

Artículo de Investigación Científica o Tecnológica

Musculoskeletal symptoms in workers of a Colombian University in times of COVID-19

Síntomas musculoesqueléticos en trabajadores de una universidad colombiana en tiempos de COVID-19

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Abstract

Objective: To establish the factors associated with musculoskeletal symptoms in collaborators of a Colombian University in times of COVID-19.

Methods: Cross-sectional study, with 385 collaborators, the self-perception of musculoskeletal symptoms was investigated through an electronic survey.

Results: in teachers, 65.4% reported lumbar discomfort, and in administrative 65.6% discomfort in the wrist or hand. Statistically significant associations were found $p < 0.05$ between the work and having shoulder and lumbar discomfort. Playing sports was a protective factor for lumbar discomfort, flexibility was a protective factor for neck discomfort, and poor muscle strength was a risk factor for shoulder discomfort ($p < 0.05$).

Conclusion: there are protective and risk factors associated with musculoskeletal symptoms that have intensified in times of pandemic in university workers, such as office, sports, flexibility, and muscular strength, therefore, it is important to generate strategies to reinforce protective factors for better job performance.

Resumen

Objetivo: Establecer los factores asociados a síntomas musculoesqueléticos en colaboradores de una Universidad Colombiana en tiempos de COVID-19.

Métodos: Estudio transversal, en 385 colaboradores. Se indagó a través de una encuesta electrónica la auto percepción sobre la sintomatología musculoesquelética.

Resultados: El 65.4% de los docentes informaron molestia lumbar y en los administrativos el 65.6% molestia en muñeca o mano. Se encontraron asociaciones estadísticamente significativas entre el cargo y presentar molestia de hombro y molestia lumbar. Realizar deporte fue un factor protector para molestias lumbares, la flexibilidad factor protector para molestia de cuello y la mala fuerza muscular factor de riesgo para molestia de hombro ($p < 0.05$).

Conclusión: existen factores protectores y de riesgo asociados a la sintomatología músculo esquelética que se han intensificado en tiempos de pandemia en trabajadores universitarios, como el cargo, hacer deporte, flexibilidad y fuerza muscular. Es importante generar estrategias para reforzar los factores protectores para un mejor desempeño laboral.

Key words: Worker, musculoskeletal symptoms, injury, absenteeism, physical activity, lumbar pain, COVID.

Palabras clave: Trabajador, factores asociados, síntomas musculoesqueléticos, dolor lumbar, dolor hombro, actividad física, COVID.

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INTRODUCTION

Musculoskeletal disorders (MSD) have been defined by the International Labor Organization (ILO) as one of the most relevant health problems and with the highest incidence in the workplace. They are defined as an alteration of the musculoskeletal system that groups various symptoms which they range from mild and momentary discomfort to irreversible diseases that can lead to disability.¹ These represent a serious health problem in the working population, constituting the first cause of morbidity and disability, and are the most frequent occupational pathology reported in high-income countries, particularly disorders of the back, neck, and upper limbs.² The previous situation is also described in Latin America and the European Union this implies economic consequences for both the worker and the companies.³ According to the reports of the European Commission, MSDs are the cause of most absences from work, 50% of all absences of more than three days, and of cases of permanent incapacity to work 60%.⁴

Some studies conclude that a worker, on average, is absent about two days from work a year due to some type of musculoskeletal problem.⁵ These disorders manifest themselves in medical costs and lost time of more than \$ 12 million a year to the Employers' State Fund, and are said to be responsible for more than 70,000 lost workdays per year.¹ For administrative workers, the use of computers and technological elements is essential in their daily work, despite the absence of physical efforts that require the application of muscular force, studies have shown that the constant use of these tools by administrative workers generate negative consequences such as pain, degeneration in the structures, loss of mobility and muscle hypertrophy.⁶

The risk factors that are associated with musculoskeletal symptoms can be physical, psychosocial, and individual. Physical factors include repetitiveness, strength, and posture, sometimes associated with environmental factors such as vibration and cold; on the other hand, there are individual worker factors, such as their medical history, age, sex, and gender. Musculoskeletal symptoms occur 3-4 times higher in some sectors when compared with general population data.⁷

On musculoskeletal pain and its association with ergonomic risk factors, in Colombian administrative workers, it revealed that 57% presented pain symptoms. The most frequent musculoskeletal injuries being a pain in the area lower back, upper back and neck, and evidence that there is an association between exposure to biomechanics risk factors and the presence of musculoskeletal injuries, indicating that forced labor positions mean greater risk.⁸

The pandemic caused by the new coronavirus Sars-CoV-2 that causes the COVID-19 disease forced governments to declare measures of confinement, physical distancing, and restriction of outdoor activities, which brought with them psychological, social, and physical consequences in workers, the latter largely derived from the increase in physical inactivity, sedentary behaviors and the consumption of foods with high caloric intake, added to the incorporation of a new work modality mediated by teleworking through the use of ICT.⁹

Many Higher Education Institutions have adopted teleworking as a work alternative with a view to continuing the training process of students and mitigating the economic effects of the pandemic. However, although it has been configured as an opportunity for workers and students, it entails health risks from an ergonomic point of view, due to the need to spend long hours sitting in front of computer equipment, which long-term can trigger transient or permanent musculoskeletal disorders.¹⁰

The problem described suggests the importance of knowing the behavior of these events in specific populations of workers and thus contribute to the formulation of strategies for their prevention and interdisciplinary management, so the objective of this work is to establish the factors associated with symptoms musculoskeletal in collaborators of a Colombian University in times of COVID-19.

MATERIALS AND METHODS

Design and population

A descriptive cross-sectional study carried out in the Universidad Autónoma de Manizales in the city of Manizales, Caldas, Colombia.

The population consisted of 550 employees between 18 and 79

Table 1. Sociodemographic characteristics (n = 385).

Variables	Frequency	%
Gender	Men	167 43.4
	Women	218 56.6
Age	19-29	70 18.2
	30-39	118 30.6
	40-49	104 27.0
	50-59	75 19.5
	≥60	18 4.7
Marital Status	Married	156 40.5
	Separated	40 10.4
	Single	151 39.2
	Free Union	37 9.6
Education level	Widower	1 0.3
	Postgraduate	209 54.3
	Undergraduate	47 12.2
	Secondary	93 24.2
	Technical	10 2.6
Social class	Technologist	26 6.8
	Stratum 1	7 1.8
	Stratum 2	23 6.0
	Stratum 3	129 33.5
	Stratum 4	89 23.1
	Stratum 5	64 16.6
Position	Stratum 6	73 19.0
	Teacher	260 67.5
	Administrative	125 32.5

years old, who were asked to fill out a digital survey, the final sample of the study was made up of 385 people who completed the entire survey.

The inclusion criteria were being linked to the institution's payroll, age over 18 years, participating voluntarily, and filling out the informed consent.

Procedures and ethics

Once the project was approved by the research committee, the first step was to request authorization from the directors of the institution, upon obtaining the endorsement, the questionnaire was sent by institutional email to all collaborators, their permanence on the web was from March 25 to May 9, 2020.

The technique used was the electronic survey designed on the google form platform; for this, two questionnaires were considered, the International Fitness Scale Questionnaire (IFIS) developed in the study by Ortega *et al.* ¹¹, to assess the main health-related components of fitness easily, quickly, and economically. In Colombia, Español and Ramirez ¹² reported that the 5-item version of the IFIS is a questionnaire with high reliability (Cronbach's alpha > 0.80) and reproducibility (intra-class correlation coefficient between 0.90 and 0.96).

The instrument that assessed musculoskeletal symptoms were the Nordic questionnaire, ¹³ where the worker was questioned about the presence of discomfort or musculoskeletal pain in any part of the body during the last 6 months.

In the first part of the survey, sociodemographic and work variables were investigated and later it focused on healthy physical condition

and musculoskeletal symptoms according to the questionnaires.

According to resolution 08430 ¹⁴ of the Colombian Ministry of Health, the research was classified as safe, all the requirements established by the Declaration of Helsinki for human research were respected. ¹⁵ The project was approved by the institutional bioethics committee in minutes 096 of March 2020.

The information was analyzed in the SPSS version 26 program (licensed by the UAM). Univariate analysis was performed using absolute and relative frequency distributions and in the bivariate analysis the Ji^2 test was calculated and the calculation of the OR value with its respective confidence interval was used as a measure of association strength.

RESULTS

The mean age was 40.7 years +/-11.18 years, the highest percentage was between 30 and 49 years, 56.6% were women, the majority were married (40.5%) followed by single (39.2%), the highest percentage reported having postgraduate studies, 67.5% were teachers and 56.6% resided in socioeconomic strata 3 and 4 (Table 1).

The highest percentage of teachers and administrators reported feeling less discomfort in the elbow and forearm, teachers' greater lumbar discomfort (65.4%), and administrators more discomfort in the wrist or hand (65.6%). A statistically significant association $p < 0.05$ was found between the work and presenting shoulder and lumbar discomfort, finding an OR of less than 1 considered a protective factor (Table 2).

The 88.1% of the participants reported that they did a physical

Table 2. Comparison between musculoskeletal symptomatology and position.

Position	Yes	No	OR	Confidence interval (95%)		Ji^2	p value
				Inf	Sup		
Neck discomfort							
Teacher	154 (59.2%)	106 (40.8%)	1.142	0.742	1.757	0.362	0.547
Administrative	70 (56.0%)	55 (44.0%)					
Shoulder discomfort							
Teacher	136 (52.3%)	124 (47.7%)	0.568	0.368	0.878	6.544	0.011*
Administrative	48 (38.4%)	77 (61.6%)					
Lumbar discomfort							
Teacher	170 (65.4%)	90 (34.6%)	0.612	0.396	0.944	4.950	0.026*
Administrative	67 (61.6%)	58 (46.4%)					
Elbow and forearm discomfort							
Teacher	67 (25.8%)	193 (74.2%)	0.757	0.453	1.264	1.138	0.286
Administrative	26 (20.8%)	99 (79.2%)					
Wrist or hand discomfort							
Teacher	163 (62.7%)	97 (37.3%)	1.135	0.726	1.774	0.308	0.579
Administrative	82 (65.6%)	43 (34.4%)					

* Sig<0.05

Table 3. Comparison between musculoskeletal symptomatology and performance of sports

Physical Activity	Lumbar discomfort		OR	Confidence interval (95%)		Ji ²	P value
	Yes	No		Inf	Sup		
Yes	63 (51.6%)	174 (62.2%)	0.546	0.353	0.846	7.425	0.006
No	59 (33.8%)	89 (48.4%)					

* Sig<0.05

activity, 63.6% that they did physical exercise, and 31.7% sport. A statistically significant association $p < 0.05$ was found between the practice of sports and the reduction of lumbar discomfort. (Table 3).

With respect to healthy physical condition, this was rated as good by most of the participants, general physical condition was reported as good by 84.4%, cardiorespiratory physical condition was good by 84.1%, muscular strength was rated as good by 82.6%, speed-agility was reported as good by 85.7% and flexibility by 74%. A statistically significant association $p < 0.05$ was found between the flexibility component and neck discomfort, with an OR value of less than 1 considered a protective factor. Similarly, a statistically significant association $p < 0.05$ was found between having low muscle strength and shoulder discomfort, with an OR of 1.576, considered a risk factor, a situation that could be explained in times of pandemic by the long periods of inactivity and the increase in screen work and the use of the mouse. (Table 4). Men reported greater discomfort in the wrist or hand (64.1%), and women reported greater discomfort in the elbow and forearm. No statistically significant association was found between sex and musculoskeletal symptoms.

DISCUSSION

The results of the present study showed that posture type, sports practice, flexibility levels, and muscle strength were associated with musculoskeletal symptoms. Participants ranged in age from 19 to 79 years, with a mean of 40.7 +/- 11.18 years, data like those reported by Parra¹⁶ in university workers, who present a mean age for administrators of 39.76 +/- 7.78 years and for teachers 42.67 +/- 7.50 years, in the same way, they coincide with the age range reported by Castaño *et al.*¹⁷, from 22 to 72 years old.

In a greater proportion, the workers evaluated are teachers (67.5%) and female (56.6%), a situation that differs from that reported in workers from another higher education institution in the Colombian context,¹⁸ where 92.7% were part of the administrative staff, and similarly, the majority of those evaluated were female (66.9%). Regarding educational level, 54.3% of the participants have a postgraduate degree, unlike the workers where 70.2% had an undergraduate degree.¹⁸

According to the world health organization (WHO),¹⁹ physical activity is considered as any body movement made by skeletal muscles that cause energy expenditure, which is present in everything a person does during the day except sleep or rest, based on the above, 88.1% of the respondents reported doing physical activity, data that are higher than those reported in a group of administrative officials where it was found that 72.4%, they do it.²⁰ It should be emphasized that, to obtain greater health benefits,

adults should dedicate up to 300 minutes per week (1 hour daily for 5 days) to the practice of moderate physical activity.²¹

Regarding physical exercise, this is considered a physical activity, said activity is mediated by structured and repetitive planning that aims to maintain or improve physical condition. Taking these characteristics into account, 63% of the participants in this study reported that they perform physical exercise, a figure higher than the 47% reported in university teachers in a health school,²² who through the IPAQ reported performing vigorous physical activity.

Unlike physical activity and physical exercise, sport is classified according to the Colombian Sports Law²³ in article 15 as human behavior characterized by a playful attitude and competitive desire, verification or challenge expressed through physical exercise and mental, in this sense 31.7% of the participating population reported playing sports, being below 43.82% of the workers of a company "PetroEcuador" who say they play sports.²⁴ This activity is the one that is carried out the least, perhaps due to its competitive and regulated nature.

The highest percentage of participants reported having a healthy physical condition between acceptable and good, for the variables of general physical condition (84.4%), cardiorespiratory physical condition (84.1%), muscular strength (82.6%), speed - agility (85.7%) and flexibility (74%); data that differ from those reported in a study conducted on university students in which the highest proportion of responses was found grouped into the good and very good qualification, in the IFIS categories speed/agility (64%), general physical condition (63%), cardiorespiratory fitness (54%) and muscular strength (53%).²⁵ On the contrary, the similarity is observed with young Chileans, the answers given in the IFIS questionnaire are located acceptable and good for both men and women. Although they are studies carried out in young people, they make it possible to compare the different components of healthy physical condition in addition to locating them by level according to the IFIS questionnaire.²⁶

The position is a protective factor ($p < 0.05$) for low back and shoulder pain, data reinforced by the findings of Alcivar and Zurita who highlight the importance of teaching good posture habits in the working population to benefit the biomechanics of the lumbar spine.²⁷ Flexibility was found as a protective factor for neck discomfort, this coincides with the results of other studies that found that improving muscle flexibility reduces pain in the neck, improving the quality of life of the worker,^{28,29} strength was identified as a risk factor for shoulder discomfort, in this regard studies such as the one carried out by Paredes and Vázquez showed that shoulder problems are usually those of greater labor

Table 4. Comparison between the musculoskeletal symptomatology and the components of the healthy physical condition.

Component	Level	Yes	No	OR	Confidence interval (95%)		Ji ²	P Value
					Inf	Sup		
Flexibility	Neck discomfort							
	Bad	126 (52.9%)	112 (47.1%)	0.563	0.367	0.862	7.036	0.008*
	Good	98 (66.7%)	49 (33.3%)					
	Shoulder discomfort							
	Bad	111 (46.6%)	127 (53.4%)	1.129	0.748	1.703	0.332	0.564
	Good	73 (49.7%)	74 (50.3%)					
	Elbow and forearm discomfort							
	Bad	54 (22.7%)	184 (77.3%)	1.230	0.765	1.980	0.732	0.392
	Good	39 (26.5%)	108 (73.5%)					
	Lumbar discomfort							
Bad	146 (61.3%)	92 (38.7%)	1.024	0.671	1.563	0.012	0.913	
Good	91 (61.9%)	56 (38.1%)						
Wrist and hand discomfort								
Bad	160 (67.2%)	78 (32.8%)	0.668	0.437	1.022	3.473	0.062	
Good	85 (57.8%)	62 (42.2%)						
Muscular strength	Shoulder discomfort							
	Bad	71 (41.5%)	100 (58.5%)	1.576	1.050	2.364	4.850	0.028*
	Good	113 (52.8%)	101 (47.2%)					
	Neck discomfort							
	Bad	92 (53.8%)	79 (46.2%)	0.723	0.481	1.088	2.426	0.119
	Good	132 (61.7%)	82 (38.3%)					
	Elbow and forearm discomfort							
	Bad	37 (21.6%)	134 (78.4%)	1.284	0.798	2.064	1.065	0.302
	Good	56 (26.2%)	158 (73.8%)					
	Lumbar discomfort							
Bad	110 (64.3%)	61 (35.7%)	0.810	0.535	1.226	0.997	0.318	
Good	127 (59.3%)	87 (40.7%)						
Wrist and hand discomfort								
Bad	113 (66.1%)	58 (33.9%)	0.826	0.543	1.257	0.795	0.373	
Good	132 (61.7%)	82 (38.3%)						

* Sig<0.05

origin, and they highlight how they generate high economic costs,³⁰ coinciding with the work carried out by Rodríguez et al, found that work activities that involve the application of force are considered a risk factor for shoulder pain.³¹

CONCLUSIONS

As factors associated with the musculoskeletal symptomatology in times of COVID 19 are the type work, playing sports, and physical capacities such as strength and flexibility, which act as a protective factor and risk factor, the results suggest the Importance of proposing institutional strategies to strengthen protective factors and thus impact on absenteeism that may be generated when said symptomatology worsens, another aspect is framed in improving

ergonomic conditions and thus reducing additional problems that have arisen from the situation that is currently living derived from work at home.

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