Musculoskeletal Disorders and their Influence on Job Performance in Security Guards of a Company in Quito 2024.

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KEYWORDS	ABSTRACT
Musculoskeletal Disorders; Job Performance; Ergonomics; Cornell Questionnaire; Individual Work Performance Questionnaire.	Musculoskeletal disorders (MSD) are a major concern in the work environment because of their considerable impact on both workers' health and productivity. This study aims to analyze how MSD affect the work performance of security guards. For this, a sample of 66 male security guards aged 19-65 was used. Participants were evaluated using two instruments: the Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) and the Individual Work Performance Questionnaire (IWPQ), in order to explore the relationship between the presence of MSD and performance at work. The Chi-square and Odds Ratio tests were used for statistical analysis. The results revealed that the areas most affected by SMT were the neck, lower back and feet, with a significant relationship between SMT and negative work behavior (p = 0.019; OR 4.2), suggesting that workers with MSD are considerably more likely to exhibit negative behaviour at work such as low motivation or conflicting attitudes. In conclusion, although MSEs affect mainly key areas of the security guard corps, their direct impact on task performance and contextual performance is limited, however, significantly affects behaviour or attitudes that negatively affect performance, environment and productivity within the work environment. .

INTRODUCTION

Musculoskeletal disorders (MSDs) are a major concern in the workplace due to their high incidence and the impact they have on both employees' health and their productive capacity. Balderas (2019) mentions that these problems encompass various body structures, including muscles, joints, tendons, ligaments, nerves, bones, and the circulatory system, and are usually caused or aggravated by repetitive movements or prolonged postures.

Symptoms of MSDs range from mild discomfort and pain associated with inflammation, muscle weakness, or loss of strength, to a marked decrease in the functionality of the affected areas. These conditions not only affect the physical health of workers, but also have a direct impact on their productivity, which can lead to disability (Pincay, 2021).

The World Health Organization (WHO) highlights the existence of more than 150 conditions that impact the locomotor system, ranging from acute injuries to chronic diseases, many of which can lead to permanent disabilities (WHO, 2021). becoming a public health problem of great relevance and high costs worldwide, causing diseases, temporary or permanent disabilities, and even early retirement from the workplace (Ramírez, 2017).

According to a joint report by the WHO and the International Labour Organization (ILO), in 2016 work-related diseases and injuries caused approximately 1.9 million deaths worldwide, reflecting the severity and extent of this problem (WHO & ILO, 2021). Globally, it is estimated that about 1710 million people experience some type of MSD, a situation that affects individuals of all ages and contexts, evidencing the need for effective strategies for the prevention and management of these conditions (Cieza, 2020).

Job performance is defined as the set of actions or behaviors that employees demonstrate and that contribute to the achievement of institutional objectives, such actions can be evaluated according to the specific competencies and capabilities that each employee contributes to the fulfillment of their functions, highlighting the importance of preserving musculoskeletal health to maintain productivity and quality in professional performance Romero (2019).

Based on the background described above, the objective of this study is to determine the influence of musculoskeletal disorders on the work performance of security guards of an Ecuadorian company, in the year 2024, which will serve to improve working conditions and increase their performance at work.

METHODOLOGY

The present study is framed in a quantitative, descriptive, cross-sectional, correlational research design.

The study population was composed of 66 security guards who work at the Quitumbe land terminal in the city of Quito, due to the size of the population, it was decided to include all the workers in the study, thus avoiding the need to apply sampling techniques and ensuring the representativeness of the results. those who met the inclusion criteria.

For the selection of participants, the following selection criteria were used:

Inclusion criteria: Security guards who are working for a period of more than 3 months in the project with a contract registered with the Ministry of Labor. Guards who have decided to voluntarily participate in the research project.

Exclusion criteria: Personnel who fill out the questionnaire incorrectly and Guards who have not signed the informed consent. Personnel who are on vacation or who were on medical rest during the time of the study.

For data collection, the Cornell Musculoskeletel Disconfor Questionnaires CMDQ was used, being a validated tool that allows evaluating the impact of musculoskeletal pain in three main dimensions: frequency, intensity and the interference of pain in work performance, considering nine anatomical regions: neck, shoulders, upper and lower back, arms and elbows. wrists and hands, hips and thighs, knees, and legs and feet. The CMDQ score combines three elements: frequency, level of discomfort, and degree of interference with daily activities. The frequency is classified into five levels with weighted values: never (0), 1-2 times per week (1.5), 3-4 times per week (3.5), every day (5), and several times a day (10). The level of discomfort and interference are assessed in a similar way, allowing a total score to be obtained to identify critical areas affected by pain (Hedge, et al. 1999).

Work performance was assessed using the Individual Work Performance Questionnaire (IPWQ), an instrument widely recognized for its ability to measure work performance in three

key dimensions: task performance, contextual performance, and counterproductive behaviors (Santalla, 2022). This questionnaire consists of 18 items that offer an accurate and self-reported assessment, which allows for a comprehensive analysis of the performance of employees in their respective job functions.

Data collection was carried out through a self-administered questionnaire, prior to which an awareness phase was carried out aimed at highlighting the importance of providing truthful answers, during this stage, detailed explanations were provided about the meaning of each item and the instructions to respond, with the aim of minimizing bias and ensuring that the answers faithfully reflected the perceptions of the participants about the factors of psychosocial risk.

The data obtained were recorded in a structured database, using Microsoft Excel to guarantee the initial organization of the information; subsequently, they were processed using the SPSS statistical software (version 26), using absolute and relative frequencies and the use of several statistical tests, such as the Chi² test, with a significance level of $p < 0.05$ as a significance level. Regarding bioethical aspects, the study strictly adhered to the principles established in the Declaration of Helsinki (Vera, 2016), ensuring the protection of the rights, dignity and well-being of the participants. All workers signed an informed consent prior to their participation, guaranteeing confidentiality, anonymity and the possibility of withdrawing from the study at any time without repercussions, complying with international research standards and fostering the confidence of the participants in the process.

RESULTS

The study was conducted on 66 security guards, who met the inclusion criteria, male, in the range of 19 to 65 years, with a mean age of 31.5 years SD ± 11.4 years, with a height in the range of 1.55 to 1.87 meters, with an average of 1.70 SD ± 0.06 meters; weight between 58.6 and 122 kilograms, with an average weight of 76.6 SD ± 10.2 kg; with a mean seniority of 2.08 SD ± 1.97 years and with an average experience of 1.17 SD ± 0.95 (Table 1).

Board 1 General data of security guards, Quito, 2024.

Item	Age	Height in meters	weight in Kg	IMC	Age in years	Experience in years
Stocking	31.5	1.70	76.6	26.7	2.08	1.17
Standard deviation	11.4	0.0608	10.2	3.66	1.97	0.954
Minimal	19	1.55	58.6	20.4	1.00	1
Maximum	65	1.87	122	42.1	11.0	7

n = 66

Table 2 shows that the areas most affected by musculoskeletal disorders (MSDs) in security guards are the neck, lower back and left foot, with 24% of cases each, while the upper back does not present any cases (0%), the upper extremities show greater risk in the right wrist (9%) and the left arm (8%). while in the lower ones, the knees (12%) and the right foot (18%) stand out, with the left foot being more vulnerable (24%); These differences could be related to prolonged standing postures, repetitive movements and possible asymmetries in physical load. Globally, 26% of guards suffer from MSDs, evidencing the need to implement preventive strategies focused on the most affected areas.

Table 2 Musculoskeletal Disorders in Security Guards, Quito, 2024

BODY PART	WITH TME		SIN TME	
	F	%	F	%
Neck	16	24%	50	76%
Right shoulder	5	8%	61	92%
Left shoulder	1	2%	65	98%
Upper Back	0	0%	66	100%
Right arm	2	3%	64	97%
Left arm	5	8%	61	92%
Lower Back	16	24%	50	76%
Right forearm	2	3%	64	97%
Left Forearm	2	3%	64	97%
Right wrist	6	9%	60	91%
Left wrist	5	8%	61	92%
Hips/buttocks	5	8%	61	92%
Right thigh	3	5%	63	95%
Left thigh	3	5%	63	95%
Right knee	8	12%	58	88%
Left knee	8	12%	58	88%
Right calf	5	8%	61	92%
Left calf	5	8%	61	92%
Right foot	12	18%	54	82%
Left foot	16	24%	50	76%
GLOBAL ASSESSMENT				
GLOBAL IMPACT	17	26%	49	74%

Note: **TME:** Musculoskeletal disorders.

In relation to work performance, in the dimension of performance in the task, 91% of the workers have a high performance; In contextual performance, a more balanced distribution is observed, with 54% in high performance and 46% in moderate performance, while in counterproductive work behavior, which reflects behaviors that could negatively affect the work environment, 77% of employees present a low level of counterproductive behavior, while 11% are in each of the moderate and high levels. In the global assessment, 75% of workers have a high performance, with 25% in moderate performance, and no workers with low performance, which highlights an efficient and productive work environment, although specific areas for improvement are identified (Table 3)

Board 2 Work Performance

DIMENSIONS	Low performance		High performance	
	f	%	f	%
Dimension 1. Performance on task	6	9%	60	91%
Dimension 2. Contextual performance	10	15%	56	85%
Dimension 3. Counterproductive work conduct	14	21%	52	79%
GLOBAL ASSESSMENT				
TOTAL PERFORMANCE	42	64%	24	36%

Table 4 shows that MSDs do not have a statistically significant association with task performance ($p = 0.656$), contextual performance ($p = 0.651$) or total performance ($p = 0.489$), according to Chi² values and Odds Ratio (OR) confidence intervals. However, in the dimension of counterproductive work behavior, there is a significant relationship $(p = 0.019)$, with an OR of 4.2, which indicates that guards with MSDs have more than 4 times the probability of presenting counterproductive work behaviors compared to those without MSDs; which evidences the need to address MSDs not only because of their physical impact, but also because of their physical impact. but also because of its influence on negative work behaviors.

Board 3 Relation of Musculoskeletal Disorders in the Work Performance of Security Guards, Quito, 2024

High performance/low performance	With MSD / Without MSD			
	Chi²	p-value	Odds Ratio (OR)	OR 95% CI
Dimension 1. Performance on task	0,198	0,656	0.667	[0,111, 4,01]
Dimension 2. Contextual performance	0,204	0,651	1,46	[0,279, 7,69]
Dimension 3. Counterproductive work conduct	5,46	0,019	4,2	[1,20, 14,7]
GLOBAL ASSESSMENT				
TOTAL PERFORMANCE	0,478	0,489	1,52	[0,162, 5,0]

DISCUSSION

The population consisted of 66 male security guards, with an average age of 31.5 years and a body mass index (BMI) of 26.7, suggesting a predominantly young population, but with a significant prevalence of overweight; a factor that could contribute to the appearance of MSDs, because they increase the mechanical load on the joints that support a large part of the body weight, as reported by Karande et al. (2015), where 68% of the guards presented musculoskeletal discomfort, finding a positive correlation between BMI and the prevalence of musculoskeletal disorders.

Regarding MSDs, the most affected areas were the neck, lower back and feet, according to the study by Karande et al. (2015), in 90 security guards of the Krishna Hospital, Karad - India, where it is observed that 96.6% presented some type of musculoskeletal disorder, with pain in the lumbar area being the most prevalent. affecting 42.6% of the participants; Similarly, the study conducted by Bhandare et al. (2020) on the prevalence of low back pain in 130 security guards in Aurangabad – India, found a prevalence of 48%, where most guards experienced pain in the lumbar region due to the physical demands of the task, particularly prolonged standing postures. Similarly, in the study by Kaur et al. (2025), carried out on 100 security guards at the Guru Gobind Singh superthermal plant, Ropar, Punjab, India, 68% had complained of MSDs, of which 42.6% had back pain.   In the study by Muntaha et al. (2018), 48.5% of security guards at the Universities of Lahore – Pakistan presented pain in the upper body, with a predominance of shoulder and neck pain, which highlights the prevalence of musculoskeletal pain in various parts of the body due to repetitive tasks and static postures.

Regarding work performance, although the dimensions of task performance and contextual performance did not show a significant relationship with MSDs, the impact on counterproductive work behavior was statistically relevant (p = 0.019, OR = 4.2), these results coincide with the study by Sridevi et al. (2020), where it was established that, when MSDs become chronic, They can lead to stress, emotional discomfort, and consequently affect the general attitude towards work and work interactions.

In the present study, critical body areas, such as the lower back, neck, and feet, presented a high prevalence of discomfort, despite not finding a significant association between MSDs and task performance or contextual performance, suggesting that factors such as the relative youth of the population studied and their limited work experience could moderate the effects of MSDs on their overall performance; However, these results underscore the need to implement prevention and ergonomics strategies that address the most vulnerable body areas, as well as programs that reduce the impact of physical pain on work behavior.

CONCLUSION

The areas most affected by MSDs in security guards are the neck, lower back, and feet; despite the prevalence of MSDs, no significant relationship was found with task performance or contextual performance, suggesting that guards maintain adequate performance in these areas. A significant association was observed between MSDs and counterproductive work behaviors (*p=0.019, OR=4.2), indicating that musculoskeletal disorders can negatively affect work behavior; these results show the need to implement preventive measures and ergonomics programs to mitigate the impact of MSDs, considering both their physical and psychological effect on the work environment.*

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