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FACTORS ASSOCIATED WITH MUSCULOSKELETAL DISORDERS IN CLEANING WORKERS OF THE EMERGENCY UNIT OF A TERTIARY HOSPITAL

FACTORES ASOCIADOS A TRASTORNOS MUSCULOESQUELÉTICOS EN TRABAJADORES DE LIMPIEZA DEL SERVICIO DE EMERGENCIA DE UN HOSPITAL TERCIARIO

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ABSTRACT

Introduction: Musculoskeletal disorders are health problems that can lead to disability. **Objective:** To determine the factors associated with the presence of musculoskeletal disorders in cleaning workers of the emergency unit of Hospital Nacional Edgardo Rebagliati Martins, 2019. **Methods:** Descriptive, observational, retrospective cross-sectional with a quantitative approach. The survey technique was used and the instrument used was the Standard Nordic Questionnaire. Descriptive and inferential statistics were applied. **Results:** 129 participants, female (82.95%). The median age was 43 years, height 1.55m, overweight or obese (57.37%), completed secondary or higher education (93.80%), from the interior of the country (37.21%), and from Lima. They lived in Lima for 32 years, the median working time was 18 months, 43.41% worked in the morning and 9.30% worked in more than one place. They presented musculoskeletal pain 93.02%, pain in more than one area 75.97%, lumbar pain 65.12%, back pain 47.29%, neck pain (37.21%), and elbow/forearm pain 13, 18%. Only in the bivariate analysis, the working time was significant for the presence of pain (P = 0.009). **Conclusion:** After performing the adjusted analysis, no factors associated with musculoskeletal disorders were found.

Key words: Musculoskeletal physiological phenomena; Musculoskeletal pain; Low back pain; Surveillance of the workers health (source: MeSH NLM).

RESUMEN

Introducción: Los trastornos musculoesqueléticos son problemas de salud que pueden llevar a la incapacidad. **Objetivo:** Determinar los factores asociados a la presencia de trastornos musculoesqueléticos en trabajadores de limpieza del servicio de emergencia del hospital Nacional Edgardo Rebagliati Martins, año 2019. **Métodos:** Descriptivo, observacional, transversal retrospectivo con enfoque cuantitativo. Se utilizó la técnica de la encuesta y el instrumento fue el Cuestionario Nórdico Estandarizado. Se aplicó estadística descriptiva e inferencial. **Resultados:** 129 participantes, de sexo femenino (82,95%); mediana de edad 43 años, talla 1,55m, con sobrepeso u obesidad (57,37%), estudios secundarios o superiores (93,80%), procedencia del interior del país (37,21 %) y de Lima; radicaban en Lima 32 años, la mediana de tiempo de trabajo fue18 meses, 43,41% trabajaban en la mañana y 9,30% laboraban en más de un lugar. Presentaron dolor musculoesquelético 93,02%, dolor en más de una zona 75,97%, dolor lumbar 65,12%, dolor dorsal 47,29%, dolor en cuello (37,21%) y dolor en codo/antebrazo 13,18%. Sólo en el análisis bivariado, el tiempo de trabajo fue significativo para presencia dolor (P= 0,009). **Conclusión:** Tras realizar el análisis ajustado, no se encontraron factores asociados a los trastornos musculoesqueleticos.

Palabras clave: Fenómenos fisiológicos musculoesqueléticos; Dolor musculoesquelético; Dolor de la región lumbar; Vigilancia de la salud del trabajador (fuente: DeCS BIREME).

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INTRODUCTION

According to the World Health Organization (WHO) and the International Labour Organization (ILO), "occupational health is the science of anticipating, recognizing and evaluating harmful risks in the workplace, as well as developing strategies for prevention and control, with the aim of protecting and promoting the health and well-being of workers. At the same time safeguarding the community and the environment in general"[1].

There is a latency period between the onset of symptoms caused by the activity performed by the worker and the diagnosis of the occupational disease, which remains silent and only becomes evident with the passage of months or years. The burden of personal illness or the inadequate habits of the worker in his work area not only contribute, but also make it more difficult to link the illness to a specific type of work.

According to ILO estimates, "Every day people die from work-related accidents or illnesses more than 2.78 million deaths per year. In addition, some 374 million Nonfatal work-related injuries occur annually, resulting in more than 4 days of absenteeism. The cost of this daily adversity is enormous and the economic burden of poor safety and safety practices is estimated at 3.94 percent of the global Gross Domestic Product each year "(two).

In Latin America and Peru, the magnitude of occupational diseases is still unknown. The ILO estimates that, in developing countries, the annual cost of occupational accidents and diseases is between 2% and 11% of the Gross Domestic Product (GDP)[3].

In the most developed countries "occupational health is considered a fundamental pillar in the development of a country, is a strategy to fight poverty. Its actions are aimed at promoting and protecting workers' health and preventing occupational accidents and diseases caused by working conditions and occupational risks in various economic activities"[3].

On the other hand, the effects of chemical products or new technologies determine new risks that only become evident over time. They obviously represent potential and real problems for both the workers and the team that has to deal with them, also having relevance to the risks they represent for the environment[4].

Cleaning workers more frequently suffer from pathologies such as musculoskeletal disorders, the main symptom of which is localized osteoarticular and muscular pain. Although on many occasions they may have a non-work-related origin, they may even be due to personal factors. It is the working conditions that usually trigger a large number of them, mainly those related to forced postures, repetitive movements, efforts, manual handling of loads, and others such as cold, heat, stress, etc.[5].

The study is aimed at expanding the incipient scientific knowledge produced by Peruvian medicine in this area in order to favor changes in work practices, especially in the prevention of musculoskeletal injuries, by implementing continuous improvement programs.

The purpose of this study is to determine the factors associated with the presence of musculoskeletal disorders in cleaning workers of the emergency unit of the Edgardo Rebagliati Martins National Hospital, 2019.

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METHODS

Design and setting

Descriptive, observational, retrospective cross-sectional with a quantitative approach. It was performed in the adult emergency unit of the Hospital Nacional Edgardo Rebagliati Martins (HNERM - EsSalud, during the months of May to July of 2019.

Population and sample

The population consisted of 141 cleaning workers from the adult emergency unit of HNERM and the sample by 129 workers since 4 cleaning workers resigned and 8 were on vacation at the time of the study.

Variables and instruments

Independent variables were considered: age, gender, marital status, place of origin, place of provenance, time living in Lima, level of education, currently studying, nutritional status, medical-surgical background, time at work, work shift, hours per shift, extra work and as a dependent variable musculoskeletal pain.

The survey technique was used in the study and the instrument was the Standard Nordic Questionnaire (SNQ)[6], a version translated into Spanish and validated with consistency and reliability coefficients, 0.727 and 0.816, the validity of the instrument was performed by calculating the coefficient from Kuder Richardson[7].

The SNQ detects musculoskeletal symptoms in the last 12 months up to 07 days prior to the survey

application, such as pain, discomfort, numbness, etc. It has two parts, one that identifies the areas of the body where the symptoms appear and using a body figure to locate the anatomical sites, and the second part identifies the functional impact of the mentioned symptoms and the evaluation that the patient may have received. The SNQ was adapted to the objectives of the present study, because of its validity, reliability, and its nationally and internationally use in various investigations.

Procedures

After information on the research work and signing of the informed consent form, a validated and anonymous survey was used by the cleaning personnel of the adult emergency unit, the time of application of the survey was 15 minutes for each worker.

Statistical analysis

The data was processed according to the SPSS 23.0 package. For the univariate analysis, the frequencies and percentages of the qualitative variables were calculated. For the bivariate analysis, the chi-square was estimated, Odds Ratio (OR) were calculated with their respective confidence interval as a measure of association, Fisher's exact test, and Mann Whitney U test was also calculated. A significance level of 95% was used; Likewise, the multivariate analysis was performed with logistic regression.

Ethical aspects

This research has the authorization of the head of the adult emergency unit of HNERM-EsSalud; In addition, the cleaning workers who participated in the survey signed the informed consent form, their dignity, integrity, privacy, and confidentiality were preserved by protecting the personal data of the patients (Declaration of Helsinki)[8].

RESULTS

In the sample of 129 cleaning workers, predominated by women (82.95%), the median age was 43 years (RIC = 15 years) and height 1.55m (RIC = 0.09m), more than half were overweight or obese (57.37%), most had completed secondary or higher education (93.80%), living in Lima on average 32 years (RIC = 24 years), more than 1/3 of workers originated from areas outside of Lima (37.21%) and came from the districts of San Juan de Lurigancho, San Martín de Porres and Comas (34.12%).

Regarding the workplace, the participants had a median of 18 months (RIC = 27 months) of seniority in their work, worked in the morning shift (43.41%), 8 hours per shift (96.90%) and only 9.30% reported working in more than one place (Table 1).

Table 1. Sociodemographic and labor variables of cleaning workers, adult emergency unit-HNERM, 2019.

Sociodemographic and health variables	n	%
Gender		
Female	107	82.9
Male	22	17.1
Age (years) *	43 (15)	
Marital status		
Single	57	44.2
Married	56	43.4
Divorced	10	7.8
Widower	6	4.7
Size (meters) *	1.55 (0.09)	
Nutritional status		
Low weight	2	1.6
Normal weight	53	41.1
Overweight	52	40.3

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Obesity 1	19	14.7
Obesity 2	2	1.6
Obesity 3	1	0.8
Degree of instruction		
Primary	8	6.2
Secondary	93	72.1
Technical superior	19	14.7
University superior	9	6.9
Currently studying		
Yes	29	22.5
No	100	77.5
Place of origin		
Lima	77	59.7
Iquitos	8	6.2
Lambayeque	6	4.7
San Martin	5	3.8
Ayacucho	4	3.1
Callao	4	3.1
Others	25	19.4
Place of provenance		
San Juan de Lurigancho	17	13.2
San Martin de Porres	14	10.8
Comas	13	10.1
Los Olivos	11	8.5
Cercado de Lima	10	7.8
Others	64	49.6
Time spent in Lima (years) *	32 (24)	
Medical/surgical history		
Yes	30	23.3
no	99	76.7
Work variables		
Time at work (months) *	18 (27)	
Work shift		
Day	56	43.4
Afternoon	45	34.9
Night	28	21.7
Hours per shift		
8 hours	125	96.9
12 hours	4	3.1
Extra work		
Yes	12	9.3
No	117	90.7

* Median interquartile range (RIC).

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93.02% of the interviewees presented musculoskeletal pain of some kind, the majority (75.9%) presented pain in more than one area, mainly lumbar pain (65.1%), dorsal back pain (47.3%) and neck pain (37.2%). On the other hand, the least reported pain was that of the elbow/forearm (13.2%) (Table 2).

Table 2. Musculoskeletal pain in cleaning workers, adult emergency unit-HNERM, 2019.

Musculoskeletal pain	n	%
Present pain		
Yes	120	93.1
No	9	6.9
Number of painful areas		
None	9	6.1
One	22	17.5
More than one	98	75.9
Neck pain		
Yes	48	37.2
No	81	62.8
Shoulder Pain		
Right Shoulder	17	13.2
Left Shoulder	15	11.6
Both shoulders	12	9.3
No pain	85	65.9
Pain from back (dorsal)		
Yes	61	47.3
No	68	52.7
Lumbar pain		
Yes	84	65.1
No	45	34.9
Pain in elbow / forearm		
Elbow / right forearm	9	6.9
Elbow / left forearm	5	3.9
Both elbows / forearms	3	2.3
No pain	112	86.8
Wrist / hand pain		
Right wrist hand	24	18.6
Left wrist hand	7	5.4
Both wrists / hands	12	9.3
No pain	86	66.7
Hip / leg pain		
Right hip / leg	19	14.7
Left hip / leg	9	6.9
Both hips / legs	4	3.1
No pain	97	75.3
Knee pain		
Right Knee	21	16.3
Left knee	10	7.7
Both knees	12	9.3
No pain	86	66.7
Ankle/foot painankle / footankle / foot		
Right ankle/ foot	12	9.3
Left ankle/ foot	8	6.2
Both ankles / feet	15	11.6
No pain	94	72.9

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By analyzing the factors associated with the presence of pain, in the bivariate analysis, we found statistical significance only for the variable time at work (p=0.009) (Table 3); however, when performing the multivariate analysis, with the logistic regression method, between the dependent variable, musculoskeletal pain and the independent variables work time, age and nutritional status, we found no association, see Table 4.

Table 3. Bivariate analysis of factors associated with musculoskeletal pain in cleaning workers, adult emergency unit-HNERM, 2019.

Associated factors		Musculoskeletal pain				p*	OR	IC OR	
		Present		Absent				LI	LS
		n	%	n	%				
Gender	Female	101	94.4	6	5.6	0.181	2.66	0.51	4.61
	Male	19	86.4	3	13.6				
Marital status	Married	53	94.6	3	5.4	0.887	1.58	0.43	3.48
	Single / widowed / divorced	67	91.8	6	8.2				
Studying	Yes	26	89.7	3	10.3	0.42	0.55	0.26	2.27
	No	94	94.0	6	6.0				
Nutritional status	Low weight / normal weight	49	88.9	6	11.1	0.17	0.35	0.22	1.77
	Overweight / obesity	71	96.0	3	4.0				
Work shift	Morning	52	92.9	4	7.1	1.00	0.96	0.38	2.53
	Afternoon / night	68	93.2	5	6.8				
Place of origin	San Juan de Lurigancho / San Martin de Porres	29	93.5	2	6.5	1.000	1.12	0.22	5.67
	Other Districts	91	92.9	7	7.1				
Place of providence	Lima / Callao	74	91.4	7	8.6	0.483	0.46	0.09	2.31
	Other regions of the country	46	95.8	2	4.2				
Medical history	Yes	29	96.7	1	3.3	0.68	2.55	0.15	14.89
	No	91	91.9	8	8.1				
Level of education	Primary / Secondary level	93	92.1	8	7.9	0.683	0.43	0.05	3.60
	Superior	27	96.4	1	3.6				
Extra work	Yes	11	91.7	1	8.3	0.597	0.81	0.09	7.07
	No	109	93.2	8	6.8				
Age†		-	-	-		0.094	-	-	-
Time at work †		-	-	-		0.009	-	-	-
Time living in Lima †		-	-	-		0.382	-	-	-

* Test exacto de Fisher / † Prueba de U de Mann Whitney.

Table 4. Multivariate analysis of factors associated with musculoskeletal pain in cleaning workers, adult emergency unit-HNERM, 2019.

Variables	OR adjusted	Confidence interval 95%		p-value
		LI	LS	
Work time	0.93	0.85	1.02	0.114
Age	0.98	0.91	1.05	0.497
Nutritional status	2.21	0.50	9.68	0.295

* Adjusted for age and gender.

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DISCUSSION

The work of the cleaning staff involves the performance of changes in posture, rapid and abrupt movements of flexion, the use of excessive force in the upper extremities, especially in the arms and hands, lower back, etc. Sometimes posture adoption becomes permanent. The aforementioned personnel works for long periods of time using incorrect postures, handling brooms, mops, pulling heavy material, pushing waste transport carts, etc. The use of repetitive movements and the adoption of various postures may imply a risk for musculoskeletal disorders[4,6,9].

82.9% of female cleaning workers express the tendency towards occupational segregation that has been oriented towards both men and women, having an important cultural component. Thus, cleaning work has traditionally been directed at women. Socioeconomic and cultural factors, as well as gender stereotypes, have affected occupational segregation, which is the underlying reason for so many gender inequalities[10].

In 2004, in the "Guide for the improvement of working conditions", it is mentioned that despite the fact that our society has made progress in the rights of women, there is still a differentiation of gender roles (women are expected to be caregivers unlike men) and a situation of preponderance and social power for men. It should also be noted that women have entered the labor market without substantial changes in how and who performs domestic work; This social reality also determines the conditions of wage and health work and causes the appearance of risks that mainly affect women[11].

The average height was 1.55m and 57.37% were overweight or obese. In a study that related body mass index (BMI) and musculoskeletal disorders, they found overweight in the cleaning staff of a Police Health Hospital, being the spine the most affected when carrying out its activities, in addition to the higher BMI, the greater incidence of musculoskeletal disorders[12]. In another study in relation to BMI and waist circumference, they found that "11.4% of the surveyed population was not suitable for moderate physical activity" and that 26.6% of respondents had an increased BMI[13]. Contrary to this association, it was reported in a systematic review of 65 epidemiological studies where only 32% of these obtained a positive association between lumbar pain and obesity[14].

Weight, height, and body mass index have been identified by different studies as potential risks of musculoskeletal disorders, especially for carpal tunnel syndrome and lumbar herniated disc. The increase in body weight and musculoskeletal disorders are related since they would cause prolonged microtrauma to the muscles, tendons, and joints of the musculoskeletal system, especially those that bear the greatest load. In relation to the lumbar herniation disc, a relationship of the disease was found with weight and height; some studies have observed that taller people have greater back pain[13].

It should be noted that despite being considered a job that does not require much preparation and studies, most with 93.7% of the respondents have a complete secondary education and even higher. No association was found with musculoskeletal symptoms. In another study, it was evidenced that there was no significant statistical association between the level of education and the presence of symptoms in a construction company; the highest prevalence of symptoms was observed in workers who reported primary education. It is thought that individuals with a low level of education and little training access to low-skilled jobs where there are various and greater occupational risk factors, which favor the appearance of musculoskeletal pathologies[15].

93.10% reported musculoskeletal pain of some kind, the majority (75.94%) in more than one area, mainly low back pain (65.12%), back pain (47.29%) and neck pain (37.21%). The type of work has ergonomic risks such as posture, strength, and movement, which would contribute to the presumption that all musculoskeletal disorders have their biomechanical origin[13,16,17]. The longer the exposure time, the greater the symptoms expected, such as those found in the study, which, however, adjusted for age and time, did not show significance.

37.21% of the respondents manifested neck pain, is the third most reported body region with pain. Various jobs often find neck pain[4], because cleaning work is prone to maintain the body in postures that force and keep in tension the body structure thus producing musculoskeletal injuries over time[18].

Lumbar pain was the most commonly reported painful symptom. Crespo[19] refers that there are work factors that predispose to the presence of low back pain in workers, such as the non-application of work breaks, ignorance of the elements of personal protection, and poor postures in job performance. Regarding the latter, it was reported that 76% of the population does not lift objects to chest height, 52% do not keep their backs straight when lifting a load, and 54% state

that they do not flex their legs to lift a weight. A great influence of the body mass index was found with respect to low back pain since 71% of the overweight and 60% obese cleaning staff presented moderate or severe low back pain. Proper ergonomics, not only in the workday but in the activities of daily life, can prevent pathologies such as herniated disc[20].

In a study of cleaning workers in Taiwan with musculoskeletal symptoms, they were found to experience various types of psychosocial stress, and time pressure was found to be a risk factor associated with discomfort in various parts of the body[21].

Symptoms in upper limbs occur when handling cleaning tools, because with their manipulation a great number of flexions and extensions of arms and wrists occur, frequently the arms and shoulders are raised and force is used when sweeping, cleaning, and polishing, also in mop draining. Thus, symptoms of carpal tunnel syndrome, epicondylitis, and painful shoulder occur with significant frequency. The alternation of tasks and breaks are the most appropriate measures to prevent them. Among the limitations of the study is insufficient statistical power, due to the fact that the size of the study population was limited.

CONCLUSION

In conclusion, working time in years is a factor associated with musculoskeletal pain, however, adjusting for age and gender did not show statistical significance.

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