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ORIGINAL ARTICLE

MUSCULOSKELETAL PAIN IN PRIMARY CARE PROFESSIONALS DURING THE COVID-19 PANDEMIC: MIXED METHODS STUDY*

HIGHLIGHTS

1. PHC professionals experience musculoskeletal pain related to work factors.
2. The demands of working during the pandemic have contributed to physical complaints.
3. The most frequently mentioned areas are the shoulders, upper back, and neck.

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ABSTRACT

Objective: To analyze musculoskeletal pain in primary care health professionals and their experience during the COVID-19 pandemic. **Method:** A mixed-methods study carried out in southern Brazil between June 2021 and February 2022. A sample of 50 participants, using questionnaires related to pain and musculoskeletal symptoms and interviews with pre-prepared scripts. Data analysis using descriptive and inferential statistics and Thematic Content Analysis. **Results:** Most of the nursing sector participants worked 40 hours a week. The most affected areas are the shoulders, upper back, and neck, ranging from moderate (42%) to severe (10%) pain. Statistically significant differences related to pain and fear of contracting COVID-19 between those with previous health problems and nurses. **Conclusion:** Given that pain can be associated with working conditions, it is essential to identify risk factors to avoid further damage to workers' health.

KEYWORDS: Musculoskeletal Pain; Health Personnel; COVID-19; Occupational Health; Primary Health Care.

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INTRODUCTION

Musculoskeletal disorders have become a major public health problem and are responsible for a high proportion of work-related injuries[1]. Musculoskeletal pain (MSP) is a common symptom of musculoskeletal disorders, with a high prevalence among health professionals[2].

Symptoms of physical and mental illness such as stress and pain are among the main complaints of health professionals in several national and international studies[2-6], both before and during the pandemic, increasing absenteeism rates and time off work. This highlights the need for a closer look at the health of the professionals involved in the care process.

It is known that, during the pandemic, it was necessary to reorganize health services and the work process, with a notable increase in these professionals' physical and mental overload. These factors favor the onset of pain, as was shown in a study of hospital health professionals[7].

On the other hand, Primary Health Care (PHC) units are environments permeated with stressors that cause physical and emotional strain, especially during the Coronavirus Disease 2019 (COVID-19) pandemic[8]. In this sense, it is understood that, in addition to the care provided in PHC, professionals had to deal with the increased demand for services and inadequate physical space, work overload and insecurity, and increasing stressors in the work environment, which favored pain.

Considering that PHC plays an important role in ensuring the population has full access to health care, it is essential to know the reality of the professionals who work in this area. It is known that pain associated with working conditions has affected the health of professionals and that it can be prevented and treated early. It is essential to identify the factors contributing to its occurrence to avoid further damage to workers' health, which sets this research apart. Given the above, this study aims to analyze MSP in PHC health professionals and their experience during the COVID-19 pandemic.

METHOD

This is a mixed-methods study of the sequential explanatory type, which combines data from a quantitative stage followed by a qualitative stage. This study allowed qualitative evidence to be used to deepen and explain the quantitative findings[9]. More weight was given to quantitative analysis (correlational cross-sectional study) and less to qualitative analysis (descriptive qualitative study).

The study was conducted in the PHC of a municipality in the south of Brazil, which has four Basic Health Units and 18 Family Health Strategies, all of which took part in the study. The target audience consisted of 162 health professionals working in PHC: doctors, nurses, nursing technicians, nutritionists, and dental professionals. However, 50 participated, representing 32.4% of the total universe proposed. As this was a viable population for the study design, it was decided to work with the entire eligible population, using the response rate as the sampling parameter.

The inclusion criteria were being a nurse, dentist, doctor, or nutritionist and working in PHC during the pandemic. Health professionals on vacation, sick leave, maternity leave, or any other type of leave at the time of data collection were excluded, as were those who did not respond to the researchers' four face-to-face and online contact attempts.

First phase: instruments and quantitative data collection

Quantitative data collection took place from June to November 2021, using a self-administered online instrument built on *Google Forms*: Sociodemographic, work, and clinical questionnaire; Nordic Questionnaire of Musculoskeletal Symptoms (QNSO); and numerical pain assessment scale. The instrument was sent to the study population via e-mails and messaging apps. Secondly, a face-to-face data collection stage was conducted to access the professionals who had not responded online. After the research objectives had been explained, the printed questionnaire was given to the participants at the units.

The socio-demographic, work, and clinical questionnaire was drawn up by the researchers and included the following variables: gender; age; marital status; children; education; postgraduate studies; job title; work unit; workload; working hours; length of time working in the sector; physical activity; health problems; use of medication; time off work, followed by COVID-19 questions related to contingency and contamination measures.

The QNSO, translated into Portuguese in 2003, consists of 36 multiple, dichotomous questions regarding the occurrence of pain, tingling/numbness in nine anatomical regions (neck, shoulders, upper back, elbows, wrists/hands, lower back, hip/thigh, knees, ankles/feet) in the last 12 months and the last seven days, whether you have been prevented from carrying out normal activities, and whether you have consulted a health professional (doctor or physiotherapist) because of this condition[10].

A numerical pain assessment scale was used to classify the intensity of pain, from zero to 10: zero represents "no pain"; mild pain, from one to four; moderate pain, from five to six; and severe pain, from seven to 10 "maximum pain"[11].

Two independent typists entered the quantitative data into the Microsoft Excel® program and then compared it to check for possible typing errors. They were then transferred to the *Statistical Package for Social Science* (SPSS) software and analyzed using descriptive and inferential statistics. Descriptive and analytical statistics were used to characterize the participants' sociodemographic, work, and clinical variables. Quantitative variables were described using measures of central tendency and dispersion. The chi-square and *Fisher*'s exact tests were used to determine the association and correlation between the variables, with p-values < 0.05 considered significant.

Second phase: instrument and qualitative data collection

Qualitative data was collected from December 2021 to February 2022. This stage aimed to search for subjective data that would help to elucidate the relationship between pain and work during the pandemic. Individual semi-structured interviews were conducted with 14 professionals: doctors, nutritionists, nurses, nursing technicians, and dentists. The professionals were selected through a simple random draw with those who participated in the quantitative stage. The qualitative stage was, therefore, an offshoot of the quantitative stage.

The number of participants was established using the criterion of theoretical data saturation[12]. Therefore, the collection was interrupted when 14 interviews had been completed, as the results were considered sufficient for this stage.

The interviews were conducted using a script drawn up by the researchers, covering the following topics: perceptions of work during the pandemic, factors that favored experiences of pain, and the interface with work during the pandemic. The investigation of these findings was important to build up a qualitative database whose content would make it possible to find information that could shed light on the quantitative findings.

The main researcher conducted the interviews online, which lasted an average of 35 minutes. A team of transcribers from the Universidade Federal de Santa Maria research group recorded and transcribed the interviews. After the transcriptions, double-checking was carried out to check for possible errors and strengthen the reliability of the data—the full transcript of the interviews made up the qualitative *corpus* for the analysis.

The qualitative data was submitted to Thematic Content Analysis and organized into three stages: pre-analysis, exploration of the material, and data treatment/interpretation[13]. Pre-analysis is the first moment the researcher comes into contact with the empirical material[13]. We strictly transcribed the speeches as they appeared from the recordings. Afterward, a floating reading was carried out to delve deeper into the content. After reading and re-reading the material, it was refined and organized according to the research proposal. At the end of this stage, it was possible to organize the theoretical content in such a way as to highlight the statements that met the study's objective. Participants were identified with the PS letter ("Health Professional"), followed by a random cardinal number.

Exploring the material involves a long phase: identifying, breaking down, and coding the emerging themes into Registration Units (RU), grouping them by content similarity, and building categories to help understand and synthesize the main findings[13]. At this stage, the material produced from the interviews was organized and grouped into three URs (tiredness, musculoskeletal pain, and work overload). These URs were grouped by affinity and organized into an analytical category: Interfaces between work and physical health.

Finally, when processing and interpreting the data, once the results are significant and reliable, the researcher can make inferences and advance interpretations according to the objective or even data obtained unexpected way[13]. This stage coincided with the data triangulation process, i.e., the qualitative findings were interpreted in the light of the quantitative findings and the national and international literature. The triangulation was consolidated in the joint discussion of the results.

The local Research Ethics Committee approved the project under opinion no. 30792920.5.1001.5350.

RESULTS

Fifty health professionals took part in the quantitative stage. The sample was predominantly female, 44 (88%), 19 (38%) aged between 41 and 50, married 30 (60%), 37 (74%) with children, 21 (42%) are nurses, 24 (48%) have been trained for more than sixteen years. Concerning working hours, the highest percentage, 27 (54%), corresponded to eight hours a day, as shown in Table 1.

Table 1 - Sociodemographic, clinical, and work-related characteristics and pain intensity of PHC health professionals (*n = 50). Ijuí (RS), Brazil, 2021.

				Musculoskeletal pain				
Variables	n*	n*	%†	Without Pain	Lightweight	Moderate	Intense	p-value
Sex	Female	44	88	9(20,5)	10(22,7)	20(45,5)	5(11,4)	0,14‡
	Male	6	12	1(16,7)	4(66,7)	1(16,7)	0(0)	

Marital status	Married	30	60	5(16,7)	11(36,7)	11(36,7)	3(10)	0,36‡
	Single	7	14	3(42,9)	2(28,6)	1(14,3)	1(14,3)	
	Separated	3	6	5(33,3)	0(0)	2(66,7)	0(0)	
	Stable union	10	20	1(10)	1(10)	7(70)	1(10)	
She has children	Yes	37	74	7(18,9)	10(27)	16(43,2)	4(10,8)	0,96‡
	No	13	26	3(23,1)	4(30,8)	5(38,5)	1(7,7)	
Profession	Nurse	21	42	1(4,8)	3(14,3)	14(66,7)	3(14,3)	0,01‡
	Nursing Technician	13	26	4(30,8)	4(30,8)	4(30,8)	1(7,7)	
	Doctor	11	22	4(36,4)	4(36,4)	3(27,3)	0(0)	
	Nutritionist	2	4	1(50)	1(50)	0(0)	0(0)	
	Dentist	2	4	0(0)	2(100)	0(0)	0(0)	
	Dental assistant	1	2	0(0)	0(0)	0(0)	1(100)	
Post-graduation	Yes	24	48	2(8,3)	5(20,8)	14(58,3)	3(12,5)	0,06‡
	No	26	52	8(30,8)	9(34,6)	7(26,9)	2(7,7)	
Health problem	Yes	24	48	2(8,3)	6(25)	11(45,8)	5(20,8)	0,03‡
	No	26	52	8(30,8)	8(30,8)	10(38,5)	0(0)	
Fear of contracting COVID-19	Yes	37	74	4(10,8)	12(32,4)	17(45,9)	4(10,8)	0,04‡
	No	13	26	6(46,2)	2(15,4)	4(30,8)	1(7,7)	
Total	50	100	10(20)	14(28)	21(42)	5(10)		

Source: Authors (2021).

Legend: * n: Sample; †: Percentage; ‡ Fisher 's test for $p<0.05$.

There was a statistically significant difference between greater pain intensity and fear of contracting COVID-19, with higher pain scores among those who were afraid of becoming infected with the virus. Also, between pain and those who reported previous health problems. Also, intensity varies between moderate and severe pain between pain and the profession variable.

Table 2 then shows the results regarding musculoskeletal pain by anatomical region, problems such as pain, tingling/numbness in the last 12 months and the seven days before data collection, the inability to carry out daily activities in the last 12 months, and the need to seek professional help to treat pain symptoms.

Table 2 - Frequency of musculoskeletal pain, by anatomical region, reported by health professionals (ǁn= 50) in PHC. Ijuí (RS), Brazil, 2021.

Musculoskeletal pain		PDF*	IAN†	CPS‡	PR§
Division of the body		nǁ (%)	nǁ (%)	nǁ (%)	nǁ (%)
	Neck	22(44)	5(10)	8(16)	10(20)
	Shoulders	27(54)	7(14)	9(18)	12(24)
	Upper back	24(48)	4(8)	6(12)	8(16)
	Elbows	3(6)	0(0)	1(2)	0(0)
	Fists or hand	12(24)	6(12)	1(2)	6(12)
	Lower back	17(34)	6(12)	7(14)	7(14)
	Hips/thighs	6(12)	2(4)	1(2)	2(4)
	Knees	7(14)	4(8)	2(4)	0(0)
	Ankles/feet	8(16)	4(8)	2(4)	5(10)

Source: Authors (2021).

Legend: *PDF: had problems such as pain, tingling/numbness in the last 12 months; †IAN: had an impediment to carrying out daily activities in the last 12 months; ‡CPS: consulted a health professional in the last 12 months; §PR: had problems such as pain, tingling/numbness in the last seven days; ǁn: sample.

In the qualitative stage, among the 14 interviewees, there was a predominance of females (n=12, 85.7%), nurses (n=8, 57.1%), and an average age between 31-40 years (50%).

Interfaces between work and physical health

The category to be discussed concerns the interfaces between work during the pandemic and the physical health of PHC health professionals. The participants reported their pain, highlighting the interference with their well-being and the need for specialized help, as can be seen in the following excerpts:

I felt a lot of pain at the end of the day: pain in my body, pain in my joints, especially in my knee. We *spend a lot of time on our feet, with back pain, more intense back pain, and tiredness* (PS 5).

I had a lot of pain; the muscle pain was concentrated in my shoulders and back. There were times when I needed chiropractic (PS 3).

The testimonies indicated that the MSP arose as a consequence of the work overload experienced by professionals during the COVID-19 pandemic, which reinforces the *interfaces* between pain, work, and the pandemic context:

The demand was excessive; there was a lot of spontaneous demand, and we almost didn't manage to work with those who were scheduled. The teams were not increased; we continued with the same professionals, with a much greater overload. In the middle of the vaccine, the dressing came, the patient got sick, and we had to manage it all (PS 3).

Sometimes, we get overloaded due to the absence of colleagues and employees who are away, and no one else is put in their place; they must be replaced by those who remain. It *certainly gave me a work overload* (PS 11).

Tiredness was a clear element in the qualitative findings. The interviewees pointed to the intensification of work during the pandemic. In this context, pain was related to exhaustion and impaired quality of life (such as insomnia and changes in eating patterns).

I notice a big difference between before and now. I don't know if it's due to work overload or wearing a mask. But I notice an excess of tiredness (PS 1).

We end up not sleeping properly and not eating properly. I say that the question of exhaustion or tiredness, I've always had a heavy workload, but I've never worked as hard as I have during the pandemic (PS 9).

By triangulating the data, we can see the *interfaces* between work during the pandemic and the physical health of PHC professionals. The testimonies showed that this is related to the elements that make up the working conditions of these professionals, linked to the environment in which they are inserted. The activities carried out are directly related to the patient and the family. And with the pandemic scenario, they had to deal with an even greater demand, which required a great effort on the part of the professionals.

The changes that took place in the units to maintain care were accompanied by postures and environments that were unsuitable for care, work overload, an insufficient number of professionals on the team, a lack of knowledge about the new disease, and also insecurity in the provision of care are factors that are demonstrated in the reports of the participants in the interviews and are pointed out as being responsible for contributing to the damage to the physical and emotional health of these professionals, contributing to the onset of pain and altering their quality of life.

DISCUSSION

New challenges have been imposed on PHC health professionals, who have had to work in different scenarios than usual due to the COVID-19 pandemic. This has contributed to the physical health of these professionals being negatively affected and has favored the emergence of symptoms of musculoskeletal disorders, such as pain. This is based on the reflections that emerged from the analysis of the results of this study, in which health professionals reported the presence of MSP of varying intensities and in different anatomical regions.

MSP can cause limitations in daily activities and at work and is responsible for high rates of sick leave and retirement[14]. Due to the nature of the services provided by health professionals and their frequent exposure to risk factors in the workplace, they are more susceptible to developing pain, which can interfere with the quality of their work and increase absenteeism rates[1,15].

Thus, the pandemic has increased occupational risks, contributing to the illness of professionals involved in care management. The qualitative results showed the professionals' perception of emotional and physical overload, with complaints of pain. In addition, they revealed dissatisfaction with the quality of their sleep and diet, tiredness, and the use of medication, making it possible to perceive high levels of damage to the health of professionals as a result of working during the pandemic.

Of the total, 84% of participants had some physical complaint or pain in one or more anatomical regions in the last year. This suggests that it has become an occupational health problem among PHC professionals during the pandemic. A study in Turkey corroborates these results, in which 94.9% of health professionals in hospital care also had MSPs during the pandemic[7]. This highlights the increase in complaints of physical symptoms due to work in the context of the pandemic.

Thus, most participants reported pain, tingling, and numbness in the last seven days before data collection. Due to the same condition, they could not carry out daily activities in the last twelve months, so seeking professional help to treat these symptoms is necessary. Similar results were found in studies involving health professionals who worked in mobile

emergency services and hospitals[7,16]. The MSP reported by the participants shows that, despite being in varying anatomical regions and percentages, it was experienced by most participants. These results point to the etiology of the pain, which changes from acute to chronic, and suggest the perception of pain related to changes in the work context due to the pandemic.

Regarding pain in the different anatomical regions in the last 12 months, shoulder pain is the most frequent, followed by the upper back and neck. It was also the most cited cause for inability to carry out normal activities and the most frequent in the last seven days. A study in Brazil with nursing professionals from a nephrology unit showed that 46.7% of those interviewed reported shoulder pain in the last 12 months[17].

A national and an international study[5,18] showed that pain affects health professionals in different sectors. In PHC, studies conducted before the pandemic found that the majority of professionals had pain or physical complaints associated with the performance of their activities[5]. In hospital care, complaints of pain were also frequent, as shown by a study in Vietnam in 2018, in which 74.7% of participants had suffered from pain in the last twelve months and 41.1% in the last seven days[18]. This data is justified by the characteristics of the work carried out by these professionals, who often required a great deal of physical and mental effort to carry out their care activities[19], contributing to the increase in complaints of exhaustion and physical symptoms.

Health professionals are prone to developing pain due to the particularities of their work process[19]. By observing the testimonies, it is possible to see that the COVID-19 pandemic required an immediate reorganization of the work process, leading professionals to a new scenario, which demanded new skills and knowledge for the care process, causing greater physical and emotional strain on professionals, increasing the factors that favor pain. Remember that pain can be triggered in individuals exposed to stressful factors that influence quality of life[19].

In addition, there were reports of difficulty in practicing physical activity during the pandemic, a factor that favored the onset of pain[1]. People who do some physical activity are better able to withstand work demands, unlike sedentary individuals. Lack of adequate physical activity is a cause of musculoskeletal disorder symptoms[20].

By analyzing the data and statements collected in the two stages of this research, it is understood that pain symptoms interfere with physical health and may be linked to the workloads and activities routinely carried out by health professionals, regardless of their functions. Although no statistically significant difference was observed between pain and work overload, it is notable that the majority of participants reported fatigue and overload. These factors can be detrimental to workers, both professionally and in social and behavioral terms, as well as contributing to absenteeism, stress, and pain symptoms[21].

About the intensity of the pain, 42% of the professionals reported feeling moderate pain and 10% severe pain. There was a statistically significant difference between the MSP and the variable fear of contracting COVID-19, which can be explained by the fact that psychological demands are important predisposing factors for the onset of pain. Work that requires a great deal of physical and mental effort to perform and care activities carried out within a health unit is responsible for most pain complaints from workers[22].

An association was also found between pain and the occurrence of health problems, which suggests that workers who had a previous illness were more prone to pain, and between pain and the occupation variable, since nurses had greater pain intensity. Nursing professionals exert a great deal of physical and mental effort at work, making them more vulnerable to MSPs, associated with working conditions and workload, and responsible for a large proportion of sick leave[20]. It is therefore necessary to consider appropriate policies for managing the prevention and treatment of pain in health professionals, reducing the harmful effects of these symptoms on their health and work.

The limitations of this study include the fact that the interviews were conducted online, considering that face-to-face contact allows for greater interaction and perception of body language, as well as potential selection bias. Despite this, this study has important results that make it possible to understand the reality experienced by these professionals in PHC and stimulate other research better to characterize the relationship between work and health in PHC.

CONCLUSION

In PHC, professionals are exposed to the risk factors that favor the onset of MSPs. In the study, participants' reports showed that the most affected areas are the shoulders, upper back, and neck, with pain ranging from moderate to severe. In addition, working in PHC during the pandemic has had an impact on the lives of health professionals, causing an overload of work, which has led to greater complaints of pain, tiredness, and physical and mental exhaustion.

This study revealed that health professionals are susceptible to the pain inherent in the work process. It made it possible to identify factors contributing to the emergence and worsening of MSP symptoms in PHC workers during the COVID-19 pandemic. Furthermore, it highlights the importance of implementing strategies and public policies aimed at the health care of health professionals, given that pain is a public health problem that directly affects the quality of life of these professionals and the quality of their care.

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