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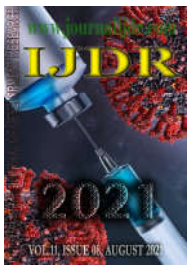

RESEARCH ARTICLE OPEN ACCESS

TELEWORK AND MUSCULOSKELETAL SYMPTOMATOLOGY IN UNIVERSITY PROFESSORS IN TIMES OF COVID 19 PANDEMIC

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ABSTRACT

Ceballos and Santos (2015), report in their studies that more than 90% of the teaching population is affected by musculoskeletal symptoms (MSS). Such symptoms can be influenced during the time of pandemic by COVID 19, due to the need for teachers to carry out their activities through telework. The aim of this study was to characterize the prevalence of self-reported musculoskeletal symptoms in university professors who are carrying out their activities through telework, in order to contribute to the development of programs to prevent such symptoms. Data collection was performed online using the following instruments: Nordic SME Questionnaire (QNSO) and Questionnaire for the evaluation of demographic, occupational, habit and lifestyle variables. Through the study, it can be concluded that most of the evaluated professors are carrying out their activities through telework in an exclusive or partial way and that in the last 12 months the presence of SME was higher in the cervical and lumbar regions.

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INTRODUCTION

Over 90% of the teaching population is affected by musculoskeletal symptoms (SME) (Ceballos and Santos, 2015). These symptoms are characterized by complaints related to the presence of pain, tension, discomfort, fatigue (Neves, Vieira, Cardia, Lucena, and da Silva, 2018), which arise from inflammatory or degenerative conditions that affect muscles, tendons, ligaments, joints, peripheral nerves and blood vessels (Punnett and Wegman, 2004). Teaching is a profession whose intellectual and emotional wear is always present in its workers, exposing them to psychosocial health risks (Bogaert, De Martelaer, Deforche, Clarys, and Zinzen 2014), and it is recognized that psychosocial risk factors may play a relevant role in the development of musculoskeletal symptoms (Eatough, Way & Chang, 2012). In addition to these factors, currently university professors need to adapt to the Covid 19 Pandemic. Adaptation is done through working at home using computers, cell phones, among others, and it had to be sudden and in accordance with studies by Kraemer, Moreira and Guimarães (2020), the main risk factors of university professors using computers are: permanence for long periods in the sitting posture, presence of sharp corners on the edges of worktables, use of the laptop touchpad instead of the mouse, and improper height of the computer monitor. Data from this study, through the application of the Nordic questionnaire, showed that 100% of teachers had pain in the last 12 months. In this sense, preventive assessments and interventions are essential. These should consider the assessment of musculoskeletal health, identifying and supporting people with such impairments, through the assessment of risk factors, in order to then reduce the worker's exposure to them and consequently reduce the probability of developing musculoskeletal injuries, that can even affect the quality of life at work (Porto, Reis, Andrade, Nascimento and Carvalho, 2004). Thus, this work aims to characterize the prevalence of self-reported musculoskeletal symptoms in university professors who are carrying out their activities through telework, in order to contribute to the development of programs that prevent such symptoms.

Theoretical Reference: After emerging in December 2019 in the city of Wuhan, Hubei Province, China, a new human Coronavirus, called Coronavirus 2 Severe Acute Respiratory Syndrome (SARS-CoV-2) (Clerkin, Fried, Raikhelkar, Sayer, Griffin, Masoumi, Jain, Burkhoff,

Kumaraiah, Rabbani, Schwartz, Uriel, 2020; Ganatra, Hammond, Nohria, 2020), and also called COVID-19 by the World Health Organization (Croda and Garcia, 2020), was considered pandemic, killing and contaminating millions of people around the world. COVID-19 is a condition that can affect the lungs, respiratory tract and other systems (Ferrari, 2020), and the virus is transmitted from person to person (Ghinai, McPherson, Hunter, Kirking, Christiansen, Joshi, 2020). For some time now, the importance of isolation for infection control has been highlighted, which is widely publicized and recognized by several authors, such as Ward (2000) and Findik (2012). Isolation during this period of pandemic meant that new adaptations were made, mainly in relation to the work performed by each person, in which many institutions opted for total or partial telework. During the Covid 19 pandemic, university professors suddenly needed to adapt to working at home using computers, cell phones, among others, and according to Xie, Szeto and Dai (2017), the use of these electronic devices is considered a risk factor associated with SME. The prevalence of SME in workers who use computers can range from 55 to 69% in the cervical region, 31 to 54% in the lumbar region and 5 to 15% in the extremities (Oha, Animagi, Paasuke, Cogon, and Merisalu, 2014). Also as consequences of telework, Rocha and Amador (2018), verified the intensification of work, the difficulty of separating space and time of work, family and personal life, the decrease in the possibilities of professional ascension and also the risk of the work being extended indefinitely in all periods and spaces of a person's life through mobile devices, which could contribute to the risk of SME. However, the benefits of telework are pointed out by Filardi, Castro and Zanini (2020), who consider it important in reducing transport costs, reducing exposure to pollution and violence, generating greater flexibility in working hours, greater privacy and better quality of life.

METHODOLOGY

The target population of this study was 358 (three hundred and fifty-eight) professors from UniRV - Universidadede Rio Verde, in the state of Goiás, Brazil, involved only with teaching functions, who received an email inviting them to the study and containing the link to the questionnaire. This questionnaire included the following instruments: Questionnaire for the assessment of occupational demographic variables and habits and lifestyle and Nordic SME Questionnaire (QNSO) (Barros and Alexandre, 2003), as well as the Informed Consent Form (TCLE). The questionnaires were transferred to the SurveyMonkey online platform and sent to the professors via email. A period of two weeks was established for professors to participate so that they could send their answers. A recall was carried out after these two weeks. It is understood that individuals were able to respond to the questionnaires calmly and voluntarily, according to the best convenience in terms of time and place for each one. All the necessary information for the correct clarification of the participants was sent in the body of the said email. The TCLE was integrated in the first part of the online questionnaire. To accept, each professor needed to click on the option "I accept" that was available in the document. After this acceptance, professors had access to the questionnaires and to the researcher's telephone and e-mail in case of any doubts, suggestions and/or withdrawals. It was only allowed to fill in one questionnaire per email. Virtually applying the questionnaires originated an automatic database, which allowed direct transfer to the SPSS statistical program, thus avoiding errors and flaws in the transfer and typing of the collected data. Questionnaires that were not completely filled out were eliminated. Of the 358 (three hundred and fifty-eight) professors, 176 (one hundred and seventy-six) responded, but there were only 165 (one hundred and sixty-five) complete answers, which corresponded to a response rate of 46.1%.

For data analysis, using the SPSS program, version 25, a descriptive analysis was performed, and associations between dichotomous qualitative variables were verified using the Qi square test. The analysis of mean differences was performed using the student t test. Values of p less than or equal to 0.05 were considered significant.

RESULTS AND DISCUSSION

The sample of professors had a mean age of 39.8 years [±8.3], with a greater representation of the age group of 31-40 years old (40%), a mean BMI of 26.63 [±3.55], with the highest percentage in the overweight category (49.4%), which 51.5% were male, 66.1% were married or in a consensual marriage, with an average number of at home dependents (minors, elderly or disabled) of 1.4 [±1.1] (Table 1 and 2). The average time of teaching assessed was 11.9 years [±8.1], and the average workload in teaching was 38 hours [±11.2] (Table 2).

Table 1. Characterization of sex, age group, marital status and BMI

Sociodemographic Characteristics		N	%
Sex	Female	80	48,5
	Male	85	51,5
	Total	165	100
Age Groups (years)	21-30	22	13,3
	31-40	66	40,0
	41-50	59	35,8
	□ 50 years	18	10,9
	Total	165	100
Marital Status	Single	37	22,4
	Married / Consensual marriage	109	66,1
	Divorced / Widower	19	11,5
	Total	165	100
Body Mass Index (BMI)	Low weight	1	0,6
	Normal weight	55	34.4
	Overweight	79	49,4
	Obesitytype I, II, III	25	15,6
	Total	165	100

Table 2. Characterization of age, mean number of dependents in the household, mean teaching time and weekly workload

	N	Min – Max	Mean	DP
Age (years)	165	25 – 64	39,8	8,3
Mean teaching time (years)	159	1 – 34	11,9	8,1
Mean number of dependents in The household	161	0 – 5	1,4	1,1
Weekly workload (hours)	146	8– 80	38,0	11,2

Table 3. Difficulties perceived by professors in telework

Perception of difficulties in telework		N	%
Difficulties with physical and material resources	Never / Little Frequent	96	63,2
	FrequenttoAlways	56	36,8
	Total	152	100
Lack of skill and/or knowledge with required technologies	Never / Little Frequent	106	69,3
	FrequenttoAlways	47	30,7
	Total	153	100
Difficulty in adapting to work schedules	Never / Little Frequent	126	81,8
	FrequenttoAlways	28	18,2
	Total	154	100
Difficulty in interpersonal relationships with the bosses	Never / Little Frequent	143	94,1
	FrequenttoAlways	9	5,9
	Total	152	100
Difficulty in interpersonal relationships with the work team	Never / Little Frequent	143	94,1
	FrequenttoAlways	9	5,9
	Total	152	100
Difficulty in adapting to distance classes	Never / Little Frequent	103	67,3
	FrequenttoAlways	50	32,7
	Total	153	100
Difficulty in obtaining support for technological problems	Never / Little Frequent	112	73,6
	FrequenttoAlways	41	26,5
	Total	153	100

With the current public calamity state that the whole world is experiencing, the work environment can contribute to the dissemination of the COVID 19 virus, so it is necessary to understand strategies to fight the pandemic, such as telework (de Seixas Filho et al. al, 2020).

Table 4. Self-reported musculoskeletal symptoms in the last 12 months

SME in the last 12 months		N	%
Cervical	No	107	64,8
	Yes	58	35,2
	Total	165	100
Dorsal	No	125	75,8
	Yes	40	24,2
	Total	165	100
Lumbar	No	92	55,8
	Yes	73	44,2
	Total	154	100
Shoulders	No	121	77,3
	Yes	44	26,7
	Total	165	100
Elbows	No	148	89,7
	Yes	17	10,3
	Total	165	100
Wrists / hands	No	139	84,2
	Yes	26	15,8
	Total	153	100

Because of this, the vast majority of the university professors studied (77.7%) are in a telework regimen, either exclusively or partially. However, several university extension projects since the beginning of the pandemic have been carried out by the institution responsible for the evaluated professors, providing general guidelines in relation to telework, as it is understood that care for the workplace at home should ensure the best conditions for productivity, quality, safety and preservation of the individual's health and well-being (Hyeda and Costa, 2017). The projects emphasize that when organizing the space for telework, preference should be given to airy places, preferably avoiding the bedroom, and with natural lighting, opting for LED lighting when this is not possible, trying to maintain the routine hours adopted at the University, using a chair that provides correct posture and avoid working lying down on sofas or elsewhere. Another way would be to make all the work material available on a table, so that they can be easily stored at the end of the day (dos Reis et al, 2020). However, some studies show the advantages (feel safer working from home, are less exposed to violence, etc.) and disadvantages (lack of training, availability of technology, etc.) of teleworking in the context of a pandemic (Filardi, Castro and Zanini, 2020).

In this sense, the characterization of university professors in this sample showed that the frequency of occurrence of problems or difficulties in telework was not very high, however the difficulties lie in physical and material resources (36.8%) in adapting to distance classes (32.7%) and the lack of skill and/or knowledge with the required technologies (30.7%) (Table 3). It is also recognized that telework determines the adoption of prolonged periods in the sitting posture (Sobratt, 2016) and is related to a greater probability of developing musculoskeletal symptoms (Rocha and Amador, 2018).Among the professors in this sample, 86.3% work sitting down for more than 8 hours, very often or always, with slight forward bending (57.5%). These findings are worrisome, as according to Marques, Hallal and Gonçalves (2010) the sitting posture with forward flexion can interfere with the emergence of SME. Add to adopting the sitting posture a sedentary lifestyle to increase the risk of SME (De Vitta et al, 2013), which was also verified in this sample, with 57% not performing, during the week, 10 minutes of moderate activities and 55 ,7% not walking for at least 10 minutes. Silva and Neves (2018) through a systematic review of articles on SME published between 2006 and 2015, conclude that the Nordic questionnaire of musculoskeletal symptoms is essential to collect information about SME. Some authors used the period of the last 12 months and the last seven days to verify the presence of SME (Carvalho and Alexandre, 2006; Mango, 2012; Calixto et al, 2015). However, others used only the last 12 months (Suda et al, 2011; Branco et al, 2011), which will also be adopted in this study. This study used the Nordic questionnaire which made it possible to realize that in the last 12 months these professors had pain, numbness or tingling, predominantly in the following regions of the cervical (35.2%), dorsal (24.2%), lumbar (44.2%) and shoulders (26.7%) (Table 4), which is in agreement with the studies by Suda, Coelho, Bertaci and Santos (2011), in which most of the studied population presented SME in the neck and lower back. In the studies by Calixto et al (2015) and Suda et al (2011), the SME in the cervical region ranged from 39.3% to 70%, in the shoulders 30.4% to 61.6%, in the dorsal it ranged between 42% to 62.4%, and in the lower back from 41.7% to 64%, wrists and hands with 27.9% to 51.2% and elbows between 10.2% and 20%. When comparing this study to those presented by the aforementioned authors, the SME results are inferior.

A factor that may be related to these lower SME indices refers to telework, because when teaching in a classroom, the emergence of SME may be related to the inadequate conditions of educational institutions, so much so that many professors claim that the working conditions canbe terrible, adding to this the lack of preventive measures and a multidisciplinary team with competent professionals to act in these situations (Suda et al, 2011; Branco et al, 2011). Thus, when university professors carry out their activities through telework, in addition to being protected against the Coronavirus (Sars – cov2) (Losekann and Mourão, 2020), they also reduce transportation costs, are less exposed to pollution and violence, they have greater time flexibility, greater privacy, better quality of life, among others (Filardi, Castro and Zanini, 2020), which may have contributed in this study to the lower percentage of SME.

Regarding cervical SME, there are statistically significant differences in the mean age, number of dependents and total teaching time between those who report the presence or absence of symptoms ($p<0.050$). Those who report cervical symptoms are older, with a greater number of dependents and with more years of teaching experience (Table 5), which corroborates the findings of Cardoso (2009), who in their studies reported that professors who had fourteen or more years in the profession had higher prevalence of SME. In regards to lumbar SME, there are statistically significant differences in mean age, number of dependents and BMI between those who report the presence or absence of symptoms ($p<0.050$). Professors who report lumbar symptoms are older, with a greater number of dependents and with a higher BMI (Table 6), which is in agreement with the studies by Monteiro et al (2006) that verified the SME was more frequent among the obese. Stephen et al (2017) reported that age is one of the most important non-modifiable risk factors for SME. Cervical SME showed a statistically significant association with difficulties with physical and material resources ($p<0.050$), in which those who do not present symptoms do not have difficulties in a higher percentage (Table 7).

But it also showed a significant association with the difficulties in obtaining support for technological problems ($p<0.050$) and with the lack of knowledge of the technologies required in telework ($p<0.050$). In both cases, those who do not present symptoms do not have difficulties in a higher percentage (Table 7), which may indicate a relationship between little technological knowledge and the emergence of cervical SME due to the increased time in front of the computer for carrying out a particular task. These findings are in agreement with the studies by Paksaichol et. al. (2012) who identified several risk factors for cervical SME, including, among other factors, poor computer knowledge. In addition, de Castro, Neto, Pereira, Souza, França, Fernandes and Gouveia (2021), concluded that SME associated with inadequate postures interfere in the worsening of pain, especially with the advent of new technologies. In turn, lumbar SME showed a statistically significant association with difficulties with physical and material resources ($p<0.050$) and with difficulty in adapting to working hours ($p<0.050$). In both situations, those who present symptoms have a higher percentage of difficulties (Table 8).

Table 5. Characterization of age, BMI, mean number of dependents in the household, mean teaching time, weekly workload as a function of cervical SME

Cervical SME	No			Yes				
	N	Mean	DP	N	Mean	DP	t-student	p-value
Age (years)	107	38,68	8,5	58	42,2	7,5	-2,683	0,008*
BMI	107	26,4	3,6	58	27,0	3,3	-1,086	0,279
Mean teaching time (years)	102	10,7	8,1	57	14,0	7,8	-2,469	0,015*
Mean number of dependents in the household	103	1,2	1,1	58	1,7	1,0	-3,093	0,002*
Weekly teaching workload (hours)	95	38,5	12,5	51	37,2	8,4	0,662	0,509

*p<0,050

Table 6: Characterization of age, BMI, mean number of dependents in the household, mean teaching time, weekly workload as a function of lumbar SME

Lumbar SME	No			Yes				
	N	Mean	DP	N	Mean	DP	t-student	p-value
Age (years)	92	38,65	8,7	73	41,3	7,6	-2,039	0,043*
BMI	92	26,0	2,8	73	27,5	4,1	-2,685	0,008*
Mean teaching time (years)	87	11,1	8,2	72	12,9	7,8	-1,385	0,168
Mean number of dependents in the household	89	1,2	1,2	72	1,6	1,0	-2,266	0,025*
Weekly teaching workload (hours)	80	38,6	12,4	66	37,2	9,6	0,738	0,462

*p<0,050

Table 7. Characterization of cervical SME due to difficulties with physical and material resources, support for technological problems and lack of skill and/or knowledge with the required technologies

	Cervical SME	No		Yes			
		N	%	N	%	Qui-Square	p-value
Difficulties with physical and material resources	Never / Little Frequent	69	38,7	27	28,1	7,329	0,007*
	Frequent to Always	28	50,0	28	50,0		
Difficulty in obtaining support for technological problems	Never / Little Frequent	78	69,6	34	30,4	5,673	0,017*
	Frequent to Always	20	48,8	21	51,2		
Lack of skill and/or knowledge with required technologies	Never / Little Frequent	76	71,7	30	28,3	8,761	0,003*
	Frequent to Always	22	46,8	25	53,2		

*p<0,050

Table 8. Characterization of lumbar SME due to difficulties with physical and material resources

	Lumbar SME	No		Yes			
		N	%	N	%	Qui- Square	p-value
Difficulties with physical and material resources	Never / Little Frequent	60	62,5	36	37,5	6,552	0,010*
	Frequent to Always	23	41,1	33	58,9		
Difficulties in adapting to working schedule	Never / Little Frequent	75	59,5	51	40,54	5,251	0,022*
	Frequent to Always	10	35,7	18	64,3		

*p<0,050

This result may be mainly related to the need to remain seated for long periods of time when there is difficulty with physical and material resources, as it will be more time consuming to reach a goal, causing the professor to sit longer, reducing available hours to remain at rest for pain relief, which consequently makes it difficult to adapt to working hours and promotes lumbar SME manifestation. The studies by Marques (2018) prove that, among other factors, remaining in a chair for several hours increases the possibility of triggering lumbar SME.

Final Considerations

In this study, it was found that most university professors studied are in a telework regimen and that despite this, they present low percentages of SME. However, it is important to emphasize that this study points to the need to go deeper into the factors that determine the musculoskeletal symptomatology related to telework in university professors, in order to define and implement more preventive interventions and strategies that make professors and university managers aware of the risks of the profession, being performed in person or by telework in order to prevent physical limitations resulting from SME in professionals with great abilities and in full working age.

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