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A Hazardous Duty: Occupational Health Challenges for Traffic Police at Koshi Province

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Abstract

Background: Traffic police officers are integral to maintaining urban traffic flow and safety, yet their occupational roles expose them to a variety of health hazards. This study investigates the spectrum of occupational health hazards faced by traffic police officers in Koshi Province.

Methods: A cross-sectional study was conducted involving 175 traffic police officers in Koshi Province. Data were collected through structured questionnaires, physical examinations, and environmental assessments. The study evaluated the prevalence of various health issues and their association with identified occupational hazards.

Results: Findings reveal high prevalence rates of respiratory ailments (35%), musculoskeletal disorders (28%), stress and anxiety (40%), hearing impairments (15%), and exposure to vehicular pollutants. Environmental assessments indicated significant levels of noise, particulate matter, and exhaust fumes in traffic hotspots. Statistical analysis identified prolonged exposure duration as significant predictors of adverse health outcomes.

Conclusion: Traffic police officers in Koshi Province are susceptible to multiple occupational health hazards, necessitating comprehensive intervention strategies include enhancing protective measures, implementing regular health screenings, and establishing mental health support systems.

Keywords: Occupational health hazard, traffic police, Koshi Province

Introduction:

Unplanned urbanization has accelerated environmental pollution, exacerbating occupational health risks, particularly for traffic police officers stationed at urban intersections. These officers are continuously exposed to high levels of air pollution, noise, extreme weather, and physical strain due to their role in maintaining order and safety on busy roads. According to the International Labor Organization, occupational hazards contribute significantly to global public health issues, with millions of work-related injuries and thousands of fatalities reported each year[1.] Workplace exposures to pollutants and physical and psychological stressors impact various occupations, but traffic police, due to their specific work environment, are especially vulnerable[2].

Traffic police officers in South Asia, including Nepal, frequently encounter high levels of vehicular emissions, noise from congested traffic, and extended hours of standing in challenging weather conditions. Studies highlight that these exposures can lead to respiratory issues, noise-induced hearing loss (NIHL), and musculoskeletal disorders (MSDs) [3, 4]. Furthermore, high job demands, irregular hours, and interactions with often-stressed drivers and pedestrians add to the psychosocial strain, increasing the likelihood of stress, anxiety, and burnout[5]. Existing research underscores a clear need for more robust

workplace safety interventions, yet occupational health practices tailored to traffic police in South Asia remain limited[6].

This study addresses these gaps by examining the occupational health hazards faced by traffic police officers in Koshi Province, Nepal. By assessing exposure to pollutants, ergonomic factors, and psychosocial stressors, this study aims to provide insights into the unique challenges these officers face. The findings will help guide the development of tailored occupational health policies and interventions that could improve the well-being and effectiveness of traffic police personnel in Nepal and similar urban environments.

The demanding nature of traffic police work—characterized by heavy traffic congestion, irregular hours, and high job demands—contributes to both physical and mental exhaustion, heightening vulnerability to stress and anxiet[7]. Studies conducted in Kathmandu, Nepal, reveal concerning rates of mental health issues among traffic police, including depression, anxiety, and stress, with contributors such as smoking and long working hours exacerbating these conditions[8] . Furthermore, exposure to traffic-related pollutants has been linked to increased risks for cardiovascular diseases and cancer. Occupational health risks among traffic police have received increasing attention due to their critical role in urban traffic management and consequent exposure to diverse health hazards. Literature highlights a broad range of health issues arising from occupational exposures, spanning physical, chemical, biological, ergonomic, and psychosocial domains. This study aims to identify the various occupational health hazards faced by traffic police officers in Koshi province.

Methodology:

A descriptive cross-sectional study was conducted to assess occupational health hazards and health outcomes among traffic police officers in Koshi Province. The study involved 175 traffic police officers stationed at various traffic control points of Biratanagar sub-metropolitan city and Itahari sub-metropolitan city of Koshi Province. Non Probability convenient sampling was done to select the sample population.

Exposure to occupational hazards included air pollutants, with average PM2.5 and PM10 concentrations at traffic points measuring 80 µg/m³ and 160 µg/m³, respectively, both exceeding WHO guidelines. Noise levels averaged 85 dB, surpassing the permissible limit of 75 dB, while ergonomic stress from prolonged standing and repetitive movements contributed to musculoskeletal strain. Major psychosocial stressors identified included high job demands, irregular working hours, and traffic congestion. Data collection involved administering a structured questionnaire to gather demographic information, service duration, lifestyle factors, and reported health symptoms. Trained medical professionals conducted physical examinations to identify respiratory issues, musculoskeletal disorders, hearing impairments, and other health conditions, while the Perceived Stress Scale (PSS) was utilized to assess stress levels and mental health status. Data were analyzed using SPSS version 20, employing descriptive statistics to summarize health issues and exposure levels, along with inferential statistics, including chi-square tests and multivariate logistic regression, to examine associations between occupational exposures and health outcomes.

Results:

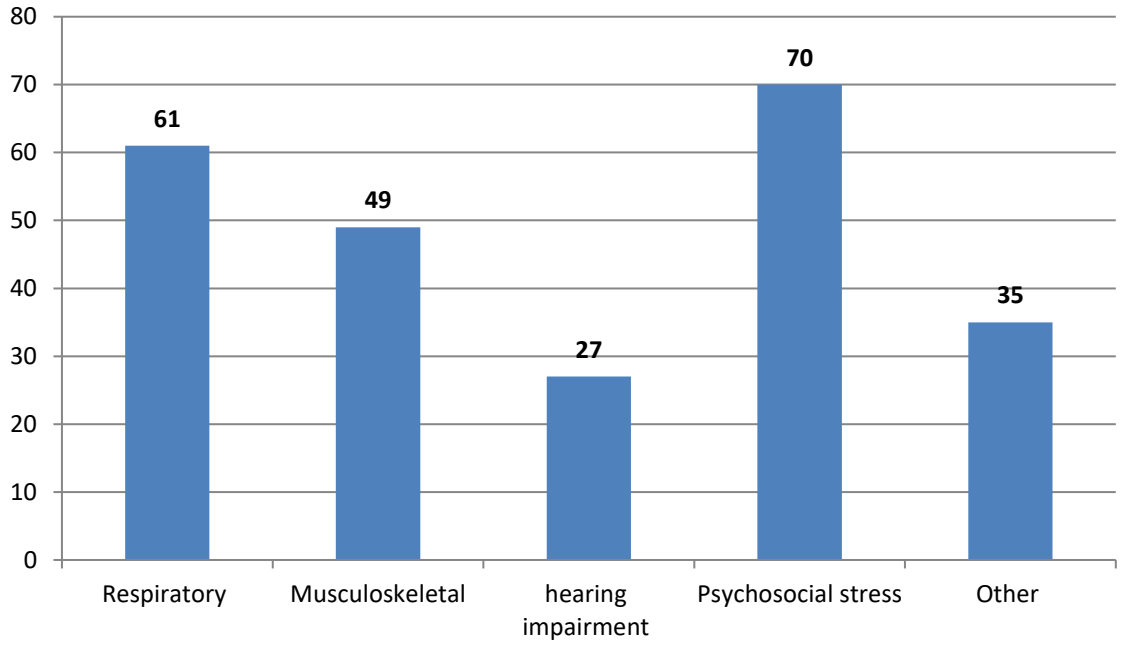
Among the 175 traffic police officers, the mean age was 33.42±8.9 years, Most of the traffic police were male (81.1%) with an average of 10±5 years of service as shown in table 1

Table 1 Socio demographic details

Characteristics	Frequency	Percentage (%)
Age (in years)		
20-30	90	51.4
31-40	52	29.7
41-50	25	14.3
>50	8	4.6
Gender		
Male	142	81.1
Female	33	18.9
Work experience		
≤10years	105	53.2
>10years	70	40%

Traffic police officers reports 35% of respiratory symptoms like chronic cough and asthma, while 28% experience musculoskeletal disorders such as back pain and neck strain. Additionally, 15% suffer from hearing impairments, and 40% indicate high levels of stress and anxiety. There's also a notable incidence of 35% other health issues, as shown in fig 1.

Fig 1 Health Outcomes



Exposure to PM2.5 (OR=2.8, 95% CI: 2.0-3.9) and PM10 (OR=2.5, 95% CI: 1.8-3.4) is significantly associated with respiratory symptoms. Prolonged standing (OR=3.0, 95% CI: 2.1-4.3) and a lack of ergonomic interventions (OR=2.5, 95% CI: 1.7-3.6) are significant predictors of musculoskeletal disorders. Continuous exposure to high noise levels (OR=3.5, 95% CI: 2.2-5.5) is strongly linked to hearing impairments. Furthermore, high job demands (OR=4.0, 95% CI: 3.0-5.3) and inadequate support

systems (OR=2.7, 95% CI: 1.9-3.9) are major contributors to psychosocial stress and anxiety as shown in table 2

Table 2. Health Risks Associated with Occupational Factors in Traffic Police Officers

Health issues	Risk factor	Odd ratio	95%CI
Respiratory issues	Exposure to PM 2.5	2.8	2.0-3.9
	Exposure to PM10	2.5	1.8-3.4
Musculoskeletal disorder	Prolonged standing	3.0	2.1-4.3
	Lack of ergonomics	2.5	1.7-3.6
Hearing impairment	Exposure to high noise	3.5	2.2-5.5
Psychosocial issues	High job demand	4.0	3.0-5.3
	Lack of support	2.7	1.9-3.9

Discussion:

The findings of this study highlight critical associations between occupational exposures and health outcomes among traffic police officers, underscoring the multifaceted nature of the health risks they face. The significant correlation between exposure to PM2.5 and PM10 and respiratory symptoms (OR=2.8 and OR=2.5, respectively) aligns with existing literature, which demonstrates that air pollution is a well-established risk factor for respiratory diseases. Research indicates that long-term exposure to particulate matter can lead to chronic respiratory conditions and exacerbate existing health issues, particularly in occupational settings[9,10]. This is particularly concerning for traffic police officers, who are often stationed in high-traffic areas where air quality is poor.

The association of prolonged standing (OR=3.0) and lack of ergonomic interventions (OR=2.5) with musculoskeletal disorders emphasizes the need for ergonomic assessments in the workplace. Studies have consistently shown that repetitive movements and static postures contribute significantly to the development of musculoskeletal disorders[11,12.] Traffic police often endure extended periods of standing without adequate breaks or ergonomic support, which can lead to discomfort and chronic conditions such as lower back pain and joint issues.

Furthermore, the strong link between continuous exposure to high noise levels (OR=3.5) and hearing impairments corroborates findings from previous studies that highlight noise-induced hearing loss (NIHL) as a prevalent concern among workers in noisy environments[13]. Traffic police are routinely subjected to elevated noise levels from vehicles, which can lead to long-term auditory damage. Protective measures, such as ear protection and noise reduction strategies, are essential to mitigate these risks.

The elevated odds ratio for high job demands (OR=4.0) and inadequate support systems (OR=2.7) further indicates that psychosocial stressors play a crucial role in the mental health of traffic police officers. Research has shown that high job demands coupled with a lack of support can lead to increased stress, anxiety, and burnout[14,15]. These findings are particularly pertinent in the context of traffic management, where officers face high-pressure situations, irregular working hours, and exposure to public conflict.

The study highlights the multifaceted occupational health hazards faced by traffic police officers in Koshi Province. Elevated levels of air pollutants and noise were significant environmental hazards contributing to respiratory and hearing impairments. The high prevalence of musculoskeletal disorders underscores the ergonomic challenges inherent in traffic police duties, such as prolonged standing and repetitive movements.

Psychosocial stress emerged as a prominent health issues, likely exacerbated by high job demands, traffic congestion, and irregular working hours. These findings align with global studies indicating that traffic police are at increased risk for both physical and mental health problems due to occupational exposures.

Conclusion:

Traffic police officers in Koshi Province are exposed to a range of occupational health hazards that significantly impact their physical and mental well-being. The high prevalence of respiratory issues, musculoskeletal disorders, hearing impairments, and psychosocial stressors highlights the urgent need for targeted interventions. Implementing protective measures, enhancing workplace ergonomics, and providing mental health support are essential steps towards improving the occupational health of traffic police personnel.

Recommendations:

For improving traffic police health and safety include installing air purifiers at traffic points and reducing vehicular emissions. Providing quality masks and ear protection is essential, alongside ergonomic improvements like rest breaks to ease physical strain. Regular health screenings should be implemented to detect and manage potential issues early. Mental health support, such as counseling and stress management, is also critical. Finally, enforcing stricter emission standards and promoting low-emission vehicles would benefit both police health and urban air quality.

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Conflict of Interest:

The authors declare no conflicts of interest related to this study.

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