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Prevalence of work-related musculoskeletal disorders among traffic police personnel: A cross-sectional study

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Abstract
Introduction: Musculoskeletal Disorders (MSDs) are a significant occupational health concern globally. Traffic Police Personnel (TPP) are a high-risk group due to prolonged static postures, continuous standing, and exposure to environmental stressors, predisposing them to Work-related Musculoskeletal Disorders (WRMSDs).
Aim: To determine the prevalence, distribution, and functional impact of WMSDs among traffic police personnel in Surat, Gujarat, India.
Materials and Methods: This cross-sectional study included 152 TPP aged 20–50 years. The Modified Nordic Musculoskeletal Questionnaire (NMQ), a validated and widely used tool for screening region-specific musculoskeletal symptoms was used to capture information on 12-month pain, 12-month activity limitation, and presence of pain in the past 7 days.
Results: The most commonly affected regions in the past 12 months were the lower back (25.0%), knees (21.1%), neck (13.8%), and foot/ankle (9.9%). Activity restriction in the last 12 months was highest for the knees (10.5%), followed by the lower back (4.6%). Age-wise analysis showed that lower-back pain predominated in the younger group (20–30 years), while knee pain sharply increased with age, peaking in the 41–50-year group (48.1%).
Conclusion: The study confirms a high prevalence of WRMSDs among TPP, predominantly affecting the lower back, knees and neck. These findings necessitate the urgent implementation of ergonomic interventions, scheduled rest breaks, and targeted occupational health programs to mitigate the occupational hazards of TPP duty.

Keywords: Traffic police personnel, work-related musculoskeletal disorders, modified nordic musculoskeletal questionnaire

Introduction
Musculoskeletal disorders (MSDs) are a major occupational health concern and are characterized by pain, discomfort, or functional impairment affecting the muscles, tendons, ligaments, nerves, joints, and supporting structures of the body [1, 2]. Repetitive movements, prolonged standing, awkward or static postures, vibration exposure, and sustained mechanical stress are well-established risk factors contributing to the development of MSDs [1, 2, 3].
Work-related musculoskeletal disorders (WMSDs) arise when occupational tasks either cause or exacerbate musculoskeletal symptoms. Physical factors such as heavy physical demand, static muscular load, repetitive motion, and whole-body vibration, along with psychosocial and organizational factors, can influence the onset and severity of WMSDs [2, 4].
Traffic police personnel (TPP) constitute a uniquely vulnerable occupational group due to the nature of their work. Their duties require prolonged standing in fixed or semi-static postures, repetitive rotation of the neck and trunk to monitor vehicle movement, sustained exposure to heat, dust, noise, and air pollution, and high mental concentration during duty hours. These environmental and ergonomic stressors significantly increase their susceptibility to musculoskeletal symptoms. Studies conducted in India and South Asia consistently report high prevalence of lower-back pain, neck pain, shoulder discomfort, knee pain, and foot/ankle problems among TPP [1, 5, 6, 7].
Despite the demanding work environment and challenging duty conditions of TPP in India, region-specific data—especially from rapidly developing cities such as Surat—remain limited. Understanding the prevalence and pattern of MSDs in this population is essential to inform ergonomic interventions, preventive physiotherapy strategies, and occupational health policy development.

Materials and Methods
1. Study Design, Setting, and Sampling
The study utilized a cross-sectional design and was conducted among traffic police personnel of Surat city, Gujarat, India. A Convenience sampling method was adopted.

2. Participants
A total of 152 traffic police personnel participated in the study. The target population was TPP aged 20–50 years.
- **Inclusion Criteria:** TPP working for more than 2 years, aged between 20–50 years, with prolonged standing (minimum 4 hours daily) during work.
- **Exclusion Criteria:** Subjects with any recent history of trauma, a history of any psychological disorders, or TPP with an age more than 50 years.

3. Data Collection Tool
The Modified NMQ is a standardized and validated screening tool used worldwide for identifying MSD symptoms across nine anatomical regions. It captures:
- 12-month region-specific pain
- 12-month activity limitation (interference with daily/occupational tasks)
- 7-day pain (Yes/No)

4. Procedure

The purpose and procedure of the study were verbally explained, and written informed consent was obtained from all participants, ensuring voluntary participation and confidentiality. Data was collected using a questionnaire in Google Forms format with body maps to pinpoint the location of pain.

Results

1. Demographic and Anthropometric Characteristics

Of the 152 participants, 67.1% (n=102) were male and 32.89% (n=50) were female. The demographic and anthropometric characteristics of the participants are presented in Table 1.

Table 1: Demographic and Anthropometric Characteristics of Participants

Variable	Mean	SD
Age (years)	32.0	± 7.30
Height (cm)	166.4	± 11.01
Weight (kg)	65.2	± 11.41
BMI (kg/m²)	23.6	± 3.72

BMI classification of the participants showed that 5.3% were underweight, 66.4% had normal BMI, 23.0% were overweight, and 5.3% were obese.

2. Prevalence of Musculoskeletal Pain in last 12 months.

The overall prevalence of musculoskeletal pain across different body regions is shown in Table 2. The most commonly reported site of pain overall was the lower back (25.0%), followed by the knees (21.1%).

Table 2: Prevalence of Musculoskeletal Pain in last 12 months

Region	Percentage (%)
Lower back	25.0
One or both knees	21.1
Neck	13.8
Ankle/Feet	9.9
Shoulder	7.2
Upper back	3.9
Hips/Thighs	3.3
Elbows	0.0
Wrist/Hands	0.0
None	15.8

3. Activity restriction during the last 12 months by body region.

The percentage of participants reporting routine restriction due to musculoskeletal trouble in last 12 months is presented in Table 3. In the last 12 months, restrictions were highest in the Knees (10.5%) and lower back (4.6%).

Table 3: Activity restriction during the last 12 months by body region. (n=152)

Affected Region	Count (n)	Percent (%)
Knees	16	10.5
Lower Back	7	4.6
Ankles/Feet	6	3.9
Shoulders	4	2.6
Hips/Thighs	3	2.0
Upper Back	2	1.3
Neck	1	0.7

4. Pain Distribution by Age Group

The distribution of pain complaints showed a pattern shift across age groups:

- **20–30 years:** Most affected regions were the lower back (28.8%), knees (19.2%), and neck (15.1%).
- **31–40 years:** Pain was most prevalent in the lower back (23.1%), neck (17.3%) and Knees (9.6%).
- **41–50 years:** Knee pain (48.1%) was the most dominant complaint, followed by lower back pain (18.5%) and ankle pain (14.8%).

Discussion

The present study revealed a considerable burden of WMSDs among TPP in Surat. The predominance of pain in the lower back (25%) and knees (21.1%) is directly linked to the core occupational demand: prolonged, static standing on hard road surfaces [1, 5, 7, 11, 12, 13]. This posture increases axial loading and contributes to muscle fatigue and chronic joint stress.

The age-wise distribution demonstrated that knee pain sharply increased with age, dominating the 41–50-year group (48.1%), suggesting the cumulative impact of chronic weight-bearing stress over years of service.

International literature also demonstrates high MSD prevalence in occupations with similar biomechanical demands (e.g., teachers, taxi drivers) [3, 8, 9, 14-21]. The combination of repetitive movements, prolonged static posture, environmental exposures, and psychosocial strain creates a cumulative biomechanical load that predisposes TPP to chronic musculoskeletal symptoms [4, 10, 11]. Given these findings, there is a pressing need for ergonomic interventions, such as scheduled micro-breaks, duty rotation, and physiotherapy-based preventive programs to mitigate risk and improve the long-term health of TPP.

Conclusion

This study demonstrates a high prevalence of musculoskeletal disorders among traffic police personnel, with the lower back, neck, and knees being the most affected regions. The chronic physical demands of the job, including prolonged standing and awkward postures, contribute significantly to these problems, resulting in considerable interference with daily routines and work performance. The findings strongly support the need for immediate ergonomic interventions, including the provision of ergonomic support, scheduled micro-breaks for mobility, and periodic health education programs for traffic police personnel.

Conflict Of Interest

None

Funding

None

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