Original Article

Assessment of pain in chronic renal failure patients going through hemodialysis

Avaliação da dor em pacientes com insuficiência renal crônica em hemodiálise

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ABSTRACT

Objective: to assess the pain and the differences of this assessment with social, economic and clinical variables in individuals with chronic kidney disease. **Methods:** cross-sectional study, with 90 patients with hemodialysis clinics. Three instruments were used clinical/sociodemographic, visual analogue pain scale and McGill pain questionnaire. Mann-Whitney and Kruskal-Wallis U tests were used. **Results:** the most frequent kind of pain was musculoskeletal (35.6%), which was classified as moderate by using the visual analogue pain scale. In McGill's questionnaire, the most selected categories were sensory and affective, which characterize pain as acute and thin. Significant statistical differences in medians of pain were found with family income, source of income, use of analgesics/anti-inflammatories, use of acupuncture and impaired sleep. **Conclusion:** pain was a recurrent result in various regions of the body among patients with chronic renal failure.
Descriptors: Pain; Kidney Failure, Chronic; Renal Dialysis; Nursing.

RESUMO

Objetivo: avaliar a dor e as diferenças desta avaliação com variáveis sociais, econômicas e clínicas em indivíduos com doença renal crônica. **Métodos:** estudo transversal, com 90 pacientes em clínicas de hemodiálise. Foram utilizados três instrumentos: clínico/sociodemográfico, a escala visual analógica de dor e o questionário de dor McGill. Utilizou-se os testes U de Mann-Whitney e de Kruskal-Wallis. **Resultados:** o tipo de dor mais frequente foi a musculoesquelética (35,6%), classificada como moderada pela escala visual analógica de dor. No questionário de McGill, as categorias mais selecionadas foram sensoriais e afetivas, que caracterizam a dor como aguda e fina. Foram encontradas diferenças estatísticas significativas nas medianas da dor com renda familiar, fonte de renda, uso de analgésicos/anti-inflamatórios, uso de acupuntura e prejuízo do sono. **Conclusão:** a dor foi um resultado recorrente em várias regiões do corpo entre pacientes com insuficiência renal crônica.
Descritores: Dor; Falência Renal Crônica; Diálise Renal; Enfermagem.

Introduction

There are countless symptoms experienced by individuals with chronic kidney disease (CKD), after starting dialysis therapy, which can trigger several complications, including hypotension, muscle cramps, nausea and vomiting, headache, chest pain, low back pain, itching, chills and hypertension, both associated with pain[1].

Patients report that pain is one of the main symptoms, considered as an unpleasant sensory and affective experience, associated with real or potential damage to tissue, or described in terms of such damage, and each individual can feel it in a different way. It is classified as acute or chronic. Acute pain can last for minutes, days or weeks and is usually associated with infections, trauma or other illnesses and occurs when the pain stimuli end while chronic pain lasts for three or more months and is often associated with chronic illnesses or injuries with incomplete healing[2].

There is a worldwide 30-40.0% occurrence of chronic diseases in the general population, which presents a five-fold greater demand for health services[2]. In this regard, it is indispensable to evaluate pain in specific groups, including the application of pain measurement scales, in order to develop adequate interventions and potentially establish non-pharmacological therapies[3].

As pain in CKD patients is a major issue, many scales are proposed and widely used, especially the Visual Analog Scale of Pain (VAS) and McGill's pain questionnaire (MPQ)[4]. The self-report of intensity using the standard pain scale is a defining characteristic of both chronic and acute pain. However, in Brazil, these surveys are used in an unsystematic way; in other words, only in specific situations.

For that matter, one study reports that nurses and their teams have a major gap regarding the care of patients under hemodialysis. Besides requiring knowledge about the whole dialysis therapy process, the team also must be prepared to teach the patients about the disease's main complications to adapt them to their new reality, in addition to considering the family's perspective before the treatment. Still, they must be aware of the treatment's complications, making use of the educative approach and the use of alternative therapies to relieve the symptoms[5].

A qualitative study[6] carried out in Canada with nephrologist nurses in which was sought to assess the management of chronic pain, identified it as a complex phenomenon, especially in elderly patients. Still, it was found that it is necessary for nurses to analyze if this pain is associated with hemodialysis, renal failure or other comorbidities. They reported that pain management in hemodialysis requires a lot of time in the evaluation and control, being difficult to be evaluated due to the professional dimension resulting in overload. Therefore, they chose interventions simply to provide the patient with momentary comfort. In view of this study, it was possible to verify the absence of the use of instruments to measure and manage pain in a numerical and multidimensional way.

Thus, considering the limitations of the scientific literature in relation to this topic and aiming to meet the needs of patients with chronic kidney disease, it is appropriate to investigate the main characteristics of pain that affect these patients through standardized instruments considering the numerical and multidimensional form; as well as analyzing whether the chosen instruments show similarities in terms of their ability to examine pain with the associations of social, economic and clinical characteristics of these individuals.

It is recognized that studies of this type may favor that nephrologist nurses assess the characteristics of pain, the relationships with social, economic, and clinical variables related to dialysis therapy, which promotes the manifestation of pain in chronic renal failure patients[7].

The objective of the study was to analyze the pain and the differences of this assessment with social, economic and clinical variables in individuals with chronic kidney disease.

Methods

This cross-sectional, descriptive, quantitative, study. Performed in two hemodialysis clinics in the city of Fortaleza, Ceará, Brazil, between May and June of 2018. The sample consisted of patients with chronic renal failure disease who were undergoing hemodialysis treatment and fulfilled the following inclusion conditions: over 18 years old, under treatment for three or more months and with moderate pain at some moment on the VAS evaluation of pain. Patients with visual and/or hearing impairment or with psychiatric disorders were excluded.

Considering that these clinics had 116 chronic kidney patients, it was observed that 26 who did not meet the inclusion and exclusion criteria, since eight were under 18 years old, ten had less than three months of treatment, four had hearing impairment, two visual impairments and two psychiatric disorders. Thus, it investigated information from 90 chronic renal patients.

In this study, a questionnaire containing sociodemographic and disease clinical characteristics was used, the VAS and MPQ. An instrument to gather sociodemographic and clinical data was used to extract data for this study; it identified age, gender, occupation, skin color, individual and family income, number of family members, civil state, education level, religion, type of transport used and travel time to the clinic.

In this study, a questionnaire containing sociodemographic and clinical characteristics of the disease (age, sex, occupation, skin color, individual and family income, number of family members, marital status, education, religion, type of transportation used and travel time to the clinic, time of dialysis treatment, presence of pruritus or constipation, amount of water intake, average daily weight gain, impaired sleep, presence of pain, type, location and duration of pain and the use of medications or other therapies for pain relief), VAS and MPQ was used for this study.

The VAS contains calm and sad faces to express pain and a corresponding numerical grid divided from zero to two as mild, three to seven as moderate and eight to ten as intense. The participants took an average of three minutes to measure their pain on this scale[4].

The MPQ considers spatial, emotional and sensitive aspects of pain by its characterization through association of descriptors. Each descriptor has a set of other words (subgroups) for easier identification of pain. The following descriptors are used: discriminative sensorial (subgroups – 01 to 10), motivational affective (subgroups – 11 to 15), cognitive evaluative (subgroup – 16), and miscellaneous (subgroups – 17 to 20). The descriptors' numerical index is the pain's characterization, where each patient may only choose one word for each subgroup for a maximum sum of 20. The pain index is made up of the total sum of the values of the intensity descriptors and ranges from 0 to 78[4]. It should be noted that this instrument has no cut-off point to infer the level of pain.

The patients who met the inclusion conditions were personally approached by the researcher at the time of dialysis. After accepting the invitation to participate in the research, they signed the free and informed consent term, answering the data collection instruments forms in an average time of 30 minutes.

The data were analyzed by the *Statistical Package for the Social Sciences Software* – SPSS 20.0, for analysis by descriptive analysis, Mann-Whitney U and the Kruskal-Wallis tests. Thus, the Mann-Whitney U test is indicated for comparing two unpaired groups to verify whether or not they belong to the same population when they do not show normal distribution using the Kolmogorov-Smirnov test. It was checked whether there is evidence to believe that a group's values are higher than another group's values. The U test is considered the non-parametric version of the t test, for independent samples. Unlike the t test, which measure equality of means, the Mann-Whitney U analyze equality of medians. Regarding the Kruskal-Wallis test, it is a non-parametric test to verify whether samples originate from the same distribution. It is used to compare two or more samples independently of the same or different sizes. It extends the Mann-Whitney

U test when there are more than two groups.

The MPQ had two types of analysis. After the Kruskal-Wallis test, Dunn's multiple comparison test was applied, used if and only if the Kruskal-Wallis test allows to reject the null hypothesis. One approached the descriptor with higher recurrence in each category, to determine which of them better characterized the patients' pain. In the second analysis, it was evaluated whether the scale's total score or individual category score was the best at defining this population's pain. For all the tests, the associations were considered significant when p<0.05.

The study was submitted to and approved by the Committee of Ethics in Research of the Federal University of Ceará that respects the national and international norms of research that involves human beings (number 2,657,655/2018).

Results

The sample was consisted of 53 men and 37 women, with a predominance of patients in the 41-60 age group (45.6%); brownish skin color 46 (51.1%); catholics 55 (61.1%); single 46 (51.1%); an education level less than eight years of study 46 (51.1%); an income received from illness aid 45 (50.6%); and having both family 35 (35.8%) and individual (84.4%) income less than or equal to minimum wage.

Regarding the pain location, there was a higher predominance of musculoskeletal pain (35.5%), followed by chest pain (22.2%), pain at the joints (21.1%) and headache (11.1%). Less prevalent was emotional pain, being reported by only two subjects (2.2%).

The pain intensity according to the VAS was considered mostly moderate (67.8%), followed by intense (27.8%) and mild (4.4%). The pain index of the chronic kidney disease patients in dialysis, according to McGill's questionnaire, varied from 9 to 52. Moreover, only one patient showed an index score of 52, the maximum value obtained in this study.

The most frequent descriptors in the McGill's questionnaire were throbbing, twinge, needle punch, thin, a squeeze, as if it was being hooked, burning feeling, tingling, painful and sensitive. The twinge (58.8%), sensitive (57.7%) and thin (56.6%) descriptors were the ones that best described the patients' pain. In the affective category, the pain was most frequently described as exhaustive (74.4%) and nauseating (65.5%). The evaluative category shows how the pain affects the patient's life; in this study, the pain was considered disturbing (32.2%) and annoying (31.1%). In the miscellaneous category, the pain was described as "bothering" (58.8%) and pain that squeezes (40.0%). Among the four categories of McGill's pain questionnaire, the ones that best described the CKD patients' pain were the sensorial and affective categories.

Assessing pain by MPQ, there was a statistically significant difference in the variables of family income above three minimum wages and source of income (Table 1). The multiple comparison by the Tukey test indicated that, for multidimensional pain, the differences were statistically significant between patients with family income ≤1 minimum wage (x=22) and those with up to 2 wages (x=17, p=0.028), with no difference between those who had less than 1 salary and those who had 3 or more salaries (x=22, p=0.687). As for the source of income, there was a statistically significant difference between those without income (x=35) and retiring (x=19, p=0.023); as well as among those without income and who receive benefits (x=20, p=0.027). It is noted that there was no difference between the medians between the groups when evaluated by the VAS (Table 1).

There was a significant difference between the medians with pain measured by MPQ in the variables use of analgesics/anti-inflammatories and the use of acupuncture in the management of pain. Only impaired sleep showed a statistically significant difference in the medians with pain using the VAS (p=0.026) (Table 2).

Table 1 – Difference of medians between sociodemographic data and pain assessment using the Visual Analogue Scale of Pain and the McGill's Pain Questionnaire in patients with chronic kidney disease on dialysis. Fortaleza, CE, Brazil, 2018

Variables	n (%)	McGill's pain questionnaire Median (Min – Max)	p-value	Visual Analogue Scale of Pain (Min – Max)	p-value
Gender*					
Female	37 (41.1)	19 (13 - 28)	0.758	7 (6 - 8)	0.146
Male	53 (58.9)	20 (16 - 26)		6 (5 - 8)	
Age group (years)†					
18-20	1 (1.1)	27 (27 - 27)	0.707	3 (3 - 3)	0.316
21-40	21 (24.4)	18 (15 - 26)		6 (5 - 8)	
41-60	41 (45.6)	21 (15 - 30)		7 (5 - 8)	
> 60	26 (28.9)	19 (17 - 22)		6 (5 - 8)	
Civil state†					
Married	44 (48.9)	19 (15 - 25)	0.468	7 (5 - 8)	0.963
Single	46 (51.1)	21 (15 - 28)		7 (5 - 8)	
Education level (years)†					
< 8	46 (51.1)	20 (16 - 27)	0.433	7 (5 - 8)	0.47
8 - 12	31 (34.4)	22 (15 - 27)		7 (5 - 8)	
≥13	13 (14.4)	18 (16 - 20)		5 (5 - 7)	
Individual income (minimum wage)†					
≤1	76 (84.4)	20 (15 - 27)	0.890	7 (5 - 8)	0.181
2	11 (12.2)	19 (16 - 22)		6 (4 - 8)	
≥3	3 (3.3)	19 (13 - 25)		4 (2 - 7)	
Family income (minimum wage)†					
≤1	35 (35.8)	22 (17 - 28)	0.031	7 (5 - 9)	0.251
2	28 (31.1)	17 (13 - 21)		7 (5 - 10)	
≥3	27 (30.0)	22 (16 - 30)		6 (4 - 7)	
Source of income†					
Retired	38 (42.7)	19 (15 - 24)	0.049	6 (5 - 8)	0.178
No income	6 (6.7)	35 (24 - 41)		9 (6 - 10)	
Receives benefit	45 (50.6)	20 (15 - 26)		7 (5 - 8)	

*Mann-Whitney U test, †Kruskal-Wallis test

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Table 2 – Difference of medians between clinical variables and pain assessment using the Visual Analogue Scale of Pain and the McGill's Pain Questionnaire in patients with chronic kidney disease on dialysis. Fortaleza, CE, Brazil, 2018

Variables	n (%)	McGill's pain question-naire Median (Min–Max)	p-value	Visual Analogue Scale of Pain (Min – Max)	p-value
Type of access*					
Arteriovenous fistula	72(80.9)	19(15-26)	0.720	7(5-8)	0.909
Permcath	11(12.4)	22(16-29)		7(5-9)	
Catheter of hemodialysis	6 (6.7)	16(15-23)		6(5-10)	
Presence of pruritus†					
Yes	19(21.3)	20(17-26)	0.348	6(5-9)	0.73
No	72(80.9)	19(15-27)		7(5-8)	
Presence of Constipation†					
Yes	35(38.9)	19(15-27)	0.660	7(5-9)	0.927
No	57(63.3)	21(16-26)		7(5-8)	
Impaired sleep†					
Yes	62 (69.0)	18(15-25)	0.618	7(7-9)	0.026
No	28(31.0)	20(16-27)		6(5-8)	
Pain affects quality of life†					
Yes	24 (26.6)	17(14-22)	0.055	7(5-10)	0.368
No	66 (73.3)	20(16-29)		7(5-8)	
Accomplished any physical activity to reduce the pain†					
Yes	23 (25.6)	19(15-26)	0.594	7(5-9)	0.136
No	67 (74.4)	20(15-27)		7(5-7)	
Use of painkillers/anti-inflammatories for pain†					
Yes	28 (31.1)	21(16-30)	0.046	7(5-9)	0.553
No	62 (68.9)	18(15-22)		7(5-8)	
Use of acupuncture for pain†					
Yes	28 (31.1)	18(15-22)	0.046	7(5-8)	0.553
No	62 (68.9)	21(16-30)		7(5-9)	

*Teste de Kruskal-Wallis; †Teste U de Mann-Whitney

Discussion

It is essential to highlight that this study had limitations. The application of the MPQ was considered difficult for some individuals with low education, requiring to decipher some of the descriptors despite the researchers having previously been trained. The sample size is established as a limitation, since the population present in the two clinics was lower than the estimates for the sample calculation, opting for the convenience sample.

The results found in this study may contribute to the assessment and management of pain in chronic renal patients; in which it was observed that most of the pains present were musculoskeletal. Still, it was found that impaired sleep was related to this condi-

tion. Thus, interventions in machine management may be adequate to control or reduce; as well as sleep hygiene interventions may be opportune to control this pain pattern.

The characterization of pain in chronic kidney disease patients undergoing dialysis was described as a twinge, sensitive, thin, that bothers, exhaustive and annoying. The descriptor "that bothers" corresponds to the patients' evaluation of how the pain affected their life and, to confirm this interpretation, the VAS showed that this pain had a moderate intensity.

The prevailing pain affecting the CKD patients of this study was a moderate one, as was shown in another study that infer the presence of moderate to severe pain in individuals who are going through dialysis[8]. However, mild pain should not be underestimated, because pain is subjective and each individual shows different responses to pain. These results are divergent from other studies that demonstrated a situation where patients with chronic pain, who mostly used painkillers, showed an improvement of their pain in addition to the favorable development of daily life activities[9].

The nursing team must be aware of the dependency of these patients in relation to medications and point out that other non-phamarcological therapies, considered complementary or alternative, are effective in reducing pain. Study reports in several guidelines that acupuncture when used proved to be effective in reducing chronic pain.

Pain represented approximately 40.0% of the total complaints presented by the CKD patients in dialysis[10] and a large portion of these painful symptoms were due to a known pathophysiological mechanism, and can therefore be adequately treated during dialysis treatment: the musculoskeletal pain that follows cramps resulting from the quick removal of body fluids, the headaches associated with high arterial pressure, and the chest pain that occurs during the so-called reaction syndrome (formerly known as first-use syndrome) to the dialyzer[11].

In such a context, it is very important to recognize the pain picture provoked by the changes that occur in patients with CKD. These patients often experience bone alterations grouped under the term Renal Osteodystrophy, which encompasses the secondary skeletal disorders that originate from the metabolism changes in calcium and phosphorus, and the consequential bone remodulations[12]. These might provoke diffuse and progressive pains that target the spine, knees, ankles and thighs and may result in total immobility.

Another reason for bone and muscular pain is the musculoskeletal syndrome that manifests in patients who have been going through dialysis for many years and could be provoked by the deposition of amyloid and beta 2-microglobulin[10-11]. Other types of aches, such as manifestations of neuropathic pain from nerve damage, are also present; however, the intensity, incapacity, physical damage, and emotional and occupational factors related to CKD pains were not found in the national literature[13]. Therefore, there is a need to comprehend the impact of chronic pain and its consequences in the CKD population because they are frequently underestimated.

The musculoskeletal pain reported in this study was also observed in other studies as the most frequent pain. Regarding the pain evaluation using the MPQ, the sensorial and affective categories were the ones with the highest scores. This prevalence was also evident in other studies[15-16]. Moreover, it is appropriate to highlight that these categories also possess a greater number of descriptors, leading to a higher score.

The majority of the study's participants used an arteriovenous fistula. Despite not showing a statistically significant difference, it showed that the type of access with the highest pain score was permcath. Recent studies only confirm that the location and the accomplished puncture type have a close relationship with the level of pain[8]. Consequently, the nursing team must be aware of what kind of puncture will cause less pain to the patient in relation to the chosen device for dialysis therapy maintenance.

Regarding the clinical data, there was a higher prevalence of symptoms such as impaired sleep. The latter showed a statistically significant difference with pain as measured through the VAS (p<0.026). Another study found that most patients with CKD had this difficulty[17]. Therefore, the literature recommends that the individual rest from six to eight hours of sleep each night. An average less than this increases an individual's sensitivity to pain the next day[2]; therefore, the low quality of sleep may raise the levels of pain[11]. Thus, the nursing team must provide a calm and comfortable environment for these patients, making their time of dialysis a time to rest[1].

Studies accomplished inside and outside of Brazil reported that patients with chronic renal failure disease possess an individual and family income of less than or equal to minimum wage[14-16]. This research confirms this information, and when relating income to the pain scale, it is possible to see that patients with low income presented a level of pain that was higher than the ones who received more than minimum wage; therefore, showing a statistically significant difference between income and pain assessed by MPQ.

Most of the populations going through dialysis do not work, mainly because of the time spent at the hemodialysis centers and thus become dependent on government benefits or family income[15-16]. Unemployed patients possessed a higher predisposition of showing pain once the pain involves emotions, and each individual can feel it in different ways. Therefore it is proven that unemployment has a statistical relationship with pain[18].

Regarding the applied scales, it was observed that the multidimensional instrument showed statistically significant differences between variables related to income and source of income, use of analgesics and complementary therapies for pain reduction. As for VAS, there was a difference in impaired sleep. Thus, it appears that both scales did not show similar statistical differences with the studied variables. However, it is noted that the affective scale has a strong relationship with variables related to emotional concerns that directly affects the level of pain while the numerical scale was related to physiological disorders.

In this study it was also possible to observe that pain can cause physical discomfort or anxiety and depression, which often results in sleep disorders. Thus, when people unexpectedly face conical pain, they can trigger physical, emotional and social manifestations, affecting the pattern of sleep and rest, a fact that inevitably can aggravate pain in chronic kidney patients.

Conclusion

The main pains were musculoskeletal and chest pain, with a moderate intensity, described as a twinge, thin, exhaustive and disturbing. The clinical variable that showed a statistically significant difference for numerical pain was impaired sleep. When comparing the sociodemographic data with the McGill questionnaire, an average difference was revealed with the following variables: source of income, family income, use of analgesics/anti-inflammatories and use of acupuncture. It is observed that both scales were not able to relate the same variables under study.

Collaborations

Silva FLB and Santos RC contributed in the conception of the project, analysis and interpretation of the data. Melo GAA, Silva RA, Aguiar LL and Caetano JÁ were responsible for the conception of the project, analysis and interpretation of the date; redaction of the article, relevant critical review of the intellectual content and final approval of the version to be published.

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