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EDITORIAL

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The advanced practice nurse and its development in the National Health System

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BACKGROUND

The functions of the Advanced Practice Nurse (APN) are gradually being defined in many countries, although with notable differences in scope. To facilitate understanding, the International Council of Nurses defines the APN as: “An advanced practice nurse is a registered nurse who has acquired, through additional graduate education (minimum of a master's degree), the expert knowledge base, complex decision-making skills, and clinical competencies for expanded practice, the characteristics of which are shaped by the context in which she or he is credentialled to practise.” The 2 roles most widely identified as APNs are the clinical nurse specialist and the direct care nurse¹.

The APN is therefore an expert nurse, able to apply scientific knowledge within a humanistic framework, serve as a reference for patients and other professionals, and assume new responsibilities. The various functions carried out within the nursing profession, together with the growing demand for quality of care in our society and ongoing technological advances, highlight the need for specific training².

The concept of the APN emerged in the United States in the late 1960s, associated with different professional terms such as *Nurse Practitioner*, *Specialist Nurse*, or *Nurse Consultant*. This development responded both to the needs of the population and the nursing workforce, as well as to the shortage of physicians at the time. It drove an expansion of the traditional competencies of the profession, with subsequent modification of training programmes. During this period, four areas of APN practice were defined: the clinical nurse, nurse practitioner, nurse anaesthetist, and nurse midwife³.

Later, in the 1990s, the model spread to Canada, where the Canadian Nurses Association focused APN competencies on clinical skills, research, leadership, and consultation/collaboration⁴.

Over time, the role extended to countries such as the United Kingdom, Ireland, Australia, Belgium, the Netherlands, and other European nations. In Spain, progress has been more limited, although certain advanced practice roles have been developed in Andalusia, Catalonia, and the Basque Country⁵. Several Autonomous Communities have refined the APN profile; however, the lack of institutional support and legal recognition has led to confusion regarding its role, scope of practice, and regulatory framework.

DEVELOPMENT AND EVOLUTION

Some countries, such as the United States, the United Kingdom, and Canada, have succeeded in defining the APN role to the point of making it a cornerstone of their health systems⁶. In these contexts, APN development has been focused on four competency domains defining the role^{7,8}:

- **Advanced clinical practice:** Much of the APN's clinical activity centres on health promotion, health education, and disease prevention. The APN may serve as the first point of patient contact through urgent consultations, telephone consultations, or scheduled visits for conditions requiring greater expertise or for patients with mild diseases. In some countries, APNs are authorised to prescribe drugs and treatments, order or perform diagnostic tests, and issue diagnoses.

- Teaching: Owing to their professional training, APNs assume an educational role and contribute to the learning of other professionals.
- Research: This is a core competency, rooted in their scope of practice, through the development of protocols and clinical practice guidelines, thereby underpinning evidence-based practice.
- Leadership and management: According to the International Council of Nurses, APNs have the authority to refer patients to other professionals, thereby strengthening coordination and collaborative work within teams.

Of note, these four domains emerged in contexts where the generalist nurse did not possess the competencies conferred by the current undergraduate nursing degree in Spain.

In Spain, new APN profiles have been developed based on demand and demographic change. However, there is no legal recognition of these professional categories within the National Health System. Review of regional health service websites indicates that only the Andalusian Health Service makes official reference to this role, thus positioning it as a pioneer. Within the Andalusian Public Health System's *Estrategia de Cuidados* (Care Strategy)⁹, APN competencies are defined according to training, distinguishing between specialist nurse, APN, and generalist nurse with competencies in specific areas. For APNs, the following areas are proposed: case management, chronic complex wounds, complex oncology, complex diabetes treatments, ostomy care, and chronic kidney disease (CKD)¹⁰. However, these are not included in the official catalogue of professional categories. Of these roles, only the case management nurse is recognised with a salary supplement, though other APN profiles are gradually being implemented (except for CKD APNs). Nurses taking on these jobs are being offered training through the Master's Degree in Advanced Practice Nursing (a proprietary qualification of *Universidad Internacional de Andalucía*), delivered via the Andalusian School of Public Health¹¹. This Master's programme includes both theoretical and practical knowledge aimed at developing transversal competencies common to all APNs, as well as specific competencies within each of the professional profiles defined by the Andalusian Care Strategy. Interestingly, the specific competencies of the APN in CKD are not developed either. Regarding the model of graduate nurses with competencies in specific areas, the following fields are proposed: critical care; emergency, urgent care, and major burns; haemodynamics and arrhythmias; transplant coordination; dialysis; perfusion; and surgical theatre. Evidently, this is an even more theoretical approach than that of the APN, and at present it is unclear how this would be reflected in job catalogues, the requirements to occupy such positions, and, above all, the criteria used to establish these 2 classifications.

From a more academic standpoint, Spanish authors have proposed competency domains for the APN¹², including research and evidence-based practice, clinical and professional leadership (its most characteristic aspect), interprofessional

relationships and mentorship, professional autonomy, quality management, care management, professional education and teaching, and health promotion.

This perspective, arising from the theorisation of a practice intended to be advanced, suggests a series of transversal competencies that could be applied across all generalist fields of the profession. However, it does not address the practical application of these competencies in clinical care, where specific competencies must be defined in professional categories or profiles across the different functional areas. It is essential to define competency domains that require specific expertise, derived from the current specialisation of health care delivery, while simultaneously defending a role that is already being carried out but remains legally unrecognised. As some authors describe, continuous research is fundamental to evaluate and describe APN roles according to population demand, thereby achieving evidence-based practice¹³.

From the perspective of nephrology nursing practice, apart from the reference to the Andalusian Care Strategy, no other institutional references were found at the level of the autonomous communities (CCAA). However, some hospitals have created an APN profile related to nephrology nursing, such as *Hospital de la Princesa* in Madrid (Spain)¹⁴ or *Fundación Puigvert* in Barcelona (Spain),¹⁵ although with differing profiles. Therefore, not all Spanish Autonomous Communities share the same vision of APN development, particularly in the area of nephrology nursing practice. These decisions are taken in settings where academic or theoretical considerations carry more weight than the realities of clinical practice. Furthermore, there is an underlying bias in these contexts towards nursing areas with strong dependence on technological development, as is the case in dialysis. For all these reasons, a legal regulatory framework on APNs is essential to establish a clear definition of this role and to contribute to its development, recognition, and implementation.

LEGISLATIVE FRAMEWORK

As noted, the absence of clear role delineation—particularly regarding areas of application—constitutes the main obstacle to APN development. Even if consensus were achieved around some regional proposals, it would be difficult for a single framework to capture the vision of all Autonomous Communities, given the ideological weight often carried in these decisions compared with the actual needs of patients and the specific competencies required.

The logical approach would be to develop the APN role within the current legislative framework for healthcare in Spain, beginning with Law 44/2003 on the Regulation of Health Professions (LOPS). Article 36 of this law, concerning Accreditation and Advanced Accreditation Diplomas, states: "*Public health administrations may issue Accreditation Diplomas and Advanced Accreditation Diplomas to certify the level of training achieved by a professional in a specific functional area of a given profession or specialty, based on accredited continuing*

education activities undertaken by the professional in the relevant functional area"¹⁶.

This provision was later regulated by Royal Decree 639/2015, of 10 July, which established the characteristics of Accreditation and Advanced Accreditation Diplomas. It requires that "the creation of an Accreditation Diploma or an Advanced Accreditation Diploma agreed upon by the CISNS [Interterritorial Council of the National Health System] shall be published in the Official State Gazette by order of the Minister of Health." Chapter 3 outlines procedures for obtaining and renewing these diplomas¹⁷.

Most recently, Order SND/1427/2023, of 26 December, published the basis for creating Accreditation Diplomas in the functional area of palliative care, establishing four diplomas: Palliative Care Physician, Palliative Care Nurse, Palliative Care Psychologist, and Palliative Care Physical therapist¹⁸.

In my view, this is the path forward: to secure, through this legislation, an Advanced Accreditation Diploma in nephrology nursing care. A key debate will be whether such a diploma should encompass all areas of nephrology nursing, focus solely on dialysis, or include advanced chronic kidney disease.

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The effectiveness of a blended-learning training methodology on the dialysis nurse's perception of competence. Quasi-experimental study

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RESUMO

Introdução: Os enfermeiros que prestam cuidados à pessoa com doença renal crónica em hemodiálise devem ter formação específica em técnicas dialíticas. Assim, os Enfermeiros de Diálise deverão desenvolver competências específicas e diferenciadas ao longo do seu percurso profissional. O b-learning desempenha um papel fundamental na modernização do ensino, tornando-o mais acessível, flexível e adaptado às necessidades dos enfermeiros. Oferece oportunidades para melhorar a qualidade da aprendizagem e promover a colaboração e a inovação no processo educativo.

Objetivos: Os objetivos do estudo foram: avaliar a influência das variáveis sociodemográficas (idade e habilitações literárias) e da formação adquirida (frequência e duração) no perfil de competências e avaliar a eficácia de um programa de formação em técnicas de HD, na perceção de competência do Enfermeiro de Diálise.

Material e Método: Estudo quase-experimental, pré e pós-teste, sem grupo controle.

Resultados: A idade, a frequência e a duração da formação influenciam a perceção de competência do enfermeiro de diálise. Os participantes apresentaram uma melhoria significativa em alguns domínios da perceção de competência do Enfermeiro de Diálise após a implementação de um programa de formação em técnicas de HD.

Conclusões: A existência de um programa de formação para Enfermeiros de Diálise, devidamente estruturado e padronizado, é uma mais-valia na aquisição, consolidação e atualização de conhecimentos.

Palavras-chave: blended-learning; formação; enfermeiro; diálise; competência.

ABSTRACT

The effectiveness of a blended-learning training methodology on the dialysis nurse's perception of competence. Quasi-experimental study

Introduction: Nurses providing care to individuals with chronic kidney disease undergoing hemodialysis must have specific training in dialysis techniques. Therefore, Dialysis Nurses should develop specific and differentiated competencies throughout their professional career. Blended learning plays a fundamental role in modernizing education, making it more accessible, flexible, and tailored to the needs of nurses. It offers opportunities to improve the quality of learning and promote collaboration and innovation in the educational process.

Objectives: The study's objectives were to assess the influence of sociodemographic variables (age and education) and acquired training (frequency and duration) on the

competence profile and to evaluate the effectiveness of a training program in HD techniques on the perception of competence of Dialysis Nurses.

Material and Method: Quasi-experimental, pre and post-test study without a control group.

Results: Age, frequency, and duration of training influence dialysis nurses' perceptions of competence. Participants showed a significant improvement in some domains of dialysis nurses' perceptions of competence after the implementation of a training program in HD techniques.

Conclusions: A properly structured and standardized training program for dialysis nurses is an asset in acquiring, consolidating, and updating knowledge.

Keywords: blended learning; training; nurse; dialysis; competence.

INTRODUCTION

Nurses who provide care to people with chronic kidney disease (CKD) undergoing hemodialysis (HD) must have specific training in dialysis techniques, and technical-scientific knowledge, associated with relational and affective skills that involve the person in treatment during the dialysis session¹. Continuous training in this area is extremely important due to the complexity of the treatment and must be supported by a properly structured training program, with periodic updates and subsequent assessment¹.

One of the factors that influence the survival and the decrease of morbidity of people with CKD on HD is the important role of professionals involved in dialysis treatment². Although there are not many studies that demonstrate that the quality of dialysis can be influenced by the dialysis nurses, Foley and Hakim, quoted by Pássaro and D'ávila² in a study in which they evaluated the mortality rate of people with CKD on HD in the USA, concluded that the higher the level of skills of the dialysis team, the higher the survival rate and consequently the decrease in comorbidity. Thus, it is expected that the professionals involved in the treatment are extremely well prepared for their tasks. Competence is described as a combination of skills, knowledge, attitudes and values that contribute to effective performance. The assessment of competency is crucial in identifying areas where professional development and education are needed. Nurses' perception of their competence is an integral component of their professional self-image, which can affect job performance and teamwork³.

Taking into account the specificity of the nurse's intervention context, in the specific area of nephrology nursing and particularly in the execution of dialysis techniques, as modalities of substitutive treatment of renal function, the Portuguese Order

of Nurses (POE) proposes the competencies adopted by the European Dialysis Nurses Association (EDTNA/ ERCA)⁴.

Thomas *et al.*⁵ refer that dialysis units are high-tech environments that perform HD. Nurses must have advanced skills to operate equipment safely and efficiently. However, the nephrology nurse is a fundamental element of the health team in this environment, ensuring that all care is focused on the person, and not just on the dialysis monitors.

Several published studies refer to the importance of having training programs. The same authors⁵, addressed the feasibility of using a safety checklist during each haemodialysis session. The conclusions of this study point to an improvement in practices, according to the feedback from Nurses and patients regarding the use of the checklist during HD treatment. More recently, Pássaro and D'ávila² developed a study whose objective was to build an educational program aimed at training nursing technicians. They verified that the methodology used proved to be a useful tool for their training, with results in the improvement of knowledge by the participants.

Information and Communication Technologies (ICT) and the blended-learning training methodology play a significant role in the area of nursing, offering several advantages and importance. Here are some of them: access to educational resources, learning flexibility, virtual clinical simulations, active learning, continuous update, remote access to supervisors and mentors, personalization of learning, cost reduction, improved communication, collaboration, and the quality of healthcare⁶.

In summary, ICT and blended-learning play a fundamental role in nursing education and professional development, providing flexibility, enriching resources and improving the competence of nursing students and professionals. This is crucial in an area where up-to-date knowledge and practical skills are essential for patient safety and well-being⁷.

The following objectives were defined: to evaluate the perception of competence of dialysis nurses; to assess the influence of sociodemographic variables (age and educational qualifications) and the training (frequency and duration) in the perception of competence of the dialysis nurses and to assess the effectiveness of the implementation of a blended-learning training program on HD techniques in the perception of competence of the dialysis nurse.

MATERIAL AND METHOD

The present study is a quantitative, quasi-experimental, pre and post-test study, in this case before and after the implementation of a training program, without a control group. The present study aligns with the TREND statement checklist. The sample consisted of a subgroup of 42 nurses, belonging to two dialysis sub-units of a Central Hospital in Portugal, in the period of time in which the data collection took place. In this case, an intentional non-probabilistic sample was chosen, selected by consulting the list of nurses in two HD units, respecting the

following inclusion criteria: Nurses with two or more years of working service. The data collection instrument used was a questionnaire consisting of three parts. The first one contained four items related to the sociodemographic characterization of the study population: age, gender (male/female), marital status (married, single, divorced, de facto union, widowed) and academic qualifications (bachelor's degree, graduation, specialization, post-graduation, master, PhD).

The second part consisted of items related to professional activity: professional experience in a hospital environment (years) and in HD units (years), frequency and duration of training actions in HD (in the hospital service where they work and in institutions private).

The third part refers to the assessment of the dialysis nurse's perception of competence. It consisted of forty items, which were divided into six groups, namely preparing the person for the HD session, connecting/establishing the extracorporeal circuit, the support provided to the person during the HD session, monitoring the person during the HD session, disconnection/complete HD session and assessment and adjustment of dialysis effectiveness.

Regarding each item of the 6 groups of the 3rd part of the questionnaire, the answer was given in terms of disagreement/agreement on a five-point Likert-type scale, with the value 1 corresponding to a position of total disagreement and 5 to a position of total agreement, so that the higher score would translate into a better perception of competence.

The application of the data collection instrument took place in two stages: pre and post-training. At first, the questionnaire was applied in its entirety, with sociodemographic and professional variables and the assessment of the perception of skills of the Dialysis Nurse. In the second moment, the questionnaire was applied only with the evaluation of the perception of competence of the Dialysis Nurse.

In the educational intervention, a blended-learning training methodology was used, associating online teaching components through the Moodle platform, with face-to-face teaching components. The training program was divided into six modules, totalling 7 hours of training: Module 1- HD principles and practices; Module 2- Pre-dialysis assessment; Module 3- Connection, monitoring and disconnection; Module 4- Monitoring during treatment; Module 5- Post-treatment assessment and finally Module 6- Professionalism in practice. The contents were prepared by the researchers based on the Orientation Guide for Good Practice - Care for Persons with Terminal CKD on HD by the POE¹ and the international guidelines issued by EDTNA⁴.

The methods used in the training included theoretical-practical presentation of content,

video analysis and discussion, allowing participants to consolidate some knowledge and encourage discussion. At the beginning of the process, an email was sent to participants, with the platform access link (<https://formdialise.ddns.net>), and access credentials. A first in-person session followed, hosted by the researcher. This session included an introduction to the Moodle platform, navigation through it, presentation of the training plan and Module 1, allowing participants to familiarize themselves with the methodology. To allow closer monitoring of them, in this first session they were divided into six groups. The remaining modules were carried out online, with their progress monitored and followed up whenever necessary. At the end, the training evaluation was carried out.

RESULTS

The sample consisted of 42 elements, who had an average age of 48.19 years (SD=8.72), with a range of variation between 26 and 64 years. The participants were mostly female (61.9%, n=26) and 38.1% versus male (n=16).

Regarding marital status, we acknowledged that 76.2% of the people surveyed were married (n=32), 14.3% were single (n=6), 4.8% were divorced and 4.8% (n=2) were widows.

Regarding academic qualifications, the majority of the sample had a bachelor's degree (71.4%, n=30), 21.4% (n=9) had a post-graduate/specialization degree and only 7.1% (n=3) had a master's degree.

Concerning professional activity, by analysing **table 1**, we discovered that the average number of years of profes-

Table 1. Sociodemographic and professional variables (n=42).

Variables		n	%	\bar{X} (SD/range)
Age				48,19 (8,72/26-64)
Gender	Male	16	38.10	
	female	26	61.90	
Marital Status	Married	32	76.20	
	Single	6	14.30	
	Divorced	2	4.80	
	Widower	2	4.80	
Qualifications	Graduation	30	71.40	
	Specialization	9	21.40	
	Master	3	7.10	
Professional Experience	Hospital Environment			25.26 (8.72/2-40)
	Haemodialysis Units			17.19 (8.24/4-40)
Place where training was performed	Hospital Environment	37	88.10	
	Private Institutions	34	81	
Last training	<1 day	24	57.10	
	1 day to 1 week	10	23.80	
	>1 week	8	19	

n: frequency; %: percentage; \bar{X} : average; SD: standard deviation.

nal experience in a hospital environment was 25.26 years (SD=8.72). Regarding the number of years of professional experience in HD units, the average was 17.19 years (SD=8.24).

The dimensions of the perception of competence in which the participants of our study presented lower average scores in the pre-training moment were: "preparation for the HD session", "connecting/establishing the extracorporeal circuit" and "evaluating and adjusting the effectiveness of the dialysis". At the post-training moment, the dimensions that continue to present lower average scores are "monitoring during the HD session" and "evaluating and adjusting the effectiveness of dialysis" (table 2).

Table 2. Sample distribution concerning the average scores obtained in each pre- and post-training dimension (n=42).

Dimensions	Pre-training \bar{X} (SD/range)	Post-training \bar{X} (SD/range)
Preparation for the HD session	3.71 (0.94/2-5)	4.48 (0.32/4-5)
Connecting/Establishing the Extracorporeal Circuit	3.96 (0.72/3-5)	4.73 (0.37/4-5)
Support provided during the HD session	4.11 (0.55/4-5)	4.11 (0.55/4-5)
Monitoring during the HD session	3.87 (0.90/3-5)	3.87 (0.90/3-5)
Turn off /conclude HD session	4.50 (0.35/4-5)	4.93 (0.35/4-5)
Assess and adjust the effectiveness of dialysis	3.73 (0.80/3-5)	3.89 (0.39/3-5)

n: frequency; \bar{X} : average; SD: standard deviation.

We proceeded to study the correlation between age and the various dimensions of the perception of competence (pre-training moment), calculating the Spearman Coefficient and the respective significance test. From the results obtained, we verified that there was a statistically significant correlation ($p < 0.05$) between age and the dimensions "preparation of the person for the HD session" ($r_s = -0.16$, $p = 0.04$) and "turn on/establish the extracorporeal circuit" ($r_s = -0.06$, $p = 0.05$), with a negative correlation coefficient for both.

Table 3. Results of the Mann-Whitney U test referring to the dimensions of the perception of competence according to the recoded educational qualifications (n=42).

	Educational Qualifications							
	Basic Education			Advanced Education				
	n	\bar{X}	SD	n	\bar{X}	SD	U	p
Preparation for the HD session	30	3.75	0.90	12	3.61	1.07	163.50	0.64
Connecting/Establishing the Extracorporeal Circuit	30	4.01	0.70	12	3.83	0.77	158.50	0.54
Support provided during the HD session	30	4.08	0.57	12	4.19	0.51	149.00	0.37
Monitoring during the HD session	30	3.97	0.88	12	3.62	0.92	139.00	0.24
Turn off /conclude HD session	30	4.49	0.38	12	4.52	0.25	171.50	0.81
Assess and adjust the effectiveness of dialysis	30	3.86	0.80	12	3.40	0.74	121.50	0.10

n: frequency; \bar{X} : average; SD: standard deviation; U: Mann-Whitney; p: statistically significant.

We recoded the variable qualifications into two categories: basic education (includes bachelor's and teaching) and advanced education (includes specialization, post-graduation, master and PhD). Thus, we crossed these two new categories with the competence of the Dialysis Nurse, through the Man-Whitney U test. The data in table 3 reveal that there are no statistically significant differences ($p > 0.05$). Thus, there is no evidence to affirm that educational qualifications influence the perception of competence of Dialysis Nurses.

We proceeded to study the relation between the frequency of training actions, and the dimensions of the perception of competence. Through the results of the Man-Whitney U test, presented in table 4 we verified that there are statistically significant differences ($p < 0.05$) between the frequency of training actions in the area of HD in the hospital service where nurses work and the competencies "connecting/establishing the extracorporeal circuit", "support provided to the person during the HD session" and "evaluating and adjusting the dialysis efficiency". This difference is more evident in the group of participants who report not having participated in training actions, namely in "connecting/establishing the extracorporeal circuit" ($\bar{x} = 4.68$; $SD = 0.39$), the support provided to the person during the session of HD" ($\bar{x} = 4.60$; $SD = 0.52$) and "evaluate and adjust the effectiveness of dialysis" ($\bar{x} = 4.50$; $SD = 0.18$). Thus, there is statistical evidence to affirm that attending training activities in a hospital environment influences the perception of competence.

There is a significant influence of the duration of training actions on the perception of competence of the Dialysis Nurse. Therefore, we verified that there are statistically significant differences between groups (table 5), in the dimensions "support provided during the HD session" ($H = 1.05$;

Table 4. Results of the Man-Whitney U test regarding the dimensions of the perception of competence according to the frequency of training actions in hospitals (n=42).

	Frequency of hospital training attendance							
	Attended			Did not attend			U	p
	n	\bar{X}	SD	n	\bar{X}	SD		
Preparation for the HD session	37	3.59	0.94	5	4.55	0.34	45.00	0.06
Connecting/Establishing the Extracorporeal Circuit	37	3.86	0.70	5	4.68	0.39	31.50	0.01
Support provided during the HD session	37	4.05	0.52	5	4.60	0.52	42.50	0.04
Monitoring during the HD session	37	3.79	0.88	5	4.40	0.92	51.50	0.10
Turn off /conclude HD session	37	4.48	0.33	5	4.62	0.46	73.50	0.45
Assess and adjust the effectiveness of dialysis	37	3.62	0.80	5	4.50	0.18	31.00	0.01

n: frequency; \bar{X} : average; SD: standard deviation; U: Mann-Whitney; p: statistically significant.

p=0.02) and “turning off/completing the HD session” (H=1.15; p=0.01). Participants who performed training sessions lasting more than a week showed a greater perception of competence in the aforementioned dimensions. In the remaining dimensions, there were no statistically significant differences (p>0.05) between the groups.

After the implementation of the training program (table 6), we found out that Nurses showed an improvement in the perception of competence in terms of the dimensions “preparation for the HD session”, “connecting/establishing the extracorporeal circuit” and “evaluate and adjust the effectiveness of dialysis” (p<0.05).

Regarding the remaining dimensions, the average values remained unchanged. The Wilcoxon test indicates that the differences found are statistically significant, in the referred dimensions, which allows us to partially accept the formulated hypothesis.

DISCUSSION

Regarding Dialysis Nurse’s Perception of Competence, we can observe the dimensions of the perception of competence in which the participants of our study presented higher scores in the post-training moment, corroborate with the

Table 5. Results of the Man-Whitney U test regarding the dimensions of the perception of competence according to the frequency of training actions in hospitals (n=42).

	Duration of training	n	\bar{X}	SD	H	p
Preparation for the HD session	<1 day	24	3.64	0.89	0.20	0.91
	1 day to 1 week	10	3.78	1.03		
	>1 week	8	3.84	1.07		
Connecting/Establishing the Extracorporeal Circuit	<1 day	24	4.01	0.73	0.21	0.90
	1 day to 1 week	10	3.94	0.76		
	>1 week	8	3.84	0.71		
Support provided during the HD session	<1 day	24	4.08	0.62	1.05	0.02
	1 day to 1 week	10	4.15	0.50		
	>1 week	8	4.16	0.40		
Monitoring during the HD session	<1 day	24	3.97	0.89	0.86	0.65
	1 day to 1 week	10	3.66	0.95		
	>1 week	8	3.83	0.92		
Turn off /conclude HD session	<1 day	24	4.50	0.37	1.15	0.01
	1 day to 1 week	10	4.42	0.37		
	>1 week	8	4.58	0.25		
Assess and adjust the effectiveness of dialysis	<1 day	24	3.75	0.77	0.09	0.95
	1 day to 1 week	10	3.65	0.86		
	>1 week	8	3.75	0.93		

n: frequency; \bar{X} : average; SD: standard deviation; U: Mann-Whitney; p: statistically significant.

Table 6. Results of the Wilcoxon test regarding the effect of implementing a training program.

	Pre-training				Post-training				Z	p
	\bar{x}	SD	min	max	\bar{x}	SD	min	max		
Preparation for the HD session	3.71	0.94	3	5	4.48	0.32	4	5	-3.77	0.00
Connecting/Establishing the Extracorporeal Circuit	3.96	0.72	3	5	4.73	0.37	4	5	-4.10	0.00
Support provided during the HD session	4.11	0.55	4	5	4.11	0.55	4	5	0.00	1.00
Monitoring during the HD session	3.87	0.90	3	5	3.87	0.90	3	5	0.00	1.00
Turn off /conclude HD session	4.50	0.35	4	5	4.50	0.35	4	5	0.00	1.00
Assess and adjust the effectiveness of dialysis	3.73	0.80	3	5	3.89	0.39	4	5	-1.23	0.02

\bar{X} : average; SD: standard deviation; min: minimum; max: maximum; Z: Wilcoxon test; p: statistically significant.

Agencia de Calidad Sanitaria de Andalucía (ACSA)⁸ through which the two dialysis units of our research are certified. In our view, it is, therefore, the duty of Nurses to keep this standard up to date, using best practices, such as the use of identifiers, verbal confirmation of the person to be cared for and the use of an identification wristband.

The researcher Bakey⁹ mentioned that Nurses had a deficit in the practices that should be applied throughout the HD treatment, as they had a moderate level of practice in all interventions. Corroborating our study, the item "assessing weight and vital signs before starting treatment" also had a score above the average value.

Our participants had scores lower than the average values in the items "recognize signs and symptoms of infection by taking appropriate measures", "connect CVC according to established standards" and "maintain asepsis when disconnecting the CVC". The items may be subject to a more specific intervention in the online training program, following international guidelines on infection control policies.

A result similar to our study was found by Manandhar *et al.*¹⁰, who reported that Dialysis Nurses had a reasonable level of knowledge about aseptic technique, demonstrated knowledge to manage changes in blood pressure and cramps, but needed to improve the ability to deal with other complications.

Regarding Influence of age on the dialysis nurse's perception of skills, most of the studies consulted regarding the competence of the HD Nurse do not address the relationship between age and the influence on competencies but highlight the importance of how many years of service they had, which also presupposes a more advanced age.

Our results point out that with increasing age, a lower perception of competence appears, which seems to corroborate the conclusions of previous studies, as mentioned by Lamb and Norton¹¹ who refer to a lower competence in caring for the CKD person in HD in the group of older nurses.

Other researchers, such as Saleh *et al.*¹², have shown that educational interventions and the training of Nurses have

become effective in achieving a progressive improvement in knowledge and skills, especially in the age group between 30 and 40 years old.

Regarding influence of educational qualifications on the perception of Competencies of the Dialysis Nurse, the results obtained reveal that there is no evidence to affirm that academic qualifications influence the perception of competence of Dialysis Nurses.

Contrary to the literature, the results obtained by Manandhar *et al.*¹⁰, showed that bachelors and graduates were the ones who had the most knowledge about basic HD procedures, providing more frequent advice on them.

In the study by Saleh *et al.*¹², statistically significant differences were found concerning the knowledge of Nurses, pre- and post-training and the Nurse's degree of training.

Regarding influence of the frequency of training actions on the perception of dialysis nurses' skills, we discovered that there are statistically significant differences between the frequency of training activities in the area of HD in the hospital service where nurses work and the skills "connect/establish the extracorporeal circuit", "support provided to the person during the HD session" and "evaluate and adjust the effectiveness of dialysis".

The results of our study were in line with the investigation by Lamb and Norton¹¹. Regardless of previous experience in HD, Nurses from the HD unit attended a dialysis course at the hospital unit where they worked. A tutor was assigned to complete clinical HD skills. All participants reported improvements in their performance of their skills.

For the investigation by Kersten *et al.*¹³, the training program lasted four months. The training of a supervisor preceded the training program for Dialysis Nurses. The supervisors had a session with four hours of direct contact with the trainer. The supervisor's training allowed to support the implementation of the intervention for the Dialysis Nurses.

Regarding effectiveness of the training program on hemodialysis techniques, we found out that the Nurses showed

an improvement in the perception of competence in terms of the dimensions of “preparation for the HD session”, “connecting/establishing the extracorporeal circuit” and “evaluating and adjusting the effectiveness of dialysis”.

Our results seem to corroborate Saleh *et al.*¹², who obtained an improvement in the post-training moment. Total knowledge was classified as very good and excellent in the same period and all Nurses continued to obtain the classification of very good and excellent in total knowledge in the follow-up period.

Kersten¹³, concluded that the systematically developed intervention for Dialysis Nurses offers a promising approach to health promotion in the dialysis setting.

On the other hand, Novita and Prasetyo¹⁴ in a recent study in which they assessed the relation between competence and person satisfaction, concluded that competence does not affect patient satisfaction. On the other hand, the Nurse's competence contributed significantly to the quality of the service. They thus concluded that there is a significant influence between the competence of nurses and the quality of service.

Study limitations

We can consider the reduced sample size and the use of a non-probabilistic sampling technique, which creates the potential for selection bias, limiting the generalization of the study results. The sample being made up of Nurses from two different HD units, their proximity in terms of size and other characteristics of the participants, may constitute a limitation for the study.

The data collection instrument was built by the researchers, based on the skills of the Dialysis Nurse, and a pre-test was not carried out, nor its internal consistency was validated.

Despite the blended-learning training program being available, with access by the participants, the time elapsed between the beginning of the training and the collection of post-training data may have been insufficient for the consolidation of some contents.

The assessment of self-perception of competence, as there is no time to assess the competence of the Dialysis Nurse in practice, could also be considered a limitation.

The importance of the existence of properly structured and standardized training programs for Dialysis Nurses is an added value in the acquisition, consolidation and updating of knowledge.

In the “preparation for the HD session”, “connecting/establishing the extracorporeal circuit” and “evaluate and adjust the effectiveness of dialysis” dimensions, there was an increase in average values in the pre-training to post-training. Regarding the remaining dimensions, the average values remained unchanged. There was no decrease in any dimension.

It was defined as main goals: to characterize the competence profile of the Dialysis Nurse; to assess the influence of sociodemographic variables (age and educational qualifications) and the training (frequency and duration) on the competence profile of the Dialysis Nurse and to evaluate the effectiveness of a training program on HD techniques, in the perception of competence of the Dialysis Nurse.

We conclude that as age increases, the perception of competence decreases regarding the dimensions of “preparing the person for the HD session” and “turning on to establish the extracorporeal circuit”; we did not find statistically significant differences between educational qualifications and the perception of competence; the fact of attending training sessions in a hospital environment seems to positively influence the perception of competences in some dimensions; the frequency of training actions lasting more than a week seems to influence the perception of dialysis nurses skills; the effectiveness of the implementation of a training program on HD techniques was confirmed, in the perception of competence of the Dialysis Nurse.

Informed Consent Statement

Formal authorization was requested from the Board of Directors of the institution and a favourable opinion from the Ethics Committee for carrying out the study. All study participants received and signed informed consent.

Conflict of interest

The authors reported no declaration of interest.

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Health-related quality of life and its association with financial toxicity in haemodialysis treatment

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ABSTRACT

Introduction: Individuals with chronic kidney disease may experience reduced quality of life associated with treatment costs.

Objective: To evaluate health-related quality of life and its relationship with financial toxicity in individuals with chronic kidney disease undergoing hemodialysis treatment.

Material and Method: An observational, cross-sectional study involving 214 individuals was carried out, with data collected from February to May 2022 at four specialized dialysis clinics in the southern region of Brazil. Sociodemographic and clinical questionnaires, the Comprehensive Score for Financial Toxicity, and the Kidney Disease Quality of Life - Short Form were utilized. Descriptive analysis with absolute and relative frequencies was conducted for sociodemographic and clinical variables, and Pearson correlation was used for financial toxicity and health-related quality of life scores.

Results: Four items of the Kidney Disease Quality of Life-Short Form questionnaire had an average score below 50, indicating poor quality of life: "General health" (10.75), "Limitations in physical functioning" (29.93), "Burden of kidney disease" (37.76), and "Work status" (39.49), with physical (34.49) and mental (49.19) composite scores. The relationship between financial toxicity and health-related quality of life

revealed that a worse financial toxicity score was associated with a greater number of impaired dimensions. There was a significant correlation between financial toxicity, the mental health dimension, and the effects of kidney disease.

Conclusion: Participants experienced compromised health-related quality of life, with a positive correlation with financial toxicity.

Keywords: quality of life; chronic kidney disease; financial stress.

RESUMO

A qualidade de vida e a relação com a toxicidade financeira no tratamento hemodialítico

Introdução: Pessoas com doença renal crônica podem ter redução da qualidade de vida associada aos custos do tratamento.

Objetivo: Avaliar a qualidade de vida relacionada a saúde e a relação com a toxicidade financeira de pessoas com doença renal crônica em tratamento hemodialítico.

Material e Método: Estudo observacional, descritivo e transversal realizado com 214 pessoas, cuja coleta de dados ocorreu de fevereiro a maio de 2022, em quatro clínicas especializadas em diálise na região sul do Brasil. Utilizou-se

os questionários sociodemográfico e clínico, Comprehensive Score for Financial Toxicity e o Kidney Disease Quality Of Life–Short Form. Os dados das variáveis da caracterização sociodemográfica e clínica, foram analisados descritivamente com frequências absolutas e relativas; para os escores da toxicidade financeira e qualidade de vida relacionada à saúde foi usado a correlação de Pearson.

Resultados: Quatro itens do questionário Kidney Disease Quality Of Life–Short Form tiveram média abaixo de 50, sendo consideradas com escore ruim de qualidade de vida, são eles: “Saúde geral” (10,75), “Limitações das funções físicas” (29,93), “Sobrecarga da doença renal” (37,76) e “Situação de trabalho” (39,49), e compostos físico (34,49) e mental (49,19). A relação da toxicidade financeira e a qualidade de vida relacionada à saúde, evidenciou que um pior escore de toxicidade financeira foi associado à maior número de dimensões prejudicadas. Houve correlação significativa entre a toxicidade financeira e a dimensão saúde mental e a efeitos da doença renal.

Conclusão: Os participantes tiveram comprometimento da qualidade de vida relacionada à saúde, havendo correlação positiva com a toxicidade financeira.

Palavras-chave: Qualidade de vida; insuficiência renal crônica; estresse financeiro.

RESUMEN

Calidad de vida y relación con la toxicidad financiera en el tratamiento en hemodiálisis

Introducción: Las personas con enfermedad renal crónica pueden tener una calidad de vida reducida asociada a los costes del tratamiento.

Objetivo: Evaluar la calidad de vida relacionada con la salud y la relación con la toxicidad financiera en personas con enfermedad renal crónica sometidas a tratamiento de hemodiálisis.

Material y Método: Estudio observacional, descriptivo y transversal de 214 personas, con datos recogidos entre febrero y mayo de 2022 en cuatro clínicas especializadas en diálisis del sur de Brasil. Fueron utilizados los cuestionarios sociodemográfico y clínico, el COMprehensive Score for Financial Toxicity y el Kidney Disease Quality Of Life - Short Form. Los datos de las variables sociodemográficas y clínicas se analizaron descriptivamente con frecuencias absolutas y relativas; se utilizó la correlación de Pearson para las puntuaciones de toxicidad financiera y calidad de vida relacionada con la salud.

Resultados: Cuatro ítems del cuestionario Kidney Disease Quality Of Life - Short Form obtuvieron una puntuación media inferior a 50, y se consideró que tenían una mala calidad de vida, a saber: “Salud general” (10,75), “Limitaciones de las funciones físicas” (29,93), “Carga de la enfermedad renal” (37,76) y “Situción laboral” (39,49), y compuestos: físico (34,49) y

mental (49,19). La relación entre la toxicidad financiera y la calidad de vida relacionada con la salud mostró que una peor puntuación de toxicidad financiera se asociaba con un mayor número de dimensiones deterioradas. Existía una correlación significativa entre la toxicidad financiera y la dimensión de salud mental y los efectos de la enfermedad renal.

Conclusión: La calidad de vida relacionada con la salud de los participantes se vio comprometida y hubo una correlación positiva con la toxicidad financiera.

Keywords: calidad de vida; insuficiencia renal crónica; estrés financiero.

INTRODUCTION

Health-related quality of life (HRQoL) reflects the impact of disease or its treatment on patients' subjective perceptions of their physical, mental, spiritual, emotional, social, and functional well-being. HRQoL assessment has been increasingly used and is regarded as an important measure in individuals receiving renal replacement therapy (RRT), since the aim of treatment—beyond improving survival—is to achieve a better quality of life^{1,2}.

A study conducted in India³ among patients on haemodialysis showed that participants and their carers valued leisure moments—such as the possibility of travelling and time free from dialysis—demonstrating the relevance of good quality of life. That study also highlighted the importance of financial resources to support such periods, as participants with lower income showed worse scores in the mental health, burden, and effects of disease subscales of quality-of-life assessment³.

Low income as a detrimental factor for HRQoL was also identified in a Brazilian study⁴ that evaluated HRQoL in patients with chronic kidney disease (CKD) undergoing haemodialysis. Two-thirds of participants reported an income equal to or less than one minimum wage, and this factor was associated with poorer HRQoL. Results further indicated that one of the main drivers of income reduction after diagnosis is withdrawal from paid employment imposed by CKD and haemodialysis treatment.

In Australia⁵, a study quantifying the financial impact and expenses of rural adults with CKD showed that 78% of families struggled to afford treatment, with 54% reporting financial catastrophe—emphasising finance as an additional source of concern.

Although in Brazil patients with CKD on haemodialysis are treated in specialised, free, public services, there are still costs associated with self-care, such as maintaining a restricted diet and travelling to the dialysis unit. These expenses, coupled with potential job loss and decreased household income, may negatively influence HRQoL⁶ and reflect an adverse event of costly disease known as financial toxicity.

Financial toxicity is a harmful impact experienced by patients unable to meet treatment costs or bear extra expenses inherent to their condition. The term encompasses both direct health-related costs and other financial issues that may affect treatment, creating barriers to necessary medical care⁷. Research on financial toxicity in CKD remains incipient.

Several studies have linked financial toxicity to worse HRQoL⁸⁻¹⁰, as patients, in an effort to save money, may not adhere to prescribed treatments, forego important procedures, and consequently experience clinical deterioration^{11,12}. Thus, the objective of this study was to assess health-related quality of life and its relationship with financial toxicity in individuals with chronic kidney disease undergoing haemodialysis.

MATERIAL AND METHOD

We conducted a quantitative, observational, descriptive, cross-sectional study derived from a Master's dissertation at the Federal University of Paraná. Data were collected between February and May 2022 in four dialysis clinics accredited to the Unified Health System (SUS) in Curitiba, Paraná, and its metropolitan region. These clinics are regional referral centres for RRT, operating since the early 1980s, and provide services in nephrology, haemodialysis, peritoneal dialysis, kidney transplantation, nutrition, and hypertension.

Sample size was calculated by a statistician using Epi Info 7 software, based on the total number of patients treated in the units (Instituto do Rim do Paraná, n=156; Clínica de Doenças Renais São José dos Pinhais, n=173; Unidade Renal do Portão, n=151; Clínica de Doenças Renais Colombo, n=117; total=597). Assuming an expected frequency of 50% for the outcome of interest (the most conservative scenario), a 5% margin of error, and a 95% confidence level, the sample was stratified, with voluntary participation.

Recruitment was by convenience sampling; all eligible patients present at the time of data collection were invited. Inclusion criteria were diagnosis of CKD and haemodialysis treatment, age ≥ 18 years. Patients with communication disorders and/or documented mental illness were excluded.

Data collection instruments included a sociodemographic and clinical form, the Comprehensive Score for Financial Toxicity (COST) questionnaire, and the Kidney Disease Quality of Life Short Form (KDQOL-SF™ 1.6).

The COST questionnaire, developed by the US Functional Assessment of Chronic Illness Therapy (FACIT) group, assesses financial toxicity through 12 items. Responses use a 5-point Likert scale (0=not at all to 4=very much), yielding a total score of 0–44, where higher scores indicate better financial well-being and lower toxicity.

The KDQOL-SF™ 1.6 evaluates HRQoL in CKD patients on dialysis. It includes eight SF-36 dimensions—physical func-

tioning (10 items), role-physical (four), role-emotional (three), social functioning (two), mental health (five), pain (two), vitality (four), general health perceptions (five), and health transition (one). These SF-36 items can be summarised into physical and mental composite scores¹³⁻¹⁴.

In addition, KDQOL-SF™ 1.6 has 11 kidney-specific dimensions (eg, symptoms, effects of kidney disease, burden of kidney disease, work status, cognitive function, social interaction, sexual function, and sleep) and three additional scales (social support, dialysis staff encouragement, patient satisfaction)¹³⁻¹⁴. Scores range from 0 (worst HRQoL) to 100 (best). Dimensions are analysed separately, providing domain-specific insights rather than a single global score. Poor HRQoL was defined as scores < 50 ¹⁵.

Clinical data were analysed using descriptive statistics, with the number of individuals per characteristic and their respective proportions recorded. For calculation of scores from the KDQOL-SF™ 1.3 instrument, the analysis spreadsheet provided by the KDQOL-SF Working Group on the RAND Corporation research website was used.

To assess the correlation between financial toxicity scores obtained from the COST instrument and HRQoL scores from the KDQOL-SF™ 1.3, Pearson's correlation was applied. A statistically significant positive correlation was considered when $p < 0.0001$.

The study was approved by the Human Research Ethics Committee of the Health Sciences Sector, Federal University of Paraná (approval no. 5.210.448).

RESULTS

The sample included 214 individuals with CKD undergoing haemodialysis. Of these, 117 were men, most had < 9 years of schooling, and 122 were retired or pensioners. A total of 128 reported receiving haemodialysis for 1–5 years, and 203 underwent treatment three times per week. Regarding education, 166 participants had < 12 years of formal schooling.

Concerning lifestyle habits, 9 participants reported current smoking, 58 were former smokers, and 127 were non-smokers. Only 9 reported moderate or higher alcohol consumption.

With regard to participants' HRQoL, according to the results presented in **table 2**, analysis of the mean scores of the KDQOL-SF™ 1.3 questionnaire dimensions showed that the lowest means, in ascending order, were: "General health" (10.75), "Physical role limitations" (29.93), "Burden of kidney disease" (37.76), and "Work status" (39.49).

Conversely, the highest scores were seen for cognitive function (87.89), sexual function (87.14), social support (84.19), and dialysis staff encouragement (83.35). Notably, the sexual function domain was completed by only 35 participants. Six

Table 1. Characterisation of the sample according to clinical variables. Curitiba, PR, Brazil, 2022.

Variables	n=214	%
Family history of CKD		
No	186	86.92
Yes	26	12.26
Not reported	2	0.93
Time since CKD diagnosis (years)		
< 1	23	10.75
1-5	102	47.66
6-10	45	21.03
> 10	44	20.56
Time on haemodialysis (years)		
< 1	37	17.29
1-5	127	59.35
6-10	22	10.28
> 10	26	12.15
Not reported	2	3.45
Number of haemodialysis sessions per week		
Twice	3	1.40
Three times	203	94.86
More than three times	8	11.11
Use of continuous medication		
Yes	188	88.26
No	25	11.68
Not reported	1	0.47

Source: The author (2022).

Legend: (n): absolute number; (%): percentage; (<): less than; (>): greater than.

domains had mean scores <50, consistent with poor HRQoL. Both the physical composite (34.49) and the mental composite (49.19) scores were also <50, indicating impaired HRQoL.

In correlation analysis, the mental health composite strongly correlated with emotional well-being ($R=0.82$, $p<0.0001$) and emotional role limitations ($R=0.83$, $p<0.0001$). Similarly, the physical composite strongly correlated with physical well-being ($R=0.78$, $p<0.0001$) and physical role limitations ($R=0.74$, $p<0.0001$) (figure 1).

Work status strongly correlated with satisfaction ($R=0.82$, $p<0.0001$). Social support and sexual function showed a moderate positive correlation ($R=0.62$, $p<0.0001$). Sexual function also positively correlated with sleep ($R=0.79$, $p<0.0001$) and symptoms/problems ($R=0.79$, $p<0.0001$).

DISCUSSION

This study evaluated HRQoL and its relationship with financial toxicity in individuals with chronic kidney disease (CKD) undergoing haemodialysis in four renal care units in Curitiba and the surrounding metropolitan region.

Regarding sociodemographic data, the results were similar to those of another Brazilian study¹⁶ conducted in Santa Cata-

Table 2. Distribution of means and standard deviations of the dimensions of the Health-Related Quality of Life questionnaire. Curitiba, PR, Brazil, 2022.

Scale	n	Mean	SD
Burden of kidney disease	214	37.76	29.24
Quality of social interaction	213	80.03	18.58
Cognitive function	213	87.89	15.58
Symptoms/problems list	205	81.74	14.77
Effects of kidney disease	180	64.22	20.26
Sexual function	35	87.14	17.80
Sleep	210	68.92	20.40
Social support	214	84.19	24.40
Work status	214	39.49	26.88
Encouragement from dialysis staff	214	83.35	25.89
General health	214	10.75	31.04
Patient satisfaction	214	68.22	46.67
Physical functioning	210	42.50	30.84
Physical role limitations	213	29.93	41.34
Pain	212	69.99	27.90
Emotional well-being	211	72.32	20.28
Emotional role limitations	211	53.87	45.07
Social functioning	210	69.52	27.23
Energy/fatigue	210	41.73	17.32
SF-12 Physical Component Summary	208	34.49	10.46
SF-12 Mental Component Summary	208	49.19	11.14

Source: The author (2022).

Legend: (n): absolute number; (SD): standard deviation.

rina with patients on haemodialysis, which found a predominance of men (52.8%), age range 20–86 years (41.42% aged 40–59 years and 39.99% aged ≥60 years), 52.85% married, with most participants having low educational attainment and being retired.

A similar profile was also found in a study carried out in Paraná, in which most individuals analysed were male (54.87%), 26.15% were aged 61–70 years, 63.10% were married, and 63.58% had not completed primary education¹⁷.

The most recent Brazilian dialysis centre censuses confirm the male predominance among patients, which may reflect unhealthy lifestyle habits, lower adherence to preventive health care, and reduced use of health services until morbidities are already advanced¹⁸⁻¹⁹.

Evaluation of HRQoL in the present study revealed that many mean dimension scores were <50, classified as poor HRQoL. The most affected domains were General Health and Physical Functioning. Similar findings were reported in a study²⁰ from Mato Grosso, Brazil, which found the lowest mean score in

the physical aspects domain (44.16). Similarly, a study in Ponta Grossa, Paraná,²¹ found that Cognitive Function (6.2) and Physical Role Limitations (49.5) were the lowest-scoring domains.

Another study in northwest Paraná²² with patients with CKD aged ≥ 18 years reported the lowest mean score in the Physical Performance domain (33.67), with a median score of 0.

Collectively, these studies demonstrate that the physical dimension is one of the most impaired in this population. Low scores in physical performance reflect limitations that hinder daily activities, affect the ability to perform previous tasks, and reduce the likelihood of maintaining active employment²².

Supporting this, an Indian study³ investigating the correlation between HRQoL and socioeconomic and clinical variables in CKD found that poorer HRQoL was associated with adverse outcomes such as increased cardiovascular risk and mortality. The study also emphasised the need for a more inclusive approach to CKD management, incorporating social determinants to strengthen patient care.

In the present study, Work Status also scored poorly. This may reflect the difficulty of maintaining employment after CKD diagnosis and initiation of haemodialysis due to the time required for treatment and its impact on work activities. Similar findings were reported in Uberaba, Brazil, where Work Status (8.82%) and Physical Limitations (26.47%) were the most affected domains²³.

When the relationship between COST and HRQoL was examined, greater financial toxicity was associated with poorer HRQoL. Comparable findings were reported in a US study²⁴ in patients with cancer, where less financial toxicity was associated with better HRQoL.

In this study, a significant correlation was observed between financial toxicity and mental health: higher COST scores (indicating less toxicity) correlated with higher mental health composite scores. A US study²⁴ likewise found a significant Pearson correlation between COST and mental well-being ($r=0.45$; $p<0.0001$). This highlights the need for nursing care to extend beyond physical aspects and address socioeconomic issues.

According to these data, financial toxicity may be correlated with worsening mental health, as evidenced by one study²⁵

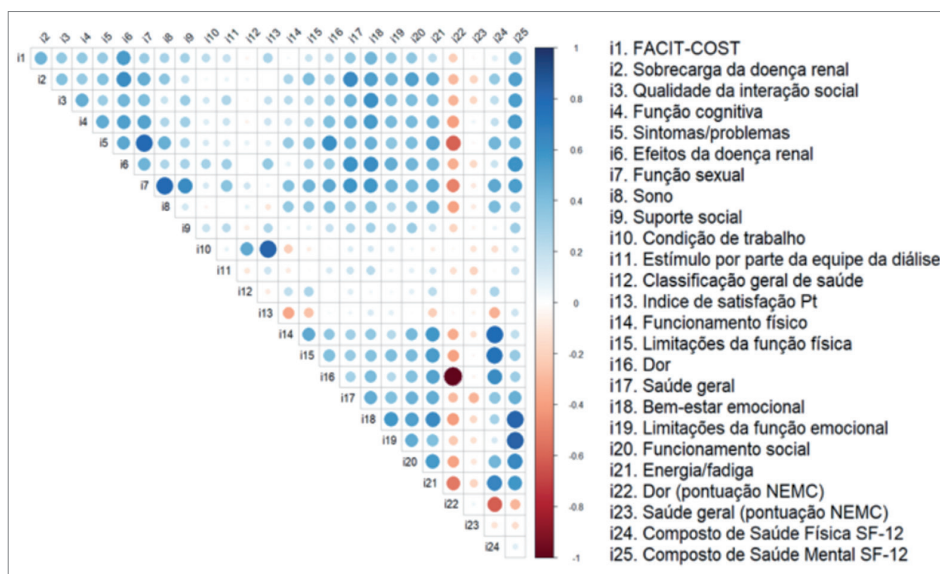


Figure 1. Correlation matrix between the COST instrument and the KDQOL-SFTM 1.3 Curitiba, PR, Brazil, 2022.

which showed that any degree of financial toxicity was associated with poorer outcomes in both the mental and physical dimensions. Furthermore, compared with individuals without financial toxicity, those with some level of toxicity had lower scores in both the physical and mental components.

In this study, an association was observed between financial toxicity and the impacts of kidney disease. This relationship was demonstrated through the strength of associations between financial toxicity and pain interference ($r=-0.27$), financial toxicity and physical functioning ($r=-0.32$), and financial toxicity and social functioning ($r=-0.31$), all of which were considered moderately strong and statistically significant. Therefore, although financial toxicity is a relatively new concept, studies already highlight the importance of nurses assessing it due to the impact it has on HRQoL.

Beyond drawing attention to the impact of CKD and haemodialysis on HRQoL in this population, it is also crucial to recognise the presence of financial toxicity, which, when combined with the disease and its treatment, can further worsen HRQoL. Thus, the results of this study point to the need for health professionals to understand the impact of financial toxicity on both HRQoL and the financial well-being of individuals with CKD, with the aim of promoting and encouraging interventions to mitigate this effect and thereby improve HRQoL.

The limitations of this study were related to the scarcity of published studies using the COST tool and HRQoL instruments in kidney disease, participants' discomfort in answering the sexuality-related question, and the use of Pearson's correlation coefficient, which assumes normality of data.

Based on the results obtained, it can be affirmed that participants experienced impaired HRQoL, with a positive corre-

lation observed with financial toxicity. Specifically, poorer COST scores were associated with a greater number of impaired HRQoL dimensions. Significant correlations were found between financial toxicity and both the Mental Health domain and the Effects of Kidney Disease domain.

To our knowledge, this is one of the first studies to apply the COST instrument, recently translated into Brazilian Portuguese, in a population with CKD undergoing haemodialysis. The findings suggest that this population experiences levels of financial toxicity that are negatively associated with HRQoL, a relationship that warrants further exploration in studies comparing the impact of CKD across different services and population groups.

The contributions to nursing practice include the need to encourage professionals to measure quality of life and financial toxicity, to incorporate these topics into nursing education, and to provide tools that support interventions aimed at minimising the harm caused by these variables in patients with CKD and other chronic conditions. In addition, establishing support networks for these patients from the point of diagnosis is essential.

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Conflicts of interest

None declared.

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AWARD FOR THE BEST RESEARCH PROJECT on Innovation in Dialysis Techniques and Outcomes

RULES

1. A total prize of €1,800 is established, divided as follows: €1,200 for the best oral communication and €600 for the best poster presentation. The award is intended for the best research project related to: **Home dialysis therapies (HDD), innovation in dialysis techniques (online HDF, pre-, post-, pre + post-, mid-dilution, adsorptive therapies – HFR and SUPRA), monitoring and biofeedback (Soglia, Aequilibrium), and innovation in vascular access.**
2. This prize may be awarded to an individual or group, provided that the corresponding author holds a Nursing Degree or equivalent qualification, and that the project focuses on the topics listed above.
3. Manuscripts must be original and unpublished and written in Spanish.
4. The format, length (number of pages), and submission deadline must comply with the official SEDEN abstract submission guidelines.
5. Submissions must be sent exclusively through the SEDEN website: www.seden.org, under the “Congress” section.
6. The selection of submissions and award decision will be made by a jury appointed from the SEDEN Selection Committee.
7. The award will be presented at the Opening Ceremony of the next SEDEN National Congress.
8. The rights for the publication of all submitted works will belong to the Spanish Society of Nephrology Nursing (SEDEN) and Mozarc Medical, who may use them in any medium.
9. Submission of a manuscript implies full acceptance of these rules.

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Impact of measurement timing and intradialytic symptoms on patient-perceived quality of life

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ABSTRACT

Objective: To determine the relationship between patients' perceived quality of life on hemodialysis, the timing of its measurement, and the number of symptoms/complications occurring during the session.

Material and Method: Longitudinal observational study in hemodialysis patients with preserved cognitive capacity. Sociodemographic and clinical variables and quality of life were collected using the Coop-Wonka instrument. The study was conducted in 2 phases:

First phase: pre-HD quality of life evaluation, self-administered questionnaire (12 hours before the 1st weekly session).

Second phase: 4 weeks later, completion of the same quality of life questionnaire, administered by nursing staff at the end of the 1st weekly session.

All symptoms, mechanical complications, and stress situations experienced by the patient during the sessions were recorded for four weeks.

Results: Sixty-one patients were studied, 39 men (64%). The mean age was 67.7 ± 13 years. Time on hemodialysis was 68.7 ± 79 months. Overall scores for health-related quality of life were 25.6 ± 6.9 points (1st phase) and 24.2 ± 7 points (2nd phase), with significant differences between both periods. 328 symptoms were recorded (0.44 ± 0.54 /patient and session). Time on hemodialysis was related to symptomatology and quality of life, pre-session and post-session. Symptomatology was related to health-related quality of life pre and post-session.

Conclusions: Patients who have been on hemodialysis for more extended periods have worse quality of life and more symptoms during the sessions. Their perception of their health status is better post-session compared to pre-dialysis sessions.

Keywords: hemodialysis session; health-related quality of life; symptomatology.

RESUMEN

Impacto del momento de medición y de la sintomatología acontecida durante la hemodiálisis en la calidad de vida percibida por el paciente

Objetivo: Determinar la relación entre calidad de vida percibida por el paciente en hemodiálisis, el momento de medición de esta y el número de síntomas/complicaciones acontecidos durante la sesión.

Material y Método: Estudio observacional longitudinal en pacientes en hemodiálisis con capacidad cognitiva conservada. Se recogieron variables sociodemográficas y clínicas, así como calidad de vida mediante instrumento Coop-Wonka. El estudio se desarrolló en 2 fases:

Primera fase: evaluación calidad de vida preHD, cuestionario autoadministrado (en las 12 h previas a 1ª sesión semanal).

Segunda fase: 4 semanas más tarde, cumplimentación del mismo cuestionario de calidad de vida, administrado por enfermería (al finalizar 1ª sesión semanal).

Durante cuatro semanas se recogieron todos los síntomas, complicaciones mecánicas y situaciones de estrés experimentadas por el paciente durante las sesiones.

Resultados: Se estudiaron 61 pacientes, 39 hombres (64%). Edad $67,7 \pm 13$ años. Tiempo en hemodiálisis $68,7 \pm 79$ meses. Las puntuaciones globales de calidad de vida relacionada con la salud fueron $25,6 \pm 6,9$ puntos (1ª fase) y $24,2 \pm 7$ puntos (2ª fase), con diferencias significativas entre ambos periodos. Se registraron 328 síntomas ($0,44 \pm 0,54$ /paciente y sesión). El tiempo en hemodiálisis se relacionó con sintomatología y calidad de vida, pre-sesión y post-sesión. Y la sintomatología se relacionó con calidad de vida relacionada con la salud pre y post-sesión.

Conclusiones: A mayor tiempo en hemodiálisis los pacientes presentan peor calidad de vida y más sintomatología durante las sesiones. La percepción sobre su estado de salud, es mejor post-sesión en comparación con la percibida antes de la sesión de diálisis.

Palabras Clave: sesión de hemodiálisis; calidad de vida relacionada con la salud; sintomatología.

INTRODUCTION

Health-related quality of life (HRQoL) is a concept that evaluates an individual's health status based on their own perception of the effects of a disease or of a given treatment, across different aspects of life such as physical, emotional, and social well-being¹.

Over recent decades, HRQoL has become an essential measure of the impact of health care on patients, as it is now widely recognised that traditional clinical outcome measures are insufficient to fully assess the effects of an intervention. HRQoL provides a more comprehensive evaluation².

Thus, the focus has shifted from relying exclusively on physicians' judgments of patients' health based on objective clinical markers to valuing patients' own perceptions of their health status³.

Patients on haemodialysis (HD) receive renal replacement therapy frequently (on average, 3 sessions per week) and are subjected to multiple medical interventions, which in routine clinical practice are assessed almost exclusively using objective data. At present, patients on HD in our setting generally achieve clinical results that exceed expectations. However, parameters that define "adequate dialysis" and demonstrate technical efficiency provide little insight into how patients perceive their own health. For this reason, assessing HRQoL is necessary to gain a more complete understanding of the outcomes of our interventions⁴⁻⁶.

At present, numerous validated instruments are available to measure HRQoL. Some of these are generic, while others are more specific and designed for patients with particular conditions. All of them are considered feasible tools because of their ease of application; they are reliable, valid for measuring what they intend to measure, and sensitive to change, as they can detect improvement or deterioration in the patient's health status after a health intervention. They also have clinical significance because they allow assessment of the magnitude of a treatment's effect by asking patients directly about the changes they perceive in their HRQoL⁷.

HD sessions are health interventions during which clinical complications can occur, affecting patient well-being⁸. Even when uneventful, sessions are burdensome for most patients, limiting work and leisure activities, and potentially affecting emotional health (anxiety and depression) and social relationships⁹.

Indeed, numerous studies have shown that HRQoL is significantly impaired in dialysis patients compared with the general population¹⁰. However, to our knowledge, no studies have specifically evaluated the impact of HD sessions themselves on patients' health perceptions.

Given that HD sessions are often uncomfortable and negatively affect patients' health perceptions, our objective was to determine whether HD sessions and their degree of comfort influence patients' perceived HRQoL.

MATERIAL AND METHOD

Study setting

The study was conducted in the Nephrology Department of *Hospital Universitario Reina Sofía* (Córdoba, Spain), including the hospital-based dialysis unit, a peripheral dialysis centre, and a contracted Fresenius Medical Care centre, between March and April 2023.

Design

We conducted a longitudinal observational study.

Population and sample

The study population comprised patients with advanced chronic kidney disease enrolled in chronic HD programmes at these three dialysis units, with all patients eligible for inclusion. Inclusion criteria were age >18 years; preserved cognitive abilities sufficient to complete the HRQoL questionnaire; and acceptance to participate in the study through signed informed consent.

Exclusion criteria were worsening of any chronic condition, onset of any acute condition, or hospital admission during the study period.

A total of 61 patients were finally included: 39 men (64%) and 22 women (36%), mean age 67.7 ± 13 years, and mean time on HD 68.7 ± 79 months.

Study variables

The outcome variable was HRQoL.

All symptoms or events occurring during the study sessions were recorded. In addition, demographic variables (age and sex), clinical variables (type of vascular access, dialysis adequacy index [Kt/V]), Charlson comorbidity index (CCI), and biochemical parameters (haemoglobin [Hb] and albumin) were collected.

Instruments and data collection

HRQoL was assessed using the Coop/Wonca questionnaire, Spanish adapted version, a validated generic instrument already used in other patient groups, demonstrating adequate psychometric quality¹⁰⁻¹¹.

This questionnaire assesses physical activity, emotional state, activities of daily living, social activities, perceived health status and quality of life, pain, and social support. It has proven to be reliable and sensitive to changes over time (test-retest reliability)¹⁰. It was selected for this study mainly for its feasibility, since it imposes minimal burden on both patients and professionals. It is simple, engaging, clear in question formulation, and brief. The questionnaire consists of 9 items referring to the patient's status over the past month, with five possible answers illustrated by representative drawings, on a five-point Likert-type ordinal scale, where lower scores indicate better health status. These features allow short completion time and rapid scoring and interpretation.

The study was conducted in two phases. In the first phase, HRQoL questionnaires were distributed to patients in sealed envelopes, with instructions to complete them at home in self-administered form, during the long weekend break, in the 12 hours prior to the first haemodialysis session of the week.

During the following four weeks (12 sessions), all symptoms, clinical or mechanical complications, or stressful situations experienced by the patient were recorded using a custom-designed log, based on observation or verification by the responsible nurse. These were considered as events potentially affecting patient comfort during the sessions, with the statistical treatment based on the number of symptoms or events per session.

After these four weeks, in the second phase, the same HRQoL questionnaire was administered again, this time by nursing staff at the bedside, at the end of the first weekly haemodialysis session, through a patient interview.

Statistical analysis

For quantitative variables, the mean \pm standard deviation and the median with interquartile range were calculated, depending on whether or not they followed a normal distribution. Student's *t* test was used for comparison of means in normally distributed variables, and the Mann-Whitney *U* test for those not normally distributed. Qualitative variables were expressed as frequency distributions. Possible associations were analysed using Pearson's test for normally

distributed variables and Spearman's correlation test for non-normally distributed variables.

Data analysis was performed using SPSS version 25. Statistical significance was set at $p < 0.05$.

Ethical considerations

This study was conducted in full compliance with the ethical principles set out in the Declaration of Helsinki. All participating patients provided informed consent, with assurance that all records generated would be safeguarded by the principal investigator and identified solely by the assigned case number. Data confidentiality was strictly maintained in accordance with the updated Spanish Organic Law 3/2018 of 5 December on the Protection of Personal Data and Guarantee of Digital Rights. Participants were informed that they could voluntarily withdraw from the study at any time.

RESULTS

Of the 61 patients studied, 43% had diabetes, and 66% had an arteriovenous fistula (AVF) as vascular access, whereas 34% carried a central venous catheter (CVC).

The study sample had a mean CCI of 6.5 ± 2 points. Mean biochemical parameters were haemoglobin (Hb) 11.2 ± 1.5 g/dL and albumin 3.8 ± 0.3 g/dL, with a mean dialysis adequacy index (Kt/V) of 1.66 ± 0.32 .

Analysis of relationships between variables showed that age was significantly correlated with comorbidity ($r = 0.61$, $p < 0.01$), with older patients presenting higher CCI values.

Regarding HRQoL, overall scores are shown in **figure 1**, with significant differences between the two measurements ($p < 0.04$, Wilcoxon test) and good correlation between them ($r = 0.61$, $p < 0.01$).

During the 4-week period between the two study phases, a total of 328 symptoms were recorded (0.44 ± 0.54 per patient per session).

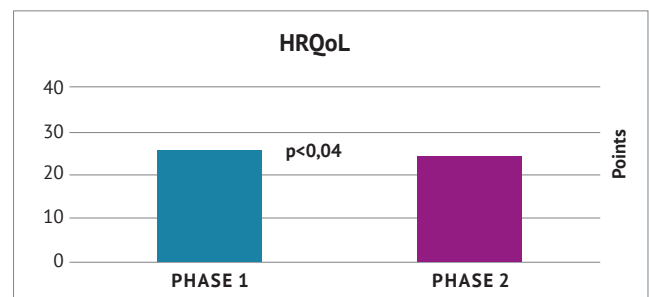


Figure 1. Mean scores of Health-Related Quality of Life between the two phases of the study.

HRQoL: Health-Related Quality of Life.

This symptomatology was correlated with time on HD ($r=0.49, p<0.01$), with patients on longer-term HD presenting a greater number of symptoms during sessions. In addition, a relationship was found between overall HRQoL scores in both phases and the presence of symptoms ($r=0.30, p<0.05$ and $r=-0.37, p<0.01$, respectively), indicating that patients with poorer HRQoL reported more symptoms.

No other significant relationships were identified.

DISCUSSION

This study was designed on the theoretical hypothesis that the HD session per se is distressing for the patient and negatively affects their perception of health status.

Although the study sample is too small to allow extrapolation of our conclusions to larger populations, its demographic characteristics in terms of age and sex distribution are consistent with those reported in previous studies conducted in our setting, notably the high mean age and the predominance of men over women. In this sense, the sample may be considered representative of the haemodialysis (HD) population¹³⁻¹⁶.

In addition, as in numerous studies on patients undergoing HD, we found a significant relationship between age and the high CCI observed in our cohort^{10,13,17}.

Regarding the biochemical parameters assessed (Hb, albumin, and Kt/V), although these do not provide an exhaustive evaluation, they suggest that this group of patients had an acceptable nutritional status and anaemia profile and received a dialysis dose slightly above that recommended in clinical practice guidelines¹⁸.

As for the overall HRQoL scores recorded in the questionnaires—showing a moderate impairment with mean scores of 25 and 24 out of 45—our sample is also in line with previously published studies that have described lower HRQoL levels in HD patients compared with the general population^{8,10,19,20}.

These considerations suggest that our cohort represents a group of stable HD patients who are receiving effective and adequate treatment, with an acceptable self-perceived health status adjusted to what is expected in our environment.

Nevertheless, we were struck by what we consider to be a high incidence of distressing symptoms reported by patients during HD sessions, and by their association with perceived HRQoL. Patients reporting poorer HRQoL were also those with the greatest symptom burden, which runs counter to our initial hypothesis that patients would report improved perceived health status after HD sessions despite experiencing symptoms during them.

This finding, which cannot be fully explained within the scope of this study, may be largely attributable to impairment in the physical dimension of HRQoL assessed by the questionnaire. It is evident that before and after an HD session, patients experience relief from uraemic toxins and volume overload, leading to improved physical well-being. However, other HRQoL dimensions assessed by the questionnaire—such as emotional status, daily activities, social activities and support, pain, and overall health perception—are dimensions that change over time as a result of the patient's adaptive process to their health condition.²¹ These are less likely to be modified by a single HD session or by any specific health care intervention. This could explain why patients with longer time on HD programmes reported poorer HRQoL, as their extended adaptation process may have negatively affected these dimensions.

The main limitation of this study is the small sample size for this type of research. Additionally, the different methods used to administer the quality-of-life questionnaire may have introduced uncontrolled bias.

More rigorous studies with broader samples and more outcome variables controlled for would be necessary to confirm these observations.

In summary, and in light of our findings, we conclude that in our setting, patients with longer duration on HD programmes report poorer HRQoL and greater intradialytic symptom burden. However, this does not preclude them from experiencing some improvement in their perception of health status after HD sessions compared with before.

Conflicts of interest

None declared.

Funding

None declared.

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- 】 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.
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Nursing practices related to pain assessment and management during haemodialysis sessions: a national study

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ABSTRACT

Introduction: Proper assessment and management of pain impact the well-being of patients undergoing hemodialysis.

Objective: To analyze the management of pain by nursing professionals nationally during hemodialysis.

Methodology: After obtaining informed consent, a national cross-sectional descriptive study was conducted in March-April 2023 using an online questionnaire addressed to hemodialysis nurses. Sociodemographic variables, type of healthcare center, work experience, pain assessment procedures, analgesia administration during hemodialysis, self-assessment of knowledge, and demand for training were collected. Descriptive and bivariate analyses (Chi-square test, Student's t-test, Mann-Whitney U test) were performed, with a significance level 0.05.

Results: There were 241 participants from 17 autonomous communities, 77.6% women, with a mean age of 43.70±9.99 years. 42.7% considered the pain management approach inadequate; 80% did not use specific protocols, and 95.9% believed they would be helpful. 66% rated their knowledge of pain management as "None/Low." Only one administered the analgesic pre-filter. 96.7% considered it worthwhile to receive specific training. We found a statistically significant relationship between "frequency of pain assessment" and "adequate pain management" ($p<0.001$) and between "administration of post-filter analgesics" and "existence

of pain management protocols" ($p=0.002$). Professionals with <5 years of experience considered themselves to have lower levels of knowledge ($p=0.022$), while those with ≥ 5 years of experience considered specific training more useful ($p=0.048$).

Conclusion: Professionals perceive pain management during hemodialysis as inadequate, and they demand more training and the existence of specific protocols. Professionals with less than five years of experience reported lower levels of knowledge, whereas those with more than five years of experience considered specific training more beneficial.

Keywords: pain; hemodialysis; analgesia; pain management; pain assessment.

RESUMEN

Prácticas enfermeras relacionadas con la evaluación y tratamiento del dolor durante la sesión de hemodiálisis: estudio nacional

Introducción: Una adecuada evaluación y manejo del dolor repercute en el bienestar de los pacientes en hemodiálisis.

Objetivo: Analizar el manejo del dolor por el profesional de enfermería durante la hemodiálisis a nivel nacional.

Metodología: Estudio descriptivo transversal nacional, realizado en marzo-abril 2023, mediante un cuestionario online dirigido a enfermeras de hemodiálisis, previo consentimiento informado.

Se recogen variables sociodemográficas, tipo de centro, experiencia laboral, procedimiento evaluación dolor y administración analgesia durante la hemodiálisis, autoevaluación conocimientos y demanda de acciones formativas.

Se realizó un análisis descriptivo y bivariado (test Chi2, T-Student, U-Mann Whitney), nivel de significancia 0,05.

Resultados: 241 participantes de 17 comunidades autónomas, 77,6% mujeres, edad media 43,70±9,99 años.

Un 42,7% consideraba inadecuado el abordaje del dolor; el 80% no utilizaba protocolos específicos y el 95,9% opinaba que sería útil tenerlos.

El 66% evaluaron sus conocimientos sobre el manejo del dolor como "Nada/Poco". Un administraba el analgésico prefiltrado. Un 96,7% consideraron útil recibir formación específica. Encontramos relación estadísticamente significativa entre "frecuencia evaluación dolor" y "adecuado manejo del mismo" ($p < 0,001$) y "administrar analgésicos postfiltro" y "existencia de protocolos de manejo dolor" ($p = 0,002$).

Los profesionales con <5 años de experiencia consideran tener peor nivel de conocimientos ($p = 0,022$), siendo aquellos con ≥ 5 años de experiencia quienes consideran útil recibir formación ($p = 0,048$).

Conclusión: Los profesionales valoran el manejo del dolor durante la hemodiálisis como inadecuado, demandan más formación y la existencia de protocolos específicos. Son los profesionales con menos de 5 años de experiencia quienes manifestaron tener peor nivel de conocimientos, sin embargo son aquellos con más de 5 años de experiencia los que consideraron más útil recibir formación específica.

Palabras clave: dolor; hemodiálisis; analgesia; manejo del dolor; evaluación del dolor.

INTRODUCTION

Pain is an unpleasant perception that interferes with patients' quality of life¹, and is considered one of the main health problems due to its significant social and economic impact²⁻⁴. The International Association for the Study of Pain (IASP) defines pain as "an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage⁵."

Chronic noncancer pain is recognised as a public health problem, affecting 20%–35% of the global population, 19% of the European population, and 17% of the Spanish population⁶.

One of the main challenges in pain management is achieving adequate quantification of pain¹. In the hospital setting,

pain management and control are often insufficient, which negatively affects the quality of care perceived by the patient⁷. A comprehensive assessment of pain requires analysing both the pain reported by the patient and the effectiveness of the treatment administered, while also recording and evaluating any potential adverse effects¹.

In patients with kidney disease, numerous studies have shown that pain is the most frequent symptom. However, it is often not adequately managed, mainly because it is not properly identified, not assessed, or goes unnoticed by health care professionals^{2,8-12}.

Some authors advocate the use of analgesic ladders in the haemodialysis (HD) population and recommend the use of fixed regimens for chronic pain control, avoiding, as far as possible, the administration of analgesia on demand¹³. Nevertheless, in practice there are insufficient data on chronic pain management in HD^{10,13}, and a lack of robust scientific evidence to enable effective pain control¹²⁻¹³.

There is very little literature of good methodological quality addressing the characteristics of intradialytic pain. Studies are needed that separately analyse the pain experienced by patients during HD sessions and the chronic pain experienced outside them².

During HD sessions, nurses spend the most time in direct contact with patients, continuously assessing their status, including the presence or absence of pain, acting on and reporting any incidents, and, when necessary, administering analgesia during the session¹⁴.

In our setting, there is limited evidence regarding the knowledge and attitudes of nursing professionals toward pain management during HD. Although numerous studies have investigated pain in HD, most are single-centre studies addressing either pain at vascular access puncture or pain more generally. These typically focus on assessing the degree and type of pain and the analgesia used, but do not consider aspects such as nurses' perceptions, knowledge level, routine practices regarding analgesia administration, or the identification of patient needs by professionals.

Analysing nursing practice in pain management during HD sessions may help to understand the current situation, identify the needs recognised by these professionals, and determine potential areas for improvement.

The overall aim of this study was to evaluate variability in pain management practices by nursing professionals during HD sessions across different centres and Autonomous Communities in Spain.

The specific endpoints were to analyse nurses' self-perception of their knowledge regarding intradialytic pain management and to identify potential areas for improvement reported by professionals in relation to intradialytic pain management.

MATERIAL AND METHOD

Study design and period. We conducted a descriptive cross-sectional study between March and April 2023.

Population and sample. The study population comprised nurses working in haemodialysis (HD) units across Spain, both in public centres and in contracted/private centres.

Inclusion criteria

Clinical nurses working in HD units nationwide who were able to complete the online questionnaire, regardless of contract type or duration. Professionals who did not provide informed consent were excluded.

Sample size

As no registry exists of the exact number of nurses working in HD in Spain, the Spanish Society of Nephrology Nursing (SEDEN) was consulted and reported approximately 1200 members, a figure that varies over time. Consequently, the sample size was estimated assuming an infinite population.

To achieve a precision of 8% in estimating a proportion using a two-sided 95% normal asymptotic confidence interval, assuming a 50% response rate to the variable “adequate pain management is provided” and accounting for a 20% rate of nonresponse or incomplete responses, recruitment of 189 professionals was required.

Variables

Based on a literature review and critical appraisal, an online questionnaire was designed to collect the following variables: procedure for pain assessment; procedure for analgesia administration during HD; procedure for pain reassessment; existence of protocols or procedures related to pain management; type of analgesics administered; route, site,

and timing of administration. Self-assessment of participants' knowledge level regarding pain management was also collected, including knowledge of whether analgesics are dialysed during HD sessions. Participants were asked about training needs in this field and potential areas for improvement.

Sociodemographic variables (age, sex), type of centre, years of professional experience in HD, and Autonomous Community were also collected.

Procedure

Data collection was performed using an ad hoc online questionnaire comprising 29 multiple-choice questions. The questionnaire was previously piloted with 10 HD nurses to ensure clarity.

Dissemination took place through SEDEN by e-mail to all members, providing study information, objectives, and a link to the survey. Participants were invited to forward the questionnaire to other HD nurses they knew. The survey was also disseminated through working groups and professional forums related to nephrology nursing, enabling responses from non-SEDEN members to increase sample size and representativeness.

Data analysis

Data collected through the online questionnaire were recorded in an anonymised database and analysed using SPSS v21.

A descriptive statistical analysis was first performed. Qualitative variables were presented as absolute frequencies and percentages. Quantitative variables were tested for normality with the Kolmogorov–Smirnov test and presented as mean and standard deviation.

Bivariate analyses were also conducted. For differences in qualitative variables, the χ^2 test or Fisher's exact test was used. To analyse the relationship between quantitative and qualitative variables, Student's t test or ANOVA was applied depending on the number of categories of the qualitative variable. Statistical significance was set at $p \leq 0.05$.

Ethical considerations

Participation was anonymous and voluntary, with informed consent obtained from all participants. The study was conducted in full compliance with the ethical principles of research and with Organic Law 3/2018 of 5 December on the Protection of Personal Data and Guarantee of Digital Rights. The study was approved by the Jaén Research Ethics Committee (Protocol Code ETD1).

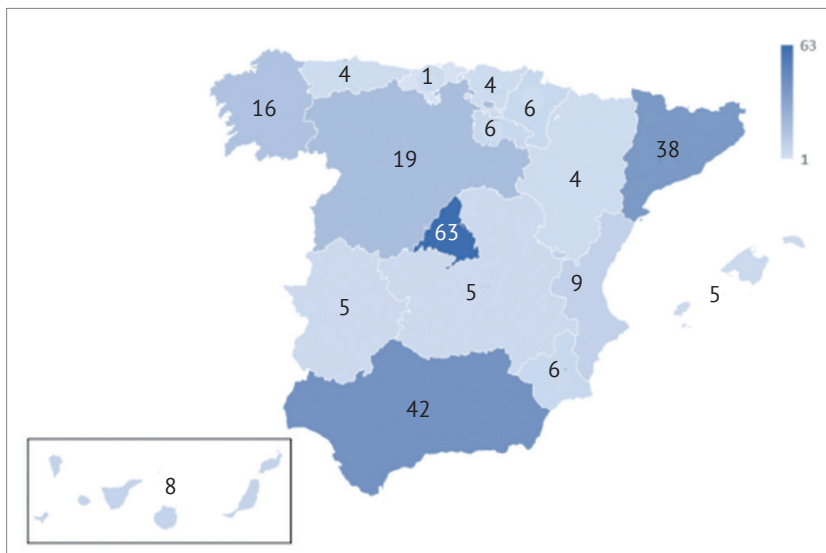


Figure 1. Distribution of participants by autonomous community.

RESULTS

A total of 241 professionals from 17 Autonomous Communities responded to the questionnaire. Of these, 70.5% (n=170) worked in public centres and 29.5% (n=71) in private or contracted centres (**figure 1**). The mean age of respondents was 43.70 ± 9.99 years, with a mean of 14.49 ± 10.37 years of professional experience in haemodialysis (HD); 77.6% (n=187) were women.

A total of 70.1% (n=109) of respondents considered it frequent for patients to experience pain during HD sessions. Regarding the management of this pain, 42.7% (n=103) perceived that it was inadequately managed, compared with 56.4% (n=136) who considered it adequate; 0.8% (n=2) did not respond. Among the main reasons cited for inadequate pain management (n = 45 free-text responses): 42.3% (n = 19) noted a lack of sensitivity towards pain by unit staff (both physicians and nurses), leading to delayed and ineffective diagnosis and treatment, with placebo use reported in some cases; 22.3% (n=10) identified the absence of specific protocols; 17.7% (n=8) stated that validated pain scales were not used and assessment relied more on professional perception; and 17.7% (n=8) reported a lack of individualisation of analgesia regimens, with ineffective treatments prescribed, delaying adequate pain control.

Table 1 shows responses regarding pain assessment/reevaluation, documentation, and the existence/use of specific protocols. In most cases, pain was assessed only if reported by the patient; a validated scale was used in 13.7% (n=33) of cases. All respondents (100%, n=241) reported conducting some form of pain reevaluation. The most frequent method of documentation in the patient's medical record was a free-text note without a numerical score; 3.7% (n=9) indicated that they did not document pain at all.

Regarding protocols for pain management and intradialytic analgesia, 80% (n=193) reported that they either did not have protocols or were unaware of their existence. Of these, 138 worked in public centres and 56 in private/contracted centres. Relative to the total number of professionals by centre type, 81.1% of those in public centres and 78.8% of those in private/contracted centres reported no knowledge of or access to protocols.

When asked whether they considered protocols useful for HD pain management, 95.9% (n=231) responded affirmatively, compared with 3.7% (n=9) who did not; 0.4% (n=1) did not respond.

Table 1. Descriptive analysis of the responses to questions on pain assessment and recording, and the use of protocols.

Variables	Frequency	Percentage
Frequency of pain assessment in HD	241	100%
I never assess it	3	1.2%
Only if the patient reports pain	125	51.9%
Once in each HD session	25	10.4%
As often as necessary	88	36.5%
Pain assessment: procedure	241	100%
I ask the patient directly	41	17%
I observe signs and symptoms	10	4.1%
I observe signs and symptoms and ask directly	157	65.1%
I use a validated scale	33	13.7%
Pain recording	241	100%
I do not record it	9	3.7%
In a free-text comment	170	70.5%
By indicating the score obtained on the validated scale	19	7.9%
Free-text comment and score obtained on the validated scale	43	17.8%
Pain reassessment: procedure	241	100%
Do not reassess pain	0	0%
I ask the patient directly	71	29.5%
Yes, I observe signs and symptoms of pain	4	1.7%
Yes, I observe signs and symptoms and ask the patient	145	60.2%
Yes, I use the same validated scale I used previously	21	8.7%
Existence/use of specific protocols	241	100%
They do not exist or I am not aware of them	193	80%
They exist, but I do not know where to find them	4	1.7%
They exist, I know where to find them, but I have not consulted them	3	1.2%
They exist, I know where to find them, I have consulted them, but I do not follow the recommendations	4	1.7%
They exist, I know them and follow the recommendations	36	15%
No response	1	0.04%

The most widely used analgesic during HD sessions was paracetamol, followed by metamizole, with intravenous administration being the most frequent route (**figure 2**).

When asked about knowledge of whether the administered analgesic was dialysable, 56.0% (n=135) did not know if ketorolac is dialysed, 49.4% (n=119) for morphine, 42.7% (n=103) for tramadol, 32.4% (n=78) for metamizole, and 22.8% (n=55) for paracetamol.

A total of 41% (n=99) reported usually administering intravenous analgesia during HD via the arterial line. **table 2** shows responses to this question and reasons for choosing one line over another.

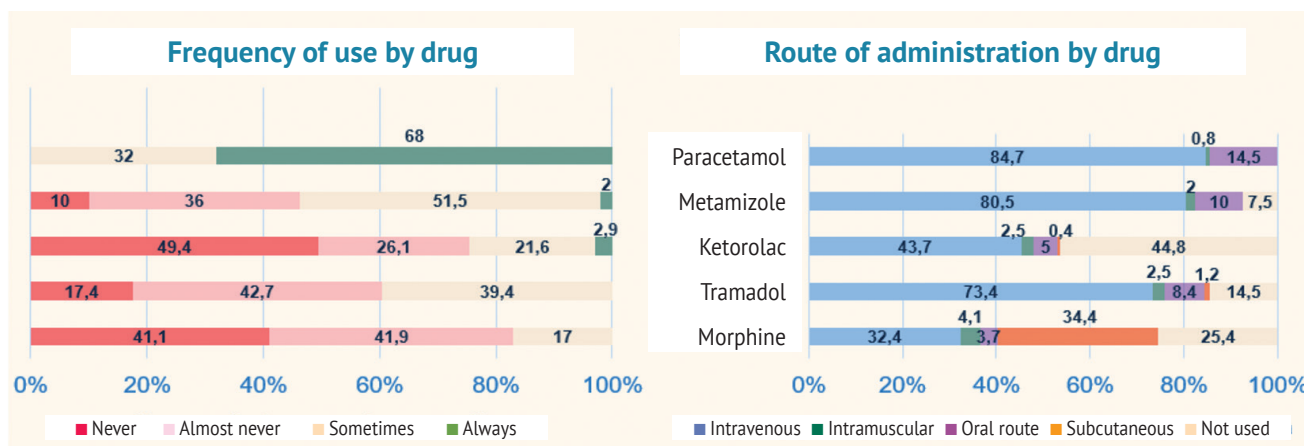


Figure 2. Frequency of use and route of administration according to the analgesic used.

Most respondents (65.5%, n=158) rated their knowledge of pain management in HD as “poor.” Nearly all (96.7%, n=233) considered specific training on these aspects useful (figure 3).

Bivariate analysis showed that greater frequency of pain assessment was associated with the perception of providing adequate pain management (p<0.001). A statistically significant association was also found between administration of analgesics via the venous line (postfilter) and the availability of protocols for pain management in the centre (p=0.002).

Professionals with ≤5 years of experience rated their knowledge level as poorer (p=0.022), whereas those with >5 years of experience were more likely to consider specific training useful (p=0.048).

Table 2. Descriptive analysis of the reasons why the drug is administered through the arterial or venous line of the haemodialysis circuit.

Reasons for administration via this line	Line through which intravenous analgesia is administered	
	Arterial line pre-filter n=99 (41%)	Venous line post-filtre n=142 (59%)
According to my centre’s protocol	11	40
Usual practice in my centre, although not protocolised	67	38
Because the rest of my colleagues do it this way	1	2
I consider the selected line to be the most effective	7	61
It makes no difference; both lines are equally effective	2	1
In my centre we do not have the material to administer it through the other line	11	0

DISCUSSION

This study analyses the perception of pain management during HD sessions from the perspective of nurses at the national level. To our knowledge, no prior publications have specifically addressed this issue within this field.

Pain is a frequent symptom among patients during HD sessions¹⁵⁻¹⁶, findings consistent with the perceptions of most professionals participating in this study. Nevertheless, nearly one-third of respondents did not consider pain to be a frequent problem.

Pain management during HD sessions was considered inadequate by 42% of the professionals, who identified lack of awareness of pain among healthcare staff as one of the main causes. Feldman et al. highlighted that some professionals do not feel responsible for addressing signs or symptoms not directly related to kidney disease or dialysis, which negatively affects analgesic management¹⁷. Pain must be understood as a multidimensional problem requiring an approach that transcends traditional professional divisions¹⁸⁻¹⁹. It is intrinsically linked to a specific social situation and will continue to exist and reproduce as long as it is regarded as the most human and natural of emotions¹⁹. According to García Espinosa et al., adopting a new perspective that recognises both individual and social experiences is essential in order to progress towards solutions to this problem¹⁸.

Patient attitudes may also hinder adequate diagnosis and pain control. At times, patients are satisfied with only moderate relief, do not request additional analgesia, or even refuse it for fear of adverse effects²⁰. In our study, more than half of professionals reported assessing pain only when the patient verbalised it, which risks failing to identify those with unexpressed pain. Moreover, our results showed that professionals who assessed pain more frequently perceived pain management to be better.

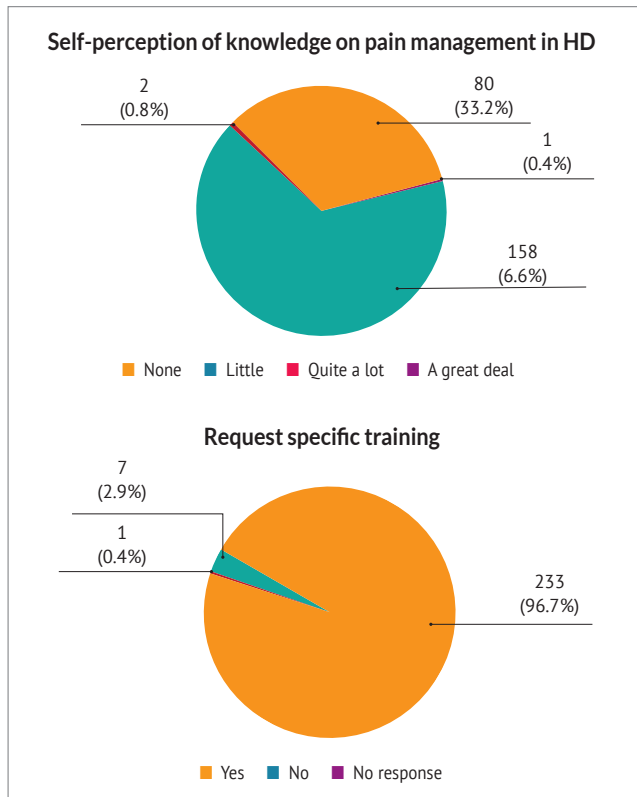


Figure 3. Perception of knowledge level and need for specific training in pain management during haemodialysis among nephrology nurses.

Nephrology nurses are accustomed to providing highly specialised care, for which protocolisation is essential¹⁴. The development of care protocols requires identifying the best evidence, expanding knowledge, supporting professional updates, and promoting scientific research²¹. Nearly all participants considered protocols for pain management useful; however, 80% reported either not having them in their units or being unaware of their existence. Professionals also identified lack of protocols as one of the reasons for inadequate pain management.

The detection and management of pain in patients receiving HD is complex. Therefore, it is necessary to explore patients' own perceptions of their pain experiences, and to implement mechanisms for early assessment and identification²². Pain has been described as the fifth vital sign⁷⁻²³, and, as such, must be assessed periodically. Quantifying pain intensity using validated scales is essential for its detection, treatment, and follow-up²⁴. Our findings indicate that more than 85% of professionals evaluate pain by observing signs and symptoms and/or asking the patient directly, but they do not use validated scales. Consequently, documentation of pain is often in free-text format, without objective scoring, limiting the capacity to track information or analyse its evolution.

There is also wide variability in clinical practice concerning intradialysis analgesic administration. Sánchez-Ospina et al.²⁵

observed that most analgesics (80%) were administered via the arterial line or pre-filter, whereas in our results this figure was much lower (41%). Furthermore, many professionals were unaware of which analgesics are dialysable during HD. In our study, a statistically significant association was observed between the availability of pain management protocols and the use of the venous line for analgesic administration. Administration via the arterial line or pre-filter may result in lower serum drug levels, depending on the type of HD used and the drug's molecular weight, among other factors²⁵. As previously emphasised, consensus documents on drug administration in relation to haemodialysis are needed from the Scientific Societies²⁵.

Many health care professionals do not feel adequately prepared to manage pain²⁶, making education and training one of the main strategies for improvement^{10,23,24}. Almost all professionals in our study considered specific training in pain management during HD to be useful, with a significant proportion recognising deficits in their knowledge.

As Davidson et al.²⁶ underline, current data provide a strong imperative to establish pain management as an educational, clinical, and research priority in nephrology. It is necessary to integrate strategies that enable continuous pain management, involving professionals in their routine practice, and identifying areas of knowledge development to improve the quality of life of patients receiving HD²⁷.

This study has the inherent limitations of its methodology. Although the sociodemographic characteristics of the participants are representative of the Spanish nursing population according to data from the National Statistics Institute (INE 2022)²⁸, there was no equitable representation across centres or autonomous communities. Additionally, a social desirability bias may have influenced responses, as professionals were asked about aspects of their own daily clinical practice. Nevertheless, the findings provide valuable insights as a starting point to contextualise the current situation.

Based on these results, we can conclude that Spanish nephrology nurses perceive pain management during HD sessions as an area in need of improvement. They identified variability in clinical practice regarding analgesic administration and expressed the need for specific training and the establishment of protocols for pain management. Professionals with fewer than 5 years of experience reported lower knowledge levels, whereas those with more than 5 years of experience considered specific training to be particularly useful.

It would be desirable for institutions and scientific societies to respond to this situation by developing specific training programmes and consensus documents/protocols to achieve better pain control in HD patients, thereby contributing to an improvement in their quality of life.

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Conflicts of interest

None declared.

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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 to awareness-raising and prevention of this condition. In line with its ongoing commitment to quality and excellence, the Renal Foundation establishes this award within the framework of the annual congress of the Spanish Society of Nephrology Nursing (SEDEN).

The first edition of this award will take place at the 49th SEDEN National Congress, to be held in Valencia from October 26th through 28th, 2024.

This award is created on the occasion of the Foundation's 40th anniversary, with the aim of further promoting research in nephrology nursing and recognizing excellence in scientific communication, rewarding both the content of the presentation and the quality of oral delivery during the congress.

CANDIDATES

Eligible candidates are nursing professionals or teams whose oral communication has been accepted for in-person presentation at the congress of the same year.

The five highest-rated oral presentations, as quantitatively assessed by the SEDEN evaluation committee for that year, will be automatically shortlisted for the award.

No submission may participate if any author is affiliated with the Renal Foundation or if the work has been carried out at any of its centers or dialysis units.

EVALUATION CRITERIA

The following aspects of the presentation will be assessed:

1. Quality: structure, presentation, and relevance of the content.
2. Clarity: ease of understanding of the oral presentation.
3. Innovation: originality of format and use of new technologies.
4. Presenter's dynamism and delivery style.
5. Impact and engagement with the audience.
6. Direct relevance to the care of patients with kidney disease.

PRIZE AMOUNT

This award is endowed with €1,000 (one thousand euros).

DISSEMINATION

The winning paper will be made available to the journal *Enfermería Nefrológica* for possible publication, subject to editorial decision.

The Renal Foundation may disseminate the winning work without this implying any transfer or limitation of the authors' intellectual or industrial property rights.

Whenever the authors use the work or its data, its origin as the Renal Foundation Award must be clearly acknowledged.

JURY

The jury will consist of an odd number of members appointed by the Board of Directors of SEDEN and the Renal Foundation. The latter reserves the right to appoint one additional member to avoid tie decisions. The award may be declared void.

AWARD CEREMONY

The official certificate will be presented to the principal author at the closing ceremony of the congress by a representative of the Renal Foundation or a person designated by the Foundation.

ACCEPTANCE OF THE RULES

Participation in this call implies full acceptance of these rules.

In compliance with the Spanish Organic Law on Personal Data Protection (LOPD), all personal data provided by applicants will be included in files owned by FUNDACIÓN RENAL IÑIGO ÁLVAREZ DE TOLEDO, for the purpose of managing educational events and research awards. Data will be retained as long as necessary for such purposes. Applicants may exercise their rights of access, rectification, cancellation, and opposition by sending a written request marked "Data Protection" to:

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Factors associated with adherence to haemodialysis and pharmacological treatment in Peru

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ABSTRACT

Introduction: Inadequate adherence to pharmacological treatment and hemodialysis sessions leads to complications for patients with chronic kidney disease.

Objective: To analyze the factors associated with adherence to hemodialysis and pharmacological treatment.

Material and Method: This non-experimental, cross-sectional, correlational, and observational study was conducted following approval from the Ethics Committee. The population consisted of 90 patients, from which a sample of 71 was obtained. Information was collected through a questionnaire consisting of the Batalla and MMAS-8 tests. Statistical analysis was performed using Microsoft Excel 2016 and the Statistical Package for the Social Sciences 25.

Resultados: 49.30% of patients showed adherence to hemodialysis sessions. However, 94.37% displayed a lack of adherence to pharmacological treatment. Factors associated with adherence to the sessions included age, knowledge about the disease, duration of hemodialysis, number of comorbidities, and number of medications. Factors associated with adherence to pharmacological treatment were knowledge about chronic kidney disease and the number of comorbidities.

Conclusions: There is a higher probability of attending hemodialysis sessions when the patient is older, knows about the disease, and has been undergoing dialysis treatment for more than five years. There is a higher likelihood of low pharmacological adherence when the patient has three or

more comorbidities. Implementing educational intervention programs is recommended, along with considering strategies such as booklets or mobile phone alarms for medication intake and attendance at hemodialysis.

Keywords: treatment compliance and adherence; chronic kidney disease; hemodialysis.

RESUMEN

Factores asociados a la adherencia a la hemodiálisis y al tratamiento farmacológico en Perú

Introducción: La inadecuada adherencia al tratamiento farmacológico y las sesiones de hemodiálisis conllevan complicaciones para el paciente con enfermedad renal crónica.

Objetivo: Analizar los factores asociados a la adherencia a la hemodiálisis y al tratamiento farmacológico.

Material y Método: Diseño no experimental, transversal, correlacional y observacional, tras aprobación del Comité Ético. Población conformada por 90 pacientes, de la cual se obtuvo una muestra de 71. La información se recolectó mediante un cuestionario conformado por el test de Batalla y test MMAS-8. Se realizó análisis estadístico con Microsoft Excel 2016 y Statistical Package for the Social Sciences 25.

Resultados: El 49,30% de los pacientes presentaron adherencia a las sesiones de hemodiálisis, sin embargo, el 94,37% tuvo falta de adherencia al tratamiento farmacológico. Los

factores asociados con la adherencia a las sesiones fueron la edad, el conocimiento sobre la enfermedad, el tiempo de hemodiálisis, el número de comorbilidades y el número de fármacos. Los factores asociados con la adherencia al tratamiento farmacológico fueron el conocimiento sobre la enfermedad renal crónica, y el número de comorbilidades.

Conclusiones: Existe mayor probabilidad de cumplir con las sesiones de hemodiálisis cuando el paciente es adulto mayor, tiene conocimiento sobre la enfermedad, y lleva más de cinco años en tratamiento dialítico. Existe mayor probabilidad de tener baja adherencia farmacológica cuando el paciente presenta de 3 a más comorbilidades. Se recomienda la implementación de programas educativos de intervención y considerar estrategias como cartillas o alarmas en celulares para el consumo de fármacos y la asistencia a la hemodiálisis.

Palabras clave: cumplimiento y adherencia al tratamiento; enfermedad renal crónica; hemodiálisis.

INTRODUCTION

Worldwide, 850 million people suffer from chronic kidney disease (CKD), and by 2040 it is projected to become the 5th most common cause of premature death¹. This disease is considered silent, slow, and progressive, and when it reaches stage 5, renal replacement therapy (RRT) is required. Among these treatments is haemodialysis (HD), the most frequently used alternative in Peru, with a rate of 363 patients per million population².

Despite high demand, there are factors associated with nonadherence both to HD sessions and to the multiple prescribed medication³. In Nepal, adherence to HD sessions was reported at 52%, while adherence to medications was 81%. Overall, 122 (55.5%) patients demonstrated good adherence, 89 (40.5%) moderate adherence, and 9 (4.1%) poor adherence⁴. In Egypt, the COVID-19 pandemic negatively affected patient adherence to both HD and pharmacological treatment⁵. In Brazil, pharmacological adherence was evaluated in patients undergoing HD, showing that 62.2% had low adherence while only 33.8% showed high adherence; furthermore, lower adherence was associated with patient-related factors (age, sex, and educational level)⁶. In Peru, a study of patients with stage 5 CKD found that 1 in 4 patients had low adherence to HD treatment, with distance from the dialysis centre identified as the main reason for nonadherence⁷.

The taxonomy of the North American Nursing Diagnosis Association includes lack of treatment adherence as one of its diagnoses⁸, with nonadherence to HD and pharmacological treatment being the most common difficulties faced by both renal patients and nursing staff in dialysis units⁹.

Therefore, it is necessary to assess which variables may affect treatment adherence in this population group, both in relation to medication use and attendance at HD sessions.

The aim of our study was to analyse factors associated with adherence to HD and pharmacological treatment.

MATERIAL AND METHOD

We conducted a quantitative study with a nonexperimental, cross-sectional, correlational, and observational design.

The study population consisted of 90 patients with CKD treated at the San Francisco Clinic in Piura, Peru. Inclusion criteria were patients >18 years with a diagnosis of stage 5 CKD, associated comorbidities, and affiliation to the Comprehensive Health Insurance under the FISSAL (Fondo Intangible Solidario de Salud) contract. Exclusion criteria were 14 patients <1 year on therapy and 5 patients on private therapy, resulting in a final sample of 71 patients.

Data were collected from September through November 2021 by the principal investigator in the hospital waiting room, with a mean duration of 15 minutes.

The primary data collection technique was a survey¹⁰. The instrument was a questionnaire comprising three sections. The first collected patient-related factors including age, sex, and educational level according to ENDES classification¹¹. The second measured knowledge of CKD using the Batalla test¹² and collected data on adherence to pharmacological treatment using the 8-item Morisky Green test (MMAS-8)¹³. A pilot study established internal validity of this scale, with a Cronbach of 0.807.

The third section recorded associated comorbidities, time on HD treatment, number of medications taken per day, and number of HD sessions in the last month.

Data were processed and analysed using Microsoft Excel 2016 and Statistical Package for the Social Sciences (SPSS) version 25. Absolute and relative frequencies were calculated, and associations between nominal or ordinal variables were tested with the chi-square test. Binary logistic regression and multinomial logistic regression were subsequently performed.

The study was approved by the Research Ethics Committee of the School of Medicine, *Universidad Católica santo Toribio de Mogrovejo* (Resolution N° 166-2021-USAT-FMED), and authorisation was obtained from the management of the San Francisco Clinic. Ethical principles¹⁴ of autonomy, nonmaleficence, beneficence, and justice were applied. Patients participated voluntarily through informed consent, and no physical or psychological harm occurred during the study.

RESULTS

Of the total patients surveyed, 60.56% (n=43) were older adults; 57.75% (n=41) were men; and 32.39% (n=23) had completed nonuniversity higher education. With regard to knowledge of CKD, 63.38% (n=45) of patients demonstrated adequate knowledge. More than half (52.11%; n=37) had at least 1 comorbidity, 63.38% (n=45) had been on HD treatment for <5 years, and 71.83% (n=51) consumed 4 to 7 medications per day. Regarding adherence, 56.34% (n=40) had medium adherence to pharmacological treatment, and 49.30% (n=35) attended all 12 monthly HD sessions (**table 1**).

Table 2, illustrates that factors significantly associated with adherence to pharmacological treatment were knowledge of CKD (p=0.0191) and number of comorbidities (p=0.0184).

Table 3, illustrates that factors associated with adherence to HD sessions were age (p=0.00095), knowledge of CKD (p=0.0041), time on HD treatment (p=0.00001), number of medications/day (p=0.0075), and number of comorbidities (p=0.0005).

Table 4, illustrates that being an older adult was associated with a 4.782 (95%CI, 0.052–0.836) times greater probability of attending all 12 HD sessions per month. Having adequate knowledge of CKD was associated with a 6.137 (95%CI, 0.039–0.677) times greater probability of attending all 12 monthly HD

Table 1. Description of the sample and adherence.

		n	%
Patient	Age		
	Adult (30–59 years)	28	39.44%
	Older adult (≥60 years)	43	60.56%
	Sex		
	Female	30	42.25%
	Male	41	57.75%
	Education level		
	Initial	8	11.27%
	Primary	13	18.31%
	Secondary	22	30.99%
	Higher university	5	7.04%
	Higher non-university	23	32.39%
Conocimiento sobre la ERC (Test de Batalla)	Adecuado	45	63.38%
	Inadecuado	26	36.62%
Treatment	Time on haemodialysis treatment		
	1 year	14	19.72%
	2 years	11	15.49%
	3 years	20	28.17%
	More than 5 years	26	36.62%
	Treatment complexity		
	Number of drugs		
	1–3 drugs/day	12	16.90%
	4–7 drugs/day	51	71.83%
	More than 7 drugs/day	8	11.27%
	Number of comorbidities		
	One	37	52.11%
Two	24	33.80%	
Three	6	8.45%	
More than three	4	5.63%	
Adherence to pharmacological treatment	High adherence	4	5.63%
	Medium adherence	40	56.34%
	Low adherence	27	38.03%
Attendance at haemodialysis sessions	12 sessions	–	49.30%
	Fewer than 12 sessions	–	50.70%
TOTAL		71	100.00%

CKD: Chronic Kidney Disease; HD: Haemodialysis; n: frequency.

sessions. For time on HD treatment, patients with ≥ 5 years of treatment had a 13.136 times greater probability of attending all 12 monthly HD sessions. In multinomial regression, independent of age, sex, educational level, knowledge of CKD, time on HD treatment, and number of medications per day, those with >3 comorbidities had a 4.63 times greater probability of low pharmacological adherence and a 1.84 times greater probability of medium pharmacological adherence

DISCUSSION

Regarding pharmacological treatment adherence, the vast majority of patients were found to be nonadherent to their medication, as their scores fell within the medium and low adherence ranges. This result is consistent with the findings of other researcher⁶⁻¹⁵, who reported that more than half of their study populations showed moderate⁵ and low adherence.⁶⁻¹⁵. In contrast, a study conducted in the United States found higher levels of pharmacological adherence¹⁶, despite most patients being prescribed 9 medications. This may be attributed to more comprehensive follow-up of these patients in that developed setting.

For adherence to HD sessions, slightly more than half of the patients failed to attend the 12 scheduled monthly sessions. These findings are in line with a study conducted

in Argentina¹⁷, where approximately half of patients missed at least one HD session per month. Similarly, in Brazil¹⁸, more than half of the study population did not comply with their scheduled sessions, with nonadherence defined as more than one missed session. By contrast, studies in Iran¹⁹ and Indonesia²⁰, involving younger patients receiving HD less frequently (twice weekly), reported that most patients (83.3%) adhered to HD attendance.

Likewise, age was not associated with pharmacological adherence, a finding that mirrors results in patients with rheumatological disease, where age was not systematically linked to nonadherence to medication²¹.

However, an association was established between age and adherence to HD sessions: older adults were 4.782 times more likely to complete all monthly HD sessions. This finding is consistent with other research²² confirming that younger patients have higher rates of nonadherence to HD sessions²². This may be because, over time, patients gain greater awareness of their disease, understand the consequences of missed sessions, and begin to incorporate HD as part of their daily lives.

No relationship was found between educational level and either pharmacological adherence or HD session attendance. These results differ from other studies^{23,15}, which suggested

Table 2. Factors associated with adherence to pharmacological treatment.

FACTORS ASSOCIATED WITH THE PERSON		MMAS8			Total (n)	p-value
		Low adherence (n)	Medium adherence (n)	High adherence (n)		
Age	Adult	14	14	0	28	0.0964
	Older adult	13	26	4	43	
Sex	Female	12	16	2	30	0.8892
	Male	15	24	2	41	
Education level	Initial	2	5	1	8	0.2434
	Primary	7	4	2	13	
	Secondary	9	12	1	22	
	Higher university	3	2	0	5	
	Higher non-university	6	17	0	23	
Knowledge about CKD	Inadequate	15	11	0	26	0.0191
	Adequate	12	29	4	45	
FACTORS ASSOCIATED WITH TREATMENT						
Time on HD treatment (years)	1 year	6	8	0	14	0.5266
	2 years	6	5	0	11	
	3 years	8	11	1	20	
	More than 5 years	7	16	3	26	
Number of drugs/day	1-3 drugs/day	6	6	0	12	0.0827
	4-7 drugs/day	20	29	2	51	
	More than 7 drugs/day	1	5	2	8	
Number of comorbidities	One comorbidity	21	15	1	37	0.0184
	Two comorbidities	5	16	3	24	
	Three comorbidities	0	6	0	6	
	More than three comorbidities	1	3	0	4	

CKD: Chronic Kidney Disease; HD: Haemodialysis; n: frequency.

Table 3. Factors associated with adherence to haemodialysis.

		N° of sessions over the past month (August)		Total (n)	p-value
		Sessions (n)	Sessions (n)		
FACTORS ASSOCIATED WITH THE PERSON					
Age	Adult	21	7	28	0.00095
	Older adult	15	28	43	
Sex	Female	16	14	30	0.7046
	Male	20	21	41	
Education level	Initial	1	7	8	0.1319
	Primary	6	7	13	
	Secondary	12	10	22	
	Higher university	2	3	5	
Knowledge about CKD	Higher non-university	15	8	23	0.0041
	Inadequate	19	7	26	
	Adequate	17	28	45	
FACTORS ASSOCIATED WITH TREATMENT					
Time on haemodialysis treatment (years)	1 year	13	1	14	0.00001
	2 years	9	2	11	
	3 years	9	11	20	
	More than 5 years	5	21	26	
Number of drugs/day	1-3 drugs/day	11	1	12	0.0075
	4-7 drugs/day	22	29	51	
	More than 7 drugs/day	3	5	8	
Number of comorbidities	One comorbidity	27	10	37	0.0005
	Two comorbidities	8	16	24	
	Three comorbidities	0	6	6	
	More than three comorbidities	1	3	4	
TOTAL		36	35	71	

CKD: Chronic Kidney Disease; n: frequency.

that adherence decreases with higher educational attainment. Likewise, no association was found between sex and either pharmacological adherence or HD attendance, consistent with the findings of other authors¹⁵. A single study²⁴ identified male sex as a risk factor for nonadherence to HD treatment.

Knowledge of CKD was associated with both pharmacological adherence and timely attendance at HD sessions. Patients with adequate knowledge of CKD were 6.137 times more likely to complete all 12 monthly HD sessions. However, we found no studies that explored this association using the same instrument.

Duration of HD treatment was not related to pharmacological adherence, a finding consistent with other authors¹⁶. Conversely, another study²⁴ reported that longer HD duration (in months) was associated with lower risk of nonadherence to pharmacological treatment.

In this study, greater adherence was observed to HD than to medications, which could be explained by patients being more aware of the importance of attending dialysis sessions than

of taking medications, or by lack of family support at home to remind them to take medications at the prescribed time.

Furthermore, patients with ≥ 5 years of HD therapy were more likely to complete the 12 monthly sessions. In contrast, a study in Turkey²⁴ reported that shorter HD duration was a risk factor for nonadherence. This may be explained by patients evaluating the effects of dialysis on their bodies, interacting with other patients, and benefiting from the education provided by health care staff.

This study also found an association between pharmacological adherence and the number of comorbidities. Patients with >3 comorbidities had a 4.63-fold higher likelihood of low adherence and a 1.84-fold higher likelihood of medium adherence. Similarly, other research has identified an increasing number of comorbidities as a significant predictor of medication adherence²⁵, although this differs from a Norwegian study of older adults on peritoneal dialysis and HD across three hospitals²³. In this regard, it is worth noting that multimorbidity and polypharmacy are common in CKD and may be directly related to poor adherence.

Tabla 4. Logistic regression.

BINARY LOGISTIC REGRESSION						
		Wald	Sig.	O.R.	95% CI	
					Lower	Upper
Edad	Adulto mayor	4.901	0.027	4.782	0.052	0.836
Age	Older adult	4.901	0.027	4.782	0.052	0.836
Sex	Female	2.197	0.138	0.368	0.098	1.381
Education level	Without higher education	0.000	0.991	0.991	0.236	4.171
Knowledge about CKD	Adequate	6.229	0.013	6.137	0.039	0.677
Time on haemodialysis treatment (years)	≥5 years	9.737	0.002	13.136	0.015	0.384
Number of drugs/day	1–7 drugs/day	1.172	0.279	3.145	0.395	25.051
Number of comorbidities	1–3 comorbidities	2.383	0.123	0.066	0.002	2.080

MULTINOMIAL REGRESSION						
MMAS-8		Sig.	O.R.	95% I.C		
				Lower	Upper	
Poor medication adherence	Age	Older adult	0.989	22.000	0.000	0.001
	Sex	Male	0.820	1.350	0.100	18.312
	Education level	With higher education	0.989	9.330	0.000	0.002
	Knowledge about CKD	Adequate	0.989	62.000	0.000	0.002
	Time on haemodialysis treatment (years)	≥5 years	0.517	2.920	0.114	74.664
	Number of drugs/day	>7 drugs/day	0.326	6.170	0.163	23.202
	Number of comorbidities	>3 comorbidities	0.000	4.630	3.651	5.891
Median medication adherence	Age	Older adult	0.989	10	0.000	0.002
	Sex	Male	0.802	0.72	0.061	8.67
	Education level	With higher education	0.989	3.11	0	0.001
	Knowledge about CKD	Adequate	0.99	23	0.000	0.002
	Time on haemodialysis treatment (years)	≥5 years	0.831	14	0.06	32.913
	Number of drugs/day	>7 drugs/day	0.648	2.02	0.099	41.324
	Number of comorbidities	>3 comorbidities	0.000	1.84	1.847	1.847

Sig.: Significance; OR: Odds Ratio; CI: Confidence Interval; CKD: Chronic Kidney Disease.

Similarly, an association was also found between the number of comorbidities and HD session attendance. Diabetes mellitus and hypertension were the most prevalent comorbidities in our study population, consistent with findings from other investigators^{19,26}. In Peru, more than half of dialysis sessions are performed in patients with diabetes and hypertension²⁷. This highlights the importance of raising awareness among patients and their families to ensure compliance with all recommendations.

Among the limitations of this study are the use of a nonprobabilistic census sample and potential self-selection bias, as participant selection was not based on statistical criteria for generalisation. Consequently, it was not possible to calculate the precision of the standard error, nor to determine the level of confidence in the estimates.

In conclusion, nearly half of patients adhered to their HD sessions, yet most demonstrated nonadherence to pharmacological treatment. Older adults, patients with

greater knowledge of CKD, and those with ≥5 years of HD treatment were more likely to adhere to their HD sessions. Conversely, patients with ≥ 3 comorbidities were more likely to exhibit low pharmacological adherence.

We, therefore, recommend implementing educational intervention programmes and strategies such as information leaflets or mobile phone reminders for both medication intake and HD attendance, to minimise forgetfulness as a barrier. We also believe it is necessary to conduct mixed-methods studies (quantitative and qualitative) that also address adherence to diet and fluid restriction.

Conflicts of interest

None declared.

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Izasa Medical

AWARDS

Vascular access and new technologies

Sponsored by Izasa Medical, with the aim of promoting nursing research and encouraging and rewarding the work of professionals in Nephrology Nursing, **this award is announced in accordance with the following rules:**

1. All papers accepted for the 49th National Congress of SEDEN will be eligible to participate.
2. All members of the Spanish Society of Nephrology Nursing (SEDEN) may apply.
3. Manuscripts must be written in Spanish, must be original, and only nursing studies with practical application will be considered.
4. Submissions must comply with the rules governing the presentation of papers for the SEDEN Annual Congress.
5. The deadline for submission of original manuscripts will be the same as that established for submission to the Congress and must be sent exclusively through the SEDEN website: **www.seden.org**, in the Congress section.
6. The Jury will be composed of the SEDEN Scientific Committee for Paper Selection and one representative of Izasa Medical, who will not have voting rights.
7. The decision of the Jury and the award ceremony will take place during the opening session of the upcoming Congress.
8. The rights for publication of the submitted texts shall remain the property of the Spanish Society of Nephrology Nursing, which may use them for publication purposes, as well as the sponsoring company.
9. Publication of the submitted papers in any other media prior to the official decision will result in automatic disqualification.
10. Any matter not provided for in these rules shall be resolved by the SEDEN Executive Board.
11. By participating, authors agree to these rules and to the Jury's decision, which shall be final and non-appealable.
12. The prize may be declared void.
13. The total award amount is **€1,200**.

*The monetary award is subject to tax withholding.



Implementation of an intravenous therapy program in nephrological patients: analysis of results

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ABSTRACT

Objective: To evaluate the prevalence and impact of midline catheters inserted by the Infusion and Vascular Access Team using echo-guided puncture compared to conventional intravenous strategies (peripheral venous catheter insertion by hospitalization nurses) in a nephrology and kidney transplant unit.

Material and Method: This is a retrospective observational study. Three periods were compared: pre-implementation, implementation, and consolidation of the Infusion and Vascular Access Team. All patients admitted to the Nephrology and Kidney Transplantation hospitalization units requiring the placement of peripheral vascular catheters and midline were included. The prevalence of venous access, dwell time, and reasons for removal (complications) were analyzed.

Resultados: The incidence of peripheral vascular catheters decreased while that of midlines progressively increased in all three periods. Moreover, there were no differences in the mean dwell time of peripheral vascular catheters, whereas the dwell time of midlines increased. A higher and variable rate of complications was confirmed in peripheral vascular catheters in all periods, while in midlines, the complication rate was lower and more stable.

Conclusions: Implementing an intravenous therapy program in nephrology patients has allowed for minimizing the number of venous devices per patient, resulting in a reduction in punctures during hospitalization and a decrease

in complications associated with venous cannulation (lower morbidity).

Keywords: infusion and vascular access team (IVAT); midlines (ML); peripheral vascular catheters (PVC); complications; nephrology patient.

RESUMEN

Implementación de un programa de terapia intravenosa en pacientes nefrológicos: análisis de los resultados

Introducción: Evaluar la prevalencia y el impacto del uso de líneas medias canalizadas por el Equipo de Infusión y Accesos Vasculares mediante punción eco-guiada comparada con la estrategia endovenosa convencional (punción de catéter venoso periférico por enfermeras de hospitalización) en una unidad de nefrología y trasplante renal.

Material y Método: Estudio observacional retrospectivo. Se compararon 3 periodos: pre-implantación, implantación y consolidación del Equipo de Infusión y Accesos Vasculares. Se incluyeron todos los pacientes ingresados en las unidades de hospitalización de Nefrología y Trasplante Renal que requirieron de la colocación de catéteres vasculares periféricos y línea media. Se analizó la prevalencia de acceso venoso, el tiempo de permanencia y los motivos de retirada (complicaciones).

Resultados: La incidencia de los catéteres vasculares periféricos fue decreciente mientras que el de las líneas medias se incrementó progresivamente en los tres períodos. Así mismo, no se observaron diferencias en el tiempo medio de permanencia de los catéteres vasculares periféricos mientras que la permanencia de días de la línea media se incrementó.

Se confirma en todos los periodos una tasa de complicaciones más elevada y variable en los catéteres vasculares periféricos; mientras que en la línea media la tasa de complicaciones fue menor y más estable.

Conclusiones: La implementación de un programa de terapia intravenosa en pacientes nefrológicos ha permitido minimizar el número de dispositivos venosos por paciente, con la consecuente reducción de punciones durante el ingreso, así como la disminución de las complicaciones asociadas a la canalización venosa (menor morbilidad).

Palabras clave: equipo de infusión y accesos vasculares (EIAV); líneas medias (LM); catéteres vasculares periféricos (CVP); complicaciones; paciente nefrológico.

INTRODUCTION

Intravenous therapy (IVT) is the administration of liquid substances (used for hydration, drug administration, or nutrition) directly into a vein via a catheter, thereby enabling immediate access to the bloodstream. Compared with other routes of administration, the intravenous route is the fastest means of delivering solutions and drugs and, moreover, is the only route available for certain treatments such as transfusions. It is essential in the management of hospitalised patients, particularly those who are critically ill, chronically ill, or undergoing oncological treatment; increasingly, it is also used in the management of home-based patients¹.

It is estimated that more than 70% of hospitalised patients are carriers of some form of vascular access device (VAD). For this reason, correct use and care of these devices is a fundamental issue of considerable professional interest, both for those who handle them and for healthcare managers, owing to their close association with patient safety and well-being^{2,3}.

In the current context, VADs may be classified as short-, medium-, or long-term devices, depending on the anticipated duration of IVT.⁴ Peripheral venous catheters (PVCs) are short-term VADs inserted directly into superficial veins and indicated for IVT of < 4 days' duration, with neutral pH and osmolarity < 600 mOsm/L.⁴ Peripherally inserted central catheters (PICCs) are long-term VADs (up to 6 months) placed under ultrasound guidance, with the distal tip located in the lower third of the superior vena cava, enabling the administration of all types of solutions and drugs⁴. Midlines (MLs) are mid-term VADs also placed under ultrasound guidance and serve as an alternative to PVCs and PICCs⁴.

The use of ultrasound-guided techniques and peripheral puncture helps avoid risks such as haemothorax and pneumothorax associated with other central catheters, ensures successful puncture on the first attempt, and reduces traumatic complications related to insertion⁵.

Similarly, ML catheters have been associated with lower rates of phlebitis compared with short PVCs and lower infection rates than central catheters. This is because they are placed in the cephalic or basilic veins, which are deeper, larger vessels with greater blood flow. These characteristics explain the lower risk of mechanically or chemically induced phlebitis⁶.

In 2019, *Hospital Clínic de Barcelona* established a Cross-sectional Intravenous Therapy Programme that included a cross-sectional Infusion and Vascular Access Team (IVAT), a multidisciplinary vascular access committee, and an internal staff training programme. After patient evaluation (treatment duration and type, as well as difficulty of venous access cannulation), ward nurses may contact the IVAT for the insertion of ML or PICC lines.

Many nephrology patients require IV treatment during hospital admissions. Furthermore, they often carry vascular accesses for haemodialysis (catheters, native or prosthetic arteriovenous fistulas), which reduces the options for cannulating veins in the same limb. This situation leads to patient suffering (multiple cannulation attempts) and depletion of venous capital.⁵ Therefore, studying the use of MLs in this population is of great interest to nursing staff, as MLs can reduce the number of venepunctures during hospital stays and minimise vascular access complications, thereby contributing to patient well-being and quality of life.

The objective of this study was to evaluate the prevalence and impact of ML use inserted by the IVAT using ultrasound-guided puncture compared with the conventional intravenous strategy (PVC puncture by ward nurses) in a nephrology and renal transplant unit.

MATERIAL AND METHOD

We conducted a retrospective, observational study to evaluate venous vascular accesses in hospitalised patients in the nephrology and renal transplant unit of Hospital Clínic de Barcelona, before and after the implementation of an IVAT. Three time periods were compared (**figure 1**):

- P1: prior to IVAT implementation, January–March 2020.
- P2: during IVAT implementation, January–March 2021.
- P3: IVAT consolidation, January–March 2022.

The IVAT consists of 2 morning-shift nurses (08:00–15:00), both experts in vascular access and trained in the care of oncological patients. Following application of a care algorithm (**figure 2**) by the ward nephrology nurse—assessing peripheral venous access risk and duration, as well as type of IV therapy

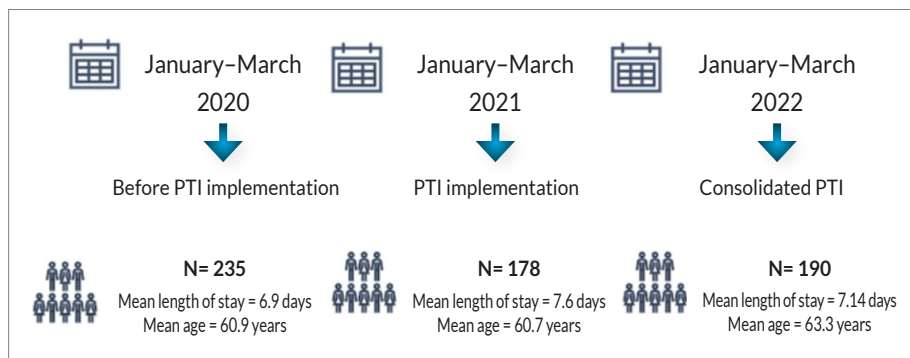


Figure 1. Graphical representation of the analysis periods together with the number of patients studied, length of stay, and mean ages.

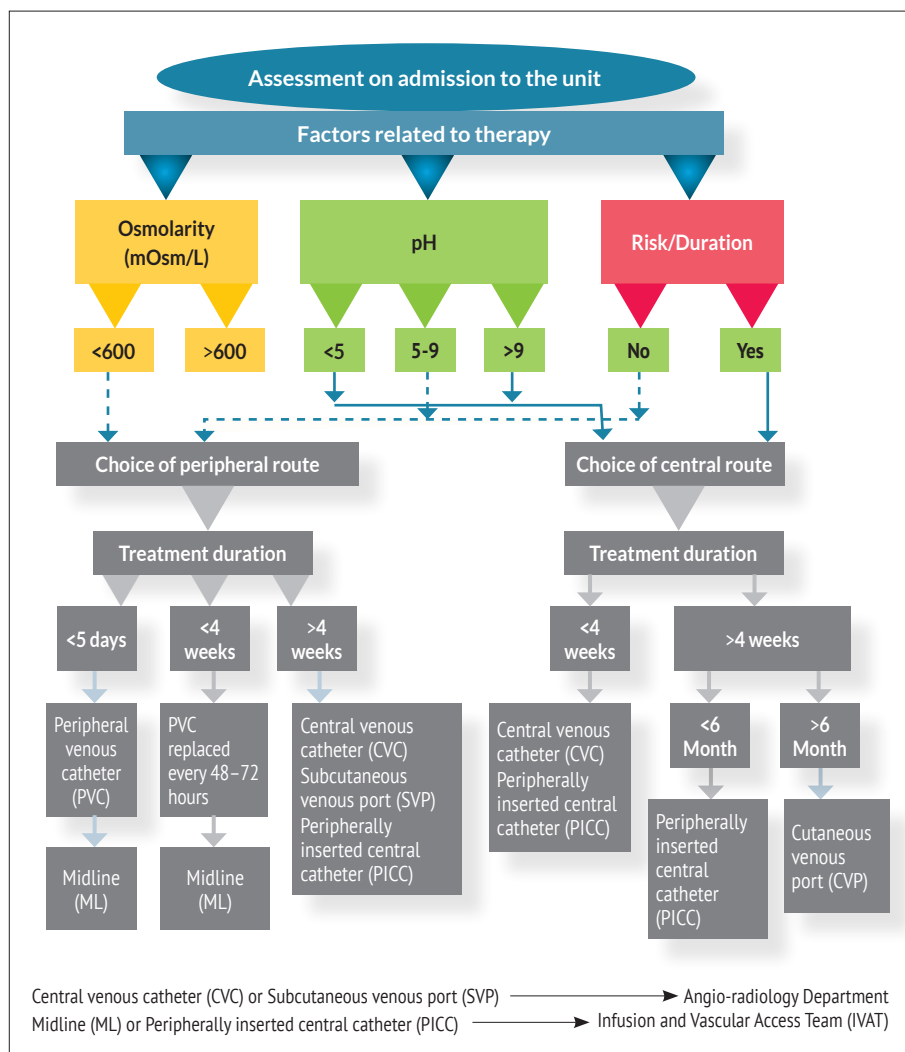


Figure 2. Decision algorithm for the most appropriate vascular access, depending on the characteristics of the treatment to be administered.

according to osmolarity and pH—a telephone consultation is made to the IVAT. Within the first 24–48 hours, the expert nurse attends the ward and, after a comprehensive patient assessment, proceeds with the insertion of ultrasound-guided VADs: 10-cm ML, 20-cm ML, or double-lumen ML.

The study population included all patients hospitalised in the nephrology and renal transplant unit during the study periods (24 conventional ward beds and 3 intermediate care beds). We analysed demographic data (age), incidence and type of venous access (ML/PVC), dwell time, and reasons for removal. Reasons for removal included complications such as extravasation, phlebitis, and dysfunction.

Data were collected using the SAP/ IPA software (SAP Logon Pad 770/IPA, Informatización del Proceso de Atención, Version 32).

Data analysis was performed using Microsoft Power BI. For quantitative variables, mean and standard deviation were calculated; for qualitative variables, absolute (n) and relative (%) frequencies were determined.

The study was approved by *Hospital Clínic de Barcelona* Research Ethics Committee (Approval code: HCB/2023/0732) and conducted in full compliance with the Declaration of Helsinki and the legal requirements of Biomedical Research (Law 14/2007).

RESULTADOS

A total of 603 patients admitted to the nephrology and renal transplant unit were studied across the 3 periods. The mean age was 61.6±15 years, with a mean length of stay of 7.21±11.11 days. During this period, 93% (561 patients) carried a PVC, while 8% (48 patients) carried an ML (considering that some patients carried both types of VAD during the same admission) (figure 3).

The mean dwell time was 3.02 days for PVCs and 8.43 days for MLs. The main reasons for device removal were end of treatment (without complications), dysfunction, extravasation, and phlebitis.

The breakdown of study variables across the three defined time periods was as follows:

■ **P1:** A total of 235 patients were analysed. The mean age was 60.9 ± 16.59 years, with a mean length of stay of 6.9 ± 8.56 days (Figure 4). During this period, 94% (221 patients) carried a PVC, whereas only 1% (2 patients) carried an ML (Figure 3). The mean dwell time was 3.15 days for PVCs and 6.9 days for MLs (figure 4). The complication rate for PVCs was 26% (57 patients: 46 extravasation [80%]; 11 phlebitis [20%]), while no complications were reported among the ML carriers (only 2 patients) (figure 5).

■ **P2:** A total of 178 patients were studied. The mean age was 60.7 ± 14.27 years, with a mean length of stay of 7.6 ± 11.36 days. PVC incidence remained at 95% (169 patients), whereas ML use increased to 8% (14 patients). The mean dwell time was 3.06 days for PVCs and 9.4 days for MLs. The complication rate for PVCs was 34% (57 patients: 33 extravasation [58%]; 14 phlebitis [24%]; 10 dysfunction [18%]), whereas for MLs it was 21% (3 patients: 2 dysfunction [67%]; 1 extravasation [33%]).

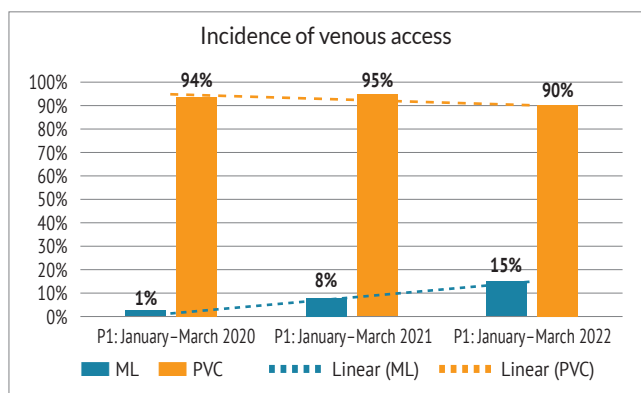


Figure 3. Incidence rate by type of device, in each of the study periods. ML: Midline. PVC: Peripheral venous catheter.

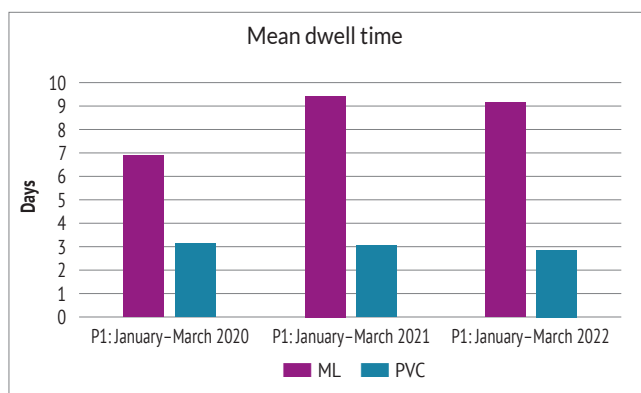


Figure 4. Mean dwell times by type of device, in each of the study periods. ML: Midline. PVC: Peripheral venous catheter.

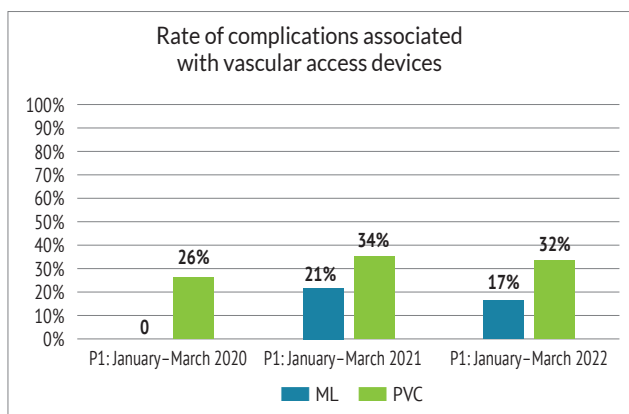


Figure 5. Incidence rate by type of device, in each of the study periods. LM: Midline. CVP: Peripheral venous catheter.

■ **P3:** A total of 190 patients were analysed. The mean age was 63.3 ± 13.67 years, with a mean length of stay of 7.14 ± 13.18 days. PVC incidence decreased to 90% (171 patients), while ML use increased to 15% (28 patients). The mean dwell time was 2.87 days for PVCs and 9.2 days for MLs. The complication rate for PVCs was 32% (55 patients: 29 extravasation [53%]; 12 dysfunction [22%]; 9 phlebitis [16%]; 5 other [9%]), whereas for MLs it decreased to 17% (5 patients: 3 extravasation [60%]; 2 dysfunction [40%]).

DISCUSSION

CKD is a public health problem with an estimated prevalence of approximately 15% in Spain. Patients with CKD have a shortened life expectancy (particularly due to cardiovascular causes and infections) and are frequently hospitalised. In both outpatient and inpatient settings, CKD patients require repeated venous cannulations (for blood tests and intravenous therapies), which increases morbidity and reduces quality of life⁷⁻⁹.

The implementation of an Infusion and Vascular Access Team (IVAT) in other medical specialties with high venous access demands, such as haemato-oncology, has proven to be an efficient alternative to PVCs, reducing the number of associated complications.

Recent literature indicates that the use of MLs may be expanding¹⁰, although few studies have been conducted in hospitalised patients with CKD.

We present our experience with venous access placement before and after the implementation of an IVAT in a nephrology and renal transplant inpatient unit.

Across the 3 study periods, the number of hospitalised patients was very similar, as were age and mean length of stay. In period P1 (prior to implementation), nearly all patients carried PVCs (94% vs 1% with MLs). Among these,

57 patients (26%) developed associated complications (21% extravasation, 5% dysfunction). In P2 (after implementation), while the proportion of patients with PVCs remained stable (95%), those with MLs (ultrasound-guided insertion) increased from 1% to 8%. Furthermore, implementation of the IVAT was associated with a significant reduction in complications: 34% in patients with PVCs compared with only 21% in those with MLs. Notably, this effect was not temporary, as the reduction in complications was sustained during the consolidation period (P3: 32% in PVC carriers vs 17% in ML carriers). These results are consistent with previous studies in patients hospitalised in level 3 trauma units and in emergency departments, which also demonstrated a lower complication rate with MLs compared with PVCs^{11,12}.

Another important finding of this study is the mean dwell time of vascular devices in hospitalised patients with CKD. Whereas PVCs remained in place for only 3.06 days in P2 and 2.87 days in P3, ML dwell time was much longer in the two post-implementation periods, reaching 9.4 days in P2 and 9.19 days in P3. These results align with other studies in hospitalised patients, confirming that MLs are the venous access device of choice in patients requiring IV therapy for > 6 days^{13,14}.

The benefits of IVAT implementation lie in improving patient safety and well-being, which positively impacts perceived quality of care. Having an IVAT generally reduces associated complications; promotes safe management of patients' venous capital; prevents future complications from venous depletion; decreases the need for multiple punctures when inserting peripheral catheters; enhances patients' quality of life; increases professional satisfaction; and reduces workloads^{15,16}.

Application of this model to other units has led to clear improvements in the quality and safety of care for hospitalised patients (fewer punctures, reduced complications, greater preservation of the vascular tree, and improved quality of life). This has resulted in the incorporation of a third nurse into the IVAT for the afternoon shift and a transition from telephone to electronic consultation requests.

The main limitation of the present study is its retrospective design and the potential biases inherent to this methodology. Moreover, it will be important in future to design prospective studies to confirm these findings and to evaluate aspects as important as patients' quality of life.

Our experience demonstrates the benefits of implementing an IVAT in a nephrology inpatient unit, particularly the reduced number of complications associated with ultrasound-guided ML placement and their longer dwell time compared with PVCs. The success of this programme has relied on the empowerment of nephrology nurses (through application of the care algorithm) and the involvement of advanced practice nurses within the IVAT.

Conflicts of interest

None declared.

Funding

None declared.

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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 8th edition of the Donation and Transplant Award is announced under the following:

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- Submissions must be written in Spanish.
- Works must be unpublished and comply with all submission guidelines for the XLIX National SEDEN Congress.
- The submission deadline will be the same as that established for other submissions to the 2024 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 XLIX National SEDEN Congress (2024).
- 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 50th SEDEN Congress, and the presenter must be one of the listed authors. Presentations by individuals not involved in the authorship will not be accepted.
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Quality of life and therapeutic adherence analysis in patients after kidney transplantation at Virgen del Rocío University Hospital: a descriptive study

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ABSTRACT

Introduction: Kidney transplantation is the treatment of choice for end-stage renal failure due to its association with patient survival and health-related quality of life. However, lifelong immunosuppressive therapy is necessary to achieve graft survival. This study evaluated health-related quality of life and adherence to immunosuppressive therapy.

Material and Method: A descriptive cross-sectional study was conducted at Virgen del Rocío University Hospital using the ESRD-SCL quality of life questionnaire and the SMAQ adherence questionnaire in patients who had undergone transplantation for over three months.

Results: Forty-two patients participated, with a mean age of 51.19 ± 13.89 years. Item-level results showed a good quality of life. Significant differences were found in the cognitive capacity dimension when comparing quality of life according to transplant duration and the physical capacity dimension among women. A description of adherence to immunosuppressive medication was provided regarding therapeutic adherence.

Conclusions: The results indicated a poorer quality of life in patients with more than 60 months post-transplantation. Adherence should be considered a multifactorial issue in future research, and new measurement methods should be explored.

Keywords: quality of life; treatment compliance and adherence; kidney transplantation.

RESUMEN

Análisis de la calidad de vida y adherencia terapéutica en pacientes tras trasplante renal en el Hospital Universitario Virgen del Rocío: un estudio descriptivo

Introducción: El trasplante de riñón supone la opción de elección como tratamiento en la insuficiencia renal terminal por su relación con la supervivencia del paciente y la calidad de vida relacionada con la salud, siendo necesario posteriormente un tratamiento inmunosupresor para de esta forma lograr la supervivencia del injerto. En este estudio se han evaluado la calidad de vida relacionada con la salud, así como la adherencia a la terapia inmunosupresora.

Material y Método Estudio descriptivo de corte transversal realizado en el Hospital Universitario Virgen del Rocío, empleando el cuestionario de calidad de vida ESRD-SCL y el cuestionario sobre adherencia SMAQ, a pacientes trasplantados de más de tres meses de evolución.

Resultados: Participaron cuarenta y dos pacientes con una edad media de $51,19 \pm 13,89$ años. Los resultados obtenidos por ítems muestran una buena calidad de vida. Al comparar la calidad de vida según tiempo de trasplante se encuentran diferencias significativas en la dimensión capacidad cognitiva; y por sexos en mujeres en la dimensión capacidad física. En cuanto a la adherencia terapéutica se ha realizado una descripción de la adherencia terapéutica a la medicación inmunosupresora.

Conclusiones: Los resultados obtenidos muestran una peor calidad de vida en aquellos pacientes con más de 60 meses de evolución postrasplante. Respecto a la adherencia se debe tener en cuenta el carácter multifactorial en futuras investigaciones y explorar nuevos métodos de medición.

Palabras claves: calidad de vida; cumplimiento y adherencia al tratamiento; trasplante de riñón.

INTRODUCTION

Renal function disorders may lead to either acute or chronic failure¹. Advanced chronic kidney disease (ACKD) is a long-term, irreversible decline in renal function requiring renal replacement therapy (RRT): kidney transplantation, haemodialysis, or peritoneal dialysis¹⁻². The preferred option is kidney transplantation, given its direct association with patient survival, quality of life, and reduced costs³.

A recent meta-analysis highlights that the global prevalence of chronic kidney disease (CKD) ranges from 4% to 13%, making it more common than diabetes, with a higher prevalence among women⁴.

In Spain, the prevalence of CKD has progressively increased, currently reaching 9.2% according to the latest data⁵.

In many countries, this figure continues to rise due to population ageing and the growing burden of cardiovascular and metabolic diseases⁶.

Annual mortality among patients with ACKD ON RRT remains between 8% and 9%, with mortality rates of 15.9% among patients on dialysis vs 2.6% in kidney transplant recipients⁷.

Kidney transplantation reduces costs by eliminating the need for dialysis, with peritoneal dialysis being the most cost-effective dialysis modality⁸. For this reason, health institutions are keen to increase the proportion of donors⁹, as this would generate considerable savings for the public health system that could be redirected to other clinical activities¹⁰.

Kidney transplantation is considered the treatment of choice for patients with ACKD because it improves quality of life, increases life expectancy¹¹, enhances physical and mental health¹, and reduces long-term costs compared with dialysis³.

Achieving these goals requires global and up-to-date data. However, no European kidney transplant registry exists to enable more precise epidemiological studies¹².

Major challenges in the transplant process include the shortage of donors relative to demand, long-term graft loss, and complications due to infections, cancer, or adverse effects of immunosuppressive treatment¹³.

The earliest kidney transplants were affected by immunological rejection, but the introduction of new immunosuppressive agents—such as ciclosporin in the 1980s, and mycophenolate mofetil and tacrolimus in the 1990s¹—improved 1-year survival rates to >90%. However, 10-year graft function remains limited (50%). A major reason for this lack of long-term improvement is poor adherence to immunosuppressive therapy¹⁴⁻¹⁵, which represents a significant clinical problem¹⁶.

Immunosuppressive therapy is divided into 2 phases: induction therapy and maintenance therapy. The standard maintenance regimen consists of a combination of calcineurin inhibitors (tacrolimus or ciclosporin), mycophenolate mofetil, and tapering doses of prednisone, or proliferation signal inhibitors (sirolimus and everolimus)¹⁷⁻¹⁸.

Despite the advantages of kidney transplantation and the improved quality of life compared with patients on dialysis, transplant recipients face challenges upon discharge¹. Analysing risk factors and causes of non-adherence is essential for developing future interventions directed at patients, healthcare professionals, transplant units, and the healthcare system as a whole¹⁵.

Therefore, the aim of this study was to analyse health-related quality of life (HRQoL) and adherence to immunosuppressive medication in kidney transplant recipients.

Specific endpoints:

- To identify the sociodemographic profile of the study population.
- To describe HRQoL in kidney transplant recipients.
- To analyse the relationship between quality of life, time since transplantation, and sex of the study participants.
- To describe adherence to immunosuppressive medication in kidney transplant recipients.

MATERIAL AND METHOD

Study design, setting, and period

We conducted a descriptive, cross-sectional study in the Kidney Transplant Outpatient Clinic at *Hospital Universitario Virgen del Rocío* (HUVR), Seville from May through September 2022.

Population and sample

The study population included all patients attending the HUVR kidney transplant clinic who met the following criteria:

Inclusion criteria: age >18 years; prior treatment with haemodialysis or peritoneal dialysis; >3 months post-transplant, regardless of the number of previous transplants.

Non-probabilistic, consecutive sampling was conducted.

Variables

Collected variables included age, sex, marital status, educational level, time since transplantation, living arrangements, and self-care autonomy. HRQoL and adherence to pharmacological treatment were also assessed.

Measurement instruments

HRQoL: The “End-Stage Renal Disease Symptom Check-List Transplantation Module” (ESRD-SCL), Spanish validated version¹⁹, was used. Originally developed by Franke, this questionnaire comprises 43 items grouped into six dimensions: limited physical capacity (10 items), limited cognitive capacity (8 items), cardiac and renal dysfunction (7 items), corticosteroid side effects (5 items), gingival and hair overgrowth (5 items), and psychological distress associated with transplantation (8 items). Items are scored on a 5-point Likert scale from 0 (not at all) to 4 (extremely), with higher scores indicating poorer HRQoL.

Adherence to immunosuppressive therapy: The “Simplified Medication Adherence Questionnaire” (SMAQ)²⁰, validated in Spanish for kidney transplant recipients, was used as an indirect method. This brief tool consists of six questions assessing different aspects of adherence: forgetfulness, routine, adverse effects, and omission quantification. Adequate validity and interobserver reproducibility have been demonstrated. A patient is classified as non-adherent if any response indicates non-adherence, or if they report missing >2 doses in the previous week or failing to take medication for >2 full days in the previous 3 months.

Procedure: Data were collected in the HUVR kidney transplant clinic. Participants were informed about the study objectives and provided with the questionnaires and the information/informed consent sheet. Anonymity of the collected information was guaranteed.

Statistical analysis: Data were analysed using IBM SPSS Statistics v27.0. Internal consistency of HRQoL dimensions was assessed with Cronbach’s alpha.

Quantitative variables were expressed as mean \pm standard deviation, and qualitative variables as absolute frequencies and percentages.

Inferential analysis used parametric or non-parametric tests depending on variable distribution. Statistical significance was set at $p < 0.05$.

Ethical considerations: This study fully complied with the Declaration of Helsinki (World Medical Association, 2013) and with current ethical and legal frameworks for biomedical research, including Regulation (EU) 2018/1725 of the European Parliament and Council (23 October 2018)¹⁴ and Organic Law 3/2018 (5 December 2018) on the Protection of Personal Data and Digital Rights.

The project was approved by Hospitales Virgen Macarena and Virgen del Rocío Research Ethics Committee. Informed consent was obtained from all study participants.

RESULTS

The final sample comprised 42 participants, with a mean age of 51.19 ± 13.89 years; 25 (59.5%) were men. Sociodemographic data for the sample are presented in **table 1**.

Table 1. Sociodemographic characteristics.

Variable	Category	n	%
Sex	Male	25	59.5
	Female	17	40.5
Marital status	Married/partner	24	57.1
	Divorced	3	7.2
	Single	13	30.9
	Widowed	2	4.8
Educational level	Primary education	16	38.1
	Secondary education	13	31.0
	University education	7	16.7
	No formal education	6	14.3
Self-care	Independent	33	78.6
	Supervision/help	9	21.4
Living arrangements	With family or accompanied	30	71.4
	Alone	11	26.2
	No response	1	2.4

Source: Own elaboration.

HRQoL was evaluated in participants who had been transplanted for at least 3 months. First, the internal consistency of the HRQoL dimensions established by the questionnaire was assessed using Cronbach’s alpha (see **table 2**). Results indicated good internal consistency in all dimensions, except for dimension 4 (Side effects of corticosteroids) and dimension 6 (Psychological distress associated with transplantation).

Table 2. Cronbach’s Alpha Coefficient.

Dimension	Cronbach’s Alpha	No. of items
D1. Limited physical capacity	0.818	10
D2. Limited cognitive capacity	0.668	8
D3. Cardiac and renal dysfunction	0.774	7
D4. Side effects of corticosteroids	0.518	5
D5. Growth of facial hair and gums	0.760	5
D6. Psychological distress associated with transplantation	0.526	8

Source: Own elaboration.

The scores for each item within the HRQoL dimensions are shown in **table 3**. The lowest-rated items (most frequently receiving a score of 4) were items 5, 7, 24, and 25, each with a response frequency of 16.7%, followed by item 4 (Tendency to bruise) with 14.3%. The best-rated item was Excessive hair growth, with 88% of the sample scoring 0.

Adherence was analysed using the criteria of the SMAQ questionnaire. Nine of the 42 participants (21.4%) failed to meet the criteria for adherence. Specifically, 14.28% did not take their medication at the prescribed time, 5% discontinued treatment when feeling unwell, and only 2.4% forgot to take medication once or twice per week. No analysis was performed of the relationship between therapeutic adherence and sociodemographic variables.

Inferential analysis compared HRQoL scores according to the different variables studied.

HRQoL dimensions were analysed according to time since transplantation, dividing participants into those with <60 months versus ≥60 months post-transplant. Results are shown in **table 4**.

When comparing HRQoL dimensions according to time since transplantation (**figure 1**), higher scores were observed in all dimensions among participants with a longer transplant duration, indicating poorer HRQoL. These differences reached statistical significance for Limited cognitive capacity ($p = 0.024$). Differences in Limited physical capacity ($p = 0.146$), Cardiac and renal dysfunction ($p = 0.396$), and Corticosteroid side effects ($p = 0.351$) did not reach statistical significance.

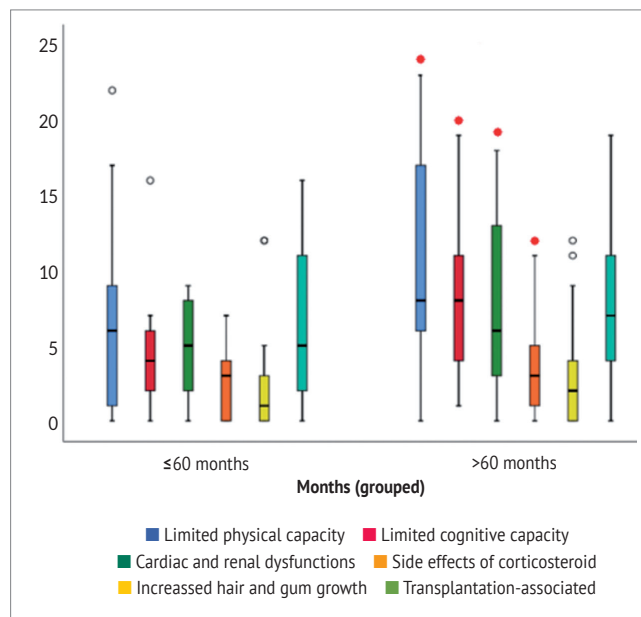


Figure 1. Comparison of HRQoL dimensions according to time since transplantation.

• p value <0.05, Mann-Whitney U hypothesis contrast test.

HRQoL was also analysed by sex (**figure 2**). Statistically significant differences were observed in the Limited physical capacity dimension ($p = 0.024$), with women scoring higher than men. No association was found between HRQoL and age.

DISCUSSION

In general terms, kidney transplantation is presented as a RRT option that allows for good HRQoL. In our study, we observed that, in the specific item referring to general health, 54.8% of participants indicated, “I do not have poor general health”, consistent with data from other studies reporting substantial improvement after transplantation exists to enable more precise epidemiological studies²¹.

Regarding symptoms associated with immunosuppressive medication, other authors have listed several manifestations, with fatigue and joint pain among the most frequent²². Similar results were obtained in the present study, in which the lowest-rated items or those with the highest scores were joint pain, muscle pain, bruising, and fatigue.

Analysis of HRQoL in relation to time since transplantation showed that patients transplanted for >60 months obtained higher scores—although not statistically significant—indicating worse HRQoL vs those transplanted for <60 months. Other studies have reported that overall quality of life scores remain stable up to 2 years post-transplantation exists to enable more precise epidemiological studies¹. Some studies confirm an

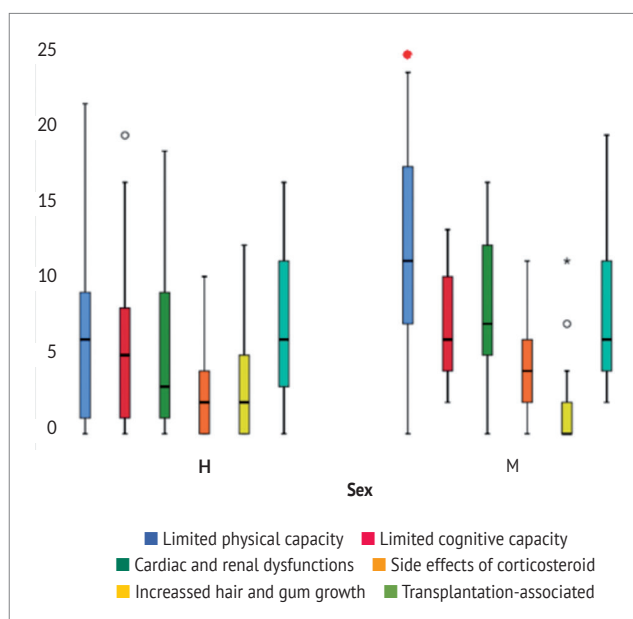


Figure 2. Comparison of HRQoL dimensions according to sex.

• p value <0.05, Mann-Whitney U hypothesis contrast test.

Tabla 3. Descriptive analysis of the questionnaire scores (HRQoL ESRD-SCL).

Item	Punctuation				
	0 (%)	1 (%)	2 (%)	3 (%)	4 (%)
01. Poor general health	54.8	14.3	19.0	11.9	-
02. Limitations of physical capacity	50.0	33.3	9.5	7.1	-
03. Concern about physical appearance	52.4	21.4	11.9	7.1	7.1
04. Limitations of cognitive abilities	69.0	26.2	4.8	-	-
05. Thoughts about transplantation	42.9	21.4	9.5	9.5	16.7
06. Disturbing thoughts about donor of transplant	69.0	16.7	7.1	2.4	4.8
07. Uncertainty about how long the transplant will last	38.1	19.0	14.3	11.9	16.7
08. Nightmares	83.3	7.1	4.8	2.4	2.4
09. Headaches	69.0	9.5	11.9	7.1	2.4
10. Insomnia	40.5	28.6	19.0	9.5	2.4
11. General discomfort	61.9	11.9	19.0	2.4	2.4
12. Difficulty maintaining concentration	64.3	23.8	7.1	4.8	-
13. Nervousness	28.6	21.4	26.2	11.9	11.9
14. Severe dizziness	88.1	9.5	2.4	-	-
15. Anxiety	50.0	21.4	21.4	2.4	4.8
16. Poor memory (recent things)	50.0	31.0	11.9	4.8	2.4
17. Loss of vision	38.1	26.2	16.7	16.7	2.4
18. Hearing loss	61.9	9.5	11.9	16.7	-
19. Tinnitus (ringing in ears)	71.9	16.7	4.8	7.1	-
20. Bad temper	61.9	23.8	4.8	7.1	2.4
21. Palpitations	52.4	23.8	16.7	7.1	-
22. High blood pressure	54.8	19.0	14.3	7.1	4.8
23. Bone pain	42.9	19.0	14.3	4.8	19.0
24. Joint pain	33.3	31.0	11.9	7.1	16.7
25. Muscle pain	40.5	16.7	16.7	9.5	16.7
26. Colds or flu	69.0	23.8	4.8	2.4	-
27. Excessive facial hair growth	78.6	11.9	2.4	4.8	2.4
28. Gum inflammation	59.5	21.4	7.1	7.1	4.8
29. Gum bleeding	64.3	16.7	9.5	4.8	4.8
30. Swollen face	57.1	26.2	11.9	4.8	-
31. Prone to infections	61.9	16.7	9.5	7.1	4.8
32. Swollen feet	71.4	7.1	9.5	7.1	4.8
33. Stomach pain	69.0	16.7	4.8	9.5	-
34. Tingling in legs	57.1	21.4	16.7	2.4	2.4
35. Feeling exhausted	38.1	21.4	16.7	14.3	9.5
36. Gum disorders	66.7	21.4	2.4	4.8	4.8
37. Increased body hair	88.1	4.8	7.1	-	-
38. Swollen face on waking in the morning	69.0	21.4	4.8	2.4	2.4
39. Facial changes	71.4	16.7	9.5	2.4	-
40. Swollen legs	66.7	16.7	2.4	7.1	7.1
41. Prone to bruising	35.7	11.9	4.9	33.3	14.3
42. Intense thirst	50.0	28.6	9.5	7.1	4.8
43. Memory problems	50.0	33.3	9.5	2.4	4.8

Source: Own elaboration.

Table 4. HRQoL dimensions according to time since transplantation (in months).

Dimension	Statistic	< 60 months	> 60 months
Limited physical capacity	Mean	6.82	10.48
	95%CI	3.66–9.98	7.34–13.62
	Median	6.00	8.00
	Standard deviation	6.14	7.60
	Variance	37.779	57.843
Limited cognitive capacity	Mean	4.41	7.61
	95%CI	2.45–6.38	5.66–9.62
	Median	4.00	8.00
	Standard deviation	3.82	4.80
	Variance	14.632	23.073
Cardiac and renal dysfunction	Mean	5.00	7.40
	95%CI	3.33–6.67	4.84–9.94
	Median	5.00	6.00
	Standard deviation	3.24	6.21
	Variance	10.500	38.583
Side effects of corticosteroids	Mean	2.65	3.68
	95%CI	1.43–3.87	2.32–5.04
	Median	3.00	3.00
	Standard deviation	2.37	3.30
	Variance	5.618	10.893
Psychological distress associated with transplantation	Mean	6.35	7.92
	95%CI	3.84–8.86	5.81–10.03
	Median	5.00	7.00
	Standard deviation	4.885	5.123
	Variance	23.868	26.243
Facial hair and gum growth	Mean	2.41	2.92
	95%CI	0.40–4.42	1.43–4.41
	Median	1.00	2.00
	Standard deviation	3.906	3.605
	Variance	15.257	12.993

Source: Own elaboration.

improvement in HRQoL after 3 years exists to enable more precise epidemiological studies²³, although individual variability in long-term outcomes must be considered. Our study assessed quality of life over a longer time frame; therefore, the results are not directly comparable and warrant further investigation in future research.

This study provides cross-sectional data, extending the follow-up period beyond the first 5 years post-transplantation, and reveals a statistically significant decline in cognitive capacity among the transplant population. This finding is consistent with other studies reporting differences of at least 5 points in both physical and mental components exists to enable more precise epidemiological studies²⁴. Careful assessment of psycho-emotional aspects and proactive nursing follow-up are thus required, with care plans tailored to address such alterations.

Sex-based analysis, consistent with other studies, showed that women report worse HRQoL in nearly all dimensions. These results are in line with Costa's study, in which women transplanted for more than 6 months reported poorer HRQoL, linked to emotional factors exists to enable

more precise epidemiological studies²⁵. This suggests that, in women—where coping may rely more heavily on emotional processes—the emotional assessment mentioned earlier has particular relevance.

With respect to therapeutic adherence, a descriptive analysis found that 14.28% of patients did not take their medication at the prescribed time, and nearly 5% discontinued medication when feeling unwell or forgot to take it. This contrasts with other studies reporting that 89.2% of transplant recipients met at least 1 criterion for non-adherence exists to enable more precise epidemiological studies²⁶.

In this regard, a direct relationship has been described between subtherapeutic blood levels of immunosuppressants and acute post-transplant rejection exists to enable more precise epidemiological studies²⁷. However, it should be noted that plasma drug levels may vary individually due to differences in absorption, distribution, or elimination; therefore, subtherapeutic or suprathreshold levels of a given drug cannot be reliably attributed to poor adherence exists to enable more precise epidemiological studies²⁸. Clinical experience has identified non-adherent behaviours that were not reflected in plasma levels, underscoring the need for new monitoring methods. Electronic monitoring of adherence is highly useful, although its routine implementation in clinical practice is limited by the requirement for additional electronic devices exists to enable more precise epidemiological studies²⁹.

Reminder systems rely on electronic devices, including text messages, mobile applications, or the use of electronic medication packaging (EMP) devices within medication containers exists to enable more precise epidemiological studies³⁰. The use of EMP devices and interventions may therefore facilitate adherence monitoring in future research.

This study has limitations, particularly regarding the generalisability of results, as the sample was small due to time constraints, post-COVID-19 attendance issues, and recruitment from a single hospital centre. Nevertheless, the reliability and specificity of the 2 instruments used—both validated for the study population—should be noted.

Given the cross-sectional design, the study will be useful for guiding future health interventions, helping to identify care needs.

In conclusion, based on the results of this study, HRQoL in renal transplant patients is generally perceived as good.

However, participants reported symptoms associated with distressing thoughts about the transplant, uncertainty about graft function, and physical symptoms. A decline in HRQoL was also observed as time since transplantation increased, with a statistically significant deterioration in the domain of “cognitive capacity limitation” at 5 years post-transplantation. Furthermore, women exhibited poorer overall HRQoL, with a statistically significant difference in the domain of “physical capacity limitation.” While further research with larger samples is required, female sex appears to be associated with poorer HRQoL.

As for adherence, the data obtained in this study are not comparable with those reported in the scientific literature. It is therefore likely that future studies with larger samples, complemented by qualitative research, will be required to account for the multifactorial nature of adherence measurement.

Conflicts of interest

None declared.

Funding

None declared.

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“JANDRY LORENZO”

GRANT 2024



THE SPANISH SOCIETY OF NEPHROLOGY NURSING (SEDEN) sponsors this grant to promote research projects aimed at expanding knowledge in the field of nephrology nursing. The deadline for grant applications is June 30, 2024, and applications must be submitted to the SEDEN headquarters in accordance with the following regulations.

- 1.- Applications for the Jandry Lorenzo Grant may be submitted by research projects in which the authors are registered nurses who are full members of SEDEN and up to date with their membership fees. Other professionals may participate as coauthors to encourage multidisciplinary collaboration.
- 2.- A detailed research project must be submitted, with no length limit, including the following sections: **Introduction** (background and current state of the topic), **Objectives** (hypothesis, if required by the study design), **Methodology** (setting, design, population and sample, measurement instruments, data collection, and statistical analysis), **References**, **Project timeline**, **Estimated budget**. The project must be submitted both in printed form and in electronic format.
- 3.- An abbreviated curriculum vitae of the applicants must also be included.
- 4.- For the awarding of the grant, the **SEDEN** Board of Directors will appoint an evaluation committee, which will act as the jury and communicate its decision to applicants before September 13th, 2024.
The grant consists of an official certificate presented to the awardees at the opening session of the 49th National SEDEN Congress (2024), and financial award of **€1,800***. Fifty percent of the grant amount will be paid upon award of the grant, and the remaining 50% upon completion of the study.
- 5.- The awardee undertakes to complete and submit the research project to the **SEDEN** Secretariat before September 13, 2025. If the study is not completed by that date, the authors may request a 6-month extension. After this period, if the study has not been submitted, the remaining funds will not be paid. The study will be considered complete when the final original manuscript is submitted, including the following sections: introduction, materials and methods, results, discussion, and references. The complete study will be presented at the 50th **SEDEN** Congress.
- 6.- The final project must comply with the **publication guidelines of Enfermería Nefrológica** and will undergo peer review by its Evaluation Committee for possible publication. If it does not pass this review, it will be published on the **SEDEN** website.
- 7.- The project may not be published or presented in any medium or forum until the requirements of Sections 5 and 6 have been fulfilled. The project must always state that it has been awarded the Jandry Lorenzo Grant 2024.
- 8.- Submitting an application implies acceptance of these regulations and of the jury's final decision, which shall not be subject to appeal.
- 9.- The grant may be declared void if no suitable applications are received.

**The financial award is subject to applicable tax withholdings.*

TERMS AND CONDITIONS
SEDEN

Renal transplant with cutaneous ureterostomy: a case report

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ABSTRACT

Introduction: Renal transplant requires immunosuppressive treatment to prevent graft rejection, but this increases the risk of infection. This risk is further exacerbated when the patient has a cutaneous ureterostomy due to catheter manipulation.

Clinical case description: A male patient was admitted for his first renal transplant and cutaneous ureterostomy. Past medical history includes a right nephrectomy in 2014, a left nephrectomy, and a radical cystectomy in 2019, which led to the initiation of hemodialysis.

Nursing care plan description: Initial assessment was conducted, with subsequent evaluations every seven days based on Marjory Gordon's functional patterns. At the 15-day mark, the following diagnoses were prioritized: Readiness for Enhanced Knowledge, Potential Infection Complication, and Readiness for Enhanced Coping.

Evaluation of care plan: The care plan was reviewed weekly, closing out resolved diagnoses. Upon discharge after 33 days of hospitalization, established goals were achieved, with an ongoing reevaluation of most of them in the post-transplant Nursing Consultation, particularly the Readiness for Enhanced Knowledge diagnosis.

Conclusions: Proper health education and involvement of an interdisciplinary team enable effective learning of care practices, promoting therapeutic adherence and facilitating early prevention and detection of complications that may arise in transplant patients. Additionally, assisting the patient

and family in accepting this new phase, which entails physical, emotional, and social changes, is crucial.

Keywords: ureterostomy; renal transplant; infection; complications; nursing care plans.

RESUMEN

Trasplante renal con ureterostomía cutánea: a propósito de un caso

Introducción: El trasplante renal precisa de un tratamiento inmunosupresor para evitar el rechazo del injerto, pero éste aumenta el riesgo de contraer una infección. Este riesgo se agrava, aún más, cuando el paciente es portador de una ureterostomía cutánea por la manipulación de las sondas.

Descripción Caso Clínico: Varón que ingresa para realización de primer trasplante renal y ureterostomía cutánea. Como antecedentes personales encontramos nefrectomía derecha en 2014 y nefrectomía izquierda y cistectomía radical en 2019, momento en el que comienza en programa de hemodiálisis.

Descripción del plan de cuidados: Se realizó valoración inicial y cada 7 días según patrones funcionales de Marjory Gordon. De los diagnósticos identificados a los 15 días se establecieron como prioritarios: Disposición para mejorar los conocimientos, Complicación potencial la infección y Disposición para mejorar el afrontamiento.

Evaluación del plan de cuidados: Semanalmente, se revisó el plan de cuidados, cerrando aquellos diagnósticos resueltos.

Al alta, tras 33 días ingresado, se alcanzaron los objetivos establecidos, aunque la gran mayoría de ellos se continuaron reevaluando en la Consulta de Enfermería post-trasplante, como fue el diagnóstico de Disposición para mejorar los conocimientos.

Conclusiones: Una correcta educación para la salud y la intervención de un equipo interdisciplinar permite un adecuado aprendizaje de los cuidados fomentando la adherencia terapéutica y una buena prevención y detección precoz de las complicaciones que pueda conllevar la derivación en un paciente trasplantado. Además, ayudar al paciente y a su familia a aceptar esta nueva etapa que conlleva cambios a nivel físico, emocional y social.

Palabras clave: ureterostomía; trasplante renal; infección; complicaciones; planes de atención de enfermería.

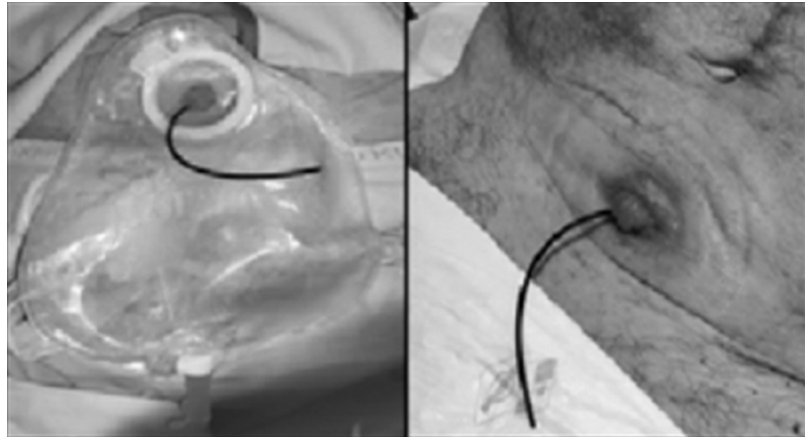


Figure 1. Images of the percutaneous ureterostomy with and without a collection bag.

INTRODUCTION

Kidney transplantation is the best treatment for patients with advanced chronic kidney disease (CKD), as it improves quality of life compared with other available treatment options, although it still requires specific care. For this reason, over the past 10 years it has consolidated its position as the most prevalent treatment modality, reaching 54.6%¹⁻³.

The success of transplantation also depends on adequate immunosuppressive therapy, which has improved in recent years; conversely, this can increase the risk of complications such as infection³.

A cutaneous ureterostomy is a heterotopic, non-continent urinary diversion performed after cystectomy. In this technique, the ureter is brought directly to the skin and everted without using any part of the intestinal segment, thereby reducing the risk of complications (Figure 1). One of the drawbacks of this technique is the need to carry ureterostomy catheters to prevent stenosis, which increases the risk of infection. Studies have reported a prevalence of urinary tract infection in patients with permanent urinary diversion of 42.8%⁴⁻⁵.

Other noteworthy complications include infection, stoma retraction, stenosis, oedema, dehiscence, and dermatitis^{4,6}.

CASE PRESENTATION

A 71-year-old man was admitted to the Nephrology Department of the *Hospital General Gregorio Marañón* (Madrid,

Spain) for his first deceased-donor kidney transplant. His past medical history included right nephrectomy in 2014 for low-grade chorion infiltration; transient ischaemic attack in 2018; left nephrectomy and radical cystectomy in 2019 for renal pelvic cancer; persistent atrial fibrillation; thrombocytopenia; advanced chronic kidney disease; and obesity.

He had been on haemodialysis since 2019 via a left radiocephalic autologous arteriovenous fistula. During pre-transplant testing, the urology team informed him that renal transplantation would require a permanent cutaneous ureterostomy. The patient agreed and was placed on the transplant waiting list in January 2023. In February, he underwent renal transplantation and left paramedian cutaneous ureterostomy with single-J catheter placement (figure 1).

NURSING ASSESSMENT

Patient assessment was performed at admission using Marjory Gordon's functional health patterns, with periodic weekly evaluations (table 1).

Table 1. Assessment according to M. Gordon's functional patterns.

<p>PATTERN I: Health perception and management</p>	<ul style="list-style-type: none"> • Medical history: Obesity, former drinker, former smoker, atrial fibrillation (2018), Barrett's oesophagus, chronic gastritis, transient ischaemic attack (2018), thrombocytopenia, right nephrectomy (2014), left nephrectomy + cystectomy (2019) for renal neoplasm. • Started haemodialysis in 2019. • Fully vaccinated. • Good adherence to treatment. • Health practices: medical check-ups. • Interest in the therapeutic regimen. • Falls risk assessment: 2 points.
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PATTERN II: Nutritional, metabolic	<ul style="list-style-type: none"> • Height: 170 cm; Weight: 91 kg; BMI: 31.49 kg/m². • Norton Scale: 20. • Malnutrition Universal Screening Tool (MUST): 0 points. • Mini Nutritional Assessment (MNA): 12 points. • Does not take supplements. No chewing problems. • No nausea or vomiting. • Well hydrated. • Afebrile. • Carries left upper limb internal arterio-venous fistula. • Carries right upper limb peripheral venous line (20G).
PATTERN III: Elimination	<ul style="list-style-type: none"> • Anuric. • Faecally continent. Daily bowel movement.
PATTERN IV: Activity and exercise	<ul style="list-style-type: none"> • Basal oxygen saturation: 96%. • No dyspnoea. • Blood pressure: 120/74 mmHg. Heart rate: 90 bpm. • Independent in basic activities of daily living and instrumental activities of daily living.
PATTERN V: Sleep and rest	<ul style="list-style-type: none"> • No disturbances. • No insomnia.
PATTERN VI: Cognitive, perceptual	<ul style="list-style-type: none"> • Conscious and oriented in all three spheres. • No communication disorders. • No sensory impairment. • Visual Analogue Scale (VAS): 0 points. • Needs specific information about the process (health education).
PATTERN VII: Self-concept / self-esteem	<ul style="list-style-type: none"> • No disturbances. • Mood: calm.
PATTERN VIII: Role and relationships	<ul style="list-style-type: none"> • Support: family.
PATTERN IX: Sexuality and reproduction	<ul style="list-style-type: none"> • No disturbances.
PATTERN X: Adaptation and stress tolerance	<ul style="list-style-type: none"> • No disturbances.
PATTERN XI: Values and beliefs	<ul style="list-style-type: none"> • No disturbances.

CARE PLAN

The care plan was developed using NANDA nursing diagnoses, NOC outcome criteria, and NIC nursing interventions⁷⁻¹⁰.

The diagnoses identified at admission, associated with renal transplantation, were: Impaired urinary elimination [00016], Impaired tissue integrity [00044], Impaired physical mobility [00085], Readiness for enhanced knowledge [00161], Acute pain [001362], Risk for electrolyte imbalance [00195], and the potential complication of infection [10024].

Two weeks after transplantation, priority was given to readiness for enhanced knowledge [00161], readiness for enhanced coping [00158], and risk for fluid and electrolyte imbalance [00195], with infection [10024] identified as a potential complication (table 2).

Table 2. NANDA-NIC-NOC diagnoses two weeks post-transplant.

NANDA	NOC (Outcomes)	NIC (Interventions)
[000161] Readiness for enhanced knowledge. Manifested by: expressed desire to improve learning.	<p>[1829] Knowledge: ostomy care.</p> <p>Indicators:</p> <ul style="list-style-type: none"> - 182902: Ostomy dressing - 189201: Ostomy functioning - 182907: Stoma complications - 182915: Procedure for changing the ostomy bag <p>Initial score: 4 pts. Target score: 16 pts.</p> <p>[1803] Knowledge: disease process.</p> <p>Indicators:</p> <ul style="list-style-type: none"> - 180302: Characteristics of the disease - 180304: Risk factors - 180305: Physiological effects - 180309: Potential complications <p>Initial score: 4 pts. Target score: 16 pts.</p> <p>[1813] Knowledge: therapeutic regimen.</p> <p>Indicators:</p> <ul style="list-style-type: none"> - 151306: Prescribed medication regimen - 181302: Responsibility for self-care during treatment - 181303: Self-care in emergency situations - 181216: Benefits of disease control <p>Initial score: 4 pts. Target score: 16 pts.</p>	<p>[5606] Individual teaching.</p> <ul style="list-style-type: none"> - Assess the patient's current level of knowledge and understanding. - Instruct the patient. - Allow time for questions and concerns. <p>[0480] Ostomy care.</p> <ul style="list-style-type: none"> - Monitor for possible postoperative complications. - Monitor stoma healing. - Help the patient practise self-care. - Instruct the patient and family in care. <p>[8020]: Multi-disciplinary care conference.</p> <ul style="list-style-type: none"> - Review referrals as appropriate. - Review discharge plans. - Review the care plan as necessary.

<p>[10024] Potential complication: infection. Due to manipulation and intake of immunosuppressants, manifested by fever.</p>	<p>[1924] Risk control: Infectious process. Indicators: - 192426: Identifies infection risk factors. - 192404: Identifies risk of infection in daily activities. - 192406: Identifies signs and symptoms. - 192415: Practices hand hygiene. Initial score: 8 pts. Target score: 10 pts.</p>	<p>[6550] Protection against infection - Maintain asepsis for the at-risk patient. - Inspect for erythema, extreme warmth, or exudate on skin and mucosa. - Teach patient and family to avoid infections.</p> <p>[1876] Urinary catheter care. - Maintain a sterile, closed, unobstructed urinary drainage system. - Observe characteristics of drained fluid.</p> <p>[3583] Skin care: graft site. - Avoid friction and shear at the graft site. - Monitor for signs of infection and other postoperative complications.</p>
<p>[00158] Readiness for enhanced coping. Manifested by expressed desire to improve management of stressors.</p>	<p>[1924] Risk control; [1305] Psychosocial adaptation: life change. Indicators: - 130502: Maintains self-esteem. - 130520: Maintains a positive self-image. - 130513: Uses available social support. - 130522: Expresses acceptance of the new role. Initial score: 15 pts. Target score: 20 pts.</p>	<p>[5220] Improvement of body image - Use anticipatory guidance to prepare the patient for predictable body image changes. - Determine if body image changes have contributed to social isolation. - Identify available support groups for the patient.</p>
<p>[00195] Risk of electrolyte imbalance, related to renal dysfunction.</p>	<p>[0504] Renal function. Indicators: - 050418: Weight gain - 050438: Oedema Initial score: 6 pts. Target score: 10 pts.</p>	<p>[2080] Fluid and electrolyte management. - Weigh daily and monitor progression. - Consult physician if signs and symptoms of hydroelectrolytic imbalance persist or worsen.</p>

<p>[00118] Disturbed body image. Manifested by: actual change in structure or function related to surgical procedures.</p>	<p>[1205] Self-esteem. Indicators: - 120501: Verbalises self-acceptance - 120511: Level of confidence - 120519: Feelings about self Initial score: 10 pts. Target score: 14 pts.</p>	<p>[5270] Emotional support. - Listen to expressions of feelings and beliefs - Discuss the emotional experience with the patient.</p>
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EVALUATION OF THE CARE PLAN

From the time of surgery, health education was initiated for the patient and his family, explaining how the procedure was performed. The main elements of health education were stoma assessment, device change, stoma and peristomal skin hygiene (with soft sponge, neutral pH soap, and water, drying with disposable towels without friction), application of a new device, and attachment of a collection bag at night⁴. The correct measurement of the stoma diameter was emphasised, as the bag must be cut 2 mm larger to avoid leaving exposed skin at risk of irritation⁶.

At 3 weeks, all proposed objectives were achieved:

- Readiness for enhanced knowledge: The patient was able to explain his new situation and independently perform ostomy care. Final score: 16 points.
- Potential complication-Infection: At review, there were no signs of infection. Ostomy care was adequate, but continued monitoring was recommended at both transplant and ostomy nursing follow-up clinics. Final score: 10 points.
- Readiness for enhanced coping: Improved self-esteem and acceptance of changes, recognising the value of these changes in improving his quality of life. Final score: 20 points.
- Risk for electrolyte imbalance: No oedema; improved creatinine and other laboratory parameters. Final score: 10 points.
- Disturbed body image: Acceptance of new body image. A referral to psychology was offered, but the patient declined. Final score: 14 points.

At 1 month, the patient continued with the diagnoses of risk for electrolyte imbalance and potential complication: infection, both requiring ongoing monitoring even after discharge. At discharge (after 4 weeks of hospitalisation), the patient had met the proposed objectives for each diagnosis, which will continue to be evaluated in the Post-Transplant Nursing Clinic. An appointment was also arranged with the stoma therapist to review progress.

To achieve these objectives, an interdisciplinary team was required:

- Nephrology nurses: Provided transplant and ureteros-tomy care, continuous assessment, and patient/family health education.
- Stoma therapists: Assessed and monitored ostomy progress and provided health education.
- Urologists and nephrologists: Monitored renal graft and ureterostomy, assessed laboratory parameters, signs, and symptoms.
- Psychology team: In this case, not required, as declined by the patient.

DISCUSSION

The risk of infection in a transplanted patient with ureteros-tomy is increased, given not only their immunosuppressed state but also manipulation of the ureterostomy catheters, which directly connect to the renal graft. Barrera-Lozano et al. reported an infection incidence of 42.8% in transplant patients with cutaneous ureterostomy⁵.

Adequate health education provided by nursing staff, combined with interdisciplinary team intervention, enables appropriate learning of specific care and early prevention and detection of potential complications such as infection, stoma oedema, or retraction in kidney transplant patients with cutaneous ureterostomy⁴. As described by other authors, these complications significantly impact graft survival⁵.

Furthermore, patients and their families must be supported in accepting this new stage, which entails physical, emotional, and social changes, through an individualised care plan that incorporates psychological assessment and encourages active listening⁴.

Since kidney transplantation has become the most prevalent renal replacement therapy, according to the 2020 ONT/SEN registry (54.6%),² and considering the role of nursing and the characteristics of our patient, this underscores the need for a holistic nursing care process to meet patient needs. Interdisciplinary teamwork is therefore essential to ensure effective learning of care for both the renal graft and the new urinary diversion, promoting therapeutic adherence, which in this case encompasses not only medication intake but also ureterostomy care.

Conflicts of interest

None declared.

Funding

None declared.

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Remembering Jandry

First President of the Spanish Society of Nephrology Nursing

As we close this issue, we have received the sad news of the passing of our first president, Jandry Lorenzo, who, as the author of this text explains, was fundamental to the birth and development of Nephrology Nursing.

Almost without thinking, I picked up a pen that reads *Spanish Society of Nephrology Nursing*.

Let us remember together her beginnings:

It was 1973, and the VII Meeting of Nephrologists was held in Santander (Cantabria, Spain). It was called a "Meeting" because the specialty of Nephrology did not yet exist; it was created after that event.

A month earlier, I received a call from a nurse in Madrid, the head of Dialysis at *Hospital General Gregorio Marañón* (Madrid, Spain) – it was you – with the intention that nurses in Spain working in Dialysis could also gather. I must confess I felt an overwhelming FEAR, which you noticed, and you told me you understood it was perhaps a little premature and that it would be better to leave it for another occasion.

During the meeting, I was introduced to your supervisor, Dr. Valderrabano, and I told him: "Tell your head nurse that I will call her." Months later, we met at the Ercilla Hotel in Bilbao (Basque Country, Spain), in a room we rented, where we remained standing because the rooms with chairs were more expensive.

At the head of that first meeting – the very first we had – were, as you remember, two women: you, Jandry, and Rosa Lavari. I never told you how much I learned that day.

From you, I learned how clear you were about the direction we needed to take, and you reminded me of Seneca's words: "*If one does not know to which port one is sailing, no wind is favourable.*" You knew exactly where we were headed – the importance of the nurse's role in caring for dialysis patients (and look at how far it has come). And from Rosa Lavari – do you remember how we were all speaking at once? – I learned about the enormous respect she showed to everyone in that meeting: respect in giving space to others' voices, in listening to others. How fortunate I was to have known you both!

The following months, as you know, were difficult. We met at your hospital, I believe once a month, on Sundays, while gathering information about the nurses performing dialysis across Spain. In your office, we wrote the letters by hand – do you remember how much we laughed at how sticky our tongues and mouths became from sealing envelopes? What times those were!

Some people now may think that this great Society we have built came about on its own. We must remind them, in our communications, that we remain a strong and significant Society thanks to the effort of many who gave and continue to give their time and knowledge, believing in the importance of nursing alongside the patient; who research to provide better care; who would manage effectively if only they were allowed. This was our Mission, and now others must continue fighting to achieve it again.

Chiquitilla, from your place of rest, continue to help us. A big embrace.

Rest in peace.

Rosa Alonso Nates

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The journal of the Spanish Society of Nephrology Nursing will publish in this section all scientific activities related to Nephrology submitted by Scientific Associations, Health care Institutions, and Training Centers.

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, objective, 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, objective, 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, objectives, 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 <http://decs.bvs.br/E/homepagee.htm> 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 objectives.

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 objectives 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, Ruiz-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":

Firaneq 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 to 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 Editors (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, objective, method, results and conclusions.	Maximum length: 3,500 words. Structure: introduction, objective, method, results, discussion and conclusions.	Maximum 6.	Maximum recommended 6.	Maximum 35.
Long articles Qualitative Methodology.	250 words. Structure: introduction, objective, method, results and conclusions.	Maximum length: 5,000 words. Structure: introduction, objective, method, results, discussion and conclusions.	Maximum 6.	Maximum recommended 6.	Maximum 35.
Brief articles.	250 words. Structure: introduction, objective, method, results and conclusions.	Maximum length: 2,500 words. Structure: introduction, objective, method, results, discussion and conclusions.	Maximum 3.	Maximum recommended 6.	Maximum 15.
Reviews.	250 words. Structure: introduction, objective, methodology, results and conclusions.	Maximum length: 3,800 words. structure: introduction, objective, 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, objective 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 publica 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 metátesis 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 director. 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 <http://decs.bvs.br/E/homepagee.htm> 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 comprensión 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.

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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»:

Firenek 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.

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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/>:

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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.
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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.

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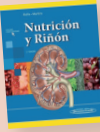
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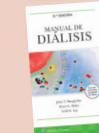
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