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Effectiveness of an individual educational intervention related to self-care management capacity in people on haemodialysis

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ABSTRACT

Introduction: In many cases, haemodialysis patients lack tools that allow them to develop self-care practices and adapt to the changes associated with their treatment.

Objectives: The present study aimed to evaluate the effectiveness of an educational intervention on the self-care management capacity in people on haemodialysis.

Material and Method: We conducted a quantitative, pre-experimental, interventional, single-centre study. A sample of 77 haemodialysis patients was included from November 2023 through June 2024. To evaluate self-care management capacity, the Appraisal of Self-Care Agency Scale (ASA-A) and a self-designed questionnaire on Self-Care Activities in Haemodialysis (SAH), validated by experts, were used. The educational intervention was carried out individually during haemodialysis sessions, with periodic evaluations to identify acquired knowledge and areas requiring reinforcement.

Results: The mean pretest scores were 81.46 and the post-test scores were 84.22. A Student's t-test for related samples was performed, and the results showed a statistically significant value in self-care management capacity (t=-3.469, p=0.001), indicating that the observed difference is attributable to the intervention.

Conclusions: The importance of establishing an educational programme in haemodialysis, led by nursing professionals with an educator profile, was confirmed to follow up on patients and strengthen their self-care capabilities.

Keywords: haemodialysis; education; self-care; self-management.

RESUMEN

Efectividad de una intervención educativa individual relacionada con la capacidad de autogestión del autocuidado en personas en hemodiálisis

Introducción: En muchos casos, los pacientes en hemodiálisis carecen de herramientas que les permitan desarrollar prácticas de autocuidado y adaptarse a los cambios asociados a su tratamiento.

Objetivos: El presente estudio tuvo como objetivo evaluar la efectividad de una intervención educativa en la capacidad autogestión del autocuidado en personas en hemodiálisis.

Material y Método: Estudio cuantitativo, preexperimental, de intervención y unicéntrico. Se incluyó una muestra de 77 pacientes en hemodiálisis de noviembre de 2023 a junio de 2024. Para evaluar la capacidad de autogestión del autocuidado, se utilizó la escala Appraisal of Self-Care Agency Scale (ASA-A) y un cuestionario sobre Actividades de Autocuidado en Hemodiálisis (AAH) de diseño propio, validado por expertos. La intervención educativa se llevó a cabo de manera individual durante las sesiones de hemodiálisis, con evaluaciones periódicas para identificar los conocimientos adquiridos y aquellos que requerían reforzarse.

Resultados: Los puntajes promedios del pretest fueron de 81,46 y para el postest fue de 84,22. Se realizo la prueba t de Student para muestras relacionadas cuyos resultaron arrojaron un valor estadisticamente significativo en la capacidad de autogestión del autocuidado (t=-3,469, p=0,001), lo que indica que la diferencia observada es atribuible a la intervención.

Conclusiones: Se comprobó la importancia de establecer un programa educativo en hemodiálisis, dirigido por profesionales de enfermería con perfil de educadores, para dar seguimiento a los pacientes y fortalecer sus capacidades de autocuidado.

Palabras clave: hemodiálisis; educación; autocuidado; autogestión.

INTRODUCTION

Comprehensive care for haemodialysis patients is a complex process requiring a series of activities aligned with personal interests, goals, and needs. In many cases, patients lack the tools to develop self-care and adapt to new changes[1].

In Mexico, the healthcare system does not have a single census of patients with chronic kidney disease (CKD), which makes it difficult to know and predict which patients require one of the renal replacement therapies[2]. As a consequence, it has been observed that most enter a dialysis programme in uraemic conditions and with a sub-optimal cognitive state to comprehend the care they should follow.

From the perspective of Dorothea Orem's Self-Care Agency Model, self-care is defined as the autonomous and deliberate capacity to care for oneself and implies an inherent responsibility[3]. For CKD patients on dialysis, this capacity demands a change in their lifestyle. To achieve this, individuals must possess the ability to reason and understand their health status, allowing for informed decision-making. Self-management of self-care, for its part, refers to the individual's capacity to perform productive actions through judgments and decisions about what they can, should, and are willing to do for their own well-being[4].

Various factors can affect self-care capacity in these patients, including advanced age, low educational level, depression and low perception of harm, medication side effects, health beliefs and attitudes, unclear instructions, lack of communication with the healthcare team, complexity of the therapeutic regimen, poor understanding of the reasons for therapy, socioeconomic difficulties, and substance abuse[5,6].

In haemodialysis units, educational activities often focus on delivering group information sessions without considering a comprehensive and individualised approach. Former studies have demonstrated that individual (one-to-one) education facilitates the acquisition of knowledge, exchange of ideas, and skills necessary for proper disease management, achieving, among other things, the exchange of ideas and emotions between the learner (care recipient) and instructor, which is fundamental in the context of haemodialysis[7].

The present study aimed to evaluate the effectiveness of an educational intervention on self-management of self-care capacity in individuals undergoing haemodialysis.

MATERIAL AND METHOD

Design and scope of application: We conducted a quantitative, pre-experimental, interventional, single-centre study from November 2023 through June 2024, at a private renal care clinic in the State of Mexico.

Population and sample: The population consisted of adult patients undergoing haemodialysis therapy. total of 77 patients were included in the study, 37 from the morning shift and 40 from the afternoon shift. Inclusion criteria were being older than 18 years, undergoing conventional haemodialysis treatment, being oriented in time, place, and person, and providing informed consent to participate in the research. Patients with sensory difficulties that could compromise data collection were excluded, and a non-probability convenience sampling method was chosen.

Instruments: To measure patients' perception of their ability to perform self-care activities, the Spanish version of the Appraisal of Self-Care Agency Scale (ASA-A) was used[8], Developed by Edilma de Reales, this instrument consists of 24 Likert-type items ("never," "almost never," "almost always," and "always"), demonstrating high reliability with a Cronbach's alpha coefficient of 0.81, validated in the Mexican population[9,10],

To define the characteristics of the educational programme, the patients' profiles were considered, leading to the design of a Haemodialysis Self-Care Activities (HSCA) instrument. This instrument underwent a validation process by nephrology nursing experts to ensure its content and structure. The instrument is divided into several sections: sociodemographic data, assessment of vascular access characteristics, presence of pruritus, cramps, muscular or joint pain, fluid retention, pharmacological adherence, nutrition, recreation, exercise, and a subjective assessment scale to determine uraemic status **(Appendix 1)**.

The instruments in this research were applied at two time points (pre-test and post-test) with a three-month interval, to enhance the temporal stability reliability of the intervention.

Methodological procedure: Data collection was carried out during haemodialysis sessions. Firstly, the purpose and scope of the research were explained in detail, ensuring each participant understood the importance of their collaboration. Secondly, the informed consent form was presented, signed, and the assessment instruments were then administered. Thirdly,

participants received support and advice to complete the instruments, which took approximately 20 to 30 minutes per patient.

During an implementation period, educational sessions were conducted. These consisted of one-to-one encounters, lasting 15 to 30 minutes, addressing topics such as chronic kidney disease, haemodialysis, vascular access care, diet and fluid management, therapeutic adherence, and self-care. At the end of each intervention, information accompanied by written support (a leaflet) related to the educational programme was provided. During this same period, an examination was administered to assess the level of knowledge and identify topics the patient had not understood, so they could be revisited.

In the post-intervention phase, the ASA-A and HSCA instruments were reapplied three months after their initial administration, with the aim of evaluating self-management of self-care capacity.

Data analysis: Data analysis and evaluation were performed using SPSS statistical software version 25. In this process, frequencies, standard deviation, maximums, minimums, and average values of the results were calculated.

For the analysis of variable normality, the Kolmogorov-Smirnov (K-S) test was used, as the sample size was >50. For inferential analyses, Student's t-test for related samples was employed to identify differences before and after the intervention. Differences were considered statistically significant with P values ≤0.05.

Ethical and Legal Aspects: In full compliance with Article 16 of Mexico's General Health Law[11], this research adheres to strict ethical and scientific requirements (autonomy, beneficence, justice), with measures implemented to protect the dignity, rights, safety, and well-being of research participants. Prior to the study, informed consent was requested, and its nature was explained in detail.

RESULTS

The mean age of the sample was 43.3 ± 10.7 years, of which 41.5% (n=32) were men and 58.4% (n=45) were women, aged between 22 and 65 years. Educational attainment was distributed as follows: primary education 7.7% (n=6), secondary education 45.4% (n=35), pre-university 36.3% (n=28), and university 10.3% (n=8). For the family support category, results reported 67.4% (n=52) for patients with support and 32.4% (n=25) for those without **(table 1)**.

Figure 1 shows the descriptive measures of the intervention phases (pretest and posttest) to assess self-care self-management capacity. It is evident that the mean scores in the posttest are higher *vs* the pretest.

Table 2 illustrates the mean scores for the assessment of self-management of self-care capacity, with the most representative results for the gender category where men had mean scores of 80.8 (±7.82) and women 81.91 (±8.31). For the educational level category, the lowest average scores corresponded to primary level 75.16 (±9.92) and the highest to university level 83.12 (±6.93). Finally, the arithmetic means for the category with and without family support were 81.69 (±8.23) and 81.00 (±7.90), respectively.

Table 1. Sociodemographic data of patients on haemodialysis.

Sociodemographic Data	n	(%)
Sex		
Female	45	58.4
Male	32	41.5
Marital status		
Single	25	32.4
Married	35	45.4
Widowed	2	2.5
Common-law union	8	10.3
Divorced	7	9.0
Educational level		
Primary	6	7.7
Secondary	35	45.4
High school	28	36.3
Bachelor's degree	8	10.3
Employment		
Yes	62	80.5
No	15	19.5
Time on hemodialysis		
< 5 years	51	66.1
> 5 years	26	33.2
Family support		
Yes	52	67.4
No	25	32.4

Nota: N: number of cases; **%:** representative percentage.

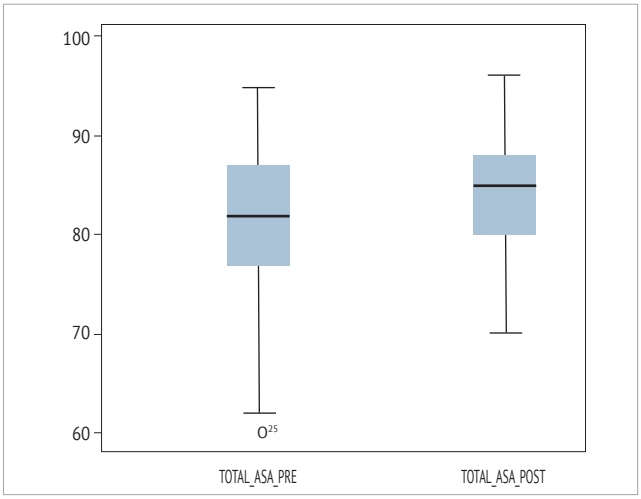

Figure 1. Sele-management capacity for self-care, pre-test and post-test.

Table 2. Sociodemographic variables related to self-care self-management capacity before and after the educational intervention.

	Category	ASA Pretest						ASA Posttest			
		N	M	DE	Min	Max		M	DE	Min	Max
Sex	Female	45	81.91	8.31	60	95		84.77	6.08	70	96
	Male	32	80.84	7.82	62	90		83.43	6.32	71	96
Educational level	Primary	6	75.16	9.92	65	93		80.66	6.12	70	88
	Secondary	35	81.85	7.58	60	95		83.34	6.56	72	96
	High school	28	81.85	8.40	62	95		85.32	5.61	71	96
	Bachelor's degree	8	83.12	6.93	73	93		86.87	5.46	79	96
Marital status	Single	25	81.52	7.71	60	92		83.52	6.51	72	96
	Married	35	81.77	8.12	63	95		84.82	5.39	70	93
	Widowed	2	79.00	2.82	77	81		84.00	7.07	79	89
	Divorced	8	82.28	8.30	69	95		84.28	8.67	73	96
	Common law union	7	79.87	10.84	62	92		83.75	7.24	71	92
Age	≤ 30	8	78.37	10.58	62	90		81.25	5.36	71	87
	31 – 43	34	81.29	7.66	60	95		84.44	6.95	72	96
	44 – 54	22	80.90	8.46	63	92		84.36	6.12	70	96
	55 +	13	84.76	7.36	70	95		85.23	4.38	79	93
Time on hemodialysis	< 5 years	51	81.74	7.78	60	95		84.41	5.63	71	96
	> 5 years	26	80.92	8.76	65	95		83.84	7.23	70	96
Family support	Yes	52	81.69	8.23	60	95		84.82	6.11	71	96
	No	25	81.00	7.90	65	95		82.96	6.24	70	96

N = 77; **N:** frequency; **M:** mean; **SD:** standard deviation; **Min:** minimum; **Max:** maximum.

The educational intervention had a significant impact on improving the care and preservation of the arteriovenous fistula with an 82.43% increase vs the first measurement, while maintaining a clean dressing showed only a 12.90% increase, which was the lowest score.

In relation to signs and symptoms (Table 4), the educational programme had a significant impact, as there was a considerable decrease following programme implementation, with the most representative results being a reduction in pruritus by 29.87% (n=23), pain by 20.78% (n=16), and skin lesions by 11.69% (n=9).

Finally, a Student's t-test for related samples was applied to evaluate the effectiveness of the self-care management intervention programme, as assessed by the ASA-A instrument. The results indicated a statistically significant difference between the two measurements, t(76)=-3.4, P=0.001. The observed differences between the means were -2.76, with this difference favouring the post-test.

Table 3. Care and maintenance of arteriovenous fistula (AVF) and central venous catheter (CVC) before and after the educational intervention.

Indicator	Pre-intervention	Post-intervention	Increase %
Knowledge of AVF care and maintenance	8 patients	45 patients	80.43% (n=37)
CVC dressing fixation	25 patients	31 patients	19.35% (n=6)
Maintenance of dry CVC dressing	24 patients	31 patients	22.58% (n=7)
Maintenance of clean CVC dressing	27 patients	31 patients	12.90% (n=4)

N= 46 patients with arteriovenous fistula; **N=** 31 patients with central venous catheter. Original source.

DISCUSSION

The results obtained in the study allowed us to evaluate how the implementation of an educational intervention programme influences the self-management capacity of self-care in patients during haemodialysis through individualised information sessions. For this, we considered demographic, clinical, and socialisation variables, as well as those directed at vascular access care, presence of pruritus, oedema, cramps, and muscle pain, among others. The findings identified a positive effect on self-management capacity and the development of self-care skills. This aligns with Griva et al[12] and Ren et al,[13] who concur that poor adherence to

Table 4. Improvement of signs and symptoms in hemodialysis patients before and after the educational intervention.

Indicator	Pre-intervention	Post-intervention	Decrease %
Pruritus	40 patients	17 patients	29.87% (n=23)
Skin lesions due to pruritus	19 patients	10 patients	11.69% (n=9)
Cramps	13 patients	6 patients	9.09% (n=7)
Edema	18 patients	11 patients	9.09% (n=7)
Muscle or joint pain	39 patients	23 patients	20.78% (n=16)

N=77. Original source.

haemodialysis therapy is associated with a lack of effective interventions and that long-term educational programmes offer better results.

The programme contributed to improved vascular access care, reduced pruritus and skin lesions, cramps, muscle and joint pain, oedematous syndrome, as well as better acceptance of consuming low-sodium foods and avoiding excessive water intake. Improvements in blood pressure readings, important for cardiovascular health, and increased pharmacological adherence were also observed. However, current evidence is inconclusive.

Following the knowledge-attitude-behaviour model[14] included in the educational intervention programme, positive behavioural changes were confirmed from a comprehensive approach to knowledge acquisition, similar to the study by Keivan et al,[15] but not for symptoms related to sleep and dialysis.

Patients reported increased participation in sociocultural activities, which promotes social and occupational integration[16,17].

It is relevant to note that the haemodialysis educational programme can address different topics[18,19], for example, information on food preparation, the importance of regular exercise, sleep hygiene, sexuality, and training for emergency situations, such as earthquakes or fires. To achieve this, the contribution of nephrologists, nutritionists, social workers, and psychologists is required, from a patient-centred care and collaborative work approach[20].

Considering continuous education, individualised training, and systematisation is proven to improve clinical indicators and patient empowerment as an active agent in their treatment[6,21]. This could form the basis for a haemodialysis nursing consultancy model in the immediate future as a key strategy to strengthen self-care and improve therapeutic adherence. The creation of the nurse consultant role would involve constant monitoring of therapeutic compliance, resolving specific doubts, adapting strategies to changing patient needs, and ensuring effective communication that reinforces trust and continuity of care[22].

Among the limitations of our study, it is important to mention, among others, its single-centre nature. Another possible limitation is that the programme was directed at patients without physical limitations; therefore, these interventions in individuals with hearing or visual problems will require other auxiliary instruments, such as educational materials to address these disabilities. Nevertheless, the study demonstrates the importance of evaluating self-management capacity for self-care, implementing an individualised educational programme, and including the role of the nurse educator.

Finally, it is important to consider patients' educational level, age, time on therapy, and the profile of the nurse guiding the patient on self-care as described by Natti et al[23]. These variables are relevant for the success of the haemodialysis educational programme with the inclusion of innovative, easy-to-understand dynamics (e.g., playful activities, short videos, infographics, leaflets). Regarding the Nurse's Role, mastery of educational competencies, communication techniques, adult learning, planning, evaluation of training programmes, a motivating attitude, and support for performing activities are required[24], with benefits and strategies that favour continuous and individualised follow-up.

In light of these results in our study group, we can observe that implementing an individual education programme for haemodialysis patients can improve self-management capacity for self-care. Healthcare professionals should continue to promote self-management and self-care, constituting a crucial aspect for these patients.

Conflict of interest
None declared.

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ANNEX 1. Self-Care Activities in Haemodialysis (SCAH)

Name: ..... Sex: ..... Age: ..... Educational level: ..... Marital status: ..... Occupation: .....
Time in programme: ..... Weekly sessions: ..... Hours per session: ..... Family support: Yes ( ) No ( )
By whom:: .....

1. Assessment of Vascular Access Characteristics

Arteriovenous fistula (AVF)				Central venous catheter (CVC)			
Criteria to assess:		Yes	No	Criteria to assess:		Yes	No
Presence of:	Thrill:			Presence of:	Dry:		
	Bruit:				Secure:		
	Haematoma:				Clean:		
Signs of infection:	Erythema:				Blood residue:		
	Pain:				Serous or purulent discharge		
	Warmth:						
	Serous or purulent discharge:						
Steal syndrome (cold hand/arm):				Other (specify)			
Fistula area clean:							
Knowledge of AVF care measures:							

2. Clinical Assessment and Interview

Pruritus: Yes ☐ No ☐
Skin lesions caused by pruritus: Yes ☐ No ☐
Cramps: Yes ☐ No ☐
Joint or muscle pain: Yes ☐ No ☐

3. Oedema (Godet's scale) pre-HD height, weight, and blood pressure

Godet's scale: 1 ☐ 2 ☐ 3 ☐ 4 ☐
Skin lesions caused by pruritus: Yes ☐ No ☐
Cramps: Yes ☐ No ☐
Joint or muscle pain: Yes ☐ No ☐
Height: ..... cm
Pre-HD weight: ..... kg Post-HD weight: ..... kg
Dry weight: ..... kg
Pre-HD blood pressure Post-HD blood pressure

4. Medication Adherence

Takes medication at prescribed times: Yes ☐ No ☐
Takes all prescribed drugs daily: Yes ☐ No ☐
Number of drugs taken daily 1-3 ☐ 4-5 ☐ More than 6 ☐
Drugs that cause problems?
Specify: .....

5. Diet

Follows dietary recommendations: Yes ☐ No ☐
Follows diet only when feeling unwell: Yes ☐ No ☐
Difficulty consuming low-salt or salt-free foods: Yes ☐ No ☐
Problems with fluid intake: Yes ☐ No ☐

6. Leisure and Exercise Activities

Performs activities of daily living: Yes ☐ No ☐
Takes holidays at least once a year: Yes ☐ No ☐
Attends cinema or theatre occasionally: Yes ☐ No ☐
Participates in recreational, religious, or social groups: Yes ☐ No ☐
Exercises 1–3 times per week: Yes ☐ No ☐

7. Subjective Assessment of Uraemic State

Rate each item: High (5) ☐ Moderate (3) ☐ Low (1) ☐
Insomnia: ..... Reversed circadian rhythm: .....
Weakness (lack of energy): ..... Dysgeusia: .....
Anorexia: .....
Vomiting (>1 day per week): ..... Nausea: .....
Score: .....

Other Relevant Data: .....