ENFERMERÍA NEFROLÓGICA

50 ANIVERSARIO 1975-2025 SEDEN

Volume 28 | Issue #4 | October-December 2025 (English edition)

Official publication of the Spanish Society of Nephrological Nursing

www.enfermerianefrologica.com

ISSN (Print): 2254-2884
ISSN (Digital version): 2255-3517

FUNDACIÓN RENAL
ESPAÑOLA

XXVI Edition of the
Íñigo Álvarez de Toledo Awards
for Research in
Nephrology Nursing

Next call for submissions: February 2026
www.fundacionrenal.es

ENFERMERÍA NEFROLÓGICA

EDITORIAL COMMITTEE

ENFERMERÍA NEFROLÓGICA

BOARD OF DIRECTORS OF SEDEN

PUBLISHED BY:
Sociedad Española de Enfermería Nefrológica.

EDITORIAL SECRETARIAT:
Sociedad Española de Enfermería Nefrológica
Calle de la Povedilla 13. Ground floor left. 28009 Madrid. Spain
Tel.: 00 +34 914 093 737
seden@seden.org ▮ www.seden.org

Founded in 1975. *BISEAN, BISEDEN, Revista de la Sociedad Española de Enfermería Nefrológica and currently Enfermería Nefrológica.*

SEDEN is part of Unión Española de Sociedades Científicas de Enfermería (UESCE).

PUBLISHED: January 30, 2026 ▮ **FREQUENCY:** Quarterly

SCIENTIFIC COLLABORATIONS

Fundación Universitaria de Ciencias de la Salud (FUCS). Colombia

Asociación Portuguesa de Enfermeros de Diálisis y Trasplante (APEDP)

Sociedad Chilena de Enfermería en Diálisis y Trasplante Renal (SENFERDIALT)

Sociedad de Enfermeras Especialistas en Nefrología del Perú (SEENP)

Sociedad Argentina de Enfermería Nefrológica (SAEN)

Asociación Mexicana de Enfermeras en Nefrología (AMENAC)

Asociación Vascular de Enfermería de Diálisis de Perú

Asociación Latinoamericana de Enfermería Nefrológica

The journal Enfermería Nefrológica charges no fees for manuscript submission or publication and is aimed at nephrology nurses.
The journal uses the Open Journal Systems (OJS) platform.

This journal is indexed in:
CINAHL, IBECS, SciELO, CUIDEN, SIIC, Latindex, Capes, DULCINEA, Dialnet, DOAJ, ENFISPO, Scopus, Sherpa Romeo, C17, RECOLECTA, Redalyc, REBIUN, REDIB, MIAR, WorldCat, Google Scholar Metric, Cuidatge, Cabells Scholarly Analytics, WoS-Scielo Citation Index, AURA, JournalTOCs, and ProQuest.

Subscription Rates:
Institutions based outside Spain: €100 (VAT included) / Institutions based in Spain: €74 (VAT included)

Layout: SEDEN
Printing: Estu-Graf Impresores S.L.
Translation: Jorge Carlos Berriatúa Pérez
Legal Deposit: M-12824-2012

This publication is printed on acid-free paper.
MIXTO Papel FSC® C008517

SUMMARY

ENFERMERÍA NEFROLÓGICA / Volume 28 / Issue #4 / 2025

EDITORIAL

ORIGINALS

LETTER TO EDITOR

SUMARIO

EDITORIAL

ORIGINALES

CARTA AL DIRECTOR

Arellano-Armisen M. https://doi.org/10.37551/S2254-28842025028

The patient's voice as a lever for change in health care strategies

Manuel Arellano-Armisen

Vice-President, National Federation of ALCER Associations (FNA ALCER); Second Vice-President, Platform of Patient Organisations (POP)

Please cite this article in press as:
Arellano-Armisen M. The patient's voice as a lever for change in health policy. Enferm Nefrol. 2025;28(4):277–9

Corresponding author:
Manuel Arellano Armisen
marellano@alcer.org

"The coach says that what matters is taking part," I heard a child say to his mother the other day at a bus stop. It sounded like consolation, a forced acceptance after defeat. It made me think about how little attention we pay to the meaning of what we say.

I have lived with a chronic illness since the age of four, and rarely have I been able to choose when to participate, although this is beginning to change. I have had to fight fire-breathing dragons, ill-tempered cyclopes and the fiercest storms at sea in order not to decide, but simply to participate. Participation is a right, not a special favour granted by someone. It is basic common sense.

Our families train us from birth to enable us to participate in society. We learn to speak through repetition, just as we learn mathematics –often with music to make the nine times table more digestible– or when we learn a language. When we start a new job, we are taught the terminology, duties, processes, organisational culture and facilities, with the aim of integrating us into the organisation.

In healthcare, however, experience tells me that things function differently. We come from a paternalistic concept of medicine, in which the person does what the doctor says –without question. It is cultural. Perhaps it stems from the classical conception of medicine in Greece and Rome. Etymologically, in Greece the term ho *pathón* referred to "the one who suffers", and in Rome *patī* meant "to suffer" or "to endure", combined with the suffix *–nte(m)* meaning "one who does".[1] Through this union of body and mind, a physical illness was believed to impair one's capacity to govern one's actions, and thus the doctor acted on one's behalf.

It was not until the mid-20th century that civil society began to organise itself, not only to provide social and health services –where the state failed to do so– but also to demand participation rights. Today, thanks to this collective effort and to a broader movement for participation, things are changing.

Patient organisations such as ALCER and the Platform of Patient Organisations (POP) have worked for many years on the concept of shared responsibility. We understand that the participation of people with chronic illness or persistent symptoms, through patient organisations[2], is a fundamental instrument for influencing health policy and institutional decision-making across all relevant sectors, with the aim of improving the health care and social support we receive.

We live in a society in which 22 million people —54% of Spain's adult population— live with a chronic condition.[3] This reality is exposing the seams of a health system designed for acute care, now transitioning towards a person-centred model. The system must adapt to this social reality.

Patients and their organisations have ceased to be passive subjects and have become active agents of their own health. This paradigm shift is essential for building a more effective health care system focused on the person, not merely the disease.

Patient organisations are calling for the transformation of the current health care system into a model centred on the needs of people with chronic conditions, requiring innovation in processes to make them more transversal, prevent gaps in care, enhance territorial cohesion and coordination, and provide multidisciplinary care that integrates both health and social services.

The need for patients to have a political agenda in the pursuit of better health care has become central to discussions about the future of the health system. It is crucial that patient organisations play an active role in shaping health policies from their inception, within a collaborative model of co-governance.

Participation must be based on equality, clearly defined objectives, objective indicators and outcome evaluation, as this directly improves patient safety and quality of care.

This new model requires the indispensable and irreplaceable participation of patients, who offer a unique experiential perspective on illness, complementing professional expertise of any specialty.

And you may wonder: how do patients begin to participate? There are two routes, both involving what we call "associative prescription".

First, map the resources in your health care centre's catchment area: patient associations, community groups, sports organisations and other local resources. Engage with them, identify simple collaborative initiatives —there is always somewhere to begin —and when treating a patient with a condition linked to a specific association, you will know where to refer them so they can find peers.

Second, embed structured information into nursing and medical consultations. Clear, complete, understandable, empathetic information, provided consistently over successive consultations, allows the person and their family or carers to understand the diagnosis, treatment options, benefits and risks, and the consequences of each decision. Through this process, patients move from receiving information to shared decision-making, becoming co-authors of their care. Associative prescription supports those experiences that require empathy from others who have walked the same path.

With education and support, patients can be actively involved in decisions affecting their health, becoming co-responsible for their illness, treatment and therapeutic adherence[4] not only during the ten hours spent in consultations each year, but throughout the remaining 8,750 hours.

But participation must extend beyond the micro level into the meso and macro levels.

POP has created participACCIÓN[5], a self-assessment tool for patient participation in these broader contexts: hospitals (meso) and institutions (macro), incorporating structured participation, strategy, planning, defined roles, continuity, task allocation, feedback and outcome evaluation.

We need a comprehensive and collaborative approach. The patient's voice provides first-hand information from the perspective of an expert user, offering non-clinical insights that add value to health care delivery. Value means care that, grounded in scientific evidence, empowers patients and families, advances shared decision-making, improves clinical outcomes and quality of life, and accounts for health care system costs[6].

Without delving deeply into the concept of value-based health care (VBHC), we approach its participatory dimension, which is rooted in addressing patients' individual needs and expectations –in essence, what truly matters to the patient. In other words, it involves reorienting the measurement of reported health outcomes towards what is expected from the patient's own perspective.

In a culture where quantitative indicators are measured more often than qualitative ones, and where, as we are seeing, the patient perspective is essential, we must actively seek their inclusion in decision-making. We count hospital beds and surgical procedures, but not the impact of disease on a person and their family, nor its effects on employment, social life or economic stability. We make limited use of PROMs (Patient-Reported Outcome Measures), which assess future expectations, and PREMs (Patient-Reported Experience Measures), which evaluate lived experiences — although these tools are gradually gaining prominence in addressing patients' unmet expectations.

I invite you to become familiar with CROBI[7] –an acronym for *chronicity and well-being*– a PROM created by patients with chronic conditions that measures biopsychological, emotional and occupational factors. These measures help us better understand the individual's situation and have proven to be highly sensitive to changes in the life of a person living with chronic disease. Understanding, for example, that what motivates an 85-year-old patient on haemodialysis to rise each morning is spending time with their grandchildren allows us to tailor treatment accordingly and helps the patient feel genuinely understood.

Many people with chronic conditions, in addition to health care needs, also have social, educational and occupational needs. These cannot be addressed in isolation without generating negative consequences for both the individual and the system –through duplication of services, inefficiencies, territorial inequities in access or fragmented systems that fail to communicate with one another. Those who experience and suffer these shortcomings most directly are the patients themselves.

Currently, the patient movement is working in the field of participation with numerous public institutions to advance societal progress. Together with the Spanish Ministry of Health, we are at the core of the new national strategy for chronic patient care. We are driving the forthcoming law on patient associations, aimed at structuring the participation of all those who form part of the National Health System, including patients. We actively contribute to the digital health strategy, participate in the review of Therapeutic Positioning Reports (IPT), sit on ethics and patient committees within hospitals and regional health authorities, and have formalised training collaboration agreements with AEMPS and ISCIII.

It is urgent to redirect efforts towards addressing the health and social needs of people living with chronic disease, as well as towards the prevention, diagnosis and treatment of chronic conditions –some of which have worsened due to gaps in health care coverage. This transformation will only be possible through the meaningful participation of patients and their organisations, if we truly wish to improve care, adapt to reality and build a health care system that is more efficient, effective, cohesive, equitable and sustainable.

REFERENCES

1. Dicciomed. [cited 04 Dec 2025]. Available from: https://dicciomed.usal.es/palabra/paciente
2. Estudio "Impacto y retos de las organizaciones de pacientes en España". Plataforma de Organizaciones de Pacientes (POP). [Internet]. 2021 [cited 28 Nov 2025]. Available from: https://plataformadepacientes.org/wpcontent/uploads/2024/03/informepop_retos_impacto2021.pdf
3. Instituto Nacional de Estadística (INE). Encuesta Europea de Salud en España. Madrid. [Internet]. 2020 [cited 28 Nov 2025]. Available from: https://www.ine.es/ss/Satellite?L=es_ES&c=INESeccion_C&cid=1259926692949&p=1254735110672&pagename=ProductosYServicios%2FPYSLayout
4. Riski M, Puspitasari IM, Rahayu C, Alfian SD. Factors associated with selfcare behavior in patients with chronic kidney disease: a systematic review. BMC Nephrol. 2025;26(1):210.
5. ParticipACCIÓN. Plataforma de Organizaciones de Pacientes (POP). [Internet]. 2024 [cited 02 Dec 2025]. Available from: https://www.plataformadepacientes.org/participaccion/participaccion/.
6. Cantero D, Gallego I, Gómez E, Fullaondo A, Merino M, Romo Mª I. Estrategia de valor en Osakidetza. Osakidetza [Internet]. 2023 [cited 29 Nov 2025]. Available from: https://www.euskadi.eus/contenidos/informacion/osk_trbg_planes_programas/es_def/adjuntos/estrategia_valor_es.pdf
7. Cronicidad y Bienestar (crobi). Plataforma de Organizaciones de Pacientes (POP). [Internet]. 2024 [cited 29 Nov 2025]. Available from: https://www.plataformadepacientes.org/crobi/.

AWARD DIAVERUM

for the best work in haemodialysis

RULES

- All papers submitted to the 51th National SEDEN Congress on topics related to the field of haemodialysis will be eligible for consideration.
- Papers must be written in Spanish.
- Papers must be unpublished and comply with all submission requirements of the 51th National SEDEN Congress.
- The deadline for submission will be the same as that established for the submission of papers to the 51th National SEDEN Congress 2026.
- The Jury will be composed of the SEDEN Paper Evaluation Committee.
- The Award will be presented at the inaugural session of the 51th National SEDEN Congress 2026.
- The winning paper will be made available to the journal *Enfermería Nefrológica* for possible publication, subject to the decision of the editorial committee. Should the authors subsequently use the work and/or its data, they must acknowledge its origin as a SEDEN Award.
- To be eligible for the award, the paper must be presented at the 51th National SEDEN Congress. The presenting author shall be the first-listed author, who must be a nurse and a full member of SEDEN. Presentation by individuals not included among the authors will not be accepted.
- Any eventuality not provided for in these rules will be resolved by the SEDEN Executive Board.
- The Award will consist of a prize of €1,000.
- The Award may be declared void.

DIAVERUM

*This award is subject to the tax withholdings established by law.

Sánchez-Tocino ML, et al. https://doi.org/10.37551/S2254-28842025029

Assessment of quality of life in haemodialysis using COOP/WONCA charts: usefulness of a visual tool

Mª Luz Sánchez-Tocino[1,2,3], Marina Burgos-Villullas[4], Julia Audije-Gil[4], Paula Manso-del Real[4], David Hernán-Gascueña[4], Fabiola Dapena-Vielba[4], María Dolores Arenas-Jiménez[4], Unidad de Investigación Fundación Renal Española y Grupo de trabajo FRAGILDIAL

[1] School of Nursing and Physiotherapy, Department of Nursing, Universidad de Salamanca, Spain

[2] Instituto de Investigación Biomédica de Salamanca (IBSAL), Spain

[3] Fundación Renal Española, Salamanca, Spain

[4] Fundación Renal Española, Madrid, Spain

Please cite this article in press as:

Sánchez-Tocino ML, Burgos-Villullas M, Audije-Gil J, Manso-del Real P, Hernan-Gascueña D, Dapena-Vielba F, Arenas-Jiménez MD. Assessment of quality of life in haemodialysis using COOP/WONCA charts: usefulness of a visual tool. Enferm Nefrol. 2025;28(4):281-90

Corresponding author:

Mª Luz Sánchez-Tocino

Lsanchez@fundacionrenal.es

Received: 08-14-25

Accepted: 10-20-25

Published: 12-30-25

ABSTRACT

Introduction: Assessing health-related quality of life is common in patients with chronic conditions such as those undergoing haemodialysis. However, many questionnaires rely on written language, which hampers comprehension and limits the reliability of responses. The COOP/WONCA charts incorporate illustrations accompanying each item, facilitating the identification of health status, especially in individuals with low educational level, cognitive impairment or language barriers.

Objective: To evaluate the usefulness of the COOP/WONCA charts for assessing quality of life in haemodialysis patients and to analyse their relationship with clinical, physical, emotional and social parameters.

Material and Method: We conducted a descriptive cross-sectional study in haemodialysis patients from 15 centres (November 2024). Sociodemographic, clinical and treatment-related variables were collected. Quality of life was assessed using the COOP/WONCA charts (lower score = better quality of life) and *vs* the FRAIL, Barthel, Lawton–Brody, PHQ-4 and Gijón scales.

Results: A total of 716 patients were included (68.2% men, mean age 70±14.5 years). Worse scores were found in women, older patients, Spanish nationals, those with primary education, higher comorbidity, longer time on dialysis and three or more weekly sessions ($p<0.05$). The charts showed a significant correlation with frailty, physical dependence and poorer emotional status, with no association with social risk.

Conclusions: The COOP/WONCA charts are an appropriate tool for assessing quality of life in haemodialysis. Their visual format facilitates comprehension and expression of health status, promoting a more accurate and person-centred assessment.

Keywords: haemodialysis; health-related quality of life; COOP/WONCA charts; comorbidity; frailty; activities of daily living; emotional status; social risk; visual questionnaires.

RESUMEN

Evaluación de la calidad de vida en hemodiálisis mediante las láminas COOP/WONCA: utilidad de una herramienta visual

Introducción: Evaluar la calidad de vida relacionada con la salud es habitual en pacientes crónicos como los que reciben hemodiálisis. Sin embargo, muchos cuestionarios se basan en lenguaje escrito, lo que dificulta su comprensión y limita la fiabilidad de

las respuestas. Las láminas COOP/WONCA incorporan ilustraciones que acompañan a cada ítem, facilitando la identificación del estado de salud, especialmente en personas con bajo nivel educativo, deterioro cognitivo o barreras idiomáticas.

Objetivo: Estudiar la utilidad de las láminas COOP WONKA para evaluar la calidad de vida en pacientes en hemodiálisis, analizando su relación con parámetros clínicos, físicos, emocionales y sociales.

Material y Método: Estudio descriptivo transversal en pacientes en hemodiálisis de 15 centros (noviembre 2024). Se recogieron variables sociodemográficas, clínicas y de tratamiento. La calidad de vida se evaluó con las láminas COOP/WONCA (menor puntuación=mayor calidad de vida) y se comparó con las escalas FRAIL, Barthel, Lawton-Brody, PHQ-4 y Gijón.

Resultados: Se incluyeron 716 pacientes (68,2% hombres, edad media 70±14,5 años). Se hallaron peores puntuaciones en mujeres, mayores, españoles, con estudios primarios, mayor comorbilidad, más tiempo en diálisis y tres o más sesiones semanales (p<0,05). Las láminas mostraron correlación significativa con fragilidad, dependencia física y peor estado emocional, sin asociación con riesgo social.

Conclusiones: Las láminas COOP/WONCA son una herramienta adecuada para evaluar la calidad de vida en hemodiálisis. Su formato visual facilita la comprensión y expresión del estado de salud, promoviendo una valoración más precisa y centrada en la persona.

Palabras clave: hemodiálisis; calidad de vida relacionada con la salud; láminas COOP/WONCA; comorbilidad; fragilidad; actividades de la vida diaria; estado emocional; riesgo social; cuestionarios visuales.

INTRODUCTION

Health-related quality of life (HRQoL) is a key indicator in the care of patients with chronic diseases such as advanced chronic kidney disease treated with haemodialysis (HD). Beyond clinical or laboratory parameters, patients' subjective perception of health reflects the true impact of treatment on functionality, psychological well-being and social integration[1-2]. In the HD population, poor HRQoL has been associated with increased risk of hospitalisation, treatment discontinuation and higher mortality[3,4].

Assessment of HRQoL in HD is usually performed using standardised questionnaires such as the KDQOL-SF or SF-36, which, although comprehensive and validated, require a minimum level of literacy, reading comprehension and administration time. These limitations may affect response reliability in patients with low educational levels, cognitive impairment or in multicultural settings where language acts as a barrier[5,6].

The COOP/WONCA charts emerge as an alternative for HRQoL assessment. They constitute a brief, visual instrument, originally developed in primary care, combining a simple question with illustrations representing different health situations. The questionnaire includes nine dimensions: physical fitness, feelings, daily activities, social activities, change in health status, general health, pain, social support and overall quality of life. Each item is scored from 1 to 5, with higher values reflecting worse perceived health[7,8]. Their visual format facilitates identification of health status even in patients with difficulties in written comprehension, cognitive impairment or language barriers[9-11].

Several studies have demonstrated the usefulness and validity of the COOP/WONCA charts in primary care populations, elderly patients and psychiatric patients, showing good correlation with more extensive quality-of-life scales and high acceptability among patients[12,13]. In nephrology, evidence remains limited, although preliminary studies suggest that this tool may be practical for evaluating HRQoL in haemodialysis patients[14,15].

Since HD patients present a high prevalence of frailty, functional dependence, anxiety-depression and social risk[16-18], it is necessary to validate tools that allow integrated assessment of HRQoL and are feasible in routine clinical practice. The present study aims to address this gap by analysing the performance of the COOP/WONCA charts in a multicentre cohort of HD patients and comparing their results with other scales assessing clinical, physical, emotional and social aspects.

The objective was therefore to study the usefulness of the COOP/WONCA charts for evaluating quality of life in haemodialysis patients, analysing their relationship with other parameters and scales that assess clinical, physical, emotional and social dimensions.

MATERIAL AND METHOD

Study setting

The study was conducted in 15 haemodialysis centres, both hospital-based and outpatient, belonging to the Spanish Renal Foundation (FRE).

Study design and population

We conducted an observational, descriptive, cross-sectional and retrospective study in November 2024, including patients enrolled in a regular haemodialysis programme. Data were collected consecutively throughout November, including both extraction of clinical and treatment data from medical records and administration of questionnaires, in all prevalent adult patients undergoing treatment. No additional exclusion criteria were applied, except for missing clinical data or failure to complete the questionnaires.

Data collection procedure

Information was obtained from the electronic medical record and the Nefrosoft® software, routinely used in dialysis units to record clinical, laboratory and sociodemographic parameters. Variables were collected in three main blocks:

- Sociodemographic variables: sex, age, marital status, educational level, employment status, migrant status and ethnicity.
- Clinical and kidney disease variables: Charlson Comorbidity Index (CCI), aetiology of chronic kidney disease, time on dialysis, session frequency (<3 or ≥3/week), presence or absence of residual diuresis, type of vascular access (catheter, fistula or graft).
- Health status, functional capacity and social support variables, obtained through the standardised scales described below.

Scales used

Health-Related Quality of Life: COOP/WONCA

Health-related quality of life was the main outcome variable and was assessed using the COOP/WONCA charts[7,8], developed by the Dartmouth COOP Project in collaboration with WONCA (World Organization of National Colleges, Academies and Academic Associations of General Practitioners/Family Physicians).

These charts constitute a graphical questionnaire that evaluates perceived health over the previous two weeks across nine domains:

1. Physical fitness
2. Feelings
3. Daily activities
4. Social activities
5. Change in health status
6. General health status
7. Pain
8. Social support
9. Overall quality of life

Each domain is represented by a simple question accompanied by five illustrations or vignettes that help the patient identify the option that best reflects their situation. Responses are scored on a scale from 1 (best state) to 5 (worst state). The total score is obtained by summing the items (range 9–45), with higher values indicating poorer quality of life. For interpretative purposes, the sample was classified into three groups: High quality of life: 0–15 points; moderate quality of life: 16–30 points; low quality of life: 31–45 points.

This instrument has demonstrated good reliability and validity in different clinical contexts and has previously been validated in Spanish haemodialysis populations[14,15], where its visual format offers a clear advantage for patients with low educational level, cognitive impairment or language barriers, which are highly prevalent in this clinical profile.

Frailty (FRAIL)

Frailty was assessed using the FRAIL scale[19], which includes five items: fatigue, resistance, ambulation, illnesses and weight loss. Each item is scored 0–1, and the final classification is: Non-frail (0 points), Pre-frail (1–2 points) and Frail (≥3 points). This scale has been validated in elderly populations and in patients with kidney disease, showing adequate predictive ability for complications and mortality.

Functional Dependence: ADL and IADL

Barthel Index (Activities of Daily Living, ADL)[20] assesses autonomy in basic daily activities such as feeding, dressing, mobility and sphincter control. Scores range from 0 to 100, categorised as: no impairment (100–96), mild (76–95), moderate (51–75) and severe impairment (≤50).

Lawton–Brody Scale (Instrumental Activities of Daily Living, IADL)[21] measures the ability to perform instrumental activities (use of telephone, transportation, medication management, shopping, etc.), with scores from 0 to 8, classified as: totally dependent (0–1), severe (2–3), moderate (4–5), and mild dependence (6–7) and independent (8).

Emotional Status: PHQ-4

The Patient Health Questionnaire-4 (PHQ-4)[22] is an ultra-brief 4-item questionnaire consisting of two anxiety questions (GAD-2) and two depression questions (PHQ-2). Total score ranges from 0 to 12, classified as: no symptoms (0–3), mild (4–6), moderate (7–9) and severe (10–12).

Social Risk: Gijón Scale

The Gijón Socio-family Scale[23] evaluates social risk based on five dimensions: family situation, social relationships, economic status, housing and social support. Each item is scored from 1 to 5, with a total score range of 5–25, categorised as: low (<10), medium (10–16) and high risk (≥17).

This tool has been validated in the Spanish population aged over 65 years.

Data were collected during November 2024. Questionnaires (COOP/WONCA, FRAIL, Barthel, Lawton-Brody, PHQ-4 and Gijón) were administered by nursing staff in each haemodialysis unit during treatment sessions using a tablet device specifically enabled for this purpose. Responses were recorded directly in the digital platform with automatic upload to the central database, avoiding manual transcription and reducing potential errors. Where patients had reading, visual or comprehension difficulties, the nurse assisted by reading the questions and supporting the process while maintaining neutrality to avoid influencing responses.

Statistical analysis

Qualitative variables were expressed as absolute frequencies and percentages; quantitative variables as mean ± standard deviation if normally distributed, or median and interquartile

range otherwise. Group comparisons were performed using Student's t test or ANOVA for parametric variables, and Mann–Whitney U or Kruskal–Wallis tests for non-parametric variables. Categorical variables were analysed using Pearson's chi-square test. Statistical significance was set at p≤0.05. Analyses were conducted with IBM SPSS® Statistics v29.0 and figures were produced with Microsoft Excel® 2021.

Ethical Considerations

The study was authorised by the Spanish Renal Foundation and approved by the Research Ethics Committee of Fundación Jiménez Díaz. Data confidentiality and compliance with Spanish Organic Law 3/2018 on Personal Data Protection and Digital Rights were ensured. All participants provided written informed consent and retained their ARCO rights (access, rectification, cancellation and opposition).

RESULTS

The sample consisted of 716 patients, predominantly male (68.2%), with a mean age of 70.0±14.5 years. The most frequent cause of chronic kidney disease was diabetic nephropathy (25.4%), followed by unknown causes (20.9%) and glomerular disease (15.2%). Median time on dialysis was 36 months (IQR 17–68), and most patients received ≥3 weekly sessions (90.2%). Mean BMI was 26.3±5.2 kg/m². Among patients with available data, 44% preserved residual diuresis. The predominant vascular access was native fistula or graft (62.9%), compared with catheter (37.1%). Sociodemographically, the cohort was mainly Caucasian (73.0%), with 16.1% migrants and a high proportion of pensioners/retired individuals (61.6%). Data on sociodemographics and renal disease are shown in **table 1**.

Table 2 illustrates the distribution of the sample according to the scales used. Over half of patients were independent in ADL (53.4%), although 39.1% showed some degree of dependence in IADL. Emotional symptoms (anxiety or depression) were present in 23.7% (PHQ-4). Frailty was highly prevalent: 46.0% pre-frail and 26.5% frail. Regarding social risk, 31.6% exhibited medium or high risk according to the Gijón scale.

Figure 1 shows the overall distribution of quality of life according to the total COOP/WONCA score. Of the 716 patients, 37 (5.2%) presented high quality of life (0–15 points), 607 (84.8%) moderate quality of life (16–30 points) and 72 (10.1%) low quality of life (31–45 points). Domain-level analysis, expressed as the mean scores on a 1–5 scale (with higher values indicating worse quality of life), showed that the most impaired areas were physical functioning (3.7) and general health (3.4). Social limitation was the domain with the best outcome (1.8), while the remaining dimensions were in intermediate ranges: emotional status (2.0), usual activities (2.1), pain (2.4), social support (2.5), global perception (2.5) and health change (2.8).

The association between general variables, renal disease characteristics and sociodemographic factors with quality

Table 1. General characteristics of the haemodialysis population (n=716).

Variable	Category	Value
General descriptives		
Sex (n=716)	Male Female	488 (68.2%) 228 (31.8%)
Age, years (n=716)	—	70.0±14.5
Charlson index (n=711, missing =5)	—	7.8±2.9
Renal disease variables		
Aetiology of CKD (n=701, missing =15)	Diabetes Unknown Vascular Nephritis/Pyelonephritis Glomerulonephritis/ Memb. nephropathy Polycystic kidney disease Tumour / Other	182 (25.4%) 150 (20.9%) 108 (15.1%) 51 (7.1%) 109 (15.2%) 56 (7.8%) 45 (6.3%)
Time on HD, months (n=677, missing=39)	—	Median 36 (IQR 17–68)
Sessions per week (n=710, missing =6)	<3 ≥3	64 (8.9%) 646 (90.2%)
Residual diuresis (n=323, missing=393)	Yes No	142 (44.0%) 181 (56.0%)
Vascular access (n=623, missing=93)	Catheter Native AVF / Graft	231 (37.1%) 392 (62.9%)
Sociodemographic variables		
Ethnicity (n=591, missing=125)	Caucasian Arab Asian Black Other	523 (73.0%) 10 (1.4%) 5 (0.7%) 9 (1.3%) 44 (6.1%)
Migrant (n=714, missing=2)	Yes No	115 (16.1%) 599 (83.9%)
Employment status (n=614, missing=102)	Employed Retired Pensioner Unemployed Other	89 (12.4%) 209 (29.2%) 232 (32.4%) 37 (5.2%) 47 (6.6%)
Educational level (n=442, missing=274)	Primary Secondary Higher	200 (27.9%) 158 (22.1%) 84 (11.7%)
Marital status (n=587, missing=129)	Single Married Divorced Separated Separated Free Union	104 (14.5%) 346 (48.3%) 27 (3.8%) 34 (4.7%) 34 (4.7%) 8 (1,1%)

Table 2. Clinical, functional, psychological and social variables used for COOP/WONCA validation.

Variable	Category (score)	Value (n, %)
Clinical dimension		
Frailty (n=648, missing=68)	Non-frail (0) Pre-frail (1–2) Frail (≥3)	178 (27.5%) 298 (46.0%) 172 (26.5%)
Physical dimension		
IADL (Lawton–Brody) (n=659, missing=57)	Totally dependent (0–1) Severe dependence (2–3) Moderate dependence (4–5) Mild dependence (6–7) Independent (8)	22 (3.3%) 101 (15.3%) 135 (20.5%) 160 (24.3%) 241 (36.6%)
ADL (Barthel) (n=676, missing=40)	No impairment (100–96) Mild impairment (76–95) Moderate impairment (51–75) Severe impairment (≤50)	361 (53.4%) 192 (28.4%) 83 (12.3%) 40 (5.9%)
Psychological dimension		
Emotional status (PHQ-4) (n=615, missing=101)	No symptoms (0–3) Mild symptoms (4–6) Moderate symptoms (7–9) Severe symptoms (10–12)	469 (76.3%) 101 (16.4%) 38 (6.2%) 7 (1.1%)
Social dimension		
Gijón Scale (n=478, missing=238)	No risk (<65 years / 0 points) Low social risk (<10) Moderate social risk (10–16) High social risk (≥17)	68 (14.2%) 259 (54.2%) 145 (30.3%) 6 (1.3%)

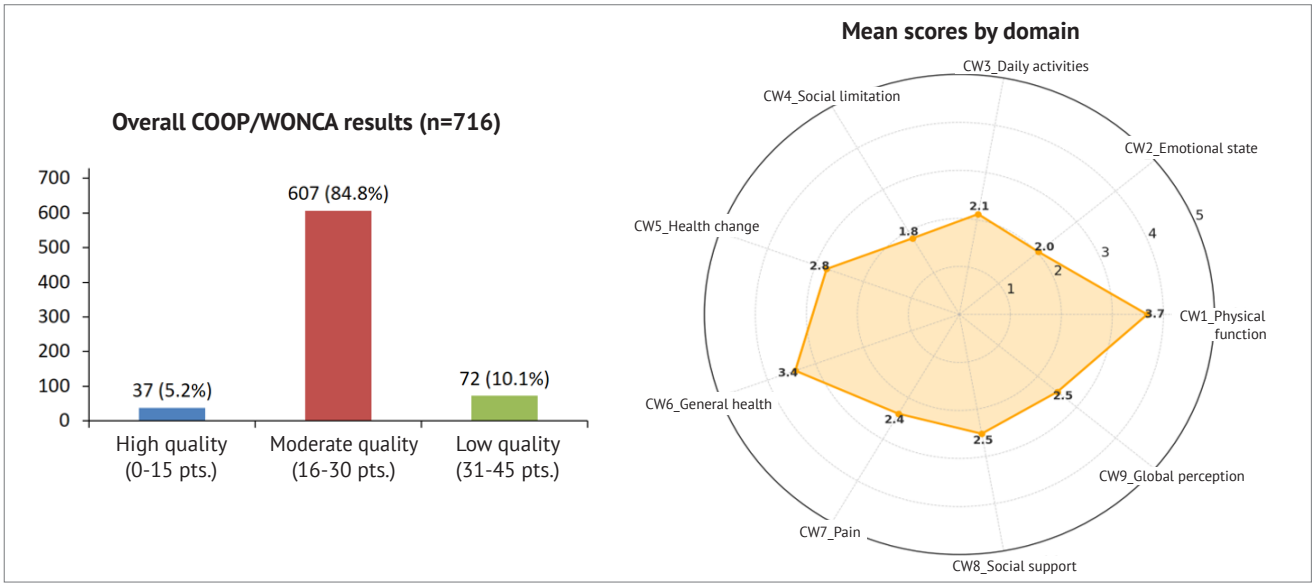


Figure 1. Overall results and domain profile of the COOP/WONCA slides in hemodialysis patients (n=716).

of life according to COOP/WONCA is presented in Table 3. Quality of life measured by COOP/WONCA was significantly worse in women (24.6±5.5 *vs* 22.6±5.6 in men; p<0.001), in older patients (60.0±15.5 in high quality *vs* 71.2±13.7 in low quality; p=0.001), and in those with greater comorbidity (Charlson index 6.8±3.4 *vs* 8.8±2.6; p=0.001). Worse quality of life was also associated with longer time on haemodialysis (p=0.041), receiving≥3 sessions per week (p=0.035) and absence of residual diuresis (24.1±5.5 *vs* 22.3±5.5; p=0.003).

Table 3. Association among general, renal and sociodemographic variables and quality of life according to COOP/WONCA.

Variable	Category	CW total score Mean ± SD/ Median (IQR)	High QoL Mean ± SD/N (%)	Moderate QoL Mean±SD/ N (%)	Low QoL Mean±SD/ N (%)	P value
Sex	Male (n=488) Female (n=228)	22.6±5.6 24.6±5.5	— —	— —	— —	**<0.001***
Age (years) (n=716)	—	—	60.0±15.5	67.7±14.4	71.2±13.7	**0.001***
Charlson index (n=711)	—	—	6.8±3.4	7.8±2.8	8.8±2.6	**0.001***
Time on HD (months) (n=677)	—	—	34 (20–57)	34 (17–66)	51 (26–80)	**0.041****
Dialysis sessions / week	<3 (n=64) ≥3 (n=646)	22.0±4.7 23.4±5.7	— —	— —	— —	**0.035***
Residual diuresis	Yes (n=142) No (n=181)	22.3±5.5 24.1±5.5	— —	— —	— —	**0.003***
Vascular access	Catheter (n=231) AVF/graft (n0392)	23.9±5.7 22.9±5.6	— —	— —	— —	0.081*
Migrant status	No (n=599) Yes (n=115)	23.5±5.7 22.3±5.4	— —	— —	— —	**0.025***
Marital status	Partnered (n=354) Not partnered (n=233)	— —	20 (5.6%) 11 (4.7%)	296 (83.6%) 202 (86.7%)	38 (10.7%) 20 (8.6%)	0.415***
Employment status	Employed (n=89) Retired (n=209) Pensioner (n=232) Unemployed (n=37) Other (n=47)	— — — — —	7 (7.9%) 10 (4.8%) 8 (3.4%) 3 (8.1%) 4 (8.5%)	73 (82.0%) 183 (87.6%) 195 (84.1%) 32 (86.5%) 39 (83.0%)	9 (10.1%) 16 (7.7%) 29 (12.5%) 2 (5.4%) 4 (8.5%)	0.426***
Educational level	Primary (n=200) Secondary (n=158) Higher (n=84)	— — —	8 (4.0%) 9 (5.7%) 7 (8.3%)	168 (84.0%) 134 (84.8%) 70 (83.3%)	24 (12.0%) 15 (9.5%) 7 (8.3%)	0.549***

Bold p-values indicate statistical significance (p < 0.005).
* t-test/ANOVA. ** Kruskal–Wallis. *** χ^2 test.

Vascular access by catheter showed a trend towards poorer scores compared with fistula/graft (p=0.081). In contrast, no significant associations were found with marital status, employment status or educational level.

Table 4 illustrates the relationship between the different scales measuring clinical status, physical condition, emotional status and social risk and their association with quality of life according to COOP/WONCA.

Quality of life showed a statistically significant association with all clinical and functional dimensions analysed, except with social risk measured by the Gijón scale. The proportion of patients with low quality of life increased progressively with greater frailty (19.8% in frail *vs* 3.4% in non-frail; p<0.001). Similarly, dependence in instrumental activities of daily living (Lawton–Brody) and basic activities of daily living (Barthel) was associated with poorer quality of life: totally dependent patients in AIVD showed 36.4% low quality of life compared with 5.8% among independent patients (p=0.001), and in ABVD the prevalence of low quality of life reached 30% in severe cases *vs* 4.4% in those without impairment (p<0.001).

Emotional status was strongly related to quality of life: whereas 6.2% of patients without symptoms on PHQ-4 had low quality of life, this figure rose to 57.1% among those with severe symptoms (p<0.001). With respect to social risk (Gijón scale), although a trend towards higher proportions of low quality of life was observed at intermediate risk levels, the overall differences did not reach statistical significance (p=0.115).

DISCUSSION

In this multicentre cohort of 716 haemodialysis patients, the COOP/WONCA charts discriminated levels of quality of life in a manner consistent with the patients' clinical, functional and emotional profiles. Poorer scores were observed in women, in older individuals, in those with higher comorbidity according to the Charlson index, in patients with longer time on dialysis, absence of residual diuresis, and in those receiving ≥3 sessions per week. In addition, a clear gradient of worsening quality of life was observed in the presence of frailty and increasing dependence in both basic and instrumental activities of daily living, as well as in patients with symptoms

Table 4. Relationship among the different scales assessing clinical status, physical function, emotional state, and social risk, and their association with quality of life according to COOP/WONCA.

Variable	Category (score)	High QoL N (%)	Moderate QoL N (%)	Low QoL N (%)	P (χ^2)
Clinical dimension					
Frailty (n=648, missing=68)	Non-frail (0) Pre-frail (1–2) Frail (>3)	18 (10.1%) 10 (3.4%) 4 (2.3%)	154 (86.5%) 263 (88.3%) 134 (77.9%)	6 (3.4%) 25 (8.4%) 34 (19.8%)	**<0.001**
Dimensión Física					
IADL – Lawton–Brody (n=659, missing=57)	Totally dependent (0–1) Severe dependence (2–3) Moderate dependence (4–5) Mild dependence (6–7) Independent (8)	0 (0.0%) 2 (2.0%) 10 (7.4%) 9 (5.6%) 15 (6.2%)	14 (63.6%) 87 (86.1%) 109 (80.7%) 134 (83.8%) 212 (88.0%)	8 (36.4%) 12 (11.9%) 16 (11.9%) 17 (10.6%) 14 (5.8%)	**0.001**
BADL–Barthel Index (n=676, missing=40)	No problem (100–96) Mild problem (76–95) Moderate problem (51–75) Severe problem (≤50)	23 (6.4%) 10 (5.2%) 3 (3.6%) 0 (0.0%)	322 (89.2%) 162 (84.4%) 60 (72.3%) 28 (70.0%)	16 (4.4%) 20 (10.4%) 20 (24.1%) 12 (30.0%)	**<0.001**
Psychological dimension					
Emotional status – PHQ-4 (n=615, missing=101)	No symptoms (0–3) Mild symptoms (4–6) Moderate symptoms (7–9) Severe symptoms (10–12)	29 (6.2%) 1 (1.0%) 2 (5.3%) 0 (0.0%)	411 (87.6%) 82 (81.2%) 28 (73.7%) 3 (42.9%)	29 (6.2%) 18 (17.8%) 8 (21.1%) 4 (57.1%)	<0.001
Social dimension					
Gijón Scale (n=478, missing=238)	No risk (<65 yrs / 0 pts) Low social risk (<10) Medium social risk (10-16) High social risk (≥17)	5 (7.4%) 16 (6.2%) 1 (0.7%) 0 (0.0%)	56 (82.4%) 217 (83.8%) 123 (84.8%) 6 (100.0%)	7 (10.3%) 26 (10.0%) 21 (14.5%) 0 (0.0%)	0.115

Bold p-values indicate statistical significance (p<0.005). Chi-square test.

of anxiety or depression, whereas no overall association was found with social risk as measured by the Gijón scale. These findings reinforce the construct validity of the instrument in haemodialysis and confirm its practical usefulness for rapid patient stratification, in line with evidence linking subjective health perception with hospitalisation, treatment discontinuation and mortality in dialysis[3,4].

The COOP/WONCA charts were originally designed as a brief visual tool for use in primary care[24], and their reliability, validity and sensitivity to change have been documented in the general population, older adults and psychiatric patients[12,13,25]. Our findings reproduce this consistency in the dialysis population, supporting previous Spanish studies that demonstrated the acceptability of the charts and their correlation with more extensive quality-of-life measures in haemodialysis[14,15]. The clear gradient between frailty (FRAIL scale) and poorer COOP/WONCA scores is physiopathologically plausible, as frailty encapsulates clinical vulnerability, functional decline and risk of complications, which translate into worse subjective health perception[26]. Similarly, dependence in basic (Barthel) and instrumental (Lawton–Brody) activities showed consistent associations with poorer quality of life, supporting the ability of the instrument to adequately reflect the impact of autonomy on daily living. These findings are consistent with the literature linking frailty and functional dependence with poorer quality of life and increased mortality in dialysis patients[27-30].

Emotional status emerged as one of the most influential domains, with a very pronounced gradient between mild, moderate and severe symptoms on the PHQ-4 and worsening COOP/WONCA scores. The nephrology literature consistently shows that anxiety and depression are central determinants of the dialysis experience[31] and of therapeutic adherence[32], which explains the strong convergence observed. Similarly, preservation of residual diuresis and dialysis schedules of fewer than three weekly sessions were associated with better quality of life, a finding consistent with studies linking preservation of residual renal function and incremental dialysis with improved fluid and toxin control, greater dietary freedom, and better survival and quality of life in haemodialysis[33].

With respect to vascular access, only a trend towards poorer quality of life was found in catheter users compared with fistula or graft carriers. Although numerous studies have demonstrated the association of catheters with higher morbidity and mortality[34], consistent differences in quality of life have not always been confirmed, probably due to the influence of multiple clinical and social confounders.

Regarding sociodemographic variables, the pattern described in the literature was confirmed: poorer quality of life in women and progressive deterioration with age and comorbidity, in agreement with large series and systematic reviews[35].

Finally, the social dimension measured by the Gijón scale showed no statistically significant association with overall quality of life. This result may be explained by loss of statistical power due to a high proportion of missing data, by the fact that the scale was designed for older populations[23] and may not discriminate equally well in younger patients, or because it measures more stable structural conditions, whereas COOP/WONCA reflects more immediate and changeable perceptions[15]. In addition, the haemodialysis context itself, where professional support networks are present, may buffer the impact of social risk on health perception[18].

This study has several strengths, including its large sample size, multicentre design, and the inclusion of clinical, functional, emotional and social dimensions, allowing a comprehensive view of quality of life in haemodialysis. Nevertheless, some limitations must be acknowledged: the cross-sectional design precludes causal inference; missing data in certain variables, particularly social risk, may introduce interpretative bias; and the absence of direct comparison with more extensive instruments such as KDQOL or SF-36 limits cross-validation within the same cohort. Future research should assess the responsiveness of the COOP/WONCA charts in longitudinal studies, evaluate their predictive value for hospitalisation and mortality, and directly compare them with longer questionnaires to determine concordance and administrative burden.

In conclusion, the COOP/WONCA charts are consolidated as a useful visual tool for assessing quality of life in haemodialysis patients. Their brief format, combining text and illustration, facilitates comprehension and enables rapid screening of patients with poorer health perception, particularly in contexts of cultural diversity, low educational level or cognitive impairment. Their implementation in clinical practice may facilitate needs identification, guide person-centred interventions and contribute to more comprehensive and effective haemodialysis care.

Funding

None declared.

Conflicts of interest

None declared.

REFERENCES

1. Maslić Sersić D, Vuletić G. Psychometric evaluation and establishing norms of Croatian SF-36 health survey: framework for subjective health research. Croat Med J. 2006;47(1):95-102.
2. Bentsen BG, Natvig B, Winnem M. Vurdering av egen funksjonsevne COOP-WONCAs spørreskjemaer i klinikk og forskning [Assessment of one's own functional status. COOP-WONCA questionnaire charts in clinical practice and research]. Tidsskr Nor Laegeforen. 1997;117(12):1790-3.
3. Oliveira AP, Schmidt DB, Amatneeks TM, Santos JC, Cavallet LH, Michel RB. Quality of life in hemodialysis patients and the relationship with mortality, hospitalizations and poor treatment adherence. J Bras Nefrol. 2016;38(4):411-20. https://doi.org/10.5935/0101-2800.20160066
4. Rincon Bello A, Ion Titapiccolo J, Berdud Godoy I, Samaniego DJC, Ortego Perez S, Sobrino Perez A, Shkolenko K, Stuard S, Neri L, Baró Salvador ME. Better health-related quality of life is associated with prolonged survival and reduced hospitalization risk among dialysis-dependent chronic kidney disease patients: a historical cohort study. BMC Nephrol. 2024;25(1):388. https://doi.org/10.1186/s12882-024-03835-0
5. Porter AC, Vijil JC Jr, Unruh M, Lora C, Lash JP. Health-related quality of life in Hispanics with chronic kidney disease. Transl Res. 2010;155(4):157-63. https://doi.org/10.1016/j.trsl.2009.10.005
6. Hussien H, Apetrii M, Covic A. Health-related quality of life in patients with chronic kidney disease. Expert Rev Pharmacoecon Outcomes Res. 2021;21(1):43-54. https://doi.org/10.1080/14737167.2021.1854091
7. Van Weel C. Functional status in primary care: COOP/WONCA charts. Disabil Rehabil. 1993;15(2):96-101. https://doi.org/10.3109/09638289309165878
8. Lizán Tudela L, Reig Ferrer A. Adaptación transcultural de una medida de la calidad de vida relacionada con la salud: la versión española de las viñetas COOP/WONCA [Cross cultural adaptation of a health related quality of life measurement: the Spanish version of the COOP/WONCA cartoons]. Aten Primaria. 1999;24(2):75-82. PMID: 10432751.
9. Galmarini E, Marciano L, Schulz PJ. The effectiveness of visual-based interventions on health literacy in health care: a systematic review and meta-analysis. BMC Health ServRes.2024;24(1):718. https://doi.org/10.1186/s12913-024-11138-1. PMID: 38862966; PMCID: PMC11165863
10. Lennon OC, Carey A, Creed A, Durcan S, Blake C. Reliability and validity of COOP/WONCA functional health status charts for stroke patients in primary care. J Stroke Cerebrovasc Dis. 2011;20(5):465-73. https://doi.org/10.1016/j.jstrokecerebrovasdis.2010.02.020. Epub 2010 Sep 2. PMID: 20813545.

11. Elias MF, Dore GA, Davey A. Kidney disease and cognitive function. Contrib Nephrol. 2013;179:42-57. https://doi.org/10.1159/000346722. Epub 2013 May 3. PMID: 23652448; PMCID: PMC3843375.

12. Kinnersley P, Peters T, Stott N. Measuring functional health status in primary care using the COOP-WONCA charts: acceptability, range of scores, construct validity, reliability and sensitivity to change. Br J Gen Pract. 1994 Dec;44(389):545-9.

13. Linaker OM, Moe A. The COOP/WONCA charts in an acute psychiatric ward. Validity and reliability of patients' self-report of functioning. Nord J Psychiatry. 2005;59(2):121-6. https://doi.org/10.1080/08039480510022918

14. Martín F, Reig A, Ferrer R, Sarró F. Láminas COOP/WONCA: un instrumento válido para determinar la CVRS en el paciente en diálisis? [COOP/WONCA charts: a valid instrument for determining health-related quality of life in dialysis patients?]. Nefrologia. 2004;24(2):192-3. PMID: 15219096.

15. Arenas MD, Moreno E, Reig A, Millán I, Egea JJ, Amoedo ML, Gil MT, Sirvent AE. Evaluación de la calidad de vida relacionada con la salud mediante las láminas Coop-Wonca en una población de hemodiálisis [Evaluation of health-related quality of life (HRQL) based on information from Coop/Wonca sheets in hemodialysis patients]. Nefrologia. 2004;24(5):470-9. PMID: 15648905.]

16. Sánchez-Tocino ML, Miranda-Serrano B, Villoria-González S, Pereira-García M, López-González A, González-Parra E. Clasificación funcional del paciente anciano en hemodiálisis y su influencia en la individualización del tratamiento. Enferm Nefrol. 2022;25(3):237-45. https://www.doi,org/:10.37551/S2254-28842022003

17. Pretto CR, Winkelmann ER, Hildebrandt LM, Barbosa DA, Colet CF, Stumm EMF. Quality of life of chronic kidney patients on hemodialysis and related factors. Rev Lat Am Enfermagem. 2020;28:e3327. https://doi.org/10.1590/1518-8345.3641.3327. Epub 2020 Jul 15. PMID: 32696925; PMCID: PMC7365615.

18. Vázquez María Isabel, Aspectos psicosociales del paciente en diálisis. En: Lorenzo V., López Gómez JM (Eds). Nefrología al día. ISSN: 2659-2606. Available from: https://www.nefrologiaaldia.org/553

19. Morley JE, Malmstrom TK, Miller DK. A simple frailty questionnaire (FRAIL) predicts outcomes in middle aged African Americans. J Nutr Health Aging. 2012;16(7):601-8. https://doi.org/10.1007/s12603-012-0084-2. PMID: 22836700; PMCID: PMC4515112.

20. Mahoney FI, Barthel DW. Functional evaluation: The Barthel Index. Md State Med J. 1965 Feb;14:61-5. PMID: 14258950.

21. Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living. Gerontologist. 1969 Autumn;9(3):179-86. PMID: 5349366.

22. Löwe B, Wahl I, Rose M, Spitzer C, Glaesmer H, Wingenfeld K, Schneider A, Brähler E. A 4-item measure of depression and anxiety: validation and standardization of the Patient Health Questionnaire-4 (PHQ-4) in the general population. J Affect Disord. 2010;122(1-2):86-95. https://doi.org/10.1016/j.jad.2009.06.019. Epub 2009 Jul 17. PMID: 19616305.

23. García González JV, Díaz Palacios E, Salamea García A, Cabrera González D, Menéndez Caicoya A, Fernández Sánchez A, Acebal García V. Evaluación de la fiabilidad y validez de una escala de valoración social en el anciano [An evaluation of the feasibility and validity of a scale of social assessment of the elderly]. Aten Primaria. 1999;23(7):434-40. PMID: 10363397.

24. Ben-Eli D, Hermoni D. [Evaluation of functional status in primary care--use of WONCA/COOP charts]. Harefuah. 1994;127(9):327-33. PMID: 7843662.

25. Broeiro P, Ramos V, Tavares I, Cunha E, Amorim J. Avaliação de estados funcionais no idoso. Exercício de aplicação de uma versão portuguesa de escala COOP/WONCA charts [The assessment of functional status in the elderly. The application of a Portuguese version of the COOP/WONCA charts]. Acta Med Port. 1995;8(5):279-88. PMID: 7625227.

26. Crocker TF, Brown L, Clegg A, Farley K, Franklin M, Simpkins S, Young J. Quality of life is substantially worse for community-dwelling older people living with frailty: systematic review and meta-analysis. Qual Life Res. 2019;28(8):2041-2056. https://doi.org/10.1007/s11136-019-02149-1. Epub 2019 Mar 14. PMID: 30875008; PMCID: PMC6620381.

27. King SJ, Reid N, Brown SJ, Brodie LJ, Sia ADH, Chatfield MD, Francis RS, Peel NM, Gordon EH, Hubbard RE. A prospective, observational study of frailty, quality of life and dialysis in older people with advanced chronic kidney disease. BMC Geriatr. 2023;23(1):664. https://doi.org/10.1186/s12877-023-04365-4. PMID: 37845618; PMCID: PMC10580596.

28. Apostolou T. Quality of life in the elderly patients on dialysis. Int Urol Nephrol. 2007;39(2):679-83. https://doi:10.1007/s11255-007-9225-7. Epub 2007 May 24. PMID: 17522961

29. Pereira M, Tocino MLS, Mas-Fontao S, Manso P, Burgos M, Carneiro D, Ortiz A, Arenas MD, González-Parra E. Dependency and frailty in the older haemodialysis patient. BMC Geriatr. 2024;24(1):416. https://doi.org/10.1186/s12877-024-04973-8. PMID: 38730386; PMCID: PMC11088105.

30. Sánchez-Tocino ML, Miranda-Serrano B, López-González A, Villoria-González S, Pereira-García M, Gracia-Iguacel C, González-Ibarguren I, Ortíz-Arduan A, Mas-Fontao S, González-Parra E. Sarcopenia and Mortality in Older Hemodialysis Patients. Nutrients. 2022;14(11):2354. https://doi.org/10.3390/nu14112354

31. Vázquez I, Valderrábano F, Jofré R, Fort J, López-Gómez JM, Moreno F, Sanz-Guajardo D; Spanish Cooperative Renal Patients Quality of Life Study Group. Psychosocial factors and quality of life in young hemodialysis patients with low comorbidity. J Nephrol. 2003;16(6):886-94. PMID: 14736017.

32. Gebrie MH, Ford J. Depressive symptoms and dietary non-adherence among end stage renal disease patients undergoing hemodialysis therapy: systematic review. BMC Nephrol. 2019;20(1):429. https://doi.org/10.1186/s12882-019-1622-5

33. Takkavatakarn K, Jintanapramote K, Phannajit J, Praditpornsilpa K, Eiam-Ong S, Susantitaphong P. Incremental vs conventional haemodialysis in end-stage kidney disease: a systematic review and meta-analysis. Clin Kidney J. 2023;17(1):sfad280. https://doi.org/10.1093/ckj/sfad280

34. Ibeas J, Roca-Tey R, Vallespín J, Moreno T, Moñux G, Martí-Monrós A, et al., por el Grupo Español Multidisciplinar del Acceso Vascular (GEMAV). Spanish Clinical Guidelines on Vascular Access for Haemodialysis. Nefrologia. 2017;37Suppl1:S1-191. https://doi.org/10.1016/j.nefro.2017.11.004. Erratum in: Nefrologia (Engl Ed). 2019;39(1):1-2.https://doi.org/10.1016/j.nefro.2018.07.001. Erratum in: Nefrologia (Engl Ed).2019;39(6):680-2.https://doi.org/10.1016/j.nefro.2019.09.001

35. Landreneau K, Lee K, Landreneau MD. Quality of life in patients undergoing hemodialysis and renal transplantation--a meta-analytic review. Nephrol Nurs J. 2010;37(1):37-44. PMID: 20333902.

AWARD

Donation and Transplant

Sponsored by the Spanish Society of Nephrology Nursing (SEDEN) with the goal of stimulating the work of professionals in this field, the 10th edition of the Donation and Transplant Award is announced under the following:

- All works submitted to the 51st National SEDEN Congress related to the field of kidney transplantation are eligible.
- Submissions must be written in Spanish.
- Works must be unpublished and comply with all submission guidelines for the 51st National SEDEN Congress.
- The submission deadline will be the same as that established for other submissions to the 2026 SEDEN Congress.
- The jury will consist of the SEDEN Scientific Committee for Abstract Evaluation.
- The award will be presented during the inaugural session of the 51st National SEDEN Congress (2026).
- The winning work will be made available to the *Enfermería Nefrológica* journal for possible publication, at the discretion of the editorial committee. Authors must cite the work's origin as a SEDEN Award if using or publishing it later.
- To receive the award, the work must be presented at the 51th SEDEN Congress, and the presenter must be one of the listed authors. Presentations by individuals not involved in the authorship will not be accepted.
- Any unforeseen circumstances will be resolved by the SEDEN Board of Directors.
- Award: Free registration to the 2027 National SEDEN Congress.
- The award may be declared void.

*** The monetary award is subject to tax withholding.**

SEDEN
SOCIEDAD ESPAÑOLA DE ENFERMERÍA NEFROLÓGICA

Calle de la Povedilla, 13. Bajo Izq. 28009 Madrid
Tel.: 91 409 37 37 • Fax: 91 504 09 77
seden@seden.org • www.seden.org

Rubio-Castañeda FJ, et al. https://doi.org/10.37551/S2254-28842025030

Maturation of native arteriovenous fistulas: influence of inflammatory, biochemical and haematological factors

Francisco Javier Rubio-Castañeda[1], Manuel Fernández-Núñez[2], Ana Isabel Sierra-Sánchez[2], María Amaya Mateo-Sánchez[2], Johanna Chico-Guerra[1], Emilia Ferrer-López[1]

[1] Instituto de Investigación Sanitaria de Aragón (IISA), Dialysis and Kidney Transplant Unit, Hospital Universitario Miguel Servet de Zaragoza, Spain

[2] Dialysis and Kidney Transplant Unit, Hospital Universitario Miguel Servet de Zaragoza, Spain

Please cite this article in press as:
Rubio-Castañeda FJ, Fernández-Núñez M, Sierra-Sánchez AI, Mateo-Sánchez MA, Chico-Guerra J, Ferrer-López E. Maturation of native arteriovenous fistulas: influence of inflammatory, biochemical and haematological factors. Enferm Nefrol. 2025;28(4):292-7

Corresponding author:
Francisco Javier Rubio Castañeda
fjrubio.due@gmail.com

Reception: 09-12-25
Acceptance: 10-20-25
Publication: 12-30-25

ABSTRACT

Objective: To determine the preoperative and postoperative inflammatory, biochemical, and haematological factors that influence the maturation of native arteriovenous fistulas.

Material and Method: We conducted a retrospective observational study. Two blood tests were performed—pre- and postoperative—analysing biochemical, haematological, and inflammatory parameters. Statistical analysis included descriptive statistics, Student's t test, Mann–Whitney U test, chi-square test, Wilcoxon test, and binomial logistic regression.

Results: The sample comprised 130 patients with a mean age of 68.3 years; 75.3% were men. Overall, 75.3% of fistulas matured. When comparing mature *vs* non-mature fistulas, the following findings were observed: Preoperative analysis: albumin (p=0.012) and PO_2 (p=0.007) were significantly higher, and C-reactive protein (CRP) (p=0.006) was significantly lower in mature fistulas. Postoperative analysis: CRP (p=0.004) and creatinine (p=0.002) were significantly lower in mature fistulas. Paired-sample analysis: in mature fistulas, there was a significant postoperative increase in PO_2 (p=0.049), leukocytes (p=0.021), and neutrophils (p=0.011), and a significant postoperative decrease in PCO_2 (p=0.042) and creatinine (p<0.001). In non-mature fistulas, a significant decrease in preoperative albumin was observed (p<0.001). Logistic regression: higher preoperative albumin (OR, 0.15; p=0.003) and PO_2 (OR, 0.54; p=0.002) were associated with a lower risk of maturation failure. Higher preoperative uric acid (OR, 1.58; p=0.005), and higher postoperative CRP (OR, 1.31; p=0.047) and creatinine (OR, 1.22; p=0.006) were associated with a greater risk of maturation failure.

Conclusions: Elevated uric acid, creatinine, and CRP levels increase the risk of fistula maturation failure, whereas higher preoperative albumin and PO_2 reduce this risk. After surgery, mature fistulas show increased PO_2, leukocyte, and neutrophil levels, together with a significant decrease in PCO_2 and creatinine.

Keywords: haemodialysis; native arteriovenous fistula; Doppler ultrasound; biomarkers.

RESUMEN

Maturation of native arteriovenous fistulas: influence of inflammatory, biochemical and haematological factors

Objetivo: Determinar los factores inflamatorios, bioquímicos y hematológicos pre-quirúrgicos y post-quirúrgicos que influyen en la maduración de las fistulas arteriovenosas nativas .

Material y Método: Estudio observacional retrospectivo. Se realizaron dos analíticas sanguíneas, pre-quirúrgica y post-quirúrgica, analizando parámetros bioquímicos, hematológicos, e inflamatorios. Análisis estadístico: Descriptivo. T-Student, U de Mann-Whitney y Chi cuadrado. Prueba de Wilcoxon y regresión logística binomial.

Resultados: Muestra de 130 pacientes, edad media 68,3 años. 75,3% hombres. 75,3% fístulas maduras. Al comparar las fístulas maduras frente a las no maduras observamos: Analítica pre-quirúrgica: albumina (p=0,012) y PO2 (≤0,007) significativamente mayores, y PCR (p=0,006) significativamente menor en fístulas maduras. Analítica post-quirúrgica: PCR (p=0,004) y creatinina (p=0,002) significativamente menores en fístulas maduras. Análisis de muestras apareadas: en fístulas maduras: incremento significativo de PO2 (p=0,049), leucocitos (p=0,021) y neutrófilos (p=0,011) post-quirúrgicos, y descenso significativo de PCO2 (p=0,042) y creatinina (p<0,001) post-quirúrgicas. En fístulas no maduras: descenso significativo de albumina pre-quirúrgica (p<0,001). Regresión logística: a mayor valor pre-quirúrgico de albumina (OR:0,15; p=0,003) y PO2 (OR:0,54; p=0,002) menor riesgo de fallos de maduración. A mayores valores pre-quirúrgicos de ácido úrico (OR:1,58; p=0,005), y post-quirúrgicos de PCR (OR:1,31; p=0,047) y creatinina (OR:1,22; p=0,006) mayor riesgo de fallos de maduración.

Conclusiones: Valores elevados de ácido úrico, creatinina y PCR aumentan el riesgo de fallos de maduración; una mayor albúmina y P02 pre-quirúrgicas lo reducen. Tras la cirugía, en fístulas maduras se observa un incremento de PO2, leucocitos y neutrófilos, y un descenso significativo de PCO2 y creatinina.

Palabras clave: hemodiálisis; fístula arteriovenosa nativa; ecografía doppler; biomarcadores.

INTRODUCTION

In patients undergoing haemodialysis (HD), the native arteriovenous fistula (nAVF) is the vascular access of choice[1]. However, more than 80% of these patients do not have a mature nAVF at the start of HD and therefore require a central venous catheter (CVC) to undergo dialysis, which increases the risk of mortality, morbidity and healthcare costs[2].

Maturation is a complex process that begins after creation of the arteriovenous anastomosis and ends when the nAVF is suitable for haemodialysis. During maturation, increased intravascular pressure and blood flow induce vascular remodelling and vessel dilatation[3-4]. In general, 4 to 6 weeks are required to achieve successful maturation; nevertheless, approximately 53% of nAVFs fail to mature adequately for use in HD[4].

Multiple factors negatively affect the maturation process, including age, sex, uraemia, inflammation and certain blood biomarkers[3,5,6].

Reduction in glomerular filtration in patients with kidney disease leads to accumulation of blood toxins, particularly uraemic toxins (urea and creatinine), giving rise to the so-called uraemic syndrome. This syndrome produces a state of inflammation and oxidative stress that damages the vascular endothelium and promotes nAVF maturation failure[2,3,7]. In addition to the systemic inflammation caused by uraemia, local inflammation occurs after nAVF creation. Together, these processes contribute to an exacerbated inflammatory state that favours neointimal hyperplasia[3,7-9].

Numerous blood biomarkers have been associated with nAVF maturation failure, including coagulation and haematological factors, blood lipids, various electrolytes, urea, creatinine, inflammatory markers and plasma proteins[5,10,11]. However, the role of these biomarkers in maturation failure remains poorly defined[12]. Moreover, there is no consensus regarding which blood biomarkers are most strongly associated with nAVF maturation failure[3,5,6,10,11], and there is a lack of literature simultaneously analysing the effects of both pre-operative and post-operative blood biomarkers on nAVF maturation.

Therefore, the aim of this study was to determine the pre-operative and post-operative inflammatory, biochemical and haematological factors that influence nAVF maturation and maturation failure.

MATERIAL AND METHOD

We conducted an observational study with retrospective data collection in March 2025 at the haemodialysis vascular access clinic of *Hospital Universitario Miguel Servet* (Zaragoza, Spain).

Population and sample: Patients attending the advanced chronic kidney disease (ACKD) clinic and the chronic haemodialysis programme who underwent creation of an nAVF at *Hospital Universitario Miguel Servet* between 1 January 2023 and 31 December 2024 were included.

Inclusion criteria: Patients aged ≥18 years who had an nAVF created between 2023 and 2024 at Hospital Universitario Miguel Servet.

Exclusion criteria: Prosthetic AVFs and thrombosed nAVFs.

Only one nAVF per patient was included in the study; patients who lost vascular access and required a new access or surgical repair of the original nAVF were not re-included.

Study variables

Sociodemographic: age (years), sex (male, female). Comorbidities: diabetes, hypertension. *Type of nAVF:* radiocephalic, brachiocephalic, brachiobasilic. *Ultrasound variables:* vein diameter (mm), vascular access flow (QA). *Laboratory parameters:* pH, PCO_2 (mmHg), PO_2 (mmHg), PTH (pg/mL), iron (µg/dL), C-reactive protein (mg/dL), urea (mg/dL), creatinine (mg/dL), uric acid (mg/dL), calcium (mg/dL), phosphorus (mg/dL), albumin (g/dL), leukocytes (10^3/µL), neutrophils (%), eosinophils (%), basophils (%), monocytes (%), lymphocytes (%) and haemoglobin (%)[6,10,13-16]. All variables, except ultrasound parameters, were obtained from the electronic health record.

Two blood tests were performed: one pre-operative and one post-operative. The pre-operative test was the closest to surgery, while the post-operative test was obtained 30 days after surgery.

Ultrasound variables were measured using Doppler ultrasound. A maturation ultrasound assessment was performed at 6 weeks in the vascular access clinic using a Hitachi-Aloka F ultrasound scanner. Venous diameter was measured 3 cm above the arteriovenous anastomosis, and QA was measured 3 cm above the bifurcation of the humeral artery. An nAVF was considered mature when venous diameter ≥4 mm and vascular access flow (QA) ≥500 mL/min at 6 weeks[4].

Approval was obtained from *Hospital Universitario Miguel Servet* and the Research Ethics Committee of the Autonomous Community of Aragón (CEICA), decision CI: PI24/032. The committee authorised exemption from informed consent. Clinical data were extracted from electronic records in anonymised format and provided by an external intermediary, in accordance with Spanish Organic Law 3/2018 on Personal Data Protection and Digital Rights and Regulation (EU) 2016/679 (GDPR).

Statistical analysis: Jamovi® version 2.3.28 was used. Descriptive analysis employed measures of central tendency (mean, median) and dispersion (standard deviation, interquartile range). Normality was assessed with the Shapiro–Wilk test. Quantitative variables were compared using Student's t test (normal distribution) or the Mann–Whitney U test (non-normal distribution). Qualitative variables were expressed as frequencies and percentages and analysed using chi-square tests. Paired samples were vs the Wilcoxon test. Binomial logistic regression was performed to examine the association between maturation outcomes and laboratory parameters.

RESULTS

The sample consisted of 130 patients with a mean age of 68.3±11.7 years. Of these, 75.3% were men (n = 98) and 24.7% women (n=32). Diabetes was present in 42.3% (n=55) and hypertension in 86.9% (n=113). Regarding the type of nAVF, 68.4% were radiocephalic (n=89), 23.8% brachiocephalic (n=31) and 7.8% brachiobasilic (n=10) **(table 1)**.

Overall, 75.3% of nAVFs matured successfully (n = 98), whereas 24.7% failed to mature (n=32). By access type, maturation occurred in 64% of radiocephalic fistulas (n=57), 90.3% of brachiocephalic fistulas (n=28) and 80% of brachiobasilic fistulas (n=8). At 6 weeks after surgery, mature fistulas showed significantly greater venous diameter (5 mm [IQR, 3.9–8.2] *vs* 4 mm [IQR, 2.2–6.1]) and higher access flow QA (834 mL/min [IQR, 441–2200] *vs* 369 mL/min [IQR, 195–605]) *vs* non-mature fistulas (both p<0.001) **(table 1)**.

In the pre-operative blood analysis, patients with mature fistulas had significantly higher albumin levels (4.1 g/dL [IQR, 2.9–4.7] *vs* 3.4 g/dL [IQR, 3.1–6.0]; p=0.012) and higher PO_2 (32 mmHg [IQR, 11–72] *vs* 25 mmHg [IQR, 15–51]; p=0.007) *vs* those with maturation failure. Conversely, CRP values were significantly lower in mature fistulas (0.3 mg/dL [IQR, 0.02–14] vs 0.74 mg/dL [IQR, 0.03–3.1]; p=0.006) **(table 2)**.

In the postoperative analysis, CRP (0.34 mg/dL [IQR, 0.03–6.8] *vs* 0.83 mg/dL [IQR, 0.02–7.9]; p=0.004) and creatinine (4.14 mg/dL [IQR, 2.7–12.3] *vs* 4.84 mg/dL [IQR, 2.3–7.8]; p=0.002) were significantly lower in patients with mature fistulas than in those with non-mature fistulas **(table 2)**.

Tabla 1. Descriptive analysis.

Variable	Total	Mature nAVF	Non-mature nAVF	p value
Sample size, n (%)	130	98 (75.3%)	32 (24.7%)	–
Age, years (mean±SD)	68.3±11.7	68.6±12.2	67.5±10.6	0.26[1]
Sex				
Male	98 (75.3%)	70 (71.4%)	28 (28.6%)	0.96[2]
Female	32 (24.7%)	23 (71.9%)	9 (28.1%)	
Diabetes	55 (42.3%)	35 (63.6%)	20 (36.4%)	0.08[7]
HTN	113 (86.9%)	85 (75.2%)	28 (24.8%)	0.05[2]
Type of fistula				
Radiocephalic	89 (68.4%)	57 (64.0%)	32 (36.0%)	0.017
Brachiocephalic	31 (23.8%)	28 (90.3%)	3 (9.7%)	
Brachiobasilic	10 (7.8%)	8 (80.0%)	2 (20.0%)	
Ultrasound variables[1]				
Vein diameter, mm	4.8 (IQR, 2.2–8.2)	5.0 (IQR, 3.9–8.2)	4.0 (IQR, 2.2–6.1)	<0.001[3]
Access flow (QA), mL/min	702 (IQR, 195–2200)	834 (IQR, 441–2200)	369 (IQR, 195–605)	<0.001[3]

Statistical tests: [1] Student's t test; [2] Chi-square test; [3] Mann–Whitney U test.
nAVF: native arteriovenous fistula.
HTN: hypertension.
[1] Ultrasound measurements obtained at 6 weeks after fistula creation.

Table 2. Pre- and post-operative laboratory parameters according to final Outcome

Parameter	Mature nAVF	Non-mature nAVF	p value
Preoperative laboratory tests			
PO_2, mmHg	32 (IQR, 11–72)	25 (IQR, 15–51)	0.007
CRP, mg/dL	0.30 (IQR, 0.02–14.0)	0.74 (IQR, 0.03–3.1)	0.006
Albumin, g/dL	4.1 (IQR, 2.9–4.7)	3.4 (IQR, 3.1–6.0)	0.012
Postoperative laboratory tests			
CRP, mg/dL	0.34 (IQR, 0.03–6.8)	0.83 (IQR, 0.02–7.9)	0.004
Creatinine, mg/dL	4.14 (IQR, 2.7–12.3)	4.84 (IQR, 2.3–7.8)	0.002

Statistical analysis: Mann–Whitney U test.
nAVF, native arteriovenous fistula.
CRP, C-reactive protein. **PO_2,** partial pressure of oxygen.

Paired-sample analysis showed that patients with mature fistulas exhibited a significant postoperative increase in PO_2 (32 mmHg [IQR, 11–72] *vs* 37 mmHg [IQR, 11–60]; p=0.049), leukocytes (7.1×10^3/µL [IQR, 3.6–13.6] *vs* 7.5×10^3/µL [IQR, 3.5–21]; p=0.021) and neutrophils (62.6% [IQR, 2.5–85] *vs* 65.4% [IQR, 44–89]; p=0.011), together with a significant reduction in PCO_2 (45 mmHg [IQR, 32–57] *vs* 43.6 mmHg [IQR, 33–58]; p=0.042) and creatinine (4.6 mg/dL [IQR, 2.6–11.8] *vs* 4.14 mg/dL [IQR, 2.7–12.3]; p<0.001). In contrast, patients with non-mature fistulas showed a significant post-operative decrease in albumin (3.4 g/dL [IQR, 3.1–6.0] *vs* 3.1 g/dL [IQR, 2.8–4.8]; p<0.001) **(table 3)**.

Binomial logistic regression demonstrated that higher preoperative albumin (OR, 0.15; p=0.003) and PO_2 (OR, 0.54; p=0.002) were associated with lower risk of maturation failure. Conversely, higher pre-operative uric acid (OR, 1.58; p=0.005) and higher post-operative CRP (OR, 1.31; p=0.047) and creatinine (OR, 1.22; p=0.006) were associated with increased risk of maturation failure **(table 4)**.

DISCUSSION

In this cohort, 24.7% of nAVFs failed to mature. These findings are consistent with published vascular access guidelines, which report failure rates between 28% and 53%[4,17]. Radiocephalic fistulas exhibited higher failure rates than humeral-based fistulas, likely due to their smaller vessel diameter[4]. Our results align with previous studies showing maturation failure rates ranging from 5–37% for radiocephalic, 8–16% for brachiocephalic and 2–23% for brachiobasilic fistulas[18].

In our study, consistent with the published literature, we found an association between elevated levels of creatinine[5,15,18,19], uric acid[11,18,20] and CRP[9,14,16] and AVF maturation failure. It should be noted that although several studies have reported an association between creatinine levels and AVF maturation failure[5,15,18],we did not identify any studies that specifically analysed the independent vascular and inflammatory effects of creatinine. Instead, the available literature examines this effect within the broader framework of the uraemic syndrome, which is defined as a condition caused by elevated blood levels of urea and creatinine[3,7,15,21,22]. Consequently, the term uraemia is used to describe the relationship between creatinine, inflammation and vascular damage.

Table 4. Binomial logistic regression analysis.

	Odds ratio	95% Confidence Interval	p value
Preoperative laboratory parameters			
Albumin	0.15	0.04 – 0.52	0.003
PO_2	0.54	0.43 – 0.81	0.002
Uric acid	1.58	1.14 – 2.19	0.005
Postoperative laboratory parameters			
C-reactive protein (CRP)	1.31	0.91 – 1.45	0.047
Creatinine	1.22	0.95 – 1.55	0.006

Reference outcome: Non-maturation of native arteriovenous fistulas (nAVF).

Uraemia and elevated uric acid levels cause vascular injury and exacerbate the inflammatory process, thereby promoting arteriovenous fistula maturation failure[3,7,18,20-24]. High uric acid levels directly damage the vascular endothelium[11,20,23,24]. In addition, uraemia not only impairs endothelial function but also induces vascular fibrosis, promotes smooth muscle cell infiltration, and increases vascular calcification[3,7,11,13,19,21,22]. Furthermore, inflammation negatively affects AVF survival by altering vascular permeability[2,16]. Both uraemia[3,7,13,21] and elevated uric acid levels[20,23,25] intensify systemic inflammation in patients with kidney disease through the release of inflammatory cytokines that further contribute to maturation failure[20].

CRP is a widely used biomarker for assessing inflammation in patients with kidney disease and has been associated with nAVF dysfunction[8,9,14,16,20,26,27]. In our study, patients with maturation failure exhibited significantly higher CRP levels both pre- and post-operatively. However, we found no previous studies that asses-

Table 3. Paired sample analysis.

	Preoperative laboratory test	Postoperative laboratory test	p value
Mature nAVF			
PCO_2, mmHg	45 (IQR, 32–57)	43.6 (IQR, 33–58)	0.042
PO_2, mmHg	32 (IQR, 11–72)	37 (IQR, 11–60)	0.049
Creatinine, mg/dL	4.6 (IQR, 2.6–11.8)	4.14 (IQR, 2.7–12.3)	<0.001
White blood cell count, $\times10^3$/µL	7.1 (IQR, 3.6–13.6)	7.5 (IQR, 3.5–21.0)	0.021
Neutrophils, %	62.6 (IQR, 2.5–85)	65.4 (IQR, 44–89)	0.011
Non-mature nAVF			
Albumin, g/dL	3.4 (IQR, 3.1–6.0)	3.1 (IQR, 2.8–4.8)	<0.001

Statistical analysis: Paired Wilcoxon signed-rank test.
nAVF: native arteriovenous fistula. **PO_2:** partial pressure of oxygen. **PCO_2:** partial pressure of carbon dioxide.

sed CRP levels after AVF creation; in the available literature, CRP is measured exclusively in the preoperative period[8,27].

Our findings also indicate that higher preoperative PO_2 and albumin levels promote nAVF maturation.

Hypoalbuminaemia in patients with kidney disease results from systemic inflammation secondary to uraemia[12]. Low serum albumin levels are associated with reduced nAVF survival[12], and preoperative hypoalbuminaemia is a recognised predictor of maturation failure[5,6,12,16,28]. Accordingly, our results are consistent with existing evidence in showing that higher preoperative albumin levels protect against maturation failure.

We found no studies examining the relationship between preoperative PO_2 levels and nAVF maturation failure. The literature exclusively focuses on the role of hypoxia in nAVF maturation. Previous authors have reported an association between hypoxia and maturation failure[1,15,19]. as hypoxia induces vascular cellular dysfunction, ultimately leading to intimal hyperplasia and impaired maturation[15,21].

To date, no studies have simultaneously analysed pre- and postoperative blood biomarkers. In the systematic review by Morton et al., no consensus was found regarding the optimal timing of blood sampling, with some studies collecting samples before fistula creation and others after fistula failure[10]. Notably, in our study, leukocyte and neutrophil counts increased significantly one month after fistula creation. Following surgery, local tissue hypoxia and inflammation develop due to macrophage and neutrophil infiltration at the surgical site[3], which likely explains this postoperative rise in white blood cell counts. In our cohort, this increase was associated with successful fistula maturation. Nevertheless, no published studies have evaluated neutrophils or leukocytes in isolation as predictors of nAVF maturation. The only haematological indices previously associated with nAVF maturation failure are the neutrophil-to-lymphocyte ratio[30] and the monocyte-to-lymphocyte ratio[13,31].

The principal limitation of this study is methodological. The small number of female participants resulted in wider confidence intervals and reduced parameter precision. Furthermore, the absence of studies simultaneously evaluating pre- and postoperative biomarkers limits direct comparison of our findings with those of other authors.

Based on our results, elevated preoperative uric acid levels and increased postoperative CRP and creatinine levels indicate the presence of an exacerbated inflammatory process that promotes nAVF maturation failure. Conversely, higher preoperative albumin and PO_2 levels increase the likelihood of achieving a mature fistula.

Finally, comparison of pre- and postoperative analyses revealed that in mature fistulas there is a significant postoperative increase in PO_2, leukocyte count, and neutrophil percentage, together with a significant decrease in PCO_2 and creatinine.

Funding

None declared.

Conflicts of interest

None declared.

REFERENCES

1. Brahmbhatt A, Remuzzi A, Franzoni M, Misra S. The molecular mechanisms of hemodialysis vascular access failure. Kidney Int. 2016;89(2):303-16.

2. Duque JC, Martinez L, Tabbara M, Dvorquez D, Mehandru SK, Asif A, Vazquez-Padron RI, Salman LH. Arteriovenous fistula maturation in patients with permanent access created prior to or after hemodialysis initiation. J Vasc Access. 2017;18(3):185-91.

3. Gameiro J, Ibeas J. Factors affecting arteriovenous fistula dysfunction: A narrative review. J Vasc Access. 2020;21(2):134-47.

4. Ibeas J, Roca-Tey R, Vallespín J, Moreno T, Moñux G , Martí-Monrós A, et al. Guía clínica española del acceso vascular para hemodiálisis. Nefrología. 2017;37:1-177.

5. Siddiqui MA, Ashraff S, Carline T. Maturation of arteriovenous fistula: Analysis of key factors. Kidney Res Clin Pract. 2017;36(4):318-28.

6. Zhang F, Li J, Yu J, Jiang Y, Xiao H, Yang Y, Liang Y, Liu K, Luo X. Risk factors for arteriovenous fistula dysfunction in hemodialysis patients: a retrospective study. Sci Rep. 2023;13(1):21325.

7. Hu H, Patel S, Hanisch JJ, Santana JM, Hashimoto T, Bai H, Kudze T, Foster TR, Guo J, Yatsula B, Tsui J, Dardik A. Future research directions to improve fistula maturation and reduce access failure. Semin Vasc Surg. 2016;29(4):153-71.

8. Stirbu O, Gadalean F, Pitea IV, Ciobanu G, Schiller A, Grosu I, Nes A, Bratescu R, Olariu N, Timar B, Tandrau MC. C-reactive protein as a prognostic risk factor for loss of arteriovenous fistula patency in hemodialyzed patients. J Vasc Surg. 2019;70(1):208-15.

9. Delgado-Ramírez A, Ruiz-García E, Latorre-López L, Crespo-Montero R. Factores que influyen en la supervivencia de la fístula arteriovenosa interna y su relación con la técnica de punción. Enferm Nefrol. 2016;19(3):215-30.

10. Morton SK, Rodríguez AJ, Morris DR, Bhandari AP, Moxon JV, Golledge J. A Systematic Review and Meta-Analysis of Circulating Biomarkers Associated with Failure of Arteriovenous Fistulae for Haemodialysis. PLoS One. 2016;11(7) e0159963.

11. Siddiqui M, Ashraff S, Carline T. An overview of AVF maturation and endothelial dysfunction in a advanced renal failure. Renal Replacement Therapy. 2017;3:42.

12. Martinez-Mier G, Camargo-Diaz C, Urbina-Velazquez MA, Avila-Pardo SF. Predictive Factors for Unsuccessful Use of Arteriovenous Fistula in a Population of End-Stage Renal Disease Patients in Southeastern Mexico. Ann Vasc Surg. 2020;62:304-9.

13. Hu S, Wang D, Ma T, Yuan F, Zhang Y, Gao X, Lei Q, Cheng J. Association between Preoperative Monocyte-to-Lymphocyte Ratio and Late Arteriovenous Fistula Dysfunction in Hemodialysis Patients: A Cohort Study. Am J Nephrol. 2021;52(10-11):854-60.

14. Kaller R, Arbănași EM, Mureșan AV, Voidăzan S, Arbănași EM, Horváth E, Suciu BA, Hosu I, Halmaciu I, Brinzaniuc K, Russu E. The Predictive Value of Systemic Inflammatory Markers, the Prognostic Nutritional Index, and Measured Vessels' Diameters in Arteriovenous Fistula Maturation Failure. Life (Basel). 2022;12(9):1447.

15. Eroglu E, Kocyiğit I, Karakukcu C, Tuncay A, Zararsiz G, Eren D, Kahriman G, Hayri Sipahioglu M, Tokgoz B, Tasdemir K, Oymak O. Hypoxia-inducible factors in arteriovenous fistula maturation: A prospective cohort study. Eur J Clin Invest. 2020;50(12):e013350.

16. Hu S, Wang R, Ma T, Lei Q, Yuan F, Zhang Y, Wang D, Cheng J. Association between preoperative C-reactive protein to albumin ratio and late arteriovenous fistula dysfunction in hemodialysis patients: a cohort study. Sci Rep. 2023;13(1):11184.

17. Lok CE, Huber TS, Lee T, et al; KDOQI Vascular Access Guideline Work Group. KDOQI clinical practice guideline for vascular access: 2019 update. Am J Kidney Dis. 2020;75(4)(suppl 2):S1-164.

18. Kaller R, Russu E, Arbănași EM, Mureșan AV, Jakab M, Ciucanu CC, et all. Intimal CD31-Positive Relative Surfaces Are Associated with Systemic Inflammatory Markers and Maturation of Arteriovenous Fistula in Dialysis Patients. J Clin Med. 2023;12(13):4419.

19. Eroglu E, Kocyigit I, Kahriman G, Karakukcu C, Tuncay A, Zararsiz GE, Eren D, Kalay N, Sipahioglu MH, Oymak O, Tokgoz B. Soluble vascular endothelial growth factor receptor-1 as a novel marker of arteriovenous fistula stenosis in hemodialysis patients. Hemodial Int. 2021;25(2):164-72.

20. Lobo JC, Stockler-Pinto MB, da Nóbrega AC, Carraro-Eduardo JC, Mafra D. Is there association between uric acid and inflammation in hemodialysis patients? Ren Fail. 2013;35(3):361-6.

21. Brahmbhatt A, Misra S. The Biology of Hemodialysis Vascular Access Failure. Semin Intervent Radiol. 2016;33(1):15-20.

22. Brunet P, Gondouin B, Duval-Sabatier A, Dou L, Cerini C, Dignat-George F, et all. Does uremia cause vascular dysfunction? Kidney Blood Press Res. 2011;34(4):284-90.

23. Caravaca F, Martín MV, Barroso S, Cancho B, Arrobas M, Luna E, et all. Niveles de ácido úrico y proteína C reactiva en pacientes con insuficiencia renal crónica. Nefrologia. 2005;25(6):645-54.

24. Murea M, Tucker BM. The physiology of uric acid and the impact of end-stage kidney disease and dialysis. Semin Dial. 2019;32(1):47-57.

25. Zhou Y, Fang L, Jiang L, Wen P, Cao H, He W, Dai C, Yang J. Uric acid induces renal inflammation via activating tubular NF-kB signaling pathway. PLoS One. 2012;7(6):e39738.

26. Roldão M, Figueiredo C, Escoli R, Gonçalves H, Sofia F, Lopes K. Vascular access type and mortality in elderly incident hemodialysis patients. Nefrologia. 2023;43(4):452-7.

27. Khavanin Zadeh M, Mohammadipour S, Omrani Z. Correlation between CRP and early failure of arteriovenous fistula (AVF). Med J Islam Repub Iran. 2015;29:219.

28. Okuhata Y, Sakai Y, Ikenouchi A, Kashiwagi T, Iwabu M. Low Serum Albumin Levels are Associated with Short-Term Recurrence of Arteriovenous Fistula Failure. J Nippon Med Sch. 2024;91(4):383-90.

29. Sadaghianloo N, Contenti J, Dardik A, Mazure NM. Role of Hypoxia and Metabolism in the Development of Neointimal Hyperplasia in Arteriovenous Fistulas. Int J Mol Sci. 2019;20(21):5387.

30. Zhang Y, Kong X, Liang L, Xu D. Regulation of vascular remodeling by immune microenvironment after the establishment of autologous arteriovenous fistula in ESRD patients. Front Immunol. 2024;15:1365422.

31. Li C, Li Q, Ou J, Li W, Guan B, Lu Y, et al. Relationship between Monocytes and Stenosis-Related Autologous Arteriovenous Fistula Dysfunction. Blood Purif. 2022;51(3):226-32.

ADVANCED CHRONIC KIDNEY DISEASE (ACKD)

If you have an idea about chronic kidney disease, this is your project.

Join us!

- All papers submitted to the 51st National SEDEN Congress whose subject is related to the field of advanced chronic kidney disease will be eligible for the competition.
- Papers must be written in Spanish.
- Papers must be unpublished and comply with all the submission guidelines for the 51st National SEDEN Congress.
- The submission deadline will be the same as that established for the 51st National SEDEN Congress.
- The jury will be composed of the SEDEN Abstract Evaluation Committee.
- The award will be presented during the opening ceremony of the 51st National SEDEN Congress 2026, and the presenter must be one of the paper's listed authors. Presentations by individuals not listed as authors will not be accepted.
- The winning paper will be made available to the journal Enfermería Nefrológica for potential publication, if deemed appropriate by the editorial committee. Whenever the authors present or publish the paper or related data, they must indicate its origin as a SEDEN Award.
- Any unforeseen circumstances not covered in these rules will be resolved by the SEDEN Board of Directors.
- The prize will consist of free registration to the 2027 National SEDEN Congress.
- The prize may be declared void.

SEDEN
SOCIEDAD ESPAÑOLA DE ENFERMERÍA NEFROLÓGICA

* The prize is subject to tax withholdings as required by law.

Calle de la Povedilla, 13. Bajo Izq. 28009 Madrid ▮ Tel.: 91 409 37 37 ▮ Fax:91 504 09 77 ▮ seden@seden.org ▮ www.seden.org

Santos N, et al. https://doi.org/10.37551/S2254-28842025031

Experiences of women undergoing hemodialysis regarding family social support

Nathalia Bertoldo Silva-Santos[1], Luiz Henrique Santana-Trindade[1], Fernanda Araújo Valle-Matheus[2], Júlia Renata Fernandes-Magalhães[3], Thaynara Maria Pontes-Bulhões[1], Andrey Ferreira da-Silva[4]

[1] Centro Universitário Maurício de Nassau, Maceió, Alagoas, Brasil

[2] Universidade Estadual de Feira de Santana, Feira de Santana, Bahia, Brasil

[3] Universidade do Estado da Bahia, Guanambi, Bahia, Brasil

[4] Universidade Federal de Alagoas, Arapiraca, Alagoas, Brasil

Please cite this article in press as:

Santos NBS, Trindade LHS, Matheus FAV, Magalhães JRF, Bulhões TMP, Silva AF. Experiences of women undergoing hemodialysis regarding family social support. Enferm Nefrol. 2025;28(4):299-306

Corresponding author:

Andrey Ferreira da Silva

andrey.silva@arapiraca.ufal.br

Reception: 10-01-25

Acceptance: 11-21-25

Publication: 12-30-25

ABSTRACT

Introduction: Social support is defined as assistance offered by other people, which generates essential protective factors for individuals diagnosed with chronic kidney disease, especially those on hemodialysis. Women often face heightened challenges related to gender roles, which adversely affect their identity, quality of life, and social support.

Objective: To describe the experience of women on hemodialysis regarding family social support.

Material and Method: We conducted a descriptive, exploratory, qualitative study with 15 women on hemodialysis at a hospital in Maceió, Alagoas, Brazil. Interviews were conducted, subjected to thematic content analysis using categorical methods, and interpreted from the perspective of House's social support theory.

Results: The emerging categories show that family social support is presented in the following types: emotional, religious, instrumental, and informational. However, some interviewees reported distancing themselves from family members and individual isolation, revealing a barrier to receiving support.

Conclusion: The study shows that family social support manifests in the lives of women on hemodialysis in a variety of ways. Furthermore, it reinforces that separation from family members and individual isolation interfere with the delivery of support.

Keywords: social support; family structure; renal dialysis; women.

RESUMO

Experiência de mulheres em hemodiálise acerca do apoio social familiar

Introdução: O apoio social é definido como a assistência oferecida por outras pessoas na qual geram fatores protetivos essenciais para indivíduos diagnosticados com doença renal crônica, especialmente aqueles submetidos ao tratamento por hemodiálise. Em que pese as mulheres essas tendem a enfrentar desafios agravados considerando os papéis de gênero, impactando em sua identidade, qualidade de vida e apoio social.

Objetivo: Descrever a experiência de mulheres em hemodiálise acerca do apoio social familiar.

Material e Mètodos: Estudo descritivo, exploratório, qualitativo realizado com 15 mulheres que estavam realizando hemodiálise em um hospital de Maceió, Alagoas, Brasil. Foram realizadas entrevistas, submetidas à análise de

conteúdo temática, na modalidade categorial, e interpretadas a partir da perspectiva da teoria do apoio social de House.

Resultados: As categorias emergentes evidenciam que o apoio social familiar se apresenta nos seguintes tipos: emocional, religioso, instrumental e informacional. Contudo, algumas entrevistadas sinalizaram o afastamento de familiares e isolamento individual, revelando uma barreira na recepção de apoio.

Conclusão: O estudo evidencia que o apoio social familiar se manifesta na vida das mulheres submetidas à hemodiálise de diversas maneiras. Além disso, reforça que o afastamento de familiares e o isolamento individual interfere na concretização do apoio.

Descritores: apoio social; estrutura familiar; diálise renal; mulheres.

RESUMEN

Experiencias de mujeres en hemodiálisis respecto al apoyo social familiar

Introducción: El apoyo social se define como la asistencia ofrecida por otras personas, lo que genera factores de protección esenciales para las personas diagnosticadas con enfermedad renal crónica, especialmente aquellas en hemodiálisis. Las mujeres a menudo enfrentan mayores desafíos relacionados con los roles de género, lo que afecta negativamente su identidad, calidad de vida y apoyo social.

Objetivo: Describir la experiencia de las mujeres en hemodiálisis con respecto al apoyo social familiar.

Material y Método: Realizamos un estudio descriptivo, exploratorio y cualitativo con 15 mujeres en hemodiálisis en un hospital de Maceió, Alagoas, Brasil. Se realizaron entrevistas, se sometieron a análisis de contenido temático mediante métodos categóricos y se interpretaron desde la perspectiva de la teoría del apoyo social de House.

Resultados: Las categorías emergentes muestran que el apoyo social familiar se presenta en los siguientes tipos: emocional, religioso, instrumental e informativo. Sin embargo, algunas entrevistadas informaron distanciamiento de los miembros de la familia y aislamiento individual, lo que revela una barrera para recibir apoyo.

Conclusión: El estudio muestra que el apoyo social familiar se manifiesta en la vida de las mujeres en hemodiálisis de diversas maneras. Además, refuerza que la separación de los miembros de la familia y el aislamiento individual interfieren en la prestación de apoyo.

Palabras clave: apoyo social; estructura familiar; diálisis renal; mujeres.

INTRODUCTION

Social support is recognised as an important resource for individuals' health and well-being, especially for those living with long-term conditions, such as chronic kidney disease. It plays an essential role in mitigating the psychological impacts imposed by the illness, promoting resilience and mediating situations of stress and adversity[1].

According to House[2], social support can be understood as the assistance provided by others, involving expressions of empathy, affection, trust, concern, comfort, financial, instrumental, and informational assistance, as well as constructive feedback, helping individuals to self-evaluate and understand their behaviours and experiences. These elements are considered protective for patients with chronic kidney disease, particularly for those whose treatment requires haemodialysis, which imposes a series of challenges[3].

Haemodialysis aims to filter the blood through an extracorporeal circuit to remove uraemic (toxic) substances and excess fluid. It is the most common form of renal replacement therapy worldwide, accounting for approximately 69% of all renal replacement therapies and 89% of all dialysis treatments[4].

Despite its benefits, this therapy requires numerous adaptations, which may trigger physical, psychological, and social repercussions. Among the contextual changes are the demanding routine of haemodialysis sessions, transportation requirements, dietary and fluid restrictions, medication use, vascular access care, medical tests and periodic consultations, as well as frequent clinical changes[3]. All these factors are considered stressors and may negatively affect patients, leading to mood changes, depressive and anxiety disorders, and reduced quality of life[3].

The experience of women on haemodialysis is considered particularly complex, given the social and family roles often attributed to them. Restrictions on daily activities and reductions in productive and personal life may result in feelings of guilt, loss of identity, and decreased quality of life[5], highlighting the importance of understanding their experiences and social support needs.

Within this context, the following question arises: *How do women undergoing haemodialysis experience family social support?* Therefore, this study aims to describe the experience of women receiving haemodialysis regarding family social support, using House's Social Support Theory[2] as its theoretical framework. Understanding these experiences may provide valuable insights for implementing care strategies that address the specific needs of this group, promoting a more holistic and effective approach to chronic kidney disease management.

MATERIAL AND METHOD

We conducted a descriptive, exploratory, qualitative study in accordance with the Consolidated Criteria for Reporting Qualitative Research (COREQ), ensuring methodological rigour at all stages. The study was carried out with women undergoing haemodialysis at a hospital within the complementary healthcare network (private) that also provides care for users of Brazil's Unified Health System (SUS), located in the city of Maceió, Alagoas, Brazil.

Initial contact with participants was established after authorisation from hospital administrators, approval by the research ethics committee, and subsequent researcher insertion into the field. Inclusion criteria were: being female, undergoing haemodialysis for more than six months, and possessing adequate cognitive and psychological conditions to participate. Women who initially agreed but could not be reached after 3 interview attempts were excluded.

Convenience sampling was adopted. Twenty-two women meeting the inclusion criteria were invited to participate and were informed about the study objectives, importance, and ethical guarantees. Two declined participation. Interviews were scheduled with the remaining participants at times of their choosing. Subsequently, five women were excluded after three unsuccessful interview attempts, resulting in a final sample of 15 participants.

Data collection occurred between August and September 2024. Interviews were conducted individually in a private space provided by the healthcare institution and led by the principal investigator, a nurse with a PhD in nursing and extensive experience in qualitative research, accompanied by two undergraduate nursing students who assisted with organisational tasks such as scheduling and preparing the interview setting. Neither the researcher nor the students had prior relationships with the participants. The relationship was established during initial contact. During each meeting, the Free and Informed Consent Form was read and signed before the interviews began.

Semi-structured interviews were conducted using a guide addressing participant characteristics (age, education, race/ethnicity, marital status, occupation, and time since diagnosis/treatment). The guiding questions were: *"After starting your treatment, did you receive any type of social support from your family?"*, *"What type of social support have you been receiving?"*, and *"Did any family member distance themselves from you?"* No pilot study was conducted. Data collection continued until saturation was reached[6], which occurred with the twelfth interview; however, three additional interviews were conducted as these participants expressed a desire to take part. Interviews lasted approximately 40 minutes, were audio-recorded, transcribed verbatim using Microsoft Word, reviewed, and validated by the participants prior to analysis.

Data systematisation followed Bardin's thematic categorical content analysis framework[7]. The principal investigator and nursing students conducted the pre-analysis by organising the textual corpus through individual and collective floating readings. During the material exploration phase, meaningful units were identified and coded. Category grouping was supported using NVivo 12 qualitative analysis software, enabling more in-depth data exploration[8]. This stage was also carried out collaboratively to ensure shared understanding of category meanings.

Finally, data interpretation was guided by House's Social Support Theory[2], which identifies different sources of social support, including family and friends, and distinguishes emotional, religious, instrumental, informational, and appraisal support[2].

The study was approved by the Research Ethics Committee of the Maurício de Nassau University Centre in Maceió, Alagoas (Opinion No. 6.972.420), in accordance with Resolution No. 510/16 of Brazil's National Health Council. To ensure anonymity, alphanumeric codes were assigned: "E" for "Interviewee," followed by interview order numbers.

RESULTS

Fifteen women on haemodialysis at the study hospital participated in the research. Table 1 presents the participants' profile, describing age, educational level, self-declared race/ethnicity, marital status, occupation, and time since diagnosis.

The participants' statements were grouped into thematic categories, created inductively and anchored in the theoretical framework, expressing the meanings attributed to the object of study. Thus, 2 categories and six subcategories emerged, as shown in **table 2.**

The participants' accounts revealed that the family plays a fundamental role in coping with haemodialysis, offering different types of support that directly affect the women's physical and emotional well-being. This support is manifested in a multifaceted way, encompassing emotional, religious, instrumental, and informational dimensions, as described below.

SOCIAL SUPPORT PROVIDED BY THE FAMILY TO WOMEN UNDERGOING HAEMODIALYSIS

Emotional Support

The participants reported that when family members notice signs of sadness, they usually offer emotional support through constant presence. This support is expressed through increased visits, especially from children and grandchildren, and encouragement to go out, thereby fostering positive feelings.

Santos N, et al. https://doi.org/10.37551/S2254-28842025031

Table 1. Profile of the women interviewed in the study.

PARTICIPANT	AGE	EDUCATION	RACE/COLOUR	MARITAL STATUS	OCCUPATION	TIME SINCE DIAGNOSIS (YEARS)
E1	29	Incomplete Secondary	Mixed race	Single	Unem-ployed	2
E2	39	Complete Secondary	Black	Single	Unem-ployed	3
E3	42	Incomplete Primary	Mixed race	Married	Homemaker	5
E4	82	Incomplete Primary	Black	Widowed	Retired	3
E5	37	Incomplete Primary	Mixed race	Single	Retired	3
E6	62	Incomplete Primary	Black	Married	Retired	5
E7	59	Incomplete Primary	Black	Married	Retired	4
E8	60	Incomplete Primary	Mixed race	Single	Retired	4
E9	54	Complete Secondary	Black	Married	Retired	5
E10	35	Complete Secondary	Mixed race	Single	Retired	5
E11	43	Incomplete Primary	Mixed race	Single	Homemaker	3
E12	66	Incomplete Primary	Mixed race	Divorced	Retired	4
E13	23	Complete Secondary	Black	Single	Unem-ployed	2
E14	62	Incomplete Primary	Mixed race	Single	Retired	4
E15	54	Incomplete Primary	Mixed race	Married	Retired	5

Source: Prepared by the authors (2025).

Table 2. Synthesis of the categories and subcategories according to the theoretical framework.

THEMATIC CATEGORIES	SUBCATEGORIES
SOCIAL SUPPORT PROVIDED BY THE FAMILY TO WOMEN ON HAEMODIALYSIS	EMOTIONAL
	RELIGIOUS
	INSTRUMENTAL
	INFORMATIONAL
BARRIERS TO THE PROVISION OF SOCIAL SUPPORT BY THE FAMILY TO WOMEN ON HAEMODIALYSIS	WITHDRAWAL OF RELATIVES
	INDIVIDUAL ISOLATION

Source: Prepared by the authors (2025).

"They (family members) are always on alert […] when they realise I am sad they do everything they can to motivate and cheer me up. They visit me, take me out for walks and distract my mind […] they say I will be cured." (E2/SF)

"My children give me a lot of affection, they support me emotionally […] when they realise I am sad, they always come close, they do not leave me alone." (E6/SF)

"When my children and grandchildren come to my house it is a joy […] I feel very happy. I forget that I am ill and I am rarely sad. I feel welcomed." (E7/SF)

"After I was diagnosed and started treatment (dialysis), my family has always been present, taking care of me […] giving me support in every way […] that is why I am alive." (E3/SF)

Religious Support

Religious support provided by family members was also reported. This emerges through encouragement for women to attend religious institutions and to engage in prayer in the search for healing.

"They encourage me to pray […] they say they are always asking God to cure me." (E2/SF)

"My son and my husband are always praying for me […] they take me to church so that I can seek God."(E12/SF)

Instrumental Support

Although most women receive a fixed income from retirement benefits, this income is often insufficient to cover food, medication, and transportation costs. Thus, instrumental family support was evidenced through financial assistance.

"Even though I am retired and have my own income, after I was diagnosed it became harder to support myself financially because of medication and transport costs […] my children help me, they give me money every month to supplement my income." (E8/SF)

"Sometimes, when I ask, they give me some money so I can buy food and medicine […] the pension I receive is too little for so many expenses." (E4/SF)

Santos N, et al. https://doi.org/10.37551/S2254-28842025031

Informational Support

Participants reported that their families demonstrate concern and vigilance regarding food and fluid intake, which characterises informational support. This support is provided through dietary counselling, preparation of meals according to restrictions, and monitoring fluid intake. However, some women admitted not following the restrictions, believing they would die because of the disease.

"They (family members) worry a lot about me, about everything I do [...] especially about food and water consumption. They are always warning me because I eat everything and do not follow the diet. I say I will eat because I am going to die." (E12/SF)

"After my disease was discovered, my family became very concerned about my diet [...] they tell me not to eat very salty foods and to avoid drinking too much water [...] my daughter prepares my lunch controlling the seasoning and monitors everything I drink." (E1/SF)

Despite the positive aspects, barriers to social support also emerged, particularly family distancing and self-imposed isolation among some women. These situations reveal fragility in family support, generating feelings of disappointment and loneliness.

BARRIERS TO FAMILY SOCIAL SUPPORT FOR WOMEN UNDERGOING HAEMODIALYSIS

Family Distancing

The absence of social support was reported through the distancing of relatives who had previously been close, visited frequently, and engaged in leisure activities together. This distancing generated feelings of disappointment.

"Some relatives who were always at my house moved away after my disease was discovered [...] I was very disappointed, because I thought they would be with me not only in good times, but also in bad times." (E1/SF)

"I never received their support [...] now it seems they have moved even further away." (E9/SF)

"Before the illness we got along well, we were always together, went out to bars and restaurants [...] after the diagnosis they moved away. Today they no longer come to my house [...] I can only count on my husband and my daughter." (E5/SF)

Self-Imposed Isolation

The narratives reveal that due to embarrassment about oedema and catheters, and exhaustion from the treatment routine, the women refuse visits from relatives, preferring to remain isolated at home. The statements also show fear of disrupting family routines because of their health condition.

"My relationship with my family has changed a lot. Before becoming ill, I used to visit friends and family [...] after I was diagnosed and started treatment (haemodialysis) I do not like going out or receiving visits, I prefer to stay isolated [...] I am ashamed of the swelling and the catheter, and I feel very tired [...] I prefer to stay at home watching TV." (E10/SF)

"I distanced myself from all of them (family) [...] I said I did not want to receive anyone, that I wanted to be alone. I do not want anyone to change their routine because of me. Besides, I am ashamed to go out with my swollen face and legs." (E14/SF)

DISCUSSION

The narratives of women on haemodialysis reveal that family emotional support is primarily manifested through the frequent presence of children and grandchildren in their homes. Companionship and the involvement of family members in coping with chronic illness are widely recognised in the literature as beneficial to the maintenance of patients' physical and mental health. Emotional support provided by relatives within the home is understood as a subjective expression of awareness regarding the severity of both the illness and its treatment. Such understanding encourages the expression of affection and care through words conveying hope and healing, thereby contributing substantially to the preservation of patients' mental health[9].

From a psychological perspective, the presence of family members in shared environments contributes to emotional regulation and serves as a protective distraction from negative thoughts that may emerge. The scientific literature indicates that women, regardless of health status, are more susceptible to mental health disorders, particularly affective disorders, a vulnerability that may be significantly exacerbated by chronic illness and aggressive treatments[10].

Living with chronic kidney disease (CKD) and undergoing haemodialysis may generate a wide range of mental health problems, particularly depression. A study conducted in Jordan involving 66 patients on haemodialysis aimed at measuring the prevalence of depression, anxiety, and quality of life found that women undergoing haemodialysis had significantly higher depression scores (mean=6. ±3.77) compared with men (mean=2.9±2.8)[11]. A similar study in the province of Córdoba, Spain, showed that 27.9% of 186 patients presented depressive disorders[12]. In this context, family emotional support strengthens well-being, promotes subjective relief, reduces feelings of loneliness, and enhances resilience in the face of adversity[2], thus fulfilling a protective and therapeutic role[13].

The process of coping with illness through adherence to treatment is further reinforced when the religious dimension is present. This aspect emerged in participants' accounts as a form of family support, particularly expressed through encouragement to attend religious institutions and seek spirituality and closeness to the divine through prayers. This type of support integrates with emotional care by

transcending physical assistance and incorporating affective and spiritual elements essential to psychological well-being[2].

Family social support expressed through religiosity functions as a strengthening mechanism for coping with the adversities imposed by chronic illness. This perspective is corroborated by a qualitative study conducted with 18 women on haemodialysis in two public hospitals in Central–Western Brazil, which highlighted that spiritual support provided by family members improves patients' mental health and quality of life[14]. In this sense, such support plays a significant role in fostering hope and sustaining the strength necessary for survival.

Beyond the elements already described, the participants' narratives revealed that family social support also manifested in an instrumental form, through financial assistance for medications, food, and transportation. A large proportion of individuals with CKD undergoing haemodialysis experience financial toxicity, defined as the harmful impact resulting from the inability to afford additional expenses related not only to healthcare but also to family and social needs[15]. This context is particularly aggravated when patients lack a stable income, as occurs among some women engaged in informal employment or entirely financially dependent on their partners.

Of note, in cases of disease progression requiring permanent medical care that precludes employment, Brazilian legislation provides for disability retirement benefits[16]. However, even with this or other forms of assistance, maintaining adequate nutrition, paying household expenses, transportation costs, and purchasing medications becomes difficult due to the low monthly minimum wage[17]. A systematic review exploring financial hardship and its relationship with symptom burden in dialysis patients found across 57 studies that financial toxicity is associated with difficulties in sustaining treatment and meeting basic needs such as food and housing, as well as increased incidence of anxiety, depression, sleep disorders, clinical deterioration, and higher hospitalisation rates[18].

Therefore, financial assistance provided by family members significantly reduces economic stress, improves access to necessary resources for individual and collective care, and positively influences clinical outcomes and overall well-being. Instrumental support is identified by House[2] as vital to preserving core aspects of social care, directly influencing survival and quality of life among individuals with chronic illness. This form of family support is often decisive in ensuring treatment adherence, particularly for patients in socioeconomically vulnerable conditions[19].

In addition to financial assistance, family members demonstrated concern by monitoring participants' food and fluid intake, thereby expressing informational support. Several dietary restrictions, such as reduced phosphorus and sodium intake, are imposed on individuals undergoing haemodialysis to optimise clinical outcomes[20]. However, many patients struggle to modify dietary habits due to cultural practices, physical symptoms, and excessive personal choices[21]. Failure to implement these changes increases the risk of complications such as fluid overload, symptom worsening, and reduced quality of life, often necessitating family involvement.

Within this context, family members exercise instrumental support through direct care practices such as preparing adapted meals, controlling fluid intake in accordance with dietary requirements, and providing health-related counselling[2]. They thus assume two strategic roles in maintaining patient health: as educators, transmitting information to encourage behavioural change, and as monitors, closely observing patients' needs and adaptations[22].

National and international evidence highlights the relevance of family involvement in the care of dialysis patients. In Brazil, studies show that family participation in dietary control is one of the most common forms of instrumental support, facilitating adherence to dietary restrictions and improving clinical conditions[19]. Internationally, family monitoring of food and fluid intake is also recognised as essential, particularly when patients have difficulty understanding and following nutritional guidance[23]. Such involvement, motivated by concern and affection, reinforces the family's role as mediator between professional recommendations and everyday practice, contributing significantly to healthy habit formation, treatment adherence, and quality of life.

Despite the presence and importance of emotional, religious, instrumental, and informational support, some participants reported the distancing of relatives who had previously been actively involved in their social lives, revealing fragility or absence of support following the onset of illness. It is common for patients facing complex diagnoses and treatments such as haemodialysis to experience negative impacts on family relationships, often marked by tension, misunderstanding, and emotional insensitivity[24]. This scenario generates stressful experiences that may promote emotional and physical distancing, leading to natural separation.

Family distancing may be understood as a failure of social support, particularly when previously reliable social networks become indifferent or absent. This experience fosters feelings of abandonment, exclusion, and disappointment, negatively affecting both illness experience and emotional state[25]. A qualitative study in Zhengzhou, China, involving 12 haemodialysis patients found that prolonged illness and treatment often lead to a reorganisation of social relationships, frequently characterised by withdrawal from family and friends, thereby increasing the risk of social isolation and exacerbating anxiety and depression[26].

It is important to recognise that family social support is not confined to favourable moments; rather, its true value emerges most strongly during adversity. The absence or breakdown of these bonds symbolises a failure in the support network, weakening disease coping mechanisms and compromising

overall well-being. The dissolution of these ties represents not merely the loss of companionship but the disruption of a vital psychological resource. Experiencing the collapse of relationships during periods of greatest vulnerability underscores the importance of sustained social support and the cultivation of enduring, compassionate bonds[27].

Self-imposed isolation driven by shame, insecurity regarding body image, and physical exhaustion was also reported as a factor distancing participants from their families. Participants expressed a desire not to burden relatives due to their health condition, stating that they did not wish their family members to alter their routines to accommodate them. Refusal of visits and reluctance to "disturb" others reflect a protective behaviour in which individuals attempt to preserve family normality, even at the expense of their own psychological suffering[26].

Although often silent, this reality constitutes a significant barrier to receiving social support, as conceptualised by House[2]. When patients voluntarily isolate themselves, the opportunity to receive and even recognise family social support is interrupted. Self-withdrawal reflects psychological responses to vulnerability, low self-esteem, and bodily stigma resulting from invasive or visible procedures such as haemodialysis catheters or oedema, particularly among female patients.

A qualitative study involving renal patients demonstrated that perceived bodily changes directly affect social interactions, leading to voluntary withdrawal from contact with friends and family[28]. Such factors promote self-censorship and social avoidance, undermining emotional well-being and the maintenance of affective bonds[1]. Consequently, psycho-emotional interventions should encourage family interaction to preserve social support and enhance coping.

In conclusion, this study demonstrated that family social support for women undergoing haemodialysis manifests in emotional, religious, instrumental, and informational forms. Nonetheless, family distancing and social isolation were also reported by some participants. Understanding the nature of family support is fundamental to improving treatment adherence and quality of life. Therefore, psychosocial and emotional support should be provided and strengthened within healthcare services for both patients and their families, employing therapeutic and educational strategies that foster self-esteem and social belonging.

Health care professionals must remain attentive to signs of weakened family support and intervene promptly, recognising the profound psychological consequences that may affect treatment outcomes. In addition to clinical indicators, behavioural characteristics should be carefully observed to identify insufficient family social support.

This study was limited to women's experiences due to difficulties in recruiting male participants, which may have restricted the breadth of perspectives. Furthermore, although the findings elucidate the types of family support and associated challenges, the small sample size precludes generalisation, though this is not an objective of qualitative research.

Funding

None declared.

Conflicts of interest

None declared.

REFERENCES

1. Abdalla Leite Adães B, Pereira Pondé M, Siquara GM. Influência do apoio social e clima familiar na ansiedade de universitários durante a COVID-19. Psicol Argum. 2025; 43(120):139-58.
2. House JS. Work stress and social support. Reading (MA): Addison-Wesley; 1981.
3. Moniz JDS, Pereira FRS, Pinheiro-Carozzo NP. Percepção de suporte social e estresse em pacientes renais em tratamento hemodialítico. Mosaico: Estud Psicol. 2024; 12(1):181-94.
4. Bello AK, Okpechi IG, Osman MA, Cho Y, Htay H, Jha V et al. Epidemiology of haemodialysis outcomes. Nat Rev Nephrol [Internet] 2022 [cited 20 Sep 2025];18(6):378-95. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC8862002/.
5. George S, Nalini M, Kumar S, D'Silva F, Shenoy P. Sobrecarga física e psicossocial vivenciada por mulheres em hemodiálise de manutenção. Rev Educ Promoç Saúde. 2023;12(1):456.
6. Guest G, Namey E, Chen M. A simple method to assess and report thematic saturation in qualitative research. PLoS One 2020;15(5).
7. BARDIN, Laurence. Análise de Conteúdo São Paulo: Edições 70, 2016.
8. Allsop DB, Chelladurai JM, Kimball ER, Marks LD, Hendricks JJ. Qualitative methods with NVivo software: a practical guide for analyzing qualitative. Psych [Internet]. 2022 [cited 2025 Apr 10];4(2):142-59. Available from: https://www.mdpi.com/2624-8611/4/2/13
9. Mestre TD, Caldeira EV, Lopes MJ. Family self-care in chronic disease management: an evolving care pattern? SAGE Open Nurs. 2024;10.
10. Farhane-Medina NZ, Luque B, Tabernero C, Castillo-Mayén R. Factors associated with gender and sex differences in anxiety prevalence and comorbidity: a systematic review. Sci Prog. 2022;105(4).

11. Alshelleh S, Alhawari H, Alhouri A, Abu-Hussein B, Oweis A. Level of depression and anxiety on quality of life among patients undergoing hemodialysis. Int J Gen Med. 2023;16:1783-95

12. Delgado-Domínguez CJ, Sanz-Gómez S, López-Herradón A, Díaz Espejo B, Lamas González O, de los Santos Roig M et al. Influence of depression and anxiety on hemodialysis patients: the value of multidisciplinary care. Int J Environ Res Public Health. 2021;18(7):3544.

13. Wang Y, Qiu Y, Ren L, Jiang H, Chen M, Dong. C. Social support, family resilience and psychological resilience among maintenance hemodialysis patients: a longitudinal study. BMC Psychiatry. 2024;24(1):76

14. Paz DB de P, Rozza SG, Lima H de P, Cândido VC, Barboza ES. Espiritualidade e religião/religiosidade: as percepções das pessoas com doença renal crônica em tratamento hemodialítico. Medicina (Ribeirão Preto) [Internet]. 2023 [cited 30 Sep 2025];56(3):e-208307. Available from: https://revistas.usp.br/rmrp/article/view/208307

15. Silva ECS, Mantovani MF, Nogueira LA, Küchler ML, Cassi CCAV, Kalinke LP. Financial toxicity in people with chronic kidney disease undergoing hemodialysis treatment. Rev Bras Enferm [Internet]. 2023 [cited 30 Sep 2025];76(4):e20220671. Available from: https://doi.org/10.1590/0034-7167-2022-0671pt

16. Sousa-Silva EC, Mantovani MF, Silva-Pires CG, Paes RG, Kalinke LP, Nogueira LA. A qualidade de vida e a relação com a toxicidade financeira no tratamento hemodialítico. Enferm Nefrol [Internet]. 2024 [cited 30 Sep 2025];27(1):[aprox. 8 p.]. Available from: https://www.enfermerianefrologica.com/revista/article/view/4585

17. Patel MR, Zhang G, Heisler M, Song PXK, Piette JD, Shi X, Choe HM, Smith A, Resnicow K. Measurement and validation of the Comprehensive Score for Financial Toxicity (COST) in a population with diabetes. Diabetes Care [Internet]. 2022 [cited 30 Sep 2025];45(11):2535-43. Available from: https://doi.org/10.2337/dc22-0494

18. Ng MSN, Chan DNS, Cheng Q, Miaskowski C, So WKW. Association between financial hardship and symptom burden in patients receiving maintenance dialysis: a systematic review. Int J Environ Res Public Health [Internet]. 2021 [cited 30 Sep 2025];18(18):9541. Available from: https://doi.org/10.3390/ijerph18189541

19. Silva MR, et al. Apoio emocional e redes familiares: um estudo sobre o impacto da companhia constante na saúde mental. Rev Bras Psicol Saúde. 2022; 10(2):150-65.

20. De Geus M, Visser W, van Egmond-de Mik A, Dam M, de Cuyper E, de van der Schueren M et al. Nutritional intake and diet quality in hemodialysis patients: scope for improvement. Res Brief [Internet] 2025 [cited 30 Sep 2025]; 35(4):550-8. Available from: https://www.jrnjournal.org/action/showPdf?pii=S1051-2276%2825%2900046-9.

21. Melo CF, Feijão GMM, Costa IM, Seidl EMF, Ramos-Cerqueira ATA, Arruda GHB. Adherence to treatment in chronic kidney disease: associations with therapeutic modalities and coping capacity. Estud Psicol (Campinas) [Internet]. 2024 [cited 30 Sep 2025];41. Available from: https://doi.org/10.1590/1982-0275202441e230042

22. Trigueros-Flores XB, Luna-Hernández G, Santos-Lopez MF, Pérez-Galván L, Flores-Camacho KJ, Díaz-Canchola LM et al. Barriers and facilitators to adherence to a healthy diet across the spectrum of chronic kidney disease. Patient Prefer Adherence [Internet]. 2025 [cited 30 Sep 2025];19:123-37. Available from: https://doi.org/10.2147/PPA.S494390.

23. Nguyen TM, Parker JL. Family monitoring and dietary adherence in chronic kidney disease: balancing support and autonomy. J Chronic Illn Care. 2023;11(1):45-59.

24. Sułkowski L, Matyja A, Matyja M. Social support and quality of life in hemodialysis patients: a comparative study with healthy controls. Medicina (Kaunas) [Internet]. 2024 [cited 30 Sep 2025];60(11):1732. Available from: https://doi.org/10.3390/medicina60111732

25. Ferreira RC, Nascimento TM, Santos AR. Apoio social percebido e sofrimento emocional em pacientes renais crônicos: uma análise qualitativa. Rev Bras Enferm. 2022;75.

26. Diao K, Wang J, Huang Y, Zhang Y, Guo D, Zhang L, Shan Y. The experience of social isolation in patients receiving peritoneal dialysis: a qualitative study. BMC Psychol [Internet]. 2025 [cited 30 Sep 2025];13:947. Available from: https://doi.org/10.1186/s40359-025-02367-y

27. Gomes LM, Oliveira S. A importância do suporte social na vivência da doença crônica: desafios frente ao abandono familiar. Rev Saúde Foco. 2021;10(1):34-45.

28. Simons A, Clarke P. Psychosocial effects of hemodialysis-related body image in chronic kidney patients: a qualitative study. Int J Chronic Illn Care. 2023;17(2):98-112.

"JANDRY LORENZO" GRANT 2026

The SPANISH SOCIETY OF NEPHROLOGY NURSING (SEDEN) sponsors this grant to promote research aimed at expanding knowledge in the field of nephrology nursing. The deadline to apply is June 30th, 2026, under the following:

TERMS AND CONDITIONS

1.- Projects whose authors are nurses who are full members of SEDEN and are up to date with their membership fees will be eligible to apply for the Jandry Lorenzo Scholarship. The participation of other professionals in the project will be permitted in order to promote multidisciplinary collaboration.

2.- Submit an anonymous, detailed project (no length limit) including: Introduction (background and current state of the topic), **Objectives** (and hypothesis if applicable), **Methodology** (setting, design, population and sample, measurement tools, data collection, and statistical analysis), **References, Project timeline, and Estimated budget**. Send via email to: seden@seden.org

3.- The **SEDEN** Board will appoint an Evaluation Committee to act as jury. The decision will be communicated by September 13th, 2026.
Award Details:
The grant includes a diploma presented at the opening session of the 51st SEDEN Congress (2026) and a monetary award of **€1,800***. 50% will be paid upon award notification. The remaining 50% will be paid upon project completion.

4.- Awardees agree to submit the final research project to **SEDEN** by September 12th, 2027. Extensions of up to 6 months may be requested. If not submitted, the remaining 50% will not be paid. The final report must include: introduction, methods, results, discussion, and bibliography. It must be presented at the LII **SEDEN** Congress, with one of the authors as presenter. Submissions by non-authors will not be accepted.

5.- The final project must adhere to ***Enfermería Nefrológica's*** **publication guidelines** and will undergo peer review. If rejected, it will be published on the **SEDEN** website.

6.- The project may not be published or presented elsewhere until conditions 5 and 6 are fulfilled. The award must be acknowledged as Jandry Lorenzo Grant 2026 in all uses.

7.- Applying implies acceptance of these rules and the jury's decision, which is final.

8.- The grant may be declared void.

**The monetary award is subject to tax withholding.*

Calle de la Povedilla, 13. Bajo Izq. 28009 Madrid • Tel.: 91 409 37 37 • Fax: 91 504 09 77 • seden@seden.org • www.seden.org

Guerrero-Rodríguez E, et al. https://doi.org/10.37551/S2254-28842025032

Analysis of factors associated with repeated needling of arteriovenous fistulas in haemodialysis patients

Elena Guerrero-Rodríguez[1], Iris Rubio-Segovia[1], Ignacio Escanes-Martínez[1], Julia Audije-Gil[2], David Hernán-Gascueña[2], María Dolores Arenas-Jiménez[2]

[1] Fundación Renal Española, Centro Los Llanos II, Getafe, Madrid, Spain

[2] Fundación Renal Española, Madrid, Spain

Please cite this article in pres as:
Guerrero Rodríguez E, Rubio Segovia I, Escanes Martínez I, Audije Gil J, Hernán Gascueña D, Arenas Jiménez MD. Analysis of factors associated with repeated needling of arteriovenous fistulas in haemodialysis patients Enferm Nefrol. 2025;28(4):308-14

Corresponding author:
Elena Guerrero Rodríguez
eguerrero@fundacionrenal.es

Reception: 04-07-25
Acceptance: 11-21-25
Publication: 12-30-25

ABSTRACT

Introduction: Identifying variables associated with difficult fistula cannulation may help prevent complications.

Objective: To determine the incidence of repeated cannulations and analyse the factors influencing successful cannulation.

Material and Method: We conducted a descriptive, retrospective, cross-sectional study in 2024. The variables analysed included number of re-cannulations, type and location of fistula, needle position, duration of use, and nurses' length of professional experience. Student's t test, Mann–Whitney U test, and chi-square test were used.

Results: A total of 81,968 sessions from 1,167 patients were included; 69% were men and 31% women, with a mean age of 66.4±14.8 years and a mean BMI of 26.4±5.4. Autologous arteriovenous fistulas accounted for 92% and prosthetic fistulas for 8%. Fistula types were humerocephalic (45.8%), radiocephalic (40.5%), humerobasilic (7.6%), and others (6.1%); 80% were in the right arm and 20% in the left arm. Needles were inserted anterogradely in 99% of cases. Mean nursing experience was 6.7 years. Repeated cannulations occurred in 1% of sessions; 83.6% involved a single additional puncture, and 71% affected the venous needle. Factors associated with a higher number of repeated cannulations included prosthetic fistulas (1.8 *vs* 0.9, $p<0.001$); fistula type—humerohumeral (2%), humeroaxillary (2%), humerobasilic (1.3%), radiocephalic (1.1%), and humerocephalic (0.7%) ($p<0.001$); retrograde cannulation (2.2% *vs* 1%, $p=0.002$); shorter duration of use (median 29 months, $p<0.001$); and greater nursing seniority (median, 3.3 years, $p=0.003$).

Conclusions: The incidence of repeated cannulations was low. Prosthetic, deep, and recently created fistulas, as well as retrograde cannulation, were associated with a higher number of additional punctures. Contrary to expectations, nurses with greater professional experience recorded a higher number of re-cannulations.

Keywords: haemodialysis; arteriovenous fistula; cannulation; complications.

RESUMEN

Análisis de los factores asociados a la punción repetida de las fístulas arteriovenosas en pacientes en hemodiálisis

Introducción: La identificación de las variables asociadas a un abordaje difícil de la fístula puede contribuir a prevenir complicaciones.

Objetivo: Determinar la incidencia de punciones repetidas y analizar los factores que influyen en una punción exitosa.

Material y Método: Estudio descriptivo, retrospectivo de corte transversal, realizado durante 2024. Variables analizadas: número repunciones, tipo y localización de fístula, posición de

agujas, tiempo de uso y antigüedad del enfermero. Se empleó t de Student, U de Mann-Whitney y chi cuadrado.

Resultados: Incluidas 81.968 sesiones de 1.167 pacientes, 69% varones y 31% mujeres, edad media 66,4±14,8 años e IMC 25,7(22,6-29,3). El 92% FAV autóloga y 8% protésica. Tipo de fístula: Humero-cefálica 45,8%, radio-cefálica 40,5%, humero-basílica 7,6% y otros 6,1%; 80% brazo derecho y 20% izquierdo. El 99% agujas canalizadas anterógradas. Antigüedad de los enfermeros mediana de 3,3 (RIQ 1,5-5,9) años. Incidencia de punciones repetidas en el 1% de las sesiones; 83,6% una única punción extra y el 70,3% aguja venosa. Variables asociadas a más punciones repetidas: fístula protésica (1,8 *vs* 0,9, $p<0,001$); tipo de fístula: Humero-humeral 2%, humero-axilar 2%, humero basílica 1,3%, radio-cefálica 1,1% y Humero-cefálica 0,7% ($p<0,001$); canulación retrógrada (2,2% *vs* 1%, $p=0,002$; menor tiempo de uso (mediana 29 meses, $p<0,001$) y mayor antigüedad del enfermero (mediana 3,3 años, $p=0,003$).

Conclusión: La incidencia de punciones repetidas fue baja. Las fístulas protésicas, profundas y de reciente creación, así como la punción retrógrada, se asociaron a mayor número de punciones adicionales. Pese a lo esperado, los enfermeros con mayor antigüedad registraron mayor número de repunciones.

Palabras clave: hemodiálisis; fístula arteriovenosa; punciones; complicaciones

INTRODUCTION

Haemodialysis (HD) is the most widely used renal replacement therapy worldwide. In Spain, approximately 78% of patients with chronic kidney disease undergoing dialysis receive this treatment, and in Europe more than 80,000 people depend on it for survival[1,2].

The efficacy of haemodialysis directly influences patients' quality of life and morbidity and mortality, and this effectiveness is largely determined by the type and functionality of the vascular access used[3,4].

Among the different available accesses, the arteriovenous fistula (AVF) is considered the access of first choice due to its durability and lower rate of infectious complications[3-8]. Nevertheless, its correct management represents a technical challenge that requires a high level of competence from nursing staff and constitutes one of the main sources of concern for both professionals and patients dialysing through it.

Factors that may hinder AVF cannulation include the patient's own anatomical characteristics (such as the quality of the available arterial and venous bed) and functional aspects of the fistula *per se:*

- Insufficient maturation may increase the incidence of cannulation-related complications (such as haematomas or thrombosis) and compromise access survival[4].
- Anatomical location is also crucial, as puncture sites must be accessible; in some cases, surgical techniques are required to facilitate cannulation (vein superficialisation)[9].
- The AVF must tolerate repeated puncture, which is particularly challenging in tortuous veins or vessels with fragile walls.

Furthermore, other determining factors are not patient-related but instead depend on the nurse performing the cannulation, such as experience with this type of access, ultrasound skills for ultrasound-guided cannulation, and specific training in vascular access[4-10].

Inadequate cannulation may result in minor complications, such as extravasation or haematoma formation, but can also lead to more serious fistula-related events, including infection, stenosis, aneurysm or pseudoaneurysm formation, and even access thrombosis. These complications compromise fistula viability and often require the placement of a central venous catheter as an alternative[4], which increases patient morbidity and mortality, healthcare costs, and the workload for nursing staff.

This procedure also has psychological repercussions. Several studies have shown that pain associated with cannulation and its potential complications are related to increased levels of anxiety and fear in patients[8]. This situation not only affects the fistula bearer but also negatively influences the therapeutic relationship between patient and nurse, weakening trust and worsening the perceived quality of care received[8,11-13]. Furthermore, patients who experience multiple cannulation attempts or fistula-related adverse events report lower overall satisfaction with their treatment[14].

Currently, few studies have examined in depth the adverse effects associated with AVF cannulation[10-12]. Most focus on severe complications requiring surgical intervention, while literature addressing extravasation, repeated punctures, or the need to dialyse using a single puncture or using a catheter as venous return remains scarce.

Although clinical experience allows most nephrology nurses to recognise which types of fistula tend to present greater cannulation difficulty, there are very few studies clearly defining which characteristics make an access difficult to cannulate[9-15]. Identifying in advance which fistulas are potentially challenging would allow more accurate and efficient planning of cannulation, thereby reducing the risk of complications related to failed attempts.

The aim of this study was to analyse the prevalence of repeated punctures in patients undergoing HD via an AVF, and to identify the factors influencing correct cannulation, with the ultimate goal of improving patients' overall wellbeing.

MATERIAL AND METHOD

Study Design and Setting

We conducted a multicentre, descriptive, retrospective, cross-sectional study. HD sessions performed between January 2nd and December 31st 2024 were analysed in 18 dialysis units of the Spanish Renal Foundation, including both hospital-based and outpatient centres (Spanish Renal Foundation, Centro Los Llanos II, Madrid, Spain; Spanish Renal Foundation, Madrid, Spain).

Population and Sample

All sessions from patients dialysed through an AVF were included.

Study Variables

Demographic variables included age, sex and nationality. Clinical variables comprised: need for additional puncture, number of repeated punctures, type of fistula used for dialysis, anatomical location of the fistula, needle direction (retrograde or antegrade), fistula age (in months), and the nurse's professional experience (in years).

Data Collection Methods

Data were obtained from the electronic medical record system Nefrosoft version 7.3.1. The nurse responsible for each session manually recorded needle position and whether additional punctures were required, including the number of attempts.

Statistical Analysis

Categorical variables were expressed as absolute frequencies and percentages. Continuous variables were presented as mean and standard deviation. Distribution normality was assessed using the Kolmogorov–Smirnov test and visual inspection of histograms. For normally distributed variables, Student's t-test for independent samples was used, reporting mean and standard deviation. For non-normally distributed variables, the Mann–Whitney *U* test was applied, with results expressed as median and 25th and 75th percentiles. Categorical variables were compared using the chi-square test. Statistical analysis was performed with IBM SPSS Statistics version 29.0.1.0, with statistical significance set at p≤0.05.

RESULTS

A total of 81,968 haemodialysis sessions corresponding to 1,167 patients were analysed. The mean age was 66.4±14.8 years and the median body mass index (BMI) was 25.7 (22.6–29.3) kg/m². 68.9% (n=56,480) of patients were male and 31.1% (n=25,488) female. 74.8% (n=28,042) were of Spanish nationality and 25.2% (n=9,457) were immigrants.

The vascular access used for dialysis was predominantly native arteriovenous fistulae (AVF) in 92.1% (n=75,464) of cases, compared with 7.9% (n=6,504) prosthetic AVFs. The anatomical distribution of fistulae is shown in **figure 1.**

Regarding the limb bearing the AVF, 79.9% (n=31,149) were located in the right arm and 20.1% (n=7,830) in the left arm. Concerning the direction of needle insertion, in 99.1% (n=76,609) of cases the arterial needle was inserted anterogradely, and in 0.9% (n=726) retrogradely. The median length of experience of the nurses performing the cannulations in the centres participating in the Spanish Renal Foundation was 3.3 years (IQR, 1.5–5.9).

Analysis of additional cannulations showed that in 818 of the 81,968 sessions at least one extra puncture was required, representing 0.99% of all sessions. Considering that two punctures are performed per fistula in each HD session, the rate of repeated punctures relative to the total number of punctures was 0.49%. In 70.3% (n=575) of cases, the additional puncture involved the venous needle, while in 29.7% (n=243) it was required for the arterial needle. Regarding the number of repeated punctures, 83.6% (n=684) of sessions required one additional puncture, 14.4% (n=118) two punctures, and 1.9% (n=16) more than two.

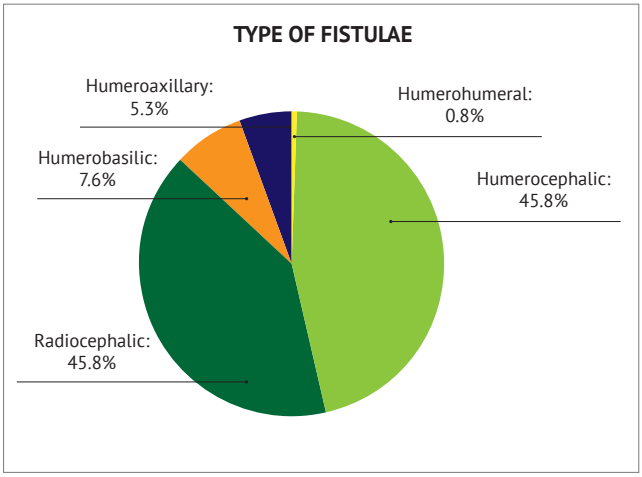


Figure 1. Percentage distribution of fistulae by anatomical location.

Several factors were significantly associated with the need for repeated punctures. Prosthetic AVFs required more additional punctures than native AVFs (0.9% [n=701] *vs* 1.8% [n=117]; p<0.001). Humerohumeral fistulae (2%, n=13), humeraxillary (2%, n=85) and humerobasilic (1.3%, n=78) fistulae required more additional punctures than radiocephalic (1.1%, n=355) and humerorcephalic (0.7%, n=272) fistulae (p<0.001). Needle orientation was also determinant: anterograde cannulation required fewer additional punctures than retrograde cannulation (1% [n=776] *vs* 2.2% [n=16]; p=0.002).

The duration of fistula use was longer in fistulae that did not require additional punctures compared with those that did (median 29 months [12–52] *vs* 11 months [4–31]; p<0.001).

Similarly, the length of nursing experience was lower in fistulae that did not require additional punctures (median 3.3 years [1.5–5.9] *vs* 4.3 years [1.7–7.7]; p=0.003).

No significant differences were observed according to sex, age, BMI, nationality, or limb used for fistula creation, as shown in **table 1.**

DISCUSSION

One of the main challenges in nephrology nursing practice is maintaining vascular access in optimal condition, as this is essential to ensure safe and effective dialysis.[13] This study analysed over 80,000 HD sessions performed through AVFs and aimed to provide conclusive data to facilitate daily nephrology nursing practice and improve the quality of vascular access management.

The incidence rate of additional punctures was <1% of all analysed sessions. Although this may be considered a positive finding and a reflection of good nursing practice, its clinical importance should not be underestimated. Direct comparison with previous studies is difficult, as the literature generally reports vascular access complications without specifying the proportion of repeated punctures per session. Van Loon et al. (2009) observed that 37% of patients with native fistulae and 19% with prosthetic fistulae required more than ten additional punctures over nearly two years of follow-up[16], although their data were expressed per patient rather than per session. Other studies focusing on access-related adverse events (extravasation, perineedle bleeding, infections, accidental needle dislodgement, etc.) do not specifically report repeated punctures[10-15], limiting direct comparison.

With regard to the factors significantly associated with the need for additional punctures, our findings indicate that prosthetic AVFs require a higher number of additional punctures compared with native AVFs. These differences, which were statistically significant in the present study, have also been reported in previous literature[7-17]. Those studies associate the use of prosthetic material with higher rates of thrombosis, stenosis and puncture-related complications, and indicate that this type of fistula requires a greater number of interventions to maintain patency[4]. Nevertheless, other studies, such as that of Van Loon et al. (2009), have reported a higher percentage of puncture errors in native fistulae[16]. Among the factors that may hinder cannulation in prosthetic AVFs are the greater rigidity and reduced elasticity of the graft[4]. the more limited puncture area[4]. reduced perception of thrill[9]. and the more rapid deterioration of the graft wall, which, moreover, does not regenerate[3,4].

Humerohumeral, humeroaxillary and humerobasilic fistulae required a higher number of additional punctures, suggesting greater technical complexity. Recent literature supports this observation, indicating that deep fistulae are more difficult to cannulate than superficial ones, particularly if they have not been transposed or superficialised prior to use[9]. Furthermore, several studies report that the initial punctures of all fistulae, especially those with high intra-access flow (such as humerobasilic fistulae), carry a higher risk of extravasation, which may necessitate more additional punctures[17]. From an anatomical perspective and based on clinical experience, it is reasonable to assume that greater depth impairs both palpation and vascular access. Accordingly, several studies recommend the use of ultrasound-guided cannulationfor this type of access to minimise extravasation and reduce the need for additional punctures[6].

The need for additional punctures was lower in fistulae cannulated with anterograde needle orientation compared with those cannulated retrogradely. According to the Spanish Clinical Guidelines for Vascular Access in Haemodialysis[4]. there is consensus that the venous needle should always be oriented in the direction of blood flow (anterograde). However, some controversy remains regarding the optimal orientation of the arterial needle, which may be positioned either anterogradely or retrogradely. Several studies have indicated that the

Table 1. Distribution of sessions according to the need for additional punctures.

Characteristic/Parameter		Additional Puncture		Total
		No	Yes	
Sex	Male Female	55,901 (99.0%) 25,249 (99.1%)	579 (1.0%) 239 (0.9%)	0.244
Nationality	Spanish Immigrant	27,708 (98.8%) 9,356 (98.9%)	334 (1.2%) 101 (1.1%)	0.334
Access material	Native Prosthetic	74,763 (99.1%) 6,387 (98.2%)	701 (0.9%) 117 (1.8%)	**0.000**
Type of fistula	Humerobasilic Humeroce-phalic Humeroaxillary Radiocephalic Humerohumeral	6,085 (98.7%) 36,952 (99.3%) 4,244 (98.0%) 32.493 (98.9%) 628 (98%)	78 (1.3%) 272 (0.7%) 85 (2.0%) 355 (1.1%) 13 (2%)	**0.000**
Location	Left Right	7,747 (98.9%) 30,865 (99.1%)	83 (1.1%) 284 (0.9%)	0.125
Needle orienta-tion	Anterograde Retrograde	75,833 (99.0%) 710 (97.8%)	776 (1.0%) 16 (2.2%)	**0.002**
Age (years) BMI (kg/m²)		66.4±14.8 26.4±5.4	66.8±14.8 26.5±5.2	0.252 0.392
Nursing experience (years)		3.3 (1.5–5.9)	4.3 (1.7–7.7)	**0.003**
Fistula age (months)		29 (12–52)	11 (4–31)	**<0.001**

***BMI:** Body Mass Index.

direction of arterial needle insertion does not significantly influence dialysis efficacy[4,16], although anterograde arterial puncture has been associated with improved AVF survival[4]. With respect to the effect of needle orientation on the need for additional punctures, the present study shows that retrograde orientation is associated with a higher frequency of repeated punctures. This finding is supported by several studies demonstrating that the anterograde technique is significantly safer and requires fewer additional punctures[5,7,18]. In contrast, only 1 study cited by Van Loon et al. (2009)[16] suggests that retrograde arterial puncture is associated with fewer cannulation-related complications. According to Parisotto et al. (2014), retrograde puncture presents greater technical difficulty due to reduced needle stability—resulting from flow turbulence—and a higher probability of acute complications such as infiltrations and haematomas[7]. Moreover, as most current nursing protocols are designed for anterograde puncture, the retrograde approach may pose additional difficulty for nursing staff because of their more limited experience with this technique.

Regarding fistula vintage, older fistulae (>29 months) were associated with fewer additional punctures. These results are consistent with previous studies, which attribute this association to the fact that longer-standing fistulae have had sufficient time to mature properly, allowing anatomical stabilisation that facilitates cannulation and reduces the risk of displacement[19].

According to the Spanish Clinical Guidelines for Vascular Access in Haemodialysis and the KDOQI guidelines, a fistula may be considered suitable for cannulation when it presents a venous diameter >5–6 mm, intra-access flow >500–600 mL/min, and depth <6 mm from the skin surface[3,4,20]. Additionally, other authors specify that the fistula should present a palpable thrill, audible bruit, adequate venous wall resistance and ease of cannulation.[21] To fulfil these criteria, it is generally recommended to wait 4–6 weeks from fistula creation before initiating use, although some authors advise extending this period to 3–4 months to ensure adequate maturation.[22] This is particularly relevant, as recently created fistulae (<6 months) show a higher risk of blood extravasation[4,17], thereby increasing the need for additional punctures. Consequently, early and appropriate vascular access planning during advanced chronic kidney disease clinics is essential.

Another important finding of this study is that, contrary to expectations, greater nursing seniority was associated with a higher number of additional punctures. This contrasts with previous studies reporting that greater nursing experience is associated with fewer complications during haemodialysis and increased patient confidence[11,16,17].

This apparent discrepancy may be explained by guideline recommendations that both initial cannulations and technically difficult punctures should be performed by the most experienced staff[3,4]. This would justify why, as observed in this study, nurses with greater experience perform more additional punctures, as they are responsible for cannulating newly created and more complex fistulae that require specialised care. Establishing nursing protocols to distribute workload according to clinical complexity would be beneficial to ensure efficient and safe patient care.

Among the main limitations of this study, it should be noted that, due to its retrospective design, the analysed data depend on the accurate completion of clinical records, which may affect the reliability of certain variables. Likewise, some comorbidities that could influence correct fistula cannulation (such as diabetes mellitus, peripheral vascular disease, etc.) were not considered.

With regard to nursing staff, neither specific training in vascular access nor professional experience in other institutions was evaluated.

Finally, the analysis was performed on the basis of the number of dialysis sessions rather than individual patients. This may introduce bias if some patients with difficult-to-manage access contributed a larger number of sessions, thereby influencing the overall results.

It is hoped that the findings of this study will provide a foundation for future research aimed at optimising treatment planning and the management of vascular access in haemodialysis patients, thereby helping to reduce complications and improve quality of life.

In light of these results, we conclude that the rate of repeated punctures in the analysed sessions is low, reflecting appropriate performance by nursing staff.

The characteristics of the vascular access are decisive in the development of puncture-related complications. Prosthetic fistulae, deep anatomical access locations (such as humeroaxillary or humerohumeral), and retrograde puncture are significantly associated with a higher probability of requiring additional punctures. In addition, older fistulae show a lower likelihood of extravasation.

A particularly interesting finding of this study is that greater nursing seniority is associated with more additional punctures, which may be explained by the fact that more experienced staff undertake the most complex cases and the initial cannulations.

The results reinforce the importance of considering both vascular access characteristics and staff experience when planning the cannulation approach in patients undergoing haemodialysis via an arteriovenous fistula.

Declaration of generative Artificial intelligence use. "During the preparation of this work, the authors used ChatGPT to improve the clarity of language. After using this tool, the authors reviewed and edited the content as necessary and assume full responsibility for the content of the publication".

Funding

None declared.

Conflicts of interest

None declared.

REFERENCES

1. Phadke G, Khanna R. SCIENCE OF MEDICINE Renal Replacement Therapies. 2011.

2. Quiroga B, Mahíllo B, Mazuecos A, Ortiz A, Comas-Farnés J, Hernández-Marrero D, et al. Registro Español de Enfermos Renales (REER): informe del año 2022 y análisis evolutivo. Nefrología. 2025;45(4):312-28.

3. Lok CE, Huber TS, Lee T, Shenoy S, Yevzlin AS, Abreo K, et al. KDOQI Clinical Practice Guideline for Vascular Access: 2019 Update. American Journal of Kidney Diseases. 2020;75(4):S1-164.

4. Ibeas J, Roca-Tey R. Guía Clínica Española del Acceso Vascular para Hemodiálisis. Enfermería Nefrológica. 2018;1-256.

5. Castro MCM, Carlquist FTY, De Fátima-Silva C, Xagoraris M, Centeno JR, De Souza JAC. Vascular access cannulation in hemodialysis patients: Technical approach. Brazilian Journal of Nephrology. 2020;42(1):38-46.

6. Kamata T, Tomita M, Iehara N. Ultrasoundguided cannulation of hemodialysis access. Vol. 2, Renal Replacement Therapy. BioMed Central Ltd; 2016.

7. Parisotto MT, Schoder VU, Miriunis C, Grassmann AH, Scatizzi LP, Kaufmann P, et al. Cannulation technique influences arteriovenous fistula and graft survival. Kidney Int. 2014;86(4):790-7.

8. Tovar-Muñoz L, Serrano-Navarro I, Mesa-Abad P, Crespo-Montero R, Ventura-Puertos P. "More than pain": Experiences of dialyzed patients regarding their puncture in hemodialysis. Enfermeria Nefrologica. 2020;23(1):34–43.

9. Behera MR, John EE, Thomas A, David VG, Alexander S, Mohapatra A, et al. Difficult cannulation of hemodialysis arteriovenous fistula – Role of imaging in access management (DICAF STUDY). Journal of Vascular Access. 2022;23(6):877-84.

10. María E, Robles M, Aguilar-García R, Becerra MM. Incidencia y tipo de efectos adversos durante el procedimiento de hemodiálisis. Enferm Nefrol. 2013;16(1):36-40.

11. Turrado MS, Pérez LG, Domínguez CC. Factores que influyen en la satisfacción del paciente de diálisis con enfermería. Enferm Nefrol. 2017;20(1):66-75.

12. Tomás PA, Peris-Ambou I, Ma Pérez-Baylach C, Castelló-Benavent J. Evaluación del dolor en la punción de una fístula arteriovenosa para hemodiálisis comparando pomada anestésica frente a frío local. Enferm Nefrol 2014; 17(1):11-5.

13. Santoro D, Benedetto F, Mondello P, Pipitò N, Barillà D, Spinelli F, Ricciardi CA, Cernaro V, Buemi M. Vascular access for hemodialysis: current perspectives. Int J Nephrol Renovasc Dis. 2014;7:281-94.

14. Lee T, Barker J, Allon M. Needle Infiltration of Arteriovenous Fistulae in Hemodialysis: Risk Factors and Consequences. American Journal of Kidney Diseases [Internet]. 2006 [cited 2025 Jul 10];47(6):1020-6. Available from: https://www.sciencedirect.com/science/article/abs/pii/S0272638606004380

15. Muñoz-Macías C, Torollo-Luna I, Sag-Legrán MJ, Salas-Cardador F, Gómez-López VE, Crespo-Montero R. Análisis de los eventos adversos en una unidad de diálisis. Enferm Nefrol. 2017;20Suppl(1):S27-60

16. Van Loon MM, Kessel AGH, Van Der Sande FM, Tordoir JHM. Cannulation practice patterns in haemodialysis vascular access : Predictors for unsuccessful cannulation. J Ren Care. 2009;35(2):82-9.

17. Franco-Valdivieso C, Crespo-Montero R. Actuación ante una extravasación sanguínea. En: Crespo Montero R, Casas Cuesta R, Ochando García A (Eds). Procedimientos y Protocolos con Competencias Específicas para Enfermería Nefrológica [Internet]. Madrid: Sociedad Española de Enfermería Nefrológica; 2024 [cited 9 Sep 2025]. [aprox. 4 p.]. Available from: https://www.enfermerianefrologica.com/procedimientos/article/view/5.13

18. Kumbar L. Complications of arteriovenous fistulae: beyond venous stenosis. Adv Chronic Kidney Dis. 2012;19(3):195-201.

19. Sidawy AN, Spergel LM, Besarab A, Allon M, Jennings WC, Padberg FT, et al. The Society for Vascular Surgery: Clinical practice guidelines for the surgical placement and maintenance of arteriovenous hemodialysis access. J Vasc Surg [Internet]. 2008 [cited 2025 Jul 10];48(5):S2–25. Available from: https://www.sciencedirect.com/science/article/pii/S0741521408013992

20. Aragoncillo Inés, Caldés-Ruisanchez Silvia. Ecografía Doppler en el Acceso Vascular. En: Lorenzo V., López Gómez JM (Eds). Nefrología al día. ISSN: 2659-06. Available from: https://www.nefrologiaaldia.org/291

21. Ocharan-Corcuera J, Mayor JM, San-Vicente J, Hernández J, Jimeno I, Minguela JI, et al. Uso y cuidados de los accesos venosos. Diálisis y trasplante: publicación oficial de la Sociedad Española de Diálisis y Trasplante. 2008. Vol. 29(4):188-92.

22. Rodríguez-Hernández JA, González-Parra E, Gutiérrez-Julián JM, Segarra- Medrano A, Amirante B, Matínez MT, et al. Creación del acceso vascular. Nefrología. 2005;25; S1:S0-97.

Renal Foundation

Award for Excellence in Communication

Award Rules

PURPOSE

The Renal Foundation is a non-profit organization dedicated to the comprehensive care of individuals with kidney disease, as well as raising awareness and promoting prevention of this condition. As part of its ongoing commitment to quality and excellence, the Renal Foundation has created this award within the framework of the annual congress of the Spanish Society of Nephrology Nursing (SEDEN). The award was established on the occasion of the Foundation's 40th anniversary, with the aim of taking a further step in promoting research in nephrology nursing, and recognizing excellence in the communication of presented work, rewarding both the content of the presentation and the quality of its oral delivery during the congress. The first edition took place at the XXXXVIII SEDEN National Congress held in Salamanca (Spain).

CANDIDATES

Eligible candidates will be nursing professionals or teams of professionals whose in-person oral presentation has been accepted at the congress. Eligibility will be automatically granted to the first five oral communications that receive the highest quantitative scores from the SEDEN evaluation panel for that year, provided that they have not received another SEDEN award for the same work. No work involving members of the Renal Foundation or conducted in any of its centers or dialysis units may participate.

EVALUATION CRITERIA

Various aspects of the presentation will be assessed, including:

1. Quality: presentation, structure, and relevance of the content.
2. Clarity: ease of understanding of the delivery.
3. Innovation: originality of format and use of new technologies.
4. Dynamism of the presenter.
5. Impact and connection with the audience.
6. Direct impact on the care of individuals with kidney disease.

FINANCIAL ENDOWMENT

This award includes a prize of €1,000 (one thousand euros).

DISSEMINATION

The winning work will be made available to the journal Enfermería Nefrológica for possible publication, subject to the editorial committee's decision. The Renal Foundation may also disseminate the winning work, without this implying the transfer or limitation of ownership rights over the awarded works, including intellectual or industrial property rights. Whenever authors use the work and/or its data, they must state that it originated as a Renal Foundation Award.

JURY

The jury will consist of an odd number of members designated by the SEDEN Board of Directors and the Renal Foundation, with the latter entitled to appoint an additional member to avoid tie votes in the final decision. The award may be declared void.

AWARD GRANTING AND PRESENTATION

To receive the award, the work must be presented at the SEDEN National Congress by one of the signing authors. Presentations by individuals who are not listed as authors will not be accepted.

ACCEPTANCE OF TERMS

Participation in this call implies acceptance of these terms.

FUNDACIÓN RENAL ESPAÑOLA

SEDEN
SOCIEDAD ESPAÑOLA DE ENFERMERÍA NEFROLÓGICA

Cirera-Segura F, et al. https://doi.org/10.37551/S2254-28842025033

Prevalence of frailty in incident haemodialysis patients

Francisco Cirera-Segura, María del Rocío Manzano-Angüa, María Adelaida Martín-Carrasco

Uro-Nephrology Clinical Management Unit (CMU), Haemodialysis Unit, Hospital Universitario Virgen del Rocío, Seville, Spain

Please cite this article in press as:
Cirera-Segura F, Manzano-Angüa MR, Martín-Carrasco MA.
Prevalence of frailty in incident haemodialysis patients. Enferm Nefrol. 2025;28(4):316-21

Corresponding author:
Francisco Cirera Segura
francisco.cirera.sspa@juntadeandalucia.es

Reception: 09-02-25
Acceptance: 09-23-25
Publication: 12-30-25

ABSTRACT

Introduction: Frailty is a syndrome characterised by reduced physiological reserve and increased vulnerability to complications, falls, and mortality. In Spain, the elderly haemodialysis population is increasing, with reported frailty prevalence ranging from 26% to 73%, depending on the assessment instrument used.

Objective: To assess the prevalence of frailty in incident haemodialysis patients using the FRAIL scale.

Materials and Method: We conducted a prospective descriptive study from November 2024 through March 2025 using convenience sampling. Fifty-one incident haemodialysis patients were included. Demographic data, renal disease aetiology, diabetes mellitus, and vascular access were collected. Frailty was assessed using the FRAIL scale (five items: fatigue, resistance, ambulation, comorbidity, and weight loss), classifying patients as frail (>3 points), pre-frail (1–2 points), or non-frail (0 points).

Results: Mean age was 68.76±12.18 years; 74.5% were men. The most frequent aetiology was unknown (25%). Overall, 64.7% of patients were frail, 29.7% pre-frail, and 5.9% non-frail. The most frequent impairments were reduced resistance (76.5%), fatigue (64.7%), and weight loss (58.8%). Diabetes mellitus was significantly associated with frailty (p=0.012). No significant differences were found according to age, sex, body mass index, place of origin, vascular access, or urgent dialysis initiation.

Conclusions: The combined prevalence of frailty and pre-frailty reached 94.4%. The FRAIL scale proved to be a rapid and useful tool for early detection, facilitating the implementation of preventive interventions. Multicentre studies with larger sample sizes are needed to confirm these findings.

Keywords: frailty; haemodialysis; chronic kidney disease; elderly patients; vascular access; diabetes mellitus.

RESUMEN

Prevalencia de la fragilidad en pacientes incidentes en hemodiálisis

Introducción: La fragilidad es un síndrome caracterizado por la disminución de la reserva fisiológica y mayor vulnerabilidad a complicaciones, caídas y mortalidad. En España, la población anciana en hemodiálisis está en aumento, con prevalencias de fragilidad del 26-73% según el instrumento de medida.

Objetivo: El objetivo fue evaluar la prevalencia de fragilidad en pacientes incidentes en he-modiálisis mediante la escala FRAIL.

Material y Método: Estudio descriptivo prospectivo realizado entre noviembre de 2024 y marzo de 2025, con muestreo incidental. Se incluyeron 51 pacientes incidentes en hemodiá-lisis. Se recogieron datos demográficos, etiología de la enfermedad renal, diabetes mellitus y acceso vascular. La fragilidad se evaluó con la escala FRAIL (cinco ítems: fatigabilidad, resistencia, deambulación, comorbilidad y pérdida de peso), clasificando a los pacientes como frágiles (>3 puntos), prefrágiles (1-2) o no frágiles (0).

Resultados: Edad media: 68,76±12,18 años; 74,5% hombres. La etiología más frecuente fue no filiada (25%). El 64,7% fueron frágiles, el 29,7%, prefrágiles, y el 5,9%, no frágiles. Las alteraciones más frecuentes fueron problemas de resistencia (76,5%), fatigabilidad (64,7%) y pérdida de peso (58,8%). La diabetes mellitus se asoció significativamente con fragilidad

(*p*=0,012). No se hallaron diferencias con edad, género, índice de masa corporal, procedencia, acceso vascular o inicio urgente.

Conclusiones: La prevalencia combinada de fragilidad y prefragilidad alcanzó el 94,4%. La escala FRAIL demostró ser un instrumento rápido y útil para la detección precoz, lo que faci-lita la implementación de intervenciones preventivas. Se precisan estudios multicéntricos y con mayor tamaño muestral para confirmar estos resultados.

Palabras clave: fragilidad; hemodiálisis; insuficiencia renal crónica; pacientes ancianos; acceso vascular; diabetes mellitus.

INTRODUCTION

Frailty is defined as a syndrome characterised by reduced physiological reserve and increased vulnerability to illness and death[1]. In patients undergoing dialysis, frailty is associated with adverse clinical outcomes such as increased mortality, falls, hospitalisations, vascular access failure, and deterioration in quality of life[2-6]. It has also been identified as an independent predictor of adverse events in chronic kidney disease[7-9], with a negative impact on functional independence[10] and quality of life[11].

In Spain, the proportion of elderly patients initiating renal replacement therapy continues to rise[12]. The prevalence of frailty in this population ranges from 26% to 73%, depending on the assessment tool used[13-17]. Among patients on dialysis, between 41% and 67% meet criteria for frailty, representing a 5–7% higher prevalence than in the general population[4,7-13].

In this context, systematic assessment of frailty at the initiation of dialysis is a clinical necessity. To this end, our centre has implemented the FRAIL scale, a brief and validated questionnaire that enables early detection of this syndrome.

The objective of the present study was to determine the prevalence of frailty in incident haemodialysis patients using the FRAIL scale.

MATERIAL AND METHOD

Study Design and Population

We conducted a prospective descriptive study between November 2024 and March 2025 in the haemodialysis unit of *Hospital Universitario Virgen del Rocío* (Sevilla, Spain). Convenience sampling was used, including all patients who initiated renal replacement therapy with haemodialysis during the study period. The final sample included a total of 51 patients.

Variables and Instruments

Frailty was assessed using the FRAIL scale, a validated tool[18-20] consisting of five items: fatigue, resistance (ability to climb stairs), ambulation, number of comorbidities, and weight loss >5% in the previous year (Appendix 1). Patients were classified into 3 categories:

- Frail (>3 points)
- Pre-frail (1–2 points)
- Non-frail (0 points)

Additional variables collected included demographic data (age, sex, weight, height, body mass index), clinical variables (aetiology of renal disease, presence of diabetes mellitus), and variables related to vascular access at the start of dialysis.

Data Collection Procedure

Data were obtained from the health records and from interviews conducted on the same day dialysis was initiated, during the admission consultation. All information was coded and stored in secure databases accessible only to the research team.

Ethical Considerations

All participants provided written informed consent prior to inclusion. Personal data were processed in accordance with the General Data Protection Regulation (EU Regulation 2016/679) and Organic Law 3/2018, ensuring lawfulness, transparency, confidentiality, and pseudonymisation. Results are presented in aggregated form, with no individual patient identification. The study complied with the principles of the Declaration of Helsinki.

Statistical Analysis

Descriptive statistics were performed. Categorical variables were expressed as absolute and relative frequencies, and quantitative variables as mean ± standard deviation or median (P25–P75), depending on distribution assessed by the Kolmogorov–Smirnov test.

Group comparisons were conducted using the chi-square test or Fisher's exact test for categorical variables, and Student's t-test/Welch test or Mann–Whitney U test for quantitative variables, as appropriate. Statistical significance was set at $p<0.05$.

Analyses were performed using PASW Statistics version 18.0 (SPSS Inc., Chicago, IL) at the Research Support Unit of *Hospital Universitario Virgen del Rocío.*

RESULTS

A total of 51 incident haemodialysis patients were included. The mean age was 68.76±12.18 years, and 74.5% were male (n=38). Baseline characteristics are shown in **table 1.**

Cirera-Segura F, et al. https://doi.org/10.37551/S2254-28842025033

Table 1. Baseline characteristics of the study sample.

Age (years)	—	68.76±12.18
Sex	Male	74.5% (n=38)
	Female	25.5% (n=13)
Diabetes mellitus	—	47.1% (n=24)
Weight (kg)	—	78.0±17.69
Height (cm)	—	163.0±11.95
BMI	Underweight	3.9% (n=2)
	Normal weight	27.5% (n=14)
	Overweight	23.5% (n=12)
	Obesity	45.1% (n=23)
Referral source	ACKD clinic > 6 months	56.9% (n=29)
	ACKD clinic < 6 months	5.9% (n=3)
	No prior nephrology follow-up	19.6% (n=10)
	Peritoneal dialysis	7.8% (n=4)
	Kidney transplant	9.8% (n=5)
Vascular access at initiation	Native AV fistula	33.3% (n=17)
	Tunnelled catheter	21.6% (n=11)
	None	43.1% (n=22)
	Prosthetic graft	2.0% (n=1)

kg: kilogram; **cm:** centimetres; **CKD:** chronic kidney disease; **ACKD clinic:** clinic for advanced chronic kidney disease management.

Regarding the aetiology of renal disease, the most frequent cause was unknown origin (25.5%; n=13), followed by diabetic nephropathy (19.6%; n=10) and other causes (19.6%; n=10). Remaining aetiologies are shown in **table 2.**

Table 2. Aetiology of renal disease.

Unknown	25.5% (n=13)
Diabetic	19.6% (n=10)
Other	19.6% (n=10)
Vascular	15.7% (n=8)
Pyelonephritis / Tubulointerstitial nephropathy	9.8% (n=5)
Glomerulonephritis	5.9% (n=3)
Polycystic kidney disease	2.0% (n=1)
Systemic diseases	2.0% (n=1)

*EDTA codes 1994–1995 and corresponding groupings, extracted from the 2006 Report, Basic Module, Chronic Renal Failure Subsystem, Andalusian Health Service, Regional Government of Andalusia. Data missing for 67 patients.

Frailty assessment using the FRAIL scale showed that 64.7% (n=33) of patients were frail, 29.4% (n=15) were pre-frail, and 5.9% (n=3) were non-frail. Item-specific results are shown in **table 3.**

Comparative analysis revealed no significant differences with respect to age (p=0.250; **figure 1**), sex (p=0.937), body mass index (p=0.658), type of vascular access (p=0.696), or urgent initiation of dialysis (p=0.522). However, the presence of diabetes mellitus was significantly associated with frailty (p=0.012).

Table 3. Items evaluated by the FRAIL Scale.

Fatigue	No	35.3% (n=18)
	Yes	64.7% (n=33)
Resistance	No	23.5% (n=12)
	Yes	76.5% (n=39)
Ambulation	No	49.0% (n=25)
	Yes	51.0% (n=26)
Comorbidity	No	82.4% (n=42)
	Yes	17.6% (n=9)
Weight loss	No	41.2% (n=21)
	Yes	58.8% (n=30)

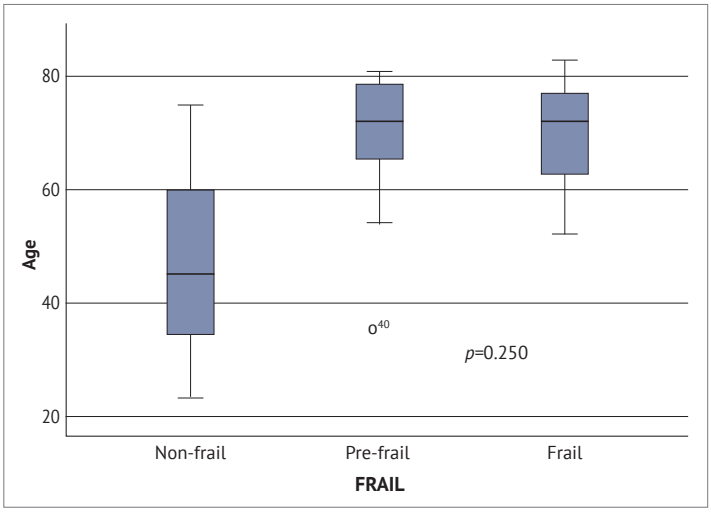


Figure 1. Age according to frailty status.

DISCUSSION

Frailty is a geriatric syndrome whose prevalence among haemodialysis patients is particularly high. In our cohort, 64.7% of patients were classified as frail and, when pre-frailty was also considered, the proportion increased to 94.4%. These figures greatly exceed those reported in the general population and fall within the upper range of values described in dialysis populations.

These findings are consistent with previous research. Moreno et al.[21]. in their cohort of 93 patients, reported frailty in 50.47%, with higher 12-month mortality (43.24% *vs* 20.51%; p=0.033) and higher hospitalisation rates (51.35% *vs* 43.59%; p=0.498). Similarly, Moreno-Useche et al.[22]. described a prevalence of 54.55% using the FRAIL scale. Barbosa et al.[5] identified frailty in 36.5% of 137 incident dialysis patients and found it to be associated with a hospitalisation rate of 22.6% and a 2.88-fold higher risk of hospital admission over 9 months (HR, 2.880; 95%CI, 1.361–6.096; p=0.006). Together, these results reinforce the strong

association between frailty and adverse outcomes in the dialysis population.

Of note, the lack of consensus regarding the optimal tool for frailty assessment. Although the Fried phenotype is the most widely used, its complexity limits routine clinical application[23]. Modified versions have been applied in patients with chronic kidney disease with variable success, and numerous alternative frailty scales have been developed for the general population[23-25]. The FRAIL scale, validated in different settings[26-28], represents a practical and rapid alternative, facilitating its implementation in haemodialysis units. In our study, its use allowed easy identification of frail and pre-frail patients, supporting its applicability in this clinical context.

Another relevant finding was the absence of an association between frailty and age in our sample. Although non-frail patients were younger on average (45 years vs 72 and 71 years), the difference did not reach statistical significance. This is consistent with the findings of McAdams-DeMarco et al.[8], who reported that up to 35.4% of patients with kidney disease under 65 years of age were frail according to Fried criteria. These data suggest that frailty in renal disease may manifest early and independently of chronological age.

Regarding vascular access, we found no significant association with frailty. However, previous studies have demonstrated meaningful relationships. Chen et al.[6], in a cohort of 313 patients, found that 40.3% were frail and 29.4% were pre-frail. Cox regression analysis showed that frail patients had a 2.2-fold higher risk of vascular access-related events compared with non-frail patients (HR, 2.205; 95%CI, 1.377–3.532; p=0.001). Similarly, Chao et al.[29] reported that frailty was associated with a higher risk of vascular access failure (HR, 2.63; 95%CI, 1.03–6.71; p=0.04). These findings suggest a possible pathophysiological link mediated by endothelial dysfunction, oxidative stress, and low-grade inflammation, which warrants further investigation in studies with greater statistical power.

Our study has several strengths, including a high patient response rate. This is partly attributable to the FRAIL scale being quick and easy to administer and to its capacity to focus interventions on affected domains. However, it also has limitations, notably its single-centre design and small sample size, which may have limited the detection of associations and group differences. Despite this and the limited generalisability of our findings, the study provides valuable insight into the utility of the FRAIL scale for identifying frail and pre-frail patients initiating dialysis in our unit.

Early identification of frailty may allow the implementation of interventions to prevent or delay its progression, with the aim of reducing adverse events. Such interventions may include exercise programmes to increase strength and nutritional supplementation to prevent weight loss[18-20]. Moreover, use of the FRAIL scale helps identify the domains requiring intervention and facilitates the development of surveillance protocols based on the patient's classification.

In conclusion, the FRAIL scale enabled effective assessment of frailty among incident haemodialysis patients in our unit, revealing a high proportion of frail and pre-frail individuals at dialysis initiation. Identification of these high-risk patients allows for personalised interventions, more accurate prognostic counselling, and improved decision-making regarding the risks and benefits of commencing dialysis.

Funding

None declared.

Conflicts of interest

None declared.

BIBLIOGRÁFIA

1. Kojima G, Liljas A, Iliffe S. Frailty syndrome: implications and challenges for health care policy. Risk Manag Healthc Policy. 2019;12:23-30.
2. Oki R, Hamasaki Y, Tsuji S, Suzuki K, Tsuneishi S, Imafuku M, et al. Clinical frailty assessment might be associated with mortality in incident dialysis patients. Sci Rep. 2022;12(1):17651.
3. Sy J, Johansen KL. The impact of frailty on outcomes in dialysis: Curr Opin Nephrol Hypertens. 2017;26(6):537-42.
4. Alfaadhel TA, Soroka SD, Kiberd BA, Landry D, Moorhouse P, Tennankore KK. Frailty and mortality in dialysis: evaluation of a clinical frailty scale. Clin J Am Soc Nephrol CJASN. 2015;10(5):832-40.
5. Barbosa EMS, Pereira AG, Mori V, da Silva Neves R, Vieira NM, Silva MZC, et al. Comparison between FRAIL scale and clinical frailty scale in predicting hospitalization in hemodialysis patients. J Nephrol. 2023;36(3):687-93.
6. Chiu-Hui Chen, Yu-Ling Hsieh, Shao-Yuan Chuang, Fan-Yin Su, Kuan-Ting Wang, Chien-Ming Luo, et al. The impact of frailty on the outcomes of hemodialysis vascular access. Acta Cardiol Sin. 2022;38(1).
7. Mei F, Gao Q, Chen F, Zhao L, Shang Y, Hu K, et al. Frailty as a predictor of negative health outcomes in chronic kidney disease: a systematic review and meta-analysis. J Am Med Dir Assoc. 2021;22(3):535-543.e7.
8. McAdams–DeMarco MA, Law A, Salter ML, Boyarsky B, Gimenez L, Jaar BG, et al. Frailty as a Novel Predictor of Mortality and Hospitalization in Individuals of All Ages Undergoing Hemodialysis. J Am Geriatr Soc. 2013;61(6):896-901.

9. Zhang Q, Ma Y, Lin F, Zhao J, Xiong J. Frailty and mortality among patients with chronic kidney disease and end-stage renal disease: a systematic review and meta-analysis. Int Urol Nephrol. 2020;52(2):363-70.

10. Goto NA, Van Loon IN, Boereboom FTJ, Emmelot-Vonk MH, Willems HC, Bots ML, et al. Association of Initiation of Maintenance Dialysis with Functional Status and Caregiver Burden. Clin J Am Soc Nephrol. 2019;14(7):1039-47.

11. Godin J, Armstrong JJ, Wallace L, Rockwood K, Andrew MK. The impact of frailty and cognitive impairment on quality of life: employment and social context matter. Int Psychogeriatr. 2019;31(6):789-97.

12. Registro Español de Enfermos Renales (REER) Informe 2021 (datos preliminares). Sociedad Española de Nefrología [Internet]. 2022 [cited 31 May 2023]; Available from: https://www.senefro.org/contents/webstructure/MEMORIA_REER_2021_PRELIMINAR.pdf

13. García-Cantón C, Ródenas-Gálvez A, López-Aperador C, Rivero Y, Díaz N, Antón G, et al. Prevalencia de fragilidad y factores asociados en pacientes en programa de hemodiálisis. Nefrología [Internet]. 2019 [cited 19 Feb 2025];39(2):204-6. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0211699518301498

14. Johansen KL, Dalrymple LS, Delgado C, Kaysen GA, Kornak J, Grimes B, et al. Association between Body Composition and Frailty among Prevalent Hemodialysis Patients: A US Renal Data System Special Study. J Am Soc Nephrol. 2014;25(2):381-9.

15. Ozturk S, Cetin DG, Cetin M, Yilmaz MD, Ozler TE, Cebeci E, et al. Prevalence and associates of frailty status in different stages of chronic kidney disease: a cross-sectional study. J Nutr Health Aging. 2022;26(9):889-95.

16. Johansen KL, Dalrymple LS, Glidden D, Delgado C, Kaysen GA, Grimes B, et al. Association of Performance-Based and Self–Reported Function–Based Definitions of Frailty with Mortality among Patients Receiving Hemodialysis. Clin J Am Soc Nephrol. 2016;11(4):626-32.

17. Zhao Y, Liu Q, Ji J. The prevalence of frailty in patients on hemodialysis: a systematic review and meta-analysis. Int Urol Nephrol. 2020;52(1):115-20.

18. Morley JE, Malmstrom TK, Miller DK. A simple frailty questionnaire (FRAIL) predicts outcomes in middle aged African Americans. J Nutr Health Aging. 2012;16(7):601-8.

19. Arias-Rivera S, Sánchez-Sánchez MM, Jareño-Collado R, Raurell-Torredà M, Oteiza-López L, López-Cuenca S, et al. Fiabilidad intraobservador e interobservador de las escalas de fragilidad Clinical Frailty Scale-España y FRAIL-España en pacientes críticos. Med Intensiva. 2025;502131.

20. Fierro-Marrero J, Reina-Varona Á, Pardo-Montero J, Paris-Alemany A, La Touche R. Adaptation, development, validity, and reliability of the Escala Multidimensional de Fragilidad (EMFRA), and the 5-item FRAIL scale: a study design of the EMFRA project. J MOVE Ther Sci. 2024;6(1):639-52.

21. Moreno LD, Ruiz CE, Urrego JC, Cadena MO, Maldonado SJ, Niño DA, et al. Frailty syndrome and end-stage kidney disease outcomes at a Latin American dialysis center. Biomédica. 2023;43(Sp. 3):S21-9.

22. Moreno-Useche LD, Urrego-Rubio J, Cadena-Sanabria M, Rodríguez Amaya R, Maldonado-Navas S, Ruiz-González C. Frailty syndrome in patients with chronic kidney disease at a dialysis centre from santander, colombia. J Gerontol Geriatr. 2021;69(2):103-9.

23. Dent E, Kowal P, Hoogendijk EO. Frailty measurement in research and clinical practice: a review. Eur J Intern Med. 2016;31:3-10.

24. Johansen K, Chertow G, Jin C, Kutner N. Significance of frailty among dialysis patients. J Am Soc Nephrol JASN. 2007.

25. Painter P, Kuskowski M. A closer look at frailty in ESRD: getting the measure right. Hemodial Int Int Symp Home Hemodial. 2013;17(1):41-9.

26. Abellan van Kan G, Rolland Y, Bergman H, Morley JE, Kritchevsky SB, Vellas B. The I.A.N.a task force on frailty assessment of older people in clinical practice. J Nutr Health Aging. 2008;12(1):29-37.

27. López D, Flicker L, Dobson A. Validation of the frail scale in a cohort of older australian women. J Am Geriatr Soc. 2012;60(1):171-3.

28. Gleason LJ, Benton EA, Alvarez-Nebreda ML, Weaver MJ, Harris MB, Javedan H. FRAIL questionnaire screening tool and short-term outcomes in geriatric fracture patients. J Am Med Dir Assoc. 2017;18(12):1082-6.

29. Chao CT, Chiang CK, Huang JW, Hung KY, COGENT study group. Self-reported frailty among end-stage renal disease patients: a potential predictor of dialysis access outcomes. Nephrol Carlton Vic. 2017;22(4):333-4.

Cirera-Segura F, et al. https://doi.org/10.37551/S2254-28842025033

Anexo 1. 5-item FRAIL scale

FRAIL SCALE

FATIGUE: During the past 4 weeks, how much of the time did you feel tired?

1 = All of the time
2 = Most of the time
3 = Some of the time
4 = A little of the time
5 = None of the time
Responses 1 or 2 are scored as 1 point; all other responses are scored 0 points.

RESISTANCE: Do you have any difficulty climbing 10 steps by yourself, without resting and without any assistance?

Yes =1 point
No =0 points

AMBULATION: By yourself and without using any aids, do you have any difficulty walking several hundred metres?

Yes =1 point
No =0 points

COMORBIDITY: For 11 conditions, the patient is asked:

Has a doctor ever told you that you have (each of the following conditions)?
The conditions are: hypertension, diabetes, cancer (excluding minor skin cancer), chronic lung disease, myocardial infarction, congestive heart failure, angina pectoris, asthma, arthritis, stroke, and kidney disease.

5 to 11 conditions =1 point
0 to 4 conditions =0 points

WEIGHT LOSS:

– What is your current weight with clothes on but without shoes? (Current weight)

– One year ago (month/year), what was your weight with clothes on but without shoes? (Weight 1 year ago)

$$\frac{\text{"Weight 1 year ago} - \text{Current weight"}}{\text{"Weight 1 year ago"}} \times 100$$

If the result is >5, this indicates weight loss > 5%=1 point.
If the result is ⩽5, =0 points.

SEDEN AWARD

for the Best Work on Peritoneal Dialysis

Sponsored by the Spanish Society of Nephrology Nursing, and aimed at encouraging the work of professionals in this field, the 8th edition of this award is announced under the following terms:

RULES

- Works must be written in Spanish.
- Submitted works must be unpublished and comply with all the submission guidelines for the 51st SEDEN National Congress.
- The submission deadline is the same as that established for general work submission to the 51st SEDEN Congress.
- The Jury will be composed of the SEDEN Work Evaluation Committee.
- To be eligible, the work must be presented at the 51st SEDEN Congress by one of the listed authors. Presentations by non-authors will not be accepted.
- The award will be presented at the opening ceremony of the 51st SEDEN Congress 2026.
- The winning work will be made available to the journal Enfermería Nefrológica for publication if the editorial committee deems it appropriate. Authors must acknowledge the origin of the work as the SEDEN Award.
- Any unforeseen event not covered in these rules will be resolved by the SEDEN Board of Directors.
- The prize will consist of a free registration to the 2027 SEDEN National Congress*.
- The award may be declared void.

SEDEN
SOCIEDAD ESPAÑOLA DE ENFERMERÍA NEFROLÓGICA

Calle de la Povedilla, 13. Bajo Izq.
28009 Madrid
Tel.: 91 409 37 37 • Fax: 91 504 09 77
seden@seden.org
www.seden.org

* The prize is subject to tax withholdings as required by law.

Casaux-Huertas A, et al. https://doi.org/10.37551/S2254-28842025034

Emotional profile of haemodialysis patients: a multicentre study

Ana Casaux-Huertas[1], Pilar Mori-Vara[2], María del Carmen Hernández-Cediel[3], David Hernán-Gascueña[4]

[1] Department of Nursing, Faculty of Nursing (Segovia Campus), Universidad de Valladolid, Segovia, Spain
[2] Department of Nursing, Universidad Complutense de Madrid, Madrid, Spain
[3] Faculty of Health Sciences, Universidad UNIE, Madrid, Spain
[4] Spanish Renal Foundation, Madrid,Spain

Please cite this article in press as:
Casaux-Huertas A, Mori-Vara P, Hernández-Cediel MC, Hernán-Gascueña D. Emotional profile of haemodialysis patients: a multicentre study. Enferm Nefrol. 2025;28(4):323-9

Corresponding author:
Ana Casaux Huertas
acasauxseden@gmail.com

Reception: 09-06-25
Acceptance: 09-23-25
Publication: 12-30-25

ABSTRACT

Introduction: Chronic kidney disease causes major physical, psychological and social changes. Its impact on quality of life, together with emotional disorders, favours symptom development at higher rates than in the general population.

Objectives: To determine the emotional profile of haemodialysis patients.

Material and Method: We conducted a multicentre cross-sectional descriptive study involving haemodialysis patients from Fundación Renal centres in the Community of Madrid (Spain). Emotional profile was assessed using the Mood State Assessment Scale (EVEA).

Results: Among 245 patients, positive emotions were rated higher than negative ones, with a predominantly "cheerful" emotional profile.

Conclusions: Patients on haemodialysis show a high positive emotional profile, with predominance of joy, optimism and joviality. Negative emotional profiles such as anxiety, irritability or sadness were observed at low levels.

Keywords: haemodialysis; emotions; chronic kidney disease.

RESUMEN

Perfil emocional del paciente en hemodiálisis. Estudio multicéntrico

Introducción: La enfermedad renal crónica ocasiona grandes problemas y cambios a nivel físico, psicológico y social en las personas que la padecen. El gran impacto sobre la calidad de vida, unido a la presencia de trastornos emocionales, favorecen la aparición de síntomas en estos pacientes en mayor proporción que en la población general.

Objetivos: Determinar el perfil emocional de los pacientes en hemodiálisis.

Material y Método: Estudio descriptivo transversal multicéntrico llevado a cabo con pacientes con enfermedad renal crónica en tratamiento de hemodiálisis pertenecientes a centros de la Fundación Renal de la Comunidad de Madrid. Se empleó la Escala de Valoración del Estado de Ánimo (EVEA) para la valoración del "perfil emocional". Se realizó un análisis descriptivo de la muestra.

Resultados: Entre los 245 pacientes muestreados, se observó una mayor valoración de las emociones positivas frente a las negativas, siendo el perfil emocional "alegre" el predominante.

Conclusiones: Los pacientes en hemodiálisis presentan un alto perfil emocional positivo, predominando sensaciones de alegría, optimismo y jovialidad. Los perfiles emocionales negativos, como ansiedad, irritabilidad o tristeza, se observan

en niveles bajos. En conjunto, la terapia renal sustitutiva con hemodiálisis se asocia con un predominio de emociones positivas frente a las negativas.

Palabras Clave: hemodiálisis; emociones; enfermedad renal crónica.

INTRODUCTION

The chronic pro-inflammatory state experienced by patients with kidney disease produces alterations at multiple levels, with consequences including the malnutrition–inflammation syndrome, vascular calcification, and endocrine system disorders, among others[1,2]. However, this state not only affects physical health; numerous studies have demonstrated a close relationship between pro-inflammatory status and reduced quality of life, the presence of depression and anxiety, and increased morbidity and mortality in affected patients.[1,3-5].

Multiple investigations have shown an association between elevated levels of pro-inflammatory substances—such as C-reactive protein, cytokines, interleukins and tumour necrosis factor—and the development of depression, anxiety and other personality traits including neuroticism, hysteria, hostility and hypochondriasis, as well as with the development of conditions such as Alzheimer's disease, Parkinson's disease, schizophrenia and bipolar disorder[4-6].

Excessive and sustained overproduction of inflammatory cytokines in the brain alters multiple neuronal functions, impairing the synthesis, reuptake and release of neurotransmitters[6].

This results in behavioural changes affecting both mood and cognition, together with the development of clinical manifestations such as anorexia, reduced mobility and physical activity, and sleep disturbances—symptoms that are recognised as characteristic of depression[6].

Several studies have linked the presence of a pro-inflammatory state in patients with chronic kidney disease (CKD) to the development of emotional disorders such as depression, while its absence or effective control favours positive emotional states[1,7,8].

Depression and anxiety have been identified as the most prevalent emotional disorders among patients with CKD and are closely related to both the diagnosis of the disease and the physical and socio-familial changes it entails[9]. According to various studies, approximately 20–60% of haemodialysis (HD) patients suffer from at least one of these emotional disorders[9-12]. The presence of depression and anxiety significantly reduces quality of life and markedly increases mortality among affected patients[9,10,13,14]. These disorders are more common in women of low socioeconomic status, unemployed individuals, those who are unmarried or without a partner, and those lacking adequate family or social support[10-12].

From a clinical perspective, the presence of comorbidities, metabolic and endocrine changes, chronic pain, inflammatory and uraemic states, hypoalbuminaemia, dietary and fluid restrictions, reduced sexual function and limited physical activity are among the factors that contribute to the development or progression of depressive and anxious states in CKD patients[10-12,14].

Individuals with chronic diseases are inherently more vulnerable to mood disorders simply as a consequence of living with illness. The disease disrupts daily life, directly affecting personal, social and work relationships, independence, activities of daily living, mobility and travel, thereby exerting a negative impact on emotional well-being[14,15].

The prevalence of depressive disorder among CKD patients undergoing HD ranges from 25.8% to 68.1%, while anxiety disorders affect 21–35.3% of patients on HD-based renal replacement therapy. These emotional states are inversely associated with health-related quality of life (HRQoL)[16,17].

Depressive and anxious disorders arising in the context of chronic illness occur predominantly in women with a characteristic profile: low educational level, absence of a partner, and living alone[12,18]. Poor health status, a high number of comorbidities, limited social relationships, restricted daily activities, and symptoms such as pain further contribute to the development of depressive and anxious symptomatology[11,19,20].

The literature review conducted by Bautovich et al.[14] highlights the growing body of evidence demonstrating that anxiety and depressive disorders increase mortality and hospitalisation rates, reduce treatment adherence and HRQoL, and influence the appearance and expression of somatic symptoms. Negative emotions such as anxiety and depression can exacerbate disease progression, interfere with treatment, and increase symptom burden, thereby significantly increasing morbidity and mortality and acting as independent predictors of survival[6,7,21,22]. These negative emotional states also intensify the perception of physical symptoms and somatic complaints.

A study conducted at the Nephrology Clinical Management Unit of *Hospital Universitario Reina Sofía* (Córdoba, Spain)[23] reported that 66.7% of chronic HD patients exhibited some form of emotional disturbance, including depression, sadness, nervousness, anxiety or distress, consistent with findings from other national and international studies[10,12,24].

Any chronic disease with life-threatening potential inevitably generates anxiety and depression. In CKD, this is compounded by feelings of helplessness, limitation and dependence on dialysis machinery, profoundly affecting emotional health. Emotional disturbances are further intensified by the numerous losses patients face throughout the disease course:

loss of health, well-being, employment, social relationships and sexual function.

In light of these considerations, the present study aimed to define the emotional profile of patients receiving chronic haemodialysis as renal replacement therapy.

MATERIAL AND METHOD

Study Design and Setting

We conducted a multicentre, cross-sectional, descriptive observational study in patients with CKD undergoing haemodialysis at centres of the Spanish Renal Foundation in the Community of Madrid.

Population and Sample

The study population comprised CKD patients receiving HD treatment at the eight Spanish Renal Foundation centres in the Community of Madrid.

Inclusion criteria:

- Age ≥18 years
- Written informed consent
- Diagnosis of advanced CKD (stages 4–5)
- At least 3 consecutive months on dialysis

Exclusion criteria:

- Current diagnosed psychiatric disorder
- Cognitive impairment and/or language barriers preventing questionnaire completion

Sample Size

Convenience sampling was carried out, taking into consideration the total number of patients receiving healthcare at the eight Spanish Renal Foundation centres in the Community of Madrid (n = 815). The final sample consisted of 245 patientsfrom 7 different centres of the Spanish Renal Foundation.

Variables

- Sociodemographic variables: age, sex and treatment centre. These variables were obtained from the electronic medical record system (*Nefrosoft*®).
- Clinical variables: cause of disease, time on treatment, type of vascular access, dialysis dose (Kt), interdialytic weight gain and Charlson Comorbidity Index (CCI). These variables were obtained from the electronic medical record system (Nefrosoft®).
- Primary emotional profile variable: discrete ordinal quantitative variable with scores ranging from 0 to 40 points.

Four emotional profiles were defined: joyful, anxious, irritable–hostile, and sad–depressive.

Measurement Instrument

The primary emotional profile variable was measured using the Mood State Assessment Scale (EVEA). This Likert-type scale provides a score between 0 and 10 for each item. According to the scale guidelines[25], item scores are grouped into four subscales that define the emotional profiles used for interpretation of results. Each emotional profile yields a total score ranging from 0 to 40 points. Higher scores on the EVEA subscales indicate higher levels of sadness–depression, anxiety, anger–hostility or joy, respectively[26].

Data Collection

Data were obtained from each patient's medical record and from the assessment instrument administered by nursing staff at participating hospitals. Prior to inclusion, patients received an information sheet explaining the purpose of the study. Those who agreed to participate provided written informed consent before data collection.

Statistical Analysis

Collected data were stored in an anonymised database created using Microsoft Excel (Office 365) and subsequently cleaned and analysed using IBM SPSS version 25 and RStudio version 1.1.463.

A descriptive analysis was performed: categorical variables were summarised as frequencies and percentages, while quantitative variables were expressed as minimum, maximum, mean ($\bar{x}$), standard deviation (SD) and quartiles.

A significance level of 5% ($p<0.05$) was used in all statistical analyses.

Ethical Considerations

The study was reviewed and approved by the Clinical Research Ethics Committee of *Hospital Clínico San Carlos* (Madrid, Spain). Authorisation for data use, processing and dissemination was also obtained from the Spanish Renal Foundation. The handling of personal data complied with Spanish Organic Law 3/2018 of 5 December on the Protection of Personal Data and Guarantee of Digital Rights. In accordance with this legislation, participants were informed of their rights of access, rectification, objection and erasure of data (ARCO rights).

RESULTS

The final study sample comprised 245 patients from 7 different centres of the Spanish Renal Foundation in the Community of Madrid.

Descriptive analysis of the sociodemographic data showed that the sample consisted predominantly of men (65.7%; n=161), with women representing 34.3% (n=84). The mean age was 63.52 years (SD, 14.99), with a minimum age of 25 years and a maximum age of 90 years. Patients had been on haemodialysis for a mean duration of 81.44 months (SD, 96.62), ranging from 4 to 527 months.

Casaux-Huertas A, et al. https://doi.org/10.37551/S2254-28842025034

With respect to clinical variables, the mean final Kt was 52.15 L (SD, 9.09), and the mean interdialytic weight gain was 1.98 kg (SD, 0.71).

Regarding the aetiology of renal disease, 25.3% (n=62) of cases were of unknown origin, followed by type 2 diabetes mellitus in 19.6% (n=48), glomerulonephritis in 11.4% (n=28), other renal disorders in 11.8% (n=29), and hypertensive vascular nephropathy in 9.0% (n=22).

Concerning vascular access, a clear majority of patients had an arteriovenous fistula (71.8%; n=176), compared with those using central venous catheters.

The mean Charlson Comorbidity Index score was 7.68 (SD, 3.36), with minimum and maximum values of 2 and 21, respectively.

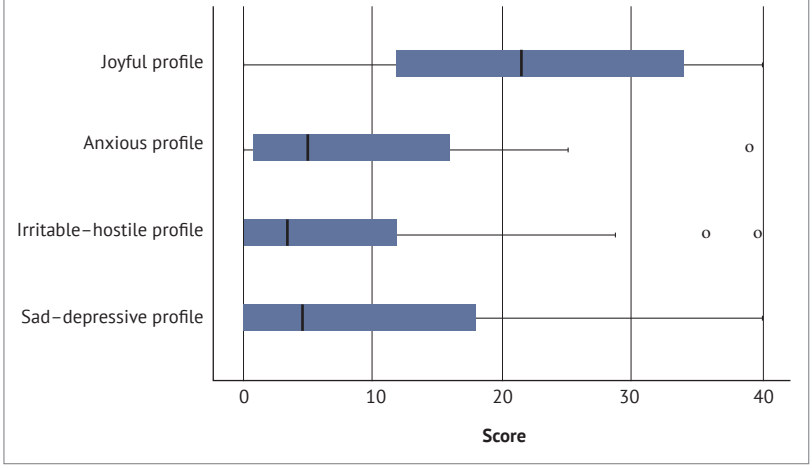


Figure 1. Emotional profile distribution.

Analysis of the emotional profile questionnaire revealed that the sample predominantly exhibited a joyful emotional profile, with scores exceeding 20 points in at least 50% of the sample and >30 points in at least 25% of patients. In contrast, negative emotional profiles (sad–depressive, irritable–hostile and anxious) showed scores <6 points in 50% of the sample **(figure 1)**.

High scores were observed for positive emotions (joyful, happy, optimistic and jovial), with at least 50% of patients scoring ≥5 points and at least 25% scoring ≥ 8 points in all four domains **(figure 2)**.

Conversely, negative emotions (angry, irritated, annoyed and anxious) showed the lowest scores, with 75% of patients scoring ≤ 3 points. The remaining negative emotions scored ≤ 5 points in 75% of patients **(figure 2)**.

DISCUSSION

The literature reports a high prevalence of negative emotional disorders such as depression and anxiety among patients with CKD on HD. Most studies indicate that 20–70% of patients experience some form of emotional disturbance, significantly affecting their quality of life[9,11,16,20,23]. However, the descriptive analysis of the emotional profile in the present study reveals a clear predominance of positive emotions (joyful, happy, optimistic and jovial) over negative emotions. The joyful profile achieved the highest scores on the EVEA scale, exceeding 20 points in at least 50% of the sample and 30 points in at least 25% of patients. In contrast, negative emotional profiles (sad–depressive, irritable–hostile and anxious) scored below 6 points in 50% of the sample.

Of note, the instrument used to assess emotional status in this study is not a diagnostic tool but a subjective self-report scale, in which patients rate from 0 to 10 the emotions experienced during the previous week. Therefore, results may be biased and influenced by the context in which the questionnaire is completed; thus, prevalence estimates of emotional disorders may vary according to the assessment tool employed[7-20]. Although the EVEA scale is not specifically designed for CKD populations, its psychometric quality and ease of administration make it a suitable instrument for mood assessment in diverse populations[25,26]. Its distinctive value lies in its ability to assess both positive and negative emotions within the same questionnaire, unlike many commonly used healthcare scales that focus on single indicators[26].

Another factor that may have influenced the findings is that patients may confuse emotional symptoms with manifestations of kidney disease itself or may conceal them due to fear of social stigma or rejection, which can lead to an underestimation of emotional disturbances in CKD[7]. Many somatic manifestations of depressive disorders—such as insomnia, loss of appetite and lack of energy—may be mistaken for symptoms of renal disease or for the social and personal changes caused by the illness, including loss of relationships, autonomy and social roles[14].

Furthermore, several studies suggest that individuals with optimistic personality traits cope better with stress and adapt more effectively to illness, which results in reduced symptom perception and even lower mortality[17,27-29]. Positive emotions are associated with lower pain scores[28], whereas negative emotions are linked to higher symptom intensity[20]. Individuals with negative emotional profiles are more prone to health problems and experience them more intensely than those with positive profiles, who display stronger coping abilities and emotional regulation[30].

Patients on HD represent a population with advanced age, multiple comorbidities, complex social circumstances and reduced HRQoL. Nevertheless, as shown in the work of

Casaux-Huertas A, et al. https://doi.org/10.37551/S2254-28842025034

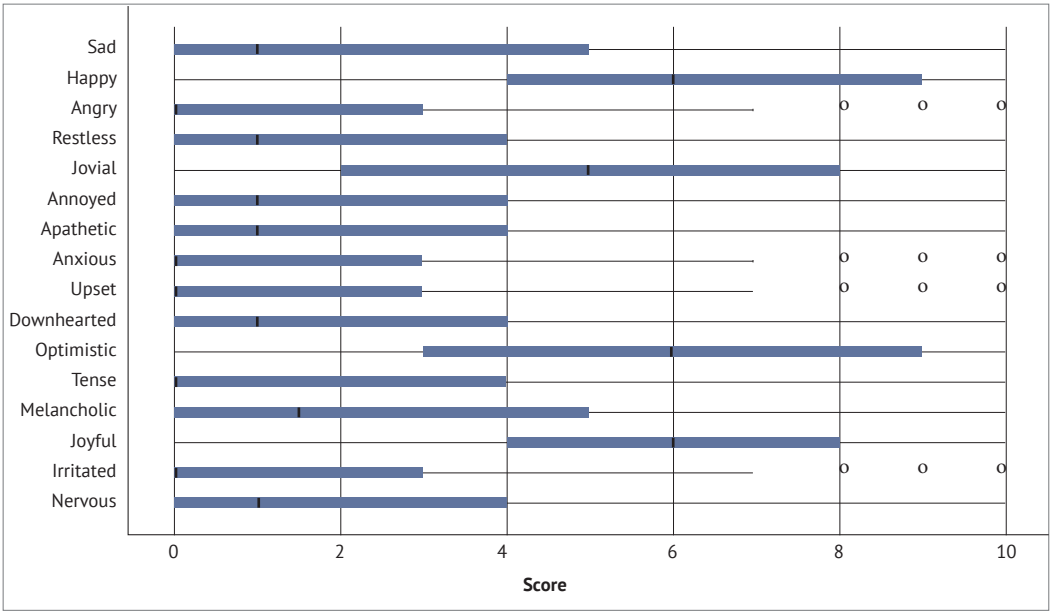


Figure 2. Distribution of emotions.

Laura L. Carstensen, older individuals develop psychological "defence mechanisms" that allow them to enjoy daily life more fully, exhibit greater empathy and gratitude, and experience more positive and fewer negative emotions than younger individuals.[31] Numerous studies have demonstrated an inverse relationship between age and negative emotions such as anxiety and depression, with positive affect and emotional well-being being more prevalent in older populations[18,31-33]. This may partly explain the high levels of positive emotions and low levels of negative emotions observed in our sample.

Happiness and other positive emotions play a crucial role in strengthening resilience, which in turn reduces negative emotions that contribute to depression[34]. Resilience is defined as an "active process resulting in positive behavioural adaptation that enables individuals to confront and overcome adverse situations with favourable outcomes"[35]. Higher resilience is inversely associated with stress and leads to improved HRQoL[36].

The concept of post-traumatic growth, described by Calhoun and Tedeschi, refers to the positive psychological changes that occur following the struggle with highly challenging life circumstances[37]. These changes promote personal, social and spiritual growth, allowing individuals to perceive life differently and derive greater enjoyment from it and from interpersonal relationships[38]. Evidence suggests that post-traumatic growth, hope and resilience are strongly associated with the predominance of positive emotions and the reduction of stress-related emotional states[39-42].

Although the results are encouraging and provide new insights into the emotional profile of haemodialysis patients, these issues must be approached from a multidimensional perspective. Clinical and psychosocial variables such as post-traumatic growth, resilience and hope should be examined in future studies using specific designs and validated instruments. This approach will enable a more comprehensive understanding of the impact of CKD on patients' quality of life and support the development of more effective, patient-centred interventions.

Limitations

Convenience sampling may have introduced selection bias, as participants may have been those with better physical and psychological health and greater motivation to participate. This could have produced selection bias, membership bias and even a Hawthorne effect, potentially inflating positive emotional profiles and reducing negative ones. Furthermore, the subjective nature of the EVEA scale represents another limitation, as it may have introduced measurement bias.

In addition, the existence of multiple emotional assessment tools with different constructs and scoring systems complicates direct comparison of results across studies.

Based on these findings, patients receiving haemodialysis as renal replacement therapy exhibit a predominantly joyful emotional profile, with high levels of joy, happiness, optimism and joviality, and low levels of negative emotions (anxiety, irritability, anger and sadness–depression).

Authors' contributions

Conceptualisation, study design, data collection, analysis and manuscript drafting: CHA. Study design, critical revision and final approval: MVP. Data collection, critical revision and final approval: HGD. Critical revision and final approval: HCMC.

All authors contributed substantially and approved the final manuscript.

Funding

None declared.

Conflicts of interest

None declared.

Acknowledgements

We thank the staff of the haemodialysis centres of the Spanish Renal Foundation in the Community of Madrid for their support and assistance with data collection. We also extend our gratitude to the CKD patients who voluntarily participated in this study, hoping their contribution advances understanding of this condition.

REFERENCES

1. Cobo G, Lindholm B, Stenvinkel P. Chronic inflammation in endstage renal disease and dialysis. Nephrol Dial Transplant [Internet]. 2018 [cited 26 Dec 2021];33(3):iii35-40. Available from: https://academic.oup.com/ndt/article/33/suppl_3/iii35/5114420
2. Carrero JJ, González ME. Inflamación en Diálisis. Nefrología al Día [Internet]. 2020 [cited 15 Dec 2020]. Available from: https://www.Nefrologiaaldia.org/es-articulo-inflamacion-dialisis-299#:~:text=La%20inflamaci%C3%B3n%20sist%C3%A9mica%20es%20una,el%20procedimiento%20de%20la%20di%C3%A1lisis
3. Furman D, Campisi J, Verdin E, Carrera P, Targ S, Franceschi C, et al. Chronic inflammation in the etiology of disease across the life span. Nature Medicine [Internet]. 2019 [cited 26 Dec 2021];25(12):1822-32. Available from: https://doi.org/10.1038/s41591-019-0675-0
4. Talarowska ME, Kowalczyk M, Maes M, Carvalho A, Su K, Szemraj J, et al. Immune to happiness-inflammatory process indicators and depressive personality traits. Arch Med Sci. 2020;16(4):848-57.
5. Ye Z, Kappelmann N, Moser S, Smith GD, Burgess S, Jones PB, et al. Role of inflammation in depression and anxiety: Tests for disorder specificity, linearity and potential causality of association in the UK Biobank. EClinical Medicine. 2021;38:100992.
6. Beurel E, Toups M, Nemeroff CB. The Bidirectional Relationship of Depression and Inflammation: Double Trouble HHS Public Access. Neuron.2020;107(2):234-56.
7. Kwan E, Draper B, Harvey SB, Endre ZH, Brown MA. Prevalence, detection and associations of depression in Australian dialysis patients. Australas Psychiatry. 2019;27(5):444-9.
8. Steptoe A. Happiness and Health. Annu Rev Public Health. 2019;40:339-59.
9. Perales CM, Duschek S, Reyes GA. Calidad de vida relacionada con la salud en la enfermedad renal crónica: relevancia predictiva del estado de ánimo y la sintomatología somática. Nefrologia [Internet]. 2016 [cited Nov 2020];36(3):275-82. Available from: https://scielo.isciii.es/pdf/nefrologia/v36n3/0211-6995-nefrologia-36-03-00275.pdf
10. Khan A, Khan A, Adnan AS, Azhar S, Sulaiman S, Mushtaq S. Prevalence and predictors of depression among hemodialysis patients: a prospective follow-up study. BMC Public Health [Internet]. 2019 [cited 12 Dec 2021];19(531). Available from: https://doi.org/10.1186/s12889-019-6796-z
11. de Alencar SB, de Lima F, do A Dias L, do A Dias V, Lessa AC, Bezerra JM, et al. Depression and quality of life in older adults on hemodialysis. Braz J Psychiatry [Internet]. 2020 [cited 12 Dec 2021];42(2):195-200. Available from: http://dx.doi.org/10.1590/1516-4446-2018-0345
12. Renz C, da Rosa MC, Matte C, Benetti SAW, de Fátima C, Fernandes E. Depression and chronic renal patients on hemodialysis: associated factors. Revista brasileira de enfermagem. 2020;73(1):e20190167.
13. Cabrera VJ, Hansson J, Kliger AS, Finkelstein FO. Symptom Management of the Patient with CKD: The Role of Dialysis. Clin J Am Soc Nephrol. 2017;12(4):687-93.
14. Bautovich A, Katz I, Smith M, Loo CK, Harvey SB. Depression and chronic kidney disease: A review for clinicians. Australian & New Zealand Journal of Psychiatry. 2014;48(6):530-41.
15. Sánchez JC, Barallat M, Torres S, Gaviro B. Análisis de la calidad de vida en pacientes con tratamiento renal sustitutivo: influencia de los parámetros analíticos y socioclínicos. Enferm Nefrol. 2019;22(2):159-67.
16. Marín MT, Rodríguez R, Montesinos F, Rodríguez S, Ágreda MR, Hidalgo E. Factores asociados a la calidad de vida y su predicción en pacientes renales en hemodiálisis. Nefrologia. 2022;42(3):318-26.
17. Zis P, Daskalaki A, Bountouni I, Sykioti P, Varrassi G, Paladini A. Depression and chronic pain in the elderly: links and management challenges. Clin Interv Aging [Internet]. 2017 [cited 28 Dec 2021];12:709-20. Available from: http://dx.doi.org/10.2147/CIA.S113576
18. Thompson KN, Hübel C, Cheesman R, Adey BN, Armour C, Davies MR, et al. Age and sex-related variability in the presentation of generalized anxiety and depression symptoms. Depress Anxiety. 2021;38(10):1054-65.
19. Fleishman TT, Dreiher J, Shvartzman P. Pain in Maintenance Hemodialysis Patients: A Multicenter Study. J Pain Symptom Manage [Internet]. 2018 [cited 13 Dec 2021];56(2):178-84. Available from: https://doi.org/10.1016/j.jpainsymman.2018.05.008
20. Sampaio DC, Leandro E, Ii M, Afonso I, Iii R, Pires L, et al. Depression and anxiety among patients undergoing dialysis and kidney transplantation: a cross-sectional study. Sao Paulo Med J. 2019;137(2):137-84.

21. Perales CM, Duschek S, Reyes GA. Influencia de los factores emocionales sobre el informe de síntomas somáticos en pacientes en hemodiálisis crónica: relevancia de la ansiedad. Nefrologia [Internet]. 2013 [cited 17 Nov 2020];33(6):816-25. Available from: https://www.revistanefrologia.com/es-pdf-X0211699513053362

22. Schouten RW, Haverkamp GL, Loosman WL, Shaw PKC, van Ittersum FJ, Smets YF, et al. Anxiety Symptoms, Mortality, and Hospitalization in Patients Receiving Maintenance Dialysis: A Cohort Study. Am J Kidney Dis. 2019;74(2):158-66.

23. Moya M. Estudio del estado emocional de los pacientes en hemodiálisis. Enferm Nefrol [Internet]. 2017 [cited 6 Nov 2019];20(1):48-56. Available from: https://enfermerianefrologica.com/revista/article/view/4048/874

24. Norozi M, Shafipour V, Jafari H, Hamzeh S, Yazdani J. Relationship of Hemodialysis Shift With Sleep Quality and Depression in Hemodialysis Patients. Clin Nurs Res. 2019;28(3):356-73.

25. Sanz J. Escala de valoración del estado de ánimo (EVEA) Ficha técnica. Universidad Complutense de Madrid; 2013.

26. Sanz J, Guitiérrez S, García MP. Propiedades psicométricas de la Escala de Valoración del Estado de Ánimo (EVEA): una revisión. Ansiedad y Estrés [Internet]. 2014 [cited 23 Nov 2019];20(1):27-49. Available from: https://eprints.ucm.es/id/eprint/58409/1/Propiedades%20psicom%C3%A9tricas%20de%20la%20Escala%20de%20Valoraci%C3%B3n%20del%20Estado%20de%20%C3%81nimo%20(EVEA)_una%20revisi%C3%B3n.pdf

27. Merino R, Morillo N, Sanchez A, Gómez V, Crespo R. Relación entre la calidad de vida relacionada con la salud y la ansiedad/depresión en pacientes en hemodiálisis crónica. Enferm Nefrol. 2019;22(3):274-83.

28. Tsai YC, Chiu YW, Hung CC, Hwang SJ, Tsai JC, Wang SL, et al. Association of symptoms of depression with progression of CKD. Am J Kidney Dis. 2012;60(1):54-61.

29. Natashia D, Yen M, Chen HM, Fetzer SJ. Self-Management Behaviors in Relation to Psychological Factors and Interdialytic Weight Gain Among Patients Undergoing Hemodialysis in Indonesia. J Nurs Scholarsh. 2019;51(4):417-26.

30. Remor E, Amorós M, Carrobles JA. El optimismo y la experiencia de ira en relación con el malestar físico. An de Psicol. 2006;22(1):37-44.

31. Carstensen LL. Socioemotional Selectivity Theory: The Role of Perceived Endings in Human Motivation. Gerontologist [Internet]. 2021 [cited 4 Jan 2022];61(8):1188-96. Available from: https://pubmed.ncbi.nlm.nih.gov/34718558/.

32. Song MK, Paul S, Ward SE, Gilet CA, Hladik GA. One-Year Linear Trajectories of Symptoms, Physical Functioning, Cognitive Functioning, Emotional Well-being, and Spiritual Well-being Among Patients Receiving Dialysis. Am J Kidney Dis. 2018;72(2):198-204.

33. Carstensen LL, Shavit YZ, Barnes JT. Age Advantages in Emotional Experience Persist Even Under Threat From the COVID-19 Pandemic. Psychol Psci. 2020;31(11):1374-85.

34. Tehranchi A, Doost HTN, Amiri S, Power MJ. The role of character strengths in depression: A structural equation model. Front Psychol. 2018;9:1609.

35. Dantzer R, Cohen S, Russo SJ, Dinan TG. Resilience and immunity. Brain Behav Immun. 2018;74:28-42.

36. García P, Ballester R, Gandhi K, Castro J, Gea V, Juárez R, et al. Perceived Stress in Relation to Quality of Life and Resilience in Patients with Advanced Chronic Kidney Disease Undergoing Hemodialysis. Int J Environ Res Public Health [Internet]. 2021 [cited 3 Jan 2022];18(2):536. Available from: https://doi.org/10.3390/ijerph18020536

37. Tedeschi RG, Calhoun LG. Posttraumatic Growth: Conceptual Foundations and Empirical Evidence. Psychol Inq. 2004;15(1):1-18.

38. Tamiolaki A, Kalaitzaki AE. "That which does not kill us, makes us stronger": COVID-19 and Posttraumatic Growth. Psychiatry Res. 2020;289:113044.

39. Satici SA, Uysal R. Psychological Vulnerability and Subjective Happiness: The Mediating Role of Hopelessness. Stress Health. 2017;33(2):111-8.

40. Satici SA, Kayis AR, Satici B, Griffiths MD, Can G. Resilience, Hope, and Subjective Happiness Among the Turkish Population: Fear of COVID-19 as a Mediator. Int J Ment Health Addiction [Internet]. 2020 [cited 3 Jan 2022];3:1-16. Available from: https://doi.org/10.1007/s11469-020-00443-5

41. Peker A, Cengiz S. Covid-19 fear, happiness and stress in adults: the mediating role of psychological resilience and coping with stress. Int J Psychiatry Clin Pract. 2022;26(2):123-31.

42. Rambod M, Pasyar N, Mokhtarizadeh M. Psychosocial, Spiritual, and Biomedical Predictors of Hope in Hemodialysis Patients. Int J Nephrol Renov Dis. 2020;13:163-9.

Mejía-Díaz AP, et al. https://doi.org/10.37551/S2254-28842025035

Factors influencing the quality of intermittent renal replacement therapy in critically ill patients

Adriana Patricia Mejía-Díaz, María del Tránsito Suárez-Plata, Gastón Julio-Piñeiro, Marta Quíntela-Martínez, Lida Rodas-Marín

Nephrology and Renal Transplant Service, Hospital Clínic, Barcelona, Spain

Please cite this article in press as:
Mejía-Díaz AP, Suárez-Plata MT, Julio-Piñeiro G, Quíntela-Martínez M, Rodas-Marín L. Factors influencing the quality of intermittent renal replacement therapy in critically ill patients. Enferm Nefrol. 2025;28(4):330-6

Corresponding author:
Adriana Patricia Mejía Díaz
apmejia@clinic.cat

Reception: 07-11-24
Acceptance: 09-23-25
Publication: 12-30-25

ABSTRACT

Introduction: Multiple factors influence the effectiveness of intermittent renal replacement therapy in critically ill patients, in which the role of nursing staff is fundamental.

Objective: To describe the factors influencing the quality of intermittent renal replacement therapy in critically ill patients.

Material and Method: We conducted a descriptive retrospective study of 413 intermittent renal replacement therapy sessions performed in intensive care units between January and December 2018. Variables analysed included age, sex, admission diagnosis, technique-related factors and factors modifying prescribed dialysis time.

Results: Mean age was 65±13 years; 78.7% were men. The main cause of admission was septic shock (35.1%). Intermittent haemodialysis was the most common technique (52.1%). The most frequent vascular access was a temporary jugular catheter (37.8%), whose dysfunction was identified as a factor associated with poorer session quality in 37% of cases (p<0.015). Other relevant factors were reduced effective haemodialysis time (27%, p<0.000) and definitive session suspension (15.5%, p<0.002). Mean Kt was 48.6±23 L/min, and 35% of sessions were below the minimum recommended Kt.

Conclusion: Dialysis quality in critically ill patients undergoing intermittent renal replacement therapy depends on non-modifiable factors such as clinical condition, and modifiable factors such as early detection of vascular access dysfunction, causes of session suspension and intradialytic adjustments to improve tolerance and prevent complications.

Keywords: acute kidney injury; dialysis quality; ionic dialysance; intermittent renal replacement therapy; dialysis dose; intensive care unit.

RESUMEN

Factores que influyen en la calidad de la terapia sustitutiva renal intermitente en pacientes en estado crítico

Introducción: En la terapia renal sustitutiva intermitente del paciente crítico, intervienen múltiples factores que condicionan la eficacia dialítica, donde el papel de la enfermera es fundamental.

Objetivo: Describir los factores que influyen en la calidad de la terapia sustitutiva renal intermitente en pacientes en estado crítico.

Material y Método: Estudio descriptivo retrospectivo de 413 sesiones de terapia sustitutiva renal intermitente, realizadas en unidades de cuidados intensivos desde enero hasta diciembre del 2018, donde se analizaron variables como: edad, sexo, diagnóstico de ingreso, factores relacionados con la técnica y los que modifican el tiempo prescrito de diálisis.

Resultados: Edad media 65±13 años; con predominancia de hombres (78,7%); la principal causa de ingreso fue shock séptico (35,1%), tipo de técnica hemodiálisis intermitente, (52,1%), acceso vascular catéter temporal yugular (37,8%), cuya disfunción se identificó como uno de los factores asociados a una menor calidad de las sesiones en un 37% (p<0,015). Otros factores relevantes fueron: disminución del tiempo efectivo de hemodiálisis 27% (p<0,000) y suspensión definiti-

va de las sesiones 15,5% (p<0,002). El Kt medio obtenido fue 48,6 l/min±23 litros y el 35% de las sesiones estuvieron por debajo del Kt mínimo recomendado.

Conclusiones: La calidad de diálisis en el paciente crítico con tratamiento sustitutivo renal intermitente depende de factores no modificables como el estado clínico del paciente y modificables como la detección precoz de alteraciones del funcionamiento del acceso vascular, causas de suspensión definitiva de la sesiones y ajustes intradiálisis para mejorar la tolerancia a la técnica y prevenir las complicaciones.

Palabras clave: lesión renal aguda; calidad de diálisis; dialisancia iónica; tratamiento sustitutivo renal intermitente; dosis de diálisis; unidad de cuidados intensivos.

INTRODUCTION

Acute kidney injury (AKI) is a frequent complication, affecting approximately 5–10% of hospitalised patients and up to 40% of patients admitted to intensive care units (ICUs) in Spain[1-3]. Approximately 4–5% of patients require renal replacement therapy (RRT), which is associated with high mortality, estimated at around 30%[3]. RRT includes continuous renal replacement therapy (CRRT) and intermittent haemodialysis (IHD), either in conventional form or adapted as slow low-efficiency dialysis (SLED)[3,4]. The main risk factors for requiring RRT include advanced age, male sex and the presence of sepsis[3,4].

In renal replacement therapy, achieving an adequate delivered dose with good treatment tolerance is a recognised quality objective[5,6]. Accordingly, international haemodialysis clinical practice guidelines (American, European, Canadian, Australian and Spanish) recommend monitoring both the prescribed and delivered dialysis dose using Kt/V, based on the urea kinetic model (UKM)[7]. This was later complemented by measurement through ionic dialysance using online clearance monitoring (OCM), expressed as Kt, where K represents dialyser urea clearance and t the programmed session duration. This system allows daily monitoring of the delivered dialysis dose[7,8]. Since 1999, Lowrie et al.proposed Kt as a marker of dialysis dose and mortality, recommending a minimum Kt of 40–45 L in women and 45–50 L in men[9].

Much less evidence is available to establish the optimal RRT dose in critically ill patients. The KDIGO international guideline recommends that such patients receive at least the same dose as chronic haemodialysis patients (Kt/V = 1.3 per session), delivered over three sessions per week[10].

Furthermore, the dialysis dose is influenced by interactions among several variables, including membrane surface area and permeability, which must meet specific requirements for solute and fluid removal, blood flow (Qb) and dialysate flow rate (Qd)[7,11].

Multiple factors may negatively affect therapy performance, such as inadequate Qb limited by vascular access dysfunction (poor flow, high recirculation), incorrect Qd, improper circuit priming, dialyser fibre clotting, reduction of programmed treatment time due to interruptions for vascular access manipulation, frequent alarms, premature session termination due to intolerance or haemodynamic instability[5,12,13]. All these aspects are directly monitored and managed by nursing staff.

Intermittent renal replacement therapy (IRRT) is therefore a critical component of the management of critically ill patients with AKI. The proper delivery and quality of dialysis dose are key determinants of treatment efficacy, patient recovery and haemodynamic stability. In this context, the nurse plays a fundamental role, being responsible for continuous monitoring, control and supervision of IRRT, including session-by-session Kt monitoring, detection of irregularities and coordination with the attending physician to implement necessary treatment adjustments, ultimately influencing patient outcomes.

Therefore, the aim of this study was to determine the factors influencing the quality of intermittent renal replacement therapy in critically ill patients.

MATERIAL AND METHOD

Study Design

Descriptive, cross-sectional, retrospective study.

Population and Setting

A total of 413 IRRT sessions (IHD/SLED) performed in 91 critically ill patients with acute kidney injury or chronic haemodialysis dependence admitted to the surgical, medical and coronary ICUs of Hospital Clínic de Barcelona (Barcelona, Spaion) during 2018 were analysed. Data were obtained from the Nefrolink® electronic registry.

Study Variables

Patient characteristics included sex, age, admission diagnosis and ICU type (surgical, coronary, or medical ICU: respiratory, hepatic and internal medicine). Treatment-related parameters included therapy modality (IHD/SLED), type and location of vascular access (native or prosthetic arteriovenous fistula; non-tunnelled jugular or femoral central venous catheter; tunnelled jugular catheter), prescribed dialysis time, dialyser type, blood flow (Qb), dialysate flow (Qd) and anticoagulation. All sessions were performed using Fresenius 5008 monitors with OCM biosensors, enabling automatic Kt measurement. An adequate Kt was defined as 45–50 L in men and 40–45 L in women, as recommended by clinical practice guidelines[8,24,27].

Factors affecting dialysis quality included vascular access dysfunction, defined as inability to obtain or maintain Qb≥300 mL/min during IHD within the first 60 minutes, despite corrective manoeuvres, with need for line reversal

and recirculation >20%; AVF infiltration or haematoma preventing re-cannulation; Qb reduction >20 mL/min from prescribed; effective dialysis time reduction >15 min in IHD or >30 min in SLED; session termination ≥30 minutes before completion; partial or total extracorporeal circuit clotting; haemodynamic instability; use of vasoactive drugs; and logistical factors (nursing availability, diagnostic procedures > 60 min, monitor malfunction).

Data Collection

Data were obtained from SAP® and Nefrolink® electronic records between March and June 2019 and recorded in an anonymised Excel database.

Statistical Analysis

Quantitative variables were analysed using mean ± standard deviation and median (interquartile range). Qualitative variables were summarised as absolute and relative frequencies (percentages). To identify associations between qualitative variables and achievement of the minimum dialysis dose (Kt), bivariate analysis was performed using the chi-square test (Fisher's exact test for expected frequencies <5), considering a p value <0.05 as statistically significant. Subsequently, a multivariable analysis was conducted using binary logistic regression to identify factors independently associated with Kt below the recommended value. Adjusted odds ratios (ORs) with their corresponding confidence intervals and p values were calculated. Variables included in the model were selected based on statistical significance in the bivariate analysis and clinical relevance.

All data were processed and analysed using SPSS® (Statistical Package for the Social Sciences), version 24.0.

Ethical considerations

The study was approved by the Research Ethics Committee for Medicinal Products (CEIm) of Hospital Clínic de Barcelona (approval number: HCB 2018/0955). The study was conducted in accordance with the principles of the Declaration of Helsinki, as revised at the October 2013 General Assembly in Fortaleza, Brazil, and in compliance with Spanish Organic Law 15/1999 of 13 December and its May 2018 amendment on the Protection of Personal Data (LOPD).

RESULTS

A total of 413 IRRT sessions were analysed, performed in 91 critically ill patients admitted to the ICU. Among them, 52.8% (n=218) had acute kidney injury and 47.2% (n=195) were chronic haemodialysis patients. Of all sessions, 52.1% (n=215) were performed as IHD and 47.9% (n=198) as SLED; the highest proportion of sessions (44.5%, n=183) took place in the surgical ICU.

The characteristics of the study sessions are shown in **table 1.** Mean patient age was 65±13 years, and 78.7% were men (n = 325). The most frequent admission diagnosis was septic shock (35.1%, n=145), followed by respiratory failure (24.2%, n=100). Regarding dose-related parameters, the most commonly used vascular access was the non-tunnelled jugular venous catheter (37.8%, n=156). Mean session duration was 360 ± 180 minutes. The most frequently used dialyser was Helixone® (1.0–1.4 m²) in 95% of sessions (n=395). Mean dialysate flow rate (Qd) was 300±75.6 mL/min, and mean blood flow rate (Qb) was 250±82 mL/min.

Table 1. Characteristics of the dialysis sessions.

Variables	n	%
Sex		
• **Male**	**325**	**78.7**
• Female	88	21.3
Reason for ICU Admission		
• **Septic shock**	**145**	**35.1**
• Respiratory failure	100	24.2
• Post-surgical	**77**	**18.6**
• Cardiogenic shock	**47**	**11.4**
• Hypovolaemic shock	**21**	**5.1**
• Polytrauma	**23**	**5.6**
Type of Kidney Failure		
• CKD	195	**47.2**
• AKI	**218**	**52.8**
Type of Renal Replacement Therapy		
• **IHD**	**215**	**52.1**
• SLED	198	47.9
Source ICU		
• Surgical ICU	183	44.3
• Medical ICU	172	41.7
• Coronary ICU	58	14.0
Vascular Access		
• **Non-tunnelled jugular CVC**	**156**	**37.8**
• Non-tunnelled femoral CVC	94	22.8
• Tunnelled jugular CVC	86	20.8
• AVF	67	16.2
• Prosthetic AVF	10	2.4
Dialyser Type		
• **Helixone® (1.0–1.4 m²)**	**395**	**95.6**
• Cellulose triacetate	16	3.9
• Polypropylene 1.7 m²	2	0.5
Blood Flow (Qb)		
• <250 mL/min	206	49.9
• 250–400 mL/min	207	50.1

CKD: Chronic kidney disease; **AKI:** Acute kidney injury; **IHD:** Intermittent haemodialysis; **SLED:** Slow low-efficiency dialysis; **CVC:** Central venous catheter; **AVF:** Arteriovenous fistula.

The mean Kt achieved was 48.6±23 L in 93.2% of sessions (n=385); Kt was not recorded in 6.8% (n=28). Regarding recommended targets, 33.6% of men (n=109) had Kt values <45 L, and 39.8% of women (n=35) were <40 L. No statistically significant difference was found between sexes in achieving the minimum Kt recommended by KDIGO guidelines (p>0.339).

Table 2. Factors associated with failure to achieve the recommended minimum dialysis dose (Kt)

Variables	n	%	OR	95%CI	p-value
Vascular access dysfunction	**74**	**17.7**	**1.89**	**1.13–3.15**	**0.015**
Recirculation >20%	27	6.5	0.85	0.57–1.28	0.461
Catheter change	15	3.6	0.93	0.31–2.78	0.899
Line reversal	**34**	**8.2**	**2.02**	**1.16–3.50**	**0.011**
Qb modification	40	9.7	0.49	0.38–1.59	0.782
Reduction of effective dialysis time > 15 min in IHD	53	13.0	1.26	0.70-2.28	0.436
Reduction of effective dialysis time >30 in SLED	**58**	**14.0**	**2.90**	**1.64-5.11**	**0.000**
Definitive session termination ≥ 30 min before ≥ 30 min before	**64**	**15.5**	**2.28**	**1.33-3.91**	**0.002**
Haemodynamic instability	217	52.5	1.16	0.77–1.74	0.461
Heparin-free sessions	150	36.3	0.82	0.53–1.24	0.344
Total extracorporeal circuit clotting	61	14.8	1.47	0.84-2.56	0.191
Organisational factors					
Lack of nursing staff	9	2.18	2.38	0.63–9.01	0.287
Session suspension due to diagnostic tests >60 min	2	0.5	0.98	0.96–1.00	0.121
Monitor malfunction ≥ 60 min	4	1.0	1.01	1.00–1.30	0.303
Sessions without clinical cor technical complications	35	8.5	1.34	0.84–2.12	0.251

IHD: Intermittent haemodialysis; **SLED:** Slow low-efficiency dialysis; **Qb:** Blood flow rate; **OR:** Odds ratio; **CI:** Confidence interval.

As shown in **table 2**, failure to reach the recommended minimum Kt was significantly associated with catheter dysfunction, line reversal, reduction of treatment time >30 minutes during SLED, and definitive session termination.

Conversely, session interruption due to diagnostic procedures (OR, 0.98; 95%CI, 0.96–1.00) and monitor malfunction (OR, 1.01; 95%CI, 1.00–1.30) were not significantly associated with suboptimal Kt (p>0.05). Although these estimates suggest potentially relevant clinical trends—particularly regarding session interruption—no conclusive association could be established in this sample **(table 2)**.

Use of IHD vs SLED was associated with a higher prevalence of hypotension and arrhythmias (OR, 4.74, p<0.05), indicating greater haemodynamic instability with IHD. Regarding anticoagulation, 36.3% of sessions (n=150) were performed without heparin, and extracorporeal circuit clotting occurred in 14.8% of sessions (n=61). However, heparin use was not significantly associated with a lower rate of circuit clotting (39% [n=44] vs 22% [n=17]; p=0.153).

Other logistical factors (interruption for diagnostic procedures, monitor malfunction, and staff shortage) accounted for reduced dialysis time in 3.6% of sessions (n=15; p<0.001). Definitive session termination was required in 15.5% of sessions (n=64), with hypotension and arrhythmias being the most frequent cause (6.5%, n=27), followed by complete extracorporeal circuit clotting (5.8%, n=24) **(table 3).**

DISCUSSION

In our centre, critically ill patients admitted to the ICU who require IRRT constitute a population in which the primary reason for admission is septic shock, predominantly male and older than 65 years. These are non-modifiable risk factors, as described in other studies conducted in critically ill populations[14-16].

Regardless of whether IHD or SLED is prescribed, the primary objective is the quality of therapy, which must be both effective[5,6] and haemodynamically well tolerated[17]. Therefore, a reliable indicator is required to closely monitor the delivered dialysis dose, determine whether it is adequate, and identify factors leading to suboptimal dosing[13,18,19], as well as aspects that can be modified through nursing interventions[19,21].

In the management of critically ill patients, non-modifiable factors such as haemodynamic instability[17,25] and sepsis[3,14,16] have been correlated with poorer tolerance of the prescribed therapy[17,25].

In our cohort, 52% of patients presented haemodynamic instability, with a clear association between hypotension and arrhythmias during dialysis. Although hypotension occurred in both treatment groups, patients receiving SLED exhibited a lower frequency of these complications compared with those receiving IHD, suggesting that treatment modality plays a key role in patient tolerance.

Table 3. Causes of definitive session termination.

Variables	n	%
Hypotension and arrhythmias	27	6.5
Total extracorporeal circuit clotting	24	5.8
Accidental removal of catheters and needles	2	0.5
Vascular access dysfunction	6	1.5
AVF infiltration and haematoma	1	0.2
Monitor malfunction	1	0.2
Diagnostic procedures	2	0.5
Allergic reaction to dialyser	1	0.2
Total	**64**	**15.5**

AVF: Arteriovenous fistula.

Schäffl et al.[28]. demonstrated that patient severity and treatment-related complications are associated with reduced dialysis dose, particularly in patients with septic shock. Similarly, Santos et al.[29]. concluded that intradialytic haemodynamic instability interferes with achieving dialysis targets and requires immediate nursing interventions. Ross et al.[20] further showed that continuous clearance monitoring enables maintenance and achievement of adequate dialysis dosing.

In our study, dialysis dose was assessed using Kt measured by ionic dialysance, enabled by conductivity sensors integrated into dialysis monitors, allowing real-time assessment of urea balance throughout each session[21,22]. A similar study reported that Kt-based dose estimation in critically ill patients allows real-time monitoring and adjustment of IRRT[23].

There is broad consensus that dialysis dose is a crucial determinant of patient prognosis; however, substantial inter-individual and inter-session variability exists. Contributing factors include modifications in effective treatment time, haemodynamic instability, and vascular access dysfunction. Fernández et al.[13] likewise reported that the main cause of suboptimal dialysis was lower than prescribed blood flow. Low dialysis dose measured by ionic dialysance has also been associated with reduced survival in patients with acute kidney failure [18].

Our analysis identified several quality-limiting factors directly involving nursing care: reduced effective dialysis time, definitive session termination, and staff shortages. Although limited literature addresses these factors in critically ill patients receiving IRRT, available studies highlight the essential role of nursing in early detection of intradialytic complications and timely intervention, ensuring both treatment quality and patient safety[20,29].

Vascular access emerged as a key preventable determinant of inadequate dialysis, with non-tunnelled venous catheters (NTVCs) exhibiting the highest complication rates[8,24]. In our study, 17.2% of sessions experienced NTVC dysfunction with high recirculation and line reversal, leading to frequent alarms and inability to achieve prescribed blood flow in 9.6% of cases. Similar findings were reported in a study from the Italian Hospital of Buenos Aires, where femoral NTVCs predominated and 22% of sessions required line reversal with suboptimal dialysis dose[25]. Although 36.3% of sessions were performed without heparin, this was not associated with increased circuit clotting, but rather with failure to achieve the prescribed blood flow. In critically ill patients, anticoagulation-free dialysis requires strict nursing surveillance to detect early signs of clotting risk (increased transmembrane pressure, reduced clearance) and prevent complete circuit coagulation. As blood flow does not appear to increase haemodynamic instability, maintaining an effective Qb≥250 mL/min is recommended to reduce clotting risk.

Dialyser selection also plays a significant role. Literature recommends optimizing dialyser performance using the smallest effective membrane surface, with appropriate blood flow and treatment duration[26]. In our study, high-flux membranes (FX 50–FX 60 Cordiax) were prescribed according to dialysis modality. Maduell et al. reported that smaller dialyser surface area reduces side effects and inflammatory response[30].

Achieving minimum Kt targets is recommended by clinical guidelines (KDIGO, European Renal Best Practice)[10,27]. We found no significant sex differences in achieving minimum Kt, consistent with prior studies[25]. However, factors independently associated with suboptimal Kt included catheter dysfunction, line reversal, reduction of SLED treatment time (>30 minutes), and definitive session termination, all of which limit solute clearance[31].

Although interruptions due to diagnostic procedures or monitor malfunction were not significantly associated with low Kt, their potential impact underscores the need to optimize treatment continuity and quality to ensure adequate clearance in critically ill patients receiving IHD/SLED[32].

This study is limited by its retrospective design and potential information loss, as well as temporal variation in clinical practice and technique adjustments. Furthermore, limited prior research exists evaluating the influence of nursing practice on dialysis quality in critically ill patients receiving IRRT.

In conclusion, dialysis quality in critically ill patients receiving IRRT depends on both non-modifiable factors (clinical status and reason for ICU admission) and modifiable factors, particularly early detection of vascular access dysfunction and timely intradialytic adjustments. These interventions improve tolerance, reduce complications, and prevent premature session termination.

The collaborative work of dialysis nurses, nephrologists, and ICU teams is fundamental to achieving an adequate dialysis dose with optimal haemodynamic tolerance.

Conflicts of interest

The authors declare no conflicts of interest related to this publication. This work reflects solely our academic and scientific findings.

The authors have no financial, commercial or personal relationships that could influence the results or interpretations presented.

Funding

This study received no external funding. All costs associated with data collection, statistical analysis and manuscript preparation were covered by the authors on a non-profit basis, with the sole aim of contributing scientific knowledge in the field of IHD and SLED therapy in critically ill patients.

BIBLIOGRAFÍA

1. Moore PK, Hsu RK, Liu KD. Management of Acute Kidney Injury: Core Curriculum 2018. Am J Kidney Dis. 2018 Jul;72(1):136-48.https://doi.org/10.1053/j.ajkd.2017.11.021

2. Herrera-Gutiérrez ME, Seller-Pérez G, Sánchez-Izquierdo-Riera JA, Maynar-Moliner J; COFRADE investigators group. Prevalence of acute kidney injury in intensive care units: the "Corte de prevalencia de disfunción Renal y Depuration en críticos" point-prevalence multicenter study. J Crit Care. 2013;28(5):687-94. https://doi.org/10.1016/j.jcrc.2013.05.019

3. Valdenebro M, Martín-Rodríguez L, Tarragón B, Sánchez-Briales P, Portolés J. Una visión nefrológica del tratamiento sustitutivo renal en el paciente crítico con fracaso renal agudo: horizonte 2020. Nefrologia. 2021;41(2):102–14.

4. Rizo-Topete LM, Arellano-Torres M, Hernández-Portales J, Treviño-Frutos R, Monreal-Puente R. Renal replacement therapies in acute kidney injury in Intensive Care Unit, continuous renal replacement, hybrid, and conventional hemodialysis: Survival analysis. Dial y Traspl. 2015;36(1):8–14.

5. Maduell F, Broseta JJ. Dosis de Hemodiálisis. Lorenzo V, López-Gómez, JM Editores. Nefrología al Día. ISSN 2659-2606. Available from: https://www.nefrologiaaldia.org/597.

6. Barbero SA, Cegarra RB. Dosis de diálisis, anemia y calidad de vida en pacientes hemodializados: diferencias por sexo. ICUE Investigación y Cuidados de Enfermería [Internet] 2018 [cited 20 Nov 2024];3(2). Available from: https://www.revistaicue.es/revista/ojs/index.php/ICUE/article/view/93

7. Alcalde BG, Alcázar AR, Angoso G M, Dolores M, Arias G M, Arribas CP, et al. Guía de unidades de hemodiálisis 2020. 2021;41(S1):S1-77.

8. Sociedad Española de Nefrología (SEN). Guías SEN. Actuación en el fracaso renal agudo. Nefrología 2007;27(Supl 3):S111-39.

9. Lowrie EG, Chertow GM, Lew NL, Lazarus JM, Owen WF. The urea [clearance x dialysis time] product (Kt) as an outcome-based measure of hemodialysis dose. Kidney Int. 1999;56(2):729–37.

10. Khwaja A. KDIGO clinical practice guidelines for acute kidney injury. Nephron Clin Pract. 2012;120(4):c179-84.

11. Pérez-García R, García Maset R, Gonzalez Parra E, Solozábal Campos C, Ramírez Chamond R, Martín-Rabadán P, et al. Guía de gestión de calidad del líquido de diálisis (LD). Nefrología. 2016;36(3):e1–52.

12. Zhang L, Liu W, Hao C, He Y, Tao Y, Sun S, et al. Ensuring Hemodialysis adequacy by dialysis dose monitoring with UV spectroscopy analysis of spent dialysate. Un J Artif Organs. 2022;45(4):351–9.

13. Fernández P, Núñez S, De Arteaga J, Chiurchiu C, Douthat W, De La Fuente J. Inadequate doses of hemodialysis. Predisposing Factors, causes and prevention. Medicina. 2017;77(2):111-6.

14. Tejera D, Varela F, Acosta D, Figueroa S, Benencio S, Verdaguer C, et al. Epidemiology of acute kidney injury and chronic kidney disease in the intensive care unit. Rev Bras Ter Intensiva. 2017;29(4):444–52.

15. Herrera-Gutiérrez ME, Seller-Pérez G, Maynar-Moliner J, Sánchez-Izquierdo JA; Grupo de trabajo "Estado actual del fracaso renal agudo y de las técnicas de reemplazo renal en UCI. Estudio FRAMI". Epidemiología del fracaso renal agudo en las UCI españolas. Estudio prospectivo multicéntrico FRAMI. Med Intensiva. 2006;30(6):260-7.

16. Rechene JB, Fernández P, Douthat W. Fallo Renal agudo en unidades críticas. Factores de riesgo y Mortalidad. Rev Nefrol Dial Traspl. 2018;38(3)170-8.

17. Wang AY, Bellomo R. Renal replacement therapy in the ICU: intermittent hemodialysis, sustained low-efficiency dialysis or continuous renal replacement therapy?. Curr Opin Crit Care. 2018;24(6):437-42.

18. Molina-Andújar A, Alcubilla P, Santiago P, Blasco M, Cucchiari D, Piñeiro G, et al. Intensive Care Working Group (GMTC). Impact of the intensity of intermittent renal replacement therapy in critically ill patients. J Nephrol. 2021;34(1):105-12.

19. Ricci Z, Romagnoli S, Villa G, Ronco C. Modality and dosing of acute renal replacement therapy. Minerva Urol Nefrol 2016;68(1):78-86.

20. Ross EA, Paugh-Miller JL, Nappo RW. Interventions to improve hemodialysis adequacy: protocols based on real-time monitoring of dialysate solute clearance. Clin Kidney J. 2018;11(3):394-9.

21. Fernández Martínez AV, Soto Ureña S, Arenas Fuentes M, Sáez Donaire N, Gracia Canovas MM, Ortega Hernández P. Estudio comparativo de la dosis de diálisis medida por dialisancia iónica (kt) y por Kt/V. Rev Esp Enferm Nefrol. 2009;12(2):97-102.

22. Ridel C, Osman D, Mercadal L, Anguel N, Petitclerc T, Richard C, et al. Ionic Dialysance: a new valid parameter for quantification of dialysis efficiency in acute renal failure? Intensive Care Med. 2007;33(3):460-5.

23. Rosa-Díez GJ, Revine P, Crucelegui MS, Bratti G, Bonfanti W, Varela F, et al. La determinación del Kt por dialisancia iónica es una herramienta útil para la evaluación de la dosis de diálisis en pacientes críticos. Nefrología. 2010;30(2):227-31.

24. Grupo Español Multidisciplinar del Acceso Vascular (GEMAV). Guía Clínica Española del Acceso Vascular para Hemodiálisis. Enferm Nefrol. 2018;21(Supl 1):S6-198.

25. Rosa-Diez GJ, Greloni G, Crucelegui M, Bedini Roca M, Heredia-Martínez A, Coli ML, et al. Factors Determining a low dose of haemodialysis as measured by ionic dialysance in critical patients with acute kidney injury. Nefrologia. 2012;32(3):359-66.

26. Pérez-García R, Alcázar R. The dialyser in the year 2017: much more than a membrane. Nefrologia. 2018:38(1):4-7.

27. Jörres A, John S, Lewington A, ter Wee PM, Vanholder R, Van Biesen W, et al. A European Renal Best Practice (ERBP) position statement on the Kidney DiseaseImproving Global Outcomes (KDIGO) Clinical Practice Guidelines on Acute Kidney Injury: part 2: renal replacement therapy. Nephrology Dialysis Transplantation [Internet]. 2013 [cited 15 Mar 2024];28(12):2940–5. Available from: https://doi.org/10.1093/ndt/gft297

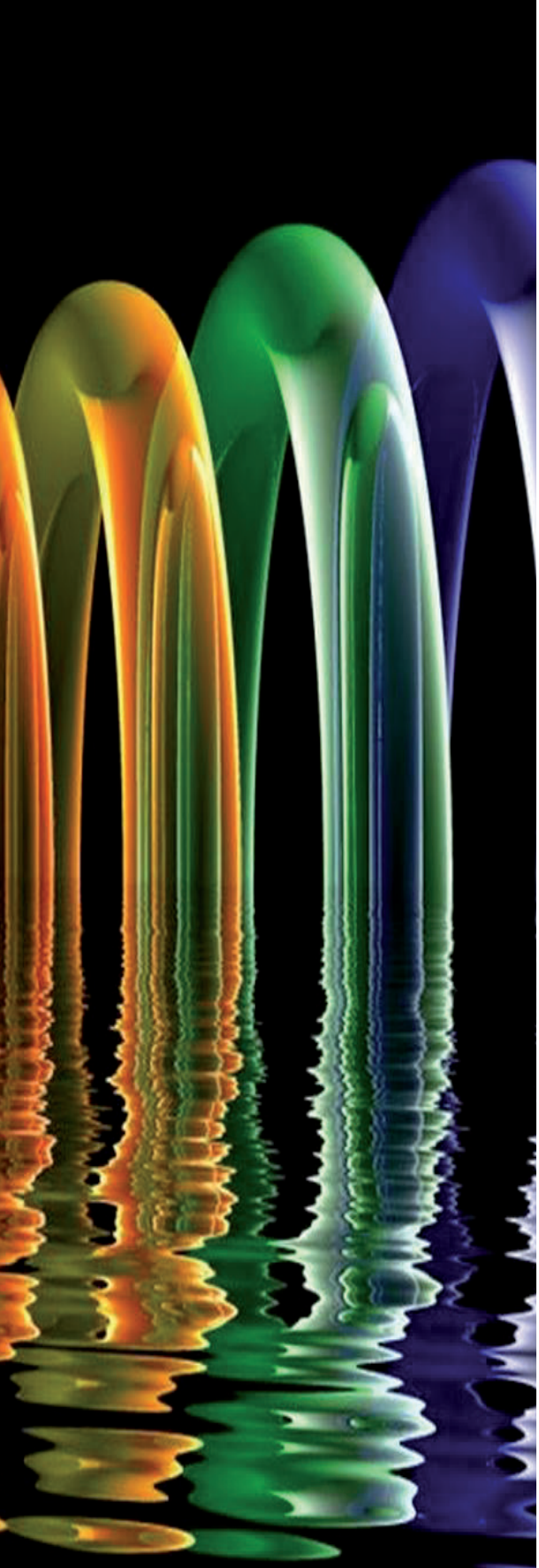
28. Schiffl H. Disease Severity Adversely Affects Delivery of Dialysis in Acute Renal Failure. Nephron Clin Pract [Internet]. 2007 [cited 15 Mar 2024];107(4):c163–9. Available from: https://www.karger.com/Article/FullText/110592

29. Santos RP dos, Carvalho AR da S, Alves SR, Lordani TVA, Vattimo M de FF, Peres LAB. Intradialytic complications in patients with acute kidney injury. Acta Paul Enferm [Internet]. 2022 [cited 15 Mar 2024];35. Available from: https://acta-ape.org/en/article/intradialytic-complications-in-patients-with-acute-kidney-injury

30. Maduell F, Ojeda R, Arias Guillén M, Bazan G, Vera M, Fontseré M, et al. Valoración de la superficie del dializador en la hemodiafiltración on-line: elección objetiva de la superficie del dializador. Nefrología. 2015;35(3):280-6.

31. Méndez González Alejandra, Díaz García Covadonga, Martínez Rodríguez Engracia, Mon Rodríguez Ana María. Impacto de las disfunciones de catéter venoso central tunelizado para hemodiálisis: eficacia y coste. Enferm Nefrol [Internet]. 2017 [cited 22 Jan 2023];20(Suppl1):S42-2. Available from: http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S2254-28842017000500042&lng=es

32. Jaldo Rodríguez Maite, Albalate Ramón Marta, Complicaciones agudas durante la sesión de hemodiálisis. En: Lorenzo V., López Gómez JM (Eds). Nefrología al día. ISSN: 2659-2606. Available from: https://www.nefrologiaaldia.



Lola Andreu AWARD 2025-2026

To the best article published in issues **28/4, 29/1, 29/2** and **29/3** of the journal **ENFERMERÍA NEFROLÓGICA**

The Editorial Committee of the journal **ENFERMERÍA NEFROLÓGICA** to encourage the submission of original manuscripts for publication, announces a single award governed by the following:

TERMS AND CONDITIONS:

1. All original articles published in issues 28/4, 29/1, 29/2, and 29/3 of the journal **ENFERMERÍA NEFROLÓGICA**, received through its website, will be eligible for the award.
2. Articles must be unpublished, not previously submitted, published, or awarded any other prize or grant, and must address topics relevant to nephrology nursing. Research-based original articles will be especially valued.
3. Compliance with the journal's publication guidelines will be taken into account when evaluating submitted articles.
4. The award will be granted by a jury composed of members of the **ENFERMERÍA NEFROLÓGICA** Editorial Committee. The decision will be final and may result in no award being granted.
5. The decision will be announced on the SEDEN website, and the award will be presented during the 51th National SEDEN Congress.
6. The award carries a monetary prize of €1,500*.
7. Enfermería Nefrológica, as the organizing entity, declines any responsibility for possible conflicts of interest, commercial associations, funding sources, or any other conflict arising from the authorship of the work.
8. Participation in this call implies acceptance of these terms and conditions.

*The monetary award is subject to tax withholding.

SEDEN
SOCIEDAD ESPAÑOLA DE ENFERMERÍA NEFROLÓGICA

Calle de la Povedilla, 13. Bajo Izq. 28009 Madrid
• Tel.: 91 409 37 37 • Fax: 91 504 09 77 •
seden@seden.org • www.seden.org

Assunção-Pereira PS. https://doi.org/10.37551/S2254-28842025036

Commentary on the article "Impact of post-dialysis fatigue and recovery time in chronic patients undergoing hemodialysis treatment: an exploratory observational study (Blanco-Mavillard et al., 2025)"

Paula Samanta Assunção-Pereira

Fresenius Medical Care/NephroCare Vila Nova de Gaia, Porto, Portugal

Please cite this article in press as:

Samanta Pereira P. Commentary on the article "Impact of post-dialysis fatigue and recovery time in chronic patients undergoing hemodialysis treatment: an exploratory observational study (Blanco-Mavillard et al., 2025)". Enferm Nefrol. 2025;28(4):338-39

Corresponding author:
Paula Samanta Assunção Pereira
samantah_pereira@hotmail.com

Reception: 03-09-25
Acceptance: 20-10-25
Publication: 30-12-25

Dear Editor,

I read with great interest the article Impact of post-dialysis fatigue and recovery time in chronic patients undergoing hemodialysis treatment: an exploratory observational study[1]. The study by these authors offers a relevant contribution to the understanding of post-dialysis fatigue, one of the most prevalent and debilitating symptoms in people with chronic kidney disease undergoing hemodialysis. The article's title immediately caught my attention, as it addresses the topic of my current research.

The research thoroughly explores the impact of fatigue and recovery time after hemodialysis sessions, highlighting factors previously underestimated both in clinical practice and in the assessment of the well-being of people undergoing treatment.

I would like to propose further reflection on the findings of Kickhöfel et al.[2], which highlight the fundamental role of the nursing team in the detection, assessment and intervention on fatigue, emphasizing the need for systematic monitoring of this symptom in the care of the person undergoing hemodialysis. This perspective reinforces that understanding fatigue and post-dialysis recovery time requires structured and continuous nursing action, capable of identifying changes in the patient's well-being early and guiding individualized interventions that mitigate the impact of this phenomenon.

To enrich the discussion, I would also like to highlight the study by Zuo et al.[3], which investigated the impact of a holistic, multidisciplinary and non-pharmacological nursing care program, led by nurses, on reducing fatigue in people undergoing hemodialysis. The intervention combined walks, motivational interviews, self-care education, and other non-pharmacological integrative strategies. The study concluded that such interventions can substantially reduce fatigue associated with hemodialysis, demonstrating measurable clinical efficacy.

The article by Zuo et al.[3] complements the study by Blanco-Mavillard et al.[1], demonstrating that non-pharmacological, multidisciplinary, and holistic nursing interventions can significantly reduce physical, mental, and muscular fatigue in people undergoing hemodialysis. While the Blanco-Mavillard study focuses on an exploratory analysis of fatigue and recovery time, Zuo et al.[3] show, through a randomized clinical trial, that fatigue is a modifiable symptom, presenting robust quantitative results that reinforce the need to systematically intervene on this phenomenon. Furthermore, the integrated care model presented by Zuo can enrich the practical implications of Blanco-Mavillard's work, offering concrete intervention proposals capable of effectively improving the well-being of people undergoing hemodialysis.

The findings of Barra et al.[4] reinforce the clinical relevance of fatigue in people undergoing hemodialysis, showing that almost all elderly individuals studied (97.7%) experience fatigue frequently directly associated with treatment sessions. These findings complement the study by Blanco-Mavillard et al.[1], demonstrating that fatigue is a cross-cutting problem marked by greater vulnerability in advanced age groups, which may be associated with greater symptomatic intensity and prolonged post-dialysis recovery time. Thus, the study by Barra et al.[4] contributes to broadening the understanding of the factors that influence the practice, reinforcing the importance of considering specific sociodemographic and clinical characteristics in the analysis proposed by Blanco-Mavillard.

Thus, integrating the systematic assessment of fatigue and recovery time into nursing practice is an essential step to optimize care, reduce suffering, and promote the well-being of people with chronic kidney disease undergoing hemodialysis.

This raises the question: how can we transform the assessment of post-dialysis fatigue into a structured and integrated clinical indicator capable of guiding institutional policies and nursing practices focused on the well-being of the person undergoing hemodialysis?

REFERENCES

1. Blanco-Mavillard I, Bolaños Herrezuelo G, Sánchez Rojas C, Palmer Massanet M del M, Martínez Nuévalos M, Fernández Fernández I. Impacto de la fatiga postdiálisis y el tiempo de recuperación en el paciente crónico en tratamiento de hemodiálisis: estudio observacional exploratorio. Enferm Nefrol. [Internet]. 2025 [cited 3 Dec 2025];28(3):[about 8 p.]. Available from: https://www.enfermerianefrologica.com/revista/article/view/4913

2. Kickhöfel MA, Schwartz E, Spagnolo LML, Sampaio AD, Cunha TN, Lise F. Avaliação de fadiga e fatores associados em pessoas submetidas à hemodiálise. Rev Cuid. 2021;12(3):e2120. https:77www.doi:10.15649/cuidarte.2120

3. Zuo M, Zhu W, Lin J, Zhuo J, He X, Jing X, Tang J, Deng R. The impact of nurse-led nonpharmacological multidisciplinary holistic nursing care on fatigue patients receiving hemodialysis: a randomized, parallel-group, controlled trial. BMC Nurs. 2022;21(1):352. https://www.doi.org/10.1186/s12912-022-01126-3

4. Barra IP, Góes Salvetti M de, Santos Pennafort VP dos, Araújo de Brito FÍ, Guimarães Oliveira Soares MJ, Oliveira de Mendonça AE. Fadiga em idosos submetidos ao tratamento hemodialítico. Rev Recien Rev Cient Enferm. 2021;11(34):142-51. https://www.doi.org/:10.24276/rrecien2021.11.34.142-151

CONGRESSES

54th INTERNATIONAL CONFERENCE EDTNA/ERCA

Mind matters in nephrology: caring beyond the kisneys

Gdańsk, Polonia, del 26-29 de 2026
Uzubaliu 7, Miklusenai, Alytaus r. sav. 62466
Lithuania
e-mail: secretariat@edtnaerca.org
www: www.edtnaerca.org

51ST NATIONAL CONGRESS OF THE SPANISH SOCIETY OF NEPHROLOGY NURSING (SEDEN)

Murcia, November 2026
Scientific Secretariat:
SEDEN
C/ de la Povedilla 13, Ground Floor Left
28009 Madrid, Spain
Tel: +34 914 093 737
E-mail address: seden@seden.org
Website: www.congresoseden.es

7TH GEMAV CONGRESS

Madrid, 4–7 March 2026
Website: https://gemav.org/eventos/
Email: info@gemav.org
Tel: +34 93 246 35 66
C/ Nàpols 187, 2nd Floor, 08013 Barcelona, Spain

AWARDS

LOLA ANDREU RESEARCH AWARD 2026

Open to all original articles published in issues 28/4, 29/1, 29/2 and 29/3 without prior publication and submitted to the journal.
Prize: €1,500
Tel: +34 914 093 737
E-mail address: seden@seden.org

JANDRY LORENZO RESEARCH GRANT 2026

To support members in conducting research projects or studies aimed at expanding knowledge in the field of Nephrology Nursing.
Grant: €1,800
Tel: +34 914 093 737
E-mail address: seden@seden.org
Website: www.seden.org

ÍÑIGO ÁLVAREZ DE TOLEDO AWARDS 2026

26th Edition of the Nephrology Nursing Research Awards

2nd Edition of the Humanisation of Healthcare for Patients with Kidney Disease Awards

Prize fund: €5,000
More information:
Tel: +34 914 487 100 | Fax: +34 914 458 533
E-mail address: info@friat.es
Website: www.fundacionrenal.com

ORGAN DONATION AND TRANSPLANT AWARD 2026

To encourage the work of nephrology nurses in the field of kidney transplantation.
Prize: Registration for the 52nd National Congress
Tel: +34 914 093 737
E-mail address: seden@seden.org
Website: www.seden.org

PERITONEAL DIALYSIS AWARD 2026

To stimulate the work of nephrology nurses in the field of peritoneal dialysis.
Prize: Registration for the 52nd National Congress
Tel: +34 914 093 737
E-mail address: seden@seden.org
Website: www.seden.org

ADVANCED CHRONIC KIDNEY DISEASE AWARD 2026

To promote the work of nephrology nurses in the field of advanced chronic kidney disease (ACKD).
Prize: Registration for the 52nd National Congress
Tel: +34 914 093 737
E-mail address: seden@seden.org
Website: www.seden.org

RENAL FOUNDATION AWARD FOR EXCELLENCE IN COMMUNICATION 2026

Recognises excellence in oral presentation at the National Congress, rewarding both content and delivery.
Prize: €1,000
Tel: +34 914 093 737
E-mail address: seden@seden.org

DIAVERUM AWARD FOR BEST HAEMODIALYSIS PROJECT 2026

To recognise outstanding work by nephrology nurses in the field of haemodialysis.
Prize: €1,000
Tel: +34 914 093 737
E-mail address: seden@seden.org

MEETINGS

39TH NATIONAL CONFERENCE OF PEOPLE WITH KIDNEY DISEASE

Ciudad Real, October 2026
National ALCER Federation
C/ Don Ramón de la Cruz 88, Office 2
28006 Madrid, Spain
Tel: +34 915 610 837
Fax: +34 915 643 499
E-mail address: amartin@alcer.org
Website: www.alcer.org

The journal of the Spanish Society of Nephrology Nursing will announce in this section all information about scientific activities related to Nephrology that is sent to us by Scientific Associations, Healthcare Institutions, and Training Centers

STATISTICAL REPORT OF THE EDITORIAL PROCESS

VOLUME 28; 2025

Number of articles received 91

Number of processed articles rejected 46

Number of processed articles accepted 36

Number of articles under review 9

Number of articles published 36

Rejection rate 50.55%

Articles published by discipline

VASCULAR ACCESS	5	13.9%
COMPREHENSIVE CARE	7	19.4%
PERITONEAL DIALYSIS	1	2.8%
CKD (Chronic Kidney Disease-Advanced Stage)	2	5.6%
HEMODIALYSIS	16	44.4%
KIDNEY TRANSPLANTATION	5	13.9%

Types of published articles

LETTERS TO THE EDITOR	2	5.56%
CASE REPORTS	4	11.11%
EDITORIALS	4	10.81%
ORIGINAL ARTICLES	22	61.11%
REVIEW ARTICLES	4	11.11%

Average time to publication (from submission to publication): ..... 151.42 days

Average review time (from submission to acceptance or rejection): ..... 89.61 days

Number of reviewers per article

1st review: ..... 2 reviewers

2nd and subsequent reviews: ..... 2 reviewers

Author Index

Volume 28

Reviewer Index

Volume 28

Aguilar Gómez, Gustavo Samuel
Aguilera Flórez, Ana Isabel
Alonso Torres, Mª Teresa
Aragó Sorrosal, Sergi
Arribas Cobo, Patricia
Brioni, Elena
Calvo Calvo, Miguel Ángel
Casas Cuesta, Rafael
Castro Notario, Mª José
Coronado Carvajal, Pilar
Fernández Fernández, Ismael
Fernández Jiménez, Antonio José
Fernández Peña, Rosario
Figueiredo, Ana Elizabeth
Gimeno Hernán, Verónica
Gómez Campos, Adrián
Gutiérrez Villaplana, Josep Mª
Lanzas Martín, Daniel
López González, Antonio
López Soto, Pablo
Molina Recio, Guillermo
Moreno Mulet, Cristina
Neves Sousa, Clemente
Núñez Moral, Miguel
Pelayo Alonso, Raquel
Pereira Feijoo, Concepción
Pereira García, Mónica
Rebollo Rubio, Ana María
Rich Ruiz, Manuel
Rodríguez Medina, Rosa Mª
Rollán de la Sota, Mª Jesús
Rubio Castañeda, Francisco Javier
Sánchez Martín, Alberto
Sánchez Villar, Isidro
Sanz Frutos, Mª Henar
Seco Lozano, Mª Luisa
Torres Quintana, Antonio
Vélez Vélez, Esperanza
Ventura Puertos, Pedro

PUBLICATION GUIDELINES

Enfermería Nefrológica is the official journal of the Spanish Society of Nephrology Nursing (SEDEN). Although the preferred language for the journal is Spanish, it also accepts articles in Portuguese and English.

Enfermería Nefrológica regularly publishes four issues a year, on the 30th of March, June, September and December, and a shorter paper version. All of the contents are available to access free of charge on the website: **www.enfermerianefrologica.com.** The journal is financed by the Spanish Society of Nephrology Nursing and distributed under the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0). This journal does not charge any article processing fees.

The journal is included in: CINAHL, IBECS, SciELO, CUIDEN, SIIC, Latindex, Capes DULCINEA, Dialnet, DOAJ, ENFISPO, Scopus, Sherpa Romeo, C17, RECOLECTA, ENFISPO, Redalyc, REBIUN, REDIB, MIAR, WordCat, Google Scholar Metric, Cuidatge, Cabells Scholarly Analytics, AURA, JournalTOCs and Proquest.

Enfermería Nefrológica publishes nursing research articles related to nephrology, high blood pressure and dialysis and transplants, which aim to increase scientific knowledge and ultimately lead to better renal patient care. It also accepts articles from other nursing fields or broader topics which result in greater professional knowledge of nephrological nursing.

In terms of publishing submissions, Enfermería Nefrológica follows the general guidelines described in the standard requirements for submissions presented for publication in biomedical journals, drafted by the International Committee of Medical Journal Editors (ICJME), available from **http://www.icmje.org**. The editorial committee will consider how well the submissions they receive follow this writing protocol.

JOURNAL SECTIONS

The journal essentially contains the following sections:

Editorial. Concise article which expresses an opinion or in which various facts or other opinions are stated. Short reviews by the editorial committee.

Long articles. These are articles in which the author(s) focus(es) on a health problem, which requires a specific nursing action performed with qualitative or quantitative methodologies, or both.

Long articles with qualitative or quantitative methodologies must contain: a structured summary (maximum 250 words in English and in the original language), introduction, objetive, method, results, discussion and conclusions (maximum length of 3,500 words for quantitative methodologies and 5,000 words for qualitative methodologies, a maximum of six tables and/or figures and a maximum of 35 bibliographic references).

Reviews. Bibliometric studies, narrative, integrative and systematic reviews, meta-analysis and meta-synthesis regarding current and relevant topics in nursing and nephrology, following the same structure and guidelines as the original qualitative work, but with a maximum of 80 bibliographic references.

Clinical case. Essentially descriptive reports of one or a few cases related to the clinical practice of nurses, in any of the various facets of their work. The report must be concise and will describe the methodology employed leading to resolution of the case from a nursing care perspective. It should include a 250-word summary in Spanish and English and cover: case description, care plan description, plan evaluation and conclusions. Maximum desired length is 2,500 words, with the following structure: introduction; presentation of case; complete nursing evaluation indicating model; description of care plan (containing the possible nursing diagnoses and problems regarding collaboration, aims and nursing interventions, wherever possible using the NANDA-NIC-NOC taxonomy); care plan evaluation and conclusions. A maximum of three tables/figures and 15 bibliographical references will be permitted.

Cover letter. These are short letters which agree or disagree with previously published articles. They can also be observations or experiences of a current topic of interest in nephrological nursing. They should be no longer than 1,500 words with up to five bibliographic references and one figure/table.

Brief articles. Research work in the same vein as the longer articles, but narrower in scope (series of cases, research on experiences with very specific aims and results), which can be communicated more concisely. These will follow the same structure: structured summary (250 words in English and Spanish), introduction, objetive, method, results, discussion and conclusion (2,500 words in length, maximum three tables and/or figures, maximum 15 bibliographical references).

Other sections. These will include various articles that may be of interest in the field of nephrological nursing.

Lengths indicated are for guidance purposes only. Submission length excludes: title, authors/affiliation, summary, tables and bibliographical purposes. The structure and length of each section of the journal are summarised in **table 1**.

FORMAL ASPECTS OF SUBMISSIONS

Authors grant the publisher the non-exclusive licence to publish the work and consent to its use and distribution under the **creative commons atribución - no comercial** 4.0 international (CC BY-NC 4.0) licence. Read the licensing information and **legal text** here. This must be expressly stated wherever necessary.

Previously published submissions or those sent simultaneously to other journals will not be accepted. Authors will inform the editorial committee of any submissions that are presented at scientific events (conferences or workshops). It would be advisable for all papers to have passed an ethics committee.

Submissions are to be uploaded to the digital platform found on the website: **http://www.enfermerianefrologica.com,** (Under the "Make a submission" section).

As part of the submission process, authors are obliged to check that their submission meets all of the requirements set out below. Any submissions that do not meet these guidelines will be declined for publication.

A letter of presentation addressed to the journal's Chief Editor must accompany the submission, in which the author(s) ask(s) for their

work to be accepted for publication in a section of the journal. This will include completing the **publication agreement form**, vouching for the submission's originality and providing assurances that it has not been published elsewhere.

Submissions will be accepted in word format, one in which the author is identifiable, and the other which is anonymous for peer review. Pages must be DIN-A4 sized, double-spaced and with size-12 font, with 2.5-cm top, bottom and side margins. Pages will be numbered consecutively. Headings, footnotes and highlighting are not recommended, as they can cause problems with layout should the submission be published.

Enfermería Nefrológica's management tool will acknowledge the receipt of all submissions. Once receipt has been acknowledged, the editorial process starts, which can be followed by authors via the aforementioned platform.

Submissions must comprise three files to be uploaded onto the journal's OJS platform.

File 1:

- Letter of presentation that accompanies the submission.
- Publication agreement form, content liability and assurance that it has not been published elsewhere.

File 2:

- Full submission (including tables and appendices) with name of author(s).

File 3:

- Full submission (including tables and appendices) with no identifying details of author(s).

The ethical responsibility section must be accepted before the files can be submitted.

The original submissions must adhere to the following presentation guidelines:

First page. This begins with the article title, authors' full names and surnames, work centres, countries or origin, email addresses and ORCID number (unique researcher ID). Indicate which author any correspondence is to be addressed to, as well as whether the surnames of the authors are to be joined by a hyphen or just one surname is to be used.

Summary. All articles must include a summary (in the original language and in English). This is to be a **maximum** length of **250 words.** The summary must contain sufficient information so that readers can gauge a clear idea of the article's content, without any reference to the text, bibliographical references or abbreviations and follow the same sections as the text: introduction, objetives, methodology, results and conclusion. The summary will not contain any new information not contained within the text itself.

Keywords. Some 3-6 keywords must be included at the end of the summary, which are directly related to the main study principles (advisable to use DeCS controlled vocabulary vocabulary https://decs.bvsalud.org/es/ and MeSH https://www.ncbi.nlm.nih.gov/mesh).

Text. In observational or experimental submissions, the text is usually divided into sections or the following: **Introduction,** which must provide the necessary items to understand the work and include its **objetives**.

Method employed in the research, including the centre where the research was conducted, its duration, characteristics of the series, sample selection criteria, techniques employed and statistical method. **Results,** which must provide data and not comment or discuss it. Results must exactly answer the objetives set out in the introduction. Tables and/or figures can be used to supplement information, although superfluous repetitions of results that are already included in the tables must be avoided, focusing instead on only the most relevant information. In the **Discussion** the authors must comment on and analyse the results, linking them to those obtained in other studies that are bibliographically referenced, as well as any conclusions they have reached with their work. The **Discussion** and **Conclusion** must stem directly from the results, with no statements made that are not validated by the results obtained in the study.

Acknowledgements. Should they wish to, authors may express their gratitude to anyone or any institution that has helped them to conduct their research. This section should also be used to acknowledge anyone who does not meet all of the criteria to be considered as an author, but who has helped with the submission, such as those who have helped with data collection, for example.

Statement on the use of generative Artificial Intelligence (AI) in scientific writing. AI and AI-assisted technologies should not be listed as author, co-author, or cited as author. Authorship implies responsibilities and tasks that can only be attributed to and performed by humans. If it has been used, authors should include a paragraph before the bibliography reporting the use of AI: "During the preparation of this paper, the authors used [NAME TOOL/SERVICE] for [REASON]. After using this tool/service, the authors reviewed and edited the content as necessary and take full responsibility for the publication's content". This statement does not apply to using essential tools to check grammar, spelling, bibliographic references, etc. If there is nothing to declare, there is no need to add this section.

References. References will follow the guidelines indicated in the ICJME with the guidance of the National Library of Medicine (NLM), available on: **https://www.nlm.nih.gov/bsd/uniform_requirements.html.**

Bibliographical references must be numbered consecutively according to the order of first appearance in the text, in superscript Arabic numerals, in the same font type and size as that used for the text. When they coincide with a punctuation mark, the reference will come before the mark. Journal titles must be abbreviated in accordance with the style used in Index Medicus; looking at the "List of Journals indexed" included every year in the January issue of Index Medicus. You can also consult the collective catalogue of periodic publications from the Spanish Health Sciences Libraries, or c17 **(http://www.c17.net/)**. Should a journal not appear in either Index Medicus or the c17, its name must be written out in full.

The bibliography of the articles should be updated to the last 7 years and it is recommended to cite an appropriate number of references.

Some examples of bibliographical references are given below.

Journal article

To be written as:

Zurera-Delgado I, Caballero-Villarraso MT, Ruíz-García M. Análisis de los factores que determinan la adherencia terapéutica del paciente hipertenso. Enferm Nefrol. 2014;17(4):251-60.

In the case of more than six authors, name the first six authors, followed by the expression *"et al"*:

Firanek CA, Garza S, Gellens ME, Lattrel K, Mancini A, Robar A *et al.* Contrasting Perceptions of Home Dialysis Therapies Among In-Center and Home Dialysis Staff. Nephrol Nurs J. 2016;43(3):195-205.

In the event that it is a supplement:

Grupo Español Multidisciplinar del Acceso Vascular (GEMAV). Guía Clínica Española del Acceso Vascular para Hemodiálisis. Enferm Nefrol. 2018;21(Supl 1):S6-198.

Online journal article:

Pérez-Pérez MJ. Cuidadores informales en un área de salud rural: perfil, calidad de vida y necesidades. Biblioteca Lascasas [Internet]. 2012 [cited 10 Mar 2015];8:[about 59 p.]. Available from: http://www.index-f.com/lascasas/documentos/lc0015.php

Article published electronically ahead of the print version:

Blanco-Mavillard I. ¿Están incluidos los cuidados paliativos en la atención al enfermo renal? Enferm Clin. Available from: 2017; http://dx.doi.org/10.1016/j.enfcli. 2017.04.005. Epub 2017 Jun 6.

Book chapter:

Pulido-Pulido JF, Crehuet-Rodríguez I, Méndez Briso-Montiano P. Punciones de accesos vasculares permanentes. En: Crespo-Montero R, Casas-Cuesta R, editores. Procedimientos y protocolos con competencias específicas para Enfermería Nefrológica. Madrid: Sociedad Española de Enfermería Nefrológica (SEDEN); 2013. p. 149-54.

Website

Sociedad Española de Enfermería Nefrológica. Madrid. [cited 5 Feb 2007]. Available from: https://www.seden.org.

Authors are advised to study the checklists on the website http://www.equator-network.org/reporting-guidelines/ for guidance on the study design of their submission.

- CONSORT for clinical trials.
- TREND for non-randomised experimental studies.
- STROBE for observational studies.
- PRISMA for systematic reviews.
- COREQ for qualitative methodology studies.

Tables and Figures. All will be referred to within the text (without abbreviations or hyphens), and consecutively numbered with Arabic numerals, without superscript, according the order mentioned within the text. They are to be presented at the end of the submission, on a separate page, with titles at the top.

Tables must be clear and simple, and any symbols or abbreviations must be accompanied by an explanatory note under the table. Images (photos or slides) must be of good quality. It is advisable to use the jpg. format.

ETHIC RESPONSIBILITY ACCEPTANCE

Enfermería Nefrológica adheres to the ethical guidelines established below for publication and research.

Authorship: Authors making a submission do so on the understanding that it has been read and approved by all of its authors and that all agree to submitting it to the journal. ALL of the listed authors must have contributed to the conception and design and/or analysis and interpretation of the data and/or the writing of the submission and the author information must include the contribution of each on the first page.

Enfermería Nefrológica adheres to the definition and authorship established by The International Committee of Medical Journal Edtiors (ICMJE). In accordance with the criteria established by the ICMJE, authorship must be based on 1) substantial contributions to the conception and design, acquisition, analysis and interpretation of data, 2) drafting of article or critical review of its significant intellectual content and 3) final approval of the published version. All conditions must be fulfilled.

Ethical approval: When a submission requires the collection of research data that involves human subjects, it must be accompanied by an express statement in the materials and method section, identifying how informed consent was obtained and a declaration, wherever necessary, stating that the study has been approved by an appropriate research ethics committee. Editors reserve the right to decline the article when questions remain as to whether appropriate processes have been followed.

Conflict of interests: Authors must disclose any potential conflict of interest when they make a submission. These may include financial conflicts of interest, patent ownership, shareholdings, employment in dialysis/pharmaceutical companies, consultancies or conference payments by pharmaceutical companies relating to the research topic or area of study. Authors must remember that reviewers have to notify the editor of any conflict of interest that may influence the authors' opinions.

Any conflict of interest (or information specifying the absence of any conflict of interest) must be included on the first page under the title "Conflict of interests." This information will be included in the published article. The following sentence must be included when authors have no conflict of interest: "Author(s) declare(s) no conflict of interest."

Sources of funding: Authors must specify the source of financing for their research when they make a submission. Providers of the assistance must be named and their location included (city, state/province, country).

PLAGIARISM DETECTION

Enfermería Nefrológica does not condone plagiarism and will not accept plagiarised material for publication under any circumstances.

Plagiarism includes, but is not limited to:

Directly copying text, ideas, images or data from other sources with the corresponding, clear and due acknowledgement.

Recycling text from the authors' own work without the corresponding referencing and approval by the editor (read more on recycling text in the policy on redundant publication, copying and recycling of text).

Using an idea from another source with modified language without the corresponding, clear and due acknowledgement.

The journal uses the **iThenticate-Similarity Check** service by Crossref to cross-match texts and detect plagiarism. All of the long articles submitted to Enfermería Nefrológica are processed by an anti-plagiarism system before being sent to peer review.

Enfermería Nefrológica follows the decision tree recommended by COPE in the event of suspecting a submission or an already-published article contains plagiarism (**http://publicationethics.org/files/Spanish%20%281%29.pdf**). Enfermería Nefrológica reserves the right to contact the institution to which the author(s) belong(s) in the event of confirming a case of plagiarism, both prior to and subsequent to publication.

Table 1. Summary table of the structure and length of each journal section.

Submission type	Summary (English and original article language)	Main text	Tables and figures	Authors	References
Editorial.	No.	Maximum length: 750 words, including references.	None.	Maximum recommended 2.	Maximum 4.
Long articles Quantitative Methodology.	250 words. Structure: introduction, objetive, method, results and conclusions.	Maximum length: 3,500 words. Structure: introduction, objetive, method, results, discussion and conclusions.	Maximum 6.	Maximum recommended 6.	Maximum 35.
Long articles Qualitative Methodology.	250 words. Structure: introduction, objetive, method, results and conclusions.	Maximum length: 5,000 words. Structure: introduction, objetive, method, results, discussion and conclusions.	Maximum 6.	Maximum recommended 6.	Maximum 35.
Brief articles.	250 words. Structure: introduction, objetive, method, results and conclusions.	Maximum length: 2,500 words. Structure: introduction, objetive, method, results, discussion and conclusions.	Maximum 3.	Maximum recommended 6.	Maximum 15.
Reviews.	250 words. Structure: introduction, objetive, methodology, results and conclusions.	Maximum length: 3,800 words. structure: introduction, objetive, methodology, results, discussion and conclusions.	Maximum 6.	Maximum recommended 6.	Maximum 80.
Clinical case.	250 words. Structure: case description, care plan description, plan evaluation, conclusions.	Maximum length: 2,500 words. Structure: introduction; presentation of case; (complete) nursing evaluation indicating model; description of care plan (containing the possible nursing diagnoses and problems regarding collaboration, objetive and nursing interventions), care plan evaluation and conclusions.	Maximum 3.	Maximum recommended 3.	Maximum 15.

NORMAS DE PUBLICACIÓN

La revista Enfermería Nefrológica es la publicación oficial de la Sociedad Española de Enfermería Nefrológica (SEDEN). Aunque el idioma preferente de la revista es el español, se admitirá también artículos en portugués e inglés.

Enfermería Nefrológica publica regularmente cuatro números al año, el día 30 del último mes de cada trimestre y dispone de una versión reducida en papel. Todos los contenidos íntegros están disponibles en la web de acceso libre y gratuito: **www.enfermerianefrologica.com.** La revista es financiada por la entidad que la pública y se distribuye bajo una licencia Creative Commons Atribución No Comercial 4.0 Internacional (CC BY-NC 4.0). Esta revista no aplica ningún cargo por publicación.

La revista está incluida en: CINAHL, IBECS, SciELO, CUIDEN, SIIC, Latindex, Capes, DULCINEA, Dialnet, DOAJ, ENFISPO, Scopus, Sherpa Romeo, C17, RECOLECTA, Redalyc, REBIUN, REDIB, MIAR, WordCat, Google Scholar Metric, Cuidatge, Cabells Scholarly Analytics, AURA, JournalTOCs y Proquest.

Enfermería Nefrológica publica artículos de investigación enfermera relacionados con la nefrología, hipertensión arterial, diálisis y trasplante, que tengan como objetivo contribuir a la difusión del conocimiento científico que redunde en el mejor cuidado del enfermo renal. Asimismo, se aceptarán artículos de otras áreas de conocimiento enfermero o de materias transversales que redunden en la mejora del conocimiento profesional de la enfermería nefrológica.

Para la publicación de los manuscritos, Enfermería Nefrológica sigue las directrices generales descritas en los requisitos de uniformidad para manuscritos presentados para publicación en revistas biomédicas, elaboradas por el comité internacional de editores de revistas biomédicas (ICJME). Disponible en **http://www.icmje.org.** En la valoración de los manuscritos recibidos, el comité editorial tendrá en cuenta el cumplimiento del siguiente protocolo de redacción.

SECCIONES DE LA REVISTA

La revista consta fundamentalmente de las siguientes secciones:

Editorial. Artículo breve en el que se expresa una opinión o se interpretan hechos u otras opiniones. Revisiones breves por encargo del comité editorial.

Originales. Son artículos en los que el autor o autores estudian un problema de salud, del que se deriva una actuación específica de enfermería realizada con metodología cuantitativa, cualitativa o ambas.

Los originales con metodología cuantitativa y cualitativa deberán contener: resumen estructurado (máximo de 250 palabras en inglés y en el idioma original), introducción, objetivos, material y método, resultados, discusión y conclusiones (extensión máxima de 3.500 palabras para los de metodología cuantitativa y 5.000 palabras para los de metodología cualitativa, máximo 6 tablas y/o figuras, máximo 35 referencias bibliográficas).

Revisiones. Estudios bibliométricos, revisiones narrativas, integrativas, sistemáticas, metaanálisis y metasíntesis sobre temas relevantes y de actualidad en enfermería o nefrología, siguiendo la misma estructura y normas que los trabajos originales cualitativos, pero con un máximo de 80 referencias bibliográficas.

Casos clínicos. Trabajo fundamentalmente descriptivo de uno o unos pocos casos relacionados con la práctica clínica de las enfermeras, en cualquiera de sus diferentes ámbitos de actuación. La extensión debe ser breve y se describirá la metodología de actuación encaminada a su resolución bajo el punto de vista de la atención de enfermería. Incluirá un resumen de 250 palabras en castellano e inglés estructurado en: descripción caso/os, descripción del plan de cuidados, evaluación del plan, conclusiones. La extensión máxima será de 2.500 palabras, con la siguiente estructura: introducción; presentación del caso; valoración enfermera completa indicando modelo; descripción del plan de cuidados (conteniendo los posibles diagnósticos enfermeros y los problemas de colaboración, objetivos e intervenciones enfermeras. Se aconseja utilizar taxonomía NANDA-NIC-NOC); evaluación del plan de cuidados y conclusiones. Se admitirá un máximo de 3 tablas/figuras y de 15 referencias bibliográficas.

Cartas al Editor Jefe. Consiste en una comunicación breve en la que se expresa acuerdo o desacuerdo con respecto a artículos publicados anteriormente. También puede constar de observaciones o experiencias sobre un tema de actualidad, de interés para la enfermería nefrológica. Tendrá una extensión máxima de 1.500 palabras, 5 referencias bibliográficas y una figura/tabla.

Original breve. Trabajos de investigación de las mismas características que los originales, pero de menor envergadura (series de casos, investigaciones sobre experiencias con objetivos y resultados muy concretos), que pueden comunicarse de forma más abreviada. Seguirán la siguiente estructura: resumen estructurado (250 palabras en inglés y castellano), introducción, objetivos, material y método, resultados, discusión y conclusiones (extensión 2.500 palabras, máximo 3 tablas y/o figuras, máximo 15 referencias bibliográficas).

Otras secciones. En ellas se incluirán artículos diversos que puedan ser de interés en el campo de la enfermería nefrológica.

Las extensiones indicadas son orientativas. La extensión de los manuscritos excluye: título, autores/filiación, resumen, tablas y referencias bibliográficas. La estructura y extensión de cada sección de la revista se resume en la **tabla 1.**

ASPECTOS FORMALES PARA LA PRESENTACIÓN DE LOS MANUSCRITOS

Los autores ceden de forma no exclusiva los derechos de explotación de los trabajos publicados y consiente en que su uso y distribución se realice con la licencia **creative commons atribución - no comercial** 4.0 internacional (CC BY-NC 4.0). Puede consultar desde aquí la versión informativa y el **texto legal** de la licencia. Esta circunstancia ha de hacerse constar expresamente de esta forma cuando sea necesario.

No se aceptarán manuscritos previamente publicados o que hayan sido enviados al mismo tiempo a otra revista. En el caso de que hubiera sido presentado a alguna actividad científica (Congreso, Jornadas) los autores lo pondrán en conocimiento del comité editorial. Sería recomendable que todos los trabajos hayan pasado un comité de ética.

Los manuscritos se remitirán por la plataforma digital de la revista que se encuentra en su página web, a la que se accede en la siguiente dirección: **http://www.enfermerianefrologica.com.** (Apartado "Enviar un artículo").

Como parte del proceso de envío, los autores/as están obligados a comprobar que su envío cumpla todos los elementos que se muestran a continuación. Se devolverán a los autores/as aquellos envíos que no cumplan estas directrices.

Junto al manuscrito deberá remitirse una carta de presentación al editor jefe de la revista, en la que se solicita la aceptación para su publicación en alguna de las secciones de la misma. En ella se incorporará el formulario de acuerdo de publicación, originalidad del trabajo, responsabilidad de contenido y no publicación en otro medio.

La presentación de los manuscritos se hará en dos archivos en formato word, uno identificado y otro anónimo para su revisión por pares. El tamaño de las páginas será DIN-A4, a doble espacio y un tamaño de letra de 12, dejando los márgenes laterales, superior e inferior de 2,5 cm. Las hojas irán numeradas correlativamente. Se recomienda no utilizar encabezados, pies de página, ni subrayados, que dificultan la maquetación en el caso de que los manuscritos sean publicados.

La herramienta de gestión de la revista Enfermería Nefrológica acusará recibo de todos los manuscritos. Una vez acusado recibo, se inicia el proceso editorial, que puede ser seguido por los autores en la plataforma mencionada anteriormente.

Los manuscritos se separarán en tres archivos, que se incluirán en la plataforma OJS de la revista:

Archivo 1:

- Carta de presentación del manuscrito.
- Formulario de acuerdo de publicación, responsabilidad de contenido y no publicación en otro medio.

Archivo 2:

- Trabajo identificado completo (incluidas tablas y anexos).

Archivo 3:

- Trabajo anónimo completo (incluidas tablas y anexos).

Antes del envío definitivo habrá que aceptar el apartado de responsabilidad ética.

Los manuscritos originales deberán respetar las siguientes condiciones de presentación:

Primera página. Se inicia con el título del artículo, nombre y apellidos completos de los autores, centros de trabajos, país de origen, correo electrónico y Orcid (identificador único de investigadores). Se indicará a qué autor debe ser enviada la correspondencia, así como si los apellidos de los autores irán unidos por un guión o sólo utilizarán un solo apellido.

Resumen. Todos los artículos deberán incluir un resumen (en el idioma de origen y en inglés). La **extensión máxima** será de **250 palabras.** El resumen ha de tener la información suficiente para que el lector se haga una idea clara del contenido del manuscrito, sin ninguna referencia al texto, citas bibliográficas ni abreviaturas y estará estructurado con los mismos apartados del trabajo (Introducción, Objetivos, Metodología, Resultados y Conclusiones). El resumen no contendrá información que no se encuentre en el texto.

Palabras clave. Al final del resumen deben incluirse 3-6 palabras clave, que estarán directamente relacionadas con las principales variables del estudio (se aconseja utilizar lenguaje controlado DeCS https://decs.bvsalud.org/es/ y MeSH https://www.ncbi.nlm.nih.gov/mesh).

Texto. En los manuscritos de observación y experimentales, el texto suele dividirse en apartados o secciones denominadas: **Introducción**, que debe proporcionar los elementos necesarios para la compresión del trabajo e incluir los **objetivos** del mismo. **Material y Método,** empleado en la investigación, que incluye el centro donde se ha realizado, el tiempo que ha durado, características de la serie, sistema de selección de la muestra, las técnicas utilizadas y los métodos estadísticos. **Resultados,** que deben ser una exposición de datos, no un comentario o discusión sobre alguno de ellos. Los resultados deben responder exactamente a los objetivos planteados en la introducción. Se pueden utilizar tablas y/o figuras para complementar la información, aunque deben evitarse repeticiones innecesarias de los resultados que ya figuren en las tablas y limitarse a resaltar los datos más relevantes. En la **Discusión** los autores comentan y analizan los resultados, relacionándolos con los obtenidos en otros estudios, con las correspondientes citas bibliográficas, así como las conclusiones a las que han llegado con su trabajo. La **Discusión** y las **Conclusiones** se deben derivar directamente de los resultados, evitando hacer afirmaciones que no estén refrendados por los resultados obtenidos en el estudio.

Agradecimientos. Cuando se considere necesario se expresa el agradecimiento de los autores a las diversas personas o instituciones que hayan contribuido al desarrollo del trabajo. Tendrán que aparecer en el mismo aquellas personas que no reúnen todos los requisitos de autoría, pero que han facilitado la realización del manuscrito, como por ejemplo las personas que hayan colaborado en la recogida de datos.

Declaración de uso de Inteligencia Artificial (IA) generativa en la redacción científica. La IA y las tecnologías asistidas por IA no deben figurar como autor o coautor, ni citarse como autor. La autoría implica responsabilidades y tareas que solo pueden ser atribuidas y realizadas por humanos. Si se ha utilizado la misma, los autores deben incluir un apartado antes de la bibliografía, informando sobre el uso de la IA: "Durante la preparación de este trabajo, los autores utilizaron [NOMBRE HERRAMIENTA / SERVICIO] para [MOTIVO]. Después de utilizar esta herramienta/servicio, los autores revisaron y editaron el contenido según sea necesario y asumen total responsabilidad por el contenido de la publicación". Esta declaración no se aplica al uso de herramientas básicas para verificar la gramática, la ortografía, las referencias bibliográficas, etc. Si no hay nada que declarar, no es necesario agregar este apartado.

Bibliografía. Se elaborará de acuerdo a lo que indica el ICJME con las normas de la National Library of Medicine (NLM), disponible en: **https://www.nlm.nih.gov/bsd/uniform_requirements.html.**

Las referencias bibliográficas deberán ir numeradas correlativamente según el orden de aparición en el texto por primera vez, en números arábigos en superíndice, con el mismo tipo y tamaño de letra que la fuente utilizada para el texto. Cuando coincidan con un signo de puntuación, la cita precederá a dicho signo. Los nombres de las revistas deberán abreviarse de acuerdo con el estilo usado en el Index Medicus; consultando la "List of Journals indexed" que se incluye todos los años en el número de enero del Index Medicus. Así mismo, se puede consultar el catálogo colectivo de publicaciones periódicas de las bibliotecas de ciencias de la salud españolas, denominado c17 (http://www.c17.net/). En caso de que una revista no esté incluida en el Index Medicus ni en el c17, se tendrá que escribir el nombre completo.

La Bibliografía de los artículos debe estar actualizada a los últimos 7 años y se recomienda citar un número apropiado de referencias

A continuación se dan algunos ejemplos de referencias bibliográficas.

Artículo de revista

Se indicará:

Zurera-Delgado I, Caballero-Villarraso MT, Ruíz-García M. Análisis de los factores que determinan la adherencia terapéutica del paciente hipertenso. Enferm Nefrol. 2014;17(4):251-60.

En caso de más de 6 autores, mencionar los seis primeros autores, seguidos de la expresión «et al»:

Firanek CA, Garza S, Gellens ME, Lattrel K, Mancini A, Robar A *et al.* Contrasting Perceptions of Home Dialysis Therapies Among In-Center and Home Dialysis Staff. Nephrol Nurs J. 2016;43(3):195-205.

En caso de ser un Suplemento:

Grupo Español Multidisciplinar del Acceso Vascular (GEMAV). Guía Clínica Española del Acceso Vascular para Hemodiálisis. Enferm Nefrol. 2018;21(Supl 1):S6-198.

Artículo de revista de Internet:

Pérez-Pérez MJ. Cuidadores informales en un área de salud rural: perfil, calidad de vida y necesidades. Biblioteca Lascasas [Internet]. 2012 [consultado 10 Mar 2015];8:[aprox. 59 p.]. Disponible en: http://www.index-f.com/lascasas/documentos/lc0015.php

Artículo publicado en formato electrónico antes que en versión impresa:

Blanco-Mavillard I. ¿Están incluidos los cuidados paliativos en la atención al enfermo renal? Enferm Clin. 2017; Disponible en: http://dx.doi.org/10.1016/j.enfcli.2017.04.005. Epub 6 Jun 2017.

Capítulo de un libro:

Pulido-Pulido JF, Crehuet-Rodríguez I, Méndez Briso-Montiano P. Punciones de accesos vasculares permanentes. En: Crespo-Montero R, Casas-Cuesta R, editores. Procedimientos y protocolos con competencias específicas para Enfermería Nefrológica. Madrid: Sociedad Española de Enfermería Nefrológica (SEDEN); 2013. p. 149-54.

Página Web

Sociedad Española de Enfermería Nefrológica. Madrid. [consultado 5 Feb 2007]. Disponible en: https://www.seden.org.

Se recomienda a los autores, que dependiendo del diseño del estudio que van a publicar, comprueben los siguientes checklists, consultables en la página web http://www.equator-network.org/reporting-guidelines/:

- Guía CONSORT para los ensayos clínicos.
- Guía TREND para los estudios experimentales no aleatorizados.
- Guía STROBE para los estudios observacionales.
- Guía PRISMA para las revisiones sistemáticas.
- Guía COREQ para los estudios de metodología cualitativa.

Tablas y Figuras. Todas se citarán en el texto (en negrita, sin abreviaturas ni guiones), y se numerarán con números arábigos, sin superíndices de manera consecutiva, según orden de citación en el texto. Se presentarán al final del manuscrito, cada una en una página diferente, con el título en la parte superior de las mismas.

Se procurará que las tablas sean claras y sencillas, y todas las siglas y abreviaturas deberán acompañarse de una nota explicativa al pie de la tabla. Las imágenes (fotografías o diapositivas) serán de buena calidad. Es recomendable utilizar el formato jpg.

ACEPTACIÓN DE RESPONSABILIDADES ÉTICAS

Enfermería Nefrológica se adhiere a las guías éticas establecidas abajo para su publicación e investigación.

Autoría: Los autores que envían un manuscrito lo hacen entendiendo que el manuscrito ha sido leído y aprobado por todos los autores y que todos los autores están de acuerdo con el envío del manuscrito a la revista. TODOS los autores listados deben haber contribuido a la concepción y diseño y/o análisis e interpretación de los datos y/o la escritura del manuscrito y la información de los autores deben incluir la contribución de cada uno en la página inicial del envío.

Enfermería Nefrológica se adhiere a la definición y autoría establecida por The International Committe of Medical Journal Edtiors (ICMJE). De acuerdo con los criterios establecidos por el ICMJE la autoría se debe basar en 1) contribuciones substanciales a la concepción y diseño, adquisición, análisis e interpretación de los datos, 2) escritura del artículo o revisión crítica del mismo por su contenido intelectual importante y 3) aprobación final de la versión publicada. Todas las condiciones han de ser cumplidas.

Aprobación ética: Cuando un envío requiere de la colección de datos de investigación en los que se involucra sujetos humanos, se debe acompañar de un estamento explícito en la sección de material y método, identificando cómo se obtuvo el consentimiento informado y la declaración, siempre que sea necesaria, de que el estudio ha sido aprobado por un comité de ética de la investigación apropiado. Los editores se reservan el derecho de rechazar el artículo cuando hay dudas de si se han usado los procesos adecuados.

Conflicto de intereses: Los autores deben revelar cualquier posible conflicto de intereses cuando envían un manuscrito. Estos pueden incluir conflictos de intereses financieros, es decir, propiedad de patentes, propiedad de acciones, empleo en compañías de diálisis/farmacéuticas, consultorías o pagos por conferencias de compañías farmacéuticas relacionadas con el tópico de investigación o área de estudio. Los autores deben tener en cuenta que los revisores deben asesorar al editor de cualquier conflicto de interese que pueda influir en el dictamen de los autores.

Todos los conflictos de intereses (o información especificando la ausencia de conflicto de intereses) se deben incluir en la página inicial bajo el título "Conflicto de intereses". Esta información será incluida en el artículo publicado. Si los autores no tienen ningún conflicto de intereses se deberá incluir la siguiente frase: "No se declaran conflictos de interés por el/los autor/es".

Fuentes de financiación: Los autores deben especificar la fuente de financiación para su investigación cuando envían un manuscrito. Los proveedores de la ayuda han de ser nombrados y su ubicación (ciudad, estado/provincia, país) ha de ser incluida.

DETECCIÓN DE PLAGIOS

La revista Enfermería Nefrológica lucha en contra del plagio y no acepta bajo ningún concepto la publicación materiales plagiados.

El plagio incluye, pero no se limita a:

La copia directa de texto, ideas, imágenes o datos de otras fuentes sin la correspondiente, clara y debida atribución.

El reciclado de texto de un artículo propio sin la correspondiente atribución y visto bueno del editor/a (leer más sobre reciclado de texto en la "Política de publicación redundante o duplicada y reciclado de texto".

Usar una idea de otra fuente usando un lenguaje modificado sin la correspondiente, clara y debida atribución.

Para la detección de plagios la revista utilizará el servicio **iThenticate-Similarity Check** de Crossref para la comprobación de similitud. Todos los originales remitidos a Enfermería Nefrológica son, previo a su envío a revisión por pares, evaluados por el sistema antiplagio.

Enfermería Nefrológica sigue el árbol de decisiones recomendado por la COPE en caso de sospecha de plagio de un manuscrito recibido o de un artículo ya publicado (**http://publicationethics.org/files/Spanish%20%281%29.pdf**). Enfermería Nefrológica se reserva el derecho de contactar con la institución de los/as autores/as en caso de confirmarse un caso de plagio, tanto antes como después de la publicación.

Tabla 1. Tabla resumen estructura y extensión de cada sección de la revista.

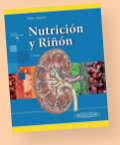
Tipo de manuscrito	Resumen (Inglés e idioma original del artículo)	Texto principal	Tablas y figuras	Autores	Referencias
Editorial.	No	Extensión máxima: 750 palabras, incluida bibliografía.	Ninguna.	Máximo recomendado 2.	Máximo 4.
Originales Metodología Cuantitativa.	250 palabras. Estructura: introducción, objetivos, material y método, resultados y conclusiones.	Extensión máxima: 3500 palabras. Estructura: introducción, objetivos, material y método, resultados, discusión y conclusiones.	Máximo 6.	Máximo recomendado 6.	Máximo 35.
Originales Metodología Cualitativa.	250 palabras. Estructura: introducción, objetivos, material y método, resultados y conclusiones.	Extensión máxima: 5000 palabras. Estructura: introducción, objetivos, material y método, resultados, discusión y conclusiones.	Máximo 6.	Máximo recomendado 6.	Máximo 35.
Originales Breves.	250 palabras. Estructura: introducción, objetivos, material y método, resultados y conclusiones.	Extensión máxima: 2500 palabras. Estructura: introducción, objetivos, material y método, resultados, discusión y conclusiones.	Máximo 3.	Máximo recomendado 6.	Máximo 15.
Revisiones.	250 palabras. Estructura: introducción, objetivos, metodología, resultados y conclusiones.	Extensión máxima: 3800 palabras. Estructura: introducción, objetivos, material y método, resultados, discusión y conclusiones.	Máximo 6.	Máximo recomendado 6.	Máximo 80.
Casos Clínicos.	250 palabras. Estructura: descripción caso, descripción del plan de cuidados, evaluación del plan, conclusiones.	Extensión máxima: 2500 palabras. Estructura: introducción; presentación del caso; valoración enfermera (completa); descripción del plan de cuidados (conteniendo los posibles diagnósticos enfermeros y los problemas de colaboración, objetivos e intervenciones enfermeras); evaluación del plan de cuidados y conclusiones.	Máximo 3.	Máximo recomendado 3.	Máximo 15.

BOOKS FOR MEMBERS

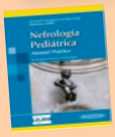
Books with discounts for SEDEN members

Tratado de Diálisis Peritoneal
Autor: Montenegro Martínez J.
Editorial: Elsevier España.
Pedir a SEDEN.
P.V.P: 177,60 € (IVA incluido)

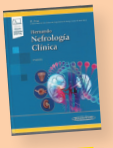
La Enfermería y el Trasplante de Órganos
Autor: Lola Andreu y Enriqueta Force.
Editorial Medica Panamericana.
Agotado. Pedir a SEDEN.
P.V.P: 33,25 € (IVA incluido)



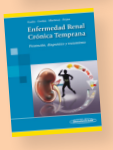
Nutrición y Riñón
Autor: Miguel C. Riella.
Editorial Médica Panamericana.
P.V.P: 87,40 € (IVA incluido)



Nefrología Pediátrica
Autor: M. Antón Gamero, L. M. Rodríguez.
Editorial Médica Panamericana.
P.V.P.: 70,30 € (IVA incluido)



Nefrología Clínica
Hernando.
Editorial Panamericana.
Papel y Digital: 209,95 € (IVA incluido)



Enfermedad Renal Crónica Temprana (eBook Online)
Autor: A. Martín, L . Cortés, H.R. Martínez y E. Rojas.
Editorial Médica Panamericana.
P.V.P.: 32,30 € (IVA incluido)

Investigación en enfermería. Desarrollo de la práctica enfermera basada en la evidencia
Autor: Grove, S.
Editorial: Elsevier.
P.V.P.: 55,41 € (IVA incluido)

Los diagnósticos enfermeros (eBook)
Autor: Luis Rodrigo Mª T.
Editorial: Elsevier España.
P.V.P.: 36,39 € (IVA incluido)

Vínculos de Noc y Nic a Nanda-I y Diagnósticos médicos
Autor: Johnson M.
Editorial: Elsevier España.
P.V.P.: 44,54 € (IVA incluido)

Clasificación de Resultados de Enfermería (NOC): Medición de Resultados en Salud
Autor: Edited by Sue Moorhead.
Editorial Elsevier España.
P.V.P.: 81,18 € (IVA incluido)

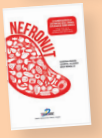
Gestión de los cuidados enfermeros y liderazgo
Autor: Huber D.
Editorial Elsevier España.
P.V.P.: 57,79 € (IVA incluido)

Lenguaje Nic para el aprendizaje teórico-práctico en enfermería
Autor: Olivé Adrados…
Editorial Elsevier España.
P.V.P.: 45,02 € (IVA incluido)

Introducción a la investigación en Ciencias de la Salud
Autor: Edited by Stephen Polgar…
Editorial Elsevier España.
P.V.P.: 33,07 € (IVA incluido)

Nefrología para enfermeros
Autor: Méndez Durán, A.
Editorial: Manual Moderna.
P.V.P.: 45,35 € (IVA incluido)

Escribir y publicar en enfermería
Autor: Piqué J, Camaño R, Piqué C.
Editorial: Tirant Humanidades.
P.V.P.: 25 € (IVA incluido)



NEFRONUT. La Alimentación en Enfermedad Renal Crónica Explicada de Forma Gráfica. Infografías para Pacientes, Cuidadores y Profesionales de la Salud
Nissenson, A. - Fine, R.
Editorial: Elservier España.
P.V.P.: 27,55 € (IVA incluido)

Manual de diagnósticos enfermeros
Autor: Gordin M.
Editorial: Mosby.
P.V.P.: 34,90 € (IVA incluido)

Manual de diálisis
Autor: Daurgidas J.
Editorial: Wolters Kluwer.
Precio: 92, 56 € (IVA incluido)

Procedimientos y Protocolos con Competencias Específicas para Enfermería Nefrológica
Autor: Crespo, R. Casas, R. SEDEN (Sociedad Española de Enfermería Nefrológica)
Editorial: Aula Médica.
P.V.P.: 21,74 € (IVA incluido)

Práctica basada en la evidencia
Autor: Orts Cortés.
Editorial: Elsevier.
Precio: 20,45 € (IVA incluido)

Investigación cualitativa
Autor: Azucena Pedraz.
Editorial: Elsevier.
Precio: 20,33 € (IVA incluido)

Guía Práctica de Enfermería Médico-Quirúrgica
Autores: Sharon L. Lewis- Linda Bucher.
Editorial: Elsevier.
Precio: 35,66 € (IVA incluido)

La Alimentación en la Enfermedad Renal Crónica Recetario Práctico de Cocina para el Enfermo Renal y su Familia
Autores: Fernández, S, Conde, N, Caverni, A, Ochando, A.
Editorial: Alcer.
Precio: 33,44 € (IVA Incluido)

Manual de Tratamiento de la Enfermedad Renal Crónica
Autor: Daugirdas, J.
Editorial: Wolters Kluwer.
Precio. 79,04 € (IVA Incluido)

Manual de Trasplante Renal
Autor: Danovitch, G.
Editorial: Wolters Kluwer.
P.V.P: 74,10 € (IVA Incluido)

Investigación en metodología y lenguajes enfermeros
Autor: Echevarría Pérez P.
Editorial: Elsevier.
Precio. 33,96 € (IVA Incluido)

Proceso de Cuidado Nutricional en la Enfermedad Renal Crónica. Manual para el Profesional de la Nutrición
Autor: Osuna I.
Editorial: Manual Moderno
P.V.P: 36,10 € (IVA incluido)

Diagnósticos enfermeros. Definiciones y clasificación. 2024-2026
Autores: T. Heather Herdman & NANDA International & Shigemi Kamitsuru.
Editorial: Elsevier.
P.V.P: 33,44 € (IVA Incluido)

The discount will be applied to the pre-VAT price.

Name: ..... Surname(s): ..... Member No.: ..... National ID (D.N.I.): .....

Address: ..... Postal Code: ..... City: ..... Province: .....

Phone: ..... Email: .....

I am interested in the following books:

- ☐ "Tratado de Diálisis Peritoneal". Montenegro Martínez J.
- ☐ "La enfermería y el Trasplante de Órganos". Lola Andreu y Enriqueta Force
- ☐ "Nutrición y Riñón". Miguel C. Riella
- ☐ "Nefrología Pediátrica". M. Antón Gamero, L. M. Rodríguez
- ☐ "Nefrología Clínica". Hernando
- ☐ "Enfermedad Renal crónica Temprana (eBook Online)". A. Martín, L. Cortés…
- ☐ Investigación en enfermería. Desarrollo de la práctica enfermera basada en la evidencia. Grove, S.
- ☐ "Los Diagnósticos Enfermeros". Luis Rodrigo, M. T.
- ☐ "Vínculos de Noc y Nic a Nanda-I y Diagnósticos médicos". Johnson M.
- ☐ "Clasificación de Resultados de Enfermería (NOC): Medición de Resultados en salud". Edited by Sue Moorhead.
- ☐ "Gestión de los cuidados enfermeros y liderazgo". Huber D.
- ☐ "Lenguaje Nic para el aprendizaje teórico-práctico en enfermería" Olivé Adrados
- ☐ "Introducción a la investigación en Ciencias de la Salud". Edited by Stephen Polgar
- ☐ "Nefrología para enfermeros". Méndez Durán, A.
- ☐ "Escribir y publicar en enfermería". Piqué J, Camaño R, Piqué C.
- ☐ "NEFRONUT. La Alimentación en Enfermedad Renal Crónica Explicada de Forma Gráfica. Infografías para Pacientes, Cuidadores y Profesionales de la Salud". Padial, M. Olveira, G. Rebollo, A.
- ☐ "Manual de diagnósticos enfermeros". Gordin M.
- ☐ "Manual de diálisis". Daurgidas J.
- ☐ "Procedimientos y Protocolos con Competencias Específicas para Enfermería Nefrológica". Crespo, R. Casas, R. SEDEN (Sociedad Española de Enfermería Nefrológica)
- ☐ "Práctica basada en la evidencia". Cortés O.
- ☐ "Investigación cualitativa". Pedraz A.
- ☐ "Guía Práctica de Enfermería Médico-Quirúrgica". Lewis S.L, Bucher L.
- ☐ "La Alimentación en la Enfermedad Renal Crónica. Recetario Práctico de Cocina para el Enfermo Renal y su Familia". Fernández, S, Conde, N, Caverni, A, Ochando, A.
- ☐ "Manual de Tratamiento de la Enfermedad Renal Crónica". Daugirdas, J.
- ☐ "Manual de Trasplante Renal". Danovitch, G.
- ☐ "Investigación en metodología y lenguajes enfermeros". Echevarría Pérez P.
- ☐ "Proceso de Cuidado Nutricional en la Enfermedad Renal Crónica. Manual para el Profesional de la Nutrición". Osuna I.
- ☐ "Diagnósticos enfermeros. Definiciones y clasificación. 2021-2023". T. Heather Herdman & NANDA International & Shigemi Kamitsuru.

Any book from Editorial Médica Panamericana, whether listed or not, will have a 10% discount off the base price for SEDEN members. Orders must be placed through www.panamericana.com, using the designated code for members at checkout. Books from Axón will also have a 10% discount, with free shipping, and must be ordered through www.axon.es, specifying the corresponding member code. Books published by Aula Médica will have a 30% discount and must be ordered via their website: https://www.clubaulamedica.com/ using the appropriate code. Books from Elsevier will have a 10% discount plus shipping costs and must be ordered through SEDEN.

The codes mentioned here can be found on the SEDEN website under the "Member Benefits" section. The discount percentage will be applied to the pre-VAT price.

Send to SEDEN.: seden@seden.org

DIAVERUM

WE HAVE JOB OPPORTUNITIES FOR YOU

WE ARE WAITING FOR YOU!

Do you want to work in a great company where people are what matters?

If you're a nurse

passionate about dialysis, and

want to work for a leading multinational company in the sector with more than 25 years of experience

This is your opportunity!

We are looking for *committed professionals*,
who enjoy being part of a
multidisciplinary team,
who want to *share initiatives* and
improve patient's quality of life.

We have *specific training* endorsed by various scientific societies.

Scan the QR code to discover available offers

You can also contact us at:

HR_Spain@diaverum.com

Or visit our website:

www.diaverum.es

VIFOR FRESENIUS MEDICAL CARE
RENAL PHARMA

CSL Vifor

LAS CONSECUENCIAS REALES DEL Pa-ERC VAN MÁS ALLÁ DE UN SIMPLE PICOR

Hasta un 67% de los pacientes podrían tener síntomas relacionados con Pa-ERC[1-5]

WWW.PRURITOERC.COM
WWW.ESCUCHATUPICOR.COM

Referencias: 1. Pisoni RL, *et al. Nephrol Dial Transplant.* 2006;21:3495-3505. **2.** Rayner HC, *et al. Clin J Am Soc Nephrol.* 2017;12:2000-2007. **3.** Silverberg JI, *et al. AM J Clin Dermatol.* 2018;19(5):759-769. **4.** Ibrahim MK, *et al. J Clin Diagn Res.* 2016;10(3):WC01-WC05. **5.** Sukul N, *et al. Kidney Medicine.* 2020;3(1):42-53.e1.
Pa-ERC: Prurito Asociado a la Enfermedad Renal Crónica.

ES-DFK-2300014