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EVALUATION AND EFFECTIVENESS OF ANALGESIA IN PEOPLE UNDERGOING HEMODIALYSIS

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ABSTRACT

Objective: To evaluate the prevalence of chronic pain and intradialytic pain in people on hemodialysis' programs, as well as the effectiveness of analgesic therapy.

Methods: Cross-sectional and correlational study. A random sample of 183 people undergoing hemodialysis in two clinics and nephrology service in the region of Lisbon, Portugal. The Brief Pain Inventory, which analyzes the impact of pain on the person's life and Visual Analog Scale were applied to assess intradialytic pain.

Results: The sample consisted mostly of men (59.6%) of Portuguese nationality (78.7%), mean age of 59.17 years (± 14.64). Chronic pain occurs in 56.6% of people and intradialytic pain in 30.1%. The causes of chronic pain were musculoskeletal (68.7%) and pain associated with vascular access (17.2%). The location in the lower limbs was the most common (43.4%). The use of analgesics for chronic pain was high (58.2%) and rest (24.1%) and massage/relaxation (6.3%) were also used. Chronic pain relief occurred in 63% of people, reporting relief of more than 50%.

Conclusions: Musculoskeletal pain is a frequent symptom in this sample. The use of drugs in chronic pain management was the most applied strategy.

Descriptors: Chronic renal insufficiency; renal dialysis; quality of life; pain.

INTRODUCTION

Chronic kidney disease (CKD) is a major risk factor for end-stage renal disease, cardiovascular disease and premature death[1-2] and has a negative overall impact, with a high economic cost on the health system[2].

CKD is defined as decreased renal function demonstrated by glomerular filtration rate (GFR) less than 60mL/min per 1.73m^2, or markers of renal damage or both, lasting at least 3 months[3].

This health condition is classified into five stages, according to the Kidney Outcomes Quality Initiative (KDOQI) guidelines[4], which use GFR estimation thresholds and/or evidence of structural renal alterations and proteinuria. All stages of CKD are associated with increased risks of cardiovascular morbidity, decreased quality of life and/or premature mortality[2].

Chronic intermittent hemodialysis (HD) is the process of blood purification through renal replacement therapy in people with end stage renal disease which is usually performed several times a week for 3 to 4 hours in specially equipped or inpatient units[5]. This therapy implies that the person is sitting in the same position during HD time, which may lead to the onset and aggravation of musculoskeletal pain.

In a systematic literature review it was found that pain can be very prevalent and severe in people undergoing HD, reporting prevalence of pain reaching 82% and chronic pain of 92%[6], which seems to be the most common symptom in people undergoing HD, and often underdiagnosed[6-8]. In a study published in 2017, with a sample of 134 people with CKD, 69% reported pain, the most intense had musculoskeletal and cramp origin, with prevalence of 36% and 24%, respectively. In 64% of these people the pain was localized in the lower limbs[9].

Pain is not always valued as a whole and the limitations that have implications for daily activities and consequently in quality of life are not always considered[10]. The Brief Pain Inventory Short Form (SF-BPI) is the most widely used instrument for assessing the relationship between pain and performing activities of daily living, having the largest number of foreign language translations[11] and being validated in Portuguese for people with CKD undergoing HD[12].

This study aims to evaluate the prevalence of chronic pain in people undergoing HD; to evaluate the prevalence of intradialytic pain; identify associated factors and evaluate the effectiveness of analgesic therapy.

METHOD

This is a cross-sectional and correlational study. The population consists of people with CKD in HD in a hospital unit and in two units of the Dialysis Clinic in the Lisbon region, Portugal. Data collection took place between May and June 2015.

Inclusion criterion were: people on HD for at least six months and 18 years of age or older and exclusion criteria were: people with active psychiatric illness; cognitive impairment and uncompensated visual or hearing impairment.

To support the application of the selection criteria, the clinical files were used, as well as the attending physician.

Of the 253 people with CKD who met the eligibility criteria (139 in Clinic 1, 114 in Clinic 2 and 15 in the hospital unit), a sample was obtained through the randomization method of 183 people in HD (93 from Clinic 1, 78 Clinic and 12 from the hospital unit).

Interviews were conducted during the HD session by five nurses, who previously met with the principal investigator, where they explained the objectives, the instruments to be completed and how to collect the data, as well as a written script to support what was asked. The data collection instrument consisted of two parts. The first part of the profile characterization of the sample at the sociodemographic and clinical level: age, gender, nationality, education, occupation, marital status, duration of dialysis sessions, presence of hypertension and diabetes, and a second part comprised of the Brief Pain Inventory-short Scale version[12], to analyze how pain interfered in the life of the person undergoing HD, and Visual Analog Scale, to assess intradialytic pain.

The study was conducted in accordance with the standards required by the Declaration of Helsinki and was approved by the Ethics Committees of the two institutions involved (Clinic – Protocol no. 1/2015, and at the Hospital Center – Protocol no. 175/2015). All participants signed an informed consent form after being informed about the guarantee of confidentiality of their data and the right to leave the study without any risk to themselves. Consent was obtained from people who met the inclusion criteria and who agreed to participate, in other words, the entire sample.

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) software, version 24.0. Continuous variables were presented as mean and standard deviation, as well as median and interquartile range, when normal distribution was not verified. Normal distribution was verified by the Shapiro-Wilk test or by skewness and kurtosis. Categorical variables were presented with absolute and relative frequency. Categorical variables were compared using Fisher's exact test or chi-square test, when appropriate, as well as odds ratio estimates (95% confidence intervals).

RESULTS

The sample consisted of 183 people diagnosed with CKD, with a mean age of 59.17 (±14.64) years, most were men (59.6%). The nationality varied as follows: Portuguese (78.7%), Cape Verdean (13.7%), Sao Tome (3.3%), Angolan (2.2%), Guinean (1.6%) and Bulgarian (0.5%). As for the qualifications, they were illiterate (3.3%), 4th year (41.1%), 6th year (18.9%), 9th grade (15%), 12 years (12.2%) and higher education (9.4%). Regarding marital status, they were single (28%), married (53.8%), widowed (11.5%) and divorced (6.6%). Regarding occupation, they were retired (76%) and regular employees (24%). Regarding health data, people had been on a hemodialysis program for about 70.09 (±54.2) months, had hypertension (61.9%) and diabetes (25.8%).

Chronic pain was reported by 104 people (58.8%) and intradialytic pain was reported in 55 (30.1%). However, 5 people did not report the causes and location of chronic pain and 3 did not report the causes and location for intradialytic pain. Table 1 shows the causes of intradialitic and chronic pain.

Table 1 – Distribution of references on the causes of intradialytic pain and chronic pain.

Causes	Intradialytic Pain	Chronic Pain
Musculoskeletal	36 (69,2%)	68 (68,7%)
Associated with the vascular access	--------	17 (17,2%)
Associated with the procedure	12 (23,1%)	-----
Other causes	4 (7,7%)	14 (14,1%)
Total	52 (100%)	99 (100%)

The most frequent cause of intradialytic pain was musculoskeletal pain (69.2%), followed by pain associated with the procedure (23.1%). Regarding chronic pain, the main causes were musculoskeletal (68.7%) and associated with the vascular access (17.2%).

The following table (table 2) shows the location of the pain.

Table 2 – Location of intradialytic pain and chronic pain.

Location of Pain	Intradialytic pain	Chronic pain
Lower limbs	22 (42,3%)	43 (43,4%)
Dorsal region	12 (23,1%)	20 (20,2%)
Upper limbs	15 (28,8%)	22 (22,2%)
Thorax	1 (1,9%)	1 (1%)
Abdomen	0 (0%)	4 (4,1%)
Head	2 (3,8%)	9 (9,1%)
Total	52 (100%)	99 (100%)

Intradialytic pain was in the lower limbs (42.3%), dorsal region (23.1%) and upper limbs (28.8%). Chronic pain was in the lower limbs (43.4%), dorsal region (20.2%) and upper limbs (dialysis catheter limb) (22.2%).

Table 3 – Chronic pain relief interventions.

	Frequency (n)	Percentage (%)
Pain medication	53	58,2%
Rest	22	24,2%
Massage and relaxation	10	11%
Cryotherapy	1	1,1%
Exercise	1	1,1%
No intervention	4	4,4%
Total	91	100%

The percentage of people taking medication for chronic pain was 58.2%, of which 86.8% are non-opioids, 11.3% weak opiates and 1.9% strong opiates. The other therapeutic interventions reported were: rest (24.2%), massage and relaxation (11%), cryotherapy (1.1%), exercise (1.1%), while 4.4% reported doing nothing. Treatment effectiveness was successful for chronic pain in 73.8% of people, with relief of more than 50%.

Table 4 summarizes the intensity and interference of chronic pain in this sample.

Table 4 – Intensity and interference of chronic pain.

Pain (n= 104)	Mean ± Standard Deviation	Median (interquartile range)
Maximum pain within 24 hours	6,3±2,9	6,5 (4-9)
Minimum pain within 24 hours	1,8±2,4	1 (0-3)
Average pain within 24 hours	4,2±2,3	4 (3-6)
Pain at this moment	2,2±2,8	1 (0-4)
Pain relief	6,3±3,1	7 (4-9)
General Activity	4,7±3,5	5 (1-8)
Mood	4,4±3,4	5 (1-7)
Walking ability	4,2±3,8	4 (0-8)
Normal Work	4,7±3,7	5 (0,5-8)
Relations with other people	3,3±3,5	2 (0-6)
Sleep	3,6±3,6	3 (0-7)
Enjoyment of life	3,6±3,7	2 (0-6)

Maximum pain values are high with a median of 6.5 and an interquartile range between 4 and 9. People felt an average relief of 6.3 (corresponding to 63%), where 50% of people felt relief of up to 70% (median 7 and interquartile range between 4 and 9).

The interference of pain is higher in general activity, mood and normal work, but interfered less in the relationship with other people.

Finally, table 5 addresses the possibilities associated with intradialytic pain and chronic pain.

Table 5 – Odd Ratio of intradialytic pain and chronic pain.

Variables	Intradialytic Pain				Chronic Pain			
	Odd Ratio	95% Confidence Interval	Chi--Square	*p*--value	Odd Ratio	95% Confidence Interval	Chi--Square	*p*--value
Sex (woman)	0,636	0,2951,369	1,344	0,246	**2,636**	1,413 ±4,917	9,521	**0,002**
Nationality (portuguese)	**3,733**	1,328±10,496	6,737	**0,009**	0,947	0,459±1,950	0,22	0,882
Maritial Status (married)	**2,375**	1,000±5,675	3,883	**0,039**	0,796	0,419±1,513	0,487	0,485

Women are 2.6 times more likely (odd) than men to have chronic pain; Being of Portuguese nationality is 3.7 times more likely to have intradialytic pain than a person of another nationality and lastly, it is 2.4 times more likely for a married person to have intradialytic pain.

DISCUSSION

In this study the prevalence of chronic pain was 56.6%. These results are similar to those found in Spanish studies in which chronic pain was 57.57%[7] and 69%[9]. However, higher values were found in multicenter studies (82%)[13] and systematic literature reviews (92%[6]. It has been unanimously that pain is one of the most prevalent symptoms in people who undergo hemodialysis[6-9,13]. For this study intradialytic pain was reported as 30.1%. However, these values differ from the results of other studies, specifically that of Alonso and colleagues[7], where the value is 78.8% and may reach 82%[6].

Chronic pain was most often associated with musculoskeletal causes (68.7%), followed by vascular access (17.2%). The most frequent cause of intradialytic pain was musculoskeletal (69.2%) and associated with the procedure (23.1%).

In previous studies, the most frequent causes were musculoskeletal[5-7,9,14], related to access[5-6]; headaches[5-6] and neuropathic[14-15]. Musculoskeletal pain and cramps had prevalences of 36% and 24%, respectively[9].

Regarding location, intradialytic pain was reported in the lower limbs (42.3%), dorsal region (23.1%) and upper limbs (28.8%). Regarding chronic pain, it was in the lower limbs (43.4%), dorsal region (20.2%) and upper limb with dialysis access (22.2%). In another study, pain was located in the lower limbs (64%) and dorsal region (16%)[9].

The proportion of people taking painkillers for chronic pain was 58.2%, of which 86.8% are non-opioids, 11.3% weak opiates and 1.9% strong opiates. In a multicenter study, 66.6% of the people who experienced pain reported being treated regularly with medication, while 24.5% used non-drug strategies[15]. In the present study, non-medication interventions were rest (24.2%), massage and relaxation (11%), cryotherapy (1.1%), exercise (1.1%). The evaluation of the etiology, nature and intensity of pain is crucial to decide which analgesic is most appropriate[14], since pain has a direct impact on most daily activities[9]. However, there are barriers in the proper management of pain due to: reduced awareness of the problem, insufficient education of health professionals, fear of possible medication side effects and the persistence of the myth of the inevitability of pain in elderly people undergoing hemodialysis[14].

In a similar study, the adequacy of treatment was found to be correct for chronic pain, but not for intradialytic pain[7]. However, self-medication cannot be neglected since, although it should be avoided in order to reduce the adverse effects of medication, it was commonly found in people undergoing HD[14], and some studies have verified the existence of adverse effects associated with muscle relaxants[16] and use of opioids[17].

In a study in which 10% of people undergoing HD received muscle relaxants had episode of mental state change (11%), fall (6%), fracture (3%) and death (13%); The use of muscle relaxants was common in these people, being associated with altered mental state and falls[16]. In another study, opioid use was associated with a significantly higher risk of mental status change and several agents were associated with a significantly higher risk of falling and fractures[17].

Treatment efficacy was successful for chronic pain in 73.8% of people, with relief of more than 50%. In a multicenter study, there was a mean pain relief of 62.5 ± 30%, measured by the Brief Pain Inventory[15].

In this study the chances of having pain were estimated, and women are more likely (2.6x) to have chronic pain than men; who has Portuguese nationality also have an increase in probability (3.7x) but for intradialytic pain and even married people are more likely (2.4x) to have intradialytic pain compared to single people. These results are similar in other studies, at the female level, in which pain was more associated[5,15,18]. In a systematic literature review[5], other factors associated with pain were identified. Most studies report-

ed common factors such as age, body mass index, race/ethnicity, marital status, HD duration, different comorbidities, and biochemical parameters. In addition, in this review other studies were found that reported more specific factors such as type, regimen or site of HD, type of dialyzer, dialysis phase, type of dialyzer membrane, site of administration, type of preparation and dose of erythropoiesis stimulating agent[5].

In view of the above, a professional approach with the participation of a doctor, nurse, pharmacist, psychologist, physiotherapist or other technicians for the management of complex painful syndrome in vulnerable people, such as people undergoing HD, is recommended[14], as well as, holistic approaches to the promotion of comfort as proposed by Kolcaba[19], where comfort is seen as a basic human need, a universally desirable, sensitive outcome of nursing care, widely recognized in nursing taxonomies and theories[19-20]. Comfort, in Kolcaba's theory, is evidenced as an immediate experience, characterized by a feeling of relief, tranquility and transcendence, inserted in a physical, psycho-spiritual, socio-cultural and environmental context[19]. The results indicate the importance of study replication in other regions with more robust, longitudinal samples, in order to verify the influence of sociodemographic variables on pain and its management.

CONCLUSION

The prevalence of pain is high in the studied people, being the most frequent one of musculoskeletal origin and related to the hemodialysis procedure. The main location was referred to the lower limbs and upper limbs at the puncture site. In addition, pain has a direct impact on most people's daily activities, and consequently on their quality of life. The main measure of pain relief is pharmacological, with non-opioids being commonly used, with a relief greater than 50% in 73.8% of people. Being a woman, married and having Portuguese nationality increases the possibility of having pain. Another more holistic approach should be made available to people on HD, as well as other pain prevention and control strategies.

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