Section: Miscellaneous

Original Research Article

PREVALENCE OF WORK-RELATED MUSCULOSKELETAL DISORDERS AND ASSOCIATED SAFETY PRACTICES AMONG SECURITY PERSONNEL IN A TERTIARY CARE HOSPITAL, CHENGALPATTU DISTRICT: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Work-related musculoskeletal disorders (WRMSDs) are a major occupational health concern affecting workers engaged in physically demanding tasks. Hospital security personnel are particularly vulnerable due to prolonged standing, repetitive movements, and manual handling activities, which can adversely impact their health and work efficiency. **Objectives:** To assess ergonomic risk factors, estimate the prevalence of work-related musculoskeletal disorders (WRMSDs), and identify safety practices among hospital security personnel. **Materials and Methods:** A cross-sectional study was conducted from March to May 2025 at SRM Medical College Hospital and Research Centre, Chengalpattu, among 200 randomly selected security personnel. Data were collected using a semi-structured questionnaire. Statistical analysis was performed using descriptive statistics and the chi-square test. **Results:** The majority of participants (92%) worked 9–12-hour shifts, and 50.5% reported prolonged standing. The most commonly affected sites were legs (42%), knees (37.5%), hips (21%), and back (16.5%). A statistically significant association was observed between prolonged standing and shoulder pain ($p<0.01$), as well as between weight lifting and involvement of multiple pain sites ($p<0.001$). More than half of the participants (56%) did not use any relief measures, and 76% did not seek medical care. **Conclusion:** WRMSDs are highly prevalent among hospital security personnel. Implementation of ergonomic interventions and effective workload management strategies is essential to reduce the burden.

INTRODUCTION

Work-related musculoskeletal disorders (WRMSDs) are among the most common occupational health problems worldwide, contributing significantly to disability, reduced productivity, and increased healthcare costs. These disorders are often associated with a combination of physical and psychosocial risk factors, and have been identified as a major occupational health concern globally.[1,6] Security personnel, particularly in healthcare institutions, are exposed to multiple occupational hazards, including prolonged standing, repetitive physical tasks, manual handling, and psychosocial stressors. These factors substantially increase their risk of developing WRMSDs.[3,9] In addition, long working hours and shift duties further exacerbate fatigue and musculoskeletal strain.[21]

In tertiary care hospitals, security guards play a crucial role in maintaining safety and operational efficiency. However, their occupational health challenges often remain under-recognized. Previous studies have reported a high prevalence of musculoskeletal problems such as back, knee, and lower limb pain among security personnel, primarily due to prolonged standing and physically demanding activities.[5,3] These conditions negatively impact their quality of life, work performance, and long-term employability. Furthermore, psychosocial factors such as job stress, low job control, and workload pressure have been shown to significantly contribute to the development and persistence of WRMSDs.[13,20] Despite the availability of ergonomic training and safety measures in some settings, adherence to preventive practices remains suboptimal, highlighting a gap between knowledge and practice.[6]

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Given the limited focus on security personnel in occupational health research, especially in hospital settings, there is a need to assess their ergonomic risk factors, prevalence of WRMSDs, and safety practices. The present study aims to address this gap and provide evidence for developing targeted interventions to improve occupational health and safety among hospital security personnel.

MATERIALS AND METHODS

This cross-sectional study was conducted in Single institution, Chengalpattu, Tamil Nadu, from March to May 2025. The study population included security personnel in various departments of the hospital. A total of 200 study subjects were included in the study, selected through simple random sampling. Inclusion criteria: The study subjects were security personnel working in the hospital, who gave their consent to participate in the study. Exclusion criteria: Study subjects who were unwilling to participate in the study.

Data Collection: A modified semi-structured questionnaire was designed to collect data from the study subjects, which included socio-demographic data, ergonomic exposure, the prevalence of musculoskeletal pain, the frequency of pain, and safety habits, including the use of protective gear.

Statistical Analysis: Data were entered into an Excel sheet, analyzed, and interpreted using the software Statistical Package for the Social Sciences version 25. Descriptive statistics, including frequencies and percentages, were done. Associations were tested using the chi-square test, with a p-value < 0.05 being statistically significant.

Ethical Approval: This study has been approved by the Institutional Ethics Committee, SRM Medical College Hospital Research Centre, Chengalpattu, Tamil Nadu, (SRMIEC-ST0224-897). Informed consent has been obtained from all the study subjects.

RESULTS

Out of 200 participants, 44.5% were aged 36–45 years, 38.5% were above 45 years, and 17% were 26–35 years. Females (58%) outnumbered males (42%). Most respondents (57.5%) had 1–5 years of employment, and 92% worked 9–12 hour shifts. Tasks involving prolonged standing were reported by 50.5%.

Musculoskeletal pain was common, affecting the legs (42%), knees (37.5%), hips (21%), and back (16.5%). Pain occurred 1–2 times per week in 52% of cases. Significant associations were observed between prolonged standing and shoulder pain ($p < 0.01$), and between weight lifting and pain in multiple sites ($p < 0.001$). Despite high pain prevalence, 56% did not use relief measures, and 76% did not seek medical help. However, 84.5% had received ergonomic training, and 80.5% reported inclusion of posture adjustment techniques.

Table 1: Socio-demographic characteristics of study participants (n=200)

Variable	Category	Frequency (%)
Age (years)	26–35	17.0
	36–45	44.5
	>45	38.5
Gender	Male	42.0
	Female	58.0
Education	Primary school	37.5
	Middle school	46.5
	Higher secondary	6.0
	Illiterate	10.0

Table 2: Distribution of ergonomic risk factors among security personnel (n=200)

Risk Factor	Category	Frequency (%)
Daily shift duration	9–12 hours	92.0
	6–8 hours	6.5
Tasks involving prolonged standing	Yes	50.5
	No	49.5
Reported physical discomfort	Yes	61.0
	No	39.0
Job-related stress	Yes	40.5
	No	59.5

Table 3: Safety practices among hospital security personnel (n=200)

Safety Practice	Category	Frequency (%)
Measures taken for WRMSD relief	Yes	44.0
	No	56.0
Sought medical help for pain	Yes	24.0
	No	76.0
Received ergonomic training	Yes	84.5
	No	15.5
PPE and first aid available	Yes	78.0
	No	22.0

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Among the 200 security personnel studied, the majority (44.5%) were aged 36–45 years, followed by 38.5% above 45 years, while only 17% were between 26–35 years. Females constituted 58% of the study group compared to 42% males. Regarding education, 46.5% had completed middle school, 37.5% had studied up to primary school, 10% were illiterate, and only 6% had higher secondary education. [Table 1]

Most participants (92%) reported working long shifts of 9–12 hours daily, with 50.5% performing tasks that involved prolonged standing. A large proportion (61%) experienced physical discomfort, and 40.5% reported job-related stress. Night-time stress was reported by 7%, whereas 41% experienced stress during the day. [Table 2]

The prevalence of musculoskeletal pain was highest in the legs (42%), knees (37.5%), hips (21%), and back (16.5%). Pain occurred 1–2 times per week in more than half (52%) of respondents, while 37% experienced it 3–4 times weekly. Prolonged standing showed a significant association with shoulder pain ($p < 0.01$), and weight lifting was associated with multiple pain sites ($p < 0.001$).

Despite these findings, 56% did not adopt any pain relief measures, and 76% did not seek medical help. However, 84.5% received ergonomic training, and 80.5% confirmed training included posture and adjustment techniques. [Table 3]

DISCUSSION

Although 84.5% of participants reported receiving ergonomic training, a significant proportion (56%) did not adopt any pain relief measures and 76% did not seek medical care. This highlights a knowledge–practice gap, which has also been reported in occupational health studies where awareness does not necessarily translate into behavioral change. Possible reasons include workload pressure, lack of time, fear of job loss, and limited access to occupational health services. Similar findings were reported by Piranveyseh et al,[11] and Anwer et al,[13] where despite awareness, compliance with ergonomic practices remained low.In addition to physical risk factors, 40.5% of participants reported job-related stress, indicating that psychosocial factors may contribute significantly to WRMSDs. Stress can increase muscle tension, reduce recovery time, and exacerbate pain perception. Studies by Deeney and O'Sullivan,[20] and Harcombe et al,[19] have demonstrated that psychosocial stressors such as job strain, long working hours, and low job control are strongly associated with musculoskeletal disorders.

The high prevalence of leg (42%) and knee pain (37.5%) observed in this study reinforces existing evidence that prolonged standing is a major ergonomic hazard. Continuous standing leads to venous pooling, muscle fatigue, and joint stress, particularly in the lower extremities. This is consistent with findings from Bhure et al,[5] and Tembo et al,[3] which reported similar patterns of lower limb and back pain among security personnel and other occupational groups. The study observed a higher proportion of female participants (58%). Literature suggests that female workers may be more susceptible to WRMSDs due to physiological differences, dual workload (work + household responsibilities), and ergonomic mismatch. This aligns with findings from Coury et al,[23] which indicate gender-related differences in musculoskeletal risk and symptom reporting.

The findings emphasize that individual-level interventions alone are insufficient. Organizational changes such as Duty rotation, Scheduled rest breaks, Provision of anti-fatigue mats and ergonomic footwear , On-site occupational health services are essential to reduce WRMSDs. Bazaluk et al,[4] highlighted that ergonomic risk management at the organizational level is crucial for sustainable occupational health improvements. This study highlights the need to integrate security personnel into occupational health surveillance programs, which are often focused on clinical staff. Regular screening for WRMSDs, early intervention, and policy-level inclusion can reduce long-term disability and productivity loss. Carrillo-Castrillo et al,[10] emphasized the importance of systematic monitoring and reporting of WRMSDs in workplace settings.

Given the multifactorial nature of WRMSDs, a multidisciplinary approach involving ergonomists, physiotherapists, occupational health experts, and hospital administrators is recommended. Evidence from Pavlovic-Veselinovic et al,[12] supports the use of ergonomic assessment systems and multidisciplinary strategies for effective prevention. This study also demonstrated the need for interventions in the workplace, which include the rotation of duties, provision of rest breaks, ergonomic adjustments, and the provision of supportive equipment such as chairs, footwear, etc., to reduce the incidence of musculoskeletal disorders among security personnel in hospitals.

Limitations

This was a single-center study, which may limit generalizability. The cross-sectional design prevents establishment of causality. Self-reported data may also introduce recall or response bias.

CONCLUSION

Work-related musculoskeletal disorders are highly prevalent among hospital security personnel, mainly due to prolonged standing, heavy workloads, and insufficient ergonomic support. Targeted interventions such as ergonomic modifications, regular safety training, workload redistribution, and

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accessible medical care are essential to safeguard the health and efficiency of security staff.

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REFERENCES

1. Malekzadeh R, Abedi G, Ziapour A, Yıldırım M, Abedini E. Patients' sense of security from clinical factors in Iran: a cross-sectional study. BMC Health Services Research. 2024 Feb 28;24(1):259.(8)
2. Savolainen T. A safe learning environment from the perspective of Laurea University of applied sciences safety, security and risk management students and staff. Heliyon. 2023 Mar 1;9(3).(1)
3. Tembo LN, Munyikwa JP, Musoro C, Majonga G, Mavindidze E. Prevalence of work related musculoskeletal disorders and associated factors among University of Zimbabwe Faculty of Medicine and Health Sciences non-academic workers: a cross-sectional study. BMC Musculoskeletal Disorders. 2023 Oct 6;24(1):792.(9)
4. Bazaluk O, Tsopa V, Cheberiachko S, Deryugin O, Radchuk D, Borovytskyi O, Lozynskyi V. Ergonomic risk management process for safety and health at work. Frontiers in Public Health. 2023 Nov 9;11:1253141.(10)
5. Bhure V, Bhagia M, Lalwani L (2022) Prevalence Low Back Pain in Security Personnel in Vidarbha Region of Maharashtra, India: A Cross Sectional Study. Int J Phys Med Rehabil. S16:005.
6. Anwer S, Li H, Antwi-Afari MF, Wong AY. Associations between physical or psycho social risk factors and work-related musculoskeletal disorders in construction workers based on literature in the last 20 years: A systematic review. International Journal of Industrial Ergonomics. 2021 May 1;83:103113.(11)
7. Slaatto A, Mellblom AV, Kleppe LC, Baugerud GA. Safety in residential youth facilities: Staff perceptions of safety and experiences of the "basic training program in safety and security". Residential Treatment for Children & Youth. 2022 Apr 3;39(2):212-37.(12)
8. Albadry AA, El-Gilany AH, Abou-ElWafa HS. Workplace violence against security personnel at a university hospital in Egypt: a cross-sectional study. F1000Research. 2020;9.(13)56
9. Sadeghi Yarandi M, Ghasemi M, Ghanjal A. The relationship between individual, physical and psycho social risk factors with musculoskeletal disorders and related disabilities in flight security personnel. International journal of occupational safety and ergonomics. 2022 Jan 2;28(1):387-97.(6)
10. Carrillo-Castrillo JA, Pérez-Mira V, Pardo-Ferreira MD, Rubio-Romero JC. Analysis of required investigations of work-related musculoskeletal disorders in Spain. International Journal of Environmental Research and Public Health. 2019 May;16(10):1682.(14)
11. alantri B, Chitnavis N, Ahemad R, Agrawal S, Mehar P, Tekulwar N. A cross sectional study on assessment of occupational stress level among security guards. International
Journal of Science and Research (IJSR). 2018;9(1):841-3.(15)
12. Pavlovic-Veselinovic S, Hedge A, Veselinovic M. An ergonomic expert system for risk assessment of work-related musculo-skeletal disorders. International Journal of Industrial Ergonomics. 2016 May 1;53:130-9.(5)
13. Piranveyseh P, Motamedzade M, Osatuke K, Mohammadfam I, Moghimbeigi A, Soltanzadeh A, Mohammadi H. Association between psychosocial, organizational and personal factors and prevalence of musculoskeletal disorders in office workers. International Journal of Occupational Safety and Ergonomics. 2016 Apr 2;22(2):267- 73.(16)
14. Akpan SS, Ayandele IA. Remodeling strategic staff safety and security risks management in Nigerian tertiary institutions. Expert journal of business and management. 2015;3(2):150-65.(3)
15. Ekpenyong CE, Inyang UC. Associations between worker characteristics, workplace factors, and work-related musculoskeletal disorders: a cross-sectional study of male construction workers in Nigeria. International Journal of Occupational Safety and Ergonomics. 2014 Jan 1;20(3):447-62.(17)57
16. Kumar P, Lee HJ. Security issues in healthcare applications using wireless medical sensor networks: A survey. sensors. 2011 Dec 22;12(1):55-91.(18)
17. Shedden P, Scheepers R, Smith W, Ahmad A. Incorporating a knowledge perspective into security risk assessments. Vine. 2011 May 17;41(2):152-66.(19)
18. Petrevski B, Dimitrovska A. Effective training of staff in the private security agencies in the republic of Macedonia-important factor for safety of the citizens and their property.2010;226.(2)
19. Harcombe H, McBride D, Derrett S, Gray A. Physical and psycho social risk factors for musculoskeletal disorders in New Zealand nurses, postal workers and office workers.Injury prevention. 2010 Apr 1;16(2):96-100. (20)
20. Deeney C, O'Sullivan L. Work related psycho social risks and musculoskeletal disorders: potential risk factors, causation and evaluation methods. Work. 2009 Jan 1;34(2):239- 48.(21)
21. Zamanian Z, Dehghani M, Mohammady H, Rezaeiani M, Daneshmandi H. Investigation of shift work disorders among security personnel. International Journal of Occupational Hygiene. 2012;4(2):39-42.(22)
22. Musculoskeletal disorders: work-related risk factors and prevention. International journal of occupational and environmental health. 1996 Jul 1;2(3):239-46.(23)
23. Coury HJ, Porcatti IA, Alem ME, Oishi J. Influence of gender on work-related musculoskeletal disorders in repetitive tasks. International journal of industrial ergonomics. 2002 Jan 1;29(1):33-9. (4) Management Sciences. 2013;1(1):83-92.
24. Mone FH, Ashrafi DM, Sarker MA. Work life balance of female doctors in Bangladesh: an overview. Journal of Health and Medical Sciences. 2019 Sep 29;2(3)

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