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# Factors associated with treatment adherence in people on haemodialysis

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## ABSTRACT

**Introduction:** Treatment adherence in haemodialysis patients is a crucial aspect for improving clinical outcomes and quality of life.

**Objectives:** To identify the factors associated with treatment adherence in people on haemodialysis.

**Methodology:** A scoping review was conducted. The search protocol was developed in the SciElo, PubMed, Scopus, ScienceDirect, EBSCO, and Cinahl databases, using the Boolean operators "AND," "OR," "NOT," relating the DeCS-MeSH search terms: "Treatment Adherence and Compliance" AND "Kidney Diseases" AND "Renal Dialysis."

**Results:** The review identified 36 articles, most from 2014, with 6 developed in Spain, 5 in Brazil and Iran, 4 in the United States, 3 in Indonesia and China, 2 in Australia and India, 1 in Colombia, Korea, Canada, Mexico, United Kingdom, and Turkey. Written in English, Spanish, and Portuguese. Adherence is influenced by biopsychosocial, economic, demographic, clinical, and psychological factors. Studies highlight the importance of education, economic stability, family relationships, mental health, medical team support, and educational strategies.

**Conclusions:** The complexity of treatment adherence in haemodialysis patients and the need for a comprehensive approach addressing multiple aspects are revealed. The importance of personalised educational programmes, socioeconomic support, effective communication with healthcare professionals, and personalised strategies to improve adherence is emphasised. These findings have important implications for designing interventions that improve quality of life and clinical outcomes in this population.

**Keywords:** chronic kidney failure; haemodialysis; treatment adherence; risk factors; nursing care.

## RESUMEN

**Factores asociados a la adherencia al tratamiento en pacientes en hemodiálisis**

**Introducción:** La adherencia al tratamiento en pacientes en hemodiálisis es un aspecto crucial para mejorar los resultados clínicos y la calidad de vida.

**Objetivos:** Identificar los factores asociados a la adherencia al tratamiento en personas en hemodiálisis.

**Metodología:** Se realizó una revisión de alcance, el protocolo de búsqueda se desarrolló en las bases de datos SciElo, Pubmed, Scopus, Science direct, EBSCO y Cinahl, con los operadores booleanos "AND", "OR", "NOT", relacionando los términos de búsqueda DeCS-MeSH, "Treatment Adherence and Compliance" AND "Kidney Diseases" AND "Renal Dialysis".

**Resultados:** La revisión identificó 36 artículos, la mayoría del 2014, desarrollados 6 en España, 5 en Brasil e Irán, 4 en Estados Unidos, 3 en Indonesia y China, 2 Australia e India, 1 en Colombia, Corea, Canadá, México, Reino Unido, Turquía. Escritos en inglés, español, y portugués. La adherencia

es influenciada por factores biopsicosociales, económicos, demográficos, clínicos y psicológicos. Los estudios destacan la importancia de la educación, la estabilidad económica, la relación familiar, la salud mental, el apoyo del equipo médico y las estrategias educativas.

**Conclusiones:** Se revela la complejidad de la adherencia al tratamiento en pacientes en hemodiálisis y la necesidad de un enfoque integral que aborde múltiples aspectos. Se subraya la importancia de programas educativos personalizados, el apoyo socioeconómico, una comunicación efectiva con los profesionales de la salud y estrategias personalizadas para mejorar la adherencia. Estos hallazgos tienen implicaciones importantes para el diseño de intervenciones que mejoren la calidad de vida y los resultados clínicos en esta población.

**Palabras clave:** insuficiencia renal crónica; hemodiálisis; adherencia al tratamiento; factores de riesgo; cuidado de enfermería.

## INTRODUCTION

Chronic Kidney Disease (CKD) represents a significant global health burden, affecting approximately 850 million people worldwide. It's predicted to be the fifth most common cause of premature death by 2040[1], with an accelerated growth of around 2.4 million annual deaths, representing over 10% of the global population[2]. For individuals with advanced chronic kidney disease (ACKD), the initiation of renal replacement therapy (RRT) becomes necessary[3], with haemodialysis (HD) being an essential component for managing the patient's health condition.

However, the mortality rate for ACKD patients on RRT remains at annual figures ranging between 8% and 9%. Patients on dialysis have the highest rate at 15.9%, compared to 2.6% for those who've received a transplant[4]. Among the difficulties faced by both renal patients and nursing staff in dialysis units is treatment adherence[5,6], which proves a persistent obstacle in caring for these patients. This is even more critical given that a lack of adherence can lead to risks associated with the disease's effects, the treatment's progression, and quality of life, resulting in personal, social, and economic losses[7]. Non-adherence is also linked to higher rates of hospitalisation and mortality[8,9].

Furthermore, other elements can influence adherence, such as the complexity of pharmacological treatment, adverse effects, polypharmacy, the patient-provider relationship, various barriers to obtaining medicines[10], and a lack of education and support from medical personnel[11]. A key aspect in the care of individuals with CKD undergoing dialytic treatment is to achieve adherence to treatment and medical indications[12], to promote treatment efficacy and safety.

Therefore, there's a clear need to identify the factors associated with treatment adherence in individuals on HD.

## METHODOLOGY

This study proposed a Scoping Review[13], aiming to conduct a comprehensive analysis of the scientific literature between 2013-2023. This involved addressing a specific research area to identify and summarise the available evidence in a general manner[13]. The main objective was to explore the breadth of existing literature and determine the nature and scope of the research carried out in this particular field. This encompassed identifying the key sources of evidence, synthesising and mapping the main characteristics of the included studies, such as the research designs employed, target populations, evaluated interventions or exposures, and reported outcomes[14].

The review process followed the guidelines put forward by Arksey, O'Malley[14]. The research question that guided the review was: "What are the factors involved in treatment adherence in patients with Chronic Kidney Disease on haemodialysis identified in the literature?"

The search protocol was developed by the researchers using the SciElo, PubMed, Scopus, ScienceDirect, EBSCO, and Cinahl databases from August to October 2023. Searches were conducted in English, Spanish, and Portuguese, and were limited to the 2013-2023 period. Boolean operators "AND", "OR", "NOT" were utilised, which enabled the linking of the following DeCS-MeSH search terms **(table 1)**.

The review and verification process undertaken involved five steps:

**Step 1: Database Search.**
A comprehensive search was conducted in various databases (search engines such as Scielo, PubMed, Scopus, Sciencedirect, Ebsco, Cinahl) of indexed scientific journals to gather relevant information on the factors influencing treatment adherence in patients with CKD on HD. Pertinent search terms were used to access each database and retrieve studies related to the topic of interest. This search compiled a broad range of relevant information and scientific studies to comprehensively address the factors affecting treatment adherence in this patient population.

**Step 2: Eligibility Criteria Review.**
Inclusion and exclusion criteria were established to ensure the selection of relevant, high-quality studies

**Inclusion criteria:** Research articles in Spanish, English, and Portuguese, published between 2013 and 2023, appearing in indexed journals that included experimental, descriptive studies, clinical trials, pilot studies, qualitative studies, and with a score of 7 or higher according to the CASPE methodological quality assessment[15].

Table 1. Identification of Search Terms with DeCS and MeSH Descriptors.

| Database | Search Query | Results |
|---|---|---|
| SciELO | "Treatment Adherence and Compliance" and "Kidney Diseases" AND "Renal Dialysis" | 124 |
| ScienceDirect | "Treatment Adherence and Compliance" and "Kidney Diseases" AND "Renal Dialysis" | 70 |
| PubMed | "Treatment Adherence and Compliance" and "Kidney Diseases" AND "Renal Dialysis" | 330 |
| CINAHL | "Treatment Adherence and Compliance" and "Kidney Diseases" AND "Renal Dialysis" | 126 |

**Exclusion criteria were applied to:** thesis papers, dissertations, monographs, letters to the editor, and abstracts from scientific conferences.

**Step 3: Data Analysis.**
Each identified study was analysed individually, and relevant data were incorporated into a descriptive table that included information on the authors, year of publication, location, main results, and conclusions. Additionally, duplicate documents were excluded to ensure data integrity and avoid repetition in the review.

**Step 4: Full-Text Verification.**
A full-text reading was verified to confirm each selected study's contribution.

Relevant data were extracted, including study design, participant characteristics, identified factors, strategies employed, main results, and conclusions. These were then systematically summarised.

**Step 5: Thematic Analysis.**
A thematic analysis16 was conducted on the identified factors and strategies used to improve treatment adherence, as well as the identification of patterns, trends, and gaps in the existing literature. The findings were summarised clearly and concisely. Furthermore, the methodological evaluation of qualitative rigour was carried out using the Spanish Critical Reading Skills Programme (CASPE) form[15].

Through the bibliographic search, a total of 650 potentially eligible studies were identified. Based on the pre-defined selection criteria, 150 documents were excluded. A further 425 were excluded for not being freely available in full text, 6 were duplicate articles, and 33 were removed after reviewing titles and abstracts. A total of 36 articles were ultimately selected for full reading and analysis **(figure 1)**.

These articles were registered in a Microsoft Excel matrix, where information categories were defined following the analysis proposed by Arksey and O'Malley[14]. Information from the articles was collected, and analytical categories consistent with the research's area of interest were assigned and grouped by theme. The study's ethical considerations were ensured, respecting copyright principles in the utilisation and referencing of the analysed material.

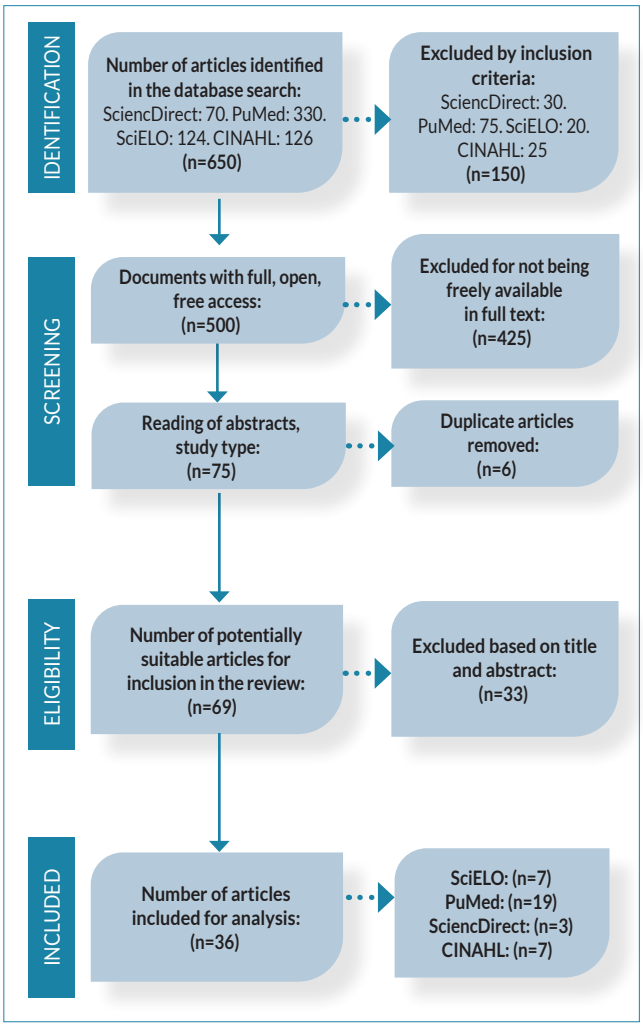


Figure 1. Flow diagram of search strategy and article selection.
**Source:** Own elaboration.

## RESULTS

The review identified a total of 36 articles that met the inclusion criteria. The results showed that the studies were predominantly published in 2014, and were conducted in Spain ((n=6) 16.22%), Brazil and Iran ((n=5) 13.51%), the United States ((n=4) 10.81%), Indonesia and China ((n=3)

8.10%), Australia and India ((n=2) 5.4%), Colombia, Korea, Canada, Mexico, the United Kingdom, and Turkey ((n=1) 2.70%). Of these, the majority were written in English ((n=25) 69.4%), followed by Spanish ((n=7) 19.5%), and Portuguese ((n=4) 11.1%).

The reviewed studies on treatment adherence in patients with chronic kidney disease on renal replacement therapy encompass a variety of research types, such as observational studies, randomised controlled trials, and literature reviews, as shown in **table 2**.

An analysis of the variables associated with the factors involved in pharmacological treatment adherence in individuals on haemodialysis revealed three key themes: biopsychosocial, economic, and demographic factors; the relationship with healthcare professionals; and educational interventions/improvement programmes.

**Biopsychosocial, Economic, and Demographic Factors**
The literature review allowed us to identify that the factors influencing treatment adherence are related to educational level[17,18,28], socioeconomic status[18,28,46,52], age[21,45,48,51], gender[48], ethnicity or race[21,45], income level[28], medication[21,31,45,49], marital status[45], duration of dialysis[18,21,28,37,45,48], pharmacological regimen[31,45,51] and its side effects[31,49,51], motivation, self-efficacy[18], depression[45,46], dialytic treatment[28,45], hospitalisations and comorbidities45; as well as family functionality[45], hope[20], health conditions, and communication barriers[52].

**Relationship with Healthcare Professionals**
The relationship between patient, family, and healthcare professionals plays a fundamental role in treatment adherence and decision-making regarding treatment[24,41,44]. Similarly, it's crucial to strengthen the bond between patients and healthcare professionals to facilitate treatment adherence in HD patients[38,41].

**Educational Interventions/Improvement Programmes**
Studies exploring various interventions to improve treatment adherence in renal patients on HD were identified.

Each study provides unique perspectives and findings to enhance adherence in this specific population, covering aspects from technological tools and education to psychological approaches and the importance of the patient-healthcare professional relationship[19,20,22,23,25-27,29,30,33,35,39,47,48,52].

**Table 2.** Articles selected for review.

| Author/(Year)/Country | Study Type | Sample | Objective | Results | Quality |
|---|---|---|---|---|---|
| Torabi et al.[17] (2023), Iran | Randomized, single-blind clinical trial. | 70 HD patients. | To compare the effects of a microlearning-based mobile health (mHealth) application with in-person training on treatment adherence and perception in hemodialysis patients. | The mHealth application along with in-person training increased treatment adherence and perception in hemodialysis patients. However, significant improvements in adherence were observed among patients trained with mHealth, especially those based on the microlearning method. | CASPE 8/10 |
| Mirzaei et al.[18] (2023), Iran | Cross-sectional study. | 260 HD patients. | To use the Capability-Opportunity-Motivation and Behavior (COM-B) model to identify the most important determinants of medication adherence among patients with end-stage renal disease. | Medication adherence was higher in patients with higher education and employment, and was positively related to income, but inversely to treatment duration. Motivation, self-efficacy, and knowledge were the main determinants of adherence. | CASPE 9/10 |
| Dsouza et al.[19] (2023), China. | Randomized controlled trial. | 260 HD patients. | To evaluate the impact of an educational intervention on the level of knowledge and adherence to the treatment regimen among hemodialysis (HD) patients, as well as to describe the association between these variables. | The increase in knowledge about disease management, fluid, and diet adherence in the intervention group was significantly greater than in the control group. Although no significant correlation was found between knowledge and adherence, the latter improved in all aspects: dialysis attendance, shortening episodes, medication, fluid restriction, and diet. | CASPE 10/10 |

| Author/(Year)/Country | Study Type | Sample | Objetive | Results | Quality |
|---|---|---|---|---|---|
| Sabouri et al.[20] (2023), Iran | Randomized controlled trial. | 80 HD patients. | To determine the effect of positive thinking training on hope and treatment adherence in hemodialysis patients. | Following the intervention, hope and treatment adherence significantly increased in the intervention group. Additionally, significant reductions were observed in blood urea nitrogen levels, phosphate, and interdialytic weight gain in this group, compared to the control group. | CASPE 10/10 |
| Pereira et al.[21] (2022), Brazil. | Cross-sectional study. | 374 HD patients. | To evaluate non-adherence to the therapeutic regimen in hemodialysis patients and associated factors. | Patients under 60 years old were more likely to be non-adherent to water restriction, therapy, diet, and medication regimens. Anuric patients were more likely to be non-adherent to water restriction and therapy. Hypoalbuminemia and hypohemoglobinemia increased the likelihood of non-adherence to water restriction, while non-white race was associated with a higher likelihood of therapy non-adherence. | CASPE 8/10 |
| Kim et al.[22] (2022), Korea | Literature review. Meta-analysis. | Not applicable. | To evaluate the effects of treatment adherence improvement programs and secondary outcomes for HD patients. | Treatment adherence improvement programs for HD patients showed a significant effect on various variables: Asian countries, study centers, sample size, study design, intervention types, number of sessions, quality scores, funding, and evidence-based approaches. | Not applicable |
| Wu et al.[23] (2022), China | Quasi-experimental study. | 90 HD patients. | To investigate the effect of self-determination theory on awareness of relevant knowledge, treatment compliance, and self-care level in maintenance HD patients. | Following the intervention, awareness of dialysis principles, diet, fistula protection, and complication prevention increased, as did compliance with diet, fluid intake, dialysis regimen, and overall compliance score. Increases were also observed in total scores for problem-solving, collaboration, emotional processing, self-care activities, self-management, and quality of life. The self-determination theory approach proved effective in improving awareness of HD-related knowledge, treatment compliance, self-care, and quality of life in maintenance HD patients. | CASPE 7/10 |

| Author/(Year)/Country | Study Type | Sample | Objetive | Results | Quality |
|---|---|---|---|---|---|
| Rivera et al.[24] (2022), United States | Qualitative study using semi-structured interviews. | 32 HD patients. | To explore the experiences of CKD patients and their adherence to CKD treatment plans, and the role their healthcare providers played in supporting their adherence. | Four main themes emerged from the analysis of factors relevant to treatment planning and adherence: patient factors (multiple chronic conditions, motivation, perspectives), provider factors (care, availability/accessibility, communication), treatment planning factors (lack of plan, proactive research attitude, provider-centered treatment goals, and shared decision-making), and responses to the treatment plan (disagreement, perceived capacity deficit, lack of information, and positive feedback). | CASPE 8/10 |
| Sheshadri et al.[25] (2021), United States. | Randomized controlled trial. | 30 HD patients. | To examine whether cognitive function impairment is associated with adherence and performance in a walking intervention. | Participants with worse cognitive function assessment results missed more calls and completed fewer weekly goals. Smaller increases in steps were also observed during the intervention and the post-intervention period. | CASPE 8/10 |
| Valsaraj et al.[26] (2021), India | Randomized controlled trial. | 67 HD patients. | To examine the effect of cognitive-behavioral therapy (CBT) on adherence to dialysis, fluids, medications, and diet. | At six months, the experimental group showed significant reductions from baseline in interdialytic weight gain, systolic and diastolic blood pressure, while experiencing significant increases in hemoglobin and adherence to dialysis, fluids, and medications. These improvements were significantly greater compared to the control group. | CASPE 10/10 |
| Arad et al.[27] (2021), Iran. | Randomized controlled trial. | 66 HD patients. | To determine the effects of a nurse-led patient education program and telephone follow-up on treatment adherence in HD patients. | The results revealed significant differences in the mean scores for HD attendance, medication use, fluid restriction, and dietary recommendations between both groups immediately, at 1 and 3 months post-intervention. Significant differences in laboratory values between the groups were also observed post-intervention, except for serum sodium. | CASPE 7/10 |
| Anisa et al.[28] (2021), Indonesia. | Observational analytical with cross-sectional design. | 120 HD patients. | To determine the effect of HD compliance. | The use of HD in patients with chronic renal failure is positively related to high HD knowledge, but is not directly linked to family income. Instead, it is indirectly influenced by family income and treatment duration. | CASPE 7/10 |

| Author/(Year)/Country | Study Type | Sample | Objetive | Results | Quality |
|---|---|---|---|---|---|
| Blumrosen et al.[29] (2020), United States. | Literature review. | 130 HD patients. | To evaluate the state of the science to determine the importance of a therapeutic alliance for the development of effective interventions that positively impact HD treatment adherence among Black patients. | Only three intervention studies, with a total sample of 130 individuals (mean age: 58.1 years; 53% women), met the established criteria. None of these studies exclusively included Black patients or provided specific data for this group. Although solid evidence is scarce regarding strategies to improve hemodialysis adherence in Black patients with end-stage renal disease, some limited intervention studies have reported positive effects on HD attendance. | Not applicable. |
| Yangöz et al.[30] (2020), Turkey. | Literature review. | Not applicable. | To raise awareness about nursing care based on Watson's Theory of Human Caring to ensure treatment compliance in individuals undergoing HD therapy. | Watson's Theory of Human Caring advocates for the application of nursing care based on love, respect, compassion, and trust, considering the individual in their totality of mind-body-spirit. This approach ensures the satisfaction of not only physical needs, but also emotional and spiritual ones. We propose using this theory as a conceptual framework for nursing care, applying and evaluating it across different disease groups. | Not applicable |
| Arenas et al.[31] (2020), Spain. | Prospective study. | 105 HD patients. | To understand the influence of phosphate binders on adherence and how to modify it. | The percentage of patients with controlled serum phosphorus levels significantly increased in the group using phosphate binders. The average daily pill count significantly decreased in that group, and all patients used only one phosphate binder, which resulted in improved adherence according to the questionnaire. The possibility of choosing the preferred mode of administration also improved acceptance. | CASPE 7/10 |
| Tayebi et al.[32] (2019), Iran. | Systematic review. | Not applicable. | To detect the most important causes of non-adherence in dialysis patients according to previous studies.. | The main reasons for non-adherence to treatment in dialysis patients include patient-related, socioeconomic, psychological, medical care, therapy, and disease factors. | Not applicable |
| Hjemås et al.[33] (2019), Norway. | Descriptive interventional single-arm study. | 69 HD patients. | To investigate patients' knowledge, beliefs, and adherence to phosphate binders among these patients and to evaluate whether personalized education and counseling led by a pharmacist improve adherence and lead to changes in serum phosphate levels. | Knowledge and perception of the need for phosphate binder treatment increased, reducing concerns. Despite this, no increase in self-reported adherence was observed, although scores were already high before the intervention. | CASPE 9/10 |

| Author/(Year)/Country | Study Type | Sample | Objetive | Results | Quality |
|---|---|---|---|---|---|
| Harish et al.[34] (2019), India. | Observational study. | 60 HD patients. | To evaluate the level of adherence to dietary and fluid restrictions among patients undergoing HD. | The study found regular to good compliance with dietary and fluid restrictions, although this varies among hemodialysis patients. Individualized interventions and constant motivation are required to improve adherence and clinical outcomes. | CASPE 8/10 |
| Wang et al.[35] (2018), China. | Literature review. | 817 HD patients. | To explore the effects of nursing intervention on dialysis compliance. | Results revealed that nursing intervention significantly increased dialysis compliance compared to standard care. However, a preliminary analysis indicated that various intervention strategies, such as educational, cognitive, and behavioral approaches, had limited effects on dialysis compliance. | Not applicable. |
| Lins et al.[36] (2018), Brazil. | Descriptive, cross-sectional study with a quantitative approach. | 78 HD patients. | To identify the adherence behavior of chronic kidney disease patients to the therapeutic regimen in its four dimensions: HD, medication use, diet, and fluid restriction. | The domain with the greatest lack of adherence was HD, at 32%, while medication had the highest compliance, at 93.6%. Treatment adherence is dynamic and requires constant monitoring. By offering closer, individualized care, adherence to therapy can be promoted by strengthening the professional-patient relationship. | CASPE 9/10 |
| Qazi et al.[37] (2018), Canada. | Scoping review. | Not applicable. | To examine predictors that might influence the dialysis dropout rate. | The study's findings were inconsistent and inconclusive. The authors have defined dialysis withdrawal in terms of interruption, suspension, death, withdrawal, treatment refusal/cessation, or technique failure. | Not applicable. |
| Novaes et al.[38] (2017), Brazil. | Descriptive study with a qualitative approach. | 41 HD service professionals. | To investigate the perception of healthcare professionals regarding the factors that interfere with HD treatment adherence. | Results were divided into four discourse classes: the professional-patient bond as initial support; patient knowledge about the disease and its treatment for adherence; depersonalization linked to knowledge deficit and fear of catheter implantation; and the alliance between patient, family, and professionals to promote self-care. | CASPE 9/10 |
| Ojeda et al.[39] (2017), Spain. | Prospective longitudinal observational cohort study. | Sample of 42 HD patients | To evaluate the effect of nursing consultation for renal patients on HD on therapeutic compliance. | Nursing consultation improves therapeutic adherence to diet and medication, correlating with increased time dedicated to treatment and greater contact with the main caregiver. | CASPE 8/10 |
| Neto et al.[40] (2017), Brazil. | Scoping review. | Not applicable. | To examine predictors that might influence the dialysis dropout rate. | When RRT is not considered beneficial for survival or quality of life, conservative treatment and palliative care can be considered as alternatives. In Brazil, renouncing RRT can be ethically and legally accepted as part of the right to a dignified death. | Not applicable. |

| Author/(Year)/Country | Study Type | Sample | Objetive | Results | Quality |
|---|---|---|---|---|---|
| Endang et al.[41] (2017), Indonesia. | Descriptive correlational design. | 7 HD patients. | To understand the factors that influence patient compliance with fluid restriction.. | Patient adherence to therapy does not depend on demographic factors, but on the quality of interaction with healthcare workers and other aspects. Further investigation is suggested into factors affecting adherence, such as psychological (beliefs, motivation), socioeconomic, and social support. | CASPE 8/10 |
| Endah et al.[42] (2016), Indonesia. | Descriptive cross-sectional. | 101 HD patients. | To understand the relationships between treatment compliance and quality of life, which can be measured using the Morisky Medication Adherence Scale and surveyors and the World Health Organization Quality of Life instrument. | The relationship between medication adherence and quality of life was significant in all aspects. Treatment adherence was found to be linked to the quality of life of hemodialysis patients. | CASPE 8/10 |
| Villegas et al.[43] (2016), Colombia. | Literature review. | Not applicable. | To understand the health impact of therapeutic non-adherence to renal replacement therapies (RRT). | Studies indicate low commitment in these patients, which increases the risk of mortality and hospitalization in those undergoing hemodialysis and peritoneal dialysis. Complex intervention strategies are required that address various aspects affecting therapeutic adherence. | Not applicable. |
| Hussain et al.[44] (2015), United Kingdom. | Systematic review. | 206 patients. | To explore how and why different factors mediate decisions about dialysis treatment. | Decision-making depends on personal resources. Healthcare professionals prioritize biomedical factors and seek to prolong life. Both patients and professionals feel powerless regarding dialysis withdrawal. Decision-making in end-stage chronic kidney disease is complex and evolves towards death. Factors are diverse and affect patients and professionals differently. More training and research are needed in open communication and shared decision-making. | Not applicable. |
| Ghimire et al.[45] (2015), Australia. | Literature review. | Not applicable. | To identify factors associated with non-adherence to pharmacological treatment in patients undergoing HD. | Common factors associated with non-adherence include young age, non-Caucasian ethnicity, disease affecting family life, being a smoker, and being single, divorced, or widowed. Disease-related factors are longevity on hemodialysis, recurrent hospitalization, depressive symptoms, and concomitant diseases such as diabetes and hypertension. Medication-related factors, such as daily pill count and total pill burden, number of phosphate binders, and regimen complexity, were also associated with poor adherence. | Not applicable. |

| Author/(Year)/Country | Study Type | Sample | Objetive | Results | Quality |
|---|---|---|---|---|---|
| Huertas et al.[46] (2014), Spain. | Observational cross-sectional study. | 35 HD patients. | To evaluate adherence to pharmacological treatment in patients on chronic HD. | Non-adherent patients have higher depression scores than adherent patients. Anxiety, cognitive impairment, and social support do not have a significant relationship with compliance. | CASPE 8/10 |
| Murali et al.[47] (2014), Australia. | Literature review. | Not applicable. | To summarize the existing literature on randomized controlled trials (RCTs) evaluating adherence interventions in CKD patients. | Most interventions focused on patient factors and included educational and cognitive interventions. Most patients showed improvements in some outcomes. Changes in phosphate and interdialytic weight gain were the most common outcomes, and both significantly improved in the meta-analysis. | Not applicable. |
| Clark et al.[48] (2014), Pennsylvania. | Secondary analysis using baseline data from an ongoing randomized clinical trial. | 122 HD patients. | To identify characteristics of HD patients most likely to experience difficulties in complying with sodium restrictions associated with their dietary regimen. | Findings indicate that younger patients and women face more difficulties with the hemodialysis regimen. Individualizing counseling and interventions for these individuals could be considered. | Not applicable. |
| Rueda et al.[49] (2014), Spain. | Observational, descriptive, retrospective cohort study. | 130 HD patients. | To analyze pharmacological adherence in HD patients. | The main cause of non-adherence is forgetfulness, followed by drug side effects. | CASPE 7/10 |
| Cazorla et al.[50] (2013), Spain. | Cross-sectional study. | 106 HD patients. | To determine the degree of therapeutic adherence to bone-mineral metabolism drugs and to identify the most relevant factors influencing adherence to this type of treatment. | The main reason for non-adherence to medication was increased water consumption, followed by pill size and dislike of lanthanum carbonate. Additionally, they acknowledge receiving dietary information. Treatment adherence is related to knowledge and understanding of medical-dietary treatment, being key factors for improving compliance. | CASPE 9/10 |
| Arenas et al.[51] (2013), Spain | Epidemiological, multicenter, case series registry with prospective data collection | 181 HD patients. | To evaluate therapeutic compliance in hyperphosphatemia patients on HD and its influence on phosphatemia during 6 months of follow-up. | Patients older than 60 years are more compliant than younger ones. Causes of non-compliance include pill size and quantity, increased water intake, and gastric intolerance. Phosphorus levels decrease at the end of the study. | CASPE 8/10 |
| Martins et al.[52] (2013), Brazil. | Cross-sectional study. | 502 HD patients. | To evaluate adherence to phosphate binders among hemodialysis patients and to explore potentially modifiable factors associated with low adherence to phosphate binders. | Results show that better care from dialysis staff and the nephrologist can reduce non-adherence to phosphate binders in hemodialysis patients. | CASPE 8/10 |

**Fuente:** Elaboración propia.

## DISCUSSION

The findings from this scoping review have enabled us to identify the following points. There's an influence of educational factors[18,49,50,52] and socioeconomic factors[18] on medication adherence; having higher education and employment is crucial for adherence to treatment. Furthermore, age, ethnicity, income level, medication, marital status, and the duration of dialysis are all linked to treatment adherence[18,37,45,48,50].

The review's findings indicate that patients under 60 years of age, those who are anuric, have low albumin or haemoglobin levels, and who self-identify as non-white are more likely to be non-adherent to treatment[21]. Moreover, patient knowledge and treatment duration are key determinants of adherence[50], whilst family income has an indirect impact[28].

The use of phosphate binders significantly improves phosphorus levels and reduces the daily pill count, leading to greater adherence[31]. Likewise, flexibility in medication administration improves satisfaction and increases adherence to the pharmacological regimen[31]. However, patients who experience side effects from medication tend to discontinue its use[28].

Other results show that clinical aspects impacting adherence are related to depression[46], HD, frequent hospitalisations, and comorbidities such as diabetes and arterial hypertension[45]. Carrying out a psychological intervention can be beneficial to improve adherence and hope in patients[20]. Regarding treatment, non-adherence to medication is associated with the daily count of prescribed pills, the total burden of required drugs, and the complexity of the medication regimen[45].

Conversely, an association has been identified between family functionality[45] and treatment adherence, suggesting that the family environment plays a crucial role in adherence; that is, in functional families, patients adhere to treatment to a greater extent. Similarly, it's reported that motivated patients show greater treatment adherence[18]. This demonstrates a link between family functionality, self-esteem, and treatment adherence; therefore, a multifaceted approach that includes family support and attention to psychological factors is considered necessary to improve treatment adherence[18].

Other authors describe medical conditions[21,45] and communication[24,32,52] as reasons for non-adherence; patients with cerebrovascular disease or high parathyroid hormone levels experience greater difficulties in following treatment. Additionally, medical conditions and barriers to understanding the information provided play a crucial role in non-adherence to treatment[52].

The relationship between the patient and healthcare professionals plays a fundamental role in treatment administration and adherence, particularly in chronic conditions like CKD41. Decision-making in kidney disease is a complex and dynamic process that evolves over time. It involves patients, healthcare professionals, and families, and there are multifaceted factors at play that need to be studied in relation to open communication and shared decision-making[44]. Effective communication and a comprehensible treatment structure tailored to the patient's needs are necessary. Additionally, it's crucial to address the patient's perceptions and reactions to treatment to improve adherence[24].

It is important to strengthen the professional-patient bond, especially in the initial stages of treatment, as well as recognise the relevance of patient knowledge about their disease as a crucial factor for adherence[38]; depersonalisation and fear arise due to a lack of information about catheter implantation and can be a significant obstacle to adherence. Adherence is influenced by close collaboration among the patient, family, and healthcare staff; consequently, maintaining a positive relationship among them is necessary[41].

The use of a mobile health (mHealth) application[17], telephone follow-up[27], and text messages[29] are effective in improving treatment adherence in CKD patients on HD. The microlearning method with traditional in-person training shows a significant increase in treatment adherence, suggesting that this type of tool can offer long-term benefits in patient adherence due to the constant availability of information and reminders provided by these applications[17].

Some authors believe that training patients in the use of positive thinking can have a tangible impact on hope and treatment adherence[20]. However, others suggest that, while educational interventions improve adherence to dietary restrictions, this doesn't correlate with an increase in patient knowledge; this indicates that adherence can be influenced by factors other than education[19].

The findings highlight how self-determination theory, when appropriately applied, can enhance knowledge, adherence, and quality of life in HD patients[23]. Other authors support the idea of education as an effective tool that positively impacts treatment adherence[22,33,47,52]. A direct relationship was found between cognitive impairment and lower adherence to interventions, suggesting the need to consider cognitive health when developing or adapting interventions for these patients[25,26]. The use of cognitive-behavioural therapy improves adherence, with significant improvements in various clinical parameters after the intervention[26].

Personalised care and attention are essential, especially using Watson's Theory of Human Caring as a guide to improve adherence[30]. Similarly, nursing interventions aimed at improving dialysis adherence are crucial; although educational and behavioural strategies may have limited impact, it's important to strengthen nursing care in clinical routine and nursing consultations to improve it[35,39,48].

In conclusion, this literature review reveals that treatment adherence in haemodialysis patients is a multifaceted

phenomenon, involving educational, socioeconomic, psychosocial, clinical, and demographic aspects. A holistic approach that includes technology, family support, and the participation of healthcare professionals, along with patient education and psychological support, appears to be key to improving adherence in this group of patients.

This exploration has important implications for healthcare professionals, public policy makers, and healthcare service providers. By identifying the factors involved in pharmacological treatment adherence in individuals on haemodialysis, it enables the construction and development of care strategies with improved health outcomes and greater well-being for individuals.

Therefore, the need for a comprehensive approach is emphasised, involving patient education, socioeconomic support, a relationship of trust and collaboration with the medical team, and personalised strategies to improve treatment adherence. This is essential for achieving optimal therapeutic results and enhancing the overall quality of life for patients with chronic kidney disease on haemodialysis.

The main limitations of this review include the time lag related to new publications appearing daily in databases, restricted access to articles, and the geographical location of the research which made access difficult. These limitations were controlled by conducting the search over an extensive period, employing databases that could provide access to full articles from various contexts.

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