

Factors Associated with Musculoskeletal Disorders among University Students in Northeastern Colombia During the COVID-19 pandemic *

Factores asociados a trastornos musculoesqueléticos entre universitarios del nororiente colombiano durante la pandemia por COVID-19

Fatores associados aos distúrbios musculoesqueléticos entre estudantes universitários do nordeste da Colômbia durante a pandemia de COVID-19

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ABSTRACT

Background: academic training processes during the COVID-19 pandemic were supported by information technologies. However, the conditions of the setting where synchronous meetings take place as well as the disposition of the students can influence the appearance of musculoskeletal disorders. **Purpose:** to identify factors associated with musculoskeletal disorders in dental students from northeastern Colombia who received virtual classes mediated by information technologies during the COVID-19 pandemic. **Methods:** cross-sectional analytical study in students who received classes in virtual mode during social isolation due to COVID-19. The validated Kuorinka questionnaire was applied, with sociodemographic variables and postural practices during virtual classes. The association was evaluated with the Chi2 tests or Fischer's test with $p < 0.05$ considered statistical significance. **Results:** a total of 170 participated (71.8 % women), median age of 20 years (IQR:19-22). In general, 81.8 % reported the presence of a musculoskeletal disorder in at least one anatomical site (upper limb), with the

back being the most bothersome (70 %) and generating the need to change the workplace (64.1 %). The use of an inappropriate chair (neck disorder) and the lack of stretching as the use of an inappropriate table (shoulder disorder) were identified as associated factors ($p < 0.05$). **Conclusions:** a high prevalence of musculoskeletal disorders was reported in dental students. Postural hygiene is a determining factor for the appearance of these events derived from remote classes mediated by technology.

Keywords: COVID-19; dental students; dentistry; ergonomics; information and communication technologies; questionnaires; muscular diseases; risk factors; safety and occupational health

RESUMEN

Antecedentes: los procesos de formación académica durante la pandemia por COVID-19 fueron soportados por las tecnologías de la información. No obstante, las condiciones del escenario donde se desarrollan los encuentros sincrónicos, así como la disposición de los estudiantes pueden influir en la aparición de trastornos musculoesqueléticos. **Objetivo:** identificar factores asociados a trastornos musculoesqueléticos en estudiantes de odontología del nororiente colombiano que recibieron clases virtuales mediadas por tecnologías de información durante la pandemia por COVID-19. **Métodos:** estudio analítico de corte transversal en estudiantes que recibieron clases en modalidad virtual durante el aislamiento social por COVID-19. Se aplicó el cuestionario Kuorinka validado, con variables sociodemográficas y las prácticas posturales durante las clases virtuales. La asociación se evaluó con las pruebas Chi² o test de Fischer con $p < 0,05$ se consideró significancia estadística. **Resultados:** en total participaron 170 (71,8 % mujeres), mediana de edad de 20 años (RIC:19-22). En general, el 81,8 % reportó presencia de trastorno musculoesquelético en al menos un sitio anatómico (miembro superior), siendo la espalda de mayor molestia (70 %) y que genera necesidad de cambio del lugar de trabajo (64,1 %). Como factores asociados se identificó el uso de silla inadecuada (trastorno en cuello) y la falta de estiramiento como uso de mesa inadecuada (trastorno en el hombro) ($p < 0,05$). **Conclusiones:** se reportó alta prevalencia de trastornos musculoesqueléticos en estudiantes de odontología. La higiene postural constituye en un factor determinante para la aparición de estos eventos derivados de las clases remotas mediadas por la tecnología.

Palabras Clave: COVID-19; cuestionario; enfermedades musculares; ergonomía; estudiantes de odontología; factores de riesgo; odontología; seguridad y salud ocupacional; tecnologías de la información y comunicación

RESUMO

Antecedentes: os processos de formação acadêmica durante a pandemia da COVID-19 foram apoiados pelas tecnologias de informação. Porém, as condições do ambiente onde acontecem os encontros síncronos bem como a disposição dos alunos podem influenciar no aparecimento de distúrbios osteomusculares. **Objetivo:** identificar fatores associados aos distúrbios musculoesqueléticos em estudantes de odontologia do nordeste da Colômbia que receberam aulas virtuais mediadas por tecnologias de informação durante a pandemia de COVID-19. **Métodos:** estudo analítico transversal em alunos que receberam aulas na modalidade virtual durante o isolamento social devido à COVID-19. Foi aplicado o questionário Kuorinka validado, com variáveis sociodemográficas e práticas posturais durante as aulas virtuais. A associação foi avaliada pelos testes Chi² ou teste de Fischer com $p < 0,05$ considerado significância estatística. **Resultados:** participaram 170 (71,8 % mulheres), idade mediana de 20 anos (IQ:19-22). De modo geral, 81,8 % relataram a presença de algum distúrbio osteomuscular em pelo menos um local anatômico (membro superior), sendo as costas o que mais incomoda (70 %) e gerando necessidade de mudança de local de trabalho (64,1 %). O uso de cadeira inadequada (distúrbio no pescoço) e a falta de alongamento assim como o uso de mesa inadequada (distúrbio no ombro) foram identificados como fatores associados ($p < 0,05$). **Conclusões:** foi relatada alta prevalência de distúrbios musculoesqueléticos em estudantes de odontologia. A higiene postural é fator determinante para o aparecimento desses eventos derivados de aulas remotas mediadas pela tecnologia.

Palavras-chave: COVID-19; doenças musculares; ergonomia; estudantes de odontologia; fatores de risco; odontologia; questionários; segurança e saúde ocupacional; tecnologias da informação e comunicação

INTRODUCTION

Musculoskeletal disorders (MSDs) are a condition that affects the locomotor system of people that can generate pain acutely or chronically, thereby minimizing the abilities to execute daily tasks (1). For the year 2019, 1,714 million people in the world were reported to have MSDs, which in turn represents 149 years of life lost due to disability (2). Studies have shown that work performance can be affected by the conditions of the furniture available at home for teleworking. Thus, the number of hours spent in

front of the computer and not using an adequate desk or chair have been associated with the presence of muscle pain in workers (3).

The COVID-19 pandemic represented a drastic change in the dynamics of the execution of labor functions of workers in different sectors. Although teleworking represented an alternative to provide continuity to company processes, lifestyles were disadvantaged by the increase in sedentary lifestyle and greater number of hours in front of mobile device screens (4,5). Furthermore, due to the mandatory isolation worldwide that generated the paralysis of all face-to-face activities that were conducted in the daily life of society, affecting basic education as well as upper secondary education to face this as an advance of new methods and forms of teaching (6). Therefore, in the context of education, the learning dynamics for health sciences students, as in the case of the dentistry program, also underwent important modifications. Fortunately, the incorporation of virtual platforms such as Zoom, Teams and Meet, among others, allowed teacher-student interaction and thus provided continuity to the teaching processes remotely from home (7-9).

Regarding dental personnel, a risk of EMT of 70 % is reported (10) and in a study conducted in Cartagena, Colombia in 2019, they concluded that 67 % of dentists presented discomfort, especially in the neck with 67 % and in the dorsolumbar region of 65 % (11); these cases occurring before the start of the pandemic. However, the presence of MSDs has been previously documented in teachers who teleworked during the COVID-19 pandemic (12–14). Where the factors associated with high cases of this disorder are related to exposure for more than half of the day, such as not having adequate ergonomic conditions in the workplace derived from mechanisms with repetitive movements of the upper limbs (51 %), maintaining the same posture for a long time (43 %) and bad positions that cause fatigue or pain (24 %) (15).

In the case of dental students, research carried out in the context of the pandemic has documented the presence of stress and depression, among others (16), however, in the region to date the presence of MSDs has not been described. In them and the question arises: what is the prevalence and factors of MSD suffered by students who receive virtual classes due to the pandemic? Therefore, the objective of this study is to identify the factors associated with the presence of MSDs in dental students in northeastern Colombia during COVID-19.

MATERIALS AND METHODS

This was an observational, descriptive, cross-sectional study (17). Where, the sample was made up of adult undergraduate students from the Faculty of Dentistry at the Santo Tomás University, Bucaramanga - Colombia, who had received classes mediated by virtuality, during confinement due to the pandemic. Furthermore, this was calculated considering a total of 519 students enrolled in the first academic period of 2021, with an expected proportion of 77 % according to what was reported in preliminary studies (18), a confidence level of 95 %, a 10 % non-response and a precision level of 5 %. With the previous data, a sample size of 179 participants was obtained through the EPIDAT 4.1 program. A type of non-probabilistic convenience sampling was applied.

During the first half of 2021 and after having the informed consent of the participants, they were invited to fill out virtually an adapted and validated version of the Kuorinka questionnaire (19,20); The instrument consisted of 19 questions with multiple response options with an estimated duration of 5 to 10 minutes. The virtual questionnaire was designed on the free access platform Google Forms. The data recorded there were exported to Microsoft Excel version 2010 software for database debugging. Finally, the validated data were exported to the statistical package Stata/MP version 14.0, where the respective analyses were conducted.

Therefore, the output variable was the presence of MSDs in the participants. The independent variables were the sociodemographic and ergonomic variables of the Kuorinka questionnaire. To

describe the qualitative variables, absolute frequencies and percentages with a 95 % confidence interval were calculated, and for the quantitative variables, measures of central tendency are presented along with measures of dispersion. The evaluation of the assumption of normality was conducted with the Shapiro Wilk test. Bivariate analysis was performed using Fisher's exact test or the Chi2 test. P values less than 0.05 were considered statistically significant.

This research followed the ethical principles that govern research on human beings in Colombia. In accordance with Resolution 8430 of 1993 (21), it was a risk-free investigation given that there was no intervention in the study subjects. Additionally, the study was presented to the research committee of the Faculty of Dentistry where it received a favorable ethical concept.

RESULTS

The study involved the participation of a total of 170 students, where 122 were female (71.8 %) with a median age of 20 years, 99 were studying higher semesters (41.7 %) and 128 (75.3 %) were from the middle stratum. Regarding the characterization of TME, 139 (81.8 %) of those surveyed reported having TME in at least one anatomical site. The sociodemographic characteristics of the participants are detailed in table 1.

TABLE 1
Sociodemographic characteristics of study participants

Variable	n (%)	CI 95 %
Gender		
Female	122(71,8)	64,4-78,4
Male	48(28,2)	21,6-35,6
Age (years)	20*	19-22**
Semester		
Lower (I-V)	71(41,7)	34,3-49,6
Upper (VI-X)	99(58,3)	50,4-65,7
Socioeconomic status		
Low	17(10)	5,9-15,5
Middle	128(75,3)	68,1-81,6
High	25(14)	9,7-20,9
Presence of MSD	139(81,8)	75,1-87,3

Source: the authors.

Regarding the anatomical site with the greatest discomfort, it was the wrist where 143 expressed it (84.1 %) and given the above, about 130 (76.5 %) have had to change the workplace due to the reported discomfort. Additionally, 86 (50.6 %) of respondents with MSDs in the wrist stated that the discomfort prevented them from conducting their academic activities. All of them are listed in table 2.

TABLE 2
MSD characterization according to the anatomical site

Variable	Back	Arm	Wrist	Hand	Neck	Shoulder
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Have you had any discomfort?						
Yes	119(70)	68(40)	143(84,1)	33(19,4)	60(35,3)	65(38,2)
Since when you have had the problem?						
1 to 7 Days	24(12,1)	20(11,7)	25(14,7)	16(9,4)	16(9,4)	22(9,4)
1 a 4 Weeks	25(14,7)	18(10,6)	25(14,7)	9(5,3)	17(10)	19(10)
1 a 11 Months	47(27,7)	23(13,5)	52(30,6)	13(7,6)	22(12,9)	18(12,9)
One year or more	26(15,3)	18(10,6)	45(26,5)	10(5,9)	16(9,4)	15(9,4)
Does not apply	48(28,2)	91(53,5)	23(13,5)	122(71,7)	99(58,2)	96(58,2)

Have you had to change your workplace because of the inconvenience?						
Yes	109(64,1)	53(31,3)	130(76,4)	27(15,9)	36(21,2)	39(22,9)
Have you had discomfort in the last 12 months?						
1 to 7 Days	59(34,7)	44(25,9)	61(35,9)	28(16,5)	36(21,2)	34(20)
8 a 30 Days	17(10)	10(5,9)	16(9,4)	7(4,1)	10(5,9)	10(5,9)
> than 2 Months	32(18,8)	14 (8,2)	39(22,9)	10(5,9)	15(8,8)	15(8,8)
Always	23(13,5)	16(9,4)	36(21,2)	8(4,7)	14(8,2)	16(9,4)
Never	39(22,9)	86(50,6)	18(10,6)	117(68,8)	95(55,9)	95(55,9)
How long does each episode last?						
< than 1 Hour	47(27,6)	36(21,2)	49(28,8)	29(17,1)	38(22,4)	37(21,7)
1 to 24 Hours	58(34,1)	27(15,9)	61(35,9)	6(3,5)	18(10,6)	17(10)
1 to 7 Days	17(10)	13(7,6)	25(14,7)	8(4,7)	10(5,9)	11(6,5)
< than a month	6(3,5)	1(0,7)	10(5,9)	4(2,4)	3(1,7)	4(2,4)
Does not apply	42(24,7)	93(54,7)	25(14,7)	123(72,4)	101(59,4)	101(59,4)
Have you had difficulty conducting activities due to discomfort?						
yes	64(37,6)	35(20,6)	86(50,6)	15(8,8)	25(14,7)	29(17,1)
Have you received treatment for the discomfort?						
yes	22(12,9)	14(8,2)	30(17,6)	6(3,5)	9(5,3)	10(5,9)
Have you had problems in the last 7 days?						
Yes	88(51,8)	48(28,2)	110(64,7)	18(10,6)	36(21,2)	38(22,3)
Classification, pain level						
Without pain	42(24,7)	92(54,1)	19(11,2)	123(72,3)	96(56,5)	103(60,6)
Soft pain	16(9,4)	19(11,2)	12(7,1)	16(9,4)	19(11,2)	17(10)
Moderate pain	28(16,5)	13(7,6)	31(18,2)	10(5,9)	17(10)	16(9,4)
Severe pain	38(22,3)	17(10)	32(18,8)	7(4,1)	13(7,6)	13(7,6)
Unbearable pain	46(27)	29(17)	76(44,7)	14(8,2)	25(14,7)	21(12,3)
What do you attribute the discomfort to?						
Bad position	51(30)	29(17,1)	59(34,7)	14(8,2)	15(8,8)	16(9,4)
Uncomfortable workplaces	11(6,5)	8(4,7)	15(8,8)	6(3,5)	8(4,7)	8(4,7)
Many hours in the same position	61(35,9)	33(19,4)	68(40)	16(9,4)	26(15,3)	20(11,8)
Lack of stretching and active breaks	9(5,3)	11(6,5)	11(6,5)	8(4,7)	16(9,4)	21(12,3)
I have not had any discomfort	38(22,3)	89(52,3)	17(10)	126(74,1)	105(61,8)	105(61,8)

Source: the authors.

Regarding the bivariate analysis, it is evident that TME in the arm is significantly more frequent in women ($p=0.012$); the presence of TME in the neck is associated with the use of an inadequate table to carry out the virtual academic activity ($p=0.030$); as well as the TME in the shoulder was associated with the place where the academic activity takes place ($p=0.036$), the non-use of a comfortable table ($p=0.011$) and the lack of stretching during the virtual activity ($p=0.028$) (table 3).

TABLA 3
Bivariate analysis for the presence of MSD according to the anatomical site

Variable	Back		Valor p	Arm		Valor p	Wrist		Valor p	Hand		Valor p	Neck		Valor p	Shoulder		Valor p
	Si	No		Si	No		Si	No		Si	No		Si	No		Si	No	
Gender																		
Female	90(73,8)	32(26,2)	0,087	56(45,9)	66(54,1)	0,012*	106(86,9)	16(13,1)	0,116	25(20,5)	97(79,5)	0,570	44(36,1)	78(63,9)	0,737	50(41,0)	72(59,0)	0,240
Male	29(60,4)	19(39,6)		12(25)	36(75)		37(77,1)	11(22,9)		8(16,7)	40(83,3)		16(33,3)	32(66,7)		15(31,2)	33(68,8)	
Age																		
≤ 20 years	67(71,3)	27(28,7)	0,686	38(40,4)	56(59,6)	0,900	80(85,1)	14(14,9)	0,695	20(21,3)	74(78,7)	0,494	34(36,2)	60(63,8)	0,790	41(43,6)	53(56,4)	0,108
> 20 years	52(68,4)	24(31,6)		30(39,5)	46(60,5)		63(82,9)	13(17,1)		13(17,1)	63(82,9)		26(34,2)	50(65,8)		24(31,6)	52(68,4)	
Academic Semester																		
I-V	47(66,2)	24(33,8)	0,360	25(35,2)	46(64,8)	0,280	57(80,3)	14(19,7)	0,247	15(21,1)	56(78,9)	0,632	21(29,6)	50(70,4)	0,187	27(38,0)	44(62,0)	0,962
VI-X	72(72,7)	27(27,3)		43(43,4)	56(56,6)		86(86,9)	13(13,1)		18(18,2)	81(81,8)		39(39,4)	60(60,6)		38(38,4)	61(61,6)	
Type of device																		
Laptop	95(70,4)	40(29,6)	0,952•	56(41,5)	79(58,5)	0,290	115(85,2)	20(14,8)	0,489	26(19,3)	109(80,7)	0,860•	51(37,8)	84(62,2)	0,478	51(37,8)	84(62,2)	0,660
Desk PC	16(69,6)	7(30,4)		6(26,1)	17(73,9)		19(82,6)	4(17,4)		4(17,4)	19(82,6)		6(26,1)	17(73,9)		8(34,8)	15(65,2)	
Mobile or tablet	8(66,7)	4(33,3)		6(50)	6(50)		9(75)	3(25)		3(25,0)	9(75,0)		3(25,0)	9(75,0)		6(50)	6(50)	
Place where you conduct your academic activity																		
Desktop	80(67,2)	39(32,8)	0,113•	43(36,1)	76(63,9)	0,346•	100(84,0)	19(16)	0,414	22(18,5)	97(81,5)	0,583•	36(30,2)	83(69,8)	0,115	40(33,6)	79(66,4)	0,036*
Dining table	28(75,7)	9(24,3)		19(51,4)	18(48,6)		31(83,8)	6(16,2)		9(24,3)	28(75,7)		17(46,0)	20(54,0)		18(48,6)	19(51,4)	
Couch	8(100)	0(-)		4(50)	4(50)		8(100)	0(-)		2(25,0)	6(75,0)		5(62,5)	3(37,5)		6(75,0)	2(25,0)	
Other	3(50)	3(50)	2(33,3)	4(66,7)	4(66,7)	2(33,3)	0(-)	6(100)	2(33,3)	4(66,7)	1(16,7)	5(83,3)						
Suitable chair for virtual academic activity																		
Yes	51(65,4)	27(34,6)	0,227	31(39,7)	47(60,3)	0,950	62(79,5)	16(20,5)	0,128	17(21,8)	61(78,2)	0,469	43(31,4)	94(68,6)	0,03*	26(33,3)	52(66,7)	0,226
No	68(73,9)	24(26,1)		37(40,2)	55(59,8)		81(88,0)	11(12)		16(17,4)	76(82,6)		17(51,5)	16(48,5)		39(42,4)	53(57,6)	
Comfortable table for virtual academic activity																		
Yes	95(69,3)	42(30,7)	0,703	51(37,2)	86(62,8)	0,133	113(82,5)	24(17,5)	0,297	25(18,2)	112(81,8)	0,434	36(33,0)	73(67,0)	0,408	46(33,6)	91(66,4)	0,011*
No	24(72,7)	9(27,3)		17(51,5)	16(48,5)		30(90,9)	3(9,1)		8(24,2)	25(75,8)		24(39,3)	37(60,7)		19(57,6)	14(42,4)	
Time dedicated to virtual activity																		
1-5 hours	32(69,6)	14(30,4)	0,947	15(32,6)	31(67,4)	0,474	37(80,4)	9(19,6)	0,510	8(17,4)	38(82,6)	0,091	14(30,4)	32(69,6)	0,716	15(32,6)	31(67,4)	0,088
Half day	38(71,7)	15(28,3)		22(41,5)	31(58,5)		47(88,7)	6(11,3)		6(11,3)	47(88,7)		20(37,7)	33(62,3)		16(30,2)	37(69,8)	
Hole day	49(69,0)	22(31)	31(43,7)	40(56,3)	59(83,1)	12(16,9)	19(26,8)	52(73,2)	26(36,6)	45(63,4)	34(47,9)	37(52,1)						
Stretching activities during the virtual activity																		
Yes	74(67,9)	35(32,1)	0,422	42(38,5)	67(61,5)	0,602	88(80,7)	21(19,3)	0,107	21(19,3)	88(80,7)	0,949	26(33,3)	52(66,7)	0,622	35(32,1)	74(67,9)	0,028*
No	45(73,8)	16(26,2)		26(42,6)	35(57,4)		55(90,2)	6(9,8)		12(19,7)	49(80,3)		34(37,0)	58(63,0)		30(49,2)	31(50,8)	
Do you perform active breaks during virtual activity?																		
Yes	108(70,1)	46(29,9)	0,909	30(19,5)	124(80,5)	0,310•	127(82,5)	27(17,5)	0,078	30(19,5)	124(80,5)	1,000•	53(34,4)	101(65,6)	0,457	57(37,0)	97(63)	0,309
No	11(68,8)	5(31,2)		1(6,2)	15(93,8)		16(100)	0(-)		3(18,8)	13(81,2)		7(43,8)	9(56,2)		8(50)	8(50)	

• Test exacto de Fisher *Valores de p con significancia estadística

DISCUSSION

When musculoskeletal disorders occur, they usually cause a lot of pain and even limitation of movement, dexterity, and seriously affect people's functionality, either by reducing people's ability to work or other daily aspects (1). Furthermore, these discomforts are generated in the neck, trunk, hands and also the upper and lower limbs; and when timely treatment is not performed, they can lead to irreversible pathologies (22). On the other hand, with the appearance of COVID-19, both work and educational spaces moved to virtuality, generating a new impact and challenge for public health due to the appearance of these disorders (23). Where, through the Kuorinka Nordic questionnaire, which serves to collect information on pain, fatigue or discomfort in different body areas (20), allowing to answer the problem question on the identification of presence and associated factors of MSD in the population to study.

Therefore, the present study allowed us to establish a prevalence of TME in dental students at a private Colombian university of 81.8 %, in the context of virtual academic activity derived from the COVID-19 pandemic. Similar results to a study in Venezuela in the administrative staff of a university, where 72.4 % presented musculoskeletal discomfort in different areas of the body (24). Considering the impact that this public health phenomenon brought about on the dynamics of humanity's activities, especially in the educational field (25), the fact of achieving continuity in the training processes in the virtual modality supported by Technology represents an important value in the training of professionals in the regional and national context.

The number of MSDs in students reported in this study is slightly higher than that reported by the authors previously in the evaluation that was carried out with the same questionnaire in the teaching population of the same educational institution (14). However, a study conducted on university professors at a Peruvian institution reported a prevalence of 100 % (23). Another study reported similar results in medical students, reporting a prevalence of 75.9 %, where pain predominated, neck pain (26). Therefore, the data are within what was previously reported in the literature in similar studies carried out in the student population. This is possibly due to prolonged working on the computer, which implies the appearance of symptoms in different structures such as the lumbar spine, neck and upper extremities (27).

The high proportion of MSDs recorded here could be related to the sedentary lifestyle of the students as a consequence of social distancing and quarantine, among others; Roggio *et al.* (28) documented this. They reported a statistically significant decrease in the levels of physical activity performed in a sample of more than two thousand Italian university students. This behavior also showed an association with pain in the neck and lower back of the respondents (OR 1.79 and 1.95 respectively), after a year of the pandemic (28). Where, according to the literature, long periods of sedentary work, not performing exercises, isolated work and stress are some of the risks associated with teleworking that can affect not only the integrity of the musculoskeletal system but also mental health. of people (29).

One of the tools used by students to carry out academic activities during the pandemic was the mobile phone. Although this device facilitated the connection with the teacher, studies conducted on students have found a 53.9 % increase in mobile phone use, compared to the period before the pandemic (30). Similar to what was concluded by García & Sánchez who expose the association between MSDs and ergonomic risk factors such as having a prolonged posture and long working hours, which is common when taking online academic training (23). Furthermore, the association between excessive use of mobile devices and upper extremity MSDs in university students has been documented (31).

This study found an association between the presence of the TME in some anatomical sites such as the shoulder and neck and the characteristics of the space where the virtual academic activity is conducted, as well as the lack of stretching during the session. These findings are consistent with those reported by Salameh *et al.* (26) who found an association between the TME and poor postural habits in

a sample of medical students from an Asian region. Another study carried out at a university in Mexico also found a relationship between the presence of musculoskeletal symptoms and the virtual modality with a degree of significance of $p=0.000$, recognizing that there is a positive dependence between the presence of symptoms and the change in educational modality (32). For this reason, experts recommend seeking comfort in front of the computer or mobile device used, as well as active breaks and stretching during the development of virtual activities (33).

The strength of the results presented here is that they were obtained from the application of a validated instrument, so the data are applicable to the regional context. However, since it is research with a cross-sectional design, it could be susceptible to non-differential information bias derived from the self-report issued by the participant, which may influence the recognition of the associated factors.

CONCLUSIONS

MSDs are one of the most common problems present in occupational health; However, certain activities or professions can increase your susceptibility to these types of disorders. Dentistry and work in virtual mode are two work activities with a high probability of suffering from MSDs, this means that with the new COVID-19 health emergency and the transition to virtuality, there is an increased risk for students of the faculty of dentistry, especially those of the female sex, from stratum four and who are in the fourth semester. Where the performance of certain habits can influence such as not stretching, not taking active breaks and connecting from a laptop computer instead of a desktop computer that allows greater comfort. These results were shared with the management of the Faculty of Dentistry, where the information obtained from the ARL was shown that the students and workers were affiliated, where they created virtual spaces for active breaks in order to minimize episodes of MSDs in the entire population. educational.

RECOMMENDATIONS

Based on the aforementioned, it is important to establish a correct Promotion and Prevention guide by the educational institution, which helps with early diagnosis and correct treatment such as referral to the appropriate professional. In addition to the creation and validation of support material for the prevention of musculoskeletal disorders not only in the academic but also in the healthcare aspects of the clinical practice of the dentist as well as for the rest of the teaching and administrative staff.

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