ORIGINAL ARTICLE

Prevalence of musculoskeletal pain in nursing professionals working in orthopedic setting

Prevalência de dor musculoesquelética em profissionais de enfermagem que atuam na ortopedia

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ABSTRACT

BACKGROUND AND OBJECTIVES: Musculoskeletal pain is considered one of the major causes for leave of absence. In the hospital setting, researchers classify the nursing activity as one of the most harmful to human health. The aim of this study was to identify the prevalence of musculoskeletal pain in nursing professionals working in the orthopedic setting at a hospital in the South of Brazil.
METHODS: The study population consisted of 29 nursing professionals among which three were nursing assistant, 23 nurse techs, and three nurses. The workers answered a questionnaire with questions related to musculoskeletal pain (Nordic adapted), sociodemographic profile, labor characteristics, and habits and lifestyle.
RESULTS: The prevalence of musculoskeletal pain in the studied subjects was 96.6% in at least one of the body parts in the last 12 months. The main regions involved were the lower and upper back (79.3 and 75.9%, respectively), the neck (65.5%), the shoulder (62.1%), ankle/feet (55.2%) and wrists/hands (51.7%). Of the professionals studied, 65.5% reported a leave of absence due to health problems in last the 12 months. It was identified that nurse practitioners showed a higher prevalence of pain in the majority of the body regions in comparison to the other professionals.
CONCLUSION: The prevalence of musculoskeletal pain reported by the nursing professionals in the study was considered high. This points to the need for health promotion programs such as exercise at the workplace, ergonomics, pre-established breaks and more professionals in the ward, measures described in the literature that can contribute to reduce the overload and improve the working conditions and quality of life of these professionals.
Keywords: Musculoskeletal abnormalities, Nursing practice, Nursing staff, Orthopedics, Quantitative analysis.

RESUMO

JUSTIFICATIVA E OBJETIVOS: As dores musculoesqueléticas são consideradas uma das principais causas de afastamentos do trabalho. No âmbito hospitalar, pesquisadores classificam a atividade de enfermagem como uma das mais nocivas à saúde humana. O objetivo deste estudo foi identificar a prevalência de dor musculoesquelética em profissionais de enfermagem atuantes na ortopedia de um hospital do Sul do Brasil.
MÉTODOS: Participaram da pesquisa 29 profissionais de enfermagem, sendo três auxiliares, 23 técnicos e três enfermeiros. Os trabalhadores responderam um questionário contendo perguntas referentes às dores musculoesqueléticas (Nórdico adaptado), perfil sociodemográfico, características laborais, e hábitos e estilo de vida.
RESULTADOS: A prevalência de dores musculoesqueléticas nos trabalhadores analisados foi de 96,6% em pelo menos uma das partes corporais nos últimos 12 meses. As principais regiões anatômicas acometidas foram as partes inferiores e superiores das costas (79,3 e 75,9%, respectivamente), o pescoço (65,5%), os ombros (62,1%), os tornozelos/pés (55,2%) e punhos/mãos (51,7%). Dos profissionais analisados, 65,5% relataram ter se afastado do trabalho por motivos de saúde nos últimos 12 meses. Identificou-se que os auxiliares de enfermagem apresentaram maiores prevalências de dores na maioria das regiões anatômicas em comparação aos outros profissionais.
CONCLUSÃO: A prevalência de dor musculoesquelética relatada pelos profissionais de enfermagem analisados foi considerada alta. Aponta-se a necessidade de programas de promoção da saúde como ginástica laboral, ergonomia, pausas pré-estabelecidas e mais profissionais no setor, medidas descritas na literatura que contribuem para diminuir a sobrecarga e melhorar as condições de trabalho e a qualidade de vida dos profissionais.
Descritores: Análise quantitativa, Anormalidades musculoesqueléticas, Enfermagem prática, Equipe de enfermagem, Ortopedia.

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INTRODUCTION

Musculoskeletal disorders are an important cause of morbidity in workers in developed and developing countries[1-4]. Many studies have highlighted the important role of stressful physical activities, psychosocial risk factors and health beliefs, culturally determined in the generation and progression of musculoskeletal injuries. Individual characteristics and cultural circumstances also appear to interfere in the prevalence of these health problems[5-9].

Normative Instruction Nº 98 of the Brazilian Ministry of Health[10] defines musculoskeletal disorders as a set of signs and symptoms of pain, paresthesia, weight sensation, fatigue, movement limitation and incapacity to work. These signs can arise in isolation or simultaneously, and determine work-related musculoskeletal disorders (MSD) and repetitive strain injuries (RSI).

Queiroz et al.[11] refer to musculoskeletal pain as a set of inflammatory and degenerative diseases of the locomotor system. Ranney[12] relates this concept to professional activities, mentioning that there is an imbalance between the repeated mechanical demands of the work and the ability to adapt the body zone reached due to insufficient time for fatigue's recovery. Several studies report that musculoskeletal disorders are frequent in nursing professionals in different fields of activity. These studies indicate that the main anatomical regions affected are the lumbar, the knees, the shoulders and the cervical[13,14].

Nursing professionals are key players in any healthcare team. They perform the most varied functions, work for continuous hours or have more than one job, reflecting the low appreciation of the profession. The American Nursing Association[15,16] defines Nursing as the protection, promotion, and optimization of health. Also, according to this organization, it is the responsibility of the nursing professional to act in the prevention of diseases and injuries, in facilitating healing, in alleviating suffering through diagnosis and treatment of the human being, and in the care of individuals, families, groups, communities and the general public.

In their daily exercise, nursing workers are responsible for moving and dislocating patients. These workers spend a lot of time standing and work with ergonomically obsolete equipment, and may still have very few hours of sleep and rest. Such conditions are predictive factors for exposure to occupational risks and reflect the high rates of removal from work, medical leave and disability retirement[13,17].

Nurses working in hospitals are particularly susceptible to work-related musculoskeletal disorders, as their work activities often involve inadequate postures and strong upper limb movements. In addition, there is a high prevalence of back, neck and shoulder pain[18]. These complications may reflect in varying degrees of functional disability, resulting in increased absenteeism, temporary or permanent removals, as well as treatment costs and indemnities[19]. In addition, as a result of absences from work, the nursing staff becomes even more overwhelmed, which makes it easier for other workers to get sick, forming a vicious cycle.

In the context of hospital institutions, orthopedics represents a section that has intense demands. This sector is responsible for the care of patients with diseases, traumas, bones deformations of bones, muscles, joints, and ligaments, therefore, it is the sector that treats patients who underwent surgical and physical interventions to treat and correct deformities, diseases and injuries in the skeletal system, in their joints and associated structures[20].

All the efforts related to occupational legislation up to now seem not been enough, as the prevalence of musculoskeletal disorders remains high in the most diverse professions, especially in nursing.

In view of the above, the present study sought to answer the following question: what is the prevalence of musculoskeletal pain in orthopedic nursing professionals of a large public hospital in the South of Brazil.

METHODS

This study included nurses, technicians and nursing assistants who were in the study site. The hospital's orthopedic sector had a total of 34 professionals. Exclusion criteria were those who were removed by medical leave or on vacation during the collection period, as well as those who had been working in the institution for less than a year. Thus, the number of participants was 29 nurses.

Data were collected from September to October 2016. Participants were invited to answer a questionnaire in an appropriate place in the institution, thus avoiding possible sampling losses. The questionnaire was delivered to the study participants by the researchers, who provided the necessary guidance and clarification. Due to the demand of the different work periods and the worker's availability, the collection was carried out in more than one moment.

The instrument used to evaluate the outcome variable, musculoskeletal pain, was the *Nordic Musculoskeletal Questionnaire* (NMQ)[21], adapted and validated for the Brazilian population. This instrument was developed with the proposal of standardizing the reports measurement of musculoskeletal symptoms in order to facilitate the comparison of the results of the studies.

The survey questionnaire was divided into four parts. The first part was related to sociodemographic information such as age, gender, body mass, height, number of minor dependents, marital status, schooling, monthly income and socioeconomic data. These latter were evaluated using the socioeconomic classification criterion of the Brazilian Association of Research Companies[22], widely used in Brazilian's research. This analysis considers the ownership, the education level of the family head and access to public services (piped water and paved street), classifying the subjects in the strata: A, B1, B2, C1, C2, D and E. The weight status was classified according to the Brazilian Guidelines for Obesity[23]. For analysis purposes, subjects with a body mass index (BMI) lower than 18.5 were considered as low weight, those with a BMI≤24.9 as normal weight, those with a BMI between 25.0 and 29.9 as overweight and obesity in cases of participants having a BMI equal to or greater than 30.0.

The second part included labor information, such as the type of work performed, working time at the institution, working time in orthopedics, if in leadership position, academic education, time of graduation, work shift, time working in the informed shift, if working only in orthopedics, if

he has another bond of paid work, if he has been removed from work and the reason for his removal. In addition, the information on the weekly workload, as well as the hours on call, were provided by the unit's coordinating nurse.

The third part of the questionnaire looked for information about habits and lifestyle, such as smoking, physical activity practice, and practice of domestic activities. In the fourth and last stage, information on musculoskeletal pain was collected. Based on a human figure in anatomical position, divided into nine regions: cervical, shoulders, thoracic, elbows, wrists/hands, lumbar, hip/thighs, knees and ankles/feet, musculoskeletal pain was assessed considering two moments, the last 12 months and the last seven days. In addition, NMQ allows the respondent to answer about the impediment to performing activities and the search for health professionals, both by anatomical region.

All participants were asked to respond to the questionnaire voluntarily, after being aware of the research objectives. From this, they signed the Free Informed Consent Form (FICF). All ethical procedures were in accordance with Resolution Nº 466/2012[24] of the National Health Council (CNS), which regulates such research procedures in humans. The study was approved by *Universidade Paulista (UNIP)*'s Research Ethics Committee, under number 1,676,533 / 2016, and only after its approval the researchers started data collection.

Statistical analysis

The data were tabulated in Microsoft Excel® software version 2010 for Windows. Descriptive analyzes of the variables investigated were performed using averages, frequency (absolute and relative) and standard deviations. Statistical Package for the Social Sciences (SPSS) for Window was used for descriptive statistics.

RESULTS

Study results were presented in four parts: sociodemographic profile; labor characteristics; habits and lifestyles; and musculoskeletal pain. Twenty-nine nursing professionals working in orthopedics participated in the study, being three auxiliaries, 23 technicians, and three nurses.

The sociodemographic characteristics of the study participants are presented in table 1.

It was observed that the majority (86.2%) of the 29 professionals were female, with an average age of 41.3±9.4 years. The anthropometric measurements of self-reported body mass and height were used to calculate BMI. It was verified that the average BMI obtained, 26.2±4.2, indicated a value above the established limit (24.9) for eutrophic individuals (normal weight in relation to height), according to the Brazilian Guidelines for Obesity[23]. In addition, almost 60% of the participants were over the weight considered normal according to height.

Nursing professionals' majority reported having dependents (62.1%). In relation to the number of children, the

Table 1. Sociodemographic characteristics of the participants

Variables	Indexes
Age, (years±SD)	41.3±9.4
Gender, n (%)	
Male	4 (13.8)
Female	25 (86.2)
Body mass index (kg/m²±SD)	26.2±4.2
Body mass, n (%)	
Low weight	1 (3.4)
Normal weight	11 (37.9)
Overweight	12 (41.4)
Obesity	5 (17.2)
Dependent, n (%)	
Yes	18 (62.1)
No	11 (37.9)
Number of children	1
Marital status n (%)	
With partner	21 (72.4)
Without partner	8 (27.6)
Education, n (%)	
High school/technical	21 (72.4)
Higher education	4 (13.8)
Postgraduate studies	4 (13.8)
Income (R$±SD)	3,652.0±1,826.7
Socioeconomic classification, n (%)	
A	2 (6.9)
B1	6 (20.7)
B2	7 (24.1)
C1	12 (41.4)
C2	2 (6.9)
D-E	-

average was one child per participant. Regarding the marital situation, it was identified that 72.4% had a partner. Regarding the level of education, the majority (72.4%) of nursing professionals stated that they had completed high school and/or technical education, 13.8% had a higher education level, and 13.8% reported having a postgraduate degree.

According to the socioeconomic classification criterion of ABEP[22], it was evidenced that the nursing professionals participating in the study belonged, in decreasing order, to the following economic classes: C2 (6.9%), C1 (41.4%), B2 (24.1%), B1 (20.7%) e A (6.9%).

Table 2 shows the results related to the work activity of the professionals who answered the questionnaire. It was identified that the majority of professionals (65.5%) performed operational functions. However, there was a high index of professionals who declared that they performed administrative and operational functions (27.6%) and only two (6.9%) had exclusive administrative functions. The average working time was 11.2±10.1 years, and the average working time in the orthopedic sector of the referred hospital was 9.1±7.4 years.

Only three of the nursing professionals (10.3%) held leadership positions. The academic education was described in three groups: nursing technicians (79.3%), nursing as-

Table 2. Labor characteristics of participants

Variables	Indexes
Type of work performed, n (%)	
Administrative	2 (6.9)
Operational	19 (65.5)
Both	8 (27.6)
Time at institution (years±SD)	11.2±10.1
Time in orthopedics (years±SD)	9.1±7.4
Leadership position, n (%)	
Yes	3 (10.3)
No	26 (89.7)
Academic education, n (%)	
Assistant	3 (10.3)
Technical	23 (79.3)
Nurse	3 (10.3)
Time of professional qualification (years±SD)	15.4±8.6
Work shift, n (%)	
Morning	3 (10.7)
Full-time	16 (57.1)
Night	9 (32.1)
Time on shift (months±SD)	75.3±97.8
Weekly workload (hours)	30.0
Weekly duty hours (hours)	12.0
Performance only in orthopedics, n (%)	
Yes	28 (96.6)
No	1 (3.4)
Other paid activity, n (%)	
Yes	6 (21.4)
No	22 (78.6)
Weekly workload at the other institution (hours±SD)	6.9±13.0
Reports of work removals, n (%)	
Yes	19 (65.5)
No	10 (34.5)
Removals per professional in the last 12 months, (X±SD)	2.3±1.2
Reason for removal, n (%)	
Pain	8 (42.1)
Stress	-
Work accident	1 (5.3)
Diseases	2 (10.5)
Other reason	1 (5.3)
Pain/stress	3 (15.8)
Pain/disease	2 (10.5)
Pain/work accident	2 (10.5)

sistants (10.3%) and nurses (10.3%). The time of professional education was on average 15.4±8.6 years.

Regarding the shift in which the nursing professionals worked, the majority (57.1%) reported working full-time, followed by night shifts (32.1%) and morning shifts (10.7%). The average workload obtained by the head nurse was 42 hours per week, already added the hours on duty. Although the work regime adopted by the state is of 30 h per week, most of them did in average 12h a week complementary. In addition, six professionals (21.4%) worked in another paid activity, in addition to the one in the sector where the research was performed, adding a weekly load average of 6.9 ± 13.0h.

From nursing professionals involved in the research, 19 (65.5%) reported having already been removed from work for health reasons. Among these, 42.1% reported that their removal was due to musculoskeletal pain, another seven workers (36.8%) declared other reasons as the removal cause. Regarding habits and lifestyle, most professionals (82.8%) reported not being a smoker, and 51.7% of them reported they performed physical activities. All professionals affirmed to perform domestic activities, with an average of 5.7±2.2 days per week.

Research results analysis showed that 96.6% of professionals reported musculoskeletal pain in at least one of the body parts in the last 12 months. Table 3 presents data on the Nordic instrument that evaluates musculoskeletal pain. It was identified, among the nursing professionals analyzed, considering the last 12 months that the anatomical regions with the highest rates of musculoskeletal pain were: the lower back (79.3%), followed by the upper back (75.9%), neck (65.5%), shoulders (62.1%), ankles/feet (55.2%) and wrists/hands (51.7%).

Still considering the last 12 months, it was observed that the nursing professionals surveyed reported having been prevented from performing any activity due to musculoskeletal pain. The most affected anatomical regions were: ankles/feet (34.5%), upper back (31%), wrists/hands (27.6%), and lower back (24.1%). As a result of the musculoskeletal pain pre-

Table 3. Prevalence of musculoskeletal pain by body regions

Variables	Indexes			
Body parts	Problems like pain, tingling/numbness (last 12 months)	Impediment to performing normal activities in the last 12 months	Consultation with a healthcare professional in the last 12 months	Presence of a problem in the last 7 days
Neck, n (%)	19 (65.5)	6 (20.7)	9 (31.0)	8 (27.6)
Shoulders, n (%)	18 (62.1)	6 (20.7)	4 (13.8)	9 (31.0)
Upper back, n (%)	22 (75.9)	9 (31.0)	10 (34.5)	11 (37.9)
Elbows, n (%)	7 (24.1)	3 (10.3)	3 (10.3)	5 (17.2)
Wrists/hands, n (%)	15 (51.7)	8 (27.6)	6 (20.7)	8 (27.6)
Lower back, n (%)	23 (79.3)	7 (24.1)	9 (31.0)	11 (37.9)
Hip/thighs, n (%)	10 (34.5)	6 (20.7)	6 (20.7)	9 (31.0)
Knees, n (%)	10 (34.5)	6 (20.7)	5 (17.2)	8 (27.6)
Ankles/feet, n (%)	16 (55.2)	10 (34.5)	7 (24.1)	9 (31.0)

sented, many of them sought specialized care in the last 12 months in an attempt to solve the problem. The upper back (34.5%), the lower back (31%) and the neck (31%) were the main anatomical regions responsible for seeking help. Regarding the musculoskeletal pain reported in the last seven days, the prevalence was 65.5% among the professionals analyzed. The anatomical regions reported as the greatest pain in this period were: upper and lower back, both with 37.9%, and shoulders, hip/thighs and ankles/feet, all with 31%.

The prevalence of musculoskeletal pain was also described according to the worker's academic education. In nursing assistants, the most affected regions were: shoulders, neck and ankles/feet with an index of 100.0%. With the same group of professionals, there was a high index of pain in other regions such as upper and lower back, elbows and wrists/hands, all with 66.7% of prevalence. Among nursing technicians, the main musculoskeletal pain was found in the upper and lower back, with 82.6 and 78.3%, respectively. Besides, neck (65.2%), shoulders (60.9%), wrists/hands (52.2%) and ankles/feet (52.2%) also obtained a high prevalence of pain among these professionals. Finally, the body regions with the greatest pain among nurses were: upper and lower back, both with a prevalence of 66.7% (Figure 1).

Figure 2 shows the number of body parts affected by musculoskeletal pain stratified by academic education. It was identified that nursing assistants had a greater number of pain regions (6.3), followed by nursing technicians (4.7) and nurses (3.6). With this analysis, it can be inferred a tendency to decrease the number of body parts affected by musculoskeletal pain as the academic title of nursing professionals increases.
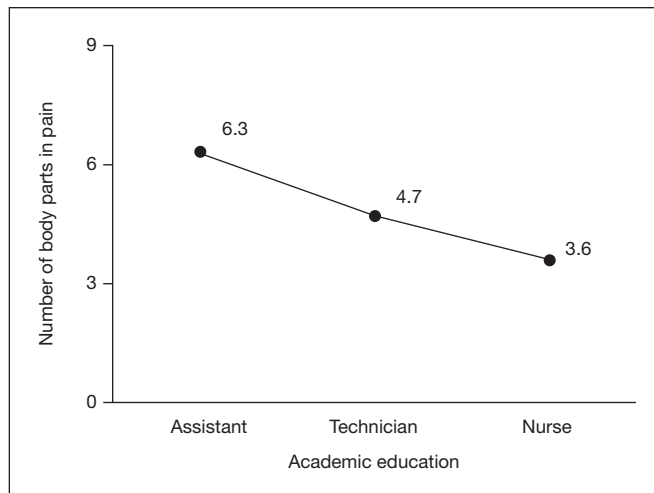

Figure 2. Number of body parts with pain according to academic education

Although it was not possible to identify associations between musculoskeletal pain and work shift, full-time workers had a higher prevalence in practically all body regions analyzed. The exception was the elbow region, which had a higher prevalence (42.9%) among night shift workers.

DISCUSSION

Research result identified that 96.6% of professionals reported musculoskeletal pain in at least one of the body parts in the last 12 months. This high prevalence has also been identified in previous studies with this popula-
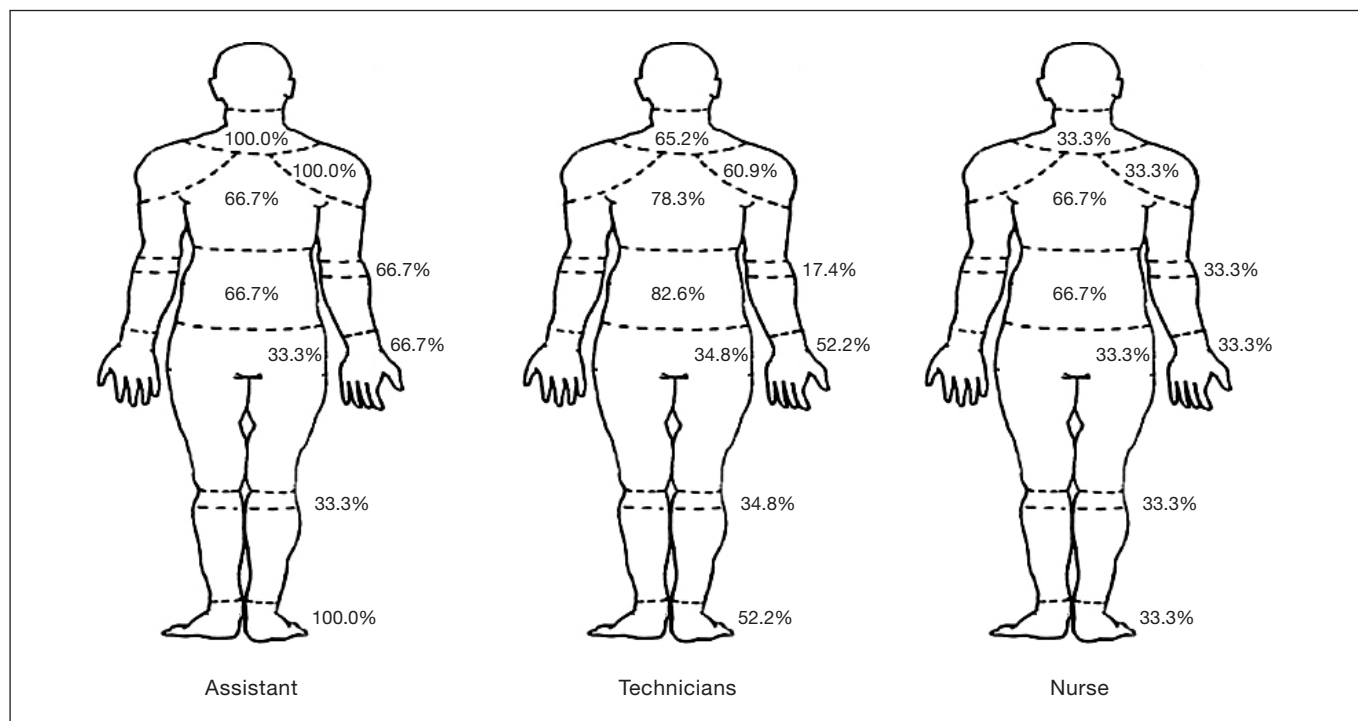

Figure 1. Percentage of musculoskeletal pain reported by the three categories of nursing workers by body region

tion in Brazil[25,26], and in other countries, such as Italy[27], Nigeria[28] and Estonia[29]. Thus, this situation seems to be the same, regardless of location and seems to be a consequence of nursing practice, and thus, more clarification is needed to improve the professionals' work quality and health.

Regarding the anatomical regions reported with musculoskeletal pain, the body parts with the highest prevalence identified in the present study were upper and lower back (79.3 and 75.9%, respectively), neck (65.5%), shoulders (62.1%), and wrists and hands (51.7%). The studies already mentioned also performed this same analysis and corroborate the results found. D'Agostin and Negro[27], for example, compared nursing professionals and workers of a university in Italy and identified a higher prevalence of musculoskeletal pain in nursing professionals compared to the other individuals analyzed. Authors reported that the most affected anatomic regions among nursing professionals were the lower back (lumbar) (61.0%) and shoulders (36.7%). In the De Souza Magnago et al.[25] study, the region with the highest prevalence of pains was also the lumbar region (71.5%). In another study with 416 nurses, Freimann et al.[29] identified lumbar (56.1%) and neck (52.0%) as the most affected regions.

It is worth noting that among the studies found in the literature, a high prevalence of musculoskeletal pain in the hand and wrist region was not identified, as in this research (51.7%). This suggests that the work characteristics in orthopedics exert a direct influence on these body regions. Researchers Ribeiro et al.[30] reported a 26.9% prevalence in this body region in their sample, composed of nursing workers from the orthopedics and traumatology sector of a hospital in Salvador, Bahia. Despite being relatively low compared to the results of the present study, the authors justify this index due to repetitive movements, the muscular force exerted when handling patients, which are characteristics similar to the workers in the orthopedic sector of the present study. This suggests that the repetitive movements and patients handling is an aggravation factor of this question.

Another important indicator regarding musculoskeletal pain refers to the pain's presence in the last seven days. This prevalence was 65.5% among the professionals analyzed. In the same way as the prevalence in the last 12 months, the value identified in this research was similar to that found in previously published studies[25,31]. In Raithatha and Mishra's[31] work with nursing workers in India, this value was 60.5%. De Souza Magnago et al.[25] in a survey carried out with 491 nurses from the *Hospital Universitário de Santa Maria*, this index was 73.1%. These data are important to be taken into account since they portray the pain occurrence in a recent period and may be associated with the number of attendances and the excessive workload at the health institution in the week prior to the collection. Authors De Souza Magnago et al.[25] relate in their findings the psychological load to which these professionals are submitted, and classify the exercise of the nursing profession as a "high labor demand." This classification is based on the two-dimensional Demand-Control model at work, proposed by Karasek and Theörell[32]. Authors classify this condition (high requirement) as high demand and low control of activities. These types of activities have important repercussions on worker physiology, such as high production of cortisol (stress hormone), with direct action on the musculoskeletal system. Its chronic increase may influence muscle atrophy and decreased strength[33], with a consequent effect on pain responses.

One of the important consequences related to musculoskeletal pain is absenteeism or the absence of work. In this study, 65.5% of the professionals analyzed reported they had been absent from work in the last year due to health reasons. Among these, the absence average was 2.3±1.2 times per year. It is noteworthy that among the reasons for this absence, 42.1% of the respondents stated they were exclusively due to musculoskeletal pain and other 36.8% reported the pain was associated with another type of occurrence, such as stress, illness and/or work accidents. These data are corroborated by the literature. An integrative review on the theme[34] identified that the main cause of work absences is related to musculoskeletal pain, and among these, scientific evidence points to low back pain as a prominent feature[35]. This region was the most prevalent among the workers analyzed in the present study, which may justify the high rate of absenteeism identified.

Main strategies adopted by health institutions to reduce these indexes are preventive actions of health education and the staff dimensioning[34], once the absenteeism is considered a problem for organizations, since it has a negative influence on costs with the labor replacement that, when not replaced, causes an overload to the other workers; and leads to a decrease in the care quality provided to patients and to an increase in the chances of new pain events in other professionals[36].

In addition, for the worker, the damages go beyond the loss of working days. Absences are associated with demotivation, low self-esteem and a decrease in the professional's quality of life[37].

One of the main factors associated with musculoskeletal pain among nursing professionals identified in the literature is related to the professional nursing practice itself. However, it was not the present study's objective to identify the work routines. Yet, it is known that the activity of moving, transferring, and transporting the patient is part of the nursing professionals' daily routine, which is related to pain, especially in the lumbar region[38]. In addition, it is part of these professionals' routine to remain standing for long hours, and this is a significant risk factor for pain in this region, in the ankles and feet[39].

Another factor that must be taken into account is the weekly workload. In the present study, the average of worked hours was 42 hours per week. Besides, six work-

ers reported having a second labor activity, and all stated they performed domestic activities. According to Prieto, Múnera and López[40], muscles, tendons, ligaments and articular capsules, human body's structures that allow the movement and the execution of numerous activities, need rest for its recovery. Overwork seems to have harmful effects on health; and, in addition to increasing the likelihood of musculoskeletal injuries, increase the chances of work accidents, fatigue, psychological symptoms and cardiovascular diseases[41]. Thus, excessive work hours, including on-call hours, along with the second work activity and daily activities, may contribute to muscle fatigue and be associated with the high prevalence identified in the present study.

With regard to sociodemographic characteristics, it can be affirmed that the nursing profession is culturally exercised mostly by women. Previous studies have shown that women have lower capacity than men to support high loads due to coping mechanisms[25] and their biomechanical characteristics[40]. The fact is that, in most cases, women still have the household demands and chores. In this way, women may be more susceptible to the greater presence of pains when compared to men. These factors are strengthened with the advancing age, due to the aging process, since the older the worker, the more sensitive he becomes to the adverse events caused by the work. This issue is corroborated by the average age of the workers analyzed (X = 41.3±9.4) years.

Another relevant question concerns the socioeconomic level. This variable is quite complex and, in general, takes into account schooling, occupation, and family income, or a combination of these[42]. Although the average income was considered satisfactory (R$ 3,652.0±1826.7), most of the workers analyzed were classified, according to ABEP[22], in the economic stratum C1. This dissonance is justified by ABEP's own criteria, which takes into account consumer goods and may not accurately reflect the actual socioeconomic level of the workers analyzed. However, recent studies have pointed out that better living conditions, such as higher income and quality of life, are determinants in the health/disease process[43].

One of the most relevant current issues with regard to worker health is shift work, especially night work. According to the International Agency for Research on Cancer (IARC)[44], night work is considered a risk factor, being associated with cancer in humans, on the same level as smoking and sun exposure, and is associated with other disorders, including the musculoskeletal pain[45], mainly due to the physiological alterations to which the worker is submitted and the biological rhythms' changes caused by the exchange of sleeping and vigil hours from night for day[46]. Besides, during sleep, physiological processes occur directly in the body that aid in tissue recovery[47]. However, in the present study, the highest prevalence of musculoskeletal pain was identified in full-time workers. Unfortunately, it was not possible to perform inferential analyzes due to the small number of workers analyzed. However, when we analyzed the number of body parts in pain, night workers obtained the highest averages (X=5.1±2.8), compared to morning workers (X=4.0±1.0) and full-time (X=4.8±2.6). Therefore, it is believed that the lower prevalence of pain in night workers may be masked due the reduced number of workers analyzed.

An important indicator of health is BMI. This index is a parameter widely used in epidemiological studies for weight classification (low weight, normal weight, overweight, and obesity). High BMI or overweight and obesity are considered risk factors for several diseases, including cardiovascular problems, hypertension, and diabetes[23]. In the present study, almost 60% of workers were classified as overweight/obese. Corroborating this prevalence, in the study of De Souza Magnago et al.[25] nursing workers also presented high BMI values. For the authors, the main anatomical regions with pain associated with high weight were the elbows, the lumbar spine, the thighs and the knees. In addition, Sapia, Felli, and Ciampone[48] identified the relationship of elevated weight with the physiological process of wear in ambulatory nurses, such as varicose veins, microvessels, and feet callosities. Therefore, the relationship of pain with high weight is pointed out as a limiting factor for the overload of work in the day to day functions. Workers of adequate weight, in general, have a greater capacity to support the workloads. However, care must be taken in these statements, since normal weight does not necessarily reflect a good physical conditioning of the subject. This relationship can be justified by the higher number of professionals who regularly practice physical activities (48.3%), compared to workers with normal weight (37.9%). Thus, it is necessary to encourage regular physical activity practices for all professionals, in order to improve physical capacities such as strength, flexibility and localized muscular endurance, aiming at a better quality of life and ability to work. Besides, it is crucial to implement weight control programs for this group of workers.

Finally, the present study results indicate that nursing assistants have a higher frequency of musculoskeletal pain in the anatomical regions of the shoulders, neck, elbows, hands/wrists and feet/ankles. Previous studies have associated musculoskeletal pain with low academic education[49]. In this sense, it was identified that, as the education level of workers increases, the number of body parts reported with pain is smaller (Figure 2). Comparing technicians and nurses, it is possible to identify a higher prevalence of musculoskeletal pain in practically all anatomical regions (Figure 1). This information suggests, according to Tezel[50], that nursing technicians' experience greater material's manipulation and, therefore, may be more exposed to develop musculoskeletal injuries compared to nursing bachelors.

The number of professionals participating in this study should be considered as a study limitation, which made it impossible to perform inferential analyzes of statistical

association between the variables. In addition, the cross-sectional design of the research prevents the evaluation of the cause and effect relationship. However, no other research with a sample composed exclusively of nursing workers from the state of Santa Catarina was identified in the literature. Thus, this study can be used as an initial reference for future research, indicating the prevalence of musculoskeletal pain in nursing workers in this state.

CONCLUSION

The prevalence of musculoskeletal pain in nursing professionals working in the orthopedic sector was considered high. Most affected anatomical regions were the upper and lower back, neck, shoulders, ankles/feet, and wrists/hands. It was not possible to identify statistical associations between musculoskeletal pain and sociodemographic, labor and lifestyle variables due to the limited number of participants number in the study.

Thus, new research should be performed with a greater number of subjects, in order to establish statistical inferential relationships. In addition, regular training programs aimed at worker health and safety is suggested, seeking to prevent complications caused by work overload. Such as, for example, workplace exercise, a training course on ergonomic issues at work, implementation of pre-established pauses and weight control programs. It is highlighted that musculoskeletal pain among nursing professionals reflects on the care provided to people. Finally, it is believed that a greater number of professionals in the orthopedic sector would improve the worker health, with the workload reduction among nursing professionals.

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