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Prevalence of Work-Related Musculoskeletal Disorders, Stress and Quality of Life Among Security Guards

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Abstract

Orthopaedic diseases have become more common as industrialization has progressed. It is one of the leading reasons for employee absenteeism from work, negatively affecting their quality of life. The incidence is unknown in professions like as security guards, whose job entails a lot of standing. Work-related musculoskeletal problems have a major influence on afflicted individuals' quality of life, can create economic hardship, and can affect service supply. The present study aims to assess the prevalence of work-related musculoskeletal disorders and their effects on quality of life among security guards. A quantitative approach with non-experimental descriptive research design was adopted for the present study 130 security were recruited as study participants by using the Convenient Sampling Technique. A self-structured questionnaire was administered to collect data regarding the demographic information and prevalence of Musculo skeletal disorders. The present study suggests that the utmost equal number of security guards (54%) are unaffected, equal number of security guards (46%) are affected, so they are almost equally aware of musculoskeletal disorders and their preventive measures. 35(26.9) has Mild stress, 65(50) Moderate stress, 30(23) Stress had a substantial positive correlation with WMSDs ($r=0.40$, $p < 0.001$). Stress and WMSDs were significantly connected with personal variables ($p<0.001$). Security guards face a risk of musculoskeletal disorders due to their physical workload. Severe complaints are linked to general health, while high exertion and social characteristics lead to sickness absence. Chronic symptoms influence medical care seeking. Ergonomic interventions may prevent hand/wrist complaints. Psychosocial and personal characteristics should be considered when investigating work-related risk factors.

Keywords: *Musculoskeletal Disorders, Prevalence, Quality, Security Guards.*

Introduction

Musculoskeletal disorders (MSDs), also referred to as repetitive motion, ergonomic, or overuse injuries, are a variety of conditions triggered by work- and non-work-related stressors. The study of employees' interactions with tools, equipment, surroundings, tasks, work techniques and rates, and other relevant systems is known as ergonomics [1, 2]. The World Health Organisation (WHO) reported that musculoskeletal conditions are the most common causes of disability and limitation related to daily living and gainful employment, the population of people aged 60 and more will grow from 900 million in 2015 to two billion by 2050 [3, 4]. Because of the different ergonomic risk factors prevalent in their employment, 50-70% of workers in developing nations are at risk of getting musculoskeletal disorders. Security guards spend nearly all their working hours standing. Chronic low back pain is the most common cause of long-term impairment in middle age

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in many nations. Workers who are exposed to manual labour work in atypical and limited postures, repetitive and static work, vibration, and poor psychological and social situations have a high prevalence of work-related musculoskeletal illnesses [5, 6]. This puts them at a higher risk for dangers associated with extended standing than other vocations such as lathe and milling machine operators, who perform repetitive movement, bending, and vibration, among other things, in addition to prolonged standing. The risk factors for back-related musculoskeletal disorders included awkward posture, high static muscle load, high-force exertion at the hands and wrists, sudden applications of force, work with short cycle times, little task variety, frequent tight deadlines, insufficient rest or recovery periods, high cognitive demands, little control over work, cold work environment, localised mechanical stresses to tissues, and poor spinal support. The risk variables related to WMSDs in security guards include age, gender, smoking, weight, height, BMI, and overall health status [7, 8].

As a result, the term "work-related musculoskeletal disorders" (WMSDs) was replaced with "cumulative trauma disorders" (CTDs) after it was shown that the stress, exhaustion, and some types of psychological depression could all cause pain even when no lesion was present [9, 10]. Musculoskeletal disorders of the neck, shoulder, elbow, hand and wrist, lower back, and lower extremities. Neck musculoskeletal issues were linked to repetition, severe exertion, and confined or immobile postures. Shoulder musculoskeletal diseases are associated with work at or above shoulder height, carrying large weights, static postures, hand-arm vibration, and repetitive motion. Risk factors for elbow epicondylitis included overexertion of the finger and wrist extensors when the elbow was extended, as well as posture. Hand-wrist tendinitis and job-related carpal tunnel syndrome were associated with repeated work, vigorous activities, flexed wrists, and prolonged continuous effort. Hand-arm vibration syndrome (Raynaud's phenomenon) has been connected to the intensity and duration of vibrating exposure. Work-related lower back diseases are linked to repetition, item weight, twisting, and poor lifting biomechanics. It causes long-term discomfort, weariness, and physical incapacity, resulting in increased employment restrictions, increased absenteeism (missed work), and job transfer. MSDs cause more work absenteeism or disability in Western countries than any other group of disorders [11, 12].

Working while standing gives a worker a lot of freedom and allows him or her to execute their job quickly and efficiently, which increases production. However, workers are at risk of occupational accidents if they spend more than 50% of their working hours standing, which is known as prolonged standing [13]. This is consistent with the incidence of low back discomfort and pain in the distal lower limb with confined standing, i.e. standing without the ability to sit, versus standing with the ability to sit. This is a significant contributor to the decline in worker performance in the industry [14]. Literary references Standing for more than four hours each day exposes a worker to low back pain, while 50% of healthy individuals report back and leg discomfort after only two hours of continuous standing [15].

Workers and employers are both concerned about work-related musculoskeletal illnesses because they have a significant cost in terms of absenteeism, medical treatment, workplace injury compensation, and permanent musculoskeletal impairments. These factors have an impact on the quality and accessibility of care for the elderly [16, 17]. Prevention of musculoskeletal disorders is warming up and stretching before beginning any repetitive, static, or long-term tasks, taking periodic 20–30-minute pauses from any continuous position to loosen tight muscles, respecting

suffering, changing postures or halting any activities that produce pain, recognise, and treat early indicators of inflammation, use splints and wrist supports as directed by the therapist. Workers, companies, insurers, and health experts worked together to create approved treatment approaches (rehabilitation) for these so-called industrial musculoskeletal illnesses. The approach is separated into three stages: symptom prevention and resolution, strength, and dynamic stability restoration, and return to work. This method comprised symptomatic treatments, physical therapy, and an ergonomic examination [18, 19].

MSDs are one of our most serious issues, however, workplace risk management systems do not reflect current evidence on their work-related causes. Inadequate attention is paid to assessing and controlling risk from psychosocial hazards, and the traditional risk management paradigm focuses too narrowly on individual hazards rather than promoting the more holistic approach required to manage the combined effects of all relevant hazards. Acting and enforcing injury prevention rules and regulations by security guards could reduce injuries [20]. Quality of life (QoL) is a framework that influences people's overall life satisfaction, emotional well-being, and emotional function. Although the concept of quality of life (QoL) lacks a universal definition due to its multidimensionality, multiculturalism, and complexity, it can be defined as individuals' perceptions of their position in life about their culture, value systems, goals, expectations, standards, and concerns about this situation. According to systematic evaluations, security guards are more stressed than the overall population and are more likely to develop burnout, anxiety, and depression [21]. Research suggests that an employee's cognitive, emotional, and behavioural responses to their work environment have a crucial role in determining their health status. Because of this complexity, various general social and organisational work characteristics such as efforts, demands, decision power, and organisational fairness have been utilised as summative assessments of workplace psychosocial risk factors.

Nonetheless, the data indicate that additional criteria must be considered. Having a strong personal commitment to work but finding the extrinsic components difficult might lead to poor mental health and sick leave. Furthermore, interfering with an individual's working and private lives increases the likelihood of subsequent sick leave. Furthermore, job control minimises sick leave both directly and indirectly via motivation. The social and organisational conditions at work, as well as personal commitment and interference between work and leisure time, are key factors in determining when and to what extent individuals perceive stress to be beyond their capacity to cope. These factors also contribute to the link between work-related stress and sick leave [22]. As a result, our research focuses on delivering the prevalence of work-related musculoskeletal symptoms (WRMs) in security guards whose job requires prolonged standing as the primary activity. Once the prevalence is recognised, preventive and coping methods for MSDs can be implemented. It will boost security guards' physical and emotional health, as well as their work efficiency and output. Therefore, the study aimed to investigate the prevalence of work-related musculoskeletal disorders and their effects on the quality of life of security guards.

Methods and Materials

Study Design: The quantitative approach with a non-experimental, descriptive correlational research design was adopted for the current study to assess the prevalence of work-related musculoskeletal disorders among security guards. **Study Setting:** The study was conducted for 3 months from March 10th, 2023, till 20th June 2023 from the security

guards working in Saveetha Medical College and Hospital, SIMATS. **Ethical Approval:** The study was carried out after getting approval from the Institutional Scientific Review Board from Saveetha College of Nursing, SIMATS (Ref No - 65/2023/ISRB/SCON) and formal consent from the designated departmental head of hospital management. **Study Participants:** A total of 130 security guards are currently working in the Saveetha Medical College and Hospital, SIMATS Campus (n=130) and those who met the inclusion criteria were recruited as study participants. The inclusion criteria for the study participants were security guards of both genders, between the ages of 30 and 50, working in different shift environments, who had experience of 3 years or more with working 8 hours per day, willing to participate and available during the study period, who can understand, speak, and write Tamil or English, met the inclusion criteria for study participants. Any history of spine trauma, any diagnosed case of local and systemic infection, cancer, any history of neurological diseases, pregnant women, orthopaedic disorder or fracture, psychological condition, and involvement in any sort of active sport were excluded. **Sampling Technique:** A total of 130 security guards were recruited based on the inclusion criteria using the convenience sampling technique. **Informed Consent:** The purpose of the study was explained clearly in depth to each of the study participants and written informed consent was obtained from them. **Assessment:** The demographic data and clinical variables among security guards were collected using a self-structured questionnaire, WMSs were scored by the participants with the Nordic Musculoskeletal Questionnaire, and subjective assessment of pain using VAS and NPRS [16] Psychological distress scale was used to assess the level of stress and then participants were asked to evaluate their QoL by scoring the World Health Organization Quality of Life-Brief Form [21]. The collected data were tabulated and analysed using descriptive and inferential statistics.

Results

Demographic and Clinical Characteristics

With regards to the demographic and clinical characteristics the security guards22(55%) were aged between 41 – 50 years**,** 19(47.5%) belonged to joint family**,** 22(55%) were Hindus**,** 19(47.5%) had 1 – 2 children**,** 12(30%) had illiterate**,** 16(40%) were working for more than 10 years**,** 21(52.5%) had an income of Rs.10,000 – 20,000, 19(47.5%) were working more than 10-12 hours, 41(68.4%) were non vegetarian, 41(68.4% had no previous history, 46(76.7%) had moderate BMI and 45(75%) had no lifestyle practice, 23(38.3%) had heavy physical activity, 23(38.3%) had signs of Malaise, 24(40%) had analgesics and 25(41.6%) had side effects of analgesics.

Assessment of Work-Related Musculoskeletal Disorders among Security Guards

With regards to low back pain, 8 (20%) had mild, 15 (37.5%) had moderate, and 17 (42.5%) had severe. In the ankles and feet, 8 (20%) had mild, 12 (30%) had moderate, and 20 (50%). Regarding the neck, 12 (30%) had mild, 10 (25%), had moderate, and 18 (45%) had severe. With regards to shoulder pain, 11 (27.5%) had mild, 15 (37.5%) had moderate, and 14 (35%) had severe. On the lower legs, 7 (17.5%) had mild, 12 (30%) had moderate, and 21 (52.5%) had severe. Considering the upper back, 6 (15%) had mild, 16 (40%) had moderate, and 18 (45%) had severe. In the knee, 6(15%) had mild, 22(55%) had moderate and 12(30%) had severe. The thighs 6 (15%) had mild, 13 (32.5%) had moderate, and 21 (52.5%) had severe.

With regards to hip 8 (20%) had mild, 10 (25%) had mild and 22 (55%) had severe. In wrists/hands had 18(45%) had mild 12(30%) had moderate and 10(25%) had severe.

Regarding the forearms, 18 (45%) had mild, 10 (25%) had mild, and 12(30%) had severe. With regards to elbows, 13 (32.5%) had mild, 11 (27.5%) had moderate, and 16 (40%) had severe (as depicted in Table 1 & Figure 1).

Table 1. Assessment of Work-Related Musculoskeletal Disorders among Security Guards

Body Region	**Mean**	**Standard Deviation**	**Proportion Confidence Interval (95% CI)**
Low back	5.675	2.585	0.826
Ankle / Feet's	5.8	2.289	0.732
Neck	5.5	2.961	0.947
Shoulders	5.3	2.642	0.845
Lower legs	6.52	2.791	0.892
Upper back	5.75	2.488	0.795
Knees	5.2	1.963	0.628
Thighs	6.65	2.413	0.771
Hip	6.1	2.292	0.723
Wrist/hand	4.75	2.789	0.892
Forearms	4.8	2.564	0.820
Elbows	5.4	2.658	0.850

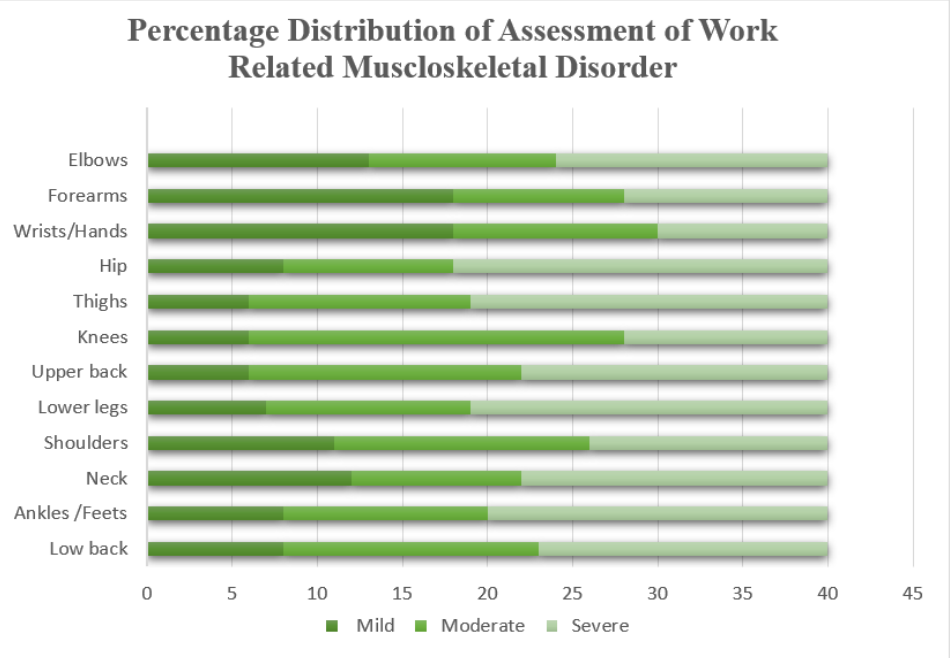

Figure 1. Percentage Distribution of Assessment of the Work-Related Musculoskeletal Disorders among Security Guards

Distribution of Security Guards According to Their Pain on NPRS

The distribution of pain in security guards according to their NPRS score. 30% of guards have mild pain,65% have moderate and 5% have severe pain (as depicted in Table 2 & figure 3).

Table 2. Distribution of Security Guards According to Their Pain on NPRS

N= 130

Mild	Moderate	Severe
30%	65%	5%

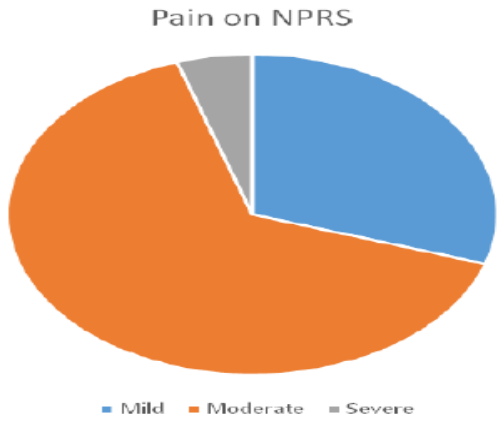

Figure 2. Percentage Distribution of Pain among Security Guards

Prevalence of Work-Related Musculoskeletal Disorders among Security Guards

Among 130 security guards who participated in the study, an utmost equal number of security guards 70 (54%) are unaffected, and an equal number of security guards 60 (46%) are affected, so they are almost equally aware of musculoskeletal disorders. The statistical analysis revealed serious symptoms in most study subjects especially those who were permanently working and were working more for long hours (as depicted in Table 3 & Figure 3).

Table 3. Percentage and Frequency Distribution of Prevalence of Work-Related Musculoskeletal Disorders among Security Guards

N= 130

Prevalence of MSD	Frequency (F)	Percentage (%)
Affected with MSD	60	46
Unaffected with MSD	70	54

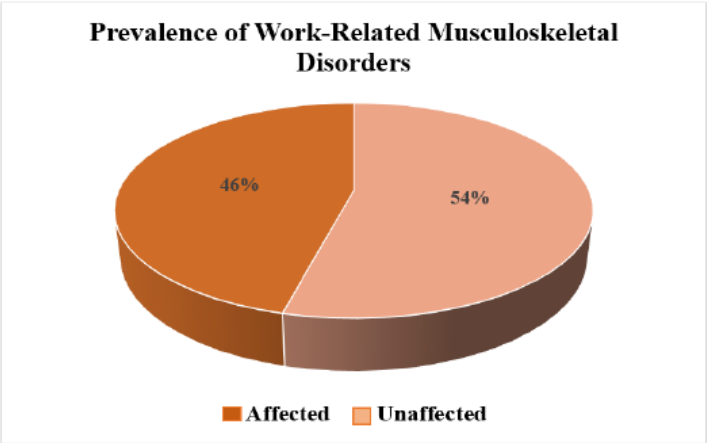

Figure 3: Prevalence of Work-Related Musculoskeletal Disorders among Security Guards

Assessment of Level of Stress among Security Guards

Among 130 security guards participated in the study, 35(26.9) has Mild stress, 65(50) Moderate stress, 30(23) Severe stress. The statistical analysis revealed that stress is a serious symptom in most study subjects especially those who are permanently working and were working more for long hours (as depicted in Table 4 & Figure 4).

Table 4. Percentage and Frequency Distribution of Level of Stress among Security Guards

N= 130

Level of Stress	Frequency (F)	Percentage (%)
Mild	35	26.9
Moderate	65	50
Severe	30	23

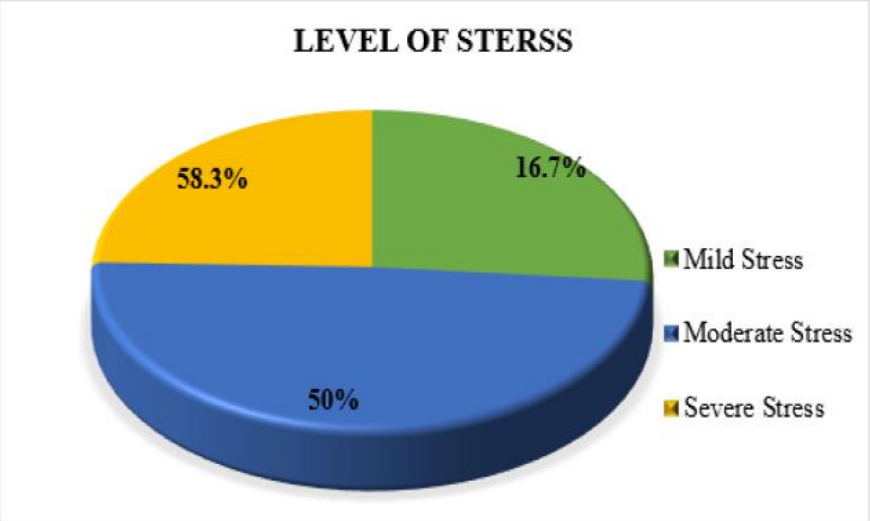

Figure 4: Level of Stress among Security Guards

Associations Between Work-Related Musculoskeletal Complaints and Quality of Life

The participants' quality of life and subscale scores. There was no significant correlation between gender, BMI, handedness, identified systemic health condition, mother's educational status, and QoL ratings ($p > 0.05$). There is a significant difference in general quality of life scores based on the father's education level ($p = 0.006$). Participants whose fathers attended university showed better mean QoL ratings across all subscales. Participants who use medication for musculoskeletal problems had lower QoL ratings, as predicted. Environmental well-being differs significantly from the father's education level ($p = 0.002$). Regular sports participation and absence of musculoskeletal disorders were associated with improved physical health $p = 0.041$, and $p = 0.018$, respectively (as depicted in table 5).

Table 5. Associations Between Work-Related Musculoskeletal Complaints and Quality of Life

N = 130

	Quality of Life General Health	**Quality of Life Physical Health**	**Quality of Life Psychological**	**Quality of Life Social Relationship**	**Quality of Life Environment**
Participants' scores (mean ± SD)	61.1 ± 17.44	66.51 ± 12.92	62.1 ± 13.11	64.55 ± 15.41	60.64 ± 10.84

Association Between Stress and Work-Related Musculoskeletal Disorders

Pearson correlation was utilised to look into the relationship between stress, WMSDs (from the SWELL), and professional and personal variables. Stress had a substantial positive correlation with WMSDs ($r=0.40$, $p < 0.001$). Stress and WMSDs were significantly connected with personal variables ($p<0.001$).

Association Between the Work-Related Musculoskeletal Disorders among Security Guards with Their Selected Demographic Variables

None of the demographic variables had shown a statistically significant association with work-related Musculoskeletal Disorders (as depicted in Table 6).

Table 6. Association Between the Work-Related Musculoskeletal Disorders among Security Guards with Their Selected Demographic Variables

N = 130

Demographic Variables	**F**	**Knowledge**
Age in years		$\chi^2=1.56$
21 – 30	6	p=0.815
31 – 40	12	**N. S**
41 – 50	22	
Type of family		$\chi^2=2.36$
Joint	19	p=0.66
Nuclear	15	**N. S**
Extended	6	
Religion		$\chi^2=4.22$
Hindu	22	p=0.37
Christian	10	**N. S**

Muslim	8	
Number of children		χ^2=5.25 p=0.26 **N. S**
Nil	5	
1 – 2	19	
2 – 3	16	
Education		χ^2=4.80 p=0.77 **N. S**
Illiterate	12	
Primary	9	
Secondary	6	
Higher Secondary	8	
Graduation	5	
Job tenure		χ^2=5.31 p=0.72 **N. S**
Less than 1 year	3	
1-3 years	3	
4-6 years	8	
7-9 years	10	
10 and more than 10 years	16	
Income		χ^2=2.82 p=0.58 **N. S**
<=10,000	9	
10,000 – 20,000	21	
>20,000	10	
Duration of working hour		χ^2=2.11 p=0.71 **N.S**
Less than 8 hours	9	
8-10hours	12	
10-12 hours	19	

Discussion

An observational study to determine the level of health problems and stress associated with MSDs, as well as techniques to reduce these risk factors among security guards who work with a total of 90 male participants. Participants aged 25 to 60 who worked 6 to 12 hours each day were included. Anthropometric data were taken after administering a Nordic musculoskeletal questionnaire. The results revealed that 96.6% of the 90 patients had musculoskeletal diseases in diverse regions, whereas 3.3% reported no musculoskeletal discomfort in any place. There is a positive correlation between body mass index, height, weight, age, and musculoskeletal disorders [5]. A cross-sectional survey was conducted among 130 security guards in Sahiwal to investigate the prevalence of nonspecific low back pain caused by job-related stress. Low back discomfort affected 87.7% of the security guards. Furthermore, 73.8% of security guards were concerned about losing their jobs, 64.5% experienced family stress, and 83.1% felt pressured. The cross-tab chi-square test was used to examine the relationship between stress and low backache. Results revealed that 87.7% experienced both stress and low backache (p-value < 0.05) [6]. The study concluded that work-related musculoskeletal disorders are common among security guards. Job-related stress factors, such as fear of job loss, on-the-job pressure, and financial stress, were identified as significant contributors to most work-related musculoskeletal disorders cases in this profession.

An observational cross-sectional study was conducted on the prevalence of low back pain among 130 security guards at MGM Institute of Health Science Aurangabad. The result is determined based on the percentage of male and female guards who have low back pain according to the Oswestry Disability Index, which shows that 29% of 73% of male guards have low back pain, while 19% of 26% of female guards have low back pain [1]. A cross-sectional survey was conducted and results found that 68% of security guards at the Guru Gobind Singh Super Thermal Plant in Ropar experienced musculoskeletal discomfort (MSDs), with 42.6% experiencing back discomfort. The highest prevalence was found in the 46-50 age group (97.1%), followed by the 41-45 age group (76.2%). The most common risk factor was repeatedly opening the gate, attributed to their job nature [16]. Hence the study results concluded that the prevalence of work-related musculoskeletal disorders is high among security guards.

Cross-sectional research was conducted in Taiwan to assess the degree of job capacity and quality of life (QOL) in 165 individuals suffering from work-related musculoskeletal diseases (WMSDs). The results reveal that overall QOL, with demographic characteristics, pain, psychological distress, and social support controlled, the model was significant ($F = 28.739$, $p < 0.001$; adjusted $R2 = 0.580$). Workability showed a substantially positive relationship with overall QOL ($\beta = 0.21$, $p < 0.01$). Work ability was positively linked with the physical domain after controlling for variables ($F = 27.684$, $p < 0.001$; adjusted $R2 = 0.570$; $\beta = 0.29$, $p < 0.001$). Work capacity was shown to be positively linked with the psychological domain after controlling for variables ($F = 16.927$, $p < 0.001$; adjusted $R2 = 0.442$; $\beta = 0.24$, $p < 0.01$). After controlling for variables ($F = 9.218$, $p < 0.001$; adjusted $R2 = 0.290$), there was no significant connection between workability and the social domain ($\beta = 0.08$, $p > 0.05$). After controlling for variables ($F = 8.174$, $p < 0.001$; adjusted $R2 = 0.263$), workability had no significant association with the environmental domain [21].

The study reports that barriers to more effective workplace management of MSD risk include the following: the widespread belief that risk arises largely or entirely from physical hazard exposures; regulatory and guidance documents targeting MSDs, most of which reflect this belief; risk assessment tools that focus narrowly on subsets of mainly physical hazards but generate outputs in the form of MSD risk indicators; and the conventional occupational health and safety (OHS) risk management paradigm, which is ill-suited to manage MSD risk. It is argued that improved workplace management of MSD risk necessitates a systems-based management framework as well as more holistic risk assessment and control procedures that address risk from all types of hazards simultaneously rather than separately, and that encourage worker participation. To comply with these regulations, new MSD risk management tools are required. Furthermore, effective implementation of such reforms is likely to necessitate considerable reorganisation of workplace duties for MSD risk management. Line managers and supervisors frequently play major roles in producing risks, both physical and psychosocial, thus they, along with OHS professionals and workers, must be more actively involved in normal risk assessment and management processes [20].

A study in Sweden found that patients with high work-related stress were more likely to seek care for mental symptoms, sleep disturbance, and fatigue. The risk of sick leave with a mental diagnosis was higher among those with high stress, but no association was found for musculoskeletal diagnoses. Seeking care for mental symptoms, sleep disturbance, and fatigue was associated with future sick leave [22]. A cross-sectional study examined the prevalence of WMSDs and exhaustion

among 2962 petrol station personnel aged 17-75, with 55.47% being female. The study found a 73.23% prevalence of WMSDs in the previous 12 months, with the highest prevalence in the neck, shoulders, ankles, and feet. Additionally, a link was found between fatigue, stress, and WMSDs. Fatigue and job role were the biggest predictors of WMSDs, with ORs ranging from 2.211 to 3.413 [23].

Limitations

The researcher was unable to generalise the study findings due to the small sample size of 130 security guards. The study only included security guards who worked in SMCH. Another constraint is the choice of Tiruvallur location for data collecting. Only security guards' cognitive and clinical data were considered. Due to a lack of literature, the current study has just a few supportive studies on the Indian population.

Conclusion

This study highlights the serious problem of work-related musculoskeletal disorders (WRMSDs) among security guards. Our research has shown that WRMSDs are a common concern in this industry, with a considerable percentage of security guards suffering from these incapacitating diseases. They are at a higher risk because of the nature of their employment, which frequently entails standing for extended periods, exercise, and repetitive duties. For this occupational health concern to be effectively addressed, it is crucial to comprehend the elements that contribute to WRMSDs. Our results underline how crucial it is to make security guard work settings more ergonomic, as well as to develop specialized training programs and other interventions to lower the risk of WRMSDs. Early detection and intervention are equally important to halt the progression of these illnesses and their effects on security guards' capacity to perform their jobs. Identifying appropriate strategies to prevent and decrease work-related musculoskeletal disorders. To improve security guards' health-seeking behaviour and coping techniques, adequate sensitization on health-seeking behaviour and coping strategies should be performed through seminars and workshops.

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Authors Contribution

Sridevi. B developed the study concept and design, Rishi, Roja and Collected the clinical data, statistical analysis and interpretation of data, Sridevi. B study supervision, critical revision of the manuscript for the intellectual content and drafting of the manuscript. All authors read and approved the final manuscript.

Conflict of Interest

The authors declare no conflict of interest.

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The authors for the current project have no financial investment are not investors in any of the health sectors related to the project and have not received any consultation payments. They did not have any patents linked to the project.

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