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PREVALENCE OF MUSCULOSKELETAL PAIN AMONG BRT BUS DRIVERS IN PESHAWAR: A CROSS-SECTIONAL SURVEY

Original Research

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ABSTRACT

Background: Musculoskeletal pain (MSP) is a common health issue affecting muscles, bones, and joints, often caused by prolonged sitting, obesity, aging, physical inactivity, smoking, and systemic inflammatory or cardiovascular conditions. Professional drivers are particularly at risk due to prolonged static postures, repetitive movements, and ergonomic challenges. Musculoskeletal disorders (MSDs) are a significant cause of reduced quality of life and work-related disability, necessitating research into their prevalence and risk factors among occupational groups such as bus drivers.

Objective: The objective of this study was to determine the prevalence of musculoskeletal pain among BRT bus drivers in Peshawar and to explore its association with occupational ergonomics.

Methods: A cross-sectional study was conducted over six months among 235 BRT bus drivers in Peshawar, selected through a convenience sampling technique. The Nordic Musculoskeletal Questionnaire (NMQ) was used to assess pain, and data were collected through structured interviews. Drivers aged 25–60 years with a minimum of one year of job experience were included, while those with pre-existing musculoskeletal issues or systemic conditions were excluded. Data analysis was performed using SPSS version 27, and results were presented using bar charts and pie charts. Descriptive and inferential statistical analyses were conducted, with significance set at $p < 0.05$.

Results: Among 235 participants, 181 drivers (77.0%) reported experiencing musculoskeletal pain over the past year, while 54 (23.0%) reported no pain. Neck pain was reported by 71 participants (30.2%), shoulder pain by 19.1%, upper back pain by 19.6%, and lower back pain by 22.6%. Pain in the hips/thighs affected 11.5%, knees 22.6%, ankles/feet 8.1%, elbows 2.1%, and wrists 3.0%. The findings suggest that ergonomic interventions may have contributed to the mild nature of the pain experienced by most drivers.

Conclusion: The study concluded that while BRT bus drivers in Peshawar commonly experienced musculoskeletal pain, its severity was generally mild, likely due to existing ergonomic practices. However, further improvements in ergonomics and supportive workplace policies are recommended to achieve complete mitigation of musculoskeletal discomfort and enhance drivers' occupational health.

Keywords: Ergonomics, Musculoskeletal Disorders, Musculoskeletal Pain, Neck Pain, Occupational Health, Pain Epidemiology, Prevalence.

INTRODUCTION

Musculoskeletal pain, characterized by discomfort or pain affecting muscles, bones, tendons, or joints, poses a significant challenge to public health. It ranges in severity and often disrupts daily activities, mobility, and overall quality of life. Globally, musculoskeletal disorders (MSDs), including low back pain, shoulder pain, neck pain, knee pain, and generalized discomfort, are among the leading causes of disability measured in years lived with disability (YLD) (1). Disabling lower back pain, a prevalent global concern, often arises from factors causing musculoskeletal pain rather than direct spinal abnormalities (3). Several risk factors, such as prolonged static postures, physical inactivity, obesity, aging, smoking, and inflammatory or cardiovascular conditions, contribute to the development of musculoskeletal pain (4). These risk factors are particularly relevant to occupations involving repetitive movements or sustained physical demands, as seen in bus driving.

Bus drivers are uniquely susceptible to musculoskeletal pain due to the repetitive strain caused by tasks such as steering, shifting gears, and braking, compounded by prolonged static seated positions and exposure to whole-body vibration (5, 10). Studies have consistently highlighted the high prevalence of musculoskeletal disorders in professional drivers, with reports from various countries indicating that between 51% and 93% of drivers experience such conditions (8). Low back pain, in particular, is a significant concern, with studies revealing that approximately 80% of bus drivers are affected (9). Research conducted in Iran corroborates these findings, demonstrating a substantial prevalence of musculoskeletal complaints, especially in the neck, back, and shoulders, among intercity bus drivers (7). Contributing to this issue are factors such as poor posture, static muscle tension, restricted blood circulation, and long hours spent sitting, all of which exacerbate localized fatigue and discomfort (2).

Professional drivers face additional occupational challenges, including time pressures, traffic congestion, noise, and environmental stressors such as temperature fluctuations. These demanding conditions not only increase the physical toll on drivers but also heighten their susceptibility to work-related musculoskeletal disorders (1). The European Agency for Safety and Health at Work (EU-OSHA) has noted that professional drivers face a high risk of injury, both due to road accidents and the physical demands of their occupation. Despite a lower bus crash rate compared to other vehicle categories, the operational environment of bus drivers is uniquely taxing and marked by elevated stress levels (13, 15).

Workplace ergonomics and posture are critical factors influencing the development of musculoskeletal pain among bus drivers. The sustained postural strain required to maintain control over vehicles, particularly in urban environments with frequent stops and starts, increases the risk of muscle and joint overload. Poor ergonomic conditions and repetitive postural adjustments further aggravate musculoskeletal stress, negatively affecting drivers' health, comfort, and professional performance (17). These issues not only have physical implications but also disrupt the social and professional lives of drivers, underlining the need for targeted interventions and preventive measures.

Given these concerns, this study seeks to analyze the factors contributing to musculoskeletal pain and occupational stress among bus drivers. The objective is to assess how these factors impact their physical health, professional performance, and social well-being, ultimately aiming to inform ergonomic improvements and health interventions tailored to this vulnerable occupational group.

METHODS

The study employed a cross-sectional design conducted over a six-month period among BRT bus drivers in Peshawar. A sample size of 235 participants was determined using the Raosoft online calculator, based on a 95% confidence level and a 5% margin of error. A non-probability convenience sampling technique was used to recruit participants, allowing drivers to be selected based on their availability and willingness to participate. The inclusion criteria for the study included male drivers aged 25 to 60 years, employed as BRT drivers in Peshawar, with a minimum job duration of one year. Exclusion criteria were established to ensure the reliability of the findings, excluding drivers with a history of musculoskeletal discomfort prior to starting their job, any known systemic diseases, recent surgeries (within the last three months), or current musculoskeletal problems resulting from recent or previous trauma.

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Approval for the study was obtained from the relevant research committee and department heads. Informed consent was secured from all participants who met the inclusion criteria, ensuring ethical compliance and voluntary participation. The Nordic Musculoskeletal Questionnaire (NMQ) was utilized as the primary tool to assess musculoskeletal pain and discomfort. Data were systematically collected and analyzed using SPSS version 22. Descriptive statistics were employed to summarize the data, with frequencies and percentages calculated for categorical variables, while means and standard deviations were reported for continuous variables such as age and BMI. For inferential analysis, chi-square tests were performed to assess associations among categorical variables, and independent sample t-tests were applied for comparative ergonomic risk assessments. A p-value of less than 0.05 was considered statistically significant to determine the presence of meaningful differences or associations.

RESULT

The study included 235 participants, with the minimum and maximum ages recorded at 26 and 56 years, respectively. The mean age of the participants was 35 years. Participants were categorized into four age groups: 83 participants (35.3%) were aged 26–35 years, 111 participants (47.2%) were aged 36–45 years, 40 participants (17.0%) were aged 46–55 years, and one participant (0.4%) was aged 56–65 years. Out of the total participants, 181 individuals (77.0%) reported experiencing musculoskeletal pain or discomfort during the past year, while 54 participants (23.0%) reported no such issues.

Regarding the prevalence of specific musculoskeletal pain, shoulder discomfort was observed in 74 participants (31.5%), with 19 participants (8.1%) reporting pain on the right side, 10 (4.3%) on the left side, and 45 (19.1%) reporting pain on both sides. Elbow pain was reported by 16 participants (6.8%), with nine (3.8%) experiencing right-sided pain, two (0.9%) reporting left-sided pain, and five (2.1%) reporting pain in both elbows. Wrist pain was less common, affecting 14 participants (6.0%), with five (2.1%) reporting right-sided pain, two (0.9%) reporting left-sided pain, and seven (3.0%) experiencing pain in both wrists. Upper back pain was reported by 46 participants (19.6%), while lower back pain was noted in 53 individuals (22.6%).

Pain in the hips or thighs was present in 27 participants (11.5%), while 53 participants (22.6%) reported pain in one or both knees. Discomfort in the ankles or feet was reported by 19 participants (8.1%), with the majority not experiencing any pain in these areas. The results revealed that the lower back and knees were the most commonly affected regions, followed by the shoulders and upper back. These findings highlight the significant burden of musculoskeletal disorders among BRT bus drivers, particularly in areas subjected to prolonged strain or repetitive movement, underscoring the need for ergonomic interventions and preventive strategies tailored to this occupational group.

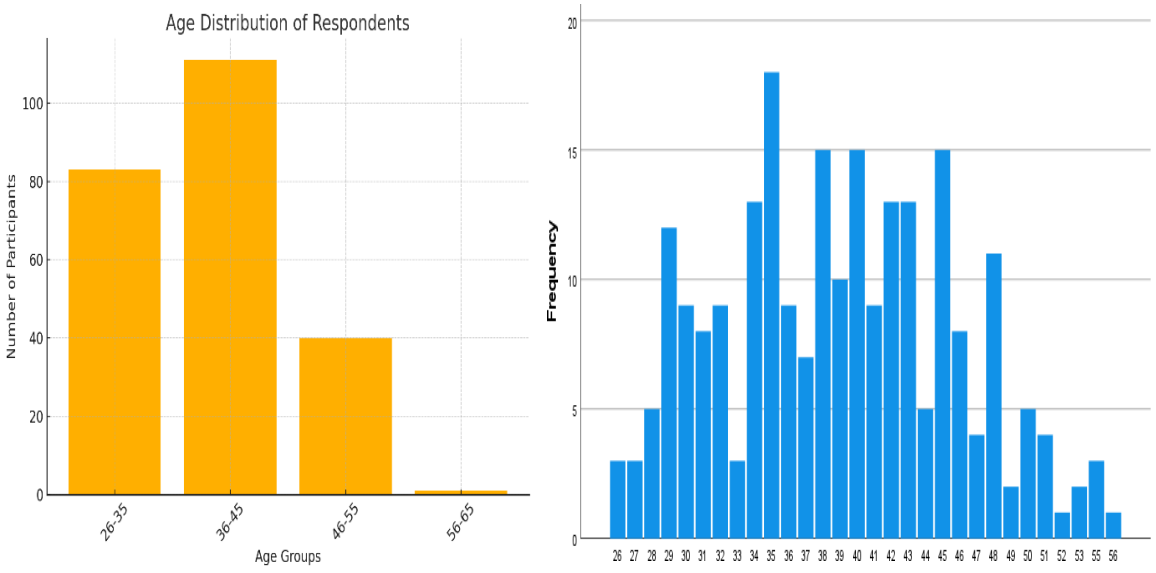

Figure 1 Age Distribution of Respondents

The age distribution of respondents showed that the majority of participants, 111 individuals (47.2%), belonged to the 36–45 age group, followed by 83 participants (35.3%) in the 26–35 age group. Additionally, 40 participants (17.0%) were aged 46–55 years, and only one participant (0.4%) fell into the 56–65 age group, indicating that most respondents were in their mid-career age range.

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Table 1: Have you had trouble at any time during the last 12 months (ache, pain, discomfort, numbness)

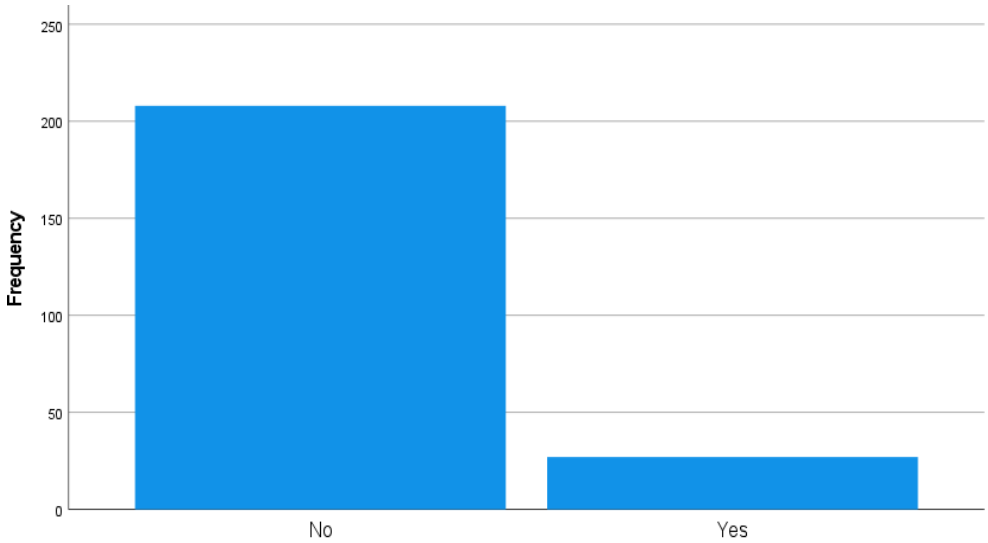
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	54	23.0	23.0	23.0
	Yes	181	77.0	77.0	100.0
	Total	235	100.0	100.0	

Over the last 12 months, 181 participants (77.0%) reported experiencing trouble such as ache, pain, discomfort, or numbness, while 54 participants (23.0%) reported no such issues, emphasizing a significant prevalence of musculoskeletal discomfort among the respondents.

Table 2: Upper back pain, ache, discomfort, numbness

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	189	80.4	80.4	80.4
	Yes	46	19.6	19.6	100.0
	Total	235	100.0	100.0	

Among the 235 participants, 46 individuals (19.6%) reported experiencing upper back pain, ache, discomfort, or numbness, while the majority, 189 participants (80.4%), did not report any such issues, indicating that upper back problems were less prevalent compared to other musculoskeletal complaints.



Out of 235 participants, 27 individuals are experiencing pain, discomfort, or numbness in either one or both hips and thighs. The remaining 208 participants do not report any pain, discomfort, or numbness in their hips, thighs.

Figure 2 Both hips/thigh pain, ache, discomfort, numbness

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Table 4: Knees pain, ache, discomfort, numbness

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	182	77.4	77.4	77.4
	Yes	53	22.6	22.6	100.0
	Total	235	100.0	100.0	

Out of a total of 235 participants, 53 individuals are currently experiencing pain, discomfort, or numbness in one or both of their knees. The remaining 182 participants do not report any pain, ache, discomfort, or numbness in their knees or related areas.

DISCUSSION

The study focused on assessing the prevalence of musculoskeletal pain among BRT bus drivers in Peshawar, addressing various types of discomfort, including neck pain, limb pain, low back pain, joint pain, and chronic widespread pain. The findings revealed a significant prevalence of musculoskeletal pain, with 77% of participants reporting some form of trouble such as pain, aching, numbness, or discomfort over the past year, while 23% reported no issues. Notably, 19.6% of participants experienced upper back pain, 22.6% reported lower back pain, 19.1% had shoulder pain, and 22.6% suffered from knee pain. These results highlighted the burden of musculoskeletal discomfort on this occupational group and emphasized the critical role of ergonomics in alleviating such issues (21, 22).

A key strength of this study was its focus on an understudied population, offering valuable insights into the health challenges faced by BRT drivers in Peshawar. The findings aligned with previous research identifying drivers as a high-risk group for musculoskeletal disorders due to prolonged static postures, repetitive movements, and limited ergonomic interventions (23, 24). For example, studies have shown that improved ergonomics, posture adjustments, and periodic breaks significantly reduce the intensity and frequency of musculoskeletal discomfort in professional drivers (25). Similarly, advancements in vehicle design and technology, including the integration of modern ergonomic features, have been linked to a reduction in pain and discomfort during work shifts (26). However, despite these improvements, not all ergonomic interventions fully mitigate the incidence of musculoskeletal disorders, as the etiology is multifactorial and influenced by biomechanical, individual, and psychosocial factors related to work (26).

A comparative study conducted by Sharma et al. (2020) in India evaluated the prevalence of musculoskeletal disorders (MSDs) among urban bus drivers and auto-rickshaw drivers, focusing on the role of ergonomic interventions. The study included 300 participants, with 150 from each group, and assessed pain intensity, frequency, and the impact of ergonomic practices. It was observed that bus drivers had a significantly lower prevalence of MSDs (65%) compared to auto-rickshaw drivers (82%), attributed to better ergonomic designs in buses, including adjustable seating, improved steering mechanisms, and reduced vibration levels. In contrast, auto-rickshaw drivers, who operated vehicles with minimal ergonomic features and were exposed to higher whole-body vibration, reported greater discomfort in the lumbar and cervical spine regions. The study highlighted that drivers operating vehicles with modern ergonomic advancements experienced less severe and less frequent MSD symptoms. This finding reinforces the importance of continuous ergonomic improvements in reducing occupational musculoskeletal strain among drivers (27).

One limitation of this study was its focus on a single city, which limits the generalizability of findings to other regions with potentially different working conditions and ergonomic practices. Additionally, the small sample size of 235 participants and the short duration of the study may not have captured the full spectrum of musculoskeletal issues among bus drivers. These constraints suggest the need for future longitudinal studies conducted on a larger, provincial or national scale, incorporating advanced objective assessment tools such as motion sensors and video analyses to provide more comprehensive and precise insights.

Overall, the study underscored the importance of maintaining good ergonomics to reduce musculoskeletal pain among drivers. While the results indicate a positive impact of ergonomic practices, complete resolution of such issues may require multifactorial preventive strategies, including policy-level interventions and individualized ergonomic adjustments. By addressing these aspects, this occupational group could experience improved health outcomes and reduced musculoskeletal discomfort, ultimately enhancing their quality of life and work performance.

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CONCLUSION

The study concluded that musculoskeletal pain is a significant concern among BRT bus drivers, with discomfort commonly reported in areas such as the back, shoulders, and knees. The findings highlighted the positive role of ergonomics in reducing musculoskeletal pain and emphasized the importance of adopting preventive measures like posture adjustments, ergonomic vehicle designs, and regular breaks to minimize physical strain. While the results suggest that existing ergonomic practices may have mitigated some issues, they also underline the need for further enhancements and multifactorial strategies to address the complex causes of musculoskeletal discomfort comprehensively. This study underscores the necessity of continued efforts to improve working conditions for bus drivers to safeguard their physical health and well-being.

AUTHOR CONTRIBUTIONS

Author	Contribution
Syed Imtiaz Ahmad*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Naeem Ullah Shinwari*	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Syed Issam Ullah Jan*	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Muhammad Abrar*	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Kainat Jaffary	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Anosha Tariq	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published

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