REV SEN
rev-sen.ec

Pain assessment in adult patients in a hemodialysis program at a tertiary hospital in Mexico. A single-center observational study.

Luis F. Machado-Favela [1], Luis E. Gómez-Contreras [1], Melisa A. Muñoz-Hernández [2], Fany K. Segura-López [2], Francisco Javier García-Alvarado [2].

1. Department of Nephrology, High Specialty Medical Unit, Specialty Hospital No. 71, Mexican Institute of Social Security, Torreón, Coahuila, Mexico.
2. Health Research Division of the High Specialty Medical Unit, Specialty Hospital No. 71, Mexican Institute of Social Security, Torreón, Coahuila, Mexico.

Received: July 22, 2025.
Accepted: September 27, 2025.
Published: October 4, 2025.
Editor: Dr. Franklin Mora.

How to cite:
Machado-Favela L, Gómez-Contreras L, Muñoz-Hernández M, Segura-Lopez F, Garcia-Alvarado F. Evaluation of pain in adult patients in a hemodialysis program of a tertiary hospital in Mexico. A single-center observational study. REV SEN 2025; 14(1):18-29.

DOI: http://doi.org/10.56867/123
Sociedad Ecuatoriana de Nefrología, Diálisis y Trasplantes.

ISSN-L: 2953-6448

Abstract

Introduction: Pain is one of the most common and disabling symptoms in patients with chronic kidney disease undergoing hemodialysis. However, its systematic assessment and treatment remain limited. The objective of this study was to describe the prevalence of pain and its clinical characteristics in adult patients in hemodialysis programs at a tertiary-level specialty hospital.

Methods: A cross-sectional study was conducted in patients receiving treatment in the hemodialysis program at the High Specialty Medical Unit No. 71 of the Mexican Social Security Institute (IMSS) from January to March 2025. Two validated Spanish instruments were administered in person: the Brief Pain Questionnaire and the Spanish Pain Questionnaire. Sociodemographic, clinical, and pain-related variables were analyzed.

Results: Sixty-seven patients were included; 76% reported pain, predominantly somatic (50.98%) or mixed (47.05%). The most common locations were the lower limbs (68.62%), back (43.13%), and head (35.29%). Pain had a significant effect on general activities, mood, and mobility. A total of 82.35% used nonopioid analgesics, mainly paracetamol, but 43.13% reported limited relief (10–40%).

Conclusion: Pain in hemodialysis patients is a highly prevalent, poorly controlled problem with a significant functional impact.

Keywords:

Pain, hemodialysis, chronic kidney disease.

* Corresponding author

Email: Francisco Javier García Alvarado < ibqjaviergarcia01@gmail.com >/Address: Mexican Social Security Institute (IMSS), High Specialty Medical Unit (UMAE) No. 71, Postal Code: 27000 Torreón, Coahuila de Zaragoza, Mexico. Telephone: 871 729 0800.

Pain is one of the main reasons for seeking medical attention and a public health problem with significant clinical, social, and economic implications. The International Association for the Study of Pain (IASP) defines pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage [1]. This definition reflects its complexity, which is influenced by not only physical stimuli but also psychological, social, and cultural factors. In patients with chronic kidney disease (CKD) undergoing hemodialysis (HD), pain is common and affects quality of life. It is estimated that between 33% and 82% of patients experience pain, with low use of appropriate analgesic treatments, highlighting deficiencies in its management [2-4].

The etiology of pain in this population is multifactorial. It can be due to comorbidities such as diabetes mellitus (DM), systemic arterial hypertension (HTN), or gout, as well as complications of chronic kidney disease (CKD), such as osteodystrophy, peripheral neuropathy, or arthropathies. In addition, arteriovenous fistulas, central catheters, and dialysis procedures can lead to ischemic or neuropathic pain [5]. Clinically, pain is classified as nociceptive (somatic or visceral), neuropathic, or mixed, each with specific manifestations that must be identified for effective treatment [6].

An adequate assessment requires validated instruments that consider intensity, location, duration, associated factors, and functional impact. Questionnaires such as the Brief Pain Questionnaire [7] and the Spanish Pain Questionnaire [8] provide objective information from the patient's perspective and are key in populations with chronic diseases [9-11]. In Mexico, the literature concerning pain in patients with chronic kidney disease on hemodialysis is scarce. Some studies have shown greater functional impairment and lower quality of life in these patients than in those receiving peritoneal dialysis, and pain is a central symptom. Despite its high prevalence, standardized clinical protocols are lacking, which limits comprehensive management [12, 13].

The objective of this study was to describe the prevalence and clinical characteristics of pain in adult Mexican patients undergoing HD treatment at a tertiary-level hospital in northwest Mexico.

Materials and methods

Studio design

This was an observational, cross-sectional study. The data source is prospective.

Scenery

This study was conducted in the hemodialysis unit of High Specialty Hospital No. 71 of the Mexican Social Security Institute (IMSS), located in Torreón, Coahuila, Mexico. The period for collecting clinical information and pain questionnaires was from January 1 to March 30, 2025.

Participants

Patients aged 18 or older receiving conventional hemodialysis who voluntarily agreed to complete the questionnaires were included. Patients who were unable to complete the questionnaires were excluded.

Variables

Sociodemographic variables included age, sex, place of residence, and occupation. The clinical variables included the etiology of CKD, the duration of HD (from the first session to the survey date), the number of hemodialysis sessions per week, and the presence of comorbidities. The questionnaires assessed pain variables, including presentation (frequency), qualitative description, type of pain (clinical classification), intensity (numerical scale), location, functional impact, relieving and worsening factors, and use of prescribed analgesic medications.

Data sources/measurements

The data source was direct. The information was compiled in an electronic database created by the authors from surveys administered in person to patients. Two validated questionnaires were used to assess pain: the Brief Pain Inventory (Spanish version) and the Spanish Pain Questionnaire, derived from the English McGill Pain Questionnaire.

The Brief Pain Questionnaire has 22 items divided into three sections. The first section measures pain intensity with four questions rated on a scale from 0 (no pain) to 10 (worst imaginable pain). The second section assesses how pain interferes with daily activities such as walking, working, sleeping, and social interactions on a 0--10 scale. The third section investigated analgesic use, including the type, dose, frequency, duration of effect, and perceived relief.

The Spanish Pain Questionnaire gathers sensory, affective, and evaluative descriptors chosen by the patient, assigning 1 point to each to determine overall intensity. It also features a Likert-type scale (0–5) to measure current pain levels and a visual analog scale (0–10) to gauge perceived pain. Both questionnaires were selected for their frequent use in populations with chronic illnesses and for their ability to evaluate the functional and emotional effects of pain from the patient's perspective.

Biases

The surveys were administered consistently by the principal investigator, following a preestablished guide approved in the research protocol. Two researchers independently reviewed and recorded the data in a copy. Only records with complete agreement were included. Clearly, defining the inclusion and exclusion criteria and obtaining a recent clinical history helped minimize selection and information bias.

Study size

The sample was selected through convenience sampling to recruit adult patients who had undergone hemodialysis during the study period, based on previously defined inclusion criteria.

Quantitative variables

The results for ordinal variables are presented as frequencies and percentages. The results for the scale variables are presented as averages. Scale variables were not converted into quantitative variables.

Statistical analysis

Stata version 17 (StataCorp LP, College Station, TX, USA) was used; descriptive statistics were performed by variable type. Categorical variables are reported as frequencies and percentages, whereas quantitative variables are presented as the means with standard deviations (±), depending on their distribution. To assess the normality of the quantitative variables, the Shapiro–Wilk test was applied, yielding a p-value > 0.05, indicating that the data followed a normal distribution.

Results

Participants

A total of 67 adult patients were included. All participants met the inclusion criteria and agreed to participate voluntarily during the study period.

Characteristics of the study population

The mean age was 51.25 ± 12.75 years. Among the total sample, 50.74% (n = 34) were women, and 49.25% (n = 33) were men. The majority resided in Coahuila (89.55%), and the remainder lived in Durango (4.47%) or Chihuahua (5.97%). Regarding occupation, 55.22% were unemployed, 22.38% were retired, 20.89% were employed, and 1.49% were students. A total of 52.23% of the participants received hemodialysis twice a week, 41.79% three times a week, and 5.97% once a week. The leading cause of chronic kidney disease was type 2 diabetes mellitus (47.76%), followed by autoimmune diseases (26.86%) and essential hypertension (10.44%). The most common comorbidities were high blood pressure (91.04%), type 2 diabetes mellitus (49.25%), and obesity (20.89%) (Table 1).

Table 1. Clinical characteristics of the study population

Sex	
Female	34 (50.74%)
Male	33 (49.25%)
Age	51.24 ± 12.75
Number of hemodialysis sessions in a week	
1 session	4 (5.97)
2 sessions	35 (52.23%)
3 sessions	28 (41.79%)
Etiology	
Diabetes mellitus	32 (47.76%)
High blood pressure	7 (10.44%)
Autoimmune disease	18 (26.86%)
Systemic infections	5 (7.46%)
Nephrotoxic drugs	3 (4.47%)
Other: Preeclampsia	2 (2.98%)
Comorbidities	
Obesity	14 (20.89%)
Diabetes mellitus	33 (49.25%)
High blood pressure	61 (91.04%)
Smoking	4 (5.97%)
Cardiovascular disease	15 (22.38%)
Osteoarthritis	2 (2.98%)
Cancer	3 (4.47%)
HIV	1 (1.49%)
Systemic lupus erythematosus	2 (2.98%)
Hypothyroidism	1 (1.49%)

HIV: human immunodeficiency virus.

Table 2. Frequency of pain types.

Type of pain	
Somatic Nociceptive	26 (50.98%)
Visceral	10 (19.6%)
Neuropathic	0
Mixed	24 (47.05%)

Clinical profile of pain

The prevalence of pain was 76%. The most affected areas were the lower limbs (68.62%), back (43.13%), and head (35.29%) (Figure 1). Nociceptive pain, primarily somatic (50.98%), was the most common, followed by mixed pain (47.05%) and visceral pain (19.6%) (Table 2). The main pain relief strategies were medication (80.39%) and rest (70.58%). Physical activity (90.19%), postural changes (43.13%), and cold (29.41%) aggravated the pain.

The most affected activities were general activities (54.90% with severe impairment), gait (47.05%), and mood (41.17%). Limitations in work, social relationships, rest, and leisure were also reported. Regarding the perceived cause, 45.09% attributed it to CKD, 13.72% to treatment, and the remainder to DM (25.49%) or HTN (7.84%) (Table 3).

In the last week, mild pain predominated (76.47%), followed by moderate (54.90%) and severe (70.58%) pain. At the time of the survey, 70.58% reported mild pain, 21.56% moderate pain, and 7.84% severe pain (Figure 2).

According to the Spanish Pain Questionnaire, the most common sensory qualities were discomfort (70.58%), stabbing (39.21%), and internal (33.33%). On an affective level, the most prominent were 'desperate' (43.13%) and 'horrible' (29.41%). In the evaluative dimension, pain was described as intermittent or constant (23.52% each). The current intensity was mild at 70.58%, bothersome at 13.72%, intense at 11.76%, and severe at 3.92% (Table 4).

Pharmacological treatment and perception of treatment

A total of 82.35% of patients used nonopioid analgesics, primarily paracetamol; 15.68% used weak opioids; and none used potent opioids. A total of 43.13% reported 10–40% pain relief, and only 5.61% reported 80–100% pain relief. The effect lasted an average of four hours (43.13%). Most patients took their medication regularly (68.62%) or up to twice a day (47.05%). A total of 52.94% wanted a more potent drug, and 43.13% wanted a higher dose. A total of 98.03% were afraid of using too many analgesics, and 100% expressed concern about side effects. Furthermore, all patients agreed that they needed more information on pain management (Table 5).

Table 3. Pain-modifying situations, their impact on daily life activities and perceived cause.

Situations		**Relief**	**Deterioration**
Position		19 (37.25%)	22 (43.13%)
Heat		9 (17.64%)	10 (19.60%)
Cold		4 (7.84%)	15 (29.41%)
Repose		36 (70.58%)	1 (1.96%)
Activity		5 (9.80%)	46 (90.19%)
Medication		41 (80.39%)	0
Friction/massage		10 (19.60%)	4 (7.84%)
Activity/ Repercussion	**Mild**	**Moderate**	**Severe**
General activities	6 (11.76%)	17 (33.33%)	28 (54.90%)
Mood	8 (15.68%)	22 (43.13%)	21 (41.17%)
Ability to walk	15 (29.41%)	12 (23.52%)	24 (47.05%)
Regular work	9 (17.64%)	18 (35.29%)	24 (47.05%)
Social relationships	17 (33.33%)	16 (31.37%)	18 (35.29%)
Rest	14 (27.45%)	19 (37.25%)	18 (35.29%)
Leisure	15 (29.41%)	18 (35.29%)	18 (35.29%)
Perception of the cause of pain			
Treatment of kidney disease		7 (13.72%)	
Chronic kidney disease		23 (45.09%)	
High blood pressure		4 (7.84%)	
Diabetes mellitus		13 (25.49%)	
Cancer		2 (3.92%)	
Osteoarthritis		1 (1.96%)	
Systemic lupus erythematosus		1 (1.96%)	

Figure 1. Prevalence of pain location in the study population.

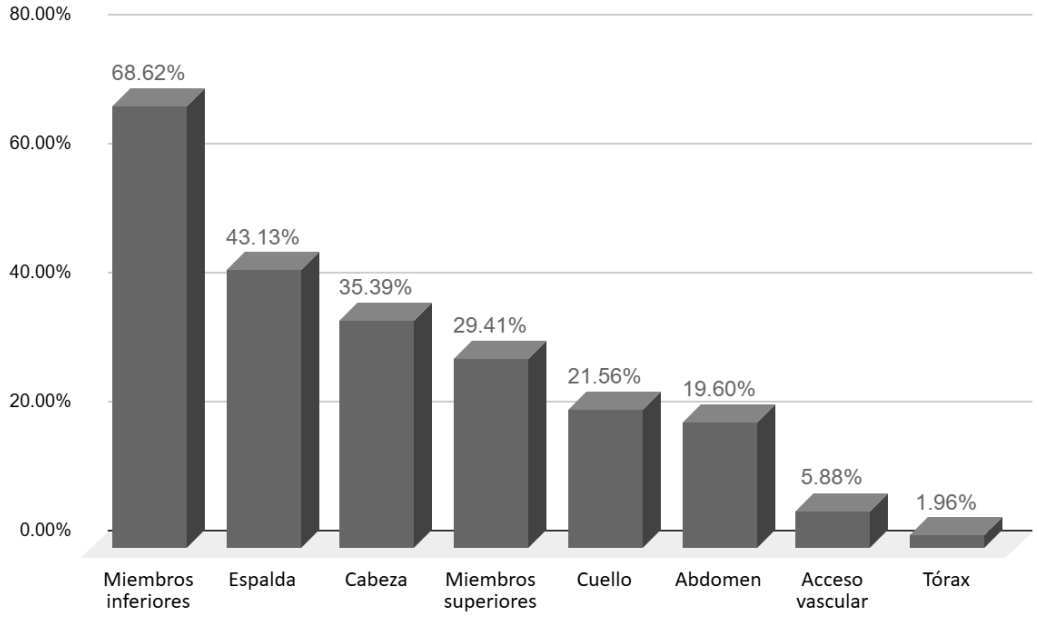

80.00%
60.00%
40.00%
20.00%
0.00%
68.62%
43.13%
35.39%
29.41%
21.56%
19.60%
5.88%
1.96%
Miembros inferiores
Espalda
Cabeza
Miembros superiores
Cuello
Abdomen
Acceso vascular
Tórax

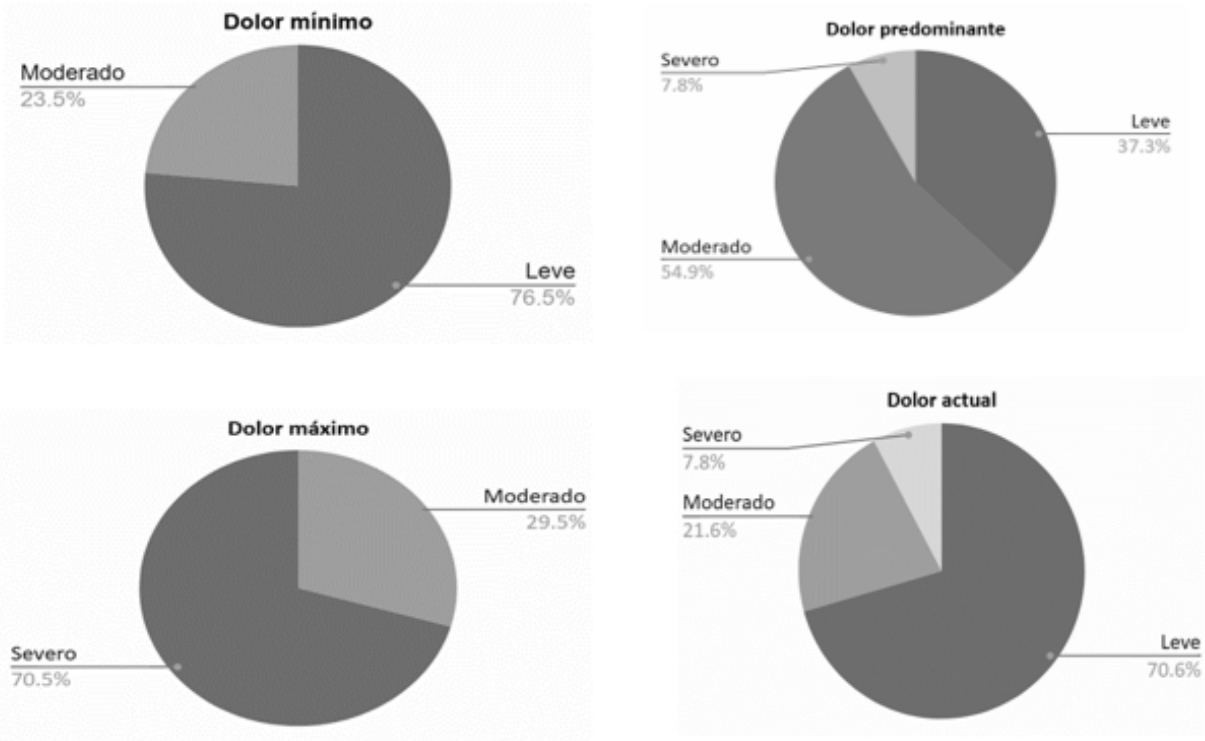
Table 4. Prescribed medication and opinion on the same.

Prescribed medication		N (%)	
Nonopioid analgesics		42 (82.35%)	
Weak opioid analgesics		8 (15.68%)	
Powerful opioid analgesics		0	
Percentage of relief felt with the medication			
0%		3 (5.88%)	
10-40%		22 (43.13%)	
50-70%		15 (29.41%)	
80-100%		11 (5.61%)	
Effect of the medication in hours			
The medication does not relieve anything.		2 (3.92%)	
One hour		2 (3.92%)	
Two hours		2 (3.92%)	
Three hours		2 (3.92%)	
Four hours		22 (43.13%)	
Five to twelve hours		13 (6.63%)	
More than twelve hours		8 (15.68%)	
She does not take any medication.		0	
Frequency of sampling			
Regularly		35 (68.62%)	
Out of necessity		16 (31.37%)	
She does not take medication.		0	
Daily dose			
Not every day		15 (29.41%)	
1 to 2 times a day		24 (47.05%)	
3 to 4 times a day		12 (23.52%)	
5 to 6 times a day		0	
More than 6 times a day		0	
Medication review	Yes	No	Do not know
You need stronger medication.	27 (52.94%)	22 (43.13%)	2 (3.92%)
You need more doses	22 (43.13%)	26 (50.98%)	3 (5.88%)
He/she is worried about taking too much painkiller.	50 (98.03%)	1 (1.96%)	0
He/she is concerned about the side effects of the medication.	51 (100%)	0	0
It has side effects from analgesics	3 (5.88%)	45 (88.23%)	3 (5.88%)
You need more information about pain relief	51 (100%)	0	0

Table 5. Results of the Spanish pain questionnaire.

Sensory intensity value	**Value of affective intensity**
Temporary 1	**Fear**
As heartbeats 25 (49.01%)	Fearsome11 (21.56%)
Like a jolt 0	Dreadful 11 (21.56%)
Like a whiplash 3 (5.88%)	Horrible 15 (29.41%)
Thermal	**Autonomic/Vegetative**
Cold 4 (7.84%)	What a dizzying 10 (19.60%)
Hot 4 (7.84%)	Suffocating 8 (15.68%)
Burning 12 (23.52%)	
Constrictive pressure	**Punishment**
Numbness 15 (29.41%)	That torments 11 (21.56%)
Like a pinch 0	Mortifying 17 (33.33%)
Seizure 8 (15.68%)	Violent 0
Cramp 11 (21.56%)	
Spasm 6 (11.76%)	
Stomach cramp 2 (3.92%)	
Oppressive 5 (9.80%)	
Pressure pointed/incisive	**Tension/Fatigue**
Puncture 4 (7.84%)	Strenuous 13 (25.49%)
Puncturing 20 (39.21%)	Exhausting 23 (45.09%)
Penetrating 13 (25.49%)	Disabling 13 (25.49%)
Acute 10 (19.60%)	
Gravitational traction pressure	**Anger/disgust**
Heavy 10 (19.60%)	Uncomfortable 36 (70.58%)
Tie rod 13 (25.49%)	That irritates 10 (19.60%)
Like a tear 7 (13.72%)	That consumes 5 (9.80%)
Tense 19 (37.25%)	
Space	**Pain/anxiety**
Surface 2 (3.92%)	Depressing 6 (11.76%)
Diffuse 7 (13.72%)	Overwhelming 8 (15.68%)
That is irradiated 8 (15.68%)	What anguish 8 (15.68%)
Fixed 7 (13.72%)	What obsesses 0
Internal 17 (33.33%)	Desperate 22 (43.13%)
Deep 10 (19.60%)	
Liveliness	**Evaluative intensity value**
Asleep 11 (21.56%)	Temporary 2
Picor 1 (1.96)	Momentary 6 (11.76%)
Tingling 6 (11.76%)	Intermittent 12 (23.52%)
Like muscle soreness 0	Increasing 11 (21.56%)
Itching 2 (3.92%)	Constant 12 (23.52%)
As a current 8 (15.68%)	Persistent 10 (19.60%)
Current intensity value	
Painless 0	
Mild 36 (70.58%)	
Annoyed 7 (13.72%)	
Intense 6 (11.76%)	
Strong 2 (3.92%)	
Unbearable 0	

Figure 2. Classification of pain intensity in the last week and at the time of the survey.



Discussion

Pain is a common and highly prevalent symptom in patients undergoing hemodialysis (HD), with a multidimensional nature that includes physical, psychological, and social components. Recent systematic reviews have reported prevalence rates ranging from 33% to 82% worldwide, highlighting the magnitude and complexity of the problem [2-4]. In Latin America, resource limitations and the concentration of nephrology services accentuate the impact on quality of life and social costs, making it essential to characterize the phenomenon locally to gain a comprehensive understanding of the situation [14, 15].

This study presents data from the UMAE HE No. 71 in Torreón, Coahuila, and reveals that 76% of patients report pain and that, in eight out of ten cases, the treatment consists solely of paracetamol. One of the most relevant findings of this research was the high frequency of comorbidities in patients with chronic kidney disease undergoing hemodialysis, with hypertension and diabetes mellitus (DM) being the most prevalent. A study conducted with hemodialysis (HD) patients at the National Institute of Medical Sciences and Nutrition "Salvador Zubirán" reported that 91.4% of patients had hypertension and 52.6% had diabetes, results similar to those reported in this research [16]. A multidisciplinary and comprehensive approach to the care of HD patients should be implemented since the coexistence of multiple comorbidities not only accelerates the progression of kidney disease but also increases the prevalence and intensity of pain and other physical and emotional symptoms, thus impairing quality of life.

In this study, 52.23% of patients received hemodialysis (HD) twice a week, which is less frequent than the standard recommended in international guidelines (three sessions per week). In the State of Mexico, 90% of patients maintain a regimen of three sessions per week, and the authors associated this frequency with better toxin clearance and a lower risk of hospitalization due to fluid overload or metabolic decompensation [17]. Reduced HD attendance has been associated with a greater symptom burden, including increased musculoskeletal pain, fatigue, and functional limitations [18-20].

The percentage of patients experiencing pain is at the upper end of the literature, exceeding the 69% documented in the Mexican cohort at HGR No. 1 [19] and the 47% reported in a Palestinian study with equivalent methodology and scale [21]. Furthermore, 70.6% of the participants rated their worst pain as severe, which was higher than the 55% reported in a multicenter series [21] and close to the 66% reported in a Brazilian cohort [22]. These differences could be explained by the shorter duration of hemodialysis (median of 26

months) and the lower weekly session frequency, both of which modulate the inflammatory load and symptomatology.

The predominance of somatic nociceptive pain (51%) and high involvement of the lower limbs (68.6%) are consistent with research indicating a musculoskeletal origin in 59% of cases and a predominant location in the extremities [23-25]. The concomitant presence of mixed pain (47%) suggests that neuropathic mechanisms are linked to diabetes mellitus and chronic inflammation; in the literature, proinflammatory markers such as C-reactive protein are significantly associated with greater pain severity [21].

Walking limitations, general activities, and mood were the most affected domains, a pattern replicated in HD quality-of-life studies, where the physical dimension received the lowest scores [25]. Functional impairment exacerbates unemployment, which was prevalent in the study sample, and increases family burden and mortality risk.

The high frequency of reported studies showing that most patients receive only paracetamol [26-28] mirrors our findings, where 82% of patients use only nonopioid analgesics and three-quarters report insufficient relief. This reflects a conservative therapeutic strategy, which is likely influenced by the risk of nephrotoxicity associated with other drugs. The concerns expressed by all patients about analgesic side effects and the need for more information highlight the need to strengthen patient education and foster more open, continuous communication with the healthcare team.

The KDIGO guidelines for CKD establish the need to investigate multimodal pain scales, the prudent use of weak opioids, and nonpharmacological therapies—recommendations that should be implemented [29]. In 2019, it was reported that more than 50% of CKD patients on renal replacement therapy experienced persistent pain, but only a minority had received a formal pain assessment via standardized scales [30]. There is an urgent need to implement systematic pain assessment protocols in hemodialysis units and to improve staff and patient education on the rational and safe use of analgesics in the context of kidney disease.

Conclusion

The study revealed a high prevalence of pain (76%) in adult patients with chronic kidney disease on hemodialysis, with somatic and mixed pain predominating, primarily located in the lower extremities and back. This pain significantly affects quality of life, especially mood, mobility, and daily functioning. The perceived origin of the pain was diverse, with both the disease and the treatment being attributed to it, highlighting the need to strengthen doctor–patient communication. Despite frequent analgesic use, relief was limited, and concerns about adverse effects and a lack of information were prevalent, indicating key areas for improving pain management in this population.

Abbreviations

CKD: Chronic kidney disease.
HD: hemodialysis.
DM: Diabetes mellitus.
HTA: arterial hypertension.

Supplementary information

The supplementary materials have not been included.

Acknowledgments

We thank the medical, nursing, and administrative staff of the UMAE No. 71 of the IMSS in Torreón, Coahuila, for the facilities provided, as well as the participating patients for their valuable collaboration.

Authors' contributions

Luis Fernando Machado Favela: Conceptualization, data curation, research, visualization, original draft writing.
Fany Karina Segura López: Conceptualization, data curation, research, visualization, original draft writing.
Francisco Javier García Alvarado: Conceptualization, data curation, formal analysis, project management, software, validation, visualization, writing–review and editing.
Luis Ernesto Gómez Contreras: Conceptualization, formal analysis, methodology, project management, resources, software, supervision, validation, writing–review and editing.
Melisa Alejandra Muñoz Hernández: Conceptualization, data curation, research, visualization, original draft writing.
All the authors read and approved the final version of the manuscript.

Financing

The study was self-funded by the authors.

Availability of data or materials

Not applicable.

Statements

Ethics committee approval and consent to participate

The study was approved by the Local Health Research Committee No. 501 of the Specialty Hospital No. 71, IMSS, in Torreón, Coahuila, Institutional Registration Number: R-2025-501-002.

Consent for publication

This does not apply when specific patient images, radiographs, or photographs are not published.

Conflicts of interest
The authors declare that they have no conflicts of interest.

Author information
Not declared.

References

1. Pain terms : a list with definitions and notes on Usage . Recommended by the IASP Subcommittee on Taxonomy . Pain . 1979 Jun;6(3):249. PMID: 460932 .

2. López MTM, Rodríguez-Rey R, Montesinos F, de Galvis SR, Ágreda-Ladrón MR, Mayo EH. Factors associated with quality of life and its prediction in kidney patients on hemodialysis . Nephrology (Engl Ed). 2022 May-Jun;42(3):318-326. doi : 10.1016/j.nefroe.2022.07.007 . Epub 2022 Sep 2. PMID: 36210621.

3. Davison SN, Rathwell S, Ghosh S, George C, Pfister T, Dennett L. The Prevalence and Severity of Chronic Pain in Patients With Chronic Kidney Disease : A Systematic Review and Meta- Analysis . Can J Kidney Health Dis . 2021 Feb 19;8:2054358121993995. doi : 10.1177/2054358121993995 . PMID: 33680484; PMCID: PMC7897838.

4. Lambourg E, Colvin L, Guthrie G, Murugan K, Lim M, Walker H, et al. The prevalence of pain among patients with chronic kidney disease using systematic review and meta- analysis . Kidney Int . 2021 Sep;100(3):636-49.
https://doi.org/10.1016/j.kint.2021.03.041
PMid:33940112

5. Brkovic T, Burilovic E, Puljak L. Prevalence and severity of pain in adults end-stage renal disease patients on chronic intermittent hemodialysis : a systematic Review . Patient . Preference Adherence . 2016; 10: 1131-50.
https://doi.org/10.2147/PPA.S103927
PMid:27382261 PMCid:PMC4922783

6. Domenichiello AF, Ramsden CE. The silent epidemic of chronic pain in older adults . Progress in neuro- psychopharmacology & biology psychiatry . 2019; 93, 284-290.
https://doi.org/10.1016/j.pnpbp.2019.04.006
PMid:31004724 PMCid:PMC6538291

7. Ferrer-Peña R, Gil-Martínez A, Pardo-Montero J, Jiménez-Penick V, Gallego-Izquierdo T, La Touche R. Adaptation and validation of the Spanish version of the graded chronic pain scale . Rheumatol Clin. 2016 May-Jun;12(3):130-8. English, Spanish . doi : 10.1016/j.reuma.2015.07.004 . Epub 2015 Aug 19. PMID: 26298083.

8. Melzack R. The McGill Pain questionnaire from description to measurement . Anesthesiology 2005;103(1):199-202.
https://doi.org/10.1097/00000542-200507000-00028
PMid:15983473

9. Pelayo Alonso R, Martínez Álvarez P, Cobo Sánchez JL, Gándara Revuelta M, Ibarguren Rodríguez E. Pain assessment and analgesia adequacy in patients undergoing hemodialysis. Enferm Nefrol . 2015;18(4): 253-9.
https://doi.org/10.4321/S2254-28842015000400002

10. Decruynaere C, Bragard D. Pain assessment: methodological aspects and clinical use. EMC-Kinesiterapia-Medicina física. 2018;39(4): 1-14.
https://doi.org/10.1016/S1293-2965(18)41445-4

11. Vicente-Herrero MT, Delgado-Bueno S, Bandrés-Moyá F, Ramírez-Iñiguez-de-la-Torre MV, Capdevilla-García L. Pain assessment. Comparative review of scales and questionnaires. Rev. Soc. Esp. Dolor. 2018; 25(4):228-236.
https://doi.org/10.20986/resed.2018.3632/2017

12. Ramos-Alcocer JR, Salas-Nolasco OI, Villegas-Domínguez JE, Serrano-Vázquez CW, Dehesa-López E, Márquez-Celedonio FG. Quality of life and associated factors in chronic kidney disease with replacement therapy. Archives in Family Medicine. 2021; 23(2): 75-83. medigraphic.com/95965 .

13. López-Cervantes M, Rojas-Russell M, Tirado-Gómez L, Durán-Arenas L, Pacheco-Domínguez R, Venado-Estrada A, et al.

Chronic kidney disease and its treatment with renal replacement therapy in Mexico. Mexico City: Faculty of Medicine, National Autonomous University of Mexico. 2009:1-189. anmm.org.mx/202123275

14. Villarreal-Ríos E, Palacios-Mateos AF, Galicia-Rodríguez L, Vargas-Daza ER, Baca-Moreno C, Lugo-Rodríguez A. Institutional cost of patients with chronic kidney disease managed with hemodialysis. Revista Médica del Instituto Mexicano del Seguro Social. 2020;58(6):698-708. redalyc.org/457769357009

15. Figueroa-Lara A, Gonzalez -Block MA, Alarcon -Irigoyen J. Medical expenditure for chronic diseases in Mexico : the case of selected diagnoses treated by the Largest care providers . PLoS one . 2016;11(1):e0145177. https://doi.org/10.1371/journal.pone.0145177 PMid:26744844 PMCid:PMC4706295

16. Guzmán-Guillén K, Fernández de Córdova-Aguirre J, Mora-Bravo F, Vintimilla-Maldonado J. Prevalence and factors associated with chronic kidney disease. Revista Médica Del Hospital General De México 2014;77(3):108-113. doi : 10.1016/j.hgmx.2014.06.001

17. Mora-Bravo FG, Torres PTM, Campoverde NR, Carcelen GLB, Mancheno JCS, Tipanta ÁCS, Perez-Grovas H, Abarca WPR. Blood pressure control with active ultrafiltration measures and without antihypertensives es essential for survival in hemodiafiltration and hemodialysis programs for patients with CKD: a prospective observational study . BMC Nephrol . 2025 Jan 17;26(1):30. doi : 10.1186/s12882-025-03948-0 . PMID: 39825259; PMCID: PMC11742504.

18. Ramos Rangel, MA. The renal patient on dialysis therapy and quality of life. Mexican Journal of Nephrology. 2023;44:177-179. imbiomed.mx/118664

19. Sánchez, A et al. Quality of life of dialysis patients. Systematic review. Enferm Nefrol . 2019; 22(3): 239-55. https://doi.org/10.4321/S2254-28842019000300003

20. Esquivel Hernández XP, Vital Flores S, Bazán de Santillana I, León Luna H. Measuring the impact of the effectiveness of educational interventions and treatment adherence in patients undergoing hemodialysis. Application of the MBG scale (Martín- Barraye -Grau). Revista nefrología mexicana. 2024;45(2):58-62. dialisisweb.com/archivos/2024/n1-enero-junio/14-TRABAJOS-ORIGINALES-aplicacion-escala-MBG-N2.pdf nv .

21. Mizher A, Hammoudi H, Hamed F, Sholi A, AbuTaha A, Abdalla MA, Jaber MM, Hassan M, Koni AA, Zyoud SH. Prevalence of chronic pain in hemodialysis patients and their correlation with C-reactive protein : a cross-sectional study . Sci Rep 2023 Mar 31;13(1):5293. doi : 10.1038/s41598-023-32648- 8. PMID: 37002289; PMCID: PMC10066398.

22. Schweiger V, Cacciapuoti M, Nizzero M, Simari S, Lombardi G, Gottin L, Stefani L, Martini A, Varrassi G, Finco G, Polati E, Gambaro G. Exploring Chronic Pain in Hemodialysis Patients : An Observational Study Based on the New IASP Classification for ICD-11. Pain Ther . 2025 Feb;14(1):375-385. https://doi.org/10.1007/s40122-024-00698-z PMid:39755882 PMCid:PMC11751259

23. Gómez Pozo M, Ruiz Parrado MC, Crespo Garrido M, Gómez López VE, Crespo Montero R. Characterization of pain in hemodialysis patients. Enferm Nefrol . 2017;20 (4): 295:304. https://doi.org/10.4321/S2254-28842017000400003

24. Monroy Alvarado E, Nafarrete Rivera J, Gutierrez Compean JG. Abnormal US findings of the shoulders in Mexican patients with end-stage renal disease : association with long-term Hemodialysis . Journal of the Mexican Federation of Radiology and Imaging . 2024; 3(3):189-196. https://doi.org/10.24875/JMEXFRI.M24000082

25. López y López LR, Baca Córdova A, Guzmán Ramírez PM, Ángeles Acuña A, Ramírez del Pilar R, López González DS, et al. Quality of life in hemodialysis and peritoneal dialysis after four years of treatment. Med . interna Méx. 2017; 33(2). ISSN 0186-4866 Scielo.mx/S0186-200177

26. Davison SN. Clinical Pharmacology Considerations in Pain Management in Patients with Advanced Kidney Failure . Clin J Am Soc Nephrol . 2019 Jun;14(6):917-31. https://doi.org/10.2215/CJN.05180418 PMid:30833302 PMCid:PMC6556722

27. Chen T, Knicely Dh , Grams ME. Chronic Kidney Disease Diagnosis and Management. A Review . JAMA. 2019;322(13):1294-1304. doi:. 10.1001/jama.2019.14745 PMid:31573641. PMCid:PMC7015670

28. Roy PJ, Weltman M, Dember LM, Liebschutz J, Jhamb M, HOPE Consortium . Pain management in patients with chronic kidney disease and end-stage kidney disease . Curr Opin Nephrol Hypertens . 2020;29(6):671-680. doi : 10.1097/MNH.0000000000000646 PMid:32941189 PMCid:PMC7753951

29. Kidney Disease : Improving Global Outcomes (KDIGO) CKD Work Group . KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Kidney disease Int . 2024;105(4S): S117:S314. https://doi.org/10.1016/j.kint.2023.10.018 PMid:38490803

30. De-Andrés-Ares J, Cruces-Prado L, Canos- Verdecho M, Penide -Villanueva L, Del-Valle-Hoyos M, Herdman M, et al. Validation of the Short Form of the Brief Pain Inventory (BPI-SF) in Spanish Patients with Non Cancer - Related Pain . Pain Pract 2015;15(7):643-53. https://doi.org/10.1111/papr.12219 PMid:24766769

DOI : Digital Object Identifier. **PMID** : PubMed Identifier.

Editor's Note

REV SEN remains neutral with respect to jurisdictional claims regarding published maps and institutional affiliations.