SUMMARY

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Spirituality and pain

Espiritualidade e dor

In recent years, the World Health Organization (WHO) has been driving transformations in the health-illness process approach. It went from the biomedical to the biopsychosocial model in the 1980s and, just over a decade, has been driving a new shift to the biopsychosocial-spiritual approach[1]. The supportive care of terminally ill patients in communities shows that high levels of spiritual well-being helps to face death with dignity and naturally, also helping to reduce suffering[2,3]. Although death is at the end of the illness process, chronic degenerative diseases also cause great suffering and can benefit from this broader health approach.

Recent studies try to relate spirituality and health in people with several chronic conditions, due to the potential to prevent disease progression and favor the development of better strategies to face the disease with a positive impact on the quality of life[4,5]. This aspect has also been explored by researchers and professionals of multidisciplinary teams of the pain management centers[5-7]. On *Web of Science* a search in literature with the words "pain" and "spirituality" found 50 publications in 2011, whereas in 2013, there were 1,000 publication[1]. This data confirms the increased attention given to this subject. A recent consensus recommends collecting the spiritual history as part of the person's whole evaluation[8].

Different ideas and thoughts permeate the minds of subjects who suffer from acute or chronic pain. Some people believe that God can heal them, others that their problem is a punishment from God for the mistakes made, others that intangible vital energies can improve symptoms, among other phenomena, which involve customs and beliefs. It is indisputable that these ideas directly influence the human mind, the expectations of cure, the worsening of symptoms, the frequency of anxiety and depression by interfering in the painful process, whether acute or chronic.

For Siddall et al[1], spirituality can be defined as "an experience that incorporates a relation with the transcendent and the sacred. It provides a strong sense of identity or direction, and that influences not only the personal beliefs but attitudes, emotions, and behaviors, creating a sense of completeness and meaning to life". Despite being a difficult concept to generate consensus, this concept goes beyond the simple idea of religiosity related to formal institutions.

Spirituality, seen as a relation between superior forces and human beings, beyond religions and their specific creeds, is a variable that has been demonstrating, both with objective and subjective data, that positive views of hope have significant impact in improving symptoms, favoring conventional treatment compliance and in the development of effective strategies to control pain crisis and other clinical manifestations. In the same way that negative and deterministic ideas aggravate symptoms. Strong correlations and associations are indicating that spiritualist people perceive chronic pain as a chance for human and spiritual development[5]. Also, in an indirect way, spirituality can improve the painful condition by impacting depressive and anxious states[1].

Therefore, it's becoming more and more evident that spirituality/religiosity has a relevant meaning for patients who suffer from chronic pain and that this variable influences the strategies to face and handle pain[5].

Thus, it is recommended to researchers and professionals in interdisciplinary teams who care for people with chronic pain to incorporate in their investigational arsenal instruments to evaluate the spiritual condition[9,10]. Likewise, the spiritual aspects in the perspective of the subject should be more and more encouraged in several health care levels as one more resource of therapeutic effect. Even if it is not possible to carry out randomized clinical trials and studies being just observational with few individuals affected by chronic pain, the incentive to follow the aspirations of the soul, in the models preferred by each person, must be encouraged by the professionals who care for those who suffer from pain.

Given the presented reasons, healthcare professionals who deal with people with chronic pain must evaluate this aspect systematically and stimulate the biopsychosocial-spiritual well-being using different strategies that make sense for each patient and family. Whether by religious practices, meditation, physical exercises, philosophies of life, self-help groups, among others, the patient-centered treatment based on his/her preferences, must be contextualized in their real life and not in scientific or religious ideologies of each professional that cares for those who suffer from painful conditions.

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Musculoskeletal disorders and disability in Brazilian Dentists in São Paulo

Distúrbios musculoesqueléticos e incapacidade em cirurgiões-dentistas de São Paulo

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ABSTRACT

BACKGROUND AND OBJECTIVES: Musculoskeletal disorders represents one of the major public health problems among workers and the general population, and it is multifactorial in origin. It has attracted the attention of researchers concerned with issues relating to health and work, due to cost and its impact on the quality of life. It causes functional impairment, limitations in activities, decreased quality of life, disability, reduced work productivity and direct medical costs. To measure the prevalence of musculoskeletal disorders and the association between the musculoskeletal disorders and pain disability in dentists in São Paulo, Brazil.
METHODS: A cross sectional study was conducted with 91 dentists in the northwest of São Paulo, Brazil. Data were collected through interviews, using the Nordic Questionnaire, The Pain Disability Questionnaire and the Numeric Pain Scale were also administered to workers who reported pain. Statistical analyses were performed using SPSS 21.0.
RESULTS: Most dentists (90.4%) had musculoskeletal disorders, especially in the neck, upper and lower back. The analysis of the intensity of pain and disability with Pain Disability Questionnaire in symptomatic dentists showed an average pain intensity of 1.96, its intensity was classified as moderate. Mean scores of the Pain Disability Questionnaire total (7.91) and its dimensions - functional condition (5.29) and psychosocial condition (2.61) - suggest moderate disability in Brazilian dentists. There was moderate t correlation (r = 0.409) between pain intensity and the total score of disability caused by pain.
CONCLUSION: Pain and work-related musculoskeletal disorders interfere significantly in dentists' lives. There is significant correlation between pain intensity and disability caused by pain in dental surgeons.
Keywords: Cumulative trauma, Disability, Disorders, Occupational health, Risk factors.

RESUMO

JUSTIFICATIVA E OBJETIVOS: Os distúrbios musculoesqueléticos representam um dos principais problemas de saúde pública entre os trabalhadores e a população em geral, e é de origem multifatorial. Esses problemas causam comprometimento funcional, limitações nas atividades, diminuição da qualidade de vida, incapacidade, redução da produtividade do trabalho e custos com cuidados médicos. O objetivo deste estudo foi avaliar a prevalência de distúrbios musculoesqueléticos e a associação com a incapacidade gerada pela dor em dentistas em São Paulo, Brasil.
MÉTODOS: Estudo transversal realizado com 91 dentistas no noroeste de São Paulo, Brasil. Os dados foram coletados por meio de entrevistas, utilizando-se o Questionário Nórdico, o Questionário de Incapacidade gerada pela Dor e a Escala Numérica de Dor também foram aplicados aos trabalhadores que relataram dor. As análises estatísticas foram realizadas utilizando SPSS 21.0.
RESULTADOS: A maioria dos cirurgiões-dentistas (90,4%) apresentou distúrbios musculoesqueléticos, especialmente no pescoço, nas costas, parte superior e inferior. A análise da intensidade da dor e incapacidade com Questionário de Incapacidade gerada pela Dor em dentistas sintomáticos mostrou uma intensidade média de dor de 1,96, sendo sua incapacidade classificada como moderada. As pontuações médias do Questionário de Incapacidade gerada pela Dor total (7,91) e suas dimensões - condição funcional (5,29) e condição psicossocial (2,61) - sugerem incapacidade moderada em dentistas brasileiros. Houve correlação t moderada (r = 0,409) entre a intensidade da dor e a pontuação total de incapacidade causada pela dor.
CONCLUSÃO: A dor e os distúrbios musculoesqueléticos relacionados ao trabalho interferem significativamente na vida dos dentistas. Existe uma correlação significativa entre a intensidade da dor e a incapacidade causada pela dor em cirurgiões-dentistas.
Descritores: Fatores de risco, Incapacidade, Saúde ocupacional, Transtornos traumáticos cumulativos.

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INTRODUCTION

Musculoskeletal disorders represent one of the major public health problems in developed countries[1]. It is common among workers and the general population, and it is multifactorial in origin[2-6]. It has attracted the attention of researchers concerned with issues related with health and work due to its cost and impact on the quality of life. It causes functional impairment, limitations in activities, poor quality of life, disability, reduction in work productivity and direct medical costs[7,8]. Therefore, it causes

problems in the population due to its high prevalence and morbidity and triggers a great potential for disability[2].

Since dentistry is a profession that demands attention and precision in the movements, the dentist is susceptible by the vulnerability and problems of various natures in the occupational framework[9], especially those related to the specific postures during their clinical activity[9-11]. In dental practice, professionals turn sharply flexing or doing rotations in the regions of the neck and spine and shoulder abduction to improve the field of view and achieve easier access to the oral cavity[3,9-14].

The compression of musculoskeletal structures become a risk factor for the development of lesions among these professionals, harming their health and possibly forcing to an early retirement. This occurs when professionals adopt static and sometimes clumsy repetitive movements that combined contribute to the worsening of pain symptoms[8,11,14]. Most of these symptoms can be relieved with proper preventive measures, especially before the settling of chronic damage[3,8,11-14].

Despite the high prevalence of musculoskeletal disorders described, very little is known about these symptoms among dentists and their predisposing factors[15]. The assessment methods to evaluate musculoskeletal disorders have been shown to be constant in order to help define the relationship between symptoms and the type of work and the body region most affected by pain[16]. Organizations and researchers concerned with issues relating to health and work have been studying measures to assess pain and disability in individuals with musculoskeletal disorders, using questionnaires and scales that have been found to be very useful to evaluate the different aspects of these occupational problems[2,16-18].

The tools to assess the functional capacity of the employee are changed due to psychosocial and health problems, and this can cause impacts or limitations on the employment activity[2,16-19]. The objective of this study is to investigate the prevalence of musculoskeletal disorders and the correlation with the disability caused among dental professionals.

METHODS

This is an exploratory transversal study, done in dental clinics that offer dental treatment in the northeastern region of the state of Sao Paulo, Brazil. The study was approved by the Committee on Ethics for Research on Humans of the School of Odontology of Araçatuba of the Paulista State University- under number 373.186, and done with the understanding and written consent of every participant.

The sample consisted of dentists enrolled in various postgraduate specialties (dentistry, endodontics, periodontics, surgery, prosthodontics, implant dentistry, pediatric dentistry, and orthodontics) of a medium-sized municipality in the State of São Paulo, Brazil, during 2016. The board recommends that each dental class specialization is comprised of 12 students (N = 96). Patients with physical limitations and pregnant women were excluded from the study.

Data collection was done during four months in 2016, after the completion of a pilot study with 20 professionals to test the viability of the data collection tools.

The data variables related to sociodemographic, work and the health of dentists were acquired through a structured questionnaire designed specifically for this study. The sociodemographic variables include age, gender, and marital status. Work-related variables include place of employment, the number of hours worked, breaks between consults, and time since graduation. Health-related variables included Body Mass Index (BMI), the practice of physical exercises, consumption of cigarettes and alcohol, the diagnosis of any disease in the last 12 months, and the use of pain medication.

To evaluate work-related musculoskeletal disorders, the Nordic questionnaire developed by Kuorinka was used, with the goal of standardizing the measuring of musculoskeletal symptoms. The Brazilian version of the Nordic questionnaire was validated and adapted by Barros and Alexandre[13]. This tool is composed of a posterior view of a human figure, subdivided into nine anatomical regions: neck, shoulders, upper and lower back, elbows, wrists/hands, hips/thighs, knees, and ankles/feet. It includes questions about the presence of musculoskeletal pain in any of the nine anatomical areas, the inability to perform normal activities and the necessity to consult a health professional, and requires the respondent to mark with an X an affirmative or negative answer (yes or no). A 12-month period prior to the time of the study was considered for the occurrence of musculoskeletal symptoms.

The Pain Disability Questionnaire (PDQ) was used to evaluate pain disabilities in dentists who reported pain in some part of the body in the past 12 months. It was developed in 2003 by Anagnostis, and the Brazilian version of the tool was validated by Giordano et al.[2]. The tool is composed of a total of fifteen items that evaluate the effect of pain on work, personal care, mobility, ability to stay sitting or still, lifting objects, walking or running, self-medication, medical consultations, social life, leisure, help to perform tasks, and emotional state. These questions were divided into two categories: one category measures the Functional Condition, and is composed of nine items (1,2,3,4,5,6,7,12,13), and the other measures the Psychosocial Component, and is composed of six items (8,9,10,11,14,15). The category corresponding to the Functional Condition can vary from 0 to 90, and the Psychosocial Component category can vary from 0 to 60 points. For the total PDQ analysis, the scoring of the tool can vary from 0 to 150 and uses the following classification: zero means no disability, scores from 1-70 indicate a moderate disability, scores from 71-100 demonstrate severe disability and scores from 101-150 indicate extreme disability.

Finally, the numerical pain scale of 0 to 10 was used to evaluate the intensity of the pain. Zero meaning the absence of pain, and ten is the worst pain imaginable[17].

Statistical analyses

Data were entered the database and analyzes were performed using the SPSS version 21.0 program. The descriptive analysis using measures of central tendencies (simple frequencies, averages, and medians) and of dispersion (standard deviation) was done for the categorization of sociodemographic, occupational and population health, and musculoskeletal disorders; disability due to pain, and intensity of pain. The multivariate Logistic Re-

gression analysis was used to analyze the relationship between the sociodemographic variables and the musculoskeletal disorders. The correlation between disability and pain intensity among symptomatic subjects was measured by the Spearman correlation coefficient. For group comparisons, the nonparametric Mann-Whitney and Kruskal-Wallis tests were used. The Maximum Likelihood was used, associating the general questions of the "Nordic Musculoskeletal Questionnaire" (NMQ) (Question A: Over the last 12 months, did you have any problems such as pain, tingling or numbness? Question B: In the last 12 months, were you unable to perform normal daily activities? Question C: in the last 12 months, have you consulted a health professional because of this condition? Question D: Did you have a problem over the past seven days?) and sociodemographic and occupational variables. A statistical significance level of 5% was considered for all tests.

RESULTS

Of the total of dentists surveyed 63.8% were female and 36.2% male (and the average age was 30.68 years (SD±6:16 years). Although the sample shows a higher percentage of female in this variable was not a risk factor for the presence of musculoskeletal disorders. Supplemental Table shows the frequency of all socioeconomic and occupational profile variables used in the study. The experience of musculoskeletal disorders was reported by 90.40% in at least one part of the body in the last 12 months due to the professional activity (Table 1). The most frequently reported sites were the neck (58.5%), lower back (57.4%), upper back (55.3%), shoulders (46.8%), hand/wrist (44.7%) (Table 1).

In evaluating the intensity and disability caused by pain, 69.1% of dentists had a "moderate" disability to work caused by the pain. The average score on a pain scale, which can range from 0-10, was 1.96 (SD ± 0.86).

The correlations of the Numerical Pain Scale with the issues of the PDQ, when significant, proved weak and positive. The intensity of pain was rated as moderate in 2.1% and null in 95.8%. The correlation between the domains of the PDQ (Functional Condition-FC, Psychosocial Component-CP, and PDQ-Total) and the Pain Scale showed moderate, positive and statistically significant differences (p = 0.409 ep≤0,01; p = 0.503 ep≤0 01; p = 0.498 ep≤0.01). Those who had pain symptoms in the last 12 months and used pain medication had a greater chance of failure than those who did not. These same results were found in comparisons of the Psychosocial Component and Functional Condition (Table 2).

Table 1. Dentists distribution regarding prevalence and severity of musculoskeletal disorders. Brazil, 2016

Regions	Complained of pain in the last 12 months		Inability to perform activities		Consulted a health professional in the last 12 months		Presented a problem in the last 7 days	
	No(%)	Yes(%)	No(%)	Yes(%)	No(%)	Yes(%)	No(%)	Yes(%)
Neck	41.5	58.5	93.6	6.4	81.9	18.1	74.5	25.5
Shoulder	53.2	46.8	94.7	5.3	86.2	13.8	85.1	14.9
Upper back	44.7	55.3	95.7	4.3	81.9	18.1	80.9	19.1
Elbows	87.2	12.8	98.9	1,1	96.8	3.2	96.8	3.2
Fists/Hands	55.3	44.7	96.8	3.2	87.2	12.8	85.1	14.9
Lower back	42.6	57.4	89.4	10.6	78.7	21.3	80.9	19.1
Hips / Thighs	87.2	12.8	97.9	2.1	96.8	3.2	94.7	5.3
Knees	71.3	28.7	94.7	5.3	90.4	9.6	87.2	12.8
Ankles / feet	81.9	18.1	93.6	6.4	94.7	5.3	94.7	5.3
Total	9.6	90.4	72.3	27.7	55.3	44.7	47.9	52.1

Table 2. Comparison of means between the components of the "Pain Disability Questionnaire (PDQ)" and the sociodemographic and occupational variables of dentists. Brazil, 2016

Variables	n	Mean	SD	p-value	Mean	SD	p-value	Mean	SD	p-value
Gender*										
Female	54	4.56	6.66	0.091	2.67	3.44	0.888	7.22	9.62	0.214
Male	31	6.58	6,98		2.52	2.87		9.1	9.37	
Marital status*										
Married	33	7.09	7.22	0.013*	3.3	3.32	0.064	10.39	9.75	0.012*
Single	52	4.15	6.34		2.17	3.12		6.33	9.1	
Working hours/day **										
6 hours	10	1.7	3.16	0.005**	1	1.7	0.016**	2.7	4.83	0.003**
8 hours	26	4.81	7.06		2.31	3.4		7.12	10.06	
More than 8 hours	32	7.69	7.04		3.84	3.51		11.53	9.69	

Table 2. Comparison of means between the components of the "Pain Disability Questionnaire (PDQ)" and the sociodemographic and occupational variables of dentists. Brazil, 2016 – continuation

Variables	n	Mean	SD	p-value	Mean	SD	p-value	Mean	SD	p-value
Have breaks *										
Yes	47	4.47	5.89	0.235	1.89	2.48	0.040*	6.36	7.77	0.154
No	36	5.97	7.33		3.53	3.86		9.5	10.81	
Presence of pain*										
Yes	23	8.35	7.21	0.005*	4.52	3.15	0.000*	12.87	9.71	0.001*
No	62	4.16	6.34		1.9	2.98		6.06	8.83	
Uses medication*										
Yes	49	7	7.45	0.002*	3.43	3.53	0.003*	10.43	10.38	0.001*
No	35	3.06	5.09		1.43	2.39		4.49	7.06	

* Mann-Whitney Test / **Kruskal-Wallis Test.

In the multivariate model, by Logistic Regression, all variables that were associated at the p <0.100 level were included. In this analysis, variables such as marital status, the presence of pain and age were statistically significant, and married professionals have 25.54 times higher risk of having a moderate disability due to pain (PDQ) than single individuals. A statistically significant difference was found with the PDQ -Total Marital Status, being married with a greater disability caused by pain than those who were reported as being single. The age was shown as a protective factor (Table 3).
37 The daily working hours of most dentists were over 8 hours (36.36%), and having breaks was reported by 55.3% and presented a significant functional disability. Those who work up to 6 hours/day had the lowest score regarding the inability of professionals to extend their workday (Table 4). Those who had pain symptoms in the previous 12 months had 18.38 times increased risk of having a moderate disability due to pain (PDQ) than the asymptomatic in a multivariate analysis (Table 3).

Table 3. Multivariate analysis by logistic regression of factors that may affect the extent of disability caused by pain among dentists. Brazil, 2016

Variables	Multivariate analysis		
	p-value	OR adjusted	CI 95%
Marital status			
Married	0.027	25.548	1.452-449.481
Single		1	-
Workday			
6 hours		1	-
8 hours	0.187	5.636	0.432-73.509
More than 8 hours	0.132	8.13	0.532-124.183
Presence of pain			
Yes	0.04	18.384	1.139-296.739
No		1	-
Use medicines			
Yes	0.07	5.846	0.864-39.563
No		1	-
Age (years)	0.031	0.834	0.707-0.983

DISCUSSION

In this study, the presence of musculoskeletal disorders was observed in 90.4% of the professionals, and this is a very high prevalence when compared to other studies that also showed higher pain rates of [6,20-24]. Pain is the major symptom resulting from musculoskeletal disorders that may generate different degrees of disability, and this is considered one of the most serious problems regarding the health of the worker[2,17].
The most prevalent regions of musculoskeletal disorders found were the neck, upper back, shoulders, wrists/hands and lower back. The pain is manifested in higher and lower degrees according to the daily requirements of static overload that the professional undergoes[6,20]. The most overburdened regions by static muscular effort are the cervical, shoulder and lower back since the dentist performs flexion and abduction of the shoulder to serve as a support base for fine and precise movements performed with the hands[4,21,23-26]. Furthermore, a sitting posture for a long time can decrease muscle flexibility and joint mobility, leading to fatigue of the extensor spinal muscles, and the somatization of these factors compromise the stability and alignment of the spine, particularly overloading the lumbar region[21,24].
Most dentists presented a "moderate" disability to work caused by pain involving both the functional capacity as well as the psychosocial aspects. This result can be explained by the average age of the study population, 30.68 years, and when analyzing the average pain intensity reported by the subjects, it was observed that it was 1.96, which indicates a predominance of mild pain[2,18,27].
A positive and statistically significant correlation was found between most of the questions and the PDQ Pain Scale. The PDQ tool allows a better understanding of the limitation of symptomatic subjects and its relationship to pain intensity[2,27]. When there was a validation of the PDQ for the Brazilian population, a positive and moderate correlation between the values obtained by the two scales was established[2]. The values found by the correlation coefficient between the PDQ scores and the Numerical Pain Scale suggests that there is a relationship between the intensity and the perception of functional disability[2].
The dentists with pain symptoms in the last 12 months and who used pain medication had more chances of failure than those

who did not. Professionals who had pain first used some form of drug therapy for the relief, seeking help from a professional specialist only after persistent symptoms[21,22,28,29].

It is important to highlight that musculoskeletal disorders are multifactorial in origin[3,4,5,6], and some variables should be considered to study the relationship between pain intensity and disability, such as frequency and location of the pain, the presence of depression and the beliefs regarding pain, among others[2]. The disability caused by pain occurs not only by the pain sensation but also involves the interaction between the physical, psychological, social and labor aspects[2,5,23,30,31].

In the multivariate model, all variables were included that had a statistically significant association. When a multivariate analysis was conducted, variables such as marital status, the presence of pain and age were statistically significant, and married professionals have 25.54 times higher risk of having a moderate disability due to pain (PDQ) than single individuals. These results differ from similar studies already performed[15,32]. Little is said in the literature about the fact that marital status has an influence on musculoskeletal disorders, but studies show that there is a greater psychological and social support for those subjects married or in a stable relationship[32]. It should be noted, however, that people who are married or in a stable relationship are willing to form a family, including children, which requires greater financial stability in order to meet the increased spending. In this framework, a prolongation of working hours associated with the fact that the dentist who performs clinical activities in more than one location can complement the household income, hence creating physical and mental fatigue, stress occurs and may contribute to the onset of painful symptoms[23].

The workday was statistically significant, and those who work up to 6 hours/day had the lowest score regarding disability than the professionals who extend their workday. The extension of the workday ends up requiring more maintenance on the static posture of the body, causing muscle fatigue, which leads to the adoption of compensatory postures, leading to the onset of muscle pain and decreased strength of the upper limbs[14,21,23]. This can be explained by muscles overload on the upper part of the body (including shoulder, neck, hands) that the dentists create when performing their work activities, coupled with the stress and excessive workload[4,11,23].

People who had pain symptoms in the last 12 months had 18.38 times increased risk of having a moderate disability due to pain (PDQ) than asymptomatic patients. Symptomatic subjects presented a higher perception to painful sensation perhaps for fear that the musculoskeletal symptoms may prevent the completion of future work activities or even recreation. The search for help of a health professional can be considered as a warning for the installation of functional disability[31].

Musculoskeletal disorders can be prevented by adopting a healthier lifestyle, taking care of nutrition, practicing sports, performing daily stretches and adoption of ergonomic principles that can protect the dentist from these diseases[26]. Physical exercise on a regular basis causes circulatory and metabolic adaptations beneficial to musculoskeletal structures, helping to maintain the static and dynamic posture, thus reducing the risk of mus-

culoskeletal injuries[15,21,26]. Interventions in work organization, changes of pace and workday, adjustments of equipment and office furniture taking into account the comfort, efficiency and the wellbeing of the professional can help to improve musculoskeletal injuries[23].

CONCLUSION

It was concluded that there was a high prevalence of musculoskeletal pain among dentists, and the upper and lower back regions were the most affected. The correlation between pain and disability was positive, despite that the intensity of pain has been shown to be minimal, and the disability of these professionals was considered moderate.

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Quality of assistance of acute chest pain patients in the State of Ceará, Brazil

Qualidade da assistência à pacientes com dor torácica aguda no estado do Ceará, Brasil

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ABSTRACT

BACKGROUND AND OBJECTIVES: Chest pain is a major reason for hospitalization in the public network due to its subjectivity, non-specificity, lack of nurses and physicians' qualification, quality of assistance and the fact that chest pain patients satisfaction is still far away from ideal. This study aimed at evaluating the quality of assistance of acute chest pain patients in the State of Ceará, Brazil.
METHODS: This is a descriptive, exploratory and analytical study. After applying a form, a sample of 430 patients and 50 professionals of a reference hospital was obtained. Non-parametric statistics was used for analysis and discussion. Dependent variables and users' satisfaction were correlated for the development of tables and simple descriptive statistical analysis.
RESULTS: Three hundred and eighty-one patients (65.65%) have looked for assistance more than once, returning for several reasons, even when there were other units for health follow up in their respective region. Most users (n=422) have not noticed assistance barriers with regard to materials and human resources (83.17). However, delay in assistance (9.0%) was the most important barrier perceived by those referring difficulties (n=38).
CONCLUSION: The complex assistance to acute chest pain patients affects the analysis of the quality of assistance provided to users. The high number of patients makes the service chaotic because the relationship between health professionals and structure is not satisfactory, requiring the insertion of more professionals and improvement in assistance time.
Keywords: Chest pain, Patients' satisfaction, Quality.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor torácica é uma das principais causas de internação na rede pública e devido ao caráter subjetivo da dor, à inespecificidade da dor torácica, e à deficiência na capacitação de profissionais enfermeiros e médicos, à qualidade dos atendimentos e à satisfação dos pacientes com dor torácica que ainda está longe de ser o ideal. Neste contexto, este estudo teve como objetivo analisar a qualidade da assistência à pacientes com dor torácica aguda no estado do Ceará-Brasil.
MÉTODOS: Pesquisa do tipo descritiva, exploratória e analítica. Aplicou-se um formulário e obteve-se uma amostra 430 pacientes e 50 profissionais do hospital de referência. Utilizou-se estatística não paramétrica para análise e discussão. As variáveis dependentes e a satisfação dos usuários foram correlacionadas para a construção de tabelas e análise estatística descritiva simples.
RESULTADOS: Trezentos e oitenta e um pacientes (65,65%) já buscaram o serviço mais de uma vez para atendimento, retornando por diversos motivos, mesmo existindo outras unidades para o acompanhamento de saúde em sua respectiva regional. A maioria dos usuários (n=422) não percebeu barreiras no atendimento quanto a materiais e recursos humanos (83,17%). No entanto, a demora no atendimento (9,0%) constituiu a maior barreira percebida por aqueles referiram haver dificuldades (n=38).
CONCLUSÃO: A complexidade do atendimento à pacientes com dor torácica aguda afeta a análise da qualidade da assistência prestada aos usuários. O elevado número de atendimentos torna o serviço caótico, pois a relação entre profissionais de saúde e estrutura é insatisfatória, requerendo a inserção de mais profissionais e a melhoria do tempo de atendimento.
Descritores: Dor torácica, Qualidade, Satisfação do paciente.

INTRODUCTION

The Federal Constitution of 1988 reformulated the Brazilian health paradigms leading to a new system till then scarcely seen and later praised by many First World countries, the so-called *Sistema* Único *de Saúde* (SUS), bringing in its formulation relevant principles to an equitable, integral and universal healthcare, among other[1]. Enrollment to the new healthcare system also generated new administrative and managerial needs to meet all the demands of a system of this magnitude and complexity. Thus, the optimization of resources, as well as the search for quality and resolvability in healthcare became imperative[2].
In this perspective, it is important to listen and to understand the demands of the users regarding care expectations since

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other studies have already demonstrated that expectations associated with the care received point to measures about the user's satisfaction[3]. Moreover, currently, the user's view can be extended to the evaluation of the SUS quality with opinions regarding the environment and the relationship with the professionals[4].

The term quality is defined by QualiSUS as an index that healthcare services are meeting the needs, expectations, and standards of care of the individuals and their families. The collection of this information generates a true database to build the knowledge about the reach of the quality of care[4].

Hospital units partnering with SUS are supported by the health managers in the process of strategical care planning, following the ideal of meeting health needs and the expectations of the human being, enabling efficiency and effectiveness in the care of the patient, promoting the quality of care[2]. Chest pain has been one of the main causes of hospitalization in the public network since cardiovascular diseases account for greater mortality rate and its proper evaluation is a challenge. Due to the subjective nature of pain, the unspecificity of chest pain the deficiency in the training and qualification of professional nurses and physicians, the quality of care, and the satisfaction of patients with chest pain is still far from ideal[5]. In this context, the purpose of this study was to analyze the quality of care of patients with acute chest pain in the State of Ceará-Brazil.

METHODS

The study was categorized as an exploratory survey with a quantitative approach, in which the quality of care of patients with acute chest pain was evaluated.

The population consisted of 430 users and 52 professionals (physicians, nurses, technicians and nurse practitioners) of a cardiopulmonary emergency unit of reference in the State. During March 2007 to February 2010, we included users and professionals with ages from 18 to 60 years from both genders and excluded those who had reports of psychiatric disorders, verbal, auditory incongruity and irritation.

A questionnaire was applied to the users with questions on socio-demographic data (gender, age, marital status, educational level, occupation, and origin) and the difficulties in care (material, equipment, human resources, and user' satisfaction). For professionals, a form containing questions about socio-demographic data, academic training and the difficulties perceived about materials, equipment, and human resources. In addition to these data collection tools, we looked for information about the number of care at hospitalization emergency service of the hospital.

The study was submitted to the Committee on Ethics in Research of the Hospital participating in the study, according to Resolution number 196, of the National Health Council, of October 10, 1996, that it regulates studies with human beings. After a favorable opinion from the Committee on Ethics in Research with registry number 431/07, we received the registry of acceptance of the patients participating in the study by means of Free and Informed Consent Term (FICT). Patients were informed about the objectives of the study and the confidentiality of the information and identities.

Statistical analysis

The data was organized in an Excel 2007 spreadsheet to provide a cross-section reading of the results. Dependable variables (perception of difficulties in care) and users' satisfaction were placed on a list and cross-referenced read to build tables for the descriptive statistical analysis with discussion according to relevant literature on responsiveness, user's satisfaction, and QUALISUS texts.

RESULTS

In the emergency sector of the cardiovascular reference hospital in the macro-region of Fortaleza, the total number of medical care in 2008 and 2009 was 242,276 thousand patients with an average (M±) of 80758.67 and standard deviation (SD) of 122394.67. The organization of this demand as risk management includes patients admitted to the cardiac arrest stay and observation room, as well as those scheduled for appointments and clinical care for acute chest pain in the Emergency Department.

Of this total, the part that is of interest for the study (n=430) were users who have been cared for acute chest pain and were not hospitalized, representing 57.07% of the total care. On average, there were 10,593 patients in 2008 (52.47%) and 9.597 (47.53%) in 2009. Both had a difference between monthly averages (M±) of 6.9314 and standard deviation of 8.1738, with significant results for the Fisher t (t=1.19) with 95% confidence interval, with a value of p=1.

Of the users cared for in this sector after screening and medical consultation, the sample was 430 patients with chest pain. The majority were female (53.4%) aged from 61 to 70 years (33.79%), with incomplete elementary school (47.32%), married (52.56%), retired (39.07%), native or with residence in the city of Fortaleza (96.78%).

These users have looked for care in the Emergency Department of this State reference hospital for different reasons (n=429) (Table 1) and had previous clinical care (n=281) (Table 2).

Table 1. Reason for going to a reference unit. Fortaleza/CE, Brazil, 2007-2010

Reason for seeking care (n=429)	n (%)
Near home	28 (6.52)
Search for cardiopulmonary care	146 (34.03)
Due to the quality and speed of service	19 (4.42)
Referral of other health units	124 (28.9)
Guidance of family or friends	22 (5.12)
Is already a patient of this hospital	66 (15.38)
Others	24 (5.59)

Source: primary data.

The predominant reason manifested by users (n=429) was because the service in question is a reference unit in cardio-pulmonary care (34.03%) (Table 1).

The health macro-region of "Fortaleza" provides services of low, medium and high complexity, available in several healthcare units. The Family Health Basic Units (UBASF) provide free access to healthcare services and programs, especially to users with cardiovascular and pulmonary risk, highlighting the "Hypertension," "Diabetes" and "Elderly Health" programs, which theoretically should contribute to decreasing medical visits and the overload in cardiovascular emergencies. In this context, only 28.9% (Table 1) of the participants in this study said they were referred from other health care units.

Thus, 65.65% (381) have been to the service more than once for care, returning for several reasons, even existing services of reference for health monitoring in their respective Regional Healthcare.

Most users (n=422) did not perceive any barriers in the service related to materials, equipment and human resources (83.17%). However, the delay in attendance (9.0%) was the biggest perceived barrier for those who reported having trouble (n=38) (Table 2).

In the professionals' perception, the majority (n=40) reported as a predominant barrier the insufficient number of physicians in the sector (80%) (Table 2). Nevertheless, 84.61% of these professionals have considered the team qualified to perform the activities successfully. Concerning the resolution of health problems at the service, most of the sample 71.6% (n=281) stated that the service was decisive (Table 3).

The percentage of those who declared that the service care of acute chest pain did not have a resolution as very small, 2,04%, however, they reported some difficulties faced previ-

Table 2. Barriers to the service for users and professionals. Fortaleza/CE, Brazil, 2007-2010

Service barriers	n (%)
User's perception (n=422)	
None	351 (83.17)
Delay	38 (9.0)
Occupancy	12 (2.84)
Few professionals	9 (2.13)
Disorganization	5 (1.18)
Bureaucracy	4 (0.94)
Lack of priority	1 (0.23)
Lack of efficiency	1 (0.23)
Professionals' perception (n=50)	
High demand of patients	13 (26.92)
Shortage of professionals for the demand	14 (28.84)
Lack of some materials and equipment (material for dressing, clothing of patients, stretcher, wheelchair) and pulse oximeter)	8 (17.30)
Insufficient number of physicians in the sector	40 (80.00)

Source: primary data.

Table 3. Resolution of the problem that leads to a search for care reported by the patients in this study. Fortaleza/CE, Brazil, 2007-2010

Resolution (n=392)	n (%)
Resolvability	281 (71.6)
No resolution	8 (2.04)
In progress of resolving	103 (26.27)

Source: primary data.

ously at the service, for example, delay in attendance, lack of professionals and disorganization. Those who described difficulties in attendance (Table 2) were the same users who declared that the service was in the process of resolution (24.82%) showing the difficulties listed in Table 2, and who were also being attended at the service for the first time.

Therefore, we find satisfaction poles with respective levels. The first pole is of those who were satisfied, represented by levels between being "very satisfied" and "satisfied," and the second pole of those who were unsatisfied, represented by "not much satisfied" and totally "unsatisfied." Thus, it was observed that the level of satisfaction (Table 4) of users cared for chest pain had a predominance in the category "satisfied" with 63.8% (n=268).

Table 4. Satisfaction and difficulties according to the users of the service. Fortaleza/CE, Brazil, 2007-2010

Level of Satisfaction	Difficulty in care		
	Inexistent (n=351)	(n=69)	n=420
Very satisfied	106 (30.19%)	5 (7.24%)	111 (26.42%)
Satisfied	229 (65.24%)	39 (56.52%)	268 (63.8%)
Somewhat satisfied	13 (3.7%)	19 (27.53%)	32 (7.61%)
Unsatisfied	3 (0.8%)	6 (8.69%)	9 (2.14%)

Source: primary data.

However, we noticed that even being satisfied, 39 patients reported difficulties with regards to the attendance, which can be related to several factors, and even though did not interfere with the satisfaction index since there is a difference between what really happens and what is perceived by the patient. This percentage is sluggish when compared to those who did not report difficulties.

DISCUSSION

The clinical care of people with chest pain must be included at the beginning of the planning process until the execution, with continuous evaluation and with the participation of users and professionals. In this way, the social participation gains space in health management and allows the development of effective strategies to assess and treat these patients, avoiding delays in care that can lead to complications, and therefore providing quality service and satisfaction[6].

The emergency care for patients with chest pain is extremely valuable because every year in Brazil there are more than 4

million patients with chest pain, and according to the data from 2001, cardiovascular diseases were the third major cause of hospitalization at SUS[7,8].

This reality is in agreement with the statistics of the hospital of the study since by the data provided by SAME (Service of Medical Attendance and Statistics), the number of hospitalizations of patients with this pain in the sector emergency represents a significant value. These data has already been presented in the results and the literature evidence that the situation of the emergency services, in general, is a reason for concern because we've seen a significant growth in the last decades[9].

The emergency sector is the best entrance door for public healthcare, and it is widely used by patients with chest pain since cardiovascular diseases are the main causes of death in Brazil, in both genders, with no significant impact on gender[10].

The causes for gender-related differences have not been defined yet[11]. However, the presence of a higher number of women (53.4%), especially between 61 and 70 years, in the present study, can be associated with the fact that they are in the menopausal period. Studies show that the period of decrease in hormone production can lead to the likelihood of cardiovascular diseases[12].

Other pieces of evidence found in the characterization of the sample, as the prevalence of retirees, married and low educational level were similar to a study carried out in the city of Campinas[13].

The motivation to look for care at the hospital of this study brings to light the fact that the unit is a reference at SUS since 33.95% went there because it is a reference in cardiopulmonary care and 28.84% being referred from other health units.

Other notes regarding the reason for looking for care, even with a lower percentage, confirms the recognition by users that it is a service that provides qualified care, and they accept and rely on the assistance.

The use of the service shows a working flow in the offices of experts cardiologists and pneumologists with a high percentage (65.65%) of previous visits. This is corroborated by the number of patients who validate the overcrowding of the unit since there are alternative health care units to follow-up the treatment, and the population should be properly oriented to allow a better organization of the hospital system. This can also be prevented visits by implementing health education strategies, that lead to a greater pharmacological treatment compliance decreasing hospital rehospitalizations[13].

Rehospitalizations can be related to flaws existing in the organizational system of the institution and to behavior factors of the users of the service, for example, non-compliance with the pharmacological treatment, difficulty to change lifestyle, and even the delay in looking for health care when the clinical situation worsens[13].

The resolvability of healthcare services is a way to evaluate institutions and the quality of the professional care from the results obtained from user's care service, reflecting the final resolution of the problems plus the patient's satisfaction[14]. Among the 281 remaining patients, the service proved to be decisive for 65.35%, meeting patients' expectations, motivating them to go back to the service whenever they feel necessary.

The unit in question showed effectiveness to meet the needs of the population. However, due to high demand, there are some difficulties that were reported by professionals and users of the service, such as the insufficient number of physicians to meet the demand (83.14%) and the delay in attendance (63.45%), respectively.

According to reports from patients, care satisfaction was positive; 26.24% reported being very satisfied, and 63.35% were satisfied. These values can be attributed from the analysis of their perception of a hospital system that is run with quality, since only 16.31% have experienced difficulties in attendance, although the number of elderly (>65 years) and the low educational level of the sample of this study might indicate a greater acceptance of the public services offered.

Currently, the authors support the idea of the importance of patients' perception when evaluating the quality of care[15,16]. In Brazil, the National Council of Health Secretaries along with the Prosecution Office, conducted in 2003 the study "Health in the Brazilians' Opinion," to analyze users' satisfaction with the health system[17]. This satisfaction is considered a goal to be reached by the services, so, therefore, it shall be studied in order to improve the healthcare system.

The Public Healthcare System in its guidelines aims to provide fair health access, and together with the Prosecution Office is working to elaborate programs to provide quality care, with principles to raise the quality level, generating greater patient' satisfaction, legitimizing, the country's healthcare policy[4].

CONCLUSION

The complexity of care of patients with acute chest pain offered by the cardiopulmonary care reference unit of Ceará affects the analysis of the quality of care provided to users. The high number of attendances makes the service chaotic, since the relation between healthcare professionals, the structure, and the organization is unsatisfactory, requiring the addition of more professionals and improvement in the attendance time. These elements were considered major barriers to the service, although the level of satisfaction was good with a low percentage of difficulties in attendance.

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Prevalence of chronic pain and associated factors among medical students

Prevalência de dor crônica e fatores associados em estudantes de medicina

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ABSTRACT

BACKGROUND AND OBJECTIVES: Pain is a major complaint of individuals looking for healthcare services. The high prevalence of both acute and chronic pain makes it a public health problem, due to high costs imposed to society and healthcare services, in addition to the negative impact on daily activities of those living with such experience. This study aimed at identifying the prevalence of chronic pain among medical students of a University in the countryside of São Paulo.
METHODS: Cross-sectional study carried out with 395 students of all grades of the medicine course of the Universidade de Taubaté. Investigated variables were: pain incidence and duration, presence or not of triggering factor(s), use or not of painkillers, pain location and dimension according to McGill questionnaire.
RESULTS: There has been predominance of females with 253 participants (64.05%), prevailing the age group between 21 to 25 years with 217 students (54.93%). Among participants, 219 (55.44%) reported some type of pain and among them, 141 (64.38%) have reported chronic pain, that is, for more than six months, in a total of 35.69%.
CONCLUSION: In our study, chronic pain prevalence was 35.69%, especially among females. With regard to pain location, there has been more prevalence of lumbar and sacrococcygeal regions, followed by knees and headache, face and mouth and finally widespread pain.
Keywords: Chronic pain, Medical students, Pain.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor é uma das principais queixas dos indivíduos que procuram atendimento nos serviços de saúde. A alta prevalência de dor tanto aguda quanto crônica na população torna este um problema de saúde pública, devido aos elevados custos impostos à sociedade e aos serviços de saúde, além do impacto negativo nas atividades cotidianas daqueles que convivem com tal experiência. Este estudo teve como objetivo identificar a prevalência de dor crônica em estudantes de medicina de uma Universidade do Interior Paulista.
MÉTODOS: Estudo transversal, realizado com 395 estudantes de todas as séries do curso de medicina da Universidade de Taubaté. As variáveis investigadas foram: ocorrência e tempo da dor sentida, presença ou não de fator (es) desencadeante (s), uso ou não de fármacos para alívio da dor, localização e dimensão da dor segundo o questionário de McGill.
RESULTADOS: Houve predomínio do sexo feminino com 253 participantes (64,05%), prevalecendo a faixa etária de 21 a 25 anos com 217 alunos (54,93%). Entre os participantes, 219 (55,44%) apontaram a presença de algum tipo de dor e destes, 141 (64,38%) relataram sentir dor de forma crônica, ou seja, há mais de seis meses, perfazendo 35,69% do total.
CONCLUSÃO: Neste estudo, a prevalência de dor crônica foi de 35,69%, com maior ocorrência no sexo feminino. Em relação a localização da dor, houve maior prevalência na região lombar e sacrococcígea, seguida pelo joelho e em terceiro lugar a dor de cabeça, face e boca e por último dor generalizada.
Descritores: Dor, Dor crônica, Estudantes de medicina.

INTRODUCTION

Pain is defined as unpleasant sensory and emotional experience described in terms of real or potential injuries, always subjective in its experiences, being a major complaint of individuals looking for health services[1,2].
According to the International Association for the Study of Pain (IASP), chronic non-cancer pain (CP) is defined as that without apparent biological value lasting beyond normal tissue healing time and for more than six months, however some authors consider it already after three months[1]. Persistence of CP prolongs the existence of already mentioned symptoms and may exacerbate them, in addition to affecting quality of life. Factors such as depression, physical and functional incapacity, dependence, social isolation, changes in sexuality, economic imbalance, death feelings and others are associated to CP[3].
The high prevalence of pain in the population makes it a public health problem due to high costs imposed to society and health services, in addition to the negative impact on daily life activities of those living with such experience[2]. Low back pain, classic example of CP, is considered a public health problem with high medical and social costs

in the United States, being reason for the loss of 1400 working days per thousand inhabitants per year. In Europe, it is the most prevalent cause of limitation in individuals aged below 45 years and the second most frequent cause of medical consultations[4]

It is estimated that CP affects between 30 and 40% of the Brazilian population, being the major reason for absenteeism, medical leaves, early retirement, labor indemnities and low productivity[5]. Among students of the nursing course of the Universidade Federal de Goiás, with 211 students, there has been self-reported CP prevalence of 59.7%[2].

All consequences of CP emphasize the importance of measuring its prevalence aiming at planning measures for its control and management[3].

To understand and compare pain among different populations and aiming at developing a universal language about pain, Melzak, in 1975, has developed the McGill Questionnaire, in the McGill University, Montreal, Canada, to supply qualitative pain measurements which could be statistically evaluated. With its major utility as clinical and research tool, in 1996, Brazilian authors have published an adaptation proposal for Portuguese with good results[6].

Based on evidences proving the impacts of CP, this study was proposed and aimed at establishing the prevalence of self-referred CP among medical students, according to gender and location.

METHODS

This is a cross-sectional study carried out in the school of medicine, Universidade de Taubaté (UNITAU), from March to August 2016.

Target population was made up of 551 participants, conveniently determined sample according to the number of students enrolled in the Medicine Graduation Course. Exclusion criteria were those below 18 and above 30 years of age. From 551 eligible students, 156 (28.31%) have not participated in the research by refusal or because they were not located in the classroom after one attempt. So, population was made up of 395 students distributed in the six years of the medical course. Outcome variables were: pain, time since onset, existence or not of triggering factors, use of painkillers, pain location and dimension (sensory, affective, evaluative and miscellaneous) according to McGill questionnaire[7].

Chronic pain was considered that felt for six months or more in a same site[1]. Pain was located by means of body diagrams illustrating patient's front and back, with numbered anatomic regions, for participants to indicate the number or mark on the diagram the affected region. Dimension was evaluated by means of McGill questionnaire, with 78 pain descriptors, classified in four major groups (sensory, affective, evaluative and miscellaneous) and 20 subgroups[7]. Exposure variables considered in this study were: gender, age, height, weight, course grade, extracurriculum activities (trainee, job, research, academic leagues, among

others) and practice of regular physical activity (minimum of once a week).

Data were collected in classrooms of the Medicine Department, UNITAU, in hospitals linked to the institution, during clinical meetings or other activities, where expected audience were all students enrolled in each grade. All candidates were informed about the study, its objectives and those accepting it have signed the Free and Informed Consent Term (FICT), filling a questionnaire developed for this purpose with already described items. Results are presented in tables.

This study was approved by the Ethics and Research Committee, Universidade de Taubaté (CEP/UNITAU 1.188.155).

RESULTS

Table 1 shows the profile of studied population with regard to gender, age, physical activity and extracurriculum activities, being that in this latter item students could tick more than one box.

Table 1. Characteristics of studied population

Items	n	%
Age group (years)		
18 to 20	127	32.15
21 to 25	217	54.93
26 to 30	51	12.91
Gender		
Male	142	35.94
Female	253	64.05
Extracurriculum activity		
No activity	106	26.83
Trainee	24	6.07
Job	13	3.29
Research	56	14.17
Academic leagues	323	81.77
Others	22	5.56
Physical activity		
Yes	302	76.45
No	93	23.54
Total participants	395	100

Table 2. Pain prevalence in medical course grades

Grade	Yes	No	Chronic pain (%)
1st	64	56	34 (28.3)
2nd	58	36	36 (38.2)
3rd	29	26	17 (30.9)
4th	28	36	23 (35.9)
5th	24	8	20 (62.5)
6th	16	14	11 (36.6)
Total	219	176	141 (35.7)

Tables 2, 3, 4 and 5 show, respectively, pain prevalence in the whole studied population; CP prevalence distributed by gender in different medical course grades; triggering factors and use of painkillers; and CP location.

Mean McGill questionnaire values among groups and also individually per group, in each parameter (sensory, affective, evaluative and miscellaneous) are shown in table 6.

Table 3. Prevalence of chronic pain by gender in medical course grades

Grade	Gender	
	Male (%)	Female (%)
1st	3 (8.8)	31 (91.2)
2nd	8 (22.2)	28 (77.8)
3rd	6 (35.3)	11 (64.7)
4th	5 (21.7)	18 (78.3)
5th	11 (55.0)	9 (45%)
6th	4 (36.4)	7 (63.6)
Total	37 (23.2)	104 (73.8)

Table 4. Drugs against chronic pain

Drugs	
Yes	64 (45.4%)
No	77 (54.6)

Table 5. Body region affected by pain lasting more than six months

Pain site	n	%
Lumbar, sacrum & coccyx	59	23.13
Knee	34	13.33
Head, face & mouth	30	11.76
Chest	23	9.01
Shoulder & arm	22	8.62
Cervical region	21	8.23
Thigh	14	5.49
Ankle & foot	12	4.70
Pelvic region	9	3.52
Leg	8	3.13
Wrist & hand	6	2.35
Abdomen	6	2.35
Thoracic	5	1.96
Elbow & forearm	5	1.96
Widespread pain	1	0.39

DISCUSSION

In our study, from 395 interviewed students, 141 (35.69%) have referred CP, defined as pain lasting for more than six months. Among grades, there has been more frequency on the fifth grade, with 62.5%, well above mean, being that the first grade had the lowest frequency, with 28.3% of students and similar to findings of a study by Harstall & Ospina[8], grouping 13 studies on the prevalence of CP where pain variation among general population was 10.1 to 55.2%.

Kreling, Cruz & Pimenta[9] have evaluated the prevalence of CP in 505 adults aged between 22 and 65 years, employees of the Universidade Estadual de Londrina, and have found 61.4% of respondents with pain for more than six months. A study by Silva et al.[2] involving 211 nursing students of the Universidade Federal de Goiás, aged between 22 and 29 years, has found CP in 59.7% of them, that is, above our findings.

When correlating pain frequency and gender, our study has shown results similar to the literature[10], pointing to higher frequency among females and similar to a review by Verhaak et al.[11] involving seven studies which have found more frequent pain among females, with just two studies showing similar prevalence of CP among males and females.

In our study, higher prevalence of CP was found among females, with 73.8% of studied population. However, when evaluating female participants, its frequency was 104 participants, or 41.1%, while in the male population if was 37 participants, or 26.1%, similar to results of four studies present in the literature review of Harstall & Ospina[8] which have found prevalence values, among males and females, of 39.6% (variation: 13.4 to 55.5%) and 31% (variation: 9.1 to 54.9%), respectively.

In search for explanations for such results, investigators have stressed the influence of constitutional, endocrine, cultural and lifestyle-related factors in the predominance of pain in females, pointing to the variation of some types of pain during the menstrual cycle[12].

As to most frequent pain location, general studies point to headache and low back pain as major sites, results which are not consistent with our study since major sites were, respectively: low back, knees and head[2,9,13-16].

According to Cordeiro et al.[15], among CP presentations, musculoskeletal pain was the most common diagnosis, being low back pain the most prevalent musculoskeletal pain with 5.12%.

Table 6. Mean of McGill questionnaire values scored b chronic pain participants in each parameter

Dimension	Pain index in series of course						
	1st	2nd	3rd	4th	5th	6th	Total
Sensory	12.87	13.77	12.94	13.52	11.53	9.24	12.31
Affective	2.99	3.39	4	3.36	2.13	2.58	3.07
Evaluative	2.71	2.75	2.52	2.14	2.55	1.91	2.43
Miscellaneous	4.67	3.84	4.94	3.52	2.65	3.22	3.80

Studies in Brazilian universities[2,13] have found more frequency of headache with regard to low back pain, differently from our study. When tabulating current study results, there has been higher CP frequency in medical students in low back, sacral and coccygeal regions, with 23.13%, followed by knee pain with 13.33% and head, mouth and face with 11.76%. Such data lead us to think about the possible relationship with overload imposed to low back muscles, due to long periods of curriculum activities present in the complete course, which are often associated to incorrect body position.

When it comes to drugs for CP patients, literature has shown a high percentage of use, such as in the studies by Loduca et al.[17] with 85% and Dellaroza et al.[18] with 80.4% although other studies question the adherence to pharmacological treatment of CP patients. Kurita & Pimenta[19,20] have carried out two different studies involving CP patients and have found variations of 40 to 56.7% and of 43.3 to 56.7% with regard to adherence to pharmacological treatment. In our study, 45.39% of medical CP students used analgesics.

In analyzing each grade separately in search for a pattern for the use of drugs, it was noticed that values have varied between 41.17 and 54.50%, except for the fourth grade where most CP students (65.21%) have not reported using any painkiller.

After comparative analysis of McGill pain questionnaire, there has been no increasing or decreasing linearity of pain index values in the four major evaluated groups: sensory, affective, evaluative and miscellaneous.

Results have shown low prevalence as compared to Brazilian studies both in populations with different ages or even studies with college populations. However, prevalence was similar to the mean found by a review carried out by Harstall & Ospina[8]. With regard to pain location, there might be relationship between the long period of curriculum activities of a complete course and possible incorrect body posture, with higher prevalence of low back pain.

Information were not crossed to characterize the profile of CP students, which would have been interesting to measure risk and identify the exposed population.

Although our study has reached the objective of characterizing CP among medical students, other studies with similar populations should confirm our results to propose the development of programs aiming at fighting this problem affecting population since the university.

CONCLUSION

CP was more prevalent among females. With regard to pain location, low back, sacrum and coccyx regions were the most prevalent.

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Functionality, psychosocial factors and quality of life in women with predominance of central sensitization

Funcionalidade, fatores psicossociais e qualidade de vida em mulheres com predomínio de sensibilização central

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ABSTRACT

BACKGROUND AND OBJECTIVES: Chronic pain is a major reason for visits to healthcare professionals and has been seen as a public health problem. Many patients with chronic pain may develop predominance of central sensitization. Patients with central sensitization must be assessed through biopsychosocial model. This study aimed at evaluating physical and psychosocial impairment in women with chronic pain with predominance of central sensitization.

METHODS: A cross-sectional study was conducted in women with chronic musculoskeletal pain and central sensitization prevalence. Fifty-seven musculoskeletal pain patients were screened. Women with chronic, widespread and neuropathic pain and with pain in more than three sites, including trunk, upper and lower limbs were also included. Central sensitization was defined by mechanism-based pain classification. Eighteen patients were enrolled and completed questionnaires on sociodemographic characteristics, pain intensity, functionality, quality of life, kinesiophobia and catastrophizing. Descriptive statistics and correlation analyses were provided.

RESULTS: All participants have pain seven days a week and 88.9% of them were classified as severe pain. It was observed high levels of catastrophizing and kinesiophobia. There was a strong correlation between catastrophizing and kinesiophobia (Rho=0.864, p<0.01). The mental component of quality of life questionnaire showed moderate negative correlation with catastrophizing (Rho=-0.611, p<0.01) and kinesiophobia (Rho=-0.646, p<0.01). There was a moderate correlation of pain intensity and catastrophizing (Rho=0.628, p<0.01) and kinesiophobia (Rho=0.581, p=0.01). No correlation was observed between age, physical component of quality of life questionnaire, functionality, and pain duration.

CONCLUSION: Quality of life and pain intensity were more remarkably affected by psychosocial factors than functionality in women with chronic musculoskeletal pain with central sensitization predominance.

Keywords: Central nervous system sensitization, Chronic pain, Musculoskeletal pain, Psychology.

RESUMO

JUSTIFICATIVA E OBJETIVOS: Dor crônica é o principal motivo para consultas de profissionais de saúde e tem sido considerada como um problema de saúde pública. Vários pacientes com dor crônica devem desenvolver o predomínio de sensibilização central. Pacientes com sensibilização central devem ser avaliados através do modelo biopsicossocial. O objetivo deste estudo foi avaliar o comprometimento físico e psicossocial de mulheres com dor crônica que apresentam predomínio de sensibilização central.

MÉTODOS: Um estudo transversal foi conduzido com mulheres com dor crônica que apresentam predomínio de sensibilização central. Cinquenta e sete pacientes com dores musculoesqueléticas participaram da triagem. Mulheres com dor crônica de natureza neuropática e com dor localizada em mais de três locais, incluindo tronco, membro superior e inferior também foram incluídas. Sensibilização central foi definida pela classificação da dor baseada em seu mecanismo. Dezoito pacientes foram identificados e preencheram um questionário com características sócio-demográficas, intensidade de dor, funcionalidade, qualidade de vida, cinesiofobia e catastrofização. Foi realizada a análise estatística descritiva e a correlação entre as variáveis.

RESULTADOS: Todos as participantes apresentavam dor sete vezes por semana e 88,9% foram classificadas como dor intensa. Foi observado elevado nível de catastrofização e cinesiofobia. Houve uma forte correlação entre catastrofização e cinesiofobia (Rho=0,864, p<0,01). O componente mental do questionário de qualidade de vida evidenciou moderada correlação com catastrofização (Rho=-0,611, p<0,01) e cinesiofobia (Rho=-0,646, p<0,01). Houve moderada correlação entre a intensidade de dor e a catastrofização (Rho=0,628, p<0,01) e cinesiofobia (Rho=0,581, p=0,01). Nenhuma correlação entre idade, componente físico da qualidade de vida, funcionalidade e duração da dor foi observada.

CONCLUSÃO: A qualidade de vida e a intensidade da dor estiveram mais relacionadas com os fatores psicossociais do que a funcionalidade em mulheres com dor musculoesquelética crônica com predomínio de sensibilização central.

Descritores: Dor crônica, Dor musculoesquelética, Psicologia, Sensibilização do sistema nervosa central.

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INTRODUCTION

Chronic pain affects approximately 40% of the adult population, more than heart disease, cancer and diabetes combined. It is one of the main causes for visits to health professionals, use of drugs and disability, as well as an important factor in reducing quality of life and individual's productivity. There is little difference between the prevalence of chronic pain in developed countries (37.7%) and developing countries (38.9%), and these values tend to increase with increasing age regardless of the country's level of development[1]. Given the high prevalence and persistence of symptoms[2] and the high cost imposed on the healthcare system[3], chronic pain has been seen as a major public healthcare problem[4].

Chronic pain may be associated with an organic condition where the source of pain can be identified; however, under different conditions, it occurs without identifying any underlying disease or without a specific diagnose[5]. Once any tissue damage has been excluded, chronic pain has been explained by the central nervous system sensitization mechanism. Central sensitization leads to a cascade of events such as referred pain, hyperalgesia, allodynia, and changes in pain modulating centers[6]. These sensitization responses are modulated by neurophysiological, environmental, and cognitive factors[7]. Central sensitization represents a "malfunctioning of descending anti-nociceptive mechanisms"[8]. Changes in pain perception are often seen in conditions called central sensitization syndrome which includes chronic low back pain, fibromyalgia, chronic fatigue syndrome, headaches, temporomandibular joint dysfunction, chronic widespread pain etc.[9,10]. In general musculoskeletal pain patients show a remarkable number of participants with central sensitization predominance pain and women are the most affected gender[11].

Chronic pain can be understood by the fear-avoidance model in which physiological, behavioral, and cognitive aspects are responsible for the development and maintenance of chronic pain behavior. In this model, the fear of movement may lead to restriction of daily life activity and then disability. A number of events may occur between fear of movement and the onset of disability; the beginning of this process usually occurs by a negative evaluation of pain leading to catastrophic thoughts that are considered kinesiophobic behavior precursors. Another psychosocial factor contributing to this process is the hypervigilance, where subjects with fear related to pain are less capable of removing the focus from pain which hinders the performance and focus on other tasks[12]. Pain intensity, disability, and catastrophizing may be considered negative predictors of the quality of life in individuals with chronic pain[13,14]. Ogunlana[14] assessed the quality of life in patients with chronic low back pain and identified as a predictive negative factor among physical components of the quality of life questionnaire an increased level of disability and duration of pain while the negative factor of the mental component was an increased level disability.

The assessment of patients with chronic pain due to their biopsychosocial characteristic must be able to evaluate the biological, cognitive, and behavioral domains of pain[12,15]. Assessments of these domains in patients with chronic pain have been investigated, but there are no studies in women with chronic pain classified with central sensitization the evaluation and correlation of pain biopsychosocial components. Maladaptive psychosocial factors are part of the criteria to identify patients with central sensitization predominance[16], however these factors have been not broadly investigated in this population.

The aim of this study was to assess the functionality, psychosocial factors and quality of life in women with chronic musculoskeletal pain classified with central sensitization and to verify the correlation between them.

METHODS

This was a cross-sectional study. Eighteen women (above 18 years old) with central sensitization were screened from a total of 57 patients with musculoskeletal disorders in the outpatient physiotherapy department of Hospital Universitário Gaffrée e Guinle, Rio de Janeiro between April and June of 2015. The study included women with chronic pain (pain that persists for more than three months)[17] who had widespread pain (pain in three or more predefined sites involving trunk and upper and lower limbs)[18], with the presence of neuropathic pain (according to the questionnaire *Douleur Neuropathique* - DN4)[19], and a predominance of central sensitization (mechanisms-based pain classification)[16]. Exclusion criteria were subjects unable to understand or read Portuguese or those with pain from an oncological process, fractures or recent surgeries. The study flowchart is presented in figure 1.

Subjects who fulfilled the study's eligibility criteria answered during the admission interview a questionnaire with socio-demographic characteristics (age, education level), pain features (pain duration, pain frequency and pain location) and lifestyle factors (physical activity and quality of sleep), in addition to other self-administered tools to evaluate pain intensity, functionality, psychosocial factors (catastrophizing and kinesiophobia), and quality of life.

Pain intensity – Pain intensity was assessed by Numeric Pain Rating Scale (NPRS). They pointed out at a 10 cm ruler the value corresponding to their self-perception of pain intensity at that time, where zero (0) represented "no pain" and 10 "the worst pain possible"[20]. Patients were grouped according to the classification proposed by Jones et al.[21] in which zero (0) represents "no pain", 1 - 3 "mild pain", 4 - 6 "moderate pain" and 7 - 10 "severe pain".

Functionality – Subjects' functionality was assessed using the Patient-Specific Functional Scale (PSFS)[22], where individual's functional ability can be assessed in different musculoskeletal conditions[23]. The PSFS showed good clinimetric properties for Brazilian patients with shoulder pain[24] and low back pain[23]. Patients were asked to identify up to three important activities that they are unable to do or are having difficulty with as a result of their injury or problem. Subsequently, they were asked to point a value that best described their current level of ability on each activity assessed on a scale ranging from 0 to 10 points, where "0" refers to "unable to perform activity" and "10" refers to "able to perform activity at the same level as before injury". Total score is the sum of scores activity / number of activities, and total score ranges from zero to 30 and the higher the values obtained, the higher the functionality of the individual.
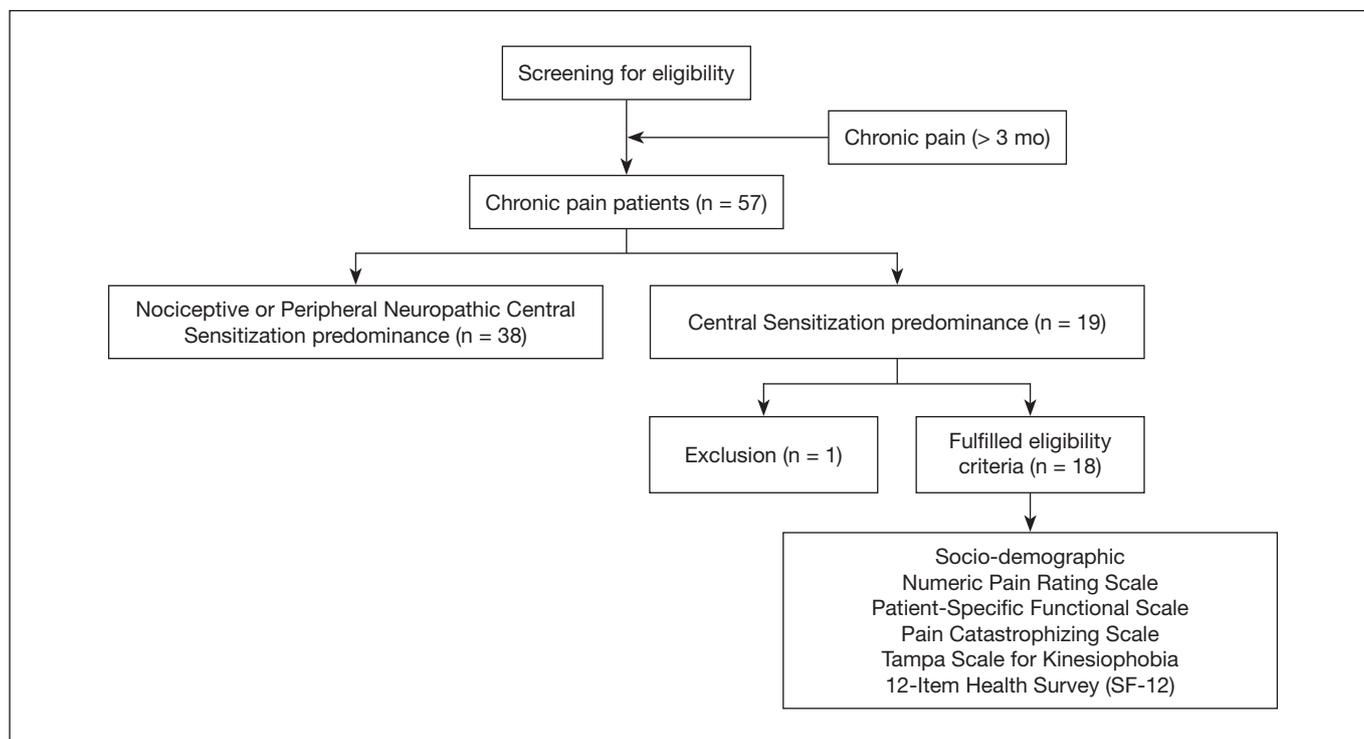
Figure 1. Study flowchart

Catastrophizing – The catastrophizing index was evaluated by the Brazilian Portuguese version of the Pain Catastrophizing Scale (BP-PCS)[25]. This scale is a self-administered questionnaire that consists of 13 items and is divided into three domains: helplessness, magnification, and rumination[26]. Items are rated on a 5-point Likert-type scale: (0) not at all, (1) to a slight degree, (2) to a moderate degree, (3) to a great degree, and (4) all the time. The domains scores are given by the sum of the corresponding items: magnification 6, 7, and 13; rumination 8 – 11; and helplessness 1– 5 and 12. Total score is computed by the sum of all items and ranges from zero to 52 points. Pain catastrophizing was classified as low when subjects got scores lower than 20 points; medium with values between 20 and 29, and high with values equal or higher than 30[27].

Kinesiophobia – Kinesiophobia was assessed by the Brazilian version of the Tampa Scale for Kinesiophobia (TSK)[28], which has similar properties as the original version[29]. This scale contains 17 questions addressing pain and symptoms severity, and each question scores from 1 to 4 points where (1) entirely disagree, (2) partially disagree, (3) partially agree, and (4) entirely agree. Total final score is the sum of all questions scores with the inversion of scores values for questions 4, 8, 12, and 16. Final score ranges from 17 to 68 points and the higher the score, the higher the kinesiophobia degree. Scores obtained in the TSK were grouped into three tertiles, obtaining three subgroups. The first tertile comprised score values between 17-33 points, in which patients were classified as low score for kinesiophobia; the second tertile between 34 to 41, in which patients were classified as moderate score; and the third tertile with values above 42 points, in which patients were classified as high score[30].

Quality of life – Quality of life of patients was evaluated by the 12-Item Health Survey (SF-12) composed of 12 items with the best correlation with each SF-36 domain[31]. The SF-12 assesses eight dimensions of influence on quality of life and the domains are grouped into two components: physical (physical component summary - PCS) and mental (mental component summary - MCS). The PCS is composed of domains physical function, physical aspect, pain, and general health while the MCS comprises vitality, social function, emotional aspect, and mental health. Total score ranges from zero to 100 and scores of physical and mental components are expressed as a percentage of total score, with higher scores associated with a better level of quality of life. PCS and MCS scores were assessed using SF-12 Health Survey Scoring database[32].

This study was conducted according to Resolution No. 466/12, of the National Health Council following the Helsinki Declaration of 1975 and it's amendment. It was approved by ethics committee on research of Augusto Motta University Center (CAAE: 43237015.8.0000.5235). Informed consent was obtained from all participants included in this study.

Statistical analysis

The software SPSS 16.0 (SPSS Inc. Chicago, IL, USA) was used to perform statistical analysis. Qualitative data are presented as absolute and relative frequency (%) while quantitative data are presented as mean ± standard deviation or median and 95% confidence interval. Shapiro-Wilk test was applied to verify the normal distribution of data. Variables were correlated using Pearson's or Spearman's correlation according to the normality of data distribution. Correlation coefficients were arbitrarily defined as very

high when value was above 0.9, as high with values between 0.7-0.89, as moderate between 0.5-0.69, as low between 0.3-0.49, and as mild below 0.29. Level of significance (p-value) was 5%.

RESULTS

The study sample was composed by 18 women with chronic pain who had central sensitization and mean age was 64.1±9.9 years. There were heterogeneous kinds of chronic pain, consisting of individuals with pain in different parts of the body, such as shoulders, knees, cervical, and lumbar spine. All patients reported feeling pain seven days a week. Severe pain was observed in 16 subjects (88.9%), moderate in 2 subjects (11.1%), and mild pain was not reported. Most subjects (88.9%) had a bad sleep quality, but no subject reported interference of chronic pain in sleep quality. Demographic characteristics of the study subjects are shown in table 1.

Table 1. Demographic characteristics of the study sample

	Values
Age, years	64.1±9.9
Pain intensity, n (%)	
Mild	-
Moderate	2 (11.1)
Severe	16 (88.9)
Levels of education, n (%)	
Incomplete basic	9 (50)
Complete basic	5 (27.7)
Incomplete high school	-
Complete high school	2 (11.1)
Complete college	1 (5.5)
Sleep quality, n (%)	
Good	2 (11.1)
Poor	10 (55.6)
Very poor	6 (33.3)
Physical activity level n (%)	
Inactive	13 (72,2)
Insufficient (less than 150 min/week)	5 (27,8)
Recommended (more than 150min/week)	-

Low levels of catastrophizing and high kinesiophobia index were observed in most participants. Central trends of measured variables (kinesiophobia, catastrophizing, quality of life, functionality, and pain intensity) are presented in table 2.

Table 2. Functionality, psychosocial factors and quality of life of women with central sensitization pain predominance

Variables	Values
Catastrophizing - BP-PCS	25.0±13.9
Low, n (%)	8 (44.4)
Medium, n (%)	4 (22.2)
High, n (%)	6 (33.3)
Kinesiophobia - TSK	42.7± 8.4
Low, n (%)	3 (16.7)
Moderate, n (%)	4 (22.2)
High, n (%)	11 (61.1)
Quality of life - SF-12	
Total, mean (±SD)	75.3±12.7
Physical Component, mean (±SD)	31.4± 8.2
Mental Component, mean (±SD)	43.9±11.6
Functionality - PSFS	2.6±2.0
Pain intensity - NPRS	8.5±1.6
Mild, n (%)	-
Moderate, n (%)	2 (11.1)
Severe, n (%)	16 (88.9)

PSFS = patient-specific functional scale; NPRS = numeric pain rating scale.

Psychosocial factors (catastrophizing and kinesiophobia) were significantly correlated with quality of life and pain intensity. There was no significant correlation of variables age, pain duration, and SF-12 physical component. Table 3 summarizes correlations between measured variables.

DISCUSSION

Women with chronic musculoskeletal pain and prevalence of central sensitization presented a low level of functionality, psychosocial impairment, and reduced quality of life. Psychosocial factors revealed a moderate correlation with high pain intensity.

Table 3. Correlation between variables: catastrophizing, kinesiophobia, quality of life, time of pain, and pain intensity

	Kinesiophobia	SF-12 Total	SF-12 Physical	SF-12 Mental	Functionality[d]	Pain duration	Pain intensity
Catastrophizing[a]	.864**	- .481*	.116	- .611**	- .059	.411	.628**
Kinesiophobia[b]		- .584*	.005	- .646**	- .344	.336	.581*
SF-12 total			.457	.774**	.429	- .083	- .510*
SF-12 physical				- .209	.268	.078	- .143
SF-12 mental					.351	- .132	- .483*
Functionality						.419	- .273
Pain duration							.348

Pearson's correlation was performed between catastrophizing, kinesiophobia, quality of life (Total SF-12, physical SF-12, and mental SF-12), and age; Spearman correlation was performed between physical SF-12, time of pain, functionality and pain intensity; a: Catastrophizing measured by Brazilian Portuguese Pain Catastrophizing Scale (BP-PCS); b: Kinesiophobia measured by Tampa Scale for Kinesiophobia (TSK); c: Pain intensity measured by Numeric Pain Rating Scale; d: Functionality measured by Patients-Specific Functionality Scale (PSFS); *p<0.05; **p<0.01.

The physical component of quality of life evidenced a more pronounced decrease. Although the mental component of quality of life was less affected, it was notably affected by psychosocial factors. The physical component of quality of life did not show any relationship with the variables studied.

In our study, a moderate correlation was shown between catastrophizing and pain intensity. Similar results were observed with chronic[33,34] and subacute pain[35]. Moreover, our findings have shown high indexes of kinesiophobia and these indexes were related to pain intensity. Similar results were found by Lundberg et al.[36], when evaluating chronic back pain. These findings suggest that the intensity of pain could contribute to fear of movement and fear of a new injury. Zale et al.[37] evaluated in a meta-analysis the association between kinesiophobia and disability in subjects with acute and chronic pain that had different diagnoses. The authors observed a weak association between kinesiophobia and pain intensity. A similar result, with a weak association between these variables, was observed in an assessment of patients with acute and chronic low back pain[38]. The difference between these studies and the present study may be explained by the different characteristics of the samples studied. While our study assessed exclusively subjects with central sensitization, the other two studies evaluated subjects with both acute and chronic pain.

In current study, we observed high levels of catastrophizing, as well as a close relationship with kinesiophobia and the mental component of quality of life. Previous studies have shown that pain catastrophizing is associated with high levels of pain and disability, and a worse evolution of the treatment[39,40]. Several conditions have central sensitization such as low back pain[13], rheumatoid arthritis[41], osteoarthritis[42] and fibromyalgia[43], showing high levels of catastrophizing, which may be related to reduced endogenous inhibition of pain in central sensitization, associated to the development, maintenance, and worsening of persistent pain[44].

Catastrophizing showed high correlation with kinesiophobia in the present study, as previously documented by Vlaeyen et al.[45]. The correlation between psychological factors can be explained by the fear-avoidance model in which catastrophic thoughts about pain are interpreted as fear and are seen as an injury risk signal[46]. The fear that some movement could trigger a new lesion favors safety behaviors, leading to avoidance behavior of physical movements, followed by disability, disuse, and depression[47]. These factors can affect the experience of pain and lead to the development of chronic pain and disability[12] in patients with central sensitization[48,49]. Picavet, Vlaeyen and Schouten[50] when evaluating patients with chronic low back pain, found a low correlation (r=0.35) between catastrophizing and kinesiophobia though high levels of catastrophizing and kinesiophobia were predictive factors in worsening low back pain and disability of the subjects.

In our study, there was a higher reduction of the physical component of the SF-12 compared to the mental component, but there was no significant correlation between the physical component and any other variable. Similar findings were reported by Ogunlana evaluating patients with chronic low back pain, in which there was a greater reduction of the physical component

of quality of life when compared to the mental component[14]. The reduction in quality of life noticed in patients with chronic low back pain can also be observed in subjects with chronic pain when compared to healthy individuals[13]. Chronic low back pain can deeply affect functional activities of the individual in society, leading to restriction of participation, and reduced quality of life. Moderate correlation between the SF-12 and total pain intensity was shown in our study, corroborating previous studies assessing chronic low back pain[13,14,51]. In a review conducted by Horn et al.[52] reported two papers with high correlation between the functionality and the physical component of quality of life and a low correlation between functionality and the mental component. However, Guclu et al.[53] evaluating subjects with chronic back pain found a weak correlation between the physical domains of quality of life and kinesiophobia in addition to weak to moderate correlation with pain intensity.

Besides the association with pain intensity, we observed a moderate negative association between quality of life and psychosocial factors (catastrophizing and kinesiophobia). Lame et al.[13], studying a heterogeneous group of chronic pain found a strong correlation between catastrophizing and all domains of quality of life, with a greater association with the mental component. According to the authors, patients with high catastrophizing index have lower quality of life compared to those with low levels of catastrophizing, corroborating the main findings of the present study. Studies have shown that quality of life is more associated with the functional and psychological state of the patient than with the physically disabled itself[13, 51].

There was no significant correlation in the current study between functionality and any other variable tested, however, conflicting results have been reported in the literature when correlations are proposed between functionality and psychosocial factors. A weak association between pain intensity and kinesiophobia was noticed by Guclu et al.[53] when evaluating patients with chronic low back pain. Preuper et al.[54], in a multicenter study, evaluated the relationship between psychosocial impairment and self-reported disability in patients with chronic non-specific low back pain. The values of the associations varied between 6 centers studied and was not observed a strong association between these variables. However, conflicting results were observed by Camacho et al.[55] who associated psychosocial factors with self-reported disability and the performance tests. The Patient-specific Functionality Scale, although developed to evaluate the functional condition of patients with various musculoskeletal disorders, is currently validated and reliable to evaluate a small number of conditions such as injury to the knee, low back and cervical spine. When used in conditions that their properties have not been established, the results may be less significant[52]. As our study sample was composed of individuals with different musculoskeletal conditions, this fact may explain the lack of correlation found between functionality with other tested variables.

Changes in sleep quality were self-reported by subjects in this study in which over 80% of subjects reported poor quality sleep. Campbell et al.[56] evaluating patients with osteoarthritis found an association between quality of sleep and central sensitization. These findings were justified by the interaction between the neu-

ral system where brain structures associated with the generation and maintenance of sleep are involved in pain modulation[57,58]. Sleep disorders have been observed in most subjects with chronic pain[59]. Buenaver et al.[60] analyzing the relationship between sleep disorder and catastrophizing in subjects with chronic pain reported that negative thoughts about the pain had an effect on self-reported sleep disorder. Nevertheless, in the current study there was no correlation between sleep quality and catastrophizing. In a review conducted by Finan, Goodin and Smith[58] were analyzed studies which associated sleep disorders both to increased risk of chronic pain in healthy individuals and the worst prognosis of chronic musculoskeletal pain.

Some limitations should be considered when interpreting data obtained in this study. The main limitation of this study was the sample size and the fact that it was composed exclusively of women. Although our results are consistent with other studies they may have been affected by the sample size. Furthermore, the sample composition by subjects with central sensitization does not allow the application of these results in conditions of acute or subacute pain. Results obtained by the questionnaires may have been influenced by the fact that they are self-applied and most subjects had low education level. Despite of the study limitations, the current study evidenced that central sensitization patients are highly affected by psychosocial factors. Thus, the management of psychosocial factors should be emphasized in patients with central sensitization, since some chronic pain patients do not develop central sensitization predominance[11].

CONCLUSION

Psychosocial factors were highly prevalent in women with chronic musculoskeletal pain who had central sensitization predominance. Pain intensity and quality of life were negatively influenced by psychosocial factors. The psychosocial component has an important role in chronic pain patients with central sensitization predominance.

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Prevalence of low back pain and interference with quality of life of pregnant women

Prevalência de lombalgia e a interferência na qualidade de vida de gestantes

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ABSTRACT

BACKGROUND AND OBJECTIVES: Pregnancy is characterized by a period when women's body suffers different changes. Between 50 and 80% of pregnant women refer low back pain, which may directly interfere with their quality of life. This study aimed at determining the prevalence of low back pain and its interference with quality of life of pregnant women assisted in the Family Health Strategy of the City of Cabo Frio.
METHODS: Field cross-sectional study with pregnant women between the 13th and 36th week of gestation, with low back pain, assisted in a low risk pre-natal program. A demographic questionnaire, Roland Morris and WHOQOL-bref questionnaires were applied to evaluate low back pain and quality of life, respectively. Descriptive statistics and Spearman correlation tests were used and p<0.05 was considered statistically significant.
RESULTS: Participated in the study 139 pregnant women assisted by the pre-natal assistance program. Mean age of 24.4±7.65 years. There has been significant correlation between quality of life domains questionnaire (physical domain p<0.000, psychological domain p<0.004, environmental domain p<0.022; social relations domain p<0.0025 and overall quality of life p<0.000 and Roland Morris questionnaire. There has been correlation between weeks of gestation and Roland Morris questionnaire (p<0.005). As to weeks of gestation and quality of life questionnaire there has only been correlation in the social relation domain (p<0.025).
CONCLUSION: Low back pain interferes with quality of life of studied pregnant women.
Keywords: Low back pain, Pregnant women, Quality of life.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A gravidez é caracterizada por um período em que o organismo da mulher sofre diversas alterações. Entre 50 e 80% das gestantes referem dor na região lombar, podendo interferir diretamente sobre a sua qualidade de vida. O objetivo deste estudo foi determinar a prevalência de lombalgia e a interferência na qualidade de vida de gestantes atendidas na Estratégia de Saúde da Família da Cidade de Cabo Frio.
MÉTODOS: Pesquisa de campo, transversal realizada com gestantes, entre a 13ª e 36ª semana de gestação, que apresentavam dor na região lombar, assistidas em um programa de pré-natal de baixo risco. Foi aplicado um questionário sócio demográfico, questionários de Roland Morris e WHOQOL-bref, para avaliar a lombalgia e a qualidade de vida, respectivamente. Foi utilizada estatística descritiva e o teste de correlação de Spearman e o valor de p<0,05 foi considerado para significância estatística.
RESULTADOS: Participaram do estudo 139 gestantes assistidas no programa de atendimento pré-natal. Idade média de 24,4±7,65 anos. Houve correlação significativa entre os domínios do questionário de qualidade de vida (domínio físico p<0,000; domínio psicológico p<0,004 domínio meio ambiente p<0,022; domínio relação social p<0,0025 e qualidade devida geral p<0,000) com o questionário Roland Morris. Houve correlação entre as semanas de gestação e o questionário Roland Morris (p<0,005). Quanto as semanas de gestação e o questionário de qualidade de vida só houve correlação com o domínio relação social (p<0,025).
CONCLUSÃO: A lombalgia interfere na qualidade de vida das gestantes pesquisadas.
Descritores: Dor lombar, Gestantes, Qualidade de vida.

INTRODUCTION

Pregnancy is characterized by a period in which the woman's organism undergoes several hormonal, metabolic and musculoskeletal changes to adapt the body to her new condition of pregnant woman[1]. Changes during pregnancy are visible, like weight gain, fluid accumulation, breasts enlargement, abdominal circumference enlargement, greater anterior pelvic tilt and greater joint instability[2]. Therefore, approximately 50 to 80% of pregnant women report pain in the low back region at some moment during pregnancy[3].
Low back pain complaints are also related to other factors, such as postural changes, which are often factors responsible for ge-

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nerating an irregular biomechanical and compensatory process. In the period between the 13th and 36th week of pregnancy, the woman begins to change her ambulation, which changes the center of gravity, causing an overload on muscles and ligaments. As a result, there may be a degree of discomfort, causing partial or total impairment for daily activities[4].

Low back pain means a symptom of pain, located between the lower region of the last coastal arc and the gluteal fold, that may radiate to the lower limbs. If not properly treated, it can preclude a pregnant woman from having a normal life, causing insomnia, depression, functional disability, and may interfere directly with her quality of life (QOL)[5,6].

QOL is defined as an individual's understanding in the face of his/her socio-cultural life condition, considering their expectations, objectives, standards and responsibilities. The personal well-being is related to aspects of personal fulfillment, habits, health, lifestyle and leisure and is related to the conditions of the individual's way of life[7,8].

The Family Health Program (*Programa Saúde da Família - PSF*) was created in 1994, as a strategy of the Ministério da Saúde (MS) to redirect the care model of the Unified Health System (*Sistema Único e Saúde - SUS*), from the basic care approach[9]. In 2006, the PSF was called the Family Health Strategy (*Estratégia da Saúde da Família - ESF*) and aimed to expand people's access to healthcare services, providing full service, encouraging popular participation and creating intersectoral partnerships[10].

ESF is composed of a multidisciplinary team, with the goal of favoring a greater advance to the health of the population, developing a relationship of co-responsibility with the professionals of the sector, simplifying the identification and the solution of the community's health problems[11,12].

The Family Health Support Centers (*Núcleos de Apoio à Saúde da Família - NASF*) aim to expand basic care actions, provide broader assistance, have better results and full individual service to SUS, identifying the needs of each person in their territory of basic care, supporting ESF and increasing the responsibility of community health agents (*Agentes Comunitários de Saúde - ACS*) in creating links between the community and the healthcare system[13]

NASF is composed of professionals from different health fields, and their actions are based on reciprocity of experiences and knowledge, through technical support and pedagogical practices of the teams relevant to the selected population[14].

The inclusion of physiotherapy in basic care is a recent fact[15]. The physiotherapist develops different actions in basic care. One of these actions is to work with groups of pregnant women. In this setting, they learn about body postures, stretching exercises, relaxation, aid to venous return, breathing exercises and incentives to breastfeeding and baby care guidelines[16]. Based on actions for disease prevention and health promotion, and when necessary, refer to the secondary and tertiary care services[17].

Based on the presented assumption, it turns out that low back pain is an important cause of disability that impacts the QOL of pregnant women.

Based on the above, the objective of this study was to determine the prevalence of low back pain, and its impact on the QOL of pregnant women cared for in the ESF of the municipality of Cabo Frio.

METHODS

Field cross-sectional study, with data collection held in the 1st District of the city of Cabo Frio, specifically in the primary care network registered at DATASUS. The total number of pregnant women registered in this district was 267 patients. In this way, the sample size was estimated in an amount exceeding 20% of the population, since this size is enough to represent the population[18]. However, after visiting the participating units, the sample size was greater than this value (52% of all pregnant women). Thus, the sample was composed of women in their gestational period participating in the low-risk prenatal care program.

The inclusion criteria were pregnant women in the 13th to 36th week of gestation, with a report of low back pain (LBP), literate and oriented as to time and place. The exclusion criteria were a history of fracture, spine surgery, gynecological and urinary diseases, amputations, mental disability, and non-attendance to the interview.

Pregnant women who were awaiting the prenatal appointment were informed about the purpose of the study and invited to participate. Pregnant women who agreed to participate in the study signed an Free and Informed Consent Term (FICT) as provided for in resolution 466/12.

In order to obtain the socio-demographic data, it was used a structured questionnaire, prepared by the researchers, with questions about weeks of gestation, age, race, marital status, education and profession/occupation of every pregnant woman.

To evaluate functional impairment of the individual with low back pain, we used the *Roland Morris Disability Questionnaire* (RMDQ), validated in Brazil in 2001[19]. The questionnaire is easy to apply and used in evaluations of low back pain. It consists of 24 closed self-report questions, the sum of the yes answers given by the individual can be from zero to 24, being zero without complaints and 24 the maximum value, which represents more severe limitations[20,21].

To finalize data collection pregnant women were subjected to the WHOQOL-bref, a short questionnaire of quick application, validated in Brazil in 2006. It consists of four QOL domains. The purpose of each domain is to verify the physical domain (DomFis) – seven questions, psychological domain (DomPsic) – six questions, social relationships domain (DomRS) – three questions and the environmental domain (DomMA) – eight questions, totaling 24 questions and two more questions about global QOL. Assessment scores are calculated for each of the four domains. The minimum value of the scores for each domain is four and the maximum twenty. The score of each domain is obtained on a positive scale, that is, the higher the score, the better the QOL in that domain[22,23].

The study was authorized by the City Department of Health of Cabo Frio and accepted by the Ethics and Research Committee of the Universidade Estácio de Sá, with CAAE registry number 47922515.1.0000.5284.

Statistical analysis

Data were handled by the software SPSS *Statistics* 20 for Windows and presented as mean, standard deviation, minimum and maximum values and absolute and relative frequencies. The Spearman correlation test was used to verify the possible associations

between the variables low back pain, time of gestation and QOL of pregnant women. The value of p<0.05 was considered statistically significant.

RESULTS

Of the 17 units visited, one had no pregnant women registered and, at one unit, pregnant women did not turn up on the day of the interview. Thus, 15 units took part in the study. In these 15 units, 267 pregnant women were registered, of which 9 did not accept to participate in the survey, 50 pregnant women were in the exclusion criteria, 69 did not show up on the days of the interview, leaving 139 that were included in the study.

Table 1. Demographic characteristics

Characteristics	N	%
Race		
White	37	26.60
Pardo	68	48.90
Black	34	24.50
Marital Status		
Single	65	46.80
Married	70	50.40
Divorced	4	2.90
Educational Level		
Elementary school	57	41.00
High School	67	48.20
Higher Education	15	10.80
Employed		
Yes	54	38.80
No	85	61.20

The average age of pregnant women was 24.4±5.88 years, being the youngest 13 years old and the oldest 41. As for gestation period, the average was 24.3±7.65 weeks.

Table 1 shows a higher number of Pardo Brazilians (mixed-race), pregnant women. There is a balance between single and married women and with elementary and high school educational level. It should be noted that most of these pregnant women do not have professional activity.

Figure 1 Refers to the number of pregnant women who were included in this study. Notice that Manoel Corrêa, Jacaré, and Tangará Health Centers have the highest number of registered pregnant women since they are the most populous neighborhoods in the city of Cabo Frio.

In the QOL questionnaire, there was uniformity among the respondents. The lowest score was in the physical domain, and all domains showed a satisfactory score (Table 2).

Observing table 3 we see that there is a significant correlation between the analyzed variables, except for weeks of gestation, with the physical, psychological and general QOL domains.

Table 2. Descriptive analysis of the study variables

	Mean	Standard deviation	Minimum	Maximum
DomFis	12.46	2.23	7.43	18.86
DomPsic	14.35	2.4	5.6	20
DomRS	14.44	3.18	6.67	20
DomMA	12.88	2.14	6.5	17.5
General QOL	14.75	2.57	8	20
Roland Morris	7.23	5.04	0	20
Weeks of gestation	24.3	7.65	13	36

DomFis = physical domain; DomPsic = psychological domain; DomRS = social relationship domain; DomMA = environmental domain; General QOV = general quality of life.
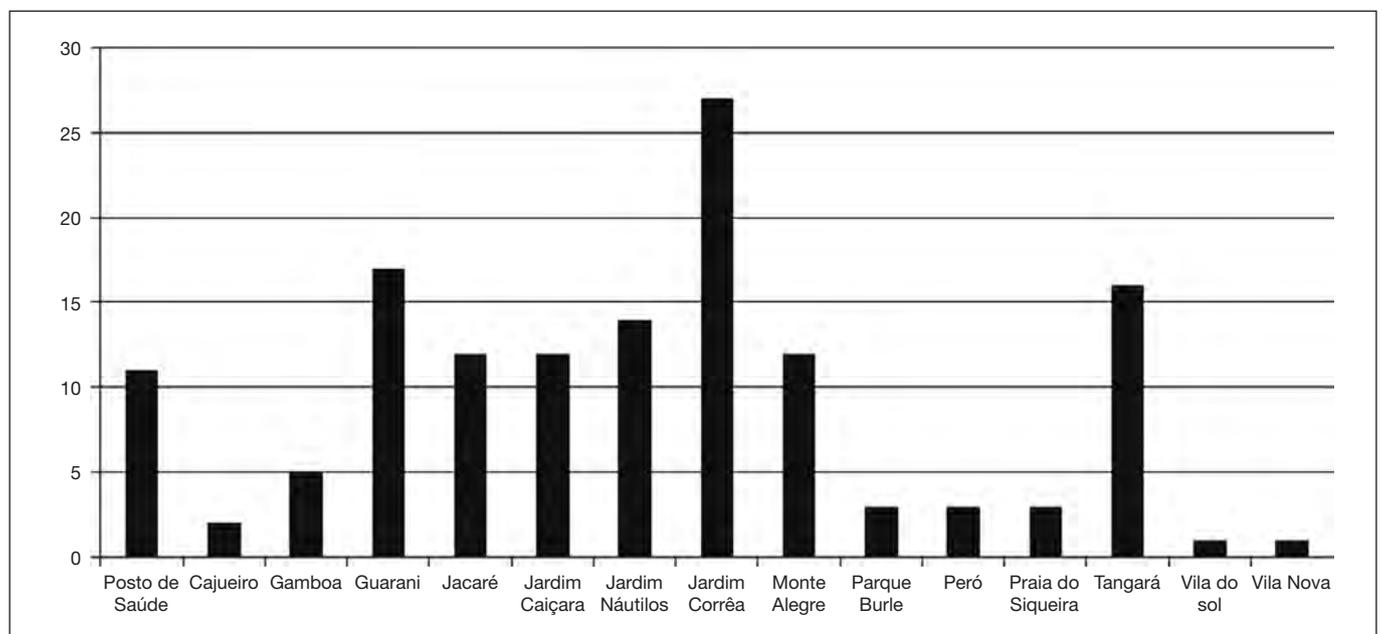
Figure 1. Health Units included in the study and number of pregnant women in each unit

Table 3. Spearman's correlation among variables: low back pain, week of pregnancy and quality of life of the sample

		Dom1	Dom2	Dom3	Dom4	GQOL	RM
Dom2	r	0,383					
	p-value	0.000					
Dom3	r	0.389	0.416				
	p-value	0.000	0.000				
Dom4	r	0.445	0.417	0.345			
	p-value	0.000	0.000	0.000			
GQOL	r	0.380	0.327	0.220	0.346		
	p-value	0.000	0.000	0.009	0.000		
RM	r	-0.430	-0.243	-0.194	-0.190	-0.319	
	p-value	0.000	0.004	0.022	0.025	0.000	
Weeks of gestation	r	-0.147	-0.028	-0.190	-0.095	-0.034	0.236
	p-value	0.083	0.742	0.025	0.267	0.689	0.005

Dom1 = physical domain, Dom2 = psychological domain, Dom3 = social relationship domain, Dom4 = environmental domain, GQOL = general quality of life, SemGest = week of gestation; RM = Roland Morris.

DISCUSSION

In this study, we could see that low back pain interferes negatively on the QOL of pregnant women, and in all domains of the WHOQOL bref questionnaire.

In a performed study[24], half of the pregnant women reported that the intensity of pain increased as weeks went by, especially between the 8th and the 9th months, with a range between 'little pain' and 'reasonable pain.' At the 7th month of pregnancy (week 29th) the uterus of the woman enlarges, producing peaks of pain due to the overload on the lumbar spine, but according to another study[23], the scale can remain between 'little pain' and 'reasonable pain.' In this study, however, as the gestational period progressed, pain intensity increased.

In a previous study[25] on low back pain in pregnant women, it was used the epidemiological questionnaire, validated and adapted from the *Quebec Back Pain Disability Scale* (QBPDS) to assess the level of functional impairment of pregnant women, emphasizing questions about LBP in the gestation period. The result shows that the pain interferes with the daily life of pregnant women, causing some limitations in their activities. In this study, however, it was used the RM questionnaire to evaluate functional impairment of pregnant women, obtaining the same result. It is believed that the prevalence of painful symptoms in the lower back region is still present in this segment of the population in the gestation period and, depending on the degree of pain, it can persist a few years after delivery if treatment is not provided[26].

In this regard, treatment and guidelines for four weeks during the pregnancy period proved to be effective to improve the functionality of pregnant women[27].

In a study[28] with 21 pregnant women to determine the presence of pain and the types of LBP in a health unit in the city of Petrolina, the authors observed that 92.23% of pregnant women had LBP during pregnancy and, in 66.65% of the cases a combination of LBP and pelvic pain. In another paper[29] of similar design, 45 pregnant women assisted in a Prenatal Program, were evalu-

ated using a numerical visual scale of pain. The results showed that the prevalence of LBP was 73%. In both studies, the characteristics of the sample were similar to those of this current work. Despite no specific test to determine pain having been applied, Roland Morris questionnaire is a valid measure of good reliability for chronic pain in the Brazilian population[30].

In some units, not 100% of the sample was surveyed. Many pregnant women were impatient and uncomfortable about the size of the questionnaires and intimate questions about their life.

CONCLUSION

From the results found in this study, we notice that in the group of pregnant women of the Health Units of the city of Cabo Frio, there is a correlation between the LBP and general QOL.

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Correlation between pain and quality of life of patients under hemodialysis

Correlação entre dor e qualidade de vida de pacientes hemodialíticos

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ABSTRACT

BACKGROUND AND OBJECTIVES: To evaluate pain symptoms and their influence on quality of life of chronic renal patients submitted to hemodialysis.
METHODS: Descriptive, exploratory, comparative and cross-sectional study paired by frequency, having as tested group (GI, n=50) chronic renal patients under hemodialysis with hypertension and diabetes mellitus type 2, and as control group (GII, n=50) patients with hypertension or diabetes mellitus type 2, assisted by the Hypertension Ambulatory. Quality of life was evaluated by the Kidney Disease and Quality of Life Short-Form, pain by the Brief Pain Inventory, emotional factors by Beck anxiety and depression scales and neuropathic pain by DN4 questionnaire.
RESULTS: Both groups had predominance of males, mean age of 47.3±16.5 years. With regard to labor, the group under hemodialysis (GI) had 80% of inactive patients. Most impaired quality of life domains were job situation and physical function. There has been prevalence of depression and anxiety, neuropathic pain and more pain complaint in GI, significantly interfering with general activities such as sleep and walking ability. There has been significant correlation (p<0.05) between anxiety, physical function and labor situation versus pain.
CONCLUSION: Pain is often ignored, but brings significant consequences to quality of life of patients, contributing for relevant worsening of anxious or depressive symptoms. Thus, it is critical the multidisciplinary management of such patients.
Keywords: Chronic pain, Chronic renal failure, Quality of life.

RESUMO

JUSTIFICATIVA E OBJETIVOS: Avaliar o sintoma da dor e sua influência na qualidade de vida dos pacientes renais crônicos submetidos a tratamento hemodialítico.
MÉTODOS: Estudo descritivo, exploratório, comparativo de corte transversal com pareamento por frequência, tendo como grupo testado (GI, n=50) pacientes renais crônicos em tratamento hemodialítico cuja etiologia era hipertensão arterial e diabetes *mellitus* tipo 2, e como grupo controle (GII, n=50) pacientes com hipertensão arterial ou diabetes *mellitus* tipo 2 atendidos no Ambulatório de Hipertensão. A qualidade de vida foi avaliada pelo instrumento *Kidney Disease and Quality-of-Life Short-Form*, a dor pelo Inventário Breve de Dor, os fatores emocionais pelas escalas Beck de ansiedade e depressão e a incidência de dor neuropática pelo questionário DN4.
RESULTADOS: Na amostra dos dois grupos houve predomínio do gênero masculino, média de idade de 47,3±16,5 anos. Em relação à situação laboral o grupo em tratamento hemodialítico (GI) encontrou uma maioria de 80% de pacientes inativos. Os domínios mais comprometidos da qualidade de vida foram situação de trabalho e função física. Houve prevalência de depressão e ansiedade, maior predomínio de dor neuropática e maior queixa álgica no GI, interferindo significativamente em atividades gerais como sono e habilidade para caminhar. Houve correlação significativa (p<0,05) entre índices de ansiedade, função física, situação de trabalho versus dor.
CONCLUSÃO: A dor é um aspecto muitas vezes ignorado, mas que acarreta em consequências significativas na qualidade de vida dos pacientes, contribuindo para um aumento relevante dos sintomas ansiosos ou depressivos. É, portanto, de fundamental importância o atendimento multidisciplinar a estes pacientes.
Descritores: Dor crônica, Insuficiência renal crônica, Qualidade de vida.

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INTRODUCTION

Chronic kidney disease (CKD) is a clinical syndrome resulting from the slow, gradual and irreversible loss of kidney function[1]. It is considered a global public health problem[2]. In Brazil, CKD incidence and prevalence is increasing, the prognosis is still bad, and treatment costs are extremely high[1,2]. According to the census of the Brazilian Society of Nephrology in July 2014, the total estimated number of patients on dialysis was 112,004[2].
Technological advances have enabled the evolution in the care of people with CKD, who are now having a greater stability in their physical health from the development and improvement of drugs and the use of sophisticated equipment, such as dialysis[2].

However, these treatments are still painful and become a barrier in the quality of life (QOL) of these patients[3].

In this context, an important point to assess QOL of the patient undergoing hemodialysis is pain that, despite being a serious problem, it is often underestimated, insufficiently studied and undertreated[3]. Pain accounts for about 40% of all complaints reported by patients during hemodialysis sessions[4]. Patients present a high incidence of bone disease and progressive loss of muscle mass, and other debilitating chronic diseases as diabetes mellitus (DM), neurological diseases, vascular obstructions, among others, which also contribute to the onset of pain in those patients[4,5].

In addition to disabling physical difficulties, pain also leads to several psychological problems, such as sleep disorders, reduced memory/attention, mood disorder (anxiety and depression), impotence and social isolation, having a direct impact on patient's QOL[5].

Despite the improvement in dialysis technology, the incorporation of new techniques and new knowledge, the pain in hemodialysis patients remains common and frequent[6]. Therefore, it is necessary to pay special attention to the pain complaints reported by this group of patients, introducing new procedures for the treatment of this clinical manifestation[6].

Based on the above, the objective of this study was to evaluate, descriptively, the pain symptoms and their influence on the QOL of patients with chronic kidney disease undergoing hemodialysis.

METHODS

It is a descriptive, exploratory, comparative cross-section study, frequency pairing, with the tested group (GI, n=50) of CKD patients under hemodialysis treatment (Hemodialysis Unit of the Hospital de São José do Rio Preto/SP) whose etiology was hypertension (HA) and DM2. As control group (GII, n=50), patients with HA or DM2 cared at the Hypertension Outpatient Clinic of the Hospital de Base de São José do Rio Preto/SP. The inclusion criteria for the GI were to have CKD, be on hemodialysis treatment for at least 3 months, and have HA or DM2 for at least 4 years prior the beginning of hemodialysis. Patients being treated at the Hypertension Outpatient Clinic for at least 6 months with a diagnosis of HA and/or DM2, and having in their patient's record normal creatinine values (<1.4mg/dL for men and <2mg/dL for women) in the last 6 months were included in GII. Patients who refused to answer the questionnaires were excluded. Patients of both groups were paired according to the underlying disease, gender, and age. The following tools were used: The *Kidney Disease and Quality-of-Life Short-Form Questionnaire* (KDQOL-SF[TM])[7], which is a specific tool that assesses terminal CKD, applicable to patients who undergo some type of dialysis program. It is a self-applicable tool with 80 items, divided into 19 scales that takes approximately 16 minutes to be answered. It presents a final score from 0 to 100 where 0 corresponds to the worst and 100 the best QOL. The Brief Pain Inventory (BPI)[8] was used to assess pain; it measures the pain and its impact in some areas of the daily life in a preset interval, where zero is the absence of pain and 10 an unbearable pain. Emotional factors like anxiety and depression were assessed by the Beck scales. In this study, we used the anxiety inventory (BAI)[9]

and the depression inventory (BDI)[10]. The BAI was proposed to measure the common anxiety symptoms and consists of 21 listed symptoms, containing four alternatives in each, in ascending order of level of anxiety. The scale ranks anxiety in: minimum (from 0 to 9 points); mild (from 10 to 16 points); moderate (from 17 to 29 points); and severe (from 30 to 63 points)[9]. The BDI comprises 21 categories of symptoms and activities, containing four alternatives in each, in ascending order of level of depression. The patient has to choose the answer that best suits his/her last week. The sum of the scores identifies the level of depression. It is proposed the following result for the level of depression: minimum (from 0 to 11 points); mild (from 12 to 19 points); moderate (from 20 to 35 points); and severe (from 36 to 63 points)[10]. The DN4 questionnaire was used to check the incidence of neuropathic pain[11]. There are 7 subjective items and 3 of physical examination. If the end result is at least 4, there are neuropathic characteristics.

The calculation of the sample was carried out from the data regarding the number of patients who undergo hemodialysis at a School Hospital in the interior of the State of São Paulo in the last five years. These numbers varied around 230 people. Based on that data, a sample with 95% confidence, maximum error equal to 5% and considering the estimated proportion equal to 50% (maximum variance), the sample size obtained was equal to 109 individuals. Thus, the sample now studied had 100 respondents to meet the statistical requirement to validate the study.

This study was approved by the Ethics Committee of the institution under opinion number 435.511.

Statistical analysis

The data was input in worksheets using the Microsoft[@] software and analyzed by descriptive statistics. Continuous variables compared the groups using Student's t-test. Categorical variables were compared with the odds ratio values and were considered significant when within the 95% confidence interval, and the levels of statistical significance (p-value) are presented in the tables and in the text.

RESULTS

Of the 100 studied patients, the male majority was discrete, with age variation between 15 and 84 years and an average of 47.3±16.5 years, the majority was married with an education level average of 7±4.5 years. Demographic and clinical characteristics are shown in table 1.

In table 2, groups I and II scores in BPI, DN4 questionnaire and Beck anxiety and depression scales were compared.

Regarding QOL, all GI patients answered the specific questionnaire for kidney disease (KDQOL-SF). The highest scores were obtained for the dimensions related to "encouragement by the dialysis staff" and "sexual function," and the lowest were for "working situation" and "physical function." The dimensions with the respective averages and standard deviations are shown in table 3. There was no comparison with GII since patients did not have kidney disease.

A linear regression model was adjusted, taking into account the results of the pain, anxiety, depression and QOL questionnaires. Table 4 shows the results with p<0.05 for the GI group.

Table 1. Demographic and clinical characteristics of patients in both groups

Variables	GI % (n=50)	GII % (n=50)
Gender		
Female	48 (24)	49 (24.5)
Male	52 (26)	51 (25.5)
Marital status		
Single	24 (12)	10 (5)
Married	64 (32)	75 (37.5)
Divorced	6 (3)	8 (4)
Widow	8 (3)	7 (3.5)
Education		
Incomplete elementary school	30 (15)	24 (12)
Complete elementary school	16 (8)	26 (13)
incomplete secondary school	6 (3)	20 (10)
Complete secondary school	34 (17)	16 (8)
Incomplete higher education	4 (2)	6 (3)
Complete higher education	10 (5)	8 (4)
Employment situation		
Active	20 (10)	62 (31)
Inactive	80 (40)	38 (19)
Etiology	65 (37.5)	70 (35)
High blood pressure	35 (17.5)	30 (15)
Diabetes mellitus type 2		
Alcohol consumption	8 (4)	16 (8)
Smoking	18 (9)	26 (13)

GI = chronic renal patients on hemodialysis treatment; hypertension and diabetes mellitus type 2. GII = control group, patients with hypertension and diabetes mellitus type 2.

Table 2. Levels of depression, anxiety, pain and its impact on daily activities and incidence of neuropathic pain

Parameters evaluated	Groups		
	GI % (n=50)	GII % (n=50)	P value
BDI (number and %)			
Minimum	34 (68)	9 (18)	
Mild	9 (18)	5 (10)	
Moderate	7 (14)	2 (4)	
Intense	0 (0)	0 (0%)	
BAI (number and%)			
Minimum	21(42%)	13 (26)	
Mild	14(28%)	10 (20)	
Moderate	6 (12%)	3 (6)	
Intense	9 (18%)	2 (4)	
BPI (average ± standard deviation)			
Pain intensity	4.70 ± 2.50	1.10 ± 0.80	0.038*
Interference of pain in general activities			
Mood	4.12 ± 3.54	0.00 ± 0.00	0.001*
Ability to walk	4.66 ± 3.69	0.80 ± 055	0.038*
Sleeping	4.66 ± 3.69	1.25 ± 0.90	0.045*
Working	3.72 ± 4.18	0.25 ± 0.00	0.028*
In personal relationship	1.30 ± 2.65	0.00 ± .000	0.048*
Enjoying life	2.50 ± 3.35	0.80 ± 0,50	0.048*
DN4 (number and %)			
Nociceptive pain	45 (90)	9 (18)	
Neuropathic pain	5 (10)	1 (2)	

BDI = Beck's Depression Inventory; BAI = Beck's Anxiety Inventory; BPI = Brief Pain Inventory; DN4 = Questionnaire for the diagnosis of neuropathic pain. *p<0.05 - statistically significant difference (Student t-test). GI = chronic renal patients on hemodialysis treatment; hypertension and diabetes mellitus type 2. GII = control group, patients with hypertension and diabetes mellitus type 2.

Table 3. Average values and standard deviation of the KDQOL-SF™ dimensions of GI patients (n=50)

Dimensions	Mean ± SD	Median
Physical functioning	48.34 ± 18.02	55,00
Physical function	36.54 ± 12.85	0,00
Pain	58.95 ± 23.40	65,00
General health	52.45 ± 15.08	55,00
Emotional wellbeing	63.55 ± 22.35	65,00
Social Function	58.46 ± 35.80	56,25
Energy/fatigue	48.55 ± 23.80	50,00
List of symptoms/problems Effects of the kidney disease	60.50 ± 25.30	65,00
Kidney disease overload	45.80 ± 12.70	52,25
Work situation	28.57 ± 39.53	0,00
Cognitive function	65.52 ± 13.40	75,00
Quality of social interaction	75.80 ± 20.55	80,25
Sexual function	74.65 ± 12.40	82,25
Sleeping	58.40 ± 32.50	60,20
Social support	89.56 ± 18.50	82,50
Patient' satisfaction	73.58 ± 15.80	78,50
General health	59.46 ± 20.55	60,25

Table 4. Anxiety, depression and quality of life indexes versus pain intensity in GI patients (n=50)

Correlation	R	Significance level
Anxiety versus pain	0,41	Significant*
Depression versus pain	0,58	Not significant.
Physical Function versus pain	0,46	Significant*
Work situation versus pain	0,41	Significant*

*p<0.05 = Pearson correlation coefficient.

DISCUSSION

The epidemiologic profile mapped in the current study for the patients on hemodialysis (GI), agrees with the Census of Dialysis of 2013, where the majority of patients was male, with age between 19 to 64 years[2,12]. The age average of 47.3 years equates to the emergence of CKD risk groups and base diseases, such as HA and DM2, that increases in adulthood[13].

There was no significant difference in demographics between GI and GII, except regarding the employment situation, where the GI had the majority of inactive patients (80%), while in GII the majority was active (63%). Studies confirm that the CKD generates difficulties at work due to several factors[14,15]. Helantera et al.[16] noted that less than 30% of patients on dialysis were employed, corroborating the data found in this study. In general, since the QOL of these patients is reduced, especially when undergoing hemodialysis treatment, it is common to see unemployment or early retirement[15], which can also contribute to negative results in the analysis of depression and anxiety in these patients.

In relation to the results found in the BDI, the prevalence of depression in GI was higher in all the levels, when compared with GII. As for the anxiety, the worse scores were also found. Andrade,

Sesso and Diniz[17] showed by BDI, that depression ranged from 0 to 37 points, with a median of 8 points showing that most patients (68%) were classified as a minimum level, 23% mild, 8% moderate and 1% severe being related to work activity and type of donor. Patients with no work activity showed more depression symptoms (p=0.027). These results are very similar to the present study. Valle, Souza and Ribeiro[18] showed with different analysis tools that all hemodialysis patients had some degree of anxiety. In the Stasiak[19] study with hemodialysis patients, depression of any intensity was found in 22.6% of patients in the BDI and anxiety of any intensity was found in 25.7% of patients in the BAI. These results were lower than those found in our study, probably due to a characteristic of the collection site, since the Hospital de Base is a Reference Center for severe cases and patients with multiple comorbidities. Abraham et al.[20] stated that patients on dialysis when physically and mentally adapted to their treatment, that is prescriptions, restrictions, and diets, end up in a state of alert and tension, which triggers anxiety reactions due to the constant exposure to stressing situations, such as dialysis and frequent stay in hospitals. Barros et al.[21] reported that questionnaires that investigate psychological aspects allow to identify the frequency and degree of anxiety, depression, and impact on QOL in patients with kidney disease and can contribute to planning a better multidisciplinary service.

Regarding QOL, all GI patients answered the questionnaire specific to kidney disease (KDQOL-SF[tm], being the lowest scores for "work situation" and "physical function". These results were consistent with Lopes[22] study. This same study showed that the disease symptoms, associated with the day-to-day factors of patients undergoing hemodialysis, generate a negative impact on these aspects. Working is the basic condition for human emancipation, and it is part of each person's identification. Therefore, it becomes one of the most precious human values. Depending on the disease and the treatment, patients often need to stop working, which influences the QOL. Stop working or reducing working time is a factor that counteracts the lifestyle that the individual had before, thus causing a negative impact on its quality. When comparing the incidence of chronic pain between GI and GII, we observed the worst scores in those patients undergoing hemodialysis. The results of the DN4 questionnaire showed a higher prevalence of neuropathic pain in GI, as well as more pain complaints by the Brief Pain Inventory. These results promoted pain interference in general activities like sleeping and ability to walk. In the study of Klassen et al.[23], these parameters indicated that untreated or prolonged neuropathic pain in chronic renal patients changes functional performance and generates myalgia and fatigue.

Taking into consideration the results of the pain, anxiety, depression and QOL questionnaires, it was observed a significant correlation of the influence of pain under the following aspects: anxiety, physical function, and work situation. However, few studies in the literature correlate the QOL in general with the pain complaints of patients undergoing hemodialysis, showing once again that pain is often underestimated, insufficiently studied and undertreated[24,25].

CONCLUSION

The data indicate a significant correlation between pain and anxiety, physical function and work situation in chronic renal patients undergoing hemodialysis.

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Retrospective review of patients referred to a temporomandibular dysfunction care setting of a Brazilian public university

Revisão retrospectiva de pacientes encaminhados a um serviço de disfunção temporomandibular de uma universidade pública brasileira

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ABSTRACT

BACKGROUND AND OBJECTIVES: The objective of this study is to describe the restrospective analysis of medical records of patients with temporomandibular disorder in a healthcare service of a Brazilian public university. The prevalence of signs and symptoms of temporomandibular disorder, associated factors, diagnosis and observations related to the treatment were recorded.
METHODS: Two hundred and thirteen medical records were assessed by one single surveyor from March 2013 to December 2014. Information about sociodemographic factors, prevalence of symptoms of temporomandibular disorder and treatment need were collected (Fonseca Anamnestic Index), clinical examination, diagnosis, treatments and referral to other professionals.
RESULTS: The majority of patients were female (81.7%), single (53.0%), students (23.3%) between 20 and 29 years of age (26.8%). Pain was reported by 50.4% of patients. According to FAI, 41.8% of patients were classified with severe symptoms of temporomandibular disorder and 73.2% identified with the need of treatment. Presence of temporomandibular disorder symptoms (p = 0.001) and need of treatment (p <0.001) were significantly associated to the female gender. The most prevalent diagnosis was muscle temporomandibular disorder (41.5%) and the most affected muscle was the masseter (21.3%). The most common treatments were occlusal splint (27.6%) and counseling (22.6%).
CONCLUSION: The greater demand for temporomandibular disorder treatment came from young patients, single, female, complaining from pain. The prevalence of temporomandibular disorder symptoms was high, muscular disorders was the most prevalent findings and most of the treatments were reversible and conservative. The frequency of referral to other specialties related to temporomandibular disorder was low.
Keywords: Temporomandibular disorder, Orofacial pain, Epidemiology.

RESUMO

JUSTIFICATIVA E OBJETIVOS: O objetivo deste estudo foi descrever a análise retrospectiva de prontuários referentes a um serviço de atendimento a pacientes com disfunção temporomandibular em uma clínica de ensino de uma universidade pública brasileira. A prevalência de sinais e sintomas de disfunção temporomandibular, fatores associados, diagnósticos e observações relacionadas ao tratamento foram registrados.
MÉTODOS: Duzentos e treze prontuários foram avaliados por um único examinador no período de março de 2013 a dezembro de 2014. Coletou-se informações sobre fatores sócio-demográficos, prevalência de sintomas de disfunção temporomandibular e necessidade de tratamento (índice anamnésico de Fonseca), exame clínico, diagnósticos, tratamentos e encaminhamentos para outros profissionais.
RESULTADOS: A maioria dos pacientes era do sexo feminino (81,7%), solteira (53,0%), estudantes (23,3%) e entre 20 e 29 anos (26,8%). A dor foi relatada por 50,4% dos pacientes. De acordo com o índice FAI, 41,8% dos pacientes foram classificados com sintomas graves de disfunção temporomandibular e 73,2% identificados com necessidade de tratamento. Presença de sintomas de disfunção temporomandibular (p = 0,001) e necessidade de tratamento (p <0,001) foram significativamente associadas ao sexo feminino. O diagnóstico mais prevalente foi disfunção temporomandibular muscular (41,5%) e o músculo mais afetado foi o masseter (21,3%). Os tratamentos mais comuns foram placa oclusal (27,6%) e aconselhamento (22,6%).
CONCLUSÃO: A maior demanda por tratamento para disfunção temporomandibular foi de pacientes jovens, solteiros, do sexo feminino, com queixa de dor. A prevalência de sintomas de disfunção temporomandibular foi alta, os distúrbios musculares foram os achados mais prevalentes e a maioria dos tratamentos foi reversível e conservadora. A frequência de encaminhamentos para outras especialidades relacionadas à disfunção temporomandibular foi baixa.
Descritores: Desordem temporomandibular, Dor orofacial, Epidemiologia.

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Retrospective review of patients referred to a temporomandibular
dysfunction care setting of a Brazilian public university

Rev Dor. São Paulo, 2017 apr-jun;18(2):128-34

INTRODUCTION

According to the American Academy of Orofacial Pain (AAOP), temporomandibular disorder (TMD) is described as a group of clinical problems that affect the masticatory muscles, the temporomandibular joint (TMJ), and related structures[1]. It is characterized as pain and fatigue of the masticatory muscles, TMJ pain, headache, otalgia, clicking, and limitation of mandibular movements[2,3].

The etiology of TMD is multifactorial, with numerous contributing factors, such as parafunctional habits (e.g. gum chewing, "jaw play", leaning of the head on the palm of the hand or arm and biting objects)[4-6], direct and indirect traumas, psychosocial and psychological factors, and genetic factors[1,6-10]. Other factors, such as sleep bruxism (SB)[11,12], awake bruxism (AB)[13], sleeping in the lateral decubitus position[14] and some occlusal factors have also been associated with the presence of TMD signs and symptoms[15].

The study of this disorders in public health has gained prominence due to its increasing and early incidence in the population, besides its association with the psychological aspects and its capacity to affect the quality of life of the patients[9,16]. Regarding its prevalence, cross-sectional epidemiological studies have shown that approximately 40 to 75% of the adult population has at least one clinical sign of TMD[1]. Moreover, studies have shown that due to the wide variety of signs and symptoms[2,3,17], this disorder may cause functional and psychosocial harm, such as a decrease in quality of life in affected individuals[18,19], thus making it necessary to promote and expand access to adequate treatment for these patients[5,20].

Therefore, the evaluation of the services aimed at the treatment of patients with TMD is critical to enabling a better understanding of the epidemiological characteristics of the affected population, to improve planning strategies regarding the provision of services and the academic training on both theory and practice, and to foster strategies aimed at expanding care toward post-graduate services[21,22]. Moreover, these data may contribute to the generation of scientific knowledge through research to improve the understanding of the characteristics of this disorder[2,3,23].

Thus, the objective of the present study was to perform a retrospective analysis of patient records referred to a temporomandibular disorder service in a healthcare setting of a Brazilian public university that offers diagnostic and treatment services to patients with TMD and other orofacial pain disorders, as well as to describe the prevalence of signs and symptoms of TMD associated factors, diagnosis and treatment related observations.

METHODS

This study was performed at the TMD school clinic of the Division of Occlusion, Temporomandibular Disorder and Orofacial Pain, Department of Restorative Dentistry, Federal University of Paraíba (UFPB), João Pessoa, Paraíba, Brazil. This was a retrospective study that followed an inductive approach with a research method based on indirect documentation through the analysis of patient records[3,24].

A total of 213 patient records of patients attended at the service from March 2013 to December 2014 were evaluated. Patient records were numbered and audited by a single examiner and all fields were analyzed, including those with incomplete or absent data. Those that contained only the patient's identification were excluded. At the study site, patients are screened based on the Fonseca's Anamnestic Index (FAI). The FAI index enables the evaluation of the severity of TMD symptoms as well as the need for treatment based on the symptoms reported[8,11,25,26]. In contrast, the classification of TMDs was established based on medical history, clinical exam, and diagnostic imaging, as suggested by the AAOP[1,20]. Clinical exam consisted of measuring the maximum mouth opening (mm) with a caliper, and values were added to the overlap of the anterior incisive teeth, and mouth opening was classified as either normal (40-60 mm), restricted mouth opening (<40mm) and hypermobility (>60mm); the presence of joint sounds (clicking, popping or "thud" and crepitus); tenderness on TMJ palpation (lateral and posterior pole palpation under a pressure of approximately 0.5 kg/cm²); tenderness on palpation of the masseter, temporalis, medial pterygoid, sternocleidomastoid, trapezius, and posterior cervical muscles (pressure of approximately 1 kg/cm²);and performance of the provocation test or functional manipulation of lateral pterygoid muscles (resistive protrusion)[4,6,8,10,15,27–29].

SB was diagnosed based on the criteria of the American Academy of Sleep Medicine (AASM), as presented by Carra, Huynh and Lavigne[30] and Ommerborn et al.[31] according to patient history (recent patient, parent, or sibling report of tooth-grinding sounds occurring during sleep for 6 months) and clinical evaluation (one or more of the following: abnormal tooth wear; hypertrophy of the masseter muscles on voluntary forceful clenching; discomfort, fatigue, or pain in the jaw muscles and transient, morning jaw-muscle pain or headache). AB was evaluated using the question: 'During the day, do you grind your teeth or clench your jaw?' (Brazilian-Portuguese RDC/TMD questionnaire).[32] The clinical criteria proposed by Lobbezoo et al.[33], using a diagnostic grading system of 'possible', 'probable' and 'definitive' was employed, and, the diagnosis of SB or AB was categorized as "possible" (self-report) and "probable" (use of self-report plus the inspection by a clinical examination and the absence of polysomnographic and electromyographic records).

Other data were also collected from the analysis of patient records: sociodemographic factors (gender, age, marital status, profession, and city of residence); major reported complaints; prevalence of TMD symptoms and need for treatment by an anamnestic index (FAI index); self-report of parafunctional habits; sleeping position; occlusal characteristics (tooth wear, lateral and anterior guidance); TMD clinical evaluation; TMD diagnoses, according to the AAOP/IHS criteria; previous treatments and referral to professionals of other areas.

To analyze the subjective data obtained from medical records, such as the major complaint and diagnosis, a theme-categorical methodology with discursive analysis was used, which consists of transforming and grouping the narrative data into units, considering their relevance, frequency, and meaning[34].

The research was compliant with the criteria set by Resolution nº 466/2012 of the National Council of Health and approved by the Research Ethics Committee of the Health Sciences Center of the UFPB (CAAE: 39134314.3.0000.5188).

Moura WP, Silva PL, Lemos GA,
Bonan PR, Montenegro RV and Batista AU

Statistical analysis

Data were assessed using the Statistical Package for the Social Sciences (SPSS) software, version 22.0, and analyzed descriptively, with the frequency and percentages of the study variables computed. The chi-square (x^2) or Fisher's Exact test was used to test the associations between the study variables. For both tests, we set $p < 0.05$ as the statistical significance level.

RESULTS

Table 1 shows the sociodemographic characteristics of the evaluated sample. The majority of the patients were female (81.7%), between 20 and 29 years of age (26.8%), single (53%), students (23.3%), and residents of the city of Joao Pessoa (79.3%) or a metropolitan region. Pain (50.4%) and TMJ clicking (14.9%) were among the most prevalent complaints reported by the subjects (Table 2). Notably, the present study grouped pain complaints into a single category that combined muscle pain, joint pain or headache.

Regarding TMD symptoms prevalence, 95.8% of the patients had TMD symptoms, in an initial trial performed by FAI Anamnestic Index. According to the FAI index, the majority presented "severe TMD" (41.8%). In the study sample, 73.2% of the patients were classified as "in need for treatment" (Table 3). The presence of TMD symptoms (p=0.001) and need for treatment were significantly associated with the female gender (p<0.001).

Regarding self-reported parafunctional habits, 58.2% (n=124) of the patients reported having such habits, with the most prevalent being fingernail biting (28.6%, n=39), leaning the head on the palm of the hand or arm (22.0%, n=30), object biting (20.6%, n=28), lip/cheek biting (16.2%, n=22), and gum chewing (8.8%, n=12). In addition, patients also reported tongue biting

Table 1. Sociodemographic characteristics of the study sample (n=213)

Variables	n	%
Gender		
Female	174	81.7
Male	39	18.3
Age range		
13-19	18	8.5
20-29	57	26.8
30-39	35	16.4
40-49	38	17.8
50-59	42	19.7
60-69	18	8.5
70-80	5	2.3
Marital status		
Single	113	53.0
Married	83	39.0
Divorced	15	7.0
Widower	1	0.5
Unknown*	1	0.5
Profession		
Student	50	23.3
Housewife	26	12.2
Civil servant	23	10.8
Retired	17	8.0
Teacher	13	6.1
Other professions**	78	36.8
Unknown*	6	2.8
City		
Joao Pessoa	169	79.3
Santa Rita	10	4.7
Bayeux	8	3.8
Cabedelo	4	1.9
Other cities***	22	10.3

* Absent data in the medical record; ** Professions reported by less than 10 patients; *** Cities reported by less than three patients.

Table 2. Frequency of the major reported complaints

Reported complaints	n*	%
Pain	155	50.4
TMJ clicking	46	14.9
Tooth wear	24	7.8
Chewing difficulty	18	5.9
Fatigue	16	5.2
Tooth grinding	15	4.9
Jaw locking	10	3.2
Difficulty in opening the mouth	5	1.6
Tingling sensation	3	1.0
Aperture deviation	2	0.6
Poorly adapted prosthesis	2	0.6
Tinnitus	2	0.6
Displaced mandible	1	0.3
Tooth crowding	1	0.3
Unknown **	8	2.7

* The sum is greater than 213 because a patient could report more than one complaint; ** Absent data in the medical record.

Table 3. Prevalence of temporomandibular disorders symptoms and the need for treatment according to the Fonseca index

Variables	n	%
TMD symptoms presence		
Absent	9	4.2
Present	204	95.8
TMD level		
No TMD	9	4.2
Mild TMD	46	21.6
Moderate TMD	69	32.4
Severe TMD	89	41.8
Need for treatment		
Absent	56	26.3
Present	156	73.2
Unknown*	1	0.5

* Absent data in the medical record.

Retrospective review of patients referred to a temporomandibular
dysfunction care setting of a Brazilian public university

Rev Dor. São Paulo, 2017 apr-jun;18(2):128-34

(1.5%, n=2), tongue thrust (1.5%), and prosthesis dislocation (0.7%). The sum of the habits above is greater than 124 because some patients could have reported more than one habit.

Regarding the occlusion assessment, 33.7% of the patients had evidence suggestive of tooth wear compatible with sleep bruxism (SB) (n=66) and 18.4% had evidence of tooth wear suggestive of AB (n=36). Functional facets and nail biting were present in 6.1% (n=13) and 0.9% (n=2) of patients, respectively. A sub-

set of 28.6% of the patients did not exhibit tooth wear facets (n=61), and in 8.5% of the charts, this information was absent or the patient was unsure of this information (n=18). The prevalence of "possible" AB diagnoses (self-reported) was reported by 19.7% (n=42) of the patients and "possible" SB by 8.0% (n=17), although the diagnosis of "probable" (self-report plus clinical examination) resulted in smaller values of prevalence: 4.3% (n=9) for SB and 8.05% (n=17) for AB.

Canine guidance was the most prevalent disocclusion pattern for both the right and left sides (n=70, 32.9% for both sides), followed by incomplete group function on the right (n=65, 30.5%) and left (n=66, 31.0%) sides. The anterior guidance pattern was considered to be normal (including only the incisor teeth) for 38.5% of the sample (n=82). Regarding the sleep position pattern, 126 patients reported sleeping in the lateral decubitus position (59.2%), 36 slept in the prone position (16.9%), and 27 slept in the supine position (12.7%). This information was absent or the patient was unsure of this information in 24 of the charts (11.2%). Table 4 presents the data related to the TMD clinical exam. The majority of the patients had a normal maximum mouth opening (73.2%) and aperture pattern with deviation (43.1%). Articular sounds were present in 55.9% of the patients, with clicking (31.5%) and popping (17.4%) being the most prevalent. Tenderness at TMJ palpation was present in 53.1% of the patients, with most of these patients reporting pain in both TMJs (28.2%). Regarding muscle tenderness, 65.7% of the patients reported pain. The muscles that were most commonly affected were the masseter (21.3%), lateral pterygoid (17.9%), and sternocleidomastoid (16.0%).

Table 5 presents data related to the diagnosis of TMD based on the medical history, clinical exam, and diagnostic imaging. A set of 64.3% of the patients had a diagnosis of TMJ and/or muscular disorder, with masticatory muscle disorders (41.5%) and disk displacement with reduction (19.5%) being the most prevalent diagnoses. This information was absent in 20.6% of the charts.

Table 4. Frequency of data related to temporomandibular disorder clinical evaluation

Clinical exam	n	%
Maximum mouth opening		
Normal	156	73.2
Restricted mouth opening	45	21.2
Hypermobility	5	2.3
Unknown*	7	3.3
Mouth opening pattern		
Straight (normal)	68	31.9
Deviation	92	43.1
Deflection with aperture restriction	31	14.6
Deflection without aperture restriction	11	5.2
Unknown*	11	5.2
TMJ sounds		
Absent	84	39.4
Clicking	67	31.5
Popping	37	17.4
Clicking and popping	10	4.7
Crepitus	3	1.4
Clicking and crepitus	2	0.9
Unknown*	10	4.7
Tenderness on TMJ palpation		
Absent	95	44.6
Left and right TMJ	60	28.2
Only left TMJ	27	12.7
Only right TMJ	26	12.2
Unknown*	5	2.3
Tenderness on muscle palpation		
Absent	66	31.0
Present**	140	65.7
Masseter	101	21.3
Lateral pterygoid	85	17.9
Sternocleidomastoid	76	16.0
Temporal	74	15.6
Trapezius	66	13.9
Posterior cervical	42	8.8
Medial pterygoid	24	5.0
Occipitofrontalis	7	1.5
Unknown*	7	3.3

* Absent data in the medical record; ** The sum of patients with tenderness on muscle palpation is higher than 140 because a patient could report tenderness of more than one muscle.

Table 5. Prevalence of joint and muscle disorders (medical history, clinical evaluation, and diagnostic imaging)

Joint and muscle disorders	n	%
No clinical TMD diagnosis	19	8.9
With diagnosis*	137	64.3
Masticatory Muscle disorders**	83	41.5
Disc displacement with reduction	39	19.5
Capsulitis/synovitis	26	13.0
Retrodiscitis	16	8.0
Disc displacement without reduction	10	5.0
Subluxation (Hypermobility)	9	4.5
Adherence	8	4.0
Osteoarthritis	7	3.5
Osteoarthrosis	2	1.0
Absent information***	57	26.8

* The sum of the specific diagnoses is higher than 137 because a patient could have more than one diagnosis; ** Includes the following TMD muscle disorders: protective co-contraction, local muscle soreness, myospasm, myofascial pain and chronic centrally mediated myalgia; ***Absent data in the medical record; ** Data were absent or the patient did not know.

Moura WP, Silva PL, Lemos GA,
Bonan PR, Montenegro RV and Batista AU

The treatments and referrals are reported in Table 6. Occlusal splint (27.6%) and counseling (22.6%) were the most common treatments, while dental prosthesis (7.4%) and restorative dentistry (2.7%) were the most common referrals. Of important note is that the referrals to dental specialties were not necessarily for the treatment of TMD but rather due to the patient's needs in each specific area. Referrals to other specialties related to TMD, including physical therapy and speech therapy, were usually few.

Table 6. Frequency of treatments and referrals to other specialties

Variables	n*	%
Treatments performed at the study site		
Occlusal splint	121	27.6
Counseling	99	22.6
Pharmacologic therapy	70	16.1
Physical therapy with thermotherapy	23	5.3
Physical therapy with stretching	23	5.3
Occlusal adjustment	2	0.5
Unknown**	15	3.5
Referrals		
Prosthesis	32	7.4
Restorative dentistry	12	2.7
Oral and maxillofacial surgery	8	1.8
Orthodontics	6	1.4
Physical therapy	6	1.4
Endodontics	4	0.9
Speech therapy	4	0.9
Rheumatology	3	0.7
Neurology	3	0.7
Orthopedics	2	0.5
Otorhinolaryngology	2	0.5
Periodontics	1	0.2

* The sum is higher than 213 because a patient could receive more than one treatment and/or referral; ** Data were absent or the patient did not know.

DISCUSSION

In agreement with the current literature, the present study revealed that the majority of the patients were women[2-4,24] in the age range of 20 to 25 years (young adults)[8,35]. Moreover, women were significantly associated with the presence of TMD symptoms and with the need for treatment according to the FAI index. The reasons for the higher female TMD population are still controversial, although a few factors are suggested in the literature, such as the greater perception of pain among females, the higher incidence of psychological factors among females, physiological and hormonal differences, muscle structure differences, and women's greater concern about their own health compared with men[1,8,35]. The majority of patients in the sample were students, single, and residents of João Pessoa or its metropolitan area. A similar sociodemographic profile was demonstrated by Pimentel et al.[23]. Conversely, Dantas et al.[3] observed a higher prevalence of TMD among individuals in the age range of 41 to 60 years and with formal employment. These authors conducted their study in a teaching hospital where most of the patients were referred by dentists or physicians from primary care clinics and private practices. In contrast, our study was conducted at the teaching clinic of the Division of Occlusion, which is embedded in an academic environment. This location explains the greater search of the service by the population of interest. Several studies have demonstrated a high prevalence of TMD among university students[9,15,35,36] suggesting that this population is exposed to risk factors that promote the development of these disorders, such as emotional stress and anxiety[8,35].

Regarding the complaints reported, results are in agreement with previous studies, which showed pain as the most prevalent complaint[2,3,37]. This finding is relevant, as the current literature shows that the presence of pain is associated with a higher degree of impairment of individual and psychosomatic characteristics among patients with TMD, which negatively influences their quality of life related to oral health[3,18,19].

The FAI index data revealed that most patients presented severe TMD with need for treatment. These findings are explained by the fact that the present study was performed in a patient population. In contrast, epidemiological studies in non-patient populations have shown a high prevalence of mild TMD and lower values of patients in need of treatment[8,35,36,38].

Regarding the presence of habits, a large percentage of the patients reported at least one parafunctional habit (58.2%), with fingernail biting, leaning the head on the palm of the hand or arm and object biting being the most prevalent. Corroborating these findings, other studies also observed a high prevalence of parafunctional habits in patients with TMD[37,39]. Branco et al.[39] observed that 76.9% of patients with TMD had some parafunctional habit, while Carvalho et al.[37] showed a lower frequency (47%). Moreover, epidemiological studies in non-patient populations have also found a high prevalence of parafunctional habits in individuals with signs and symptoms of TMD[4-6,16,36].

Data from the present study also show that different prevalence values were found for "possible" and "probable" sleep and awake-bruxism. The diagnose of "possible" AB was reported by 19.7% of the patients, and "possible" SB by 8.8%, and the diagnoses of "probable" AB and SB was reported only by 8.05% and 4,3% of the patients, respectively. The prevalence of "possible" AB and SB were similar[12] or lower than others reported in the literature.[11,40] The prevalence of sleep bruxism varies widely in the literature, and is stated to be more prevalent in children (40%), with an average of 8% prevalence during adulthood[30,41], and this is probably the result from different strategies for bruxism diagnosis and classification (e.g. questionnaires, oral history, clinical examination); the characteristics of the study population (e.g. children, adults, general or patient population) and because many studies failed to distinguish between awake-time and sleep-related bruxism[30,33,41]. The prevalence of awake-bruxism also varies in the literature, but it tends to increase with age, ranging from an estimated prevalence of 12% in children to more than 20% in adults[30]. Considering this, it is possible to verify that both values of "possible" SB and AB values found in the present study are within the values stated by the literature. In this context, a few studies have found a positive association between the pre-

Retrospective review of patients referred to a temporomandibular dysfunction care setting of a Brazilian public university

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sence of signs and symptoms of TMD and the diagnosis of sleep bruxism and/or awake bruxism (tooth clenching)[7,42], although this finding is not a consensus [43]. Notably, in the present study setting, the diagnoses of SB and AB were determined based on the clinical exam (presence of tooth wear) and medical history, similar to previous studies[4,6,31]. Currently, the gold standard for the evaluation of sleep bruxism and awake clenching is polysomnography and electromyography,[30,33] however, this is still a high-cost technique with limited availability in most Brazilian orofacial pain and TMD public health care services[6].

Nowadays, there is a consensus in the literature that dental occlusion should not be considered a major factor in the TMD etiology. Recent studies have shown a lack of scientific evidence supporting the relationship between occlusal factors and TMD[15,44,45]. Lemos et al.[15] suggested that occlusal factors may play a role as co-factors in predisposing individuals to or perpetuating this disorder but that they should not be considered as primary etiologic agents. Supporting the current literature, the findings of the present study revealed that the majority of patients had a normal lateral and anterior guidance pattern. The prevalence of tooth wear in the study sample was high. However, the diagnoses of sleep bruxism and tooth clenching were only observed in a small number of patients. This enforces the opinion that the prevalence of SB and AB should not rely only on the presence of tooth wear, since they may be the result of a previous activity and may overestimate the actual prevalence[12]. Tooth wear may could also be related to many other factors that can induce attrition and erosion on dental surfaces, like ageing, loss of posterior teeth, occlusal conditions, diet, medications or alimentary disorders[30].

Regarding the sleep position pattern, most patients reported sleeping preferably in the lateral decubitus and prone position. In the literature, few studies investigated the sleep position in patients with TMD[14,46], but the results of this studies suggest that sleeping in the lateral decubitus position may be a contributing factor to TMJ anterior disc displacement, suggesting that due to gravity, the mandibular position may change, leading to the deviation of the ipsilateral condyle posterolaterally and the contralateral one anteromedially[14]. The prone position was also associated with the development of TMJ dysfunction, in patients with unilateral obstructive nasal septal deviation[46], which suggests that these habitual postures during sleep may act as a predisposing factor of TMD[1,46]. Further studies are needed to elucidate this relationship.

The clinical evaluation of TMD revealed a high frequency of patients with articular sound, with clicking being the most prevalent. The incidence of tenderness on TMJ palpation was also high, and most patients reported pain in both TMJs. These results support previous studies that demonstrated a similar prevalence pattern of joint signs in individuals with TMD[2,4,8,35,37]. In contrast, the high number of subjects with tenderness in both TMJs agrees with the high number of patients with severe TMD and a need for treatment observed in our study, indicating that joint pain may be associated with a greater severity of TMD and an increased demand for treatment[18,19].

Corroborating previous studies, the incidence of tenderness on muscle palpation was high[2,37], with the masseter, lateral pterygoid,

sternocleidomastoid, and temporal muscles being the most affected muscles. The literature has shown greater involvement of the mandible elevator muscles in TMDs, especially the masseter and temporal muscles[1,7,47]. The involvement of these muscles may be associated with muscle hyperactivity, ischemia, sympathetic reflexes, and fusimotor reflexes, which alter the blood supply, muscle tone, and emotional and psychological status in patients with TMD[1].

The high involvement of the lateral pterygoid muscle in the present study may be associated with its function, as it is the only muscle that is directly attached to the TMJ. The upper and lower heads of the lateral pterygoid insert into the articular disc and condyle, respectively, and are responsible for the movements of protrusion, laterality, and mouth opening[1,48]. Thus, it has been suggested that the uncoordinated activity of this muscle or hyperactivity of its upper heads may lead to intra-articular disorders, such as disc displacements[48,49].

The sternocleidomastoid muscle is one of the main muscles involved in the support of the skull and cervical region, and it could be affected in the presence of abnormal stomatognathic function in patients with TMD[50]. Studies that investigate the activity of the sternocleidomastoid in patients with TMD are necessary to improve the understanding of its participation in this disorder.

The data related to the diagnosis of TMD are in agreement with previous studies conducted in populations of patients, which demonstrated a higher prevalence of masticatory muscle disorders, followed by disc displacements with and without reduction and TMJ degenerative disease (osteoarthritis/osteoarthrosis)[17,51]. However, studies in non-patient populations have demonstrated a higher prevalence of joint disorders compared to muscular alterations[4,6,17,52]. Regarding treatments, we observed a greater prevalence of reversible therapies, including patient education, self-management, use of medications, interocclusal splints, postural training, physical therapies, and behavioral intervention. These findings are consistent with the current literature, which recommends the use of conservative practices for the treatment of TMDs[1,21,22].

Concerning referrals to TMD-related areas, we found only a small frequency of referrals, with physical therapy and speech therapy being the most common. These data are not in agreement with the literature, which suggests a multidisciplinary and integrative approach in the treatment of TMDs[1,2,15,21,22]. These results can be explained by the fact that the study setting is part of an academic division and is not located in the outpatient clinic of the university hospital, which centralizes most of the specialized medical care.

The data also showed a high frequency of referrals to other dentistry specialties, especially prosthodontics and restorative dentistry. As our study setting provides on-demand service with no screening, it receives patients with problems that are not directly related to TMD, thus explaining the large number of referrals to those specialties.

CONCLUSION

According to the results obtained and considering the limitations of the present study, it was possible to conclude that the greatest demand for treatment in the study came from women, indivi-

duals in the age range of 20 to 29 years, students, single individuals, and individuals with pain complaints. The prevalence of severe symptoms of TMD was high according to the anamnestic index, and the clinical and diagnostic imaging evaluations revealed muscular disorders as the most prevalent findings. The vast majority of therapies were conservative and reversible, and the frequency of referrals to other TMD-related specialties was low.

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ORIGINAL ARTICLE

Prevalence of musculoskeletal pain in leather products industry workers: cross-sectional study in a city of the state of Minas Gerais

Prevalência de dor osteomuscular em trabalhadores de indústria de artefatos de couro: estudo transversal em um município do estado de Minas Gerais

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ABSTRACT

BACKGROUND AND OBJECTIVES: Musculoskeletal injuries induced by labor process and organization are relevant for health/labor relationship. This study aimed at investigating the prevalence of musculoskeletal complaints and associated factors among leather products manufacturers.
METHODS: Cross-sectional study where data were obtained by means of self-applied questionnaires to 320 workers distributed among 13 plants of the city of Cristina, MG, between February and March 2011. Nordic questionnaire of musculoskeletal symptoms was applied to measure the prevalence of complaints in different body regions. A descriptive analysis was carried out on the socio-demographic profile of the studied population. Multivariate logistic regression was used to describe the association between dependent variable, musculoskeletal complaint and the set of explanatory variables, with adjusted odds ratio calculation. Logistic regression was used with adjusted odds ratio calculation.
RESULTS: The study involved 138 workers. Better adjusted multivariate model after confusion variables control was for knee pain, with prevalence of 40.0% among males and 24.1% among females. Sewing and finishing sectors behaved as "protection", that is, less chance for pain as compared to the cutting sector. Age had negative association, that is, the higher the age the lower the chance of pain. In a different adjusted model for shoulder pain, workers and time working on the job showed higher chance of pain.
CONCLUSION: The prevalence of complaints was higher than that found in the literature. Significant variables were identified which may subsidize the prevention of job distress, such as knee pain. Further studies are needed with the inclusion of other variables and other designs to minimize biases.
Keywords: Epidemiology, Pain, Work.

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RESUMO

JUSTIFICATIVA E OBJETIVOS: As lesões musculoesqueléticas decorrentes do processo e da organização do trabalho são relevantes na relação saúde e trabalho. O objetivo deste estudo foi investigar a prevalência de queixas osteomusculares e os fatores associados entre trabalhadores de confecção de artefatos de couro.
MÉTODOS: Estudo transversal, pelo qual os dados foram obtidos por meio de questionários autoaplicados a 320 trabalhadores distribuídos em 13 fábricas do município de Cristina, MG, entre os meses de fevereiro e março de 2011. O questionário nórdico de sintomas osteomusculares foi empregado para mensurar a prevalência de queixas nas diferentes regiões do corpo. Foi realizada uma análise descritiva sobre o perfil sócio-demográfico da população do estudo. Utilizou-se de regressão logística multivariada para descrever a associação entre a variável dependente, queixa osteomuscular, e o conjunto de variáveis explanatórias, com o cálculo das razões de chances ajustadas. Utilizou-se regressão logística, com cálculo das razões de chances ajustadas.
RESULTADOS: O estudo compreendeu 138 trabalhadores. O modelo multivariado mais bem ajustado, após o controle das variáveis de confusão, foi para dor nos joelhos, com prevalência de 40,0% entre os homens e de 24,1% entre as mulheres. Os setores de costura e acabamento se comportaram como "proteção", ou seja, de menor chance de dor, quando comparado ao setor de corte. A idade apresentou uma associação negativa, ou seja, à medida que ela se eleva, menor a chance de dor. Em outro modelo ajustado, para dor nos ombros, as trabalhadoras e a extensão do tempo no cargo apresentaram maior chance de dor.
CONCLUSÃO: Foram reveladas prevalências de queixas superiores às encontradas na literatura. Variáveis significativas foram identificadas, que podem subsidiar a prevenção de sofrimento no trabalho, como por exemplo, dor nos joelhos. São necessários estudos posteriores, com a inclusão de outras variáveis e outros desenhos para a redução de vieses.
Descritores: Dor, Epidemiologia, Trabalho.

INTRODUCTION

Repetitive strain injuries or work-related musculoskeletal disorders (RSI-WRMD) involve a wide range of degenerative and inflammatory conditions, normally affecting muscles, tendons, ligaments, joints and peripheral nerves. These situa-

tions manifest themselves as clinical syndromes, inflammation of the tendon and associated conditions (tenosynovitis, epicondylitis, bursitis), nerve compression disorders (carpal tunnel syndrome, sciatica) and osteoarthritis. There are also other conditions, considered less standard in this scenario, such as myalgia, back pain, and other localized pain syndromes[1].

RSI-WRMD are classified as the category of higher expression in the list of work processes harms to health. In the United States, the Nordic countries and Japan they account for one-third or more of all occupational diseases[1]. In Brazil, the reality is not different, since they are the most prevalent harm to the worker`s health, according to the Social Security data[2].

According to a survey conducted by the Ministry of health[2], the textile and apparel industry is one of the sectors with the most frequent occurrence of RSI-WRMD among workers in Brazil, along with bank employees, typists and assembly line operators. The determining factors of its onset are linked to the fast pace of work and the repetitive movements; insufficient recovery time, weightlifting and forced movements with the hands, body postures that are not neutral, the concentration of mechanical pressure, localized or whole body vibration. Surely there may be interactions among these variables in addition to the factors associated with the psychosocial work environment, characterized by high demands and low control over the work itself[3].

It has been shown that muscle activity is substantially higher, regarding capacity, among women than men when performing activities considered identical. In addition, RSI-WRMD in the neck and upper extremities regions are also more prevalent in women[4].

Regarding the lower limbs region, especially the knees, studies on occupational loads have shown that standing, intensive walking, weight lifting, heavy-duty work in the standing position are important risk factors for the onset of pain. Such results have been adjusted for gender, age, body mass index (BMI), smoking, domestic activities and practice of sports[5].

Tenure, execution of repetitive movements and exposure to vibration are classified in the literature as significant conditions in the occurrence of shoulder pain[6].

Several studies in Brazil, in various areas of activity, have been devoted to investigating existing associations between risk factors in the work process and the occurrence of indicating symptoms of RSI-WRMD, including the apparel industry[7-12]. However, no specific studies have been published about the manufacturing of leather goods. Furthermore, it is important to explore the health and work reality to contribute to the promotion and preventive measures in the city, where this industry has great economic relevance.

The objective of this study was to investigate the prevalence of musculoskeletal pain and identify the associated variables in a sample of workers in the leather manufacturing sector.

METHODS

Cross-sectional study, which investigated the association between musculoskeletal complaints, expressed by pain, and the activities carried out at workstations in the manufacturing of leather gloves in the city of Cristina, South of Minas Gerais. The number of plants and workers in the city was obtained through secondary data from the City Council[13]. Main job positions in the factories, description of activities and occupational hazards for each position has been identified.

The target population was composed of 550 workers from 42 plants located in the city. The workers in the cutting, sewing, finishing, and central process flow, answered questionnaires with clear and easy to understand questions. Considering a level of reliability of 95%, an expected prevalence of musculoskeletal complaints of 20%[14,15], the sample was defined with 246 workers[16] and an absolute accuracy of five percentage points. The exclusion criteria were workers aged below 18 years, working with the company for less than one year, as well as the workers who refused to answer the questionnaire. In each company, the workers were asked to answer the questionnaire at home and hand it back on the following day. In this way, the procedure used in other studies on the prevalence of the theme [7,10] was characterized as a non-probabilistic sample or named for convenience, aiming at meeting the entire population of workers of the city. It is known that the representativeness of a sample process is based on randomness, that allows the results to be extended to the population of workers of leather products manufacturing. Despite this observation, a randomness-based process can also contain factors that influence the consistency of the results.

Data were collected through the application of two questionnaires, the first with demographic variables (age, gender) and occupational (tenure, work sector). Lifestyle related ones (regular domestic activity in last the 12 months, regular practice of physical activity in the same previous period, current smoking) have been categorized into two levels: yes or no.

The Nordic Musculoskeletal Questionnaire (NMQ), was applied with the purpose of measuring the prevalence of complaints (pain/tingling/numbness in last the 12 months) in different regions of the body[17]. It consists of a binary or multiple choice questionnaire concerning the occurrence of symptoms in different anatomical regions where it is more common to be found. In the questionnaire, the respondent reported the occurrence of symptoms in the 12 months and the seven days before the interview, as well as the occurrence of leave of absence in the previous year. A pilot study to adjust the instrument was carried out arbitrarily with 5% of the population calculated for the sample, randomly selected and kept in the study.

This study was approved by the Research Ethics Committee of the Medical School of Itajubá, with registry number 060/10. The data obtained were considered valid only with the signature of the worker on the Free and Informed Consent Term (FICT). Resolution 466/12 of the National Health Council was followed in all stages of the study.

Statistical analysis

A descriptive analysis was elaborated with the purpose of outlining the social-demographic profile of the study population.

Prevalence of musculoskeletal pain in leather products industry
workers: cross-sectional study in a city of the state of Minas Gerais

Rev Dor. São Paulo, 2017 apr-jun;18(2):135-40

The prevalence of complaints from all the population and in the different sectors was described separately. It was used the non-corrected Chi-square test for the analysis of the different category variables.

The study-dependent variable was of the dichotomy type and represented by complaint (pain/tingling/numbness in last the 12 months) or absence of this manifestation.

With the purpose to analyze the association between the dependent variable, musculoskeletal complaint, and the set of independent variables, it was used the non-conditional multivariate logistic regression technique. In order to find the best-adjusted model, we applied the Forward Stepwise method. In the construction of the multivariate model, single variant analyses were performed, using a value of p<0.20 as the criterion to enter in the modeling process based on the maximum likelihood ratio test. The significance of the variables in the final model was also checked by the same test, allowing the permanence of the variables (p≤0.05)[18].

RESULTS

Of the studied universe comprising 42 companies of the sector, only 13 (31%) agreed to participate in the study. 320 questionnaires were distributed, of which 220 (69.0%) were considered to be suitable to use in the study. The application of the exclusion criteria reduced the sample to 138 employees. Amongst participants 42.0% were male. In the sewing area, however, 68.1% of the workforce was made up of women. The other sectors discussed have a male predominance, and in the cutting area, all workers were men. Workers' age ranged from 18 to 49 years, with an average of 27.0 ± 7.6 years. The male population is also more prevalent in the finishing sector, in particular, in the age range of 18 to 29 years. Tenure was in the range between 12 and 180 months, with an average of 36.9± 25.9 months.

Table 1 presents the distribution of the workers' characteristics. Table 2 shows the prevalence of complaints according to the various sites referred in the questionnaire.

The general prevalence of musculoskeletal complaints was 89.1%. Among women, the prevalence of complaints was 94.8%, while among men it was 85.0% showing no significant difference (p=0.07). The sewing sector presented the largest number of complaints among workers, with a value of 80.4%. For workers, the highest prevalence of complaints (38.6%) was in the finishing sector.

There were significant differences in the prevalence of pain between genders in the following regions: upper dorsal, shoulder, neck, wrists/hands, knees, and forearms. In all areas, except for the knees, the prevalence of pain was higher in

Table 1. Distribution of workers' characteristics in the leather goods industry (n = 138)

Explanatory variable	Gender		Total	P value
	Female n(%)	Male n(%)		
Age (years)				
<25	19 (27.5)	50 (72.5)	69	<0.01
≥25	39 (56.5)	30 (43.5)	69	
Tenure (months)				
<32	26 (36.6)	45 (63.4)	71	0.185
≥32	32 (47.8)	35 (52.2)	67	
Sector				
Cutting	0 (0.0)	24 (100.0)	24	<0.01
Sewing	49 (68.1)	23 (31.9)	72	<0.01
Finishing	9 (21.4)	33 (78.6)	42	<0.01
Domestic activity				
No	4 (8.5)	43 (91.5)	47	<0.01
Yes	54 (59.3)	37 (40.7)	91	
Physical activity				
No	47 (70.1)	20 (29.9)	67	<0.01
Yes	11 (15.5)	60 (84.5)	71	
Smoking				
No	41 (48.6)	49 (54.4)	90	0.25
Yes	17 (35.4)	31 (64.6)	48	
Total	58 (42.0)	80 (58.0)	138	

Table 2. Distribution of the prevalence of complaints (%), according to the site of pain, work sector and gender of workers in the leather goods industry (n=138)

Site of pain	Cutting		Sewing		Finishing		Total		P value
	Male	Female	Male	Female	Male	Female	Male	Female	
Shoulder	29.2		21.7	55.1	24.2	66.7	25.0	56.9	<0.001
Neck	33.3		34.8	51.0	30.3	77.8	32.5	55.2	<0.001
Wrists/hands	29.2		21.7	55.1	36.4	44.4	30.0	53.4	<0.001
Knees	54.2		34.8	24.5	33.3	22.2	40.0	24.1	0.051
Upper dorsal	37.5		56.5	59.2	36.4	77.8	42.5	62.1	0.023
Forearms	8.3		17.4	26.5	12.1	33.3	12.5	27.6	0.025
Ankles/feet	37.5		30.4	34.7	33.3	66.7	33.8	39.7	0.476
Hips/thighs	20.8		13.0	16.3	15.2	44.4	16.3	20.7	0.503
Lower dorsal	29.2		34.8	32.7	27.3	44.4	30.0	34.5	0.577
Elbows	8.3		8.7	6.1	3.0		6.3	5.2	0.789

female workers, being the pain in the dorsal region the highest value (Table 2).

The most prevalent pain in the cutting sector was knee pain (54.2%). On the other hand, in sewing and finishing, the highest prevalence relates to pain in the upper dorsal region, higher among female workers, with values between 59.2 and 77.8%, respectively.

The best-adjusted model among all complaints, in accordance with the adopted logistic regression procedure, was a pain in the knees. The single and multivariate analysis are shown in table 3. In the odds ratio analysis for the production sector, the cutting sector was used as a reference in comparison with the others, that is, with odds ratio equal to one. The possible interactions were tested. However, no statistically significant result was observed.

The model built for the occurrence of pain in the knees presents a very adequate adjustment with a significant level of 0.02, for the likelihood ratio test. The age variable presented an adjusted RC for pain of 0.94, being considered a protective factor. Working in the cutting sector represents a risk for knee pain, as the adjusted RC was 3.34 and 3.46, compared with sewing and finishing sectors, respectively, that showed up in the model as "protection" sectors for knee pain. Despite being significant in the multivariate analysis, it was not possible to design an adjusted model for the gender variable.

Regarding the outcome of shoulder pain in the built multivariate model considered significant, being male represents

less chance (RC = 0,26) of pain, compared with being female. Tenure is shown as a risk for the outcome (RC = 1.02), as mentioned in the literature[6]. Table 4 shows the results corresponding to the single and multivariate analysis.

Figures 1 and 2 present estimates of pain probability according to the two models.

Table 4. Single and multivariate analysis of the explanatory variables in the occurrence of shoulder pain, over the last 12 months, in workers in the leather goods manufacturing industry (n=138)

Explanatory variable	Single variable			Multivariate	
	RC[a]	IC$_{95\%}$[b]	p[c]	RC[d]	IC$_{95\%}$
Gender					
Female	1.00				
Male	0.25	0.12-0.52	<0.01	0.26	0.12-0.54
Tenure (months)	1.02	1.00 – 1.03	0.02	1.02	1.00 – 1.03
Physical activity					
No	1.00				
Yes	0.46	0.23-0.92	0.03		
Domestic activity					
No	1.00				
Yes	1.77	0.83 – 3.74	0.13		
Age (years)	1.03	0.99-1.08	0.15		
Sectors					
Cutting	1.00		0.29		
Sewing	1.94	0.72-5.26			
Finishing	1.21	0.41-3.60			
Smoking					
No	1.00				
Yes	1.08	0.53-2.21	0.84		

RC[a] = gross odds ratio; IC$_{95\%}$:[b]= confidence interval of 95%; Likelihood ratio test; RC[d] = adjusted odds ratio.

Table 3. Single and multivariate analysis of the explanatory variables in the occurrence of knee pain, over the last 12 months, in workers in the leather goods manufacturing industry (n=138)

Explanatory variable	Single variable			Multivariate	
	RC[a]	IC$_{95\%}$[b]	p[c]	RC[d]	IC$_{95\%}$
Sectors					
Cutting	1.00		0.06	1.00	
Sewing	0.33	0.13-0.85		0.30	0.11-0.81
Finishing	0.38	0.13-1.07		0.29	0.10-0.86
Age (years)	0.94	0.89-0.99	0.16	0.93	0.88 - 0.99
Gender					
Female	1.00				
Male	2.10	0.99-4.43	0.05		
Smoking					
No	1.00				
Yes	1.76	0.85-3.66	0.13		
Tenure (months)	1.00	0.99-1.02	0.53		
Physical activity					
No	1.00				
Yes	0.92	0.45-1.86	0.81		
Domestic activity					
No	1.00				
Yes	0.95	0.45-2.01	0.90		

RC[a] = gross odds ratio; IC$_{95\%}$[b] = confidence interval of 95%; Likelihood ratio test; RC[d] = adjusted odds ratio.
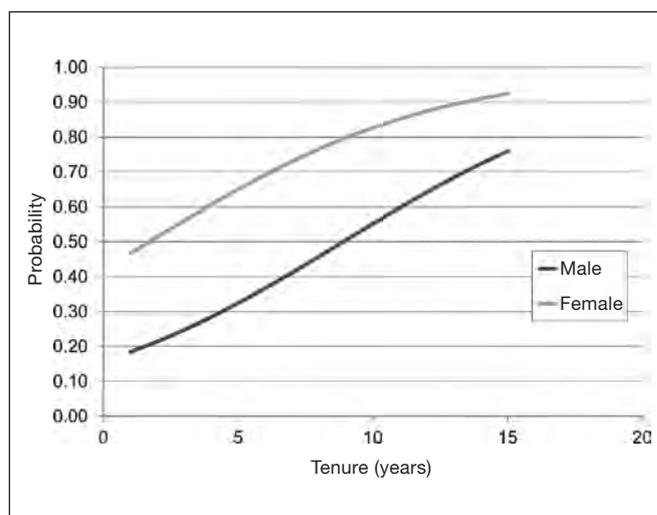

Figure 1. Estimates of pain probability in the shoulder, by tenure (years) and gender

Prevalence of musculoskeletal pain in leather products industry
workers: cross-sectional study in a city of the state of Minas Gerais

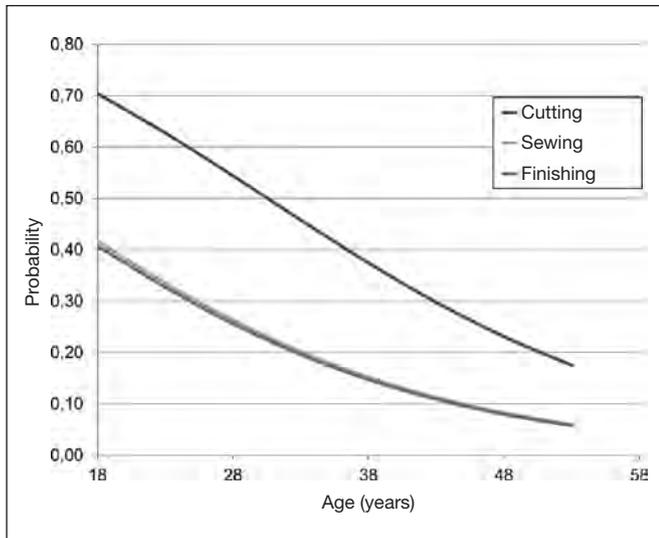Rev Dor. São Paulo, 2017 apr-jun;18(2):135-40

Figure 2. Estimates for the chances of knee pain by age (years) and work sector

DISCUSSION

This study tried to determine the prevalence of musculoskeletal pain or complaints in several regions and to investigate the associations between social-demographic and work related variables. The prevalence of complaints registered in the study was similar to the literature[9,13] and substantially superior to those reported in other studies[7,8,14,15].

Regarding the adopted sampling process, it is known that the representativeness of a sample process is based on randomness, that allows the results to be extended to the population of workers in the leather products manufacturing. Despite this observation, a randomness-based process can also contain factors that influence the consistency of the results. The best known relates to the limitation of observance, that is, the manifestation of lack of interest, indifference when answering the questions[19].

The multivariate analysis generated a model adjusted for knee pain in the last 12 months, controlled by age and work sector. In the cutting sector, in which it was found the highest risk of pain occurrence, the prolonged standing position and other loads, as weightlifting, proved to be relevant factors of risk for pain occurrence, as shown in the literature[5,10]. In the multivariate analysis, the occurrence of knee pain was associated with males. However, in the construction of the final model, which offered the most appropriate adjustment, it was excluded because it lost significance.

For pain in the shoulder, in another multivariate model elaborated, the adjustment was for tenure and gender, in which females outstand with a higher probability of injuries, ratifying the results in other studies for pain prevalence in general[4,7,10]. There was a positive association between pain and tenure, coherent with the literature[8,10].

Prevalence of musculoskeletal symptoms, above 60%, was found in the upper dorsal region, neck, wrist and hands, ankles and feet, and shoulder. The prevalence of pain, corroborating the literature, was most prominent in females[4,7,10].

Only for the knee region was observed a higher and significant prevalence among men. Although domestic activity, representing a double workday, was not a significant explanatory variable in the presented models, it should not be omitted, as mentioned in other studies[7,9].

The risks of ergonomic nature, consolidated in the literature, to which workers are exposed vary whether due to the work organization or to an inadequate posture. When checking the high perception of workers of the adverse conditions of their activities, the study points out important prevention directions, as for example, participative ergonomics. It is necessary to engage all individuals in the company and provide input about the work conditions to be improved, with the criteria of productivity and comfort. In the case of the cutting and sewing sectors, which activities involve being in static positions for long periods of time and repetitive movements, specific preventive measures are necessary to reduce the risk of diseases. Such particular measures are beyond the scope of this study, which purpose was to describe and point out the major risks and complaints with a cross-sectional study.

This study has the typical limitations of a cross-sectional study, subject to distortion of the results due to systemic errors or bias[19]. It is worth mentioning the healthy worker's bias, or survivor, since only workers exerting the activity were addressed, therefore excluding those in leave of absence or who did not adapt to the rhythm. This study is also subject to information bias, particularly because it is a study based on questionnaires[19].

CONCLUSION

The study identified the important prevalence of musculoskeletal complaints among workers in the process of manufacturing leather goods, identifying the associated variables. It discloses a poorly investigated universe, in a relevant regional industry, pointing out that the process must be reformulated to avoid conditions that lead to pain and suffering of the workers in that sector. These results also serve as significant input to the city health surveillance in the context of integration with worker's healthcare actions. Necessary transformations, strongly prioritizing the adaptation of the work to the worker, shall provide dignity to workers and undeniable benefits to the productive process.

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Evaluation in adolescents practitioners and non-practitioners of futsal to detect positivity for patellar chondromalacia

Avaliação em adolescentes praticantes e não praticantes de futsal para detectar positividade para condromalácia patelar

Carlos Eduardo Alves de Souza[1], Thayse Alanne Bezerra Silva[1], Gabriella Wendy Duarte[1], Jéssica Priscila da Silva Souza[1]

ABSTRACT

BACKGROUND AND OBJECTIVES: An increasingly popular modality is futsal; with increased popularity, the number of adolescents practicing such sport is also increasing and, as consequence, related injuries are also increasing, becoming object of interest of healthcare professionals. This study aimed at comparing signs and symptoms in adolescents practicing and not practicing futsal, to suggest positivity for patellar chondromalacia.
METHODS: To detect patellar chondromalacia, history and physical evaluation (Perkin, lateral patellar shift, Waldron, patellar apprehension and Clarke's signal) were performed.
RESULTS: Participated in the study 88 individuals, being 44 futsal practitioners and 44 non-practitioners. In the practitioners group, 54.5% have reported knee pain versus 34.1% of non-practitioners. The crossing of clinical signs with pain has shown statistically significant values: Perkin test (p=0.030), Waldron test (p=0.030) for practitioners and Perkin (p=0.002), lateral patellar shift (p=0.020) and Clarke's signal (p=0.014) for non-practitioners.
CONCLUSION: This study has shown more positivity of clinical tests for patellar chondromalacia in non-practitioners of futsal, however practitioners had lower frequency of positivity, except for Clarke's signal. In addition, pain was more frequent in the practitioners group.
Keywords: Evaluation, Knee, Pain.

RESUMO

JUSTIFICATIVA E OBJETIVOS: Uma das modalidades em ascensão mundial é o futsal; com aumento na popularidade, o número de adolescentes que praticam o esporte tem aumentado e como consequência as lesões de sua prática também têm crescido, tornando-se objeto de interesse de profissionais da área da saúde. O objetivo deste estudo foi comparar sinais e sintomas presentes em adolescentes não praticantes e praticantes de futsal, para sugerir a positividade nos testes para condromalácia patelar.
MÉTODOS: Foram realizados anamnese e exame físico (Perkin, deslocamento lateral da patela, Waldron, apreensão patelar e sinal de Clarke) para detecção de condromalácia patelar.
RESULTADOS: Foram avaliados 88 indivíduos sendo 44 praticantes de futsal e 44 não praticantes. No grupo dos praticantes 54,5% relataram sentir dor no joelho, *versus* 34,1% dos não praticantes. O cruzamento dos testes clínicos com a dor mostrou valores estatisticamente significantes: teste de Perkin (p=0,030) teste de Waldron (p=0,030) nos praticantes e nos não praticantes Perkin (p=0,002), deslocamento lateral da patela (p=0,020) e sinal de Clarke (p=0,014).
CONCLUSÃO: Esse estudo mostrou maior frequência de positividade de testes clínicos para condromalácia patelar em não praticantes de futsal, entretanto, os praticantes apresentaram menor frequência de positividade, exceto no sinal de Clarke. Além disso, a presença de dor apresentou maior frequência para o grupo de praticantes.
Descritores: Avaliação, Dor, Joelho.

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INTRODUCTION

The practice of sports embraces a wide range of age groups, being widespread in the adolescence phase. However, this activity may lead to future diseases, as for example, chondromalacia patella. It can be defined as the deterioration of the articular cartilage of the posterior part of the patella. In addition, its progression can lead to the formation of fissures, ulcerations, arthritis and osteoarthritis[1]. This dysfunction occurs mainly because of the bad alignment of the patella, due to the load asymmetry on the vastus medialis and vastus lateralis[2].
Knee performance depends on the balance between ligaments and muscles, and instability in these structures causes a lateral displacement of the patella, a common alteration in athletes reporting patellofemoral pain[3]. Physical and functional assessment of patients with chondromalacia consists of subjective information about the pain, functional impairment, as well as special tests that can be performed. Considering the preceding, clinical tests such as Waldron, Clarke's sign, Perkin's, patellar apprehension, lateral patellar displacement and knee angle measurement for the diagnosis of chondromalacia patella have been described in the literature[4].
Chondromalacia patella is related to sports practice and accounts for approximately 10% of care in a rehab clinic. Trau-

ma, in general, and the excess of physical activity, as joint overload or excessive runs are frequent etiologic agents related to chondromalacia patella in sportspeople in the most varied sports modality, involving mainly women and young people[1]. According to Fronza e Teixeira[5], adolescents require a careful prescribing of physical activities, since the individual is in the final period of development before adulthood. In this context, the objective of this study was to compare signs and symptoms present in adolescents and players of school futsal to suggest the positivity of chondromalacia patella tests.

METHODS

The study was carried out through a cross section into two groups, G1 (individuals who did not play futsal) and G2 (futsal players), who underwent a physical and functional assessment protocol for the suggestive detection of chondromalacia patella, with special and physical tests.

The study was conducted at the Municipal School Professora Josélia Florêncio da Silva (20) and at the Municipal School Álvaro Lins (68). The survey was carried from August to September 2014. In selecting the sample, 88 male volunteers were recruited, with ages between 10 and 15 years, futsal players or not, in each school partnering with the study, selected by convenience. Teenagers who practiced other sports modality were excluded, as well as those with physical and/or mental disability; low frequency (greater than 20% of absences in training); prior knee dysfunction.

All those responsible for the students and volunteers were informed about the purpose of the study and asked to sign two copies of the Free and Informed Consent Term (FICT).

In data collection, it was used a questionnaire containing data such as identification, body mass index (BMI), characteristics of lower limbs (LLLL) using special tests (Figure 1) to detect specific knee diseases, and the visual analog scale (VAS) for quantitative assessment of pain.

Each component was analyzed as follows:

• BMI: calculated by dividing the weight by the square of the height[2], expressed in kg/m^{2}. For this analysis, we used a Candy® scale and an RIEC® measuring tape. The reference parameters established by the World Health Organization (WHO) were considered[6].

• VAS: validated by Carlsson in 1983. This is an instrument to assess pain intensity[7]. In this analysis, the adolescent was told to rank his pain, ranging from zero to 10, where zero represents absence of pain and 10 unbearable pain

• Waldron's test: the student performed slow push-ups with a full range motion of the knee, while researchers palpated the patella. The test was positive regarding pain and crackle reported during movement.

• Perkin test: the examined knee remained in full extension, and the lateral and medial edges of patella were palpated to generate a medial and lateral movement; the test was positive based on the pain reported.

• Q Angle: the angle between the anterior superior iliac spine line and the center of the patella and another line extending
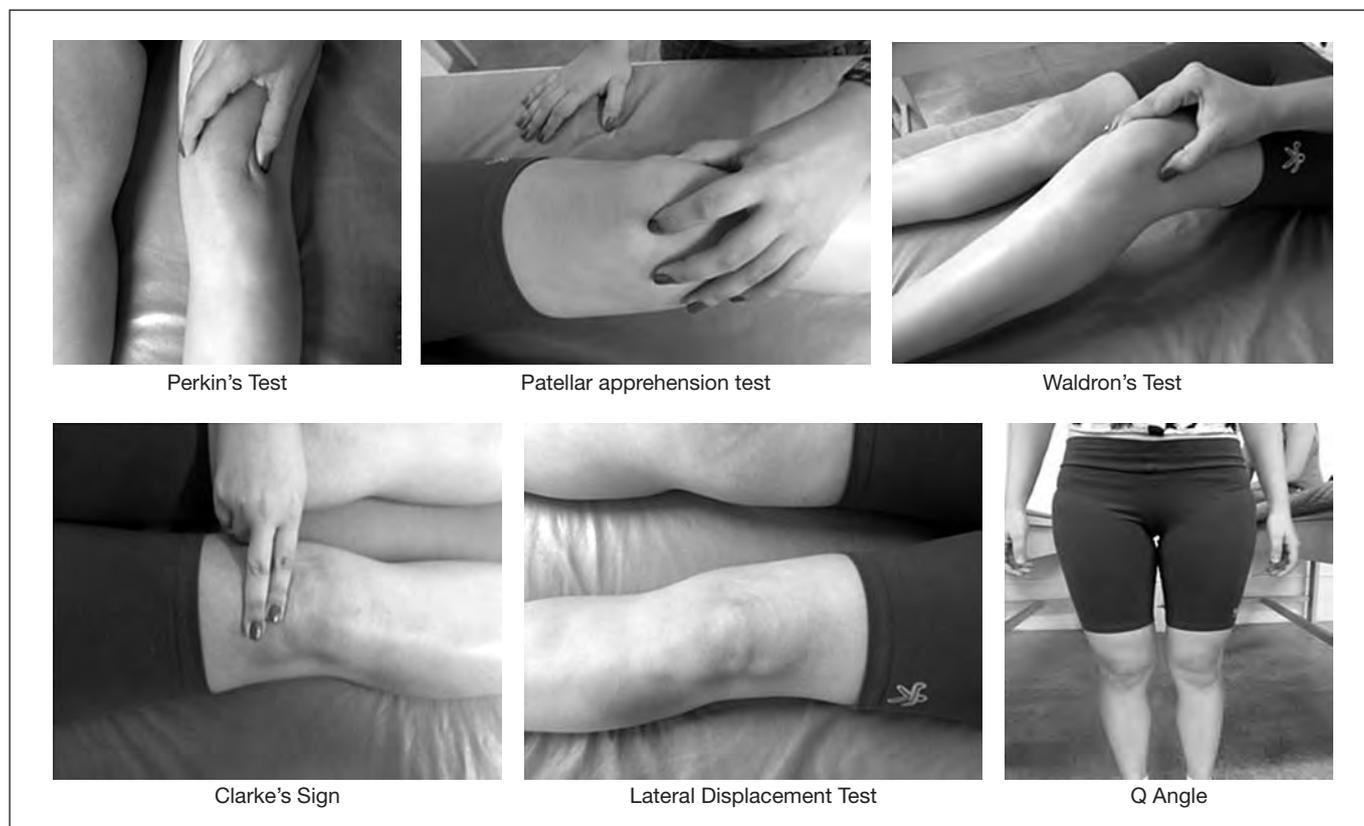

Perkin's Test   Patellar apprehension test   Waldron's Test

Clarke's Sign   Lateral Displacement Test   Q Angle

Figure 1. Special tests for knee assessment

Evaluation in adolescents practitioners and non-practitioners
of futsal to detect positivity for patellar chondromalacia

Rev Dor. São Paulo, 2017 apr-jun;18(2):141-4

from the center of the patella to the center of the tibial tuber-osity[8]. A goniometer was used to obtain this measurement.

• Test of the lateral displacement: the maneuver consisted of the isometric contraction of the quadriceps while the researchers assessed the patella displacement. It was considered positive when the lateral displacement was superior to the cranial[9].

• Clarke's sign: the subject was positioned in the supine position with the limb extended, the examiner pressed the superior pole of the patella and requested an isometric contraction of the quadriceps of the subject while exerting pressure. The test was positive based on pain report by the participant.

This study was approved by the Research Ethics Committee of ASCES College, according to the opinion number 765,477 (2014).

Statistical analysis

Data were processed and analyzed descriptively by the software Epi-Info 6.04 (Center for Disease Control and Prevention, Atlanta, United States). Continuous variables were presented as averages and percentages and were categorized to enable the bivariate analysis, considering statistically significant if p≤ 0.05.

RESULTS

G1 was composed of 44 individuals, with an average age of 12.7 years, 1.55 cm, 47.73 kg (body mass), 20,21 kg/m² (BMI) and 2.61 VAS. G2 was composed of 44 individuals, with an average age of 13 years, 1.62 cm, 53.23 kg (body mass), 20.13 kg/m² (BMI) and 1.70 VAS.

Table 1 shows that in G2, 34.1% reported knee pain more frequently (20.5%) during the practice of sports, and in higher proportion (13.6%), when running. On the other hand, in G1, 54.5% reported knee pain, with higher frequency (36.4%) after sports practice. In relation to the time of pain onset, of the 24 subjects who reported knee pain, 14 (31.8%) reported it when at rest.

Table 1. Distribution of the variables in relation to pain assessment

Variables	G1		G2		Total (n = 88)	
	n	%	n	%	n	%
Knee pain	24	54.5	15	34.1	39	44.3
Present	20	45.5	29	65.9	49	55.7
Absent						
Moment of pain						
Absence	19	43.2	29	65.9	48	54.5
Before the practice of sports	2	4.5	1	2.3	3	3.4
During the practice of sports	7	15.9	9	20.5	16	18.2
After the practice of sports	16	36.4	5	11.4	21	23.9
Pain in what situation						
No pain	19	43.2	29	65.9	48	54.5
Jumping	1	2.3	1	2.3	2	2.3
Walking	1	2.3	2	4.5	3	3.4
Running	7	15.9	6	13.6	13	14.8
Sudden stops	2	4.5	0	0.0	2	2.3
Crouching	0	0.0	0	0.0	0	0.0
Resting	14	31.8	3	6.8	17	19.3
None of the situations	0	0.0	3	6.8	3	3.4

According to table 2, the relation between pain and the variables of the clinical tests of G1, Perkin (p=0.030) Waldron (p=0.030), and G2, Perkin (p=0.002), lateral displacement of the patella (p=0.020) and Clarke's sign (p=0.014), presented statistically significant association. Cross-linking the other tests with the pain variable showed no statistically significant value.

Table 2. Distribution of cross-linking data of clinical tests and pain

Clinical tests	Pain				Total (n = 88)	P value
	Yes		No			
	n	%	n	%		
Perkin Group 2						
Positive	10	62.5%	6	37.6	16	
Negative	5	17.9%	23	82.1	28	0.002*
Lateral patellar displacement Group 2						
Positive	6	66.7%	3	33.3	9	
Negative	9	25.7%	26	74.3	35	0.020*
Clarke's sign Group 2						
Positive	15	42.9%	20	57.1	35	
Negative	0	0.0	9	100	9	0.014*
Perkin Group 1						
Positive	5	100%	0	0.0	5	
Negative	19	48.7%	20	51.3	39	0.030*
Waldron Group 1						
Positive	5	100%	0	0.0	5	
Negative	19	48.7%	20	51.3	39	0.030*

G1 = individuals who did not play futsal; G2 = futsal players; * Values that showed statistically significant association (p<0.05).

DISCUSSION

Soccer and Futsal are some of the sports modalities most practiced in the world, and mainly in Brazil. These modalities are characterized by a greater physical contact, sharp movements of acceleration and deceleration, leading to various musculoskeletal injuries[10]. Soccer favors the development of lesions in athletes, and it is estimated that about 50 to 60% of sports injuries are caused by this modality[11]. According to Almeida et al.[10], the most prevalent lesions are on the LLLL, involving mainly the thigh and knee. In the study of Pedrinelli et al.[12], carried out during a soccer championship with 12 teams (276 players) with a history of 26 games, 26 players had 63 lesions. The most frequent type of lesion was bruise (25 cases), and the worst-affected regions were thighs (17 lesions) and knees (15 lesions). The region with a higher prevalence of pain reported by children is the LLLL, more specifically the knees, followed by ankle and foot, and this is a result of the practice of sports activities[13]. The present study corroborates the data presented, where it was reported a high rate of knee pain both in G2 (54.5%) and G1 (34.1%).

The practice of physical activity by children and adolescents is being encouraged as a way of preventing several diseases associated with lifestyle. With this, this population group has been choosing one single sports modality very early[13]. The incomplete development of the musculoskeletal system and the large amount of cartilaginous tissue influence the high lesion rate due to musculoskeletal system overload in children and adolescents. A study by Purnell et al.[14] that evaluated 73 acrobatic gymnasts with ages between 8 and 26 years showed that the critical period for the occurrence of injuries is between 11 and 15 years among those evaluated athletes. Although the evaluated modality does not match the modality evaluated in the present study, the age group mentioned as the critical period for the occurrence of lesions is the same as in this study. Carrying clinical tests as a way of diagnosis contributes to identifying changes in the musculoskeletal system, being essential for a comprehensive evaluation and correct kinetic-functional diagnosis, without excluding the need for complementary examinations[15]. Tavares, Brazil and Nunes[4], after carrying out a study with 52 individuals that had been separated into two groups; G1 with 28 individuals presenting a clinical diagnosis of chondromalacia patella confirmed by image tests, and G2 with 24 individuals with no complaints of knee pain and crackles. The two groups underwent clinical tests for the diagnosis of chondromalacia patella, among them, Clarke's sign. The study suggested caution in the application of clinical tests for the diagnosis of chondromalacia patella, considering that 50% of individuals in G2 presented a false positive result, with apparently healthy knees.

These results are consistent with the ones of the present study, where the group of non-practicing subjects presented an excessive positivity (79.5%) for pain and/or crackles during Clarke's test, even not being exposed to excessive loads for not regularly practice a sports modality. Furthermore, there was a statistically significant association between the pain and Clarke's sign variable in those who do not practice sports (p≤ 0.014).

Lillegard, Butcher and Rucker[16] state that several factors can displace the patella from its initial position, leading to an increase in intraosseous pressure and pain. Among these, there are the anatomical factors, including excessive femoral anteversion, external tibial torsion and valgus knee. According to Brandalize and Leite[17], the valgus knee can cause knee pain, since the increase in the tibiofemoral angle leads to the onset of femoropatellar joint painful syndromes and the lateral displacement of the patella causing a bad distribution of weight on the LLLL. In this study, it is observed the high incidence of valgus knees or 55 subjects of the total sample, being 26 of them futsal players and 29 not. Soccer and futsal players tend to acquire a considerable shortening of the posterior musculature of the thigh due to the muscle strengthening programs with the objective to improve the performance of the kick. This fact leads to the reduction of the sports performance and higher likelihood of muscle lesions[12]. McHugh and Cosgrave[18] emphasized that stretching causes an increase in the amplitude of the joint movement due to the reduction of muscle stiffness or the increase in muscle compliance, helping to reduce pain. This result is not consistent with the results of this study, which showed that of the 26 futsal players who did stretching, 15 reported pain according to the information gathered during the interview. We did not find recent articles (stretching, harm, pain) addressing the secondary effects of stretching in athletes.

CONCLUSION

This study showed a higher frequency of positivity in chondromalacia patella clinical tests in non-futsal players. However, futsal players presented less positivity frequency, except for Clarke's sign. Moreover, pain was more frequent in the group of futsal players.

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Effect of supervised physical exercise on flexibility of fibromyalgia patients

Efeito do exercício físico supervisionado sobre a flexibilidade de pacientes com fibromialgia

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ABSTRACT

BACKGROUND AND OBJECTIVES: Fibromyalgia is characterized by chronic diffuse musculoskeletal pain. The syndrome, of still unknown etiology, predominantly affects females. Considering that aerobic, resisted and flexibility exercises may help improving the negative impact of fibromyalgia on quality of life, this study aimed at observing the effect of supervised physical exercise on the flexibility of female patients with fibromyalgia treated in the Extension Project "Interdisciplinary treatment of fibromyalgia patients", developed in the Universidade do Rio de Janeiro.
METHODS: The study consisted in a program of supervised physical exercises lasting six months. Training frequency was equal to two weekly sessions lasting one hour each. Flexibility evaluation tool was the sit and reach test, which was applied in the beginning, three months and six months after intervention.
RESULTS: Sample was made up of 29 females (age: 48.6±10.3 years) diagnosed with fibromyalgia. No significant changes in flexibility were observed after three months of intervention. ANOVA one-way has shown significant improvement (p<0.05) from beginning of intervention to completion (Δ=22.77%).
CONCLUSION: Six months intervention with supervised physical exercises may improve flexibility levels of fibromyalgia females.
Keywords: Female, Fibromyalgia, Flexibility, Pain, Physical exercise, Rehabilitation.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A fibromialgia é uma síndrome caracterizada por dor musculoesquelética crônica e difusa no corpo humano. A síndrome, que ainda não tem etiologia conhecida, acomete predominantemente pacientes do sexo feminino. Considerando que exercícios aeróbicos, resistidos e de flexibilidade podem colaborar na redução do impacto negativo que a fibromialgia impõe à qualidade de vida, o objetivo deste estudo foi verificar o efeito do exercício físico supervisionado sobre a flexibilidade de pacientes mulheres com fibromialgia tratadas no Projeto de Extensão "Tratamento Interdisciplinar para pacientes com fibromialgia", desenvolvido na Universidade do Estado do Rio de Janeiro.
MÉTODOS: A intervenção do estudo consistiu em um programa de exercícios físicos supervisionados com duração de seis meses. A frequência de treinamento foi igual a duas sessões semanais com uma hora de duração cada. O instrumento utilizado para avaliação da flexibilidade foi o teste de sentar e alcançar, o qual foi aplicado no início, depois de três meses e após seis meses de intervenção.
RESULTADOS: A amostra do estudo foi composta por 29 mulheres (idade: 48,6±10,3 anos) diagnosticadas com fibromialgia. Após os três primeiros meses de intervenção com exercício físico supervisionado, não foram encontradas alterações significativas na flexibilidade da amostra do estudo. A ANOVA *one-way* apresentou melhora significativa (p<0,05) na amostra do momento inicial para o final (Δ=22,77%).
CONCLUSÃO: Uma intervenção de seis meses de duração com exercícios físicos supervisionados pode melhorar os níveis de flexibilidade de mulheres com fibromialgia.
Descritores: Dor, Exercício físico, Feminino, Fibromialgia, Flexibilidade, Reabilitação.

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INTRODUCTION

Fibromyalgia (FM) is a clinical syndrome mainly characterized by diffuse and chronic musculoskeletal pain[1]. Besides pain, it is often associated with a set of signs and symptoms, such as pervasive fatigue, morning stiffness, cognitive disorders[2], headaches, anxiety, depression[3], dyspnea, sleep and mood disorders, among others[4,5]. According to Mattos and Luz[6] and Álvarez-Gallardo et al.[7], FM patients present decreased physical capacity due to pain, causing a vicious cycle between physical inactivity and functional limitations. In some cases, the level of pain is very intense, interfering in

Souza Oliveira LH, Mattos RS, Castro JB,
Barbosa JS, Chame F and Vale RG

the work, in the activities of daily life and in the quality of life (QOL)[5,6].

The levels of physical aptitude, flexibility, muscular strength and aerobic endurance are low in patients with FM[7-9]. Subjective complaints associated with FM may contribute to the functional disability of patients[10]. Pain, the main symptom and complaint of the patient with FM, is related to higher levels of physical inactivity and lower levels of physical activity[11,12].

The prevalence of FM in world population varies between 0.66 and 4.4%, affecting eight times more women in the age group between 35 and 60 years. In Brazil, it reaches about 2% of the population[13]. The syndrome diagnosis is clinical, with no existing pathophysiological evidence showing the diffuse and chronic pain[14]. In 2009, the American College of Rheumatology published preliminary criteria for the diagnosis of FM. It counts the painful body areas, the so-called Widespread Pain Index (WPI), which can range from 0 to 19; and the severity of symptoms fatigue, non-restorative sleep, and cognitive aspects added to the intensity/number of somatic symptoms, designating the Symptom Severity (SS) *scale score*, resulting in a score of 0 to 12. According to these criteria, to be classified as a having FM, the patient must present WPI ≥ 7 and SS scale score ≥ 5 or WPI of 3 to 6 with SS scale score ≥ 9[15].

When it comes to the treatment of FM, an interdisciplinary approach is ideal, combining pharmacological and non-pharmacological treatments[16-20]. Aerobic exercise, cognitive-behavioral therapy, and drugs are considered effective strategies[21-23]. Thus, interdisciplinary programs contribute to the improvement of QOL in patients with FM[24]. Furthermore, physical exercise, such as stretching, walking, and low-impact exercises have been a high point in the treatment of this syndrome[22,25,26].

Stretching exercises are used for maintenance or development of flexibility. This is an adjustment that is characterized by the extent of the joint movements. Flexibility, as well as muscle strength and aerobic endurance, is a physical adjustment needed to perform the activities of daily life and the conservation of health[27,28]. There is evidence about the importance of muscle stretching on the treatment of FM[29,30]. Muscle flexibility can contribute to the execution of efficient movements and maintain balance, positively correlating with the QOL[31]. Muscle stretching, when present at physical training sessions, promotes positive and significant effects on QOL of patients with FM. The training of flexibility needs to be part of the non-pharmacological intervention because it can reduce pain and soreness on the sensitive points of the patients[32-34].

A research aiming to assess the physical aptitude of patients with FM, through a battery of physical tests, including the sit and reach test, found no correlation with pain or with the total of the Fibromyalgia Impact Questionnaire (FIQ) scale. The sit and reach test pointed out significant differences between patients with FM and healthy individuals[35].

Thus, the objective of this study was to check the effect of supervised physical exercise over the flexibility of women patients with FM treated in a university extension project in Rio de Janeiro.

METHODS

The participants were women diagnosed with FM from the Extension Program "Interdisciplinary Treatment for patients with Fibromyalgia," linked to the Extension Program "Body Health Practices" (Práticas Corporais de Saúde - PRACORSAU), of the State University of Rio de Janeiro (UERJ). All participants in the study signed an Free and Informed Consent Term (FICT). The sample was of convenience related to the number of individuals enrolled in the program and who have agreed to participate effectively in all stages of the study.

Inclusion criteria were: a) medical referral requesting the inclusion in the Extension Project; b) cardiac evaluation with a stress test. Exclusion criteria were: a) performed the sit and reach test at some point not foreseen in this study; b) absences exceeding 20% of the number of classes.

The extension project "Interdisciplinary Treatment for patients with Fibromyalgia" offers physical exercises supervised by Physical Education teachers in two weekly sessions of 1 hour each (Tuesdays and Thursdays), biweekly nutritional guidance and weekly psychological support by qualified professionals. Project activities are free. Women who come to the Extension Project are referred by the Rheumatology Service of the University Hospital Pedro Ernesto (HUPE), by the Piquet Carneiro Polyclinic and, exceptionally, by private or public physicians from other entities. The activities are divided into three phases. I) Adaptation (3 months): physical exercise sessions are offered twice a week aiming at the development of health-related physical fitness, involving strength, flexibility, and aerobic resistance training; II) Transition (4-6 months): these months include the participation in psychological support group supervised by two psychologists, in addition to physical exercises; III) Interaction (7th month onwards): period during which the participants dedicate themselves only to physical exercises and release the vacancies of psychological support group to new participants.

The physical exercise session is divided into four parts: 1) warm-up (5 to 8 minutes); 2) aerobic training (30 minutes); 3) strength training (15 minutes); 4) flexibility training (10 minutes).

Aerobic training is divided into three blocks, each lasting 10 minutes, with a three-minute run/walk in between (RuWa) around a hall with two-minute activities taught by the teacher. These activities are characterized by the collective, by playful and cooperation, involving: circuits, activities with hula hoops, balls and/or ropes, dances, competitions, relay race, gymnastics, among others (Table 1).

The heart rate (HR) is measured by the participant himself every 10 minutes on the radial artery, with the help of the index and

Table 1. The structure of the aerobic training in the Extension Project "Interdisciplinary Treatment for patients with fibromyalgia"

Block I	Block II	Block III
3 minutes of RuWa	3 minutes of RuWa	Activity V
Activity I	Activity III	3 minutes of RuWa
3 minutes of RuWa	3 minutes of RuWa	Activity VI
Activity II	Activity IV	3 minutes of RuWa

RuWa = running and walking; activities I to VI = 2 minutes each.

middle fingers. The intensity of aerobic exercises is calculated using the HRR calculator. Thus, the resting HR is subtracted from the maximum HR obtained in the stress test. Later, it is taken 52 and 60% of the HRR and add each of these values to the Resting HR to obtain the variation of target HR[36].

Strength training consists of 10 exercises, in a series of 10 maximum repetitions of each exercise. The external load is adjusted so that the participant can carry out a series with 10 repetitions in a painless way and with the correct biomechanical pattern. The major muscle groups of the body are demanded through 10 exercises: leg press, plantar flexion, biceps curl, triceps curl, abduction machine, adduction machine, leg curl machine, T-bar rowing and chest press machine (Technogym©).

Flexibility training is static and involves the main musculature of the body, with a supporting time at the threshold of discomfort for 10 seconds[37]. The main demanded groupings are biceps brachii, triceps brachii, pectoral, gluteal, deltoid, hip adductors, quadriceps adductors, hamstrings, triceps surae, scapula and low back muscles.

The sit and reach test was used to evaluate the flexibility, whose goal is to register the maximum distance achieved in trunk flexion over the hip, in a sitting position[38]. The test was carried out at the time of entering the Extension Project, after three months of training and after six months. The procedure of this test consisted in the individual being barefoot under the Wells' Bench, knees fully extended (the evaluator can hold them), elbows extended in front of the body, with one hand over the other (palms facing down). From that position, the individual attempted to achieve the maximum distance along the measuring scale. This procedure was carried out three times, with a 30-second interval between repetitions, without prior warm-up or running test. It was considered the maximum distance achieved in one of the three attempts[35,38,39].

The study was approved by the Study Ethics Committee of the University Hospital Pedro Ernesto (CEPHUPE), with the following registration of the Presentation Certificate to Ethics Assessment (CAAE): 49971715.3.0000.5259.

Statistical analysis

Data were handled by the statistical package IBM SPSS Statistics 20 for Windows and presented in descriptive form with the use of average, standard deviation and absolute and relative frequencies. The normality and homogeneity of variance of the sample data were verified by the Shapiro-Wilk test and Levene tests, respectively. The variance analysis (ANOVA one-way) was used, followed by the Tukey post hoc, to check possible differences in the studied variables. The research adopted the value of $p < 0.05$ for statistical significance.

RESULTS

The sample was composed of 29 women diagnosed with FM, with an average age of 48.6±10.3 years. Table 2 presents the absolute and relative frequencies of diseases present in patients who participated in the study. Of the 29 patients, 4 (13.8%) are affected only by FM; 6 (20.7%) are affected by FM and one other

disease; 7 (24.1%) had FM and also two more diseases, and 12 (41.4%) are affected by FM and by three or more other diseases. Figure 1 represents the comparative analysis of the sample levels of flexibility. In the first column is the average of the flexibility variable at the pre-intervention moment, that is, before the beginning of the intervention with physical exercise. The second column represents the average of the flexibility variable 3 months after beginning the intervention. Finally, the last column represents the average of the same variable 6 months after intervention.

The intervention with supervised exercise during the first three months after the entry caused no significant changes in the flexibility of the studied sample. It should be noted that the flexibility training included the muscles evaluated in the sit and reach test. Contrary to results found with 3 months of intervention, after 6 months of entering the Project, there have been signifi-

Table 2. Other diseases presented in the sample (n=29)

Illness	n	%
Depression	14	48.3
Systemic arterial hypertension	11	37.9
Dyslipidemia	8	27.6
Disc herniation	5	17.2
Hypothyroidism	4	13.8
Diabetes	3	10.3
Panic disorder	2	6.9
Carpal Tunnel Syndrome	2	6.9
Arthrosis	2	6.9
Tendonitis	2	6.9
Morton's neuroma	1	3.4
Chondromalacia patella	1	3.4
Scoliosis	1	3.4
Spur	1	34
Plantar fasciitis	1	3.4
Osteoporosis	1	3.4
Anemia	1	3.4
Thyroid dysfunction	1	3.4
Inflammation in the knees	1	3.4
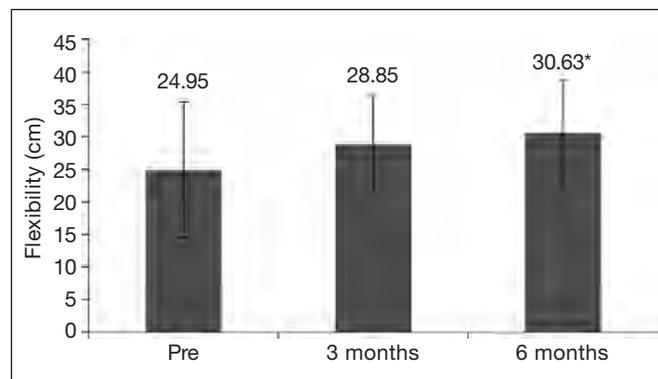
Figure 1. Comparative analysis of the sample levels of flexibility
*p < 0.05; pre versus 6 months.

Souza Oliveira LH, Mattos RS, Castro JB,
Barbosa JS, Chame F and Vale RG

cant and positive changes in the flexibility of the participants in the project, where the ANOVA *one way* showed significant improvement (p<0.05) in the sample from the beginning to the end (Δ=22.77%). However, no significant changes were found in flexibility between months 3 and 6.

Average differences between the moments of evaluation of the sample were analyzed in this study. The difference between the first moment of evaluation (pre-intervention) and the second time (3 months) was -3.90cm. The difference between the first and the third time (6 months) was -5.68 cm. The difference between the second and the third moment of the evaluation was of -1.78cm.

The significance (p=0.040<0.05) was found on the first time (pre)*versus* third time (6 months). There were no significant changes in the other moments of evaluation.

DISCUSSION

Due to few studies addressing the relationship between flexibility and FM, the present study stands out because it focuses on a field with limited scientific evidence[30,33,34,40]. It should be noted that physical valances trained during the project sessions are those related to physical aptitude and health[11,14], that is, physical valances essential to the studied population. Marques et al.[41] also studied the effect of physical exercise on the flexibility of patients with FM. The exercise could improve the symptom framework of the syndrome, the QOL, and flexibility in patients with FM. The 50-minute sessions, once a week, were composed exclusively of stretching exercises. Ten sessions were sufficient to significantly increase the flexibility of the patients in a period fewer than 3 months of training. By contrast, in the present study was not observed a significant increase in flexibility in the first 3 months, which may have occurred because only 10 minutes of the total class time was dedicated to flexibility training.

According to Ferreira et al.[42], it is necessary at least 20 seconds of static stretching to improve flexibility. The methodology of the present study does not corroborate this other study[42] because stretching was sustained with less than 20 seconds. However, Cyrino et al.[43] warn that flexibility is dependent on the level of use, and can be improved through other types of training, especially if the practitioners are people who don't use their joints that much. The authors[43] found positive and significant results of strength training on flexibility. Strength training and aerobic training in the studied sample may have also contributed to the significant increase in flexibility after 6 months of intervention.

As presented in the methods, all participants exercised twice a week, training flexibility for 10 minutes per exercise session. This methodology was enough to point out positive results on the sample flexibility. Coelho and Burini[44] corroborate the methodology adopted in this study, because they recommend that flexibility exercises should be performed at least twice a week, with 10 minutes per training session, being these recommendations to promote health and prevent functional disability in the elderly.

In line with the present study, Coelho and Araújo[45] state that a regular participation between 3 and 18 months in a supervised exercise program, with at least 10 minutes of flexibility per training session can lead to significant increases in adults' flexibility. The findings of this study point to the same direction, because the six-month intervention with supervised exercise caused significant and positive changes in the sample flexibility.

In relation to the absence of significant increase in flexibility from the third to the sixth month, the changing potential of a physical variable could be the answer. According to Azevedo et al.[46], the changing potential of a physical variable is greater when beginning training. This phenomenon can be called adaptation window. Therefore, the less trained the individual, the greater the change potential with the training and the greater the adaptation window. The participants reached the third month with an average flexibility superior to pre-intervention, that is, the adaptation window reduced, causing the changing potential of the flexibility variable to require an increasingly significant stimulus. The stimulus on the participants in the project may have been insufficient to significantly increase the flexibility from the third to the sixth month.

In this study, participants trained not only flexibility, because the exercise session was also composed of exercises of strength and aerobic endurance. Likewise, the participants of Reis et al.[47] study experienced concurrent training, because they were training more than one physical valance (flexibility and aerobic endurance) per training session. Just as in the present study, the authors[47] also found positive results for the concurrent training on flexibility.

Gonçalves, Gurjão and Gobbi[48] and Vale et al.[49] studied the effects of strength training sessions on the levels of flexibility. In both studies, strength training seemed not to compromise improving flexibility. Vale et al.[49] add that the amplitude of movement in strength training explains the flexibility gains. In this research, all the participants were also involved in counter-resistance exercises.

Campos et al.[50] also noted positive effects of concurrent flexibility training. The exercise program proposed by the researchers consisted of aerobic training and muscle resistance training, with a sample consisting of hypertensive women (age: 63.7±5.1 years). The present study presents some similarities because the sample was also made up of women who performed strength and aerobic endurance training, 37.9% of the sample being composed of hypertensive women.

The findings of Salvat et al.[51] also noticed the importance of interdisciplinary treatment for patients with FM. According to the results, patients with FM of the interdisciplinary group showed significant improvement of physical aptitude.

CONCLUSION

From the results, it was concluded that six months of supervised exercise can significantly enhance the flexibility of women with FM. The applicability of the study is confirmed, because it tried to verify the effect of supervised physical ex-

ercise upon a conditional physical valance, being flexibility a component of health related to physical aptitude. It points out the need for new studies on flexibility and FM, and it is suggested the use other assessment tools, in addition to the sit and reach test.

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Nonspecific chronic low back pain and incapacity level: influence of walking performance

Dor lombar crônica inespecífica e nível de incapacidade: influência no desempenho da caminhada

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ABSTRACT

BACKGROUND AND OBJECTIVES: Chronic low back pain syndrome promotes several functional losses which impact quality of life of patients, and walking is one of the most impaired functions. Being chronic low back pain a syndrome with multiple etiologies, efforts to understand the relation between functional losses and etiologic factors are justified. This study aimed at correlating walking speed with pain perception, incapacity level (I) and condition of having or not chronic low back pain (group).
METHODS: Sample was made up of volunteers with nonspecific low back pain (LG/n=8) and healthy subjects (CG/n=8). Incapacity level was obtained by Oswestry Incapacity Index during evaluation. Tests battery was divided in three sessions according to walking intensity, as follows: preferred self-selected speed (VP) and faster and slower speeds as compared to VP. In each session, volunteers walked for five minutes and at every minute pain was quantified by the analog scale. Kendal Tau test was used with p=0.05.
RESULTS: Walking speed was not correlated with pain intensity, with incapacity level or with the group. However, group versus incapacity level, group versus pain, incapacity level versus pain were correlated with one another.
CONCLUSION: Walking performance was not influenced by nonspecific chronic low back pain and by incapacity level.
Keywords: Chronic pain, Gait, Human locomotion, Psychosocial impact.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A síndrome de dor lombar crônica promove diversos prejuízos funcionais que impactam a qualidade de vida dos pacientes, e a caminhada é uma das funções mais comprometidas. Sendo a dor lombar crônica uma síndrome multietiológica, os esforços para se entender a relação os entre prejuízos funcionais e os fatores etiológicos se justificam. O objetivo deste estudo foi correlacionar a velocidade de caminhada com a percepção dolorosa, o nível de incapacidade (I) e a condição de ter ou não dor lombar crônica (grupo).
MÉTODOS: A amostra foi composta por voluntários com dor lombar crônica inespecífica (GL/n=8) e sujeitos saudáveis (GC/n=8). O nível de incapacidade foi obtido pelo Índice de Incapacidade de Oswestry durante a avaliação. A bateria de testes foi dividida em três sessões de acordo com a intensidade da caminhada como segue: velocidade autosselecionada preferida (VP), e velocidades mais rápidas e mais lentas que a VP. Em cada sessão os voluntários caminharam por cinco minutos e a cada minuto a intensidade dolorosa foi quantificada pela escala analógica. Foi usado o teste Tau de Kendall com p=0,05.
RESULTADOS: A velocidade de caminhada não se correlacionou com a intensidade dolorosa, com o nível de incapacidade e nem com o grupo. Entretanto, grupo *versus* nível de incapacidade, grupo versus dor, nível de incapacidade versus dor foram correlacionados uns com os outros.
CONCLUSÃO: O despenho da caminhada não foi influenciado pela dor lombar crônica não específica e pelo nível de incapacidade.
Descritores: Dor crônica, Impacto psicossocial, Marcha, Locomoção humana.

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INTRODUCTION

Low back pain is a syndrome-based condition with high prevalence in the global population. The identification of the etiology of low back pain has remained a challenge since there is little correlation between pathological findings and clinical presentation. One of the main characteristics of chronic low back pain is functional impairment, walking speed being one of the factors most affected, with a possible impairment in the metabolic cost of walking[1-3].
The contribution of psychosocial and neuropsychological etiological factors on the performance of motor tasks, for instance, walking, is still poorly understood and confusing in the context of chronic low back pain, even though these factors give an im-

portant contribution for both, the assessment of chronic low back pain and rehabilitation programs[4].

Clinically, healthcare professionals may recognize the nature of chronic low back pain using several models proposed in the scientific literature (pathological, neurophysiological, signs and symptoms, biopsychosocial, motor control, among others). These models often lead clinicians to adopt unidimensional therapeutic interventions rather than multidimensional ones[5] increasing the chances of obtaining less-than-ideal results. Thus, efforts at contributing to the understanding of the relationship between the various etiological dimensions of chronic low back pain are justified.

Al-Obaidi et al.[6] concluded, by multiple linear regression, that the level of physical activity and anticipation of pain, the latter being a factor of psychosocial nature, were strong predictors of deficits in walking speeds between subjects with low back pain compared to the control group. Other authors have also shown that in chronic low back pain patients, as compared to asymptomatic individuals, walking speed on self-determined preferred gait intensity is significantly lower[7,8].

Studies regarding low back pain present conflicting findings with respect to the relationship between functional performance, physical activity level, painful intensity, level of disability and walking speed: a weak but significant correlation between pain, disability and quality of life[9]; lack of evidence that walking plays a positive role in reducing pain and in improving functionality in chronic low back pain[10]; poor evidence for the association between chronic low back pain and the impairment in performance of activities of daily living[11]; positive correlation between high rates of disability and low levels of physical activity[12].

Considering the difference in the contributions of various studies, the aim of this study was to correlate walking speed (WS) with pain perception, level of disability (LD) and condition of having or not chronic nonspecific low back pain (group). The hypothesis of this study proposes that patients with chronic nonspecific low back pain are less able to adapt their spatial-temporal parameters and thus, the walking speed variation performed at different intensities (preferred self-selected speed, slower and faster than the preferred self-selected speed) is positively correlated with perceived painful intensity and level of disability.

METHODS

Volunteers with chronic nonspecific low back pain, being treated in an Institutional Physical Rehabilitation Center (IPRC), were recruited intentionally, not probabilistically, to compose the chronic low back pain group (LG). They were of both genders, aged between 25 and 60 years, without osteomuscular injuries in other joints and/or systemic illnesses. We opted for a convenience sampling because a considerable part of patients from IPRC lives at neighboring towns covered by this Rehabilitation Center. The control group (CG) consisted of subjects without systemic or musculoskeletal disorders, either chronic or acute, in lower limbs and/or spine, and were matched per age, weight, and height about the LG.

Volunteers, from both groups, were excluded if they systematically and routinely engaged in physical exercise, two or more times per week for at least 30 minutes; showed obvious differences in length of lower limbs, postural misalignments and body mass indexes greater than 30.0 kg.m[2].

Inclusion criteria for the LG followed the recommendations of original or review articles that focused on the diagnosis and treatment of low back pain, according to signs and symptoms indicated in the anamnesis and physical examination[13-15]. Volunteers should report low back pain persisting for more than three months, without radiation to lower limbs but with physical and clinical characteristics compatible with category 1 pain (nonspecific low back pain) according to the guidelines for evaluation and treatment proposed by the American College of Physicians and the American Pain Society[14]. According to those guidelines, the main guideline was the search for signs and symptoms present in the anamnesis and physical examination that could suggest specific cause for low back pain (called red flags) and that, when found, have not characterized chronic nonspecific low back pain.

The experimental design of this study involved the following steps: 1) screening; 2) preferred self-selected speed determination; 3) walking test.

After receiving explanations of the procedures and objectives of the research, volunteers underwent clinical screening for the collection of history and anthropometric data.

To all volunteers, the level of self-reported disability was determined by the Brazilian version of the Oswestry Disability Index (ODI) adapted from the original - version 2.0 whose reliability was recognized (αCronbach = 0.87, ICC = 0.99)[16,17]. It is a questionnaire composed of 10 questions with six possible answers each, which reflects the repercussion of low back pain on individual's daily and social activities. The scores are presented in percentage values.

The subject underwent a familiarization period, for five minutes, on the treadmill (Embrex 563-R3, Brusque, Brazil) and then the preferred self-selected speed (PS) was determined.

Walking intensity in PS was determined as follows: a) the volunteer was asked to choose the most comfortable speed, similar to the one used daily, that could be maintained over a long path; b) the treadmill speed was increased progressively up to a standard of 7 km.h^{-1} (or until before the volunteer feels insecure walking) and then reduced in the same pattern so that the volunteer could choose his PS in each set; c) the PS of each patient was determined by calculating the mean of PSs from two sets of recording[18].

The test battery was divided into three sections according to walking intensity as follows: preferred self-selected speed (PS), and slower and faster than the PS. Only three intensities were proposed to avoid overloading the LG. Before starting, subjects received instructions about the use of the pain visual analog scale (VAS) to quantify the intensity of pain during the test. The intensity of pain was graphically represented as a 10 cm line so that the number zero, representing the absence of pain, was on the left and the number 10, representing the worst possible pain, was on the right[19].

Carvalho AR, Bertor WR, Abico RM, Brandl L,
Mattjie TF, Andrade A and Peyré-Tartaruga LA

During the time they walked on the treadmill, in the three sections, minute by minute, the volunteer was asked to score the pain experienced at that exact moment through the VAS making a total of six samples: from moment zero immediately before the beginning of walking until the moment five at the end of the last walking minute. The valid painful intensity of each section for statistical analysis was the arithmetic average of all measures of that section.

In the first section, subjects walked at their PS. The order of the next two sections was randomly selected so that in one case, the volunteers walked 0.5 km.h^{-1} slower than that in the PS and in the other, the volunteers walked 0.5 km.h^{-1} faster than that in the PS. In each section, the subjects walked for five minutes.

This study followed the principles embodied in the Declaration of Helsinki and was approved by the Institutional Ethics Committee on Human Research and classified as observational, expost facto, exploratory-descriptive, transversal study. All the volunteers in this study signed a free informed consent form (FICT) before participation.

Statistical analyses

For statistical analysis, we used the SPSS 15 software. Data normality was tested by the Shapiro-Wilk test. The inter-group comparisons for sample data characterization and walking speed were done by applying unpaired t-test. The correlations were determined by Kendall´s Tau test. The correlation strength was interpreted by the following score: very low (r value<0.2), low (r value between 0.2 and 0.39), moderate (r value between 0.4 and 0.69), high (r value between 0.7 and 0.89), very high (r value between 0.9 and 1). For all statistical tests, we adopted $\alpha=0.05$.

RESULTS

The sample consisted of 21 volunteers (CG/n=10; LG/n=11) and statistical differences were not found in age and in anthropometric characteristics between groups: age (year) CG 37.7±6.4/ LG 43.6±10.6/T(19)= -1.525; p=0.144; height (cm) CG 177.3±8.0/LG 165.5±10.1/T(19)=1.757; p=0.095; body mass (kg) CG 73.3±10.0/LG 72.1±15.8/T(19)=0.189; p=0.852; lower limbs (in meters) CG 0.90±0.05/LG 0.84±0.08/T(19)=1.863; p=0.078. Median length of LG chronicity pain was 10 years, with the lowest value of one year and the highest 30 years.

Descriptive statistics for painful intensity, walking speed and level of disability variables are shown in Figure 1. Statistical differences were not found in walking speed, in each walking speed intensity, between groups, but the level of disability and painful intensity were statistically different.

Painful intensity in LG in the last two months previous to the collection was 6.8 ± 1.1. Average values of pain observed in LG, in all walking speed intensities, were lower than average intensity reported in the last two months before the sampling.

Correlations can be seen in table 1. Significant correlations were observed between group versus the level of disability, group versus pain intensity, and between the level of disability versus pain intensity. However, statistical correlations were not found between walking speed and other variables.
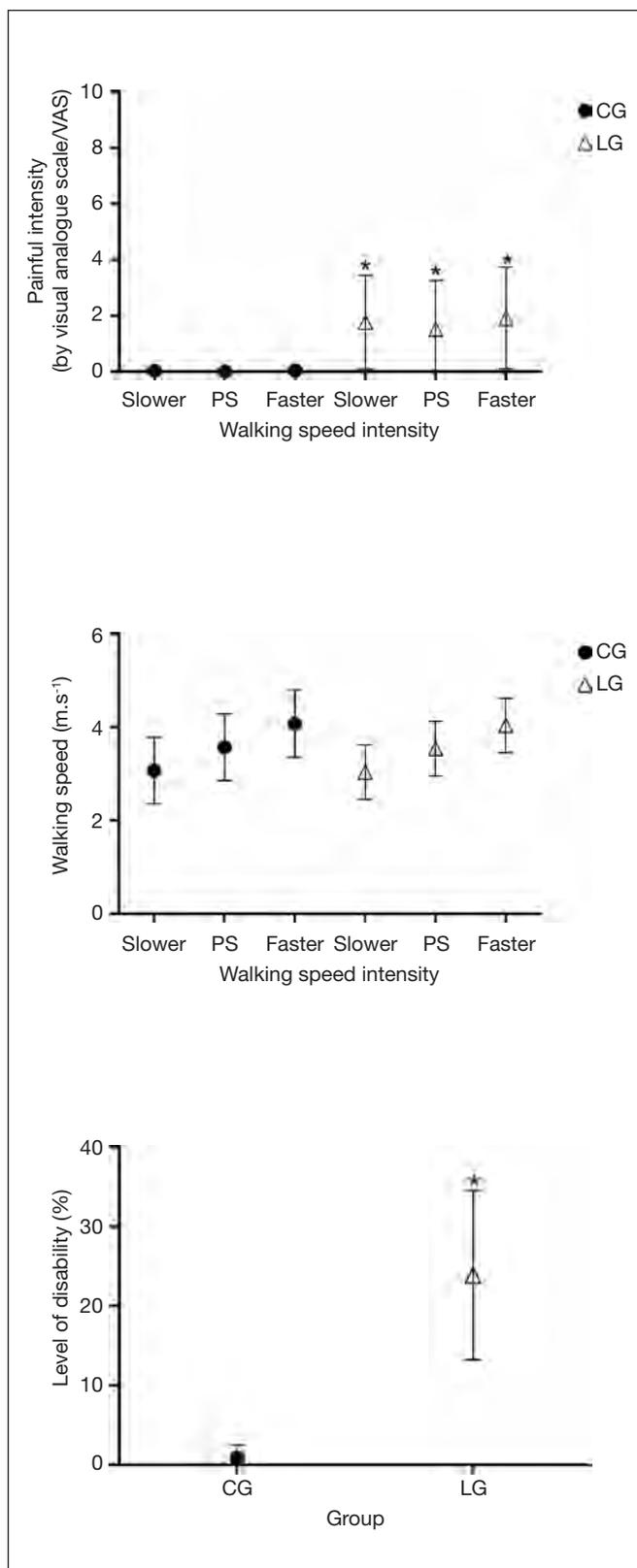
Figure 1. Descriptive statistics (median, minimum and maximum values) for variables painful intensity, walking speed and level of disability. Walking speed 0.5 km.h^{-1} slower than preferred self-selected speed (SLOWER), preferred self-selected speed (PS), speed 0.5 km.h^{-1} faster than preferred self-selected speed (FASTER), visual analog scale (VAS), control group (CG), lumbar group (LG). *The show statistical difference with regard to CG at same walking speed intensity.

Table 1. Correlation among group, painful intensity, level of disability and walking speed

Pairs of Correlation			Correlation (R)	Significance (P-value)	Strength
Group	X	Painful intensity in SLOWER	0.638	0.001*	Moderate
		Painful intensity in PS	0.548	0.008*	Moderate
		Painful intensity in FASTER	0.638	0.001*	Moderate
Level of disability	X	Painful intensity in SLOWER	0.498	0.004*	Moderate
		Painful intensity in PS	0.421	0.020*	Moderate
		Painful intensity in FASTER	0.486	0.005*	Moderate
Level of disability	X	Group	0.780	<0.001*	High
Group	X	Walking speed in SLOWER	-0.400	0.832	-
		Walking speed in PS	-0.400	0.832	-
		Walking speed in FASTER	-0.400	0.832	-
Level of disability	X	Walking speed in SLOWER	-0.095	0.573	-
		Walking speed in PS	-0.095	0.573	-
		Walking speed in FASTER	-0.095	0.573	-

Note: Walking speed 0.5 km.h^{-1} slower than preferred self-selected speed (SLOWER), preferred self-selected speed (PS), speed 0.5 km.h^{-1} faster than preferred self--selected speed (FASTER). *Statistical significance.

DISCUSSION

The aim of his study was to correlate walking speed with pain perception, the level of disability and the condition of having or not chronic nonspecific low back pain (group). However, the hypothesis of the study was not confirmed. Pain perception, level of disability and even low back pain did not modify the walking ability. Painful intensity indicated by the volunteers of the LG during the tasks of walking on a treadmill was low when it was compared to pain intensity in the last two months. It should be informed that the use of medications which, by whatever means, may relieve or even eliminate pain was not controlled in this study, and we considered it as a study limitation.

In fact, two LG volunteers reported, informally, having used analgesics/anti-inflammatories several days before the collection period and both showed no pain during the walking tasks at different effort intensities, though disability scores had been 8% for one and 32% for the other, the latter being the highest score of disability of LG. We decided not to exclude volunteers who had reported using medication for it being a common behaviour among these patients and that decision was reinforced by the finding of a study that estimated the size of the effect of several therapeutic approaches in nonspecific low back pain compared to the condition without treatment, in which the use of nonsteroidal anti-inflammatory drugs showed only a moderate effect on the condition of chronic low back pain[20].

Another important contribution that may help explaining why LG volunteers presented lower pain levels during the experimental tasks is the effect of attention demands on pain aspects. Behavioral theories and neurobiology suggest that the attention demand favours the information process related to pain, however, compared to multiple stimuli, the purpose of achieving an objective often hinders the achievement of another simultaneous objective. Thus, cognitive tasks that generate distraction are associated with lower pain levels and reduction in brain activity related to pain[21]. Also, moderate intensity exercise could significantly attenuate the attention demand in relation to rest and high-intensity exercise[22].

From the findings of the two afore mentioned studies[21,22] it may be suggested that walking could compete with painful information. Walking was considered, in this study, as moderate-intensity activity, in the sense that it was intended to simulate the intensity performed by volunteers in their daily activities. As such, walking on a treadmill and the task of quantifying pain while walking may have contributed to decreasing pain perception and may explain the difference between the average pain intensity corresponding to the two months prior to the study and pain intensities recorded during the collection.

A high correlation was also observed between the group effect and the level of disability, with the lumbar group showing higher levels of disability. Such observation is consistent with findings from other studies[9]. Regarding those, although there was a moderate correlation of low back pain with disability and with catastrophizing, the correlation between disability and catastrophizing was strong and the latter accounted for 28% of disability while the severity of pain accounted for only 3%[23]. This reinforces the suggestion that psychosocial aspects significantly contribute to the clinical condition and that there is a possible link between these psychosocial factors and physiological changes that lead to recurrence of the painful condition.

A systematic review study, which used only longitudinal delineation research, evaluated the clinical course of pain and disability among patients with acute nonspecific low back pain (less than 12 weeks) and persistent (more than 12 weeks but less than 12 months). Authors concluded that the evolution of pain and disability was similar and without significant differences among those with acute low back pain. However, in those with persistent pain, the clinical manifestation of pain was more apparent than the disability[24], though it is likely, for this group of patients, to have moderate levels of pain and disability in a period of one year.

The level of disability being correlated with both the group effect (patients with low back pain with higher disability levels) as well as painful intensity (volunteers with higher disability levels reported greater pain perception), it was expected that such relationships could influence the speed in which volunteers walked on the treadmill. However, contrary to what would have been expected, the speed performed did not correlate with any of the variables measured in this study, traditionally considered relevant in cases of chronic low back pain[15]. Perhaps the absence of correlation is because patient perceives and quantifies the impact of chronic low back pain in a different and independent way of motor and kinematic changes that the syndrome causes on physical dimension.

The level of disability in this study was measured by self-reported instrument type. Some authors[25] argued that self-reported disability and functional capacity measurements are moderately related. In their research, these authors used self-reported disability evaluations in addition to ones based on performance tests, which involved a walking test. They concluded that both disability assessment methods are influenced by different patient characteristics. Self-reported measurements are more influenced by psychological conditions than those based on the performance. Corroborating this idea, other researchers have observed in a sample of chronic low back pain features of significantly worsened mood in relation to those without low back pain, but no difference in the Six-Minutes Walk test[26].

Though the tests used to measure the impact of low back pain on people's performance and quality of life may help orient health professionals, such tests don't always reflect the multiplicity of influencing factors that affect pain conditions. In fact, personal goals of the evaluated person and the discrepancy between what is important for the patient and what is being evaluated can have implications on results[24]. Similarly, specific performance tests, such as the walking test, may not reflect the limitations in other activities. Thus, it is recommended that more sensitive tests to the distinct needs of patients are more appropriate[24,27].

According to a study[28], whose sample was composed of patients with lumbar spinal stenosis, and considering conceptual differences between capacity (individual's ability to perform a given task or action in a controlled setting) and performance (activities performed by an individual on a day to day basis in the context of their own life), as proposed by the International Classification of Functioning, Disability and Health, we can observe that an improvement in walking capacity is not necessarily accompanied by gains in walking performance. Clinical evaluation by questionnaires seem mostly associated with capacity but not with performance.

Moreover, in another study, authors observed that patients with specific and nonspecific low back pain, despite lower strength levels for dorsal and lower limb muscles, did not show any worse functional performance than healthy subjects[29].

The main contribution of this study is the idea of how chronic low back syndrome can reflect in distinct manners on different etiological aspects and therefore the need to identify the effects caused by this syndrome specifically in each of its etiological dimensions to have a broader view of the patient and that the treatment, from this analysis, meets these specific needs. Therefore, the challenge remains as to how to recognize and assimilate therapeutic approaches and the diversity of changes that chronic low back pain triggers in the individual.

Despite a large amount of research performed to better understand what causes and/or maintains low back pain, the contradictions in the notes of these studies still predominate. Per a review[30], most the 60 articles that were registered in the Clinical Trial Registry of the World Health Organization from October 2009 retook approaches that failed to contribute to previous clinical trials. Perhaps this shows the need for continuous investigation on the topic, for it is a highly prevalent syndrome that remains largely unexplained.

CONCLUSION

We conclude that the walking speed performed was not influenced by chronic nonspecific low back pain and level of disability.

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Pain evaluation in patients under chemotherapy: application of McGill pain Questionnaire

Avaliação da dor em pacientes em tratamento quimioterápico: utilização do questionário McGill

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ABSTRACT

BACKGROUND AND OBJECTIVES: Cancer pain is common in patients under chemotherapy and there is the need for a multiprofessional therapeutic plan, especially for nursing assistance, in the attempt to control it. This study aimed at evaluating qualitative pain characteristics of cancer patients under chemotherapy, by means of the McGill Pain Questionnaire.
METHODS: This is a quantitative, descriptive and cross-sectional study made up of 23 participants under chemotherapy with cancer pain. Data were collected by means of McGill Pain Questionnaire in a High Complexity Assistance Unit of a city of Minas Gerais.
RESULTS: Most participants were females, Caucasian, with basic education, affected by more advanced breast cancer. Burning and sore were the most prevalent descriptors in sensory pain category. Among affective descriptors, tiresome and sickening were the most prevalent. Troublesome pain has prevailed as evaluative characteristic and for miscellaneous descriptors, most prevalent were radiating and nauseating.
CONCLUSION: Scales to evaluate qualitative pain aspects favor nursing assistance, providing tailored assistance aimed at the complaint of each patient. Their competences allow the use of this tool aiming at increasingly qualifying its practice, thus improving quality of life of patients or, at least, decreasing their distress.
Keywords: Cancer, Evaluation in Nursing, Nursing, Pain, Pain measurement.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor oncológica é uma queixa comum em pacientes em quimioterapia e há a necessidade da elaboração de um plano terapêutico multiprofissional, em especial para a assistência do enfermeiro, na tentativa de controlá-la. Este estudo teve como objetivo analisar as características qualitativas da dor de pessoas com câncer em tratamento quimioterápico, por meio do Questionário de Dor de McGill.
MÉTODOS: Estudo quantitativo, descritivo, transversal, composto por 23 participantes em tratamento quimioterápico com queixa de dor oncológica. A coleta de dados ocorreu por meio da aplicação do Questionário de Dor de McGill em uma Unidade de Assistência de Alta Complexidade de um município mineiro.
RESULTADOS: A maioria dos participantes era mulheres, brancas, com ensino fundamental, acometidas pela neoplasia da mama em estágios mais avançados. Os descritores queimação e dolorida foram os mais prevalentes na categoria sensorial da dor. Entre os descritores afetivos, cansativa e enjoada foram os mais encontrados. Dor que incomoda prevaleceu como característica avaliativa do sintoma e para os descritores miscelânea, destacaram-se dor que irradia e dá náusea.
CONCLUSÃO: O uso de escalas que avaliam os aspectos qualitativos da dor favorece o atendimento do enfermeiro, o que proporciona que a assistência seja individualizada, voltada para a queixa de cada paciente. Suas competências permitem a utilização desse instrumento com o objetivo de qualificar cada vez mais sua prática e, desse modo, melhorar a qualidade de vida dos pacientes ou, pelo menos, diminuir seu sofrimento.
Descritores: Avaliação em Enfermagem, Dor, Enfermagem, Mensuração da dor, Neoplasias.

INTRODUCTION

Cases of cancer in Brazil have been increasing in recent years, becoming a serious public health problem, mainly, due to the deficient structure of health services to meet this demand. This growth makes the professionals of the area deal with some alterations presented by patients during the treatment, being pain one of the symptoms most frequently reported[1,2]. Cancer pain is a complex symptom, where usually the patient experiences different types of pain, in varied intervals and intensity, with simultaneous sensations of acute and chronic pain and potential reduction in quality of life[3]. Many times, the suffering caused by this symptom makes patients fear it more than the disease itself[4].

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Cancer pain has multifaceted aspects, which takes into consideration not only the conditions of the disease but also the treatment, psycho-emotional and socio-economic factors, the habits of life and the experiences of each patient, becoming a challenge for the healthcare team[5].

Even in an attempt to control pain, its prevalence is high, and approximately 55% of patients experience it during cancer treatment[2]. This has led to greater attention to this symptom, especially in recent years. Despite the various methods available to manage it, the relief of pain, however, is insufficient, not reaching acceptable levels, which shows that its control is still flawed and the symptom is recurrent[6].

In this context, the assessment of cancer pain must be a priority action, involving all the multi-professional team for the qualitative measurement of this symptom, since this action helps in the choice of treatment and more complex and assertive decision making[7].

The assessment and the qualitative perception of pain in cancer patients, even having little attention in recent times[8], should be encouraged, mainly because of the variation in pain intensity, its etiology, and location[9].

In practice, pain complaint is frequent, and health professionals must be careful in its evaluation, always on the basis of scientific evidence. This approach will allow all care to be planned and provide the adequate relief of this symptom. However, professionals use only quantitative assessment methods of the pain, as the verbal numerical rating scale (VNRS), neglecting qualitative methods such as the McGill Questionnaire (MPQ), treating only the unidimensional aspects of pain during care[10].

It is pointed out that the nurse, the professional of the multidisciplinary team who is in close contact with the patient, should be trained to use multidimensional pain measurement tools for the development of the most appropriate therapeutic plan. Thus, this study aimed to analyze the qualitative characteristics of pain in cancer patients undergoing chemotherapy treatment.

METHODS

Quantitative, descriptive, cross-section study carried out from December 2015 to May 2016. The convenience sample was based on the dynamics of the healthcare service and on the characteristics of the patients in that service. Therefore, 23 patients with malignancy who received chemotherapy treatment at the High-complexity Care Unit (UNACON) of Casa de Caridade Nossa Senhora do Perpétuo Socorro - Santa Casa de Alfenas, a municipality located to the South of Minas Gerais participated in the study. The inclusion criteria were: be in chemotherapy treatment and mentally oriented; have pain; being followed by the hospital oncology sector and be 18 years old or more. Those with pain in the terminal stage of the disease were excluded.

MPQ was applied for the qualitative assessment of pain. This is a multidimensional tool that was created in 1975 by Melzack, at McGill University in Canada, and translated to Portuguese and validated in 1996. The tool evaluates sensorial, emotional and painful phenomenon qualities being one of the world's most used questionnaires in practice and in qualitative assessment of cancer[11,12].

MPQ is composed of four groups of descriptors (sensorial, emotional, evaluative and miscellaneous), in a total of 78 words. These four groups are organized into 20 subgroups according to the pain sensation. Subgroups from 1 to 10 refer to the sensorial characteristic of pain, subgroups from 11 to 15 to emotional characteristics of the pain symptom, subgroup 16 refers to the evaluative dimension of pain, and the other subgroups (17 to 20) comprise of miscellaneous descriptors. Each of these subgroups contemplates 2 to 6 similar descriptors, but differing in magnitude[11].

In this study, the tool was applied verbally by a trained surveyor and participants were guided to choose the word that better represented their pain, with the possibility of choosing only one word or none for each subgroup. In addition to responding the questionnaire, participants were characterized by means of an instrument elaborated by the surveyor who assessed the socio-economic variables and those related to the diagnosis and treatment. The stage of the disease, the chemotherapy protocol, and the medical records of the participants were analyzed to confirm the type of cancer,

This study was approved by the Research Ethics Committee of UNIFAL-MG, under the opinion number 1.330.960 and Certificate of Submission to the Ethics Assessment (CAAE) number 49341715.0.0000.5142 and with the signature of the Free and Informed Consent Term (FICT).

Statistical analysis

After collection, the data was stored and tabulated in an electronic spreadsheet and then analyzed by the Statistical Package for Social Sciences (SPSS), version 20.0 and used descriptive statistics (average, standard deviation), frequency (f) and percentages (%) with the purpose of delineating the general characteristics found.

RESULTS

Participants presented the following characteristics: 78.3% (n=18) were female and the average age was 55±9.3 years; 73.9% (n=17) of these self-declared white and 56.5% (n=13) had primary education (Table 1).

Table 1. Characterization of participants

Variables		Frequencies	%
Gender	Female	18	78.3
	Male	5	21.7
Self-declared color	White	17	73.9
	Pardo	5	21.7
	Yellow	1	4.4
Education	No education	1	4.4
	Primary education	13	56.5
	Secondary education	6	26.1
	Higher education	3	13.0

When asked about the clinical data of the disease, 52% (n=12) of the participants said they had breast neoplasm. 82.6% (n=19) had the disease in more advanced stages (stages III and IV) and 47.8% (n=11) underwent weekly chemotherapy (Table 2).

After applying the MPQ we saw that of the 78 cited descriptors, 50 have been reported by the participants, of which 26 were sensorial qualities of pain, 10 were emotional, four represented the evaluative descriptors and 10 miscellaneous descriptors. Adding all the descriptors reported by the 23 participants, it was found that the sensorial descriptors were found 104 times (mean±SD: 4.5±2.8). Emotional descriptors

appeared 40 times (1.7±1.6). Evaluative descriptors of pain were cited 19 times (0.8±0.3), while miscellaneous descriptors appeared 25 times (1±1.2). Therefore, 188 descriptors reported by participants were evaluated (8.1±5.3).

When analyzing the sensorial characteristics of the pain symptom, the *burning* descriptor was most mentioned, followed by *sore*, *jumping,* and *tugging*, as shown in table 3.

Concerning the emotional characteristics of pain, *tiring* (20%), *sickening* (20%) and *frightful* (15%) were reported more times by participants (Table 4).

The descriptor *troublesome* was the most reported to qualify pain in relation to the evaluative characteristic. The descriptors, *annoying* (n=3), *intense* (n=3) and *unbearable* (n=3) were also found in this group (Table 5).

It was also observed that when asked about the descriptors of the miscellaneous group, participants mentioned a *radiating* (20%) and *nauseating* (20%) pain as those that better represent the quality of their pain (Table 6).

Table 2. Characteristics related to clinical data of the disease

Variables		Frequencies	%
Types of cancer	Breast	12	52.0
	Lung	3	13.0
	Uterus	2	8.7
	Intestine	2	8.7
	Pancreas	1	4.4
	Melanoma	1	4.4
	Ovaries	1	4.4
	Liver	1	4.4
Cancer Stage	II	4	17.4
	III	10	43.5
	IV	9	39.1
Chemotherapy protocol	Weekly	11	47.8
	Fortnightly	2	8.7
	21-day interval	6	26.1
	28-day interval	4	17.4

Table 3. Sensorial descriptors of pain reported by the participants of the study

Sensorial quality of pain	Frequencies	%
Burning	14	13.46
Sore	11	10.58
Jumping	8	7.69
Tugging	8	7.69
Throbbing	7	6.73
Pricking	7	6.73
Pulsing	6	5.77
Sharp	4	3.85
Pressing	4	3.85
Tingling	4	3.85
Taut	4	3.85
Cramping, wrenching, aching, tender*	12▪	11.53
Flashing, lacerating, gnawing, stinging**	8▪	7.69
Quivering, cutting, itchy, smarting, dull, hurting, splitting***	7▪	6.73
Total	104	100

*Reported by three participants. **Reported by two participants. ***Reported by one participant. ▪Sum of descriptors.

Table 4. Emotional descriptors of pain reported by the participants of the study

Emotional quality of pain	Frequencies	%
Tiring	8	20
Sickening	8	20
Frightful	6	15
Punishing grueling, fearful, blinding*	12▪	30
Exhausting, cruel, wretched**	6▪	15
Total	40	100

*Reported by three participants; **Reported by two participants; ▪Sum of the descriptors.

Table 5. Evaluative descriptors of pain symptom reported by the participants of the study

Evaluative quality of pain	Frequencies	%
Troublesome	10	52.63
Annoying	3	15.79
Intense	3	15.79
Unbearable	3	15.79
Total	19	100

Table 6. The miscellaneous group descriptors reported by the participants of the study

Miscellaneous descriptors of pain	Frequencies	%
Radiating	5	20
Nauseating	5	20
Numb	3	12
Nagging	3	12
Spreading. drawing, sharp*	6▪	24
Penetrating, squeezing, tearing**	3▪	12
Total	25	100

*Reported by two participants; **Reported by one participant; ▪Sum of the descriptors.

All the 20 subcategories were cited by the participants. Of the 28 descriptors that were not reported, 16 belonged to the following subgroups: sensorial *flickering, beating, pounding, shooting, boring, drilling, stabbing, lancinating, pinching, crushing, pulling, hot, scalding, searing, heavy, rasping*). Four related to the emotional qualities of the pain symptom: *suffocating, terrifying, vicious, killing*), one describes the evaluative characteristic of pain (*miserable*) and seven were described in the miscellaneous group (*piercing, tight, cold, freezing, agonizing, dreadful, torturing*).

DISCUSSION

In the present study, cancer was most reported by white people (73.9%) and females (78.3%), who had, in general, more than seven years of education and the average age of 55 years. These data are similar to some general characteristics of the population profile in the region and the findings of other studies, only differing in the educational level that was higher[8,13]. Moreover, the age is in accordance with 77% of the population that has a diagnosis of cancer in this age bracket[14].

It is important to point out that the disparity in the socioeconomic characteristics of the population directly influence the vulnerability of the cancer diagnosis and the painful experience since it changes the way people look after care at healthcare centers and the acceptance of pain as part of the disease process[8].

The type of cancer most reported in this study was breast cancer (52%). This data is consistent with the epidemiology of cancer in Brazil, where breast cancer is the higher incidence in the female population[1].

When analyzing the data on cancer stage, it was noticed that 19 participants (82.6%) had the disease in more advanced stages (stages III and IV). This variable is crucial to know the proportions of the disease[1]. The delay in the diagnosis and in the beginning of the treatment can cause a tumor progression and more advanced stages, requiring more aggressive treatments, which generates bad prognostic and reduction in patient's survival[15].

In the context of more advanced stages, the pain symptom can be more prevalent since there is the possibility of other body structures be affected during the treatment as a result of surgery, chemotherapy or radiation therapy and the presence of metastases, which stresses the importance of evaluating this symptom qualitatively.

The antineoplastic protocols used during the treatment have varied purposes, such as cure and supportive care, and the outcome is better when applied in high doses and smaller intervals[16]. With that, 47.8% (n=11) of participants were in the weekly chemotherapy protocol, that is with short intervals between sessions in order to reduce the risk of worsening. However, this data can also be justified by the treatment of breast cancer, which involved most of the sample and, usually, includes paclitaxel in its treatment routine - an antineoplastic used in treatments of this kind of neoplasia, with weekly administration[16].

Regarding the qualitative assessment of pain, studies[12,17-19] show that there is a variation in the words used by patients to describe how they perceive their pain. Some authors[18,19] apply the MPQ dividing it into three categories: sensorial, evaluative and emotional, and thus there were variations in the interpretations of these categories. Moreover, when analyzing such studies, we notice that the size of the samples varied between 20[12,18], 75[17] and 159[19] participants, being the number of participants in the present study (23) in accordance with some studies[12,18].

When applying the MPQ, the words *burning* and *sore*, present in the sensorial category, were cited by 14 (60.9%) and 11 (47.8%) participants in this study, respectively, being the ones that presented the highest percentages. Silva et al.[19] also found in their study a great number of patients (75%) who selected the word *burning*. However, the word *sore* was not reported. In Costa and Chaves' study[17], only 30.76% described *burning*, and 34.62% characterized their pain as *sore*.

The description of *troublesome* pain (n=10), present in the evaluative category, was the third most found in this study (43.5%), in alignment with other studies[12,17-19]. Followed by *jumping* (34.8%) and *tugging* (34.8%), in the sensorial group; *tiring* (34.8%), *sickening* (34.8%) and *frightful* (26.1%), in the emotional group; *annoying* (13%), *intense* (13%) and *unbearable* (13%), in the evaluative category; and *radiating* (21.7%) and *nausea* (21.7%) in the miscellaneous category, were the most cited in this study.

In the study carried out by Barbosa et al.[12], *jumping* (11.5%) and *tugging* (8.6%) were the most reported sensorial characteristics and *intense* (27.8%) was among the most prevalent in evaluative. *Jumping* (65.38%) was also among the most mentioned words in another study[17], as well as *sickening* (76.92%) and *tiring* (73.07%). The descriptors *radiating, tugging, sickening, annoying* and *tiring* were the most prevalent in their respective categories in other studies[18,19].

In this study, the *throbbing* (30.4%) and *pricking* (30.4%) descriptors, that fall in the sensorial group, were cited seven times each, being representative also in other studies[12,18].

One of the most prevalent descriptors in this study, *nauseating*, cited by 21.7% participants, was reported by men and women. This fact did not occur in Costa and Chaves study[17], where men did not cite this descriptor even once. Moreover, several words not cited in this study, such as *flickering, beating, pounding, shooting, lancinating, gnawing, scalding*, among others, match with other studies where these words have not been found[12,17].

In this context, facing the variety of qualitative characteristics expressed by the cancer patient to describe his/her pain, the multidimensional strategy approach provides a personalized care using methods that assess pain, both in the quantitative and qualitative terms. The treatment and the evaluation of these patients should not be an incidental action. The care given to the cancer patient should be systematic as a way to ensure the treatment success, especially because it is a subjective symptom and with multiple associated factors that can vary throughout the treatment process[9].

CONCLUSION

The use of the MPQ is of great value to know the qualitative aspects of pain, which allows the nurse to provide an

individualized treatment and improve the quality of care reported by patients.

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Pain assessment tools in critical patients with oral communication difficulties: a scope review

Instrumentos de avaliação da dor em pacientes críticos com dificuldade de comunicação verbal: revisão de escopo

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ABSTRACT

BACKGROUND AND OBJECTIVES: Pain is a frequent experience in intensive care units and its assessment and handling are challenging to healthcare professionals. The objective of this study was to identify and analyze the available tools to assess pain in patients with oral communication difficulties in intensive care units.

CONTENTS: Scope review of the literature in six databases that identified four observational tools to assess pain in critical patients: *Behavioral Pain Scale, Critical-Care Pain Observation Tool, Nociception Coma Scale* and *Nociception Coma Scale-Revised*. All tools use behavior indicators of pain and only one is adapted to the Portuguese language.

CONCLUSION: The use of a valid, easy to apply instrument, with clear and straightforward descriptions is essential to assess pain in patients with oral communication difficulties in intensive care units. There are good quality tools to assess pain in intensive care units. Most tools, however, are not yet validated to the Portuguese language. Translation and validation studies are necessary so that tools with well-established psychometric properties can be available in our practice.

Keywords: Pain assessment, Critical care, Disorders of consciousness, Pain, Review.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor é uma experiência frequente em unidades de terapia intensiva e sua avaliação e manuseio são desafiadores para os profissionais de saúde. O objetivo deste estudo foi identificar e analisar os instrumentos disponíveis para avaliar a dor em pacientes com dificuldade de comunicação verbal em unidades de terapia intensiva.

CONTEÚDO: Revisão de escopo da literatura, realizada em seis bases de dados, que identificou quatro instrumentos observacionais para avaliação da dor em pacientes críticos: *Behavioral Pain Scale, Critical-Care Pain Observation Tool, Nociception Coma Scale* e *Nociception Coma Scale-Revised*. Todos os instrumentos utilizam indicadores comportamentais de dor e apenas um está adaptado para a língua portuguesa.

CONCLUSÃO: A utilização de um instrumento válido, de fácil aplicação, com descrições claras e objetivas é essencial para a avaliação da dor em pacientes com dificuldade de comunicação verbal em unidades de terapia intensiva. Há instrumentos de boa qualidade para avaliar a dor em unidades de terapia intensiva. A maior parte dos instrumentos, no entanto, não está validada para a língua portuguesa. Estudos de tradução e validação são necessários para que instrumentos com propriedades psicométricas bem estabelecidas estejam disponíveis em nosso meio.

Descritores: Avaliação da dor, Cuidado crítico, Distúrbios da consciência, Dor, Revisão.

INTRODUCTION

In the intensive care unit environment (ICU), patients are subjected to several procedures that can be painful, and not always healthcare professionals are alert to pain in these patients[1,2]. In this context, patients incapable of communicating, submitted to sedation, invasive mechanical ventilation or altered mental state pose a higher risk of untreated pain.

The International Association for Studies of Pain (IASP) recently redefined the pain concept as "an overwhelming experience associated with a real or potential tissue injury with sensorial, emotional, cognitive and social components"[3].

Pain is a subjective symptom, difficult to measure and traditionally evaluated using self-report. In sedated patients, unconscious or incapable to tell the presence and intensity of pain, it is important to have other means to assess pain, including objective indicators that can be confirmed without oral communication[4].

Several scales based on behavior indicators of pain are being applied to assess and register this symptom in critical patients[4-8] being considered important tools to assess pain in patients incapable of communicating[5].

Physiological indicators such as heart rate, blood pressure, and the respiratory rate could be used in pain assessment, but they are nonspecific elements in critical patients since they are vulnerable to multiple factors, including the effect of the drugs used in ICU[4,9].

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A study that investigated the practice related to pain assessment and management by intensivist nurses found that 98.6% of the nurses used some pain assessment tool in patients capable of self--reporting, and 37.1% indicated the use of more than one tool. However, only 45.7% used one or more tools in patients incapable of communicating[10].

Considering the lack of tools validated for the Portuguese language to assess pain in critical patients, the objective of this study was to identify and analyze the available tools to assess pain in patients with oral communication difficulty in the ICU.

CONTENTS

This is a scope of the literature review on pain assessment tools for patients with difficulty in oral communication as a result of sedation or unconsciousness, which followed the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines and of the Joanna Briggs Institute for scope reviews[11-13]. We included studies published in full in indexed journals, in Portuguese, English or Spanish, with no time limit, that described or analyzed pain assessment tools in adult patients with difficulty in oral communication, sedated, unconscious in the ICUs. Updating articles, editorials, letters to the editor and articles published only in abstract form were excluded.

Search strategy
The search was done from May to July 2016 in the Pubmed, SCOPUS, CINAHL, Web of Science, LILACS and Cochrane electronic databases. We also did manual searches of studies in the references of publications found in the digital search. A reviewer selected the studies and, in cases of uncertainty as to the eligibility of studies, a second reviewer was consulted.
For the selection of the controlled keywords, the tools used were the MeSH (Medical Subject Headings Section), from PubMed/Medline, DeCS (Describing in Sciences of the Health), from the BVS Portal, and CINAHL headings, as well as combinations of synonymous terms by means of previous readings for the selection of the non-controlled keywords, resulting in the combinations: *"intensive care units" OR "critical care" AND "persistent vegetative state" OR "consciousness disorders" OR "unconsciousness" OR "deep sedation" AND "pain" OR "pain measurement" OR "symptom assessment" OR "outcome and process assessment (health care)" AND "pain management"*.

Data selection and extraction
Initially, the articles were identified by the heading and the abstract, disregarding those that did not meet the inclusion and exclusion criteria, as well as the repeated ones. Then, the selected articles were read in full. And so we started the data extraction of eligible articles. Data extracted was about the author, year of publication, country of origin, purpose, type of study, location, sample, methodology and major findings, including the pain assessment tool used in the study and the psychometric properties evaluated.

Figure 1 shows the flowchart of the selection process of the studies, and it is based on the model proposed by PRISMA guidelines[11-13].
Of the 17 studies selected for analysis, 15 were observational, 1 was quasi-experimental, and 1 was a systematic review of the literature on pain assessment tools in sedated and unconscious patients in ICU. The search identified four observational and behavioral tools to assess pain in critical, sedated, unconscious patients or with oral communication difficulty: Behavioral Pain Scale (BPS)[4], Critical-Care Pain Observation Tool (CPOT)[5], Nociception Coma Scale (NCS)[7] and Nociception Coma Scale--Revised (NCS-R)[8]. Table 1 represents the main features related to the psychometric properties of the studied tools.

Behavioral Pain Scale (BPS)
Observational tool to assess pain, comprising of three behavioral domains: facial expression, movements of upper limbs and conformity with the mechanical ventilator. Each domain ranges from 1-4 points, and its total score ranges from 3 (no pain) to 12 points (maximum pain)[4]. BPS presents good validity and reliability in the study population. No significant correlation was found between the BPS scores and the physiological variables analyzed[2]. So far, BPS is the only scale found that went through the validation process in Brazil, receiving the name of *Escala Comportamental de Dor* (ECD), showing good internal consistency (Cronbach's α 0.8) and good criterion validity[23]. A previous study on translation and cultural adaptation for the Portuguese language (Brazil), showed good agreement among reviewers, but low internal consistency (Cronbach's α 0.501)[24].

Critical-Care Pain Observation Tool (CPOT)
Initially developed in French and later translated into the English, CPOT comprises four behavioral domains: facial expression, body movements, muscular tension and conformity with the mechanical ventilator for intubated patients or vocalization for extubated patients. Each domain ranges from 0 to 2 points, and the total score may vary from zero to 8 points[5]. It is the most widely tested tool for the psychometric properties and presents good levels of validity and reliability[15,16]. When pain was assessed immediately after the endotracheal aspiration, CPOT scores were significantly higher than at rest[16]. Arbour, Gélinas and Michaud[15] reported higher frequency of pain assessment after training the team on how to use the tool, as well as higher frequency of pain episodes, with reduction of complications in the patients of this group, indicating that the acceptance of the scale by the team is essential for the success of its implementation and use.

Nociception Coma Scale (NCS
A scale developed by Schnakers et al[7] for pain assessment in uncommunicative patients, with consciousness disorders, that contains four subscales that evaluate the motor, oral, visual and facial responses to a nociceptive stimulation. Each subscore ranges from zero to 3 points, reaching a total score that goes from zero to 12 points. It presents less sensitivity and higher specificity when compared with NCS-R[8], with a regular agreement among
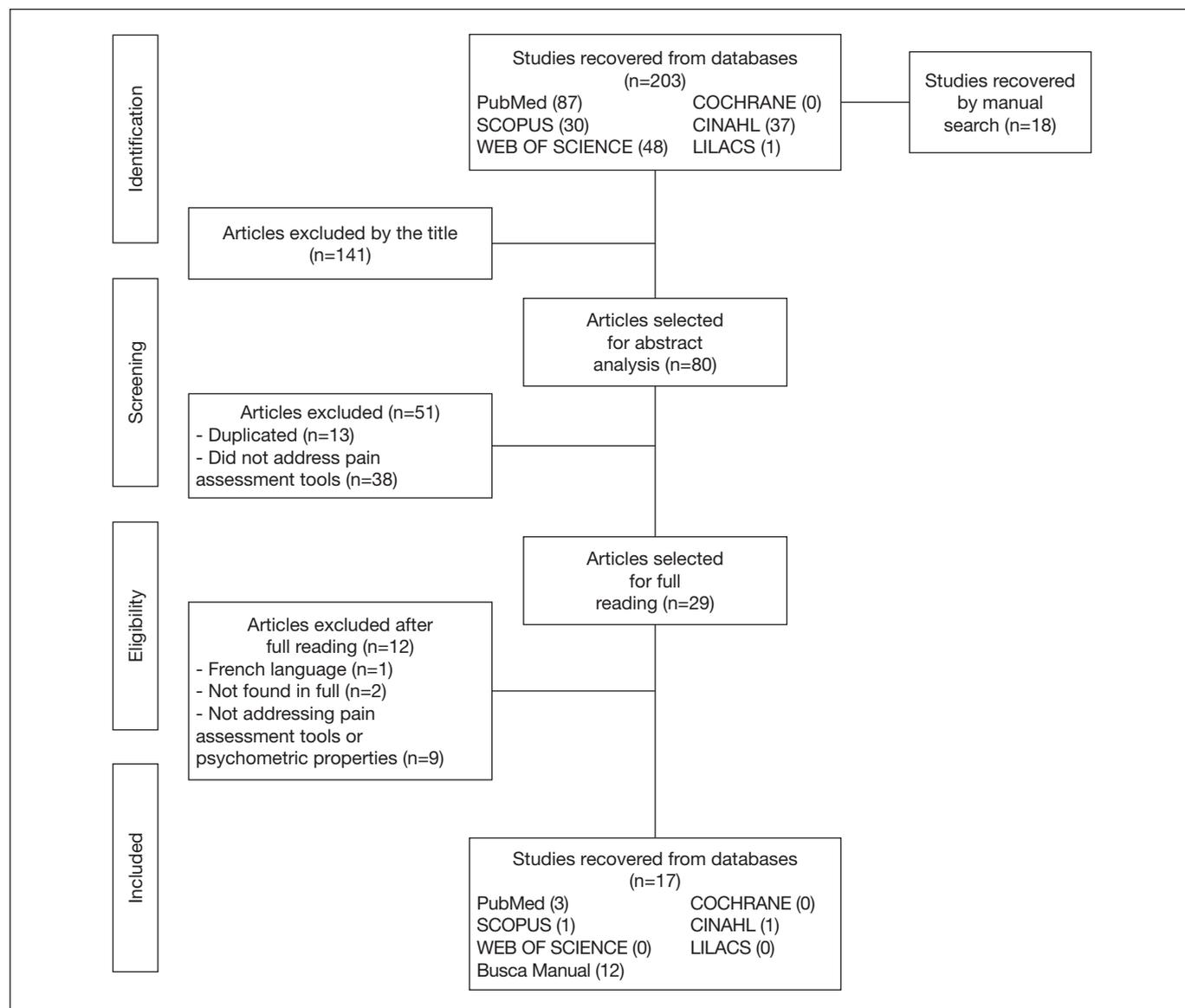
Figure 1. Flowchart of articles selection in the systematic review, adapted from PRISMA guidelines. São Paulo, 2016
PRISMA - Preferred Reporting Items for Systematic Reviews and Meta-Analysis.

surveyors[7,21]. Thus more studies are necessary to investigate the validity and reliability of the scale.

Nociception Coma Scale-Revised (NCS-R)
Revised version of the NCS, with the exclusion of the visual response domain. It was developed for pain assessment in patients with disorders of consciousness, consisting of 3 subscales that evaluate motor, oral and facial expression responses. Each subscore ranges from zero to 3 points and the total score goes from zero to 9 points[8]. It has higher sensitivity when compared to NCS[8] and higher consistency among surveyors[22].
In the analyzed studies, the main procedures identified as nociceptive in ICU were mobilization and endotracheal aspiration[25,26]. Traditional pain indicators, such as fluctuation in the hemodynamic parameters, are not always accurate measurements to identify pain in unconscious patients[4, 9,18]. Behavioral indica-

tors are more suitable for pain assessment in critical, sedated, unconscious patients or who have oral communication difficulties. A European secondary study identified facial expression, body movement and muscular tension as the main indicators of pain clinically observable in patients with severe brain injury, and found a synchronism with the ventilator only in studies that have exclusively investigated patients under mechanical ventilation[27]. At least two of these indicators are present in four tools included in this study.
BPS was first validated for use in patients deeply sedated and under mechanical ventilation [2,4]. Ahlers et al.[14] have included in their study patients under deep sedation, and sedated and conscious patients and their data indicate that BPS can be a valid pain measure in both groups due to its power of detention and discrimination of pain. The self-report of pain in conscious patients was considered by them the "gold standard" in pain asses-

163

Table 1. Description of the major characteristics of pain assessment tools in critical patients with difficulty in oral communication. São Paulo, 2016.

Tool	Authors	Key Features
BPS	Payen et al.[4]	Moderate to good internal consciousness[2,9,14], agreement among surveyors from moderate to almost perfect[4,9,14]. No significant correlation was found between the scale and the physiological variables [2].
CPOT	Gélinas et al.[5]	Discriminating properties from moderate to good; good internal consistency[1,20]; regular to almost perfect agreement among surveyors[1,5,18,19]; during the painful stimulus it presented a sensitivity of 66.7-86%, specificity of 78-83.3% and accuracy of 63%[17,18]; a significant correlation between the self-reported pain and the CPOT score during the painful procedure[5,18]. The definition of the cut-off value during the painful procedure varied between >2 and >3[17,18]. Highest CPOT scores during and immediately after a painful procedure[5,16]. After the tool implementation, there was a higher frequency of pain reassessment, of pain episodes, and lower number of complications[15].
NCS/ NCS-R	Schnakers et al.[7] / Chatelle et al.[8]	There was a significant difference in the diagnosis of vegetative state and minimum consciousness state[7,8]. With the ROC curve analysis, the following cut-off values were defined for the NCS: <2 no pain, 2-3 possible presence of pain, and ≥3 probable presence of pain. The NCS-R cut-off values were: <1 no pain, 1-2 possible presence of pain, and ≥2 probable presence of pain. NCS: moderate to good agreement between surveyors[7,21,22]; sensitivity 46-73.6%, specificity 67.3-97% and accuracy 72%[8,22]. NCS-R: good agreement among surveyors[22]; sensitivity of 73-76.7%, specificity of 74.7-97% and accuracy of 85%[8,22].

BPS = Behavioral Pain Scale; CPOT = Critical-Care Pain Observation Tool; NCS = Nociception Coma Scale; NCS-R = Nociception Coma Scale-Revised.

sment and some studies show an inversely proportional relation to the levels of pain related to BPS and the sedation dose and received analgesia.[2,4,9] BPS can be considered a valid and reliable tool applicable to critical, sedated, unconscious patients or with oral communication difficulty, especially those undergoing mechanical ventilation since one of its three domains is specifically designed for ventilation conformity.

CPOT is the most studied tool regarding validity and reliability and has well-consolidated results in the foreign literature. Unlike BPS, beyond the domain intended for patients under mechanical ventilation, it has the vocalization domain, that also encompasses extubated patients. An Iranian study conducted with nurses who, after training, used CPOT in their practice, found a positive impact on managing pain in patients with reduced consciousness level[28.] It can be used for the detection and assessment of pain and the effect of measures to manage pain in critical patients regardless of their level of consciousness[5].

Other secondary studies analyzed clinical tools for pain assessment in critical sedated patients[29,30]. The systematic review included in this study[29] found three pain assessment tools, among them, CPOT and BPS, in which BPS also presented strong evidence that support the validity and reliability of the scale, and CPOT showed a good validity of construct and moderate validity of criterion[29].

There is limited evidence about pain indicators in patients with brain injury, and these patients' response to pain can vary according to the level of consciousness[27]. Disorders of consciousness are mainly due to acquired brain injuries, and pain processing in these patients is different from those in vegetative state (VS), and those in a minimally conscious state (MCS) [31], as well as the total NCS scores, which show a significant difference between the scores of the scale in terms of diagnosis, indicating that those in MCS have a higher score than those obtained in VS[7]. VS is characterized by an unconscious reflective behavioral pattern, i.e. the autonomic functions are preserved in the absence of consciousness, and, in response to a stimulus, there are spontaneous eye opening

or reflexes behaviors not related to the environment[31]. MCS is characterized by a fluctuating conscious behavioral pattern in which patients may exhibit emotional responses and targeted behavioral responses[31].

Although NCS and NCS-R require more studies on their validity and reliability, Chatelle et al.[32] tried to identify which brain regions have correlation with the total NCS-R scores using positron emission tomography in patients with disorders of consciousness, indicating a positive correlation between the NCS-R scores and the metabolism on the posterior part of the anterior cingulate cortex involved in cortical pain processing. Such results interfere with the assessment of pain and in the decision-making related to its management.

The validation of any pain tool requires repeated tests of reliability, validity, and responsiveness of samples, scenarios, and observers[2]. Nurses are the major responsible professionals for assessing pain in critical patients, as well as for applying pharmacological and non-pharmacological measures to manage pain. The training of professionals to use validated tools to assess pain and the acceptance of the scale by the healthcare team provides greater quality in the assessment and management of pain in critical patients, with consequent support for decision making, shorter hospitalization period and lower costs related to health care.

CONCLUSION

A validated tool, easy to use and with clear and straightforward descriptions is essential for the systematic and standardized assessment of pain in ICU. CPOT and BPS showed good validity and reliability and included domains related to mechanical ventilation, which is often present in sedated, unconscious patients or who have oral communication difficulties. NCS-R proves to be promising in critical patients with disorders of consciousness and, although it requires further studies related to its validity and reliability, its correlation with neuroimaging data corroborate the influence of behavioral indicators in the processing and experience of pain.

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Pain and dyspnea control in cancer patients of an urgency setting: nursing intervention results

Controle da dor e dispneia de pacientes com câncer no serviço de urgência: resultados da intervenção de enfermagem

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ABSTRACT

BACKGROUND AND OBJECTIVES: To outline best practices guidelines to control pain and dyspnea of cancer patients in an urgency setting.
CONTENTS: PI[C]O question, with resource to EBSCO (Medline with Full Text, CINAHL, Plus with Full Text, British Nursing Index), retrospectively from September 2009 to 2014 and guidelines issued by reference entities: Oncology Nursing Society (2011), National Comprehensive Cancer Network (2011; 2014) and Cancer Care Ontario (2010), with a total of 15 articles. The first stage for adequate symptoms control is systematized evaluation. Pharmacological pain control should comply with the modified analgesic ladder of the World Health Organization, including titration, equianalgesia, opioid rotation, administration route, difficult to control painful conditions and adverse effects control. Oxygen therapy and noninvasive ventilation are control modalities of some situations of dyspnea, where the use of diuretics, bronchodilators, steroids, benzodiazepines and strong opioids are effective strategies. Non-pharmacological measures: psycho-emotional support, hypnosis, counseling/training/instruction, therapeutic adherence, music therapy, massage, relaxation techniques, telephone support, functional and respiratory reeducation equally improve health gains.
CONCLUSION: Cancer pain and dyspnea control require comprehensive and multimodal approach. Implications for nursing practice: best practice guidelines developed based on scientific evidence may support clinical decision-making with better quality, safety and effectiveness.
Keywords: Cancer pain, Dyspnea, Nursing interventions, Urgency service.

RESUMO

JUSTIFICATIVA E OBJETIVOS: Delinear linhas orientadoras de boa prática no controle da dor e dispneia, de pacientes com doença oncológica em serviço de urgência.
CONTEÚDO: Pergunta PI[C]O, com recurso à EBSCO (Medline with Full Text, CINAHL, Plus with Full Text, British Nursing Index), retrospectivamente de setembro de 2009 até 2014 e guidelines emanadas por entidades de referência: *Oncology Nursing Society* (2011), *National Comprehensive Cancer Network* (2011; 2014) e *Cancer Care Ontario* (2010), dos quais resultou um total de 15 artigos. A primeira etapa para um controle adequado de sintomas é uma apreciação sistematizada. O tratamento farmacológico da dor deve-se reger pela escada analgésica modificada da Organização Mundial da Saúde, com inclusão da titulação, equianalgesia, rotatividade de opioides, vias de administração, condições dolorosas de difícil tratamento e controle de efeitos adversos. A oxigenoterapia e ventilação não invasiva são modalidades de controle de algumas situações de dispneia, onde a utilização de diuréticos, broncodilatadores, corticoides, benzodiazepínicos e opioides fortes são estratégias eficazes. As medidas não farmacológicas: apoio psicoemocional, hipnose, aconselhamento/treino/instrução, adesão terapêutica, musicoterapia, massagem, técnicas de relaxamento, apoio telefónico, reeducação funcional e respiratória aumentam igualmente os ganhos em saúde.
CONCLUSÃO: O controle da dor oncológica e dispneia exigem uma abordagem compreensiva e multimodal. Implicações para a prática de Enfermagem: linhas orientadoras de boa prática, desenvolvidas com base na evidência científica podem suportar uma tomada de decisão clínica com maior qualidade, segurança e efetividade
Descritores: Dispneia, Dor oncológica, Intervenções de enfermagem, Serviço de urgência.

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INTRODUCTION

Globally, every year, there will be an additional 14 million new cases of people with cancer, and the expectation is that it will triple by 2030, also as a result of the survival[1]. Survivors continue to experience significant limitations compared to all those without a cancer history[2]. The presence of symptoms persists permanently, derived from the direct adverse effects of neoplasia, the treatment, the exacerbation and/or the development of new, recurrence-associated or a second cancer[3].

Hospitals, particularly, the emergency service, continues to be one of the most used support systems[4]. Symptoms have been studied separately. However recent studies support the need for an integrative approach. Pain, dyspnea, fatigue, emotional stress arises simultaneously, and they are interdependent. This is where the designation of symptoms *cluster* comes from when two or more symptoms present an interrelation between, taking into account that they can share the same etiology and produce a cumulative effect on the person's functioning[5]. Pain gets a particular emphasis since it is an item present in all the multiple scales of symptoms assessment, besides being the most frequent reason to seek the emergency service, and the evidence also suggests that there is a predominance of improper analgesic control in this context[6]. The incidence of the pain at the beginning of the illness trajectory is estimated at 50%, and it goes to approximately 75% in the advanced stages, which means that the survivor does not have to cope with it only as the immediate result of the treatment[5]. In an advanced stage of the disease, dyspnea is one of the symptoms that take a particular relevance, often associated with pain (about 45%), representing a symptom *cluster* driver of greater anxiety and fatigue responsible for the demand for health care, making it crucial to have serious investments to control it[3-6]. In this sense, the purpose is to highlight the guidelines for good nursing practice in pain and dyspnea control in patients with cancer in the emergency service.

RESEARCH STRATEGY

As a starting point, the following initial question was elaborated in PI[C]O format: What are the good practice guidelines (Intervention) in the control of pain and dyspnea (Outcomes) in patients with cancer (Population) in the ER Setting? The electronic database used focused on EBSCO (Medline with Full TEXT, CINAHL Plus with Full Text, British Nursing Index). The keywords were searched in the following order: [guideline OR practice guideline OR evidence-based practice OR randomized controlled trial] AND [symptoms dyspnea control OR dyspneaOR tachypnea OR cheyne-stokes respiration OR respiratory sounds OR chronic pain OR cancer pain OR breakthrough pain] AND [oncology nursing OR emergency care OR acute care OR palliative care]. The keywords were sought, retrospectively as of September 2009 to 2014, resulting in a total of 12 articles. In the inclusion criteria also encompasses the guidelines from reference entities on the subject: Oncology Nursing Society (2011), National Comprehensive Cancer Network (2014) and Cancer Care Ontario (2010). The exclusion criteria included all articles with unclear methodology, repeated in both databases (n=3), age below 18 years and date before 2009. In total, there were 15 articles, as shown in figure 1.

It was decided to follow the criteria approved by the Agency for Healthcare Research and Quality (AHRQ), expressed in the National Guideline Clearinghouse, with equally focus on oncology[7]. At the same time, complying with the rational of the National Comprehensive Cancer Network[8], in which for a safe and consistent application in clinical contexts, are only acceptable evidence levels considered to be of high quality, that is, up to 2[a] shown in table 1.

RESULTS

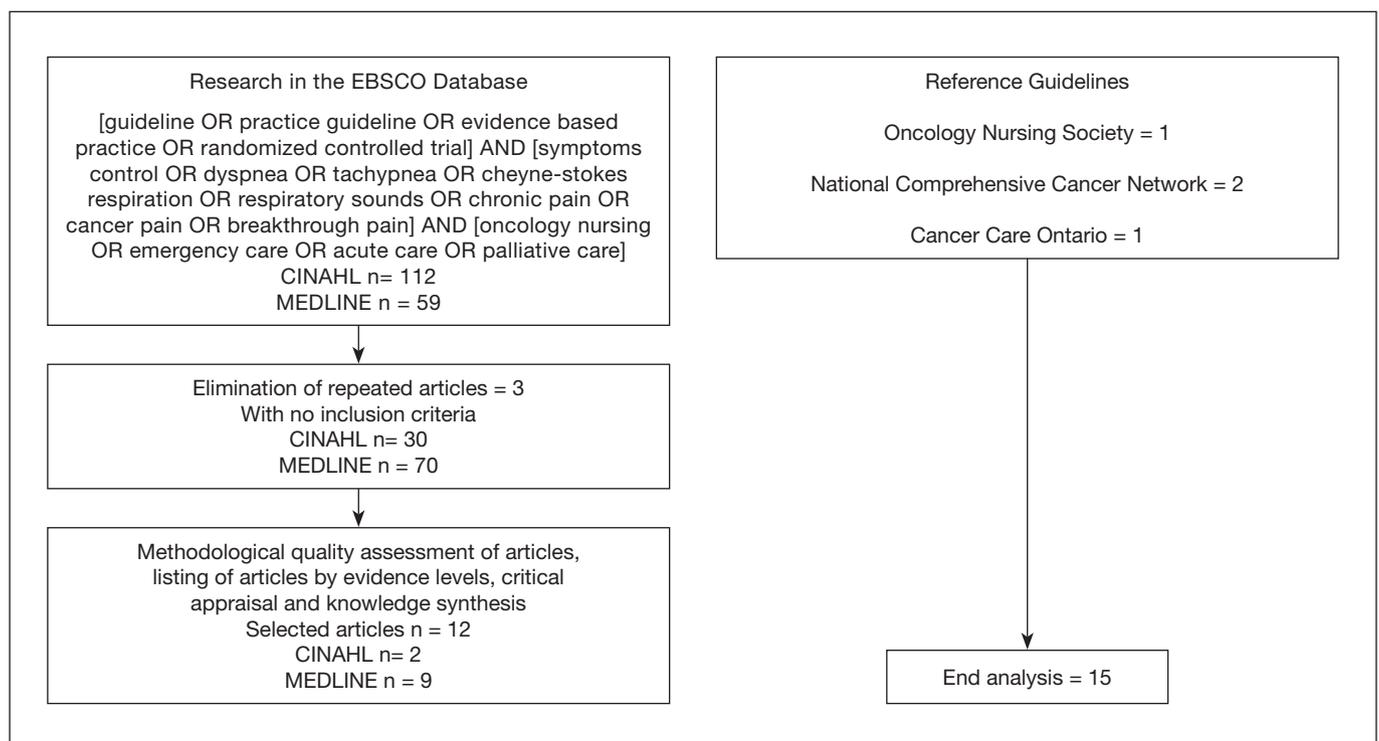First, the results referring to cancer pain are presented, subdivided in the initial assessment, pharmacological and

Figure 1. Process of research and article selection, in the period from 2009/01/01 to 2014/10/09

Table 1. Levels of evidence adapted[7]

Levels	Types of Evidence
1[a]	High-quality evidence obtained from meta-analyses, systematic reviews of randomized clinical trials (RCT)
1b	Evidence obtained from at least one RCT
2[a]	Evidence obtained from case-control studies of high quality or cohort, with a very low risk of bias and a high probability of causal relationship
2b	Evidence obtained from at least one other type of well-designed quasi-experimental study
3	Evidence obtained from well-designed non-experimental studies, with correlation studies or case studies
4	Evidence obtained from experts' opinion or recognized Identities/reputable authorities

nonpharmacological treatment, delivery path and control of adverse effects, where it is also included the recommendations found regarding nurses' education, as shown in table 2.

Also, regarding dyspnea control, the good practice begins with a structured initial assessment, which allows determining the need for oxygen therapy or noninvasive ventilation, as well as the pharmacological and nonpharmacological strategies most appropriate, as shown in table 3.

This way, it is possible to infer that, in spite of cancer pain and dyspnea present a close relationship, they require a specific and differentiated approach, with synergistic potential.

Table 2. Good practice guidelines for pain control of the person with cancer disease

Assessment of cancer pain	Use self-assessment tools	Revista's faces pain rating scale Wong-Baker faces pain rating scale Numerical rating scale Qualitative scale Edmonton symptom assessment scale Brief pain summary
	Use hetero-assessment tools	Pain assessment in advanced dementia Observer scale Portuguese version of the pain Behavioral Pain Scale
	Assess the characteristics of the cancer pain	Intensity Frequency Type of pain (somatic, visceral, neuropathic pain or mixed) Location and/or presence of irradiation Pain duration and pattern (continuous/end of dose/irruptive) Relief and exacerbation factors Response to current and rescue analgesic scheme Existence of other associated symptoms Interference in daily life activities
	Assess psychoemotional state	Degree of concern with the disease Degree of anxiety Previous diagnosis of depression and/or personality disorders Presence of suicidal ideation Presence of spiritual concerns
		Check for the existence of other comorbidities and/or addictive behaviors
		Check for the completion of previous or current cancer treatments
		Perform comprehensive analysis of the cancer pain etiology with analytical and imaging results
Pharmacological treatment of cancer pain	Mild pain (WHO Step I – NRS 1-3)	Paracetamol (max dose: 4g/day NSAIDS: ibuprofen (max dose: 3200mg) and ketorolac (15-30mg EV 6/6h) maximum of 5 days Protonic pump inhibitors or H$_2$ receptor blockers in the treatment with NSAIDS Discontinue NSAIDS if the liver function increases 1.5 of the normal limit
	Mild or moderate pain (WHO step II - NRS 4-6)	Weak opioids: codeine (≤360mg/day) or tramadol (≤400mg/day: 100mg 4x/day) PO If inadequate control, use strong opioids in small doses: morphine (≤30mg/day), oxycodone (≤20mg/day) and hydromorphone (≤4mg/day)
	From moderate to severe (WHO step III - NRS 7-10)	Severe and unstable pain it is recommended fast absorption formulas Non-opioid pain relievers should be used simultaneously with opioids in continuous pain The regular dose of strong opioids may be increased in persons with continuous pain (no ceiling dose) Transdermal Fentanyl or buprenorphine are alternatives in the difficulty swallowing or grade 4 or 5 renal failure Tapentadol is a centrally acting opioid analgesic, recommended for neuropathic pain, with an initial dose of 50-100 mg PO, with a maximum dose of 500 mg/day every 12 hours

Table 2. Good practice guidelines for pain control of the person with cancer disease – continuation

Pharmacological treatment of cancer pain	From moderate to severe refractory pain (WHO step IV – NRS 7-10)	Invasive techniques are recommended for severe pain 1) related to the innervation zones of nerve plexuses; 2) no response to opioid rotation; 3) with need for administration of higher doses of opioids; 4) significant adverse effects with conventional methods Not recommended in coagulopathy, immunosuppression and life expectation of fewer than 6 months The spinal pathways (epidural and subarachnoid) allows the neuroaxis blockade. In epidural, it is only necessary 20-40% of the systemic dose for equianalgesic. For the subarachnoid route, it should be used 10% of the opioid systemic dose The effectiveness of local administration of anesthetic agents is higher than in subcutaneous administration Morphine and local anesthetics, such as bupivacaine are the most recommended For visceral pain, it is recommended the use of sympathetic system blockade
	Titration	Performed with a supplementation of strong opioid (equivalent to 10-15% of the usual total dose) of the same drug, but always for quick action Oral or intravenous Injection is indicated for quick pain control Methadone has a variable half-life. Therefore titration is recommended during 5-7 days
	Rotation of opioids	For equianalgesic purpose, the full dose of opioids for 24 hours should be computed Take into consideration when it is not possible to achieve a satisfactory balance between pain relief and adverse effects Start with a lower dose than the one calculated by the equianalgesic tables Start only with transdermal opioids in pain reasonably controlled
	Neuropathic pain	Antidepressants and anticonvulsants are considered first-line adjuvants It is recommended the inclusion of anticonvulsants in neuropathic stabbing pain (like shock) under opioids: 1) carbamazepine (100 mg 2 x/day up to a maximum of 400 mg/day) attention only for pain in the head region up to 1200 mg/day 2) gabapentin (100 to 300 mg in a single dose at night to reduce sedation, it can be titrated to a maximum of 900mg-3600/day divided in 2 or 3 intakes) 3) pregabalin (start with a dose of 50mg 3x/day and increase to 100mg, up to a maximum of 600mg) Tricyclic antidepressants (amitriptyline) should be started at low doses 10-25mg/day up to 75mg (it must be titrated within 1 or 2 weeks to minimize side effects: sedation, dry mouth, and urinary urgency) Associate dexamethasone for bone, visceral and neuropathic pain in acute situations (4 to 8mg 2 to 3 x/day) Ketamine in low doses can produce analgesia and modulate central sensitization, hyperalgesia, and tolerance to opioids
	Visceral pain (Malignant Bowel Obstruction)	Octreotide subcutaneously or intravenously (0.1 to 0.2 mg 8/8h or 12/12h) to reduce gastrointestinal secretions Butylscopolamine and the steroids can be used in association, with food intervals and possible gastric intubation for decompression
	Breakthrough pain	It occurs when baseline pain is relatively controlled It reaches its peak at 5 minutes, with a short duration (between 30-60 min), occurring 3-4 times/day If it appears at the end of opioid half-life, one should not advance the next shot, but increase the dose of the long-acting regular opioid and/or reduce the interval between doses If the triggering stimulus is identified, it is recommended to use a prophylactic rescue dose (10-20% of the usual daily quick absorption dose), before this stimulus The need to use frequent rescue doses means that the regular dose schedule should be changed Strong opioids are recommended for 1st line treatment Opioid titration, the introduction of adjuvants and regular, timely intake are important control measures For rescue therapy, it is recommended fast-acting opioids Use the same fast-acting opioid and keep it in the long-acting formulation The efficacy of EV morphine compared to transmucosal fentanyl is superior to the 15 minutes. At 30 minutes, there is no statistically significant difference There is no equianalgesic dose for transmucosal fentanyl, thus it should start with low doses and be carefully titrated
	Delivery path	Preferably select oral administration, it reduces the incidence of adverse effects Subcutaneous administration is simple and effective for morphine, being the first choice when oral or transdermal options are not available EV may be considered when subcutaneous is contraindicated: anasarca, clotting disorders, peripheral hypoperfusion, need for infusion of high volumes or doses)

Continue...

Table 2. Good practice guidelines for pain control of the person with cancer disease – continuation

Pharmacological treatment of cancer pain	Control of adverse effects	Obstipation	Introduce laxatives during the administration of opioids Persistent obstipation requires the combination of laxatives with different modes of action Cleansing enemas or microclisteres as the last resource and in isolated situations In severe obstipation, it is recommended the exclusion of bowel obstruction In chronic obstipation, it is recommended opioid rotation Encourage rich fiber diet, adequate water intake, and moderate physical exercise
		Nausea and vomiting	Metoclopramide (10-15mg PO 3 x/day) or haloperidol (0.5-1mg PO 6-8hours) with attention to the occurrence of dyskinesia in prolonged use Identify the nausea etiology (CNS disease, chemotherapy, radiotherapy, and hyperkalemia) In persistent nausea/vomiting situation, consider the use of serotonin antagonists, like ondansetron or granisetron The use of dexamethasone and olanzapine may be considered 2.5-5mg, especially in cases of bowel obstruction
		Overdose/sleepiness/prostration	In renal failure grade 4/5 (glomerular filtration rate < 30 mL/min) administration of lower doses of opioids, followed by careful titration Adverse effects of chemotherapy, angiogenesis inhibitors: thrombocytopenia, coagulopathy, renal, hepatic and cardiovascular toxicity can be enhanced with simultaneous NSAIDS Adequate water intake to prevent the accumulation of serum metabolites, responsible for drowsiness and renal failure
		Respiratory depression	Monitor risk factors Administration of naloxone (0.4mg/1mL) in 10mL of saline solution and give 1-2mL for 30-60seg. It may be necessary to repeat since the opioids half-life is longer than naloxone (30-60minutos)
Non-pharmacological treatment of cancer pain	Individualization of nursing care Inclusion of the relevant person in the therapeutic plan Psychoemotional support Counseling/education for health self-management/health education opportunity Phone call follow-up Phone helpline Newsletter, with analgesic schema included Relaxation techniques and guided image Hypnosis Transcutaneous electrical nerve stimulation Therapeutic massage, application of heat Music therapy Nurse as case manager in therapy compliance		
Training in cancer pain	Evidence-based practice: integration of good practice guidelines Auditing and feedback on practices for cancer pain control		

NSAIDS = non-steroid anti-inflammatory drugs; NRS = Numerical rating scale.

Table 3. Good practice guidelines on dyspnea control of the person with cancer disease

Dyspnea assessment	Use the acronym O, P, Q, R, S, T, U, and V	Onset: Beginning, frequency, and duration Provoking / Palliating: relief and exacerbation factors Quality: description Region / Radiation: existence of association with other symptoms Severity: intensity Treatment: therapeutical regimen, efficacy, and adverse effects Understanding: understand the attributed etiology Values: dyspnea control objective
	Assess psychoemotional state Assess the existence of other comorbidities Use assessment tools that include dyspnea: Edmonton Symptom Assessment Scale, Hospital Anxiety and Depression Scale (HADS), Modified Dyspnea Index (MDI) Rule out the causes of undertreated dyspnea requiring pericardiocentesis, pleurodesis, thoracentesis, bronchoscopy, transfusion support or antibiotic therapy	
Oxygen therapy and non-invasive ventilation	Oxygen therapy with arterial blood gas with no hypoxemia or $SpO_2 > 90$ is not recommended in refractory dyspnea In situations of hypoxemia associated with hemoglobin <10 g/L, chronic obstructive pulmonary disease or exacerbated smoking habits, oxygen therapy can be provided, preferably through nasal mask up to 2L/min The temporary use of non-invasive ventilation (CPAP and BiPAP) may be recommended to relieve serious, reversible conditions	

Table 3. Good practice guidelines on dyspnea control of the person with cancer disease – continuation

Pharmacological strategies	The use of bronchodilators and/or diuretics in pulmonary stasis	
	Slight dyspnea (ESAS 1-3)	Opioids, with a careful titration	
	Moderate dyspnea (ESAS 4-6)	With no previous opioids	With previous opioids
		5mg of fast-acting PO morphine every 4 hours, with 2.5mg of rescue in case of refractory dyspnea after 2h	Increase 25% of the usual dose (consider the last 24h)
		3mg of SC morphine every 4 hours, with 1.5mg of rescue in case of refractory dyspnea after 1h	Rescue with 10% of the total dose of opioids in the last 24h, keeping the same pathway and dose. In oral administration, it can be repeated every 2 hours and in SC every 1 hour
		Benzodiazepines may be considered to control anxiety In COPD it may be beneficial to administer dexamethasone (8 mg/day) or prednisolone (50 mg/day) for 5 days Without COPD it may be beneficial to use of steroids for 5 days to stimulate the appetite or control pain Dyspnea accompanied by anxiety, nausea or agitation can justify the use of chlorpromazine 7.5-25 mg PO every 6 or 8 hours	
	Severe Dyspnea (ESAS 7-10)	With no previous opioids SC or EV administration of 2.5mg of strong opioid. If well tolerated, the dose can be repeated after 30 minutes	With previous opioids Administration of bolus of 10% of the total opioid dose in the last 24 hours, after performing the equianalgesic conversion from PO to SC or EV. If dyspnea persists, the dose can be increased to 25%
Nonpharmacological strategies	Control and dissociation of respiratory times Effective cough assisted training Positioning to reduce the work of breathing Apply cold therapy to stimulate the trigeminal nerve Consider the need to adopt healthy lifestyles Psychoemotional support Manage the anxiety of the patient/caregiver/family, exploring the meaning of dyspnea for the person, the disease and life expectation Relaxation and visualization exercises Consider adjustments in eating habits and water intake Education for self-management of the therapeutic regime Referral to other services/health professionals: pain care clinics, functional and respiratory rehabilitation, supportive care, mental and psychiatric health	

DISCUSSION

Pain assessment is considered the first step for an effective pain control that includes instruments of self and hetero-assessment that provides a more measurable dimension, where the person' statement is the gold standard in data collection. Pain characteristics, its influence on the psychoemotional state, on daily life activities, the existence of other comorbidities and/or addictive behaviors, previous or current cancer treatments, the analytical data and image related to the etiology of the pain are fundamental aspects in a comprehensive analysis of the person with cancer pain[8-11].

There are several studies proposing the selection of an analgesic regimen to manage cancer pain based on the intensity as described in the WHO modified analgesic ladder, which emphasizes the oral pathway as the preferred, regular prescription schemes and fixed time for pain control. The rescue doses should be added in episodes of intense pain, which appear despite the regular doses. The guidelines stress the importance of addressing the psycho-social stress, palliative intervention, and nonpharmacological strategies, being the latter aspects less valued in the articles found[9,10,12]. Ripamonti et al.[9] warn about the existence of randomized controlled trials (RCT) showing that low doses of morphine in mild to moderate pain is more effective and has fewer adverse effects when compared with the use of tramadol.

Opioids have different pharmacokinetic properties, as the speed in crossing the biological barrier, the passive and active diffusion, and yet being subject to genetic polymorphism of the individual. The success in the opioid rotation is approximately calculated by more than 50%[14] which is considered to be a useful technique in pain control that must meet the principles of equianalgesic dose[10,11,13].

Neuropathic, bone, visceral and breakthrough pain are difficult to control, and it is recommended the association of adjuvants[8-10,13]. Breakthrough pain has an oscillating prevalence between 19 and 95%, with significant impact on quality of life, being a painful condition difficult to control. At the same time, it is recognized the importance of oncology specialist nurses to increase the success of pharmacological interventions, notably through a battery of questions to establish the distinction between breakthrough and uncontrolled baseline pain, on the initial assessment[8,11].

In the control of adverse effects, the risk of opioid-induced respiratory depression is the most feared by healthcare professionals. Jarzyna et al.[15] recommends regular monitoring of the state of consciousness of the person, observing the individual,

iatrogenic, and pharmacokinetic risk factors. Gastrointestinal disorders are the most frequent adverse effects and require a multi-modal approach[8,9].

Regarding nonpharmacological strategies, patient-centric nursing care that emphasizes individualization and inclusion of a significant person improves health outcomes. Interventions directed to counseling, self-management education, training/education, phone call follow-up, health education and case management, interconnecting with other healthcare professionals and healthcare services increase treatment compliance and satisfaction with the healthcare[8,9,11,12,15]. Massage therapy, hot and/or cold therapy, positioning, hypnosis, transcutaneous electrical nerve stimulation (TENS) and music therapy are considered measures that power the pharmacological regimen[8,12].

With regards to cancer pain, audit implementation and feedback of written records in a group of 48 nurses, made it possible to increase the reporting of side effects (2-83%), the use of the pain measuring tools (22-75%) and the use of education/training strategies for self-care, including caregivers (0-47%)[16]. In the evaluation of the dyspnea, the literature suggests the use of the acronym, O, P, Q, R, S, T, U and V[17]. As for the assessment tools, it is recommended to include the Edmonton System Assessment Scale - HADS, Modified Dyspnea Index (MDI) and the validation for the Portuguese reality of the Numerical Rating Scale (NRS) for breathlessness, Modified Borg, and Chronic Respiratory Questionnaire[17]. Dyspnea etiology should be carefully investigated to determine the need for other complementary relief techniques[18].

LeBlanc and Abernethy[19] developed a study with 239 people with refractory dyspnea, in supportive care, with PaO_2>55mmHg, PCO_2<50mmHg and hemoglobin ≥10g/L on the advantages of giving or not oxygen, during 7 days, concluding that there is no significant statistical difference. Adverse effects increased in the group receiving oxygen therapy, such as xerostomia, irritation of the nasal mucosa and epistaxis. The use of non-invasive ventilation in reversible situations, oxygen therapy in situations of hypoxemia, bronchodilators, steroids, benzodiazepine, chlorpromazine, and diuretics are proved effective control measures[17-20].

In the dyspnea control, the use of strong opioids is a measure to consider, where the recommended dose varies according to the intensity and previous analgesic scheme, with or without opioids[17]. The literature does not recommend the use of nasal spray opioids or another type of drug in the treatment of dyspnea[18,20]. Nonpharmacological strategies directed to functional and respiratory rehabilitation, cold therapy, adoption of healthy lifestyle, self-management education/counseling, psychoemotional support, and relaxation/visualization exercises to control anxiety, and referral to other healthcare professionals/services provide a better control of dyspnea[17-21].

CONCLUSION

The efficacy of the pharmacological regimen and/or control of adverse effects can be powered by the simultaneous use of nonpharmacological techniques that contribute to reducing the intensity of the baseline pain and control exacerbations, improving comfort, well-being, reducing the level of anxiety, pain, and dyspnea that are results impacted by nursing care[22]. At the same time, the manifestation of a symptom rarely occurs in isolation, so both the assessment and the treatment require a comprehensive and multi-modal approach. The combination of two or more symptoms experienced at the same time can generate high levels of stress, which when undervalued or undertreated, can lead to the onset of burden symptoms. In this sense, the literature recommends the establishment of good practices guidelines for the symptomatic control, developed based on scientific evidence, for a more sustainable decision-making, where the nurse incorporates research results in his/her practice[11,12].

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Low back pain – a diagnostic approach

Dor lombar – uma abordagem diagnóstica

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ABSTRACT

BACKGROUND AND OBJECTIVES: Low back pain is a problem that affects 80% of adults at some point in life, it is among the top 10 primary causes of consultation with internists and, every year, workers are absent from work for more than seven days due to this disease, causing a great impact in productivity and economy. The objective of this study was to provide the clinician working at the primary care with an adequate approach to the patient with chronic low back pain, emphasizing the differential diagnosis of this disease.
CONTENTS: The etiological characterization of low back pain is a process that requires a propaedeutic approach that includes the clinical history, physical and complementary exams. The approach to low back pain of mechanical origin, and others less common such as those with a neuropathic component or resulting from inflammation, infection or neoplasia was developed, based on the literature.
CONCLUSION: The diagnosis of low back pain is essential, yet challenging for the primary care physician. Most patients with back pain can be treated at the primary care setting, provided that the GP has the proper knowledge to elaborate the differential diagnosis of this disease.
Keywords: Diagnosis, Low back pain, Primary care.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor lombar é um problema que afeta 80% dos adultos em algum momento da vida, está entre as 10 primeiras causas de consultas a internistas e, em cada ano, trabalhadores se ausentam de suas atividades por mais de sete dias em razão dessa doença com grande impacto na produtividade e redução da economia. O objetivo deste estudo foi fornecer ao clínico que trabalha no atendimento primário uma maneira de abordagem adequada do paciente com dor lombar crônica, enfatizando o diagnóstico diferencial dessa doença.
CONTEÚDO: A caracterização etiológica da dor lombar é um processo que exige uma abordagem propedêutica que inclua história clínica, exame físico e exames complementares. Foi desenvolvido, baseado na literatura, abordagem de dor lombar de origem mecânica, e outras menos comuns, como as que cursam com componente neuropático ou decorrentes de inflamação, infecção ou neoplasia.
CONCLUSÃO: O diagnóstico da dor lombar é essencial, porém desafiador, para o médico no atendimento primário. A maioria dos pacientes portadores de lombalgia pode ser tratado no ambiente de atendimento primário, desde que o médico assistente tenha conhecimento apropriado da forma como elaborar o diagnóstico diferencial dessa doença.
Descritores: Atenção primária, Diagnóstico, Dor lombar.

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INTRODUCTION

According to MeSH (Medical Subject Headings), chronic pain is a painful sensation lasting a few months, and may or may not be associated with trauma or disease, and persists even after the healing of the initial injury.
Back pain (BP) is one of the most common health problems in adults. It is defined as located pain and discomfort below the costal margin and above the superior gluteal line, with or without related pain in the lower limb, being chronic if it persists for three months or more[1].
BP is a problem that affects 80% of the adults at some moment in life[2], and it is among the top 10 causes of consultation with internists and, every year, 5 to 10% of workers miss more than seven days of work due to this disease[3]. A study carried out by the group of chronic non-communicable diseases of the Institute of Collective Health of the Federal University of Bahia, showed a 14.7% prevalence in the total population of Salvador, and found statistically significant differences in those older than 60 years (18.3%)[3].
Chronic back pain (CBP) is a complex, heterogeneous medical condition that includes a wide variety of symptoms[4]. Also, it is a frequent cause of morbidity and disability, being surpassed only by headache in the scale of the painful disorders affecting people[5].
In clinic practice, patients with CBP are categorized into three groups: 1) associated with a specific underlying disease; 2) with the presence of a neuropathic component, that is BP associated with an injury or disease of the somatosensory nervous system; 3) non-specific, which in most cases is of mechanical origin[6] (Table 1). It is observed that in the non-specialized primary care,

only 15% of back pain are related to a specific cause (trauma, infection, inflammation, rheumatoid arthritis, tumor, disc hernia, vasculopathy etc.), and there is no evident organic cause in 75%[7,8].

The objective of this study was to provide the GP working in primary care an appropriate approach to the patient with chronic low back pain, emphasizing the differential diagnosis of this disease.

CONTENTS

Several factors have been associated with the presence of CBP, such as being older than 30 years, male, smoking, alcohol abuse, obesity, incorrect posture, mood disorder, low social level and education, sedentarism and work activities that demand efforts with excess of flexion, rotation, vibration on the chest and carrying weight[9].

However, the approach to CBP can be difficult due to the non-existence of a trustworthy correlation between the clinical and image findings. The fact of the lumbar segment be innervated by a diffuse and interwoven network of nerves, makes it not always possible to establish with accuracy the site of the CBP origin. Thus, the etiological characterization of low back pain is a process that requires a propaedeutic approach that includes clinical history, physical and complementary exams[10].

Although there is no one defined cause for non-specific back pain, the diagnosis is frequently associated with the musculoskeletal system. Pain may be due to 1) the degenerative process of the small posterior joints, causing irritation of the spinal nerve roots; 2) the intensification of lordosis due to an increase in the curvature of the spine; 3) the weakness in the abdominal muscles that causes greater pressure on the facet joints; 4) the asymmetry of the facet joints. The clinical manifestation consists of pain in the lumbar region, of sudden or slow installation, blocking the movements and determining an attitude of rigidity of the lumbar spine. Lumbago of mechanical origin can be caused by disorders in muscles, tendons, and ligaments. Usually, it can be attributed the activities such as lifting weights and remaining seated or standing for a prolonged time. Pain is reported as a weight and worsens by the end of the day due to the activities and the physical efforts. There are no neurological signs associated, and coughing or sneezing does not exacerbate symptoms. The onset is insidious, and the patient is usually sedentary, obese, with weak muscles of the lumbar spine and abdomen, buttocks, with shortening of the hamstring muscles[11].

The myofascial pain syndrome may be present in the vast majority of patients with low back pain, either as a primary factor or as a component of muscle contraction due to the segmental reflex pain. The diagnosis is made by medical history, and the physical examination reveals the presence of trigger points (TP) in the muscles involved[12]. The main muscles involved are the paravertebral, abdominal, gluteal, piriformis, quadratus Os principais músculos acometidos são os abdominais, os glúteos, o piriforme, o quadrado lombar e o iliopsoas. Although the mechanisms of the disease are still not totally clear, it is possible that the spinal neuronal plasticity is a key factor that determines the painful hypersensitivity. Thus, it is important to approach both the local and systemic cause factors that facilitate the persistent muscle contraction such as alteration induced in the central nervous system by pain and inflammation[13]. The myofascial TP presents a local increase of prostaglandin, bradykinin, serotonin, norepinephrine, tumor necrosis factor, interleukin 1, peptide/calcitonin-related gene and substance P, and pH reduction when compared to normal controls. Thus, untreated active TP may be peripheral secondary focal points of pain, able to start, amplify and perpetuate the central sensitization and may be related to the presence of CBP[14].

Table 1. Most common causes of lower back pain[6]

Mechanics (80 to 90%)
Unknown cause – attributed to muscle tension or ligament injury (65-70%)
Disc degeneration or joint disease
Spine fracture
Congenital deformity (such as scoliosis, kyphosis, transitional vertebra)
Spondylosis
Instability
Neurogenic (5 to 15%)
Disc hernia
Spinal stenosis
Osteophyte injury of nerve root
Annular fissure with chemical irritation of the nerve root
Syndromes due to surgery failure on the spine (arachnoiditis, epidural adherence, recurrent hernia)
No mechanical conditions (1 to 2%)
Neoplasia (primary or metastatic)
Infections (osteomyelitis, discitis, abcess)
Inflammatory arthritis (rheumatoid arthritis, spondylarthropathies, reactive and enteropathic arthritis)
Paget Disease
Other (Scheuermann's disease)
Referred visceral pain (1 to 2%)
Gastrointestinal disease (inflammatory bowel disease, pancreatitis, diverticulitis)
Kidney disease (lithiasis, pyelonephritis)
Abdominal aortic aneurysm
Others (2-4%)
Fibromyalgia
Somatoform disorder
Simulation

BP investigation, however, must be directed to determine the main causes of the disease and the literature suggests that healthcare professionals need to pay attention to the red and yellow flags, that are a set of warnings for the clinical investigation and prognosis of factor[15]. Red flags indicate the possible cause of higher morbidity, while yellow flags suggest the risk of recurrence of the problem or of a worse prognosis to treatment response even when it comes to BP of mechanical origin[16].

On the other hand, despite the nomenclature, not always a red flag indicates the presence of severe disease. It emphasizes the need to differentiate a mechanical from a non-mechanical cause. Table 2 summarizes some possibilities related to clinical history data. A large number of these situations should be referred to an orthopedist or a neurosurgeon, except for CBP with no other signs of alarm, that should be referred to a multidisciplinary team.

Yellow flags are signs that may indicate recurrence of BP in addition to the functional deficit as well as absences from work. Unlike the red flags that indicate primarily physical risks, the yellow flags suggest psychosocial risk factors. Also, they can indicate that some aspect of the person's life directly interferes in pain and, therefore, requires a more detailed investigation or a more focused intervention. Yellow flags can be related to the attitudes and beliefs regarding pain, to emotions and painful behavior, to compensatory aspects, to the family, the work, the diagnosis and the treatment (Table 3).

The neuropathic component of the chronic back pain can be caused by nociceptive stimulus related to 1) nerve sprouting inside the degenerated vertebral disc; 2) mechanical compression of a nerve root, and 3) release of inflammatory mediators by the injured disc but with no mechanical involvement[17].

Thus, it is necessary to develop tools based on questionnaires, neurological examination and sensitive quantitative test to get the diagnosis of neuropathic pain. A systematic review with meta-analysis reported a high frequency around 36.6% of neuropathic component in chronic low back pain, with variation depending on the diagnosis method used between 16.7 and 54.4%[18]. In Germany, the application of PainDETECT on

Table 3. Yellow flags[15,16]

Depressive or negative mood (major risk factor for chronicity), social isolation.
The belief that pain and the maintenance of activity are harmful.
"Unhealthy Behavior" (insistence on staying home for long periods).
Previous treatment that does not comply with the best practices.
Indications of exaggeration in the complaint and hope of reward. History of excessive use of the medical certificate.
Problems at work, job dissatisfaction. Hard work with few leisure hours.
Family overprotection or little family support.

8,000 patients evaluated who reported chronic low back pain found that 37% of these patients had a painful condition with neuropathic predominance[19].

The percentage of the neuropathic component was higher in patients with typical root pain or in those with previous surgery with no satisfactory result. Another issue is that, even with intervention on patients with sciatica, the sciatic component may persist, which favors the hypothesis of central sensitization as the pathophysiological mechanism that maintains pain[20]. In a study with 622 sciatica surgery patients, 53% of them remained with sciatica after four years, and among those who resolved the sciatic component, 61% maintained the lower back pain[21]. It is possible that certain diseases that come with sciatica have greater or lesser neuropathic component (spinal canal stenosis and patients with multiple spine interventions). Also, among the existing diagnostic questionnaires, there is variation in specificity and sensitivity. The LANSS offers sensitivity ranging from 82 to 91% and speci-

Table 2. Red flags in the evaluation of low back pain and investigation strategies[15,16]

Result	Possible diagnosis				Investigation strategy		
	Cauda equina syndrome	Fracture	Cancer	Infection	CBC, CRP or ESR	X-rays	MRI
>50 years old with a history of trauma or >70 years old		X	X		X**	X	X
Fever, chills, sore next to the spine, ICU or recent skin infection				X	X	X	X*
Moderate to severe trauma		X				X	X
Pain at night or at bedtime			X	X	X**	X	X*
Motor deficit or progressive sensitive	X		X				XE
Saddle anesthesia, sciatica, weakness in the legs, urinary retention, fecal incontinence	X						XE
Unexplained weight loss			X		X**	X	X
History or suspicion of cancer			X		X**	X	X*
History of osteoporosis		X			X	X	X*
Immunosuppression				X	X	X	X*
Chronic use of corticosteroids		X		X	X	X	X*
Use of intravenous drug				X	X	X	X*
Psychoactive substance abuse		X		X	X	X	X*
Therapy failure after 6 weeks of treatment (maintenance or worsening of the picture)	X	X	X		X**	X	X*

ICU = Infection of the intestinal tract; CBC = complete blood count; CRP = reactive protein; ESR = erythrocyte sedimentation rate; MRI = magnetic resonance imaging; * Consider nuclear magnetic resonance for investigation sequence; **Consider prostate-specific antigen (PSA); E-Emergency Assessment.

ficity between 80 and 90%, while the DN4 has 83% sensitivity and specificity of 90%. The PainDETECT has 85% sensitivity and specificity of 80%. When differentiating root low back pain from axial low back pain, the StEP had 79% sensitivity and 98% specificity compared to DN4 that obtained 61% sensitivity and specificity of 73%. When compared to the results of the nuclear MRI, the StEP kept superior results with 90% sensitivity and 95% specificity versus 86 and 41% of NMRI[19]. These differences will interfere with the occurrence of neuropathic pain in chronic low back pain[22].

Another study[23] evaluated the presence of neuropathic pain applying the DN4 in patients with sciatica in an attempt to determine if the neuropathic component would be from the lumbar region or the distal part of the leg. Of the 132 patients studied, 40 had a disc hernia, 24: facet arthropathy-related spinal stenosis, 17: degenerative disc disease: 56: degenerative spine disease and two: scoliosis. Thirty patients (23%) underwent spine surgery: discectomy (n=18), chemonucleolysis (n=2), Laminectomy (n=7) and lumbar arthrodesis (n=3). Patients were classified into four groups according to The Quebec Task Force Classification of Spinal Disorders (QTFSD), being group 1 with irradiating pain to the gluteal line, group 2 with irradiating pain to the knee, group 3 with irradiating pain beyond the knee and with no neurological changes and group 4 with pain until the foot, following the distribution of the dermatome and with neurological alteration (sensory loss or alteration of reflection). In group 4, pain impaired mostly the L5-S1 path than L4. There were no differences between the demographic patterns (gender, age, race, or pain treatment) inter groups, however, as expected, the neurological change was more prevalent in group 4, as well as the higher consumption of anticonvulsants. Also with DN4, scores ≥ to 4/10 were higher in group 4, with a sensitivity of 80% and specificity of 92%. With respect to low back pain, there was a higher proportion of scores ≥ to 4/10 in group 4, and it was different in all groups. The same occurred in low back pain with irradiation, except that the scores were statistically similar between groups 2 and 3. The proportion of patients with a positive score for neuropathic pain in lower limb and negative for low back pain was 7.4% in group 2, 23.7% in group 3 and 51.8% in group 4. The number of patients with positive neuropathic pain in the DN4 assessment of low back pain was higher in the group that underwent previous surgery. This may be explained by changes resulting from the tissue healing or nerve injury at the surgery site.

Regarding the pharmacological treatment, before prescribing, the guidelines recommend that GPs evaluate the patient, including pain assessment, the functional impairment and an analysis of risks/benefits of each therapy[24].

The treatment of chronic low back pain involves several drugs. The most commonly prescribed drugs for CBP pain include simple painkillers, non-steroid anti-inflammatory drugs (NSAIDs), muscle relaxants, opioids, and antidepressants[25]. It is prudent to use painkillers for the shortest time necessary, discontinuing them when there is no result or when the patient has intolerable adverse effects. Antidepressants are part of the first-line treatment of neuropathic pain. However, its use in nonspecific CBP is still controversial.

Tricyclic antidepressants, on the other hand, can have a place on CPB treatment for patients who are able to tolerate its sedative and anticholinergic effect. Evidence points to the use of low dose of tricyclic drugs. These drugs should start with a low dose, for example, amitriptyline 10 to 25 mg at bedtime, an increase of 10 to 25 mg per week, up to 75 to 150 mg or as tolerated[26].

Selective inhibitors of serotonin reuptake, on the other hand, do not seem to be effective. Some serotonin-norepinephrine reuptake inhibitors were approved for use in diabetic neuropathy and fibromyalgia, raising the issue of the usefulness of these agents in CBP, mainly, in sciatica and in the spinal canal stenosis where the neuropathic component is present. Bupropion, Venlafaxin and Duloxetine were tested to provide analgesia for these conditions. However, there are few clinical trials on its use for CBP, with conflicting results[27-30].

CONCLUSION

The diagnosis of low back pain is essential, however challenging, for the physician in primary care. Most patients with low back pain can be treated in this environment provided the physician has the proper knowledge on how to elaborate the differential diagnosis and identify the various components of pain. Therefore, the clinical history, physical and neurological examination, the request for supplementary exams and the use of diagnostic tools are essential. This implies appropriate therapy planning, focused on CBP patients, balancing patient's expectations about the treatment outcome.

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CASE REPORT

5-Fluorouracil induced late peripheral neuropathy. Case report

Neuropatia periférica tardia induzida pelo 5-Fluorouracil. Relato de caso

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ABSTRACT

BACKGROUND AND OBJECTIVES: Peripheral neuropathy caused by chemotherapeutic drugs is today one of the major limiting factors in cancer pharmacological therapy due to its negative influence in the cancer patient's quality of life. Its incidence varies depending on the pharmacological nature of the therapy used. Peripheral neurotoxicity caused by 5-Fluorouracil was scarcely described, being characterized as rare adverse effect of this drug. The objective of this study is to report a 5-Fluorouracil induced late peripheral neuropathy case treated at the Pain Clinic, with standard care for neuropathic main.
CASE REPORT: Female patient, 62 years old, undergoing 5-Fluorouracil chemotherapy 2520mg/week in 5 cycles of 360mg/day continuous infusion to treat colorectal cancer. Three months after the end of the cycle she reported burning pain and hand and foot dysesthesia with proximal irradiation and allodynia. She was referred to the Pain Clinic 2 years after the symptoms onset. The treatment started with gabapentin and she was advised to have psychiatric follow-up and physical exercises. The Visual Numeric Scale was used to assed pain. In less than 6 months the patient reported pain improvement with values reduced from 10 to 2.
CONCLUSION: Although uncommon, peripheral neuropathy can occur as permanent toxicity due to 5-Fluorouracil chemotherapy and should be early identified and treated to improve patient's quality of life.
Keywords: Anticonvulsant, Chemotherapy, Chronic pain, Fluorouracil, Gabapentin, Neurotoxicity.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A neuropatia periférica causada por quimioterápicos é hoje um dos principais fatores limitantes do tratamento farmacológico do câncer, devido a sua influência negativa na qualidade de vida do paciente oncológico. Sua incidência varia com a natureza farmacológica da terapia utilizada. A neurotoxicidade periférica causada pelo 5-Fluorouracil foi pouco descrita, sendo caracterizada como efeito adverso raro deste quimioterápico. O objetivo deste estudo foi relatar um caso de neuropatia periférica tardia induzida por 5-Fluorouracil atendido na Clínica de Dor com tratamento padrão para dor neuropática.
RELATO DO CASO: Paciente do sexo feminino, 62 anos, submetida a quimioterapia com 5-Fluorouracil protocolo 2520mg/semana em 5 ciclos de infusão contínua de 360mg/dia para tratamento de câncer colorretal. Três meses após o fim do ciclo apresentou dor em queimação e disestesia em mãos e pés, com irradiação proximal e alodínea. Foi encaminhada à clínica de dor 2 anos após o começo dos sintomas. Iniciou-se o tratamento com gabapentina e foi orientada a fazer acompanhamento psiquiátrico e realizar exercícios físicos. Para a avaliação da dor foi utilizada a escala visual numérica. Em menos de 6 meses a paciente referiu melhora da dor com redução de valores de 10 para 2.
CONCLUSÃO: Apesar de incomum, a neuropatia periférica pode ocorrer como toxicidade permanente da quimioterapia com 5-Fluorouracil e deve ser precocemente identificada e tratada para proporcionar melhora da qualidade de vida do paciente.
Descritores: Anticonvulsivante, Dor crônica, Fluorouracil, Gabapentina, Neurotoxidade, Quimioterapia.

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INTRODUCTION

Peripheral neurotoxicity from the chemotherapy in cancer treatment is relatively common, and this effect can be considered one of the major limiting factors in the use of some chemotherapeutic drugs. Neuropathy deeply affects daily life, handling objects, eating, working, with personal hygiene and it is also associated with a great psychological distress[1].
The fluoropyrimidine antimetabolite 5-Fluorouracil (5-FU) started to be clinically used as an anticancer agent 40 years ago. Today it is commonly used as a chemotherapy component for a wide range of epithelial neoplasias[2]. Its toxicity spectrum differs according to the management protocol, and the most common adverse effects are stomatitis, diarrhea, myelosuppression and skin toxicity. Neurotoxicity is far less common (incidence of 2 to 5%)[3]. The generally described syndrome is central, with an acute brain disorder, characterized by ataxia, which can be

accompanied by muscle weakness, bilateral paralysis of the oculomotor nerve and signs of involvement of the first motor neuron. These symptoms are usually reversible with the discontinuation of the drug[2].

Peripheral neurotoxicity is common after the administration of 5-FU in combination with agents that are notably known as producers of cumulative peripheral neuropathy, the platinum-based agents (e.g.: oxaliplatin). In colorectal cancer, protocols that use 5-FU/LV (leucovorin) plus oxaliplatin are currently considered standard for first-line therapy both adjuvant and palliative[4].

Up to now, the cases of induced peripheral neuropathies associated with 5-FU as single therapy have seldom been described[5]. The objective of this study was to report a case of late and persistent peripheral neuropathy after 5-FU chemotherapy.

CASE REPORT

Female patient, 62 years old, with a history of colorectal cancer diagnosed 4 years ago. Her major complaint was burning pain in the upper and lower limbs (LL and UL). The cancer treatment was radiation therapy associated with 5-FU chemotherapy - protocol 2520 mg/week in 5 cycles of continuous infusion of 360mg/day - successful. Three months after finishing chemotherapy, she complained of intense and continuous burning pain, in the hands and feet, associated with paresthesia and allodynia. These symptoms worsened with emotional stress.

She was referred by the oncology service to the pain clinic two years after the beginning of the painful symptoms. She was very grieved and depressed. During the physical examination, she reported burning pain in the arms and legs, extending up to the shoulders and pelvis. Normal gait, strength and superficial and deep reflexes preserved in LL and UL. No signs of meningeal irritation. Paresthesia in the fingertips and allodynia regions extending to the four limbs. DN4 5 in 10 (burning, tingling, pricking and pain when brushing). The intensity of pain assessed by the visual numeric scale (VNS) was 10, maximum score. No myofascial tender points. Lumbosacral nuclear magnetic resonance (NMRI) showed evidence of small disc protrusion in L_4-L_5 and L_5-S_1 with no significant alterations.

Although not frequent, after 5-FU single therapy, we thought about the possibility of the diagnosis of chemotherapy-induced late neuropathy. Other causes of peripheral neuropathy were discarded, such as diabetes mellitus, vitamin B_{12} deficiency, autoimmune diseases, infections, and traumas.

We started the treatment with gabapentin (300mg every 8 hours, a total of 900mg/day), as well as advice to practice regular physical activities.

In the second visit, with a 2-month interval, the patient reported irregular walking practice and regular use of gabapentin, reporting 50% improvement in pain (VNS=5). She was anxious, complaining of mood fluctuations. She was referred to Psychiatry and the night dose of gabapentin was increased to 600mg (total 1200mg/day).

In the third visit, also with a 2-month interval, the patient was in good spirits, with regular use of gabapentin (300-300-600mg)

associated to fluoxetine (20mg/day) and alprazolam at night (2mg). Practicing regular water aerobics exercises and walking. In the physical exam, she presented paresthesia in hands and feet without irradiation and without allodynia (VNS=2).

The patient is in follow-up at the pain clinic, with periods of improvement and worsening of the symptoms and the emotional state. She is taking gabapentin and in psychiatric follow-up.

DISCUSSION

Peripheral neuropathy is commonly reported as a frequent complication of the 5-FU systemic combination therapy with similar platinum-based agents, showing the incidence of up to 90%[1]. However, the incidence and severity of neurotoxicity appear to be associated with the single platinum-based drug, that is, the peripheral neuropathic involvement would occur regardless of the use of 5-FU as adjuvant[2].

Moreover, the vast majority of the reported cases of neurotoxicity caused by 5-FU alone are central and reversible neuropathic conditions after treatment discontinuation[6].

In this case, probably due to these reasons, the diagnosis of persistent late peripheral neuropathy associated with 5-FU chemotherapy was long neglected, which aggravated the condition.

However, through documented bibliographic review and after ruling out other causes of peripheral neuropathy, we thought about the possibility of the case in question be a rare secondary condition to the chemotherapy used.

Argyriou et al.[7] carried out a clinical trial with 150 patients treated with the Folfox (oxaliplatin + 5-FU) or Xelox (oxaliplatin + capecitabine) protocols, followed during 18 months and comparatively evaluated for the onset of the neurotoxicity symptoms. No significant difference was observed in the incidence of acute neurotoxicity (84.4% in the Folfox group and 79.5% in the Xelox group). However, the Folfox protocol showed an increased incidence of chronic neurotoxicity compared with the Xelox (83.1% vs. 60.3%). In addition to higher incidence, patients treated with Folfox showed more intense chronic peripheral neuropathy.

These findings suggest the 5-FU participation in the development of peripheral neurotoxicity induced by combination chemotherapy[7].

In the case reported, it was observed the presence of chronic neurotoxicity with the use of 5-FU alone.

Stein et al.[3] reported two cases of patients who have developed peripheral neuropathy associated with the 5-FU therapy. Both patients underwent postoperative radiation and 5-FU in intravenous bolus on the first day and in the last 3 days of radiation. Six weeks after receiving the adjuvant chemotherapy with 5-FU + levamisole 3 doses per day for 5 consecutive days per month.

During the chemotherapy, the first patient developed pain in the legs with dorsiflexion weakness and reduction of tactile and vibratory sensitivity. Neurophysiological studies were consistent with demyelinating polyneuropathy diagnosis involving mainly the large fibers. The adjuvant therapy was discontinued, with symptoms stabilization. After 3 months, this patient had liver metastases, and the 5-FU/LV chemotherapy was reintroduced

for 5 consecutive days. In the first infusion, the patient already presented symptomatic neurological deterioration, confirmed by physical examination and neurophysiological study, being necessary to discontinue the treatment[3].

The second patient complained of pain and weakness in the LL after 6 months of 5-FU/LV monthly cycles. The neurological examination showed the absence of distal alterations in deep tendinous reflexes, but with reduced tactile and vibration sensitivity and ataxia. Neurophysiological studies showed demyelinating polyneuropathy of large fibers[3].

Werbrouck, Pauwels and De Bleecke[5] reported a case of peripheral neuropathy associated with the 5-FU chemotherapy. That patient developed late syndrome after finishing the last drug cycle. The characteristics of the neuropathy reported by Stein et al.[3] and Werbrouck, Pauwels and De Bleecker[5] are similar to the ones of the present study. It is worth mentioning that, corroborating our results, the symptoms were also irreversible, even after treatment discontinuation. This suggests a possible subclinical lesion of nerve fibers during chemotherapy.

Oxaliplatin-induced chronic neurotoxicity is well-documented and demonstrated in several studies in the literature[7]. Its prophylaxis and treatment are being studied in promising pharmacological schemes that have already been described. The patient in this study presented a satisfactory response to gabapentin, which is also used in the treatment of oxaliplatin--induced neuropathy, as described by Grothey[4]. This association allows for a comparison between the pathophysiologies responsible for each of the clinical contexts and the use of similar therapeutic schemes.

CONCLUSION

Although the neurotoxicity of 5-FU is classically associated with the central nervous system involvement, the professionals involved in cancer patients care should be attentive to a possible relation between 5-FU and a peripheral demyelinating disease.

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Potential role of thalidomide in the management of chronic pelvic pain. Cases report

Papel potencial da talidomida no tratamento de dor pélvica crônica. Relato de casos

Fábio A. Nascimento[1], Caroline Folchini[2], Pedro André Kowacs[3,4]

ABSTRACT

BACKGROUND AND OBJECTIVES: Chronic pelvic pain is a condition that lacks specific treatment and often is refractory to several therapeutic approaches. This study aims to report two patients in whom chronic pelvic pain was nearly completely controlled with thalidomide as an add-on therapy.
CASES REPORT: The response to therapy of two postmenopausal women who presented to our service with a longstanding history of refractory chronic pelvic pain secondary to interstitial cystitis is reported. Due to their uncontrolled pain and consequent poor quality of life, these women were started on thalidomide at 25 mg/day as an add-on therapy. At one-month follow-up, the patients' pain was reduced in 80% and 70%, respectively. Subsequently, their pain increased, but was again relieved with higher doses of thalidomide. Notably, this medication was well tolerated by both patients. At one-year follow-up and eleven-month follow-up (respectively), their pain has remained controlled and their quality of life is significantly improved.
CONCLUSIONS: These results suggest that thalidomide may have therapeutic value for chronic pelvic pain/interstitial cystitis. Based on previously published data, we hypothesize that suppression of TNF-alpha may be one of the mechanisms by which thalidomide controls pelvic pain. Our study may lead to a better understanding of the currently unclear pathogenesis of chronic pelvic pain. Lastly, we hope to encourage further studies to establish the efficacy and safety of thalidomide for CPP and other chronic pain conditions.
Keywords: Chronic pelvic pain, Interstitial cystitis, Refractory Pain, Thalidomide.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor pélvica crônica é uma condição que não possui tratamento específico e é geralmente refratária a várias formas terapêuticas. Este estudo teve como objetivo relatar duas pacientes nas quais a dor pélvica crônica foi praticamente controlada com a talidomida como terapia complementar.
RELATO DOS CASOS: Resposta à terapia de duas pacientes no período de pós-menopausa que compareceram ao nosso serviço com um longo histórico de dor pélvica crônica refratária, secundária a cistite intersticial. Como terapia complementar foi iniciada talidomida (25mg/dia), devido à dor sem resposta ao tratamento. No seguimento após um mês, a dor das pacientes havia reduzido em 80 e 70%, respectivamente. Posteriormente, a dor aumentou, sendo controlada com doses mais altas de talidomida. O fármaco foi bem tolerado por ambas as pacientes. No seguimento de um ano e 11 meses, respectivamente, a dor permanecia controlada.
CONCLUSÃO: Os resultados sugerem que a talidomida pode ter valor terapêutico para dor pélvica crônica relacionada a cistite intersticial. Baseados em dados já publicados, levantou-se a hipótese de que a supressão de TNF-alfa possa ser o principal mecanismo pelo qual a talidomida controla a dor pélvica.
Descritores: Cistite intersticial, Dor pélvica crônica, Dor refratária, Talidomida.

INTRODUCTION

Thalidomide was developed in 1953 as a sedative. Soon after, it was found to be analgesic and also effective in treating morning sickness of pregnancy. Its use in pregnancy resulted in the tragic figure of 8,000 children with congenital malformations, leading to the virtually complete withdrawal of this drug from clinical practice. Currently, thalidomide is used as an immunomodulatory and anti-inflammatory drug, indicated for the treatment of multiple conditions including Crohn's disease and Behçet's disease[1].
Chronic pelvic pain (CPP) refers to pain of at least six months' duration that, by definition, is severe enough to cause functional impairment or to require treatment. Its prevalence is 3.8% in women ranging from 15 to 73 years of age. Concerning its pathophysiology, it has been hypothesized that noxious stimuli, secondary to tissue damage, increase the production of several components of the "inflammatory cascade" directly affecting nociceptors. One of these substances is known as a tumor necrosis

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factor alpha (TNF alpha), a cytokine that plays an active role in the process of neurogenic inflammation and perhaps in the chronicity of pain[2]. Treatment for CPP is known to be challenging, for which reason new therapies have been investigated – especially within the last few years.

Herein, we report two patients in whom CPP was nearly completely controlled with thalidomide. Thalidomide's known effects of decreasing TNF-alpha and interleukin-12[3] serum levels may be the responsible for the great symptomatic improvement observed in reported patients – raising the hypothesis that chronic inflammation plays a key role in the pathophysiology of CPP.

This study aimed at reporting the case of two patients in whom pelvic pain was virtually controlled with thalidomide as adjuvant therapy.

CASES REPORT

A 64-year-old woman (patient 1) presented to our hospital in February 2015 with a 16-year history of severe, refractory vulvar and perineal pain, which was continuous and worsened by sitting and voiding. This pain, which was described as burning and rated as 10/10 in intensity - per visual analogue scale (VAS), did not allow patient to sit down and was significantly affecting her quality of life. She had been previously diagnosed with interstitial cystitis thus submitted to multiple therapies. These included oral medications (amitriptyline, pregabalin, gabapentin, alprazolam, fluoxetine, citalopram, methadone and morphine) and surgical procedures – intradetrusor botulinum toxin injection, presacral neurectomy, and superior hypogastric plexus neurolysis – all of which failed to control her pain.

At presentation, she was using amitriptyline (50mg/day), gabapentin (1,800mg/day), citalopram (10mg/day), alprazolam (1mg/day) and methadone (5mg) every other day. Interestingly, she also reported a history of intermittent painful oral ulceration. Despite the absence of any constitutional symptom, eye lesions, skin lesions, or genital ulceration, a diagnosis of Bechet's disease was considered. Based on the exquisite, refractory pelvic pain in association with the history of painful oral ulcers, thalidomide (25mg/day) was added to her drug regimen. At follow-up, one month later, she reported impressive pain reduction (2/10, VAS) and improvement in being able to sit. At four-month follow-up, her pain increased to 6/10 (VAS) and she reported mild somnolence as the only side effect. Thalidomide dose was then escalated to 300 mg/day. Presently, at one-year follow-up, pain is rated as 4/10 (VAS) and no other side effects developed (Figure 1) Notably, her other medications (described above) remained unaltered throughout the treatment with thalidomide. Patient's satisfaction with treatment was assessed with the Pain Outcomes Questionnaire (POQ) and and Pain Treatment Satisfaction Scale (PTS)[4]; the score was 47/50.

Similarly, a 93-year-old woman (patient 2) presented to our hospital in March 2015. This woman complained of a 4-year history of severe, refractory vulvar and perineal pain, which was continuous and described as burning. Pain was rated as 10/10 (VAS) and interfering with her quality of life. She had also been diagnosed with interstitial cystitis, thus submitted to multiple medi-
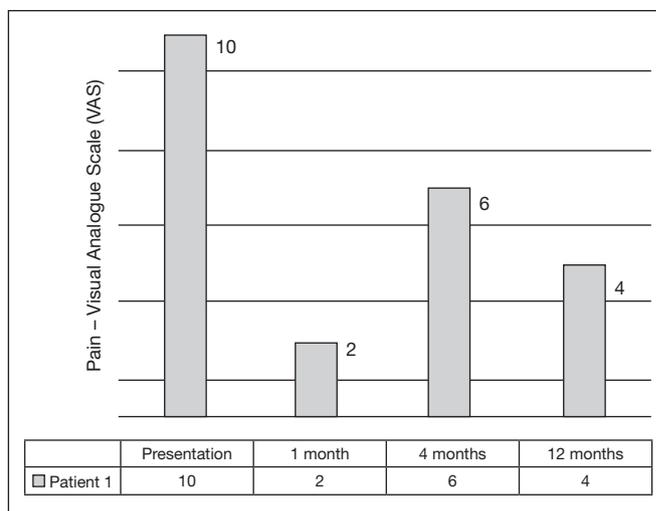

Figure 1. Patient reported pain scores based on visual analogue scale during the treatment with thalidomide (Patient 1)

cal therapies – including tramadol, gabapentin, clonazepam, and morphine – which failed to improve pain.

At presentation, she was using gabapentin (300mg/day), clonazepam (0.5mg/day), trazodone (100mg/day), and morphine (5mg/day). Thalidomide at 25 mg per day was added to her drug regimen. At one-month follow-up, she rated pain as 3/10 (VAS) and stated significant improvement in her quality of life; no side effect was reported. At six-month follow-up, her pain score increased to 5/10 (VAS); therefore, thalidomide dose was increased to 50 mg qam and 100 mg qpm Presently, at 11-month follow-up, she reports full improvement of pain (0/0, VAS) and continues side effect-free. (Figure 2) Notably, her other medications, previously described, remained unaltered throughout the treatment with thalidomide. Patient's satisfaction with treatment was also assessed with the PTS[4]; the score was 48/50.
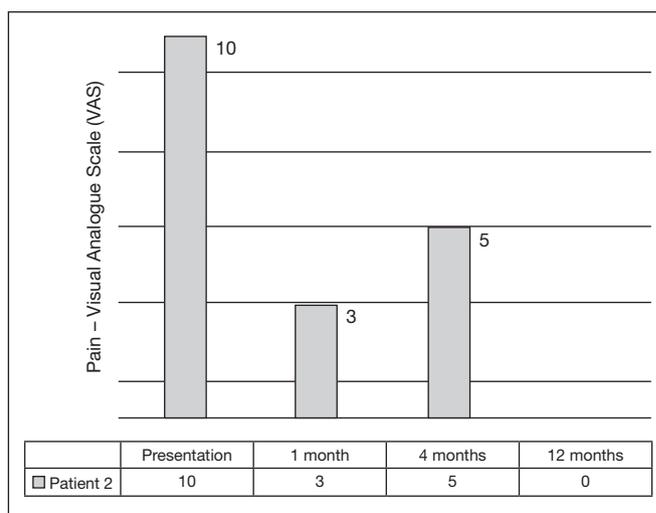

Figure 2. Patient reported pain scores based on visual analogue scale during the treatment with thalidomide (Patient 2)

Potential role of thalidomide in the management
of chronic pelvic pain. Cases report

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DISCUSSION

Thalidomide was introduced in Europe as sedative and antiemetic in the late 1950s. Approximately a decade after, this drug was withdrawn from the market due to its linkage to teratogenesis. In the last couple of decades, however, thalidomide has reemerged – mostly because of its analgesic, anti-inflammatory, immunomodulatory, and antiangiogenic properties[3,5]. Based on these features, thalidomide has been used for the treatment of several conditions ranging from autoimmune disorders (e.g. Crohn's disease and rheumatoid arthritis), skin diseases (e.g. chronic pruritus, lepromatous leprosy, cutaneous lupus, Behçet syndrome), neoplastic diseases (e.g. multiple myeloma and melanoma), chronic pain/inflammatory conditions (e.g. complex regional pain syndrome and radiculopathic pain)[6]. Particularly concerning its anti-inflammatory and immunomodulatory capacities, thalidomide has been found to selectively reduce the synthesis and expression of tumor necrosis factor alpha (TNF-alpha). By suppressing TNF-alpha, there is a consequent decrease in various other pro-inflammatory cytokines, including interleukin 1Beta (IL-1B), interleukin 6 (IL-6) and interleukin 8 (IL-8), leading to an overall inhibition of inflammation[3].

Despite the rich literature on the use of thalidomide for the above-mentioned diseases, there is little data assessing this drug's activity in chronic pelvic pain (CPP). To our knowledge, only one clinical study has explored the effects of thalidomide in pelvic pain. This study involved ten patients with relapsing endometriosis treated with a combination of GnRH analogue and thalidomide followed by thalidomide alone. Interestingly, eight of the ten women remitted during the therapy with GnRH analogue plus thalidomide, with no relapse even when patients were solely on thalidomide[7]. The authors hypothesized that the symptom control observed in these patients was due to the antiangiogenic property of thalidomide. An experimental study originally reported inhibition of TNF-alpha-induced IL-8 production by thalidomide in human endometrial stromal cells[8]. More recently, thalidomide was evaluated in a rat model of endometriosis. This study showed that this drug was effective in treating endometriosis in rats based on pathological improvement as well as reduction in serum leukocytes and peritoneal IL-6 and VEGF[9]. These ex-perimental findings, in conjunction with the pilot clinical study described[7], suggest that thalidomide might be, in fact, a promising therapy for endometriosis/chronic pelvic pain – through antiangiogenic and/or immunomodulatory and analgesic properties. However, both of our patients were already menopaused, a finding that extends thalidomide efficacy to causes of chronic pelvic pain other than endometriosis and probably not related to its anti-angiogenic effect.

Irrespective of the exact etiology, CPP represents a major challenge to health care providers, especially because of its common refractoriness to treatment. In this context, adding an effective and well-tolerated drug, as thalidomide, to our armamentarium of pain medications would be extremely valuable. Results presented herein – our two patients' impressive pain relief response to thalidomide – suggest that this drug may have therapeutic value for interstitial cystitis/CPP. Moreover, based on our results, we hypothesize that suppression of TNF-alpha (a proved effect of thalidomide) may contribute to pain relief in patients with CPP. This hypothesis may lead to a better understanding of the currently unclear pathogenesis of CPP. Finally, we hope to encourage further studies to establish the efficacy and safety of thalidomide for chronic pelvic pain and other chronic pain conditions.

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