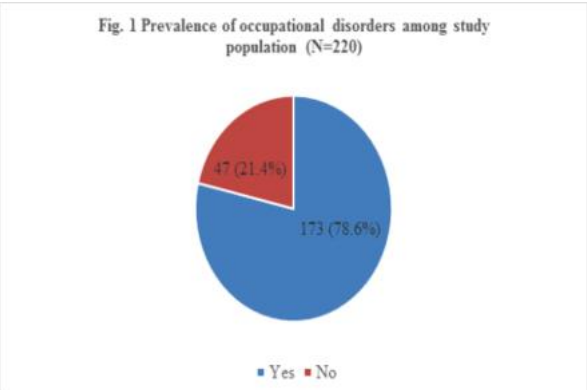
Statistical Analysis

Data was analyzed and presented in tables and graphs using Microsoft Excel and Jamovi 2.3.28 software. Categorical variables were summarized as frequency counts and percentages and continuous variables as mean and standard deviation (SD). Chi-square test was applied to test statistical significance wherever needed. Significance was assessed at 5% level and p-value of <0.05 was considered statistically significant.

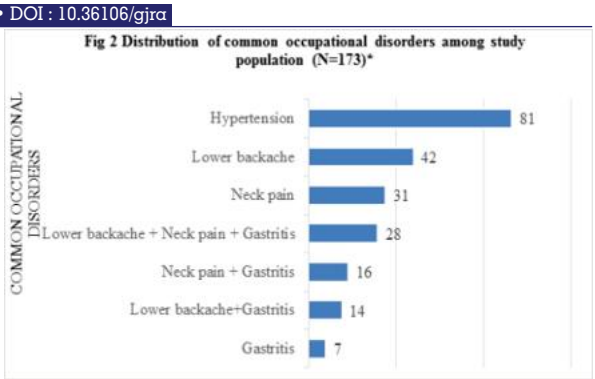
RESULTS

Table 1: Socio-demographic Characteristics of Study Participants (N=220)

Variables	n	%
Age (in years)		
Less than 30	18	8.2
31-40	61	27.7
41-50	78	35.5
51 and above	63	28.6
Education		
Primary	13	5.9
Middle school	54	24.5
High school	90	40.9
Graduate & above	63	28.6
Religion		
Hindu	201	91.4
Muslim	19	8.6
Marital status		
Unmarried	18	8.2
Married	184	83.6
Widower	18	8.2
Type of family		
Nuclear	116	52.7
Joint	89	40.5
Three-generation	15	6.8
Addiction (tobacco/alcohol/smoking/all)		
Yes	115	52.3
No	105	47.7



As presented in Figure 1, the prevalence of occupational disorders among the population under investigation (N = 220) revealed that a total of 173 participants (78.6%) reported the existence of occupational disorders. Whereas 47 participants (21.4%) reported the absence of an occupational disorder.



*Multiple Responses Allowed

Figure 2 shows the distribution of common occupational disorders among the affected study population. Out of the total population of 173, hypertension was the most common condition and was seen in 46.5% of the population followed by lower backache in 24.0% and neck pain in 17.7% of the participants. A number of the study population were suffering from more than one condition. Out of the total population of 173, the combination of lower backache and neck pain and gastritis was seen in 15.9% of the population. Additionally, the combination of neck pain and gastritis was seen in 9.09%, and the combination of lower backache and gastritis was seen in 7.7% only. Gastritis was seen in 4.09% of them.

Table 2: Association Between Occupational Disorders & BMI (N=220)

Nutritional Status (BMI)	Occupational Disorders		Total n (%)
	Yes	No	
	n (%)	n (%)	
Normal	40 (76.9)	12 (23.1)	52 (23.7)
Overweight	101 (80.2)	25 (19.8)	126 (57.2)
Obese	32 (76.2)	10 (23.8)	42 (19.1)
Total	173 (78.6)	47 (21.4)	220 (100)
^{2} : value= 10.4, p-value= 0.8			

Table 2 depicts association between common occupational disorders and BMI. In the study, 78.6% had occupational disorders. In the study, 76.9% of the bus drivers with normal BMI documented occupational disorders compared with 80.2% with overweight and 76.2% with obesity. Though occupational disorders seemed higher among the overweight, the correlation between BMI and occupational disorders was not statistically significant (chi-square=10.4, p-value=0.8). This implies that BMI could not be a key predictor of occupational disorders among the study population.

Table 3: Association Between Work-related Musculoskeletal Disorders (WMSD) and Duration of Service (in Years)

WMSD	Duration of Service			Total n (%)
	<5 years	5-10 years	>10 years	
	n (%)	n (%)	n (%)	
Present	10 (11.7)	30 (35.3)	45 (53.0)	85 (49.1)
Absent	22 (25.0)	21 (23.9)	45 (51.1)	88 (50.9)
Total	32 (18.4)	51 (29.5)	90 (52.1)	173 (100)
^{2} : value=6.03, p-value=0.04*				

Work-related musculoskeletal disorders are very common among the participants due to the nature of their job that demands long sitting hours. As depicted in table 3, nearly 49.1% participants had been affected by work-related musculoskeletal disorders (WMSDs). The incidence of WMSDs was higher in cases of length of service: 11.7% were reported among those with fewer than 5 years' experience, 35.3% among those with 5–10 years' experience, and the highest, 53%, among those with over 10 years' experience. On the contrary, WMSDs were not present in 51.1% of those with more than 10 years of working experience, indicating a mixed trend. The relation between job duration and WMSDs was

statistically significant (chi-square=6.03 and p-value=0.04). This means that increased job tenure has a significant correlation with increased probability of developing WMSDs among bus drivers.

Table 4: Association Between Tobacco/Gutka Chewing and Working Shift (N=126)

Tobacco/ Gutka Chewing	Working Shift		Total n (%)
	Night n (%)	Both (Day+Night) n (%)	
Yes	12 (22.2)	42 (77.8)	54 (42.9)
No	2 (2.8)	70 (97.2)	72 (57.1)
Total	14 (11.1)	112 (88.9)	126 (100)
Fischer exact test statistic value=0.0009			

Tobacco/Gutka, with nicotine as its primary component, is known to disrupt sleep and promote wakefulness. There were 126 participants who had to work in night shifts, either regularly or combined with day shifts; as shown in table 4. Out of them 42.9% reported chewing tobacco/gutka. Among those who consumed tobacco, the majority were working in both day and night shifts (77.8%), while 22.2% were working only night shifts. In contrast, among non-users, an overwhelming proportion (97.2%) were engaged in both day and night shifts, with only 2.8% working during night shifts alone. A highly significant association was observed between tobacco/gutka chewing and working shift pattern. The association was tested using Fisher's exact test, yielding a p-value of 0.0009, indicating a statistically significant relationship. This suggests that individuals involved in night shift work are more likely to consume tobacco/gutka, possibly as a coping mechanism to counteract fatigue and maintain alertness.

DISCUSSION

This study revealed a significant burden of occupational health issues in bus drivers in Meerut, with nearly four-fifths (78.6%) of participants reporting at least one occupational disorder. These findings underscore the vulnerable health profile of this occupational group and align with emerging evidence from India that identifies transport workers as a high-risk population for both non-communicable and work-related disorders.

With a mean age of 43.35 ± 9.82 years and a majority in the 41–50 year age group, the study population largely comprised middle-aged, experienced drivers. Similar age distributions have been reported in studies from Karnataka by Verma et al[6] and Delhi by Kumar et al[7] that prolonged occupational exposure begins to manifest as morbidity during the most productive years of life. The high proportion of married individuals and those living in nuclear families reflects typical urban workforce patterns. Notably, more than half of the participants reported addictive behaviors, consistent with findings from studies by Patil et al[8] and Singh et al[9], indicating that substance use remains a significant lifestyle risk factor in this group.

The overall prevalence of occupational disorders (78.6%) observed in this study is comparable to findings from Sharma et al[10] and Ramesh et al[11] in Tamil Nadu, who reported prevalence ranging from 70–75%. This high burden can be attributed to the sedentary nature of driving, prolonged sitting, whole-body vibration, irregular work schedules, and psychosocial stress. These occupational exposures, compounded over time, predispose the drivers to multiple health conditions.

Hypertension emerged as the most common disorder (46.5%), followed by lower backache (24%) and neck pain (17.7%). This reflects a dual burden of cardiovascular and musculoskeletal morbidity. Comparable prevalence of hypertension (45–50%) among drivers has been reported in studies from Kerala by Joseph et al[12] and Uttar Pradesh by Khan et al[13], highlighting the role of occupational stress, poor dietary habits, and physical inactivity. The high prevalence of musculoskeletal complaints, particularly involving the lower back and neck, is consistent with studies by Kulkarni et al[14] and Saha et al[15] which emphasize the impact of poor ergonomics and prolonged static posture. The coexistence of multiple conditions in a significant proportion of participants further indicates cumulative occupational strain and the presence of multimorbidity.

Although a higher proportion of occupational disorders was observed among overweight individuals, the association between BMI and occupational disorders was not statistically significant in this study. Similar findings have been reported by Gupta et al[16], suggesting that BMI alone may not be a strong independent predictor in this population. Instead, occupational factors such as duration of sitting, exposure to vibration, and lack of rest breaks may play a more dominant role. However, other studies have demonstrated a significant association between obesity and both musculoskeletal disorders and hypertension, indicating that BMI may act synergistically with occupational exposures rather than independently.[17]

A key finding of this study was the significant association between duration of service and work-related musculoskeletal disorders. Drivers with more than 10 years of service exhibited the highest prevalence of WMSDs. This is in agreement with findings from Reddy et al[18] and Saha et al[15], who reported increased chances of chronic musculoskeletal pain with longer occupational tenure. Prolonged exposure to repetitive movements, constrained postures, and inadequate ergonomic support likely contributes to progressive musculoskeletal damage. The presence of WMSDs even among drivers with shorter service duration suggests early onset, highlighting the need for preventive strategies from the initial years of employment.

The study also demonstrated a highly significant association between tobacco/gutka use and shift work, with higher consumption among those engaged in night or mixed shifts. This finding is consistent with Mishra et al[19] and Banerjee et al[20] who reported increased substance use among shift workers as a coping mechanism for fatigue, sleep disruption, and occupational stress. Nicotine, while temporarily enhancing alertness, contributes to long-term cardiovascular risk and may aggravate existing health conditions. This association highlights the behavioral adaptations by drivers to meet occupational demands, often at the cost of their health.

Overall, the findings of this study indicate that bus drivers are affected by a complex interplay of occupational, behavioral, and lifestyle factors leading to a high burden of morbidity. While BMI did not show a significant independent association, factors such as duration of service and shift work patterns emerged as important determinants. These results are consistent with recent studies conducted in Indian settings, reinforcing the need for comprehensive occupational health interventions.

CONCLUSION & RECOMMENDATIONS

This study emphasizes the great burden of occupational health problems among drivers of public transport in Meerut with nearly three-fourth of the study participants suffering from occupational disorders, in which musculoskeletal disorders are found to be the most prevalent. The results emphasize the key influence of modifiable risk factors such as high body mass index (BMI), irregular work hours, and the use of substances (e.g., gutka and tobacco) on these health issues. Statistically significant correlation was noted for BMI and hypertension, and for job experience and musculoskeletal disorders, indicating the longer someone works in this

job, the more health risk. Further, a significant correlation was noted between the use of tobacco/gutka and night shifts, reflecting maladaptive coping mechanisms employed to counteract occupational weariness. Considering the crucial services rendered by these transportation workers, it is necessary that specific health interventions, routine medical check-ups, ergonomic enhancements, and lifestyle modification programs be incorporated into occupational health policies. Encouraging awareness, modulation of reversible risk factors, early diagnosis and control of chronic diseases, and prevention can help greatly to enhance their general well-being.

REFERENCES

1. Rajan V, TS P, Chandrappa M. Occupational stress and its effect on health status among Karnataka State Road Transport Corporation (KSRTC) bus drivers: a cross-sectional study. Cureus. 2024;16(9):e70336.
2. Singaravel SS, Kandaswamy EK. A cross-sectional study on prevalence of hypertension and associated risk factors among bus drivers of Metropolitan Transport Corporation Limited, Chennai. Int J Community Med Public Health. 2023;10(5):1740-4. Available from: https://www.ijcmph.com/index.php/ijcmph/article/view/11113
3. Mohana Priya M, Keerthana D, Nisha B, Raghavi R, Ruma Dutta. A cross-sectional study on occupational health hazards among bus drivers working in government bus depot in Tiruvallur district, Tamil Nadu. TPM. 2025;32(Suppl 5):490-7. Available from: https://tpmap.org/submission/index.php/tpm/article/view/1385
4. World Health Organization. Obesity: preventing and managing the global epidemic. Report of a WHO consultation. WHO Tech Rep Ser. 2000;894.
5. Sheth A, Pagdhune A, Viramgami A. Prevalence of work-related musculoskeletal disorders (WRMSDs) and its association with modifiable risk factors in metropolitan bus transit drivers: a cross-sectional comparison. J Family Med Prim Care. 2023;12(8):1673-8. doi:10.4103/jfmpc.jfmpc_532_23.
6. Verma A, Chaudhary SS, Singh S. A study on morbidity profile among bus drivers in Karnataka. Int J Community Med Public Health. 2018;5(6):2385-9.
7. Kumar P, Singh S, Kumar R. Health status and morbidity pattern among bus drivers in Delhi: a cross-sectional study. Indian J Community Health. 2019;31(2):212-7.
8. Patil SS, Deshmukh PR, Suryawanshi SR. Morbidity pattern among bus drivers in an urban area of Maharashtra. Int J Community Med Public Health. 2017;4(6):2071-5.
9. Singh R, Singh H, Kumar A. A study of morbidity profile and associated risk factors among bus drivers in North India. Indian J Occup Environ Med. 2018;22(2):90-4.
10. Sharma PK, Ganguly E. Morbidity profile of long-distance truck drivers in Hyderabad city, India. J Dr NTR Univ Health Sci. 2014;3(4):234-7.
11. Ramesh N, Joseph B, Reddy MM. Health status and morbidity pattern among transport workers in Tamil Nadu: a cross-sectional study. J Clin Diagn Res. 2016;10(6):LC01-4.
12. Joseph B, Reddy MM, Rao S. Prevalence of hypertension and associated risk factors among bus drivers in Kerala. J Clin Diagn Res. 2015;9(3):LC01-4.
13. Khan SA, Ahmad A, Rizvi S. Morbidity profile and cardiovascular risk factors among bus drivers in Uttar Pradesh: a cross-sectional study. Int J Community Med Public Health. 2020;7(5):1854-8.
14. Kulkarni V, Khandekar J, Patil S. Prevalence of musculoskeletal disorders among bus drivers in an urban setting. Int J Community Med Public Health. 2019;6(3):1234-8.
15. Saha D, Sahu S, Paul G. Work-related musculoskeletal disorders among professional drivers: a cross-sectional study. J Family Med Prim Care. 2020;9(2):678-82.
16. Gupta SD, Mishra GA, Pimple SA, Kulkarni VY, Patil AS, Shaikh HK, et al. Tobacco use among taxi drivers in Mumbai, India: prevalence and predictors. Indian J Cancer. 2025;62(3):388-94. doi:10.4103/ijc.ijc_1119_22.
17. Balasubramanian R, Patil S, Narlawar U. Work-related musculoskeletal disorders and associated risk factors among city bus drivers: a cross-sectional study. Indian J Community Med. 2025;50(Suppl 2):S213-8.
18. Yasobant S, Chandran M, Reddy EM. Are bus drivers at an increased risk for developing musculoskeletal disorders? An ergonomic risk assessment study. J Ergonomics. 2015;S3:011. doi:10.4172/2165-7556.S3-011.
19. Mishra A, et al. Association between shift work and substance use among workers: a cross-sectional study. Indian J Occup Environ Med. 2021;25(3):123-8.
20. Banerjee S, et al. Substance use and sleep disturbances among shift workers: a cross-sectional analysis. Chronobiol Int. 2023;40(2):215-22.