http://www.periodicos.uem.br/ojs/index.php/CiencCuidSaude
ISSN on-line1984-7513
DOI: 10.4025/cienccuidsaude.v24i1.78859

ORIGINAL ARTICLE

MUSCULOSKELETAL CHANGES IN NURSING PROFESSIONALS AT UNIVERSITY HOSPITALS IN THE CONTEXT OF COVID-19: A MULTICENTER STUDY

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ABSTRACT

Objective: To understand the use of integrative and complementary practices in the context of palliative care. **Method:** Qualitative research, whose data collection was carried out in June 2021, by application of a semi-structured instrument with 11 health professionals and a spiritual assistant from two public hospitals linked to clinical units and palliative care commission, in Florianópolis, Santa Catarina. Thematic Content Analysis directed to the analytical processes. Study approved by the Research Ethics Committee of the Federal University of Santa Catarina, under opinion 4.079.038. **Results:** Two categories emerged from the analysis, the first: Ways of understanding the process of death and dying and the Integrative and Complementary Practices, in which there is the recognition of the finitude and importance of palliative care and the relationship of these practices as mitigating suffering. The second category: Structure of the assistance by the Integrative and Complementary Practices in palliative care, where they show the decision-making regarding the application of the practices in palliative care. **Final thoughts:** The findings allow to reflect on the importance of integrative practices, through the recognition of professionals as an approach that improves health care.

Keywords: Occupational health. Musculoskeletal disorders. Nursing. Healthcare workers. Hospitals.

INTRODUCTION

Work-related musculoskeletal disorders (WRMDs) are a global public health problem, which makes it essential to deepen our understanding of their causes, especially in the workplace, given the growing trend of these conditions[1]. In this sense, WRMDs encompass a variety of discomforts and inflammatory or degenerative changes that affect muscles, tendons, ligaments, joints, peripheral nerves, and supporting vessels[2].

These conditions are commonly associated with exposure to repetitive strain, physical overload, and poor posture at work, thereby compromising workers' health and functional performance[2]. Among nursing professionals, WRMDs are primarily associated with work conditions that require intense physical effort, such as frequent patient handling, prolonged periods in inappropriate postures, and repetitive standardized movements. In addition, factors such as long working hours, insufficient preventive training, and professional inexperience increase these workers' susceptibility to musculoskeletal disorders[3].

It is well established that preventing musculoskeletal disorders requires early identification of workplace risk factors. Strategies such as ergonomics training, regular breaks, job rotation, and workstation adjustments are identified as effective measures for reducing occupational illness[4].

During the COVID-19 pandemic, working conditions changed abruptly, leading to increased risk factors, primarily due to increased workload and working hours, as well as deteriorating work and emotional conditions[5,6].

During this period, measures to reduce occupational illness were often neglected due to unfavorable working conditions, resulting in increased risks and a consequent rise in health problems among nursing professionals[5,6].

In this context, coordinated action between

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managers and workers is essential for promoting safer working environments and for formulating public policies focused on the occupational health of these professionals[4]. Furthermore, knowledge gained from the pandemic experience can support team training to enhance professional performance without compromising physical and mental health[7].

It is recognized that the impact of WRMDs can compromise the quality of care, as physical discomfort and sick leave make it challenging to perform professional activities[3].

In the national context, a study conducted between 2013 and 2018 among nursing professionals identified WRMDs as the second leading cause of sick leave in an emergency hospital service in southern Brazil[8]. These findings converge with international evidence, since a meta-analysis involving 42 studies conducted between 2000 and 2021 on different continents, pointed to an annual prevalence of 77.2% of WRMDs among nurses working in hospitals, highlighting the impact of work activities on the musculoskeletal health of this category, especially in the lumbar, cervical, and shoulder regions[9]. Corroborating these results, studies conducted in southern Brazil indicate that the pandemic period has increased the incidence of WMSDs among healthcare professionals, reinforcing the vulnerability of this population during health crises[5,6].

WRMDs are also significant predictors of prolonged absenteeism, increasing the likelihood of leave exceeding 15 days by more than 8-fold. This phenomenon reinforces the role of musculoskeletal disorders as a frequent cause of illness among nurses, associated with the physical and repetitive demands of the job[8]. Based on the above, it can be inferred that in health crisis scenarios, absenteeism tends to exacerbate the workload of nursing teams, thereby intensifying the risk of WRMDs.

Considering the above, the objective was to identify musculoskeletal changes that emerged during the COVID-19 pandemic among nursing professionals in university hospitals.

METHOD

This is a quantitative, descriptive, multicenter study entitled "Work processes and health of nursing professionals in the COVID-19 pandemic: a mixed methods study," with the overall objective of "Analyzing the work process and health changes among hospital nursing professionals in light of the working conditions imposed by the COVID-19 pandemic." It was conducted in three federal university hospitals administered by the Brazilian Hospital Services Company (Ebserh) in the state of Rio Grande do Sul, Brazil, namely: HU Dr. Miguel Riet Correa Junior, Rio Grande/RS; Hospital Escola, Pelotas/RS; and Hospital Universitário, Santa Maria/RS. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)[10] checklist was used to elaborate the article.

The data were collected between October 2022 and August 2023 from nursing professionals (nurses, technicians, and assistants) working in the three hospitals, selected for convenience, for the multicenter study. The population was estimated at approximately 3,000 professionals distributed among the three institutions. The sample size was calculated assuming the maximum variability of the events studied (p=0.5), a 95% confidence level, a 5% sampling error, and a design effect of 1, yielding a minimum sample size of 325 participants. Given an estimated response rate of 70%, the sample was adjusted to 465 professionals.

In selecting interviewees, the inclusion criteria were that they were nursing professionals who had worked during the COVID-19 pandemic. Professionals who were on leave or vacation during the designated data-collection period at their institution/sector were excluded. This sample included participants who responded to the study's dependent variable, "Did you develop any musculoskeletal changes during the COVID-19 pandemic?", totaling 461 respondents, including 176 nurses, 260 technicians, and 25 nursing assistants. Data collection was conducted by three postgraduate students and five undergraduate nursing students, all of whom had received appropriate training.

The professionals were approached at their workplace and invited to participate in the study by signing the Free and Informed Consent Form. A structured, self-administered form, developed by the researchers, was used to collect sociodemographic, occupational, and health data. When distributing the forms, the data collection team agreed on a date for their collection, with two attempts per professional. The response rate was

75%, meeting the target number of respondents.

For this study, musculoskeletal changes will be considered as the dependent variable, and the independent variables will be the hospital where they work, gender, professional category, unit of operation, other employment in the health field, length of service at the hospital, weekly workload, length of service in nursing, and chronic illness.

The data were entered twice into EpiData and then transferred to Stata 13.1, where descriptive statistics were computed, including absolute and relative frequency distributions and measures of central tendency. The chi-square or Fisher's exact test was used to assess statistical significance in the distributions, with $p < 0.05$.

The ethical principles of Resolution No. 466/12 of the National Health Council[11] were respected, with a favorable opinion issued by the Research Ethics Committee of the Nursing School of the Federal University of Pelotas No. 5,498,487, approved on June 29, 2022.

RESULTS

Table 1 shows the sociodemographic and clinical characteristics of nursing staff at the three university hospitals managed by EBSERH in Rio Grande do Sul, stratified by the presence of musculoskeletal changes developed during the COVID-19 pandemic. Of the 461 nursing professionals included in the study, 15.2% (70) reported musculoskeletal changes during the COVID-19 pandemic.

Table 1. Characteristics of nursing staff at three university hospitals managed by the Brazilian Hospital Services Company in Rio Grande do Sul, stratified by self-reported musculoskeletal disorders during the COVID-19 pandemic (N=461), 2025

Characteristics of workers	Musculoskeletal change				*p*-value
	Yes (n=70)		No (n=391)		
	n	%	n	%	
Hospital where you work (n=461)					
Hospital 1	28	15.1	158	84.9	
Hospital 2	25	16.3	128	83.7	0.86
Hospital 3	17	13.9	105	86.1	
Gender (n=450)					
Female	54	14.3	324	85.8	0.09
Male	16	22.2	56	77.8	
Professional category (n=461)					
Higher education	23	13.1	153	86.9	0.32
Secondary education	47	16.5	238	83.5	
Operating unit (n=459)					
Adult critical care units	32	13.2	210	86.8	0.20
Adult clinical units	38	17.5	179	82.5	
Length of professional experience					
Up to 5 years	30	13.3	195	86.7	0.33
Between 5 and 10 years	31	18.5	137	81.5	
Over 10 years	9	13.2	59	86.8	
Other employment relationship (n=460)					
Yes	12	19.3	50	80.7	0.33
No	58	14.6	340	85.4	
Weekly workload (n=461)					
Up to 36 hours	60	15.7	321	84.3	0.43
Over 36 hours	10	12.5	70	87.5	
Chronic disease (n=454)					
Yes	34	23.3	112	76.7	
No	34	11.0	274	89.0	0.00

Data source: database from the study "Work processes and health of nursing professionals in the COVID-19 pandemic: mixed methods study, 2022–2023"

*Fisher's exact test

The incidence of musculoskeletal disorders was distributed proportionally across hospitals, with a slight predominance at Hospital 2. A higher frequency was observed among male professionals with secondary education who worked in clinical units and had between five and ten years of experience. The injuries were similarly distributed according to skin color and marital status. Among the affected professionals, the presence of another employment relationship and a weekly workload of up to 36 hours predominated. The only variable that showed a statistically significant association was the presence of musculoskeletal disorders among professionals with a history of chronic disease ($p < 0.001$).

Table 2. Perceptions of aspects of nursing work in the three university hospitals managed by the Brazilian Hospital Services Company in Rio Grande do Sul, stratified by self-reported musculoskeletal changes during the COVID-19 pandemic (N=461), 2025.

Characteristics of workers	Musculoskeletal change				*p*-value
	Yes (n=70)		No (n=391)		
	n	%	n	%	
Safety (n=459)					
Excellent	7	15.9	37	84.1	
Good	38	15.6	205	84.4	0.99
Fair	21	14.6	123	85.4	
Poor	4	14.3	24	85.7	
Rest period between shifts(n=442)					
Enough	39	13.8	244	86.2	0.21
Insufficient	29	18.2	130	81.8	
Comfort (n=460)					
Excellent	7	25.0	21	75.0	0.41
Good	22	14.4	131	85.6	
Fair	25	16.2	129	83.8	
Poor	16	12.8	109	87.2	

Data source: database from the study "Work processes and health of nursing professionals in the COVID-19 pandemic: mixed methods study, 2022–2023"

Table 2 presents nursing professionals' perceptions of work-related aspects, stratified by the presence of musculoskeletal changes during the COVID-19 pandemic. No statistically significant associations were observed. However, a higher proportion of musculoskeletal changes was noted among professionals who rated their rest period as insufficient (18.2%) and among those who rated their workplace comfort as excellent (25.0%). The perception of safety showed a similar distribution among the categories excellent, good, fair, and poor, indicating homogeneity in the occurrence of musculoskeletal changes regardless of the assessment of this aspect.

DISCUSSION

WRMDs are a significant public health problem, especially in developed countries, and are associated with work environments characterized by repetitive activities and high levels of stress. These conditions negatively affect the performance of nursing professionals and have significant social, cultural, and economic consequences[3]. It is known that the hospital environment favors exposure to multiple occupational risks that contribute to physical and mental illness, including moderate to high-intensity musculoskeletal pain[2], reinforcing that hospital work, especially in health crisis scenarios such as COVID-19, is a significant risk factor for the development of WRMDs among nursing workers.

The prevalence of musculoskeletal disorders found, at 15.2%, was lower than that reported in the literature. In a cross-sectional study of 309 nurses in Ghana, 75.3% reported musculoskeletal disorders attributable to work in the past 12 months[12]. In Malaysia, a prevalence of 97.3% was observed among 300 nurses who reported musculoskeletal pain in the past 12 months[13]. In the Brazilian context, a prevalence of 77.3% was

also observed among 205 health professionals in the previous 12 months during the pandemic period, as assessed using the Nordic Musculoskeletal Symptom Questionnaire (QNSO)[6]. This divergence may be related to memory bias, as the professionals in the present study were interviewed after the pandemic. Furthermore, the data collection instrument did not include in-depth questions about musculoskeletal changes, which may have contributed to an underestimation of the prevalence of these conditions among study participants.

In this study, a higher proportion of musculoskeletal disorders was found among male professionals, contrary to the findings of other studies that showed a higher prevalence among females[6] and a higher likelihood of women developing musculoskeletal disorders (MSDs)[14]. It should be noted that most nursing staff are female, and many of these professionals have heavy domestic workloads that encroach on time that should be devoted to rest and leisure [6].

However, the interference of sociocultural issues, both in exposure and response to risk, places males, especially nursing technicians, who usually take on heavier tasks and tend to be less concerned with ergonomics, at high risk for back pain related to heavy lifting[15], which may justify the findings of the present study. Given the gendered aspects highlighted, there must be an institutional proposal for continuing education in ergonomics that accounts for these particularities to adapt working conditions and promote the health and safety of all workers.

Among professional categories, mid-level professionals exhibited the highest proportion of changes in the present study. Corroborating this idea, a study focusing on nursing technicians in Hafr Al-Batin, Saudi Arabia, concluded that these professionals are particularly vulnerable to WMSDs due to the physically demanding nature of their work, with a 12-month prevalence of 78.4%. The tasks that contribute to this include lifting and transferring patients, standing for long periods, and adopting inappropriate postures[16]. These findings reinforce the occupational vulnerability of these professionals and underscore the need for educational and technological interventions to improve ergonomic and organizational conditions in the workplace.

The type of unit in which professionals with musculoskeletal disorders were most frequently identified was adult clinical units. This data differs from some of the literature[16], which points to the Intensive Care Unit (ICU) as having the highest prevalence due to the complexity of critical care. However, adult clinical units have structural particularities that justify this finding, especially in the context of a pandemic.

While ICUs have continuous technological monitoring and full-time medical staff, inpatient units lack these resources, which increases the psychological and physical demands on nursing staff and thereby necessitates more constant bedside monitoring and frequent vital-sign checks[18].

In addition, ergonomic conditions in these units are often exacerbated through inadequate furniture, such as stretchers with manual height adjustments, which require greater biomechanical effort during patient handling[19]. Therefore, the high volume of bedridden patients, coupled with less technological incorporation and less rigorous staffing levels than in intensive care, generates a disproportionate physical overload, corroborating the high prevalence of WRMDs identified in this sector.

Musculoskeletal disorders were predominant in the group of workers who reported having worked for between 5 and 10 years, multiple employment contracts, a weekly workload of up to 36 hours, and unsatisfactory rest periods between work shifts. These results should be discussed together, as they pertain to long working hours and high workloads, which directly contribute to the onset of musculoskeletal disorders.

These results were consistent with those from a systematic review that identified occupational factors (work shift, work unit, and length of experience) as risk factors for low back pain among healthcare professionals. In addition, it notes that with increasing years of work and time, the likelihood of physical injuries increases[20].

In the context of the COVID-19 pandemic, this scenario has become even more evident, with an intensification of the workload and a reduction in rest periods, according to a study conducted in a Brazilian capital with 121 nursing professionals, in which 45.3% reported exceeding their daily workload and 21.8% reported not having any rest periods during their shift[21].

It is recognized that maintaining multiple

employment relationships is associated with work overload and a greater risk of pain and health problems among nursing professionals, as it increases working hours. In this sense, it should be noted that the accumulation of employment relationships reflects not only the pursuit of higher income but also highlights the problem of low pay in nursing, exacerbated by the historical devaluation of the profession and the slow implementation of the minimum wage[22]. These elements favor presenteeism and disrupt the continuity of care, necessitating institutional strategies to value and retain these professionals.

The 36-hour workweek typically involves six consecutive days of work, leaving less time for rest or leisure, which may contribute to musculoskeletal changes among participants in the present study. Corroborating this finding, a study conducted in Ghana[11]) found that the absence of adequate breaks or rest intervals between workdays contributes to the development of WRMDs, underscoring the importance of recovery time within the work routine as a preventive measure.

This problem was exacerbated during the COVID-19 pandemic, due to the removal of professionals from risk groups and the adoption of emergency hiring. In this context, marked by a reduction in the available workforce and an increase in job opportunities, employment relationships among nursing professionals [23] have proliferated thereby increasing the risk of WRMDs.

In addition to the elements discussed above, the pandemic has intensified occupational risks, aggravating the physical and mental exhaustion accumulated over the years, often due to the lack of time and conditions for recovery and the adoption of effective preventive measures[24], which has led to an accumulation of problems for the post-pandemic period. During this period, representative entities of the category, such as the Order of Nurses, also issued warnings about the seriousness of the situation, highlighting the shortage of Personal Protective Equipment (PPE) and the increased risks to the safety of professionals and the population, evidencing the impact of the health crisis on nursing[25].

Given the above, it is essential to develop institutional strategies, with the support of professional associations, to reduce the workload of nursing staff. In addition to public policies that value the profession, the profession's struggle for a 30-hour workweek stands out as a measure to minimize illness. This reduction in working hours is considered a means of reducing constant exposure to stressors, thereby directly contributing to professional valorization and the physical and emotional well-being of workers[26].

In the present study, there was statistical significance in the association between the presence of chronic diseases and WRMDs, consistent with findings from a study of primary health care professionals during the COVID-19 pandemic[27]. Musculoskeletal disorders in nursing professionals impact work performance through presenteeism. In the study, only 10.9% took time off work, whereas 63.9% continued working despite health problems. Those with MSDs in the previous week were 3.74 times more likely to experience presenteeism, 3.0 times more likely to experience loss of productivity, and 2.24 times more likely to experience limitations at work[26], which can compromise the continuity and quality of care. It is noteworthy that the association between the presence of chronic diseases and musculoskeletal disorders reinforces the need for special attention to workers with greater clinical vulnerability, showing that previous illness potentiates the impacts of work overload.

Considering the above, the construction of safer work environments and the implementation of ergonomic measures are fundamental strategies for preventing musculoskeletal injuries among nursing professionals. Such actions include providing training on ergonomics, scheduled breaks, the use of adjustable furniture, lifting equipment, and planned workspaces, as well as implementing preventive programs with safety protocols and early response to signs of injury. These strategies aim to promote the health of nursing staff by reducing occupational risks associated with repetitive work and prolonged standing, both of which are strongly related to the development of WRMDs[28,12].

Regarding limitations, it should be noted that this study is an excerpt from a broader multicenter investigation, whose main objective was not the specific evaluation of WRMDs. Thus, the data collection form was insufficiently sensitive. The possibility of memory bias compounds this, as professionals were questioned retrospectively about experiences during the pandemic, which may

have influenced the accuracy of self-reported information and, consequently, the estimate of the occurrence of these conditions.

CONCLUSION

The findings indicate that musculoskeletal changes cannot be understood in isolation, but result from the interaction between individual and organizational conditions, intensified by the pandemic scenario. In this sense, the pandemic context has exacerbated existing inequalities in nursing working conditions, such as long working hours, multiple jobs, and insufficient rest periods, thereby contributing to accumulated physical exhaustion.

The results have direct implications for hospital management and institutional policy formulation, underscoring the urgency of strategies to promote worker health. Measures such as reorganizing work schedules, strengthening worker health surveillance programs, implementing ergonomic interventions, and professional recognition are fundamental to preventing musculoskeletal disorders and sustaining nursing work during health crises.

Finally, this study contributes to the knowledge base on the pandemic's occupational impacts on hospital nursing by highlighting the need for integrated approaches among management, surveillance, and worker care. It is recommended that future investigations deepen this analysis by triangulating self-reported data with institutional leave records, WRMD notifications, and occupational health indicators, and by incorporating variables related to ergonomic practices and work organization to broaden understanding of the determinants of musculoskeletal disorders in this professional group.

ALTERAÇÕES MUSCULOESQUELÉTICAS EM PROFISSIONAIS DE ENFERMAGEM DE HOSPITAIS UNIVERSITÁRIOS NO CONTEXTO DA COVID-19: ESTUDO MULTICÊNTRICO

RESUMO

Objetivo: identificar alterações musculoesqueléticas desenvolvidas durante a pandemia de COVID-19 por profissionais de enfermagem de hospitais universitários. **Método:** estudo quantitativo, descritivo e multicêntrico, realizado entre outubro de 2022 e agosto de 2023, com 461 profissionais (enfermeiros, técnicos e auxiliares) atuantes em três hospitais universitários administrados pela Empresa Brasileira de Serviços Hospitalares no Rio Grande do Sul. Coleta com formulário estruturado, análise no Stata 13.1, com estatística descritiva e testes de associação (qui-quadrado ou exato de Fisher, p<0,05). **Resultados:** identificou-se 15,2% (n=70) de alterações musculoesqueléticas. A maior proporção ocorreu entre profissionais do sexo masculino (22,2%), de nível médio (16,5%), atuantes em unidades clínicas (17,5%) e com tempo de serviço entre 5 e 10 anos (18,5%). Observou-se maior ocorrência entre aqueles com outro vínculo empregatício (19,3%), carga horária até 36 horas semanais (15,7%) e descanso inadequado (18,2%). Verificou-se associação significativa entre doenças crônicas e alterações musculoesqueléticas (23,3%; p=0,00). **Conclusão:** o estudo evidenciou que as alterações musculoesqueléticas entre trabalhadores da enfermagem estiveram associadas a fatores ocupacionais e clínicos.

Palavras-chave: Saúde ocupacional. Doenças musculoesqueléticas. Enfermagem. Trabalhadores da saúde. Hospitais.

ALTERACIONES MUSCULOESQUELÉTICAS EN PROFESIONALES DE ENFERMERÍA DE HOSPITALES UNIVERSITARIOS EN EL CONTEXTO DEL COVID-19: ESTUDIO MULTICÉNTRICO

RESUMEN

Objetivo: identificar trastornos musculoesqueléticos desarrollados durante la pandemia de COVID-19 por profesionales de enfermería de hospitales universitarios. **Método**: estudio cuantitativo, descriptivo y multicéntrico, realizado entre octubre de 2022 y agosto de 2023, con 461 profesionales (enfermeros, técnicos y auxiliares) que trabajan en tres hospitales universitarios administrados por la Empresa Brasileña de Servicios Hospitalarios en Rio Grande do Sul/Brasil. Recolección con formulario estructurado, análisis en Stata 13.1, con estadística descriptiva y pruebas de asociación (chi-cuadrado o exacto de Fisher, p<0,05). **Resultados**: se identificó 15,2% (n=70) de alteraciones musculoesqueléticas. La mayor proporción ocurrió entre profesionales masculinos (22,2%), de nivel medio (16,5%), que actuaban en unidades clínicas (17,5%) y con tiempo de servicio entre 5 y 10 años (18,5%). Se observó mayor incidencia entre aquellos con otro vínculo laboral (19,3%), carga horaria hasta 36 horas semanales (15,7%) y descanso inadecuado (18,2%). Se encontró asociación significativa entre enfermedades crónicas y trastornos musculoesqueléticos (23,3%; p=0,00). **Conclusión**: el estudio evidenció que

las alteraciones musculoesqueléticas entre trabajadores de enfermería estuvieron asociadas a factores ocupacionales y clínicos.

Palabras clave: Salud ocupacional. Enfermedades musculoesqueléticas. Enfermería. Trabajadores de la salud. Hospitales.

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Submitted: 09/07/2025
Accepted: 19/12/2025

Financial support:

Fundação de Amparo à Pesquisa do Estado do Rio Grande do Sul (FAPERGS), and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES)