

Prevalence and Associated Factors of Musculoskeletal Pain Among Traffic Police Personnel in Jalalabad City: A Cross-Sectional Study

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ABSTRACT

Musculoskeletal pain is a common occupational health problem among traffic police personnel, who may experience prolonged standing, static postures, and demanding field duties. This study aimed to determine the prevalence of musculoskeletal pain and its associated factors among traffic police personnel in Jalalabad City. A cross-sectional study was conducted among traffic police personnel from 1 October to 30 November 2025 in Jalalabad City, Nangarhar, Afghanistan. A total of 151 traffic police personnel were included using a non-probability convenience sampling method. Data were collected through a modified Nordic Musculoskeletal Questionnaire and analyzed using Statistical Package for the Social Sciences (SPSS) version 27.0. Descriptive statistics and chi-square tests were used to assess associations between musculoskeletal pain and selected demographic, occupational, and lifestyle characteristics, with statistical significance set at $p < 0.05$. The overall 12-month prevalence of musculoskeletal pain was 104 (68.9%), while the 7-day prevalence was 78 (51.7%). The most commonly affected body regions were the lower back (52.3%), neck (47.0%), and shoulders (44.4%). Musculoskeletal pain was significantly associated with age group, body mass index, working hours per day, physical activity, and ergonomic practices. Higher prevalence was observed among older participants, those who were overweight or obese, those working more than 8 hours per day, those who reported no regular physical activity, and those with poor ergonomic practices. Gender and residence were not significantly associated with musculoskeletal pain. Among participants, 64 (42.3%) reported functional limitations and 55 (36.5%) reported work absenteeism due to musculoskeletal pain during the previous 12 months. The findings indicate a high burden of musculoskeletal pain among traffic police personnel in Jalalabad City. The observed associations with demographic, occupational, and lifestyle factors highlight the need for occupational health measures, including ergonomic education, promotion of physical activity, and appropriate management of working hours.

Keywords: Ergonomics; Musculoskeletal Pain; Occupational Exposure; Prevalence; Traffic Police

INTRODUCTION

Work-related musculoskeletal disorders (WMSDs) represent one of the most significant occupational health concerns worldwide, affecting workers across a wide range of professions and socioeconomic settings [1]. These disorders encompass a group of conditions involving muscles, tendons, ligaments, joints, nerves, and supporting structures, typically arising from or exacerbated by occupational activities [2, 3]. They commonly manifest as pain, stiffness, discomfort, or functional limitation, and may progress into chronic disability if not addressed appropriately [2]. The severity may vary from minor and short-lived symptoms to serious, disabling conditions, often triggered or exacerbated by occupational activities and the nature of the working environment [4]. Worldwide, work-related musculoskeletal disorders (WMSDs) contribute to a significant burden of disability-adjusted life years and rank among the most prevalent occupational health conditions, impacting a wide range of industries and leading to considerable economic losses and social consequences [5]. According to the World Health Organization, an estimated 1.71 billion individuals worldwide are affected by musculoskeletal conditions, with nearly 619 million cases specifically attributed to low back pain [6]. According to some researches, it is estimated that approximately 2.78 million workers die each year due to occupational diseases and workplace accidents, while an additional 374 million experience non-fatal work-related injuries [7]. The etiology of WMSDs is multifactorial, involving an

interplay of physical, ergonomic, psychosocial, and individual risk factors [8]. Physical contributors include repetitive movements, prolonged static postures, excessive force, and exposure to vibration, all of which place continuous strain on the musculoskeletal system [9]. Ergonomic inadequacies such as poorly designed workstations and improper body mechanics further aggravate these risks. In addition, psychosocial factors—including job stress, workload, low job satisfaction, and organizational constraints—have been increasingly recognized as important determinants that can exacerbate the development and persistence of musculoskeletal symptoms. Individual characteristics such as age, body mass index, and lifestyle behaviors also play a contributory role [8, 9]. The high prevalence observed in such occupational groups is largely attributable to sustained biomechanical loading and limited opportunities for rest or posture variation during work hours. Prolonged sitting or standing, combined with awkward body positioning and repetitive tasks, contributes to cumulative musculoskeletal strain [10]. Additionally, exposure to whole-body vibration in driving occupations has been identified as a significant risk factor for spinal disorders, particularly low back pain [11]. Although traffic workers may not always experience vibration to the same extent as drivers, they are exposed to other comparable stressors such as long working hours, static posture, and environmental hazards, which collectively increase their susceptibility to

musculoskeletal disorders [12]. Traffic police personnel are exposed to various job-related hazards within their working environment that elevate their likelihood of developing musculoskeletal disorders [13]. These conditions represent a major concern for both the health and functional capacity of traffic officers, adversely influencing their occupational performance as well as their overall quality of life [14]. Among police personnel, the prevalence of musculoskeletal disorders may reach up to 72%, with neck pain reported in about 51% of cases and lower back pain in approximately 45% [14].

Despite the growing body of global evidence, there remains a scarcity of data from low- and middle-income countries, including Afghanistan, where occupational health research is still limited. In such settings, workers are often exposed to challenging working conditions, including extended working hours, inadequate occupational safety measures, and limited access to healthcare services. Traffic Police personnel in urban centers like Jalalabad represent an important yet understudied population, as they play a critical role in maintaining road safety and traffic regulation while being exposed to multiple occupational hazards. The absence of local epidemiological data hinders the development of targeted interventions and evidence-based policies aimed at improving worker health and productivity. Therefore, this study aims to determine the prevalence of musculoskeletal pain and to identify its associated factors among traffic workers in Jalalabad City. By providing locally relevant data, this research seeks to contribute to the existing body of knowledge and support the development of targeted occupational health interventions in Afghanistan.

METHODOLOGY:

Study Design and Setting

A cross-sectional study was conducted among traffic police personnel working over a period of two months from 01-10-2025 to 30-11-2025 in Jalalabad City, Nangarhar, Afghanistan.

Study Population

The study population included all traffic police personnel (N = 212) actively working in Jalalabad City during the study period. Traffic police personnel aged ≥ 20 years with at least 6 months of experience in traffic duty were eligible for inclusion and Personnel with known congenital musculoskeletal disorders, those who had undergone recent orthopedic surgery and Individuals unwilling to participate in the study were excluded from the study.

Sample Size and sampling method

The required sample size was calculated using the Cochran formula $n = (Z^2 \cdot p \cdot (1-p)) / d^2$ for a finite population [15]. A 95% confidence level ($Z = 1.96$), an expected prevalence of 50% ($p = 0.50$), and a 5% margin of error ($d = 0.05$) were used. An expected prevalence of 50% was selected because it provides the maximum sample size when a reliable local prevalence estimate is unavailable. Considering the finite study population of 212 traffic police personnel, the finite population correction was applied, resulting in a minimum sample size of 137 participants. To account for an anticipated 10% non-response or incomplete questionnaires, the sample size was increased to 151 participants.

Because a complete sampling frame of eligible traffic police personnel distributed across traffic checkpoints and administrative units was not available to the researchers, participants were recruited using non-probability convenience sampling. Eligible personnel who were available at selected traffic checkpoints and the central traffic police personnel administration during the data-collection period were invited to participate until the required sample size of 151 was reached. All participants were screened according to the predefined eligibility criteria before enrollment.

The sample size was calculated using the Cochran formula for finite populations, Where: n = required sample size, Z = Z-score at 95%

confidence level = 1.96. p = expected prevalence of musculoskeletal pain; based on previous studies, estimated at 50% (0.5) for maximum sample size, d = margin of error = 5% (0.05). Since the total population (N) is finite ($N = 212$), the finite population correction formula was applied and the sample size was calculated 137. To account for non-response or incomplete questionnaires (10%), the final sample size was adjusted to 151. Thus, a total of 151 traffic police personnel were selected from multiple traffic checkpoints and central administration using non-probability Convenience method and the sampling was conducted until 151 participants were completed.

Data Collection

Data were collected through face-to-face interview using a standardized Nordic Musculoskeletal Questionnaire (NMQ), which has been widely used for assessing musculoskeletal symptoms in occupational populations. The questions included in the questionnaire were paraphrased and the scale was not altered. The questionnaire evaluates pain, discomfort, and functional limitations in nine anatomical regions: neck, shoulders, upper back, elbows, lower back, wrists/hands, hips/thighs, knees, and ankles/feet over the last 12 months and last 7 days. The NMQ was supplemented with sociodemographic and occupational data, including Age, gender, residence, Body Mass Index (BMI), Years of service and work hours per day, Physical activity and ergonomic practices and History of previous musculoskeletal injuries. The questionnaire was translated into Pashto for better understanding, then back-translated into English to maintain validity. The Pashto version was reviewed by senior researcher for correctness and conceptual confirmation. Informed written consent was obtained from all participants prior to data collection.

Ethical Considerations

Ethical approval for the study was obtained from the Research Committee of the Nangarhar Medical Faculty, before commencement of data collection. Participation was voluntary, and written informed consent was obtained from all participants. Confidentiality was maintained throughout the study, and no personally identifying information was included in the dataset. The collected data were used solely for research purposes and were not shared with unauthorized individuals or institutions.

Data Analysis

Data were entered and analyzed using Statistical Package for the Social Sciences (SPSS) version 27.0. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize

participant characteristics and the prevalence of musculoskeletal pain. The chi-square test was used to assess associations between musculoskeletal pain and categorical demographic, occupational, and lifestyle variables. Statistical significance was considered at $p < 0.05$. Because the study used a cross-sectional design and non-probability sampling, the observed associations were interpreted as statistical associations rather than causal relationships.

RESULTS

A total of 151 traffic police personnel were included in the study. The mean age of the participants was 34.6 ± 7.8 years, indicating a predominantly middle-aged workforce. The largest proportion of participants (41.1%) fell within the 30–39 years age group, followed by those aged 20–29 years (25.2%) and 40–49 years (23.8%), while a smaller proportion (9.9%) were aged 50 years or above. Most participants were male, comprising 94.7% of the participants, whereas females accounted for only 5.3%. In terms of residence, the

majority of respondents (62.9%) were living in urban areas, while 37.1% were from rural settings. Assessment of body mass index (BMI) revealed that 38.4% of participants had normal weight, whereas a considerable proportion were classified as overweight (34.4%) and obese (17.2%), with a smaller percentage (9.9%) being underweight.

Table 1: Sociodemographic Characteristics of Participants (n = 151)

Features	Category	Frequency (n)	Percentage (%)
Age (years)	20–29	38	25.2
	30–39	62	41.1
	40–49	36	23.8
	≥50	15	9.9
Gender	Male	143	94.7
	Female	8	5.3
Residence	Urban	95	62.9
	Rural	56	37.1
BMI	Underweight	15	9.9
	Normal	58	38.4
	Overweight	52	34.4
	Obese	26	17.2

Occupational Characteristics

The mean duration of service among participants was 9.2 ± 5.6 years, indicating a moderately experienced workforce, with the largest proportion (44.4%) having 6–10 years of service. In terms of working conditions, most participants (61.6%) reported working more than 8 hours per day, while 38.4% worked 8 hours or less. Regarding lifestyle and occupational practices, only 28.5% of participants engaged in regular physical activity, whereas a majority (71.5%) did not report any routine exercise. Similarly, a high proportion (72.8%) of participants reported poor ergonomic practices during duty, while only 27.2% followed appropriate ergonomic measures.

Table 2: Occupational Characteristics of Participants (n = 151)

Characteristics	Category	Frequency	Percentage
Years of Service	<5 years	35	23.2
	6–10 years	67	44.4
	>10 years	49	32.5
Working Hours/Day	≤8 hours	58	38.4
	>8 hours	93	61.6
Physical Activity	Yes	43	28.5
	No	108	71.5
Ergonomic Practice	Good	41	27.2
	Poor	110	72.8

Prevalence of Musculoskeletal Pain

The overall 12-month prevalence of musculoskeletal pain among traffic police personnel was found to be 104 (68.9%), while the 7-day prevalence was 78 (51.7.7%) (Figure 1).

Distribution of Musculoskeletal Pain by Body Region

Among the nine anatomical regions assessed, the most commonly affected areas were the lower back (52.3%), neck (47.0%), and shoulders (44.4%). The least affected regions were elbows (18.5%) and hips/thighs (21.2%).

Functional Limitations due to Musculoskeletal Pain

Among participants reporting musculoskeletal pain, 64 (42.3%) experienced limitations in daily activities, while 55 (36.5%) reported work absenteeism due to pain in the last 12 months.

Table 3: Distribution of musculoskeletal pain by region (n=151)

Region	Frequency (n)	Percentage (%)
Neck	71	47.0
Shoulders	67	44.4
Upper Back	55	36.4
Elbows	28	18.5
Lower Back	79	52.3
Wrists/Hands	49	32.5
Hips/Thighs	32	21.2
Knees	61	40.4
Ankles/Feet	58	38.4

Factors Associated with Musculoskeletal Pain

The association between selected demographic, occupational, and lifestyle characteristics and 12-month musculoskeletal pain was assessed using the chi-square test. Musculoskeletal pain was significantly associated with age group ($p = 0.021$), body mass index ($p = 0.015$), working hours per day ($p = 0.008$), physical activity ($p = 0.003$), and ergonomic practices ($p < 0.001$). The prevalence of musculoskeletal pain was higher among older participants, participants who were overweight or obese, those working more than 8 hours per day, those who reported no regular physical activity, and those with poor ergonomic practices. These findings represent unadjusted associations and should not be interpreted as evidence of independent effects or causality. Gender was not significantly associated with musculoskeletal pain. Among male participants, 99 (69.2%) reported musculoskeletal pain and 44 (30.8%) did not. Among female participants, 5 (62.5%) reported musculoskeletal pain and 3 (37.5%) did not. Overall, 104 (68.9%) participants reported musculoskeletal pain and 47 (31.1%) did not. Similarly, residence was not significantly associated with musculoskeletal pain. Among urban participants, 68 (71.6%) reported musculoskeletal pain and 27 (28.4%) did not. Among rural participants, 36 (64.3%) reported musculoskeletal pain and 20 (35.7%) did not. Overall, 104 (68.9%) participants reported musculoskeletal pain and 47 (31.1%) did not. The detailed distribution of musculoskeletal pain according to demographic, occupational, and lifestyle characteristics is statistically significant at $p < 0.05$. Presented in Table 4.

Table 4: Factors Associated with Musculoskeletal Pain (n=151)

Variable	Category	Pain Present n(%)	Pain Absent n(%)	p-value
Age	20–29	21(55.3)	17(44.7)	0.021*
	≥30	83(73.6)	30(26.4)	
BMI	Normal	34(58.6)	24(41.4)	0.015*
	Overweight/Obese	70(74.3)	25(25.7)	
Working Hours	≤8 hours	33(56.9)	25(43.1)	0.008*
	>8 hours	71(76.3)	22(23.7)	
Physical Activity	Yes	22(51.2)	21(48.8)	0.003*
	No	82(75.9)	26(24.1)	
Ergonomic Practice	Good	20(48.8)	21(51.2)	<0.001*
	Poor	84(78.2)	26(21.8)	
Gender	Male	99(69.2)	44(30.8)	0.412
	Female	5(62.5)	3(37.5)	
Residence	Urban	68(71.6)	27(28.4)	0.276
	Rural	36(64.3)	20(35.7)	

DISCUSSION

This cross-sectional study assessed the prevalence of musculoskeletal pain and its associated factors among traffic police personnel in Jalalabad City. The 12-month prevalence of musculoskeletal pain was 68.9%, while the 7-day prevalence was 51.7%. The lower back, neck, and shoulders were the most frequently affected anatomical regions. Musculoskeletal pain was significantly associated with age group, body mass index, working hours per day, physical activity, and ergonomic practices, whereas gender and residence were not significantly associated with pain. In addition, 42.3% of participants reported limitations in daily activities and 36.5% reported work absenteeism related to musculoskeletal pain during the previous 12 months. The 12-month prevalence observed in the present study is comparable to findings reported among police personnel in other settings. A study among police employees in India reported a prevalence of approximately 72%, which is close to the prevalence observed in the present study. Differences between studies may reflect variations in occupational duties, working environments, participant characteristics, sampling methods, and instruments used to assess musculoskeletal symptoms [16]. Similarly, research among traffic police personnel in Iran has reported a substantial burden of musculoskeletal symptoms, particularly involving the back and neck regions. These findings suggest that musculoskeletal symptoms are common among police personnel across different occupational settings, although direct comparisons should be made cautiously because of differences in study populations and assessment methods [17]. However, A study conducted in Aligarh, Uttar Pradesh, reported a lower prevalence of 58.9%. This difference may be attributable to variations in occupational conditions, working hours, study populations, and assessment instruments [18]. The distribution of musculoskeletal pain by body region in the present study showed that the lower back (52.3%), neck (47.0%), and shoulders (44.4%) were the most commonly affected areas. These findings are consistent with studies conducted in India, where the neck and lower back were reported as the most affected regions among police personnel [16]. Similarly, studies from Iran have also reported a high prevalence of pain in the lower back, neck, and shoulders among traffic police, further supporting the consistency of anatomical distribution patterns across different populations [17]. A study conducted by Juhi Panchal and colleagues in India reported that, over a 12-month period, musculoskeletal complaints were most frequently observed in the lower back (25.0%), followed by the knees (21.1%), neck (13.8%), and foot or ankle regions (9.9%) [12]. The sociodemographic characteristics of the present study revealed a predominantly middle-aged workforce with a mean age of 34.6 years, which is comparable to studies conducted in India where most participants were in their third and fourth decades of life. Age was significantly associated with musculoskeletal pain ($p = 0.021$) in the current study, with higher prevalence among older individuals [18]. This finding is consistent with evidence from studies in Iran, where increasing age has been identified as a key determinant of MSDs due to cumulative occupational exposure and degenerative musculoskeletal changes [19]. The present study also demonstrated that gender was not significantly associated with musculoskeletal pain ($p = 0.412$), despite the predominance of males (94.7%) in the study population. This finding is consistent with previous studies among police personnel, including the Indian study mentioned above, which also reported no statistically significant gender differences in MSD prevalence [16]. Body mass index (BMI) was found to be significantly associated with musculoskeletal pain in the present study ($p = 0.015$), with higher prevalence among overweight and obese individuals. This finding is supported by studies conducted in Iran, where increased waist circumference and higher body mass

have been linked to a higher risk of MSDs. Excess body weight increases mechanical stress on the musculoskeletal system, particularly affecting weight-bearing joints such as the lower back and knees, which were among the most affected regions in the current study [19]. Occupational characteristics also played a significant role in the occurrence of musculoskeletal pain. In the present study, 61.6% of participants worked more than 8 hours per day, and longer working hours were significantly associated with MSDs ($p = 0.008$). This finding aligns with studies from India, where prolonged working hours and extended duty periods were identified as major contributors to musculoskeletal problems among police personnel [16]. Ergonomic practices were found to be one of the most significant factors in the present study, with 72.8% of participants reporting poor ergonomic behavior and a highly significant association with musculoskeletal pain ($p < 0.001$). This finding is strongly supported by studies conducted in Iran, which have identified poor posture, prolonged standing, and improper body mechanics as key contributors to MSDs among traffic police personnel [17]. The functional impact of musculoskeletal pain observed in the present study is also notable, with 42.3% of participants experiencing limitations in daily activities and 36.5% reporting work absenteeism. These findings are comparable to studies conducted in other countries, where MSDs have been shown to significantly affect work performance, productivity, and quality of life among police personnel and similar occupational groups [20]. In summary, the findings of the present study are in strong agreement with existing literature from India, Iran, and other countries, confirming that musculoskeletal disorders are highly prevalent among traffic police personnel and are influenced by multiple interrelated factors, including age, BMI, working hours, physical activity, and ergonomic practices. The consistency of these findings across different geographical settings highlights the need for targeted occupational health interventions, including ergonomic training, promotion of physical activity, and regulation of working hours, to reduce the burden of musculoskeletal disorders in this high-risk occupational group.

This study has several limitations that should be considered when interpreting the findings. First, its cross-sectional design prevents determination of temporal or causal relationships between musculoskeletal pain and the examined factors. Second, the study used non-probability convenience sampling, which may have introduced selection bias and limits the representativeness of the sample. Therefore, the findings may not be generalizable to all traffic police personnel in Afghanistan or to other occupational groups. Third, the study was conducted in a single city and within a relatively small population, which may further limit external validity. Fourth, the assessment relied primarily on self-reported information, which may have been affected by recall and reporting bias, particularly for symptoms experienced during the previous 12 months. Finally, potential confounding variables, including previous injuries, comorbidities, and detailed ergonomic exposures, were not fully controlled for in the analysis.

CONCLUSION

Musculoskeletal pain was highly prevalent among traffic police personnel in Jalalabad City, with the lower back, neck, and shoulders being the most commonly affected regions. Significant associations were observed between musculoskeletal pain and age group, body mass index, working hours, physical activity, and ergonomic practices, while gender and residence were not significantly associated with pain. Given the high prevalence and reported functional consequences, occupational health measures such as ergonomic education, promotion of appropriate physical activity, and

review of working conditions may be beneficial. However, because of the cross-sectional design and non-probability sampling, these findings should be interpreted as associations and should not be considered evidence of causal relationships. Further studies using probability sampling and longitudinal designs are recommended to better investigate determinants of musculoskeletal pain among traffic police personnel.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this study.

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AUTHORS' CONTRIBUTION

Roohullah Mohammad Khil contributed to the study conception, design, data analysis, and manuscript drafting. Shahidullah was involved in data collection, data entry, and literature review. Toryalai Ihsaas and Sayed Zekria Hashimi contributed to data interpretation, critical revision of the manuscript, and final approval of the manuscript. All authors read and approved the final version of the manuscript.

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