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Health education in the renal transplant patient: an integrative review

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ABSTRACT

Introduction: The most advanced stage of advanced chronic kidney disease requires renal replacement therapy, with renal transplantation being a prominent option due to its benefits. It is crucial to guarantee compliance with certain aspects of post-transplantation to ensure its success, among which health education plays a fundamental role.

Objective: To understand and synthesise the scientific production of recent years on health education interventions in renal transplant patients.

Methodology: An integrative review was conducted following the recommendations of the PRISMA statement. Articles were extracted from the PubMed and Scopus databases. Articles published between 2013 and 2023 in English and Spanish addressing health education and post-renal transplantation were included.

Results: Sixteen articles were included (9 observational studies, 3 clinical trials, 3 qualitative studies, and 1 systematic review). The main variables that emerged were: characteristics of the population studied, different health education interventions, critical outcomes of the interventions, complications or challenges identified, and patient satisfaction.

Conclusions: Post-transplant education interventions for renal patients are especially effective if they involve aspects such as individualised and integrated care and take into account the patient's biopsychosocial sphere. They offer notable improvements in the satisfaction of renal transplant recipients, strengthening their autonomy, independence, and confidence in facing their new stage in life.

Keywords: kidney transplantation; health education; educational interventions; nursing care.

RESUMEN

Educación sanitaria en el paciente trasplantado renal: una revisión integrativa

Introducción: La fase más avanzada de la enfermedad renal crónica avanzada, requiere tratamiento renal sustitutivo, siendo el trasplante renal una opción destacada debido a sus beneficios. Es crucial garantizar el cumplimiento de ciertos aspectos en el post-trasplante para asegurar su éxito, entre los cuales, la educación sanitaria desempeña un papel fundamental.

Objetivo: Conocer y sintetizar la producción científica de los últimos años acerca de las intervenciones de educación sanitaria en el paciente trasplantado renal.

Metodología: Se realizó una revisión integrativa siguiendo las recomendaciones de la declaración PRISMA. Se extrajeron artículos de las bases de datos PubMed y Scopus. Se incluyeron artículos publicados entre 2013 y 2023 tanto en inglés y español, que abordaban la educación sanitaria y el post-trasplante renal.

Resultados: Se incluyeron 16 artículos (9 estudios observacionales, 3 ensayos clínicos, 3 estudios cualitativos y 1 revisión sistemática). Como principales variables emergieron: características de la población estudiada, diferentes intervenciones de educación sanitaria, resultados claves de las intervenciones, complicaciones o desafíos identificados, y satisfacción del paciente.

Conclusiones: Las intervenciones de educación en el post-trasplante del paciente renal son efectivas especialmente si involucran aspectos como una atención individualizada e integrada, y se tiene en cuenta la esfera biopsicosocial del paciente. Ofrecen mejoras notables en la satisfacción de los trasplantados renales, fortaleciendo su autonomía, independencia y confianza para afrontar su nueva etapa vital.

Palabras clave: trasplante de riñón; educación sanitaria; intervenciones educativas; cuidados de enfermería.

INTRODUCTION

Justification

Chronic kidney disease (CKD) is currently a highly significant health problem[1], whose most advanced manifestation, known as end-stage renal disease (ESRD)[2], requires renal replacement therapy (RRT) by dialysis or kidney transplantation[3].

According to data from the international non-profit organization World Kidney Day, CKD affects more than 10% of the world's population, with hypertension and diabetes standing out as the main risk factors[4]. In Spain, CKD affects nearly 7 million people[5], a prevalence similar to that observed in the United States (where it affects approximately 14% of adults)[6]. In terms of incidence, in Spain it represents approximately 150 newly diagnosed cases per million population each year, according to the Spanish Society of Nephrology (SEN)[7].

Of note, in Spain more than half of the people who need RRT have received a transplant (55%). This figure reflects the high level of effectiveness and access to organ transplantation in the Spanish national health system. On the other hand, a smaller percentage (39.8%) of patients receive treatment by hemodialysis, which also constitutes a vital component of ESRD management. In addition, 4.8% of patients opt for peritoneal dialysis, which offers an important alternative for those seeking greater autonomy or who have difficulties with other types of treatment[7].

Kidney transplantation (KT) is the preferred therapeutic option for people with kidney disease who require RRT, due to greater survival and better quality of life. Receiving a transplanted organ in turn entails lifelong immunosuppressive treatment to prevent rejection, which requires strict adherence to this therapy. Among the consequences of poor adherence to the immunosuppressive regimen are costly hospitalizations, complex laboratory testing, and anti-rejection therapies. All of this has a negative impact on the overall well-being of transplant recipients[8].

However, the rate of non-adherence (NA) to immunosuppressants in KT (36%) is the highest compared with other types of solid organ transplantation (liver, 6% non-adherence, being the lowest figure)[9].

Therefore, adherence to immunosuppressive treatment is highly relevant in KT patients, involving shared decision-making and responsibility between the patient and their caregivers. The reasons why such treatment is not followed may be intentional—for example, due to lack of trust in healthcare professionals or fear of possible side effects—or unintentional, related to a lack of understanding and information provided by health professionals[10].

In this context, the importance of addressing health education in kidney transplant recipients stands out, as it is essential to maintaining good self-care, quality of life, and treatment follow-up in this new stage of life[11].

Given the high incidence rate of NA to immunosuppressive therapy among kidney transplant recipients and its impact on transplant outcomes[9], it is crucial to understand and evaluate health education interventions designed to improve adherence and optimize clinical outcomes in this specific population. Therefore, the objective of this integrative review was to synthesize the scientific literature on health education interventions in kidney transplant recipients, as well as their effectiveness, with the following aims:

1. Analyze the effectiveness of health education interventions in KT.
2. Assess the influence of health education interventions on adherence in patients with KT.

METHODOLOGY

Design

We conducted a comprehensive review using studies from health sciences databases and following the guidelines of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement[12], adapting its recommendations to the specific nature of this integrative review.

Search strategy

An in-depth literature search was performed in different databases to gather as much information as possible related to the topic. The databases consulted were PubMed and Scopus.

Data collection took place in December 2023.

The search method consisted of using the following descriptors or keywords: health education and post kidney transplantation, combined with the Boolean operator "AND".

The databases used were PubMed and Scopus.

- **PubMed:** According to the inclusion and exclusion criteria, 125 articles were obtained, of which 12 were selected for further review. After excluding some following full-text reading, 9 articles remained.
- **Scopus:** Once the inclusion and exclusion criteria were applied, 141 articles remained, of which 11 were selected for in-depth reading after removing duplicates. Finally, 7 articles were retained for inclusion in the review.

Eligibility criteria

The criteria used to conduct a more focused search were:

Inclusion criteria:

- Articles addressing health education and kidney transplantation.
- Articles published between 2013 and 2023.
- Articles in English and Spanish.

Exclusion criteria:

- Articles without full-text available.
- Articles that did not present results.
- Articles in pediatric populations.

Quality analysis of the studies

To analyze the methodological quality of the articles, the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist[13] was used for observational and cross-sectional studies. The Consolidated Standards of Reporting Trials (CONSORT) tool[14] was used to assess the quality of randomized clinical trial reports, the Assessing the Methodological Quality of Systematic Reviews (AMSTAR) tool[15] was used for systematic reviews, and the Critical Appraisal Skills Programme Español (CASPe)[16] for qualitative studies.

Data extraction

Relevant information from each article was collected for this study. The title, authors, study design, sample used, main objective, and a summary of each article's main findings were specified.

Synthesis of the results

A total of 16 documents were selected, following the inclusion and exclusion criteria established above.

We used a thematic–categorical approach due to the disparity of variables and methodologies evaluated in the selected studies.

RESULTS

Search results

First, a general search was conducted without taking any inclusion or exclusion criteria into account, with the aim of determining the number of publications related to the topic and extracting as much information as possible. A total of 484 potentially related articles were identified.

Subsequently, a first screening was carried out using the inclusion and exclusion criteria in the databases, selecting 266 articles a priori, as shown in **figure 1.**

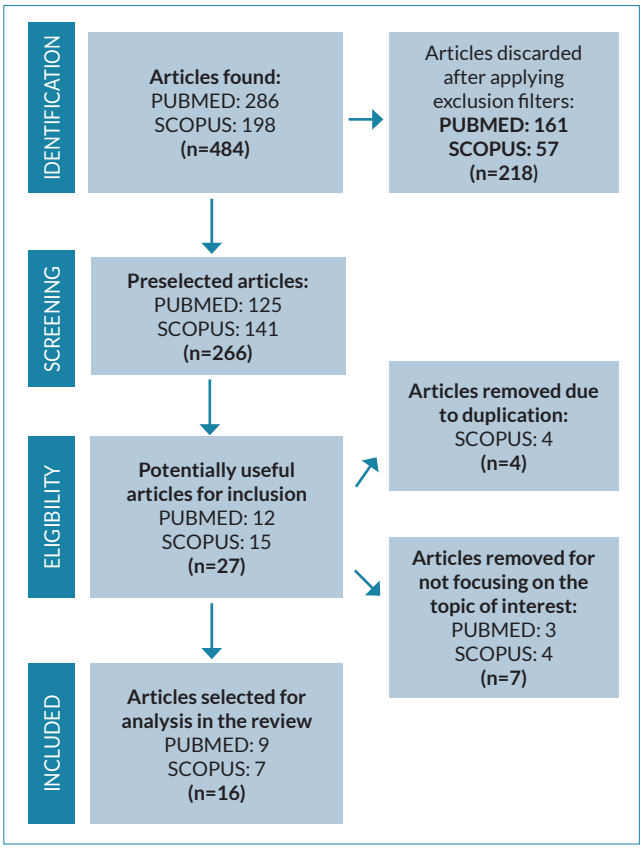

Figure 1. PRISMA flow diagram.

Flow diagram

Next, within the articles that met these criteria, a further selection was made by reading titles and abstracts, yielding 23 potentially useful articles, which were stored in a folder.

Finally, a filtering process was performed by reading the full text, and 16 articles were obtained; this is the total number of articles that met the inclusion criteria and were used for the review.

Characteristics of the study population

A total of 16 articles were selected for the review, of which 8 were from Europe, 4 from Oceania, 3 from North America,

and 1 from South America. In total, 1,280 kidney transplant recipients were studied. Nine observational studies, three clinical trials, three qualitative studies, and one systematic review that examined the relevant scientific literature on the topic were included.

The articles and their characteristics are summarized in **table 1.**

Description of the results

Characteristics of the study population

The mean age of the population included in this review at the time of receiving KT ranged from 44.5 to 68 years, although only two articles reported this figure[18,26].

In 11 of the reviewed articles, the time interval between kidney transplantation and the first educational intervention

Table 1. Characteristics of the studies included in the review.

AUTHOR, YEAR, COUNTRY	STUDY TYPE	SAMPLE	OBJECTIVES	MAIN RESULTS	QUALITY CRITERIA
Naile Aksit et al., 2022, Turkey[17]	Randomized controlled clinical trial.	60 individuals, 30 in the intervention group and 30 in the control group.	Evaluate the effectiveness of health education and interviews to improve adherence to treatment in kidney transplant recipients (KTR).	The mean score of the Immunosuppressive Therapy Adherence Scale was higher in the intervention group. Knowledge scores increased in the intervention group from 12.17 ± 3.39 at the start of the study to 20.73 ± 1.57 after the intervention.	CONSORT 17/25
Cossart A.R. et al., 2022, Australia[18]	Semi-structured qualitative study.	14 participants aged 66–77 years who were prescribed an average of 13 medications.	Examine how adults older than 60 behave regarding medication intake after kidney transplantation.	Patients felt empowered to be educated about their condition and medication. This also encouraged them to involve their loved ones. Additionally, they prioritized immunosuppressive medication mainly out of gratitude to their donor.	CASPe 9/10
Ostrowski P. et al., 2023, Poland[19]	Cross-sectional observational study.	217 kidney transplant patients at least 3 months post-transplant, aged 18–82, who voluntarily agreed to respond anonymously.	Investigate psychological factors associated with medication adherence post-transplant.	Age and educational level were related to adherence: younger and less-educated patients showed higher non-adherence. Patients with regular meal schedules tended to be more adherent.	STROBE 19/22
Thet Z. et al., 2022, Australia[20]	Observational analytical cohort study.	50 patients: 25 kidney transplant recipients and 25 with glomerular disease.	Assess the effect of an integrated education program on skin cancer risk awareness and protective behaviors in KTR and people with glomerular disease.	Significant improvement was observed in skin cancer awareness questionnaire scores at the start, 3 months, and 6 months post-intervention. Frequency of self-skin exams increased, and adherence to protective measures improved.	STROBE 21/22
Lillehagen I. et al., 2018, Norway[21]	Ethnographic observational study.	10 kidney transplant recipients (who received health education) and 13 trained nurses.	Understand how a new patient education program is adapted and internalized when implemented in daily hospital practice.	Nurses tried to apply program principles, but patients struggled to express their needs and understanding. Nurses also encountered some difficulties and limitations.	STROBE 14/22
Low J.K. et al., 2019, Australia[22]	Pilot randomized controlled clinical trial.	71 individuals, 36 in the control group and 35 in the intervention group.	Determine the effectiveness of an intervention designed for kidney transplant recipients (KTR) to improve medication adherence.	Higher adherence was observed at a specific time point among participants in the intervention group. The intervention was effective in maintaining stable adherence levels over time compared with the control group.	CONSORT 17/25

AUTHOR, YEAR, COUNTRY	STUDY TYPE	SAMPLE	OBJECTIVES	MAIN RESULTS	QUALITY CRITERIA
Yue-Harn Ng et al., 2021, United States[23]	Observational analytical cohort study.	173 participants (95% Black).	Identify pre–kidney transplant evaluation factors associated with non-adherence behaviors post-transplant across three domains, to support earlier interventions before and after transplantation in future studies.	Racial discrimination was associated with a 31% lower likelihood of adherence, while higher self-control was associated with increased adherence.	STROBE 21/22
Marsicano E.O., 2015, Brazil[24]	Cross-sectional observational study.	100 kidney transplant recipients.	Determine the prevalence of non-adherence to immunosuppressants in the Brazilian kidney transplant population.	Non-adherence prevalence was 51%. Higher family income (above 5 minimum wages) and access to private health insurance were associated with non-adherence.	STROBE 17/22
De Pasquale C. et al., 2016, Italy[25]	Descriptive observational study.	74 kidney transplant recipients.	Identify risk factors and post-transplant psychological symptoms influencing treatment adherence in kidney transplant recipients.	Those with higher education and more time since transplant had better mental balance. Women were less adherent, and although time since transplant influenced adherence, mental health did not significantly affect it.	STROBE 13/22
Gellén E. et al., 2018, Hungary[26]	Cross-sectional observational study.	221 kidney transplant recipients.	Investigate how pre-transplant sun exposure influences skin cancer risk in transplant recipients and evaluate sun-protection habits and skin cancer incidence.	Education received did not translate into reduced sun exposure nor better sun-protection methods post-transplant, highlighting the need for improved and better-adapted educational programs.	STROBE 18/22
Urstad K.H. et al., 2021, Norway[27]	Longitudinal observational study.	196 kidney transplant recipients.	Investigate knowledge and self-efficacy in kidney transplant recipients during the first year after transplantation.	The education program did not have a statistically significant impact on participants' knowledge or self-efficacy levels.	STROBE 18/22
G. Costa-Requena et al., 2016, Spain[28]	Longitudinal observational study.	73 participants, median age 57 years.	Evaluate treatment adherence after kidney transplantation and assess information received at 1 month and 18 months post-transplant, along with its influence on adherence.	Non-adherence rates ranged from 9.6% to 29.8% at different post-transplant stages. Not consulting a physician after missing a dose significantly affected adherence at 1 month. At 18 months, medication knowledge no longer influenced adherence.	STROBE 20/22
Belaiche S. et al., 2017, France[29]	Systematic review.	37 studies included.	Highlight the most relevant factors associated with lack of adherence to treatment, especially regarding immunosuppressive medications or overall medication regimens.	Non-adherence (NA) was associated with several factors: being male (rather than female), being younger (<50 years), having little social support, being unemployed, having a low educational level, being more than three years post-transplant, having received the organ from a deceased donor, having more than six comorbidities, taking more than five medications daily, having more than two daily doses, holding negative beliefs, exhibiting negative behaviors, and experiencing depression and anxiety.	AMSTAR 10/16

AUTHOR, YEAR, COUNTRY	STUDY TYPE	SAMPLE	OBJECTIVES	MAIN RESULTS	QUALITY CRITERIA
Gibson C.A. et al., 2020, United States[30]	Randomized controlled clinical trial.	10 participants who had undergone kidney transplantation 6–12 months prior.	Determine whether it is feasible and acceptable to implement a remote nutrition and physical activity intervention for kidney transplant recipients.	Adherence to healthy behaviors was high. All participants completed follow-up assessments. The control group maintained weight, while the intervention group showed weight gain at 3 and 6 months. Improvements were noted in physical activity, quality of life, and fruit and vegetable intake in both groups. Participants stated they would recommend the program to other transplant recipients.	CONSORT 25/25
Andersen M.H. et al., 2016, Norway[31]	Exploratory qualitative study.	12 kidney transplant patients.	Explore the experiences of kidney transplant recipients participating in a new evidence-based educational program.	Participants felt the new educational program was tailored to their individual needs. However, they noted that recipients and healthcare staff considered different aspects when educating. The importance of evaluating patient understanding even after the program was emphasized, since knowledge may change in clinical settings compared with controlled studies.	CASPe 10/10
Williams A. et al., 2016, Australia[32]	Exploratory qualitative study.	35 healthcare professionals.	Understand how healthcare professionals support kidney transplant recipients in maintaining long-term adherence to medication regimens.	The analysis showed that adherence is a shared task involving both the transplant team and the patient. Effective strategies included educational activities in the hospital, identifying and managing non-adherence, promoting self-care, and enhancing collaboration between the patient and healthcare professionals.	CASPe 8/10

KT: Kidney Transplant. **NA:** Non-adherent.

was documented, showing significant variability ranging from a few days before transplantation to 3 months after surgery[22,27,28,30,31], or even several years after transplantation (minimum 3, maximum 8.7 years)[18,24-26]. Of note, in 2 studies[20,23], the first educational intervention was carried out during the hospital stay, in the immediate post-KT period.

Demographic data on the sex of participants were collected in the selected studies[17-32]. Proportions varied across studies. There was a wide range of sex distributions: in 3 studies the gender distribution was approximately equal (50% men and 50% women)[18,19,30]. In the remaining studies, larger deviations from this balance were found, with the proportion of women being <45% in 6 studies[20,22,23,25,26,29], and <35% in 5 studies[21,24,27,28,31]. Only 2 studies had a higher proportion of women than men, at 58%[17], and 64.3%[32], respectively.

Participants represented a variety of ethnicities, with most identified as White in those studies that specified race[18,20,23,24,26].

Regarding donor type, 3 studies[17,23,24] reported that more than half of the participants received a kidney from a living donor. Conversely, in three studies and one systematic review[22,27,29,30], more than half of the organs were from deceased donors. Across the review, only four studies included living donors.

A variety of drug regimens were observed among kidney transplant recipients. Overall, mycophenolate mofetil[18,25,26,30] and corticosteroids[18,25,26,29,30] were frequently used as part of the immunosuppressive therapy. Three studies specified the number of medications patients took daily: in 1 study, the number exceeded 5 drugs with more than 2 doses per day[29], while in the other 2, the mean was 12 and 13 different drugs, respectively[18,24]. Immunosuppressive regimens also included cyclosporine[24,29] and tacrolimus[17,24,30].

Health education interventions and key findings

There is considerable diversity in the health education interventions analyzed in the selected studies[17-32], reflecting the complexity and multiple facets of post–kidney transplant care. Among these interventions—delivered mostly through questionnaires, surveys, scales, integrated programs, or meetings—education focused on adherence to immunosuppressive therapy emerges as a recurrent

and priority topic, addressed in a total of 9 studies[17-19,22-25,28,29]. Three of these studies focus on specific interventions aiming to increase adherence[17,18,22], while the remaining 6 investigate the most influential factors in maintaining adherence[19,23-25,28,29]. These findings suggest a clear concern with ensuring optimal adherence to immunosuppressive medication, which is crucial for the viability and long-term success of KT. In addition to treatment adherence, other aspects of health education receive attention in the reviewed literature. For example, some studies explore awareness and prevention of skin cancer risk in kidney transplant recipients[20,26], recognizing the specific challenges these patients face due to their increased susceptibility to this type of condition. Likewise, lifestyle modification after transplantation—including aspects such as diet and exercise—is addressed in a specific study[30], underscoring the importance of promoting healthy habits to improve long-term kidney transplant outcomes.

Additionally, some studies focus on evaluating the effectiveness of existing health education programs[21], offering a critical view of current strategies and their impact on KT recipients. Other studies investigate patients' self-efficacy during year 1 after transplant[27], shedding light on individuals' confidence and self-care skills during this crucial stage of recovery. Furthermore, the experiences and perceptions of kidney transplant recipients are explored, providing qualitative perspectives that complement quantitative data and enrich overall understanding of this patient group's needs and challenges[31]. Lastly, one study[32] aims to understand how healthcare professionals support patients in sustaining long-term adherence to pharmacological treatments.

Regarding outcomes, several interventions—five in total—showed favorable results[17,18,20,22,30], with a positive impact on patient behavior leading to improved adherence[17,18,22], or increased awareness and implementation of knowledge related to risk factors and lifestyle modification[20,30]. However, in 2 studies[26,27], implementation of the intervention did not necessarily result in improved patient behavior. The most influential factors in treatment adherence were analyzed in 6 articles[19,23-25,28,29], identifying several negative predictors such as younger age and lower educational level[19,25,29], experiences of racial discrimination[23], longer time since transplantation[25,28], and failing to consult a physician after forgetting a dose[28]. Regarding gender, findings diverged: in 1 study lower adherence was more prevalent among women[25], whereas in another, lower adherence was associated with being male[29]. Another interesting finding was the discrepancy related to economic status: in 1 study, low income was a major risk factor[29], while in another, having a family income >5 minimum wages and access to private health insurance were associated with non-adherence[24]. Among the positive factors, the most notable included maintaining regular mealtimes[19], higher educational level, better body mass index[23], and social support[29].

In another article, patients expressed appreciation for individualized education[21], even though they felt that nurses sometimes prioritized standard hospital procedures[31], and highlighted the importance of health care professionals being involved and demonstrating a collective commitment[32].

Table 2 illustrates the interventions and the methods used to assess therapeutic adherence in the programs that addressed it.

Complications or challenges identified

Various types of complications or challenges for participants were reported across several studies[17-22,25,30,32]. The most frequent was that patients felt overwhelmed and fatigued by the complexity and rigor of the post-transplant care regimen[18,19,22,30]. Other notable issues included some patients' false belief that they were protected vs rejection simply because they had been on immunosuppression for many years[17], and difficulties in adequately formulating each patient's interests—taking psychological and social aspects into account—which limited the effectiveness of individualized adaptation[21,25]. One study showed that pre-transplant education might also have been insufficient[20].

Of note, the presence of feelings of "shame and fear" when informing the transplant team about incorrect treatment adherence, with patients not wanting "the doctor to find out"[32].

Patient satisfaction

Some studies evaluated transplant recipients' satisfaction with educational programs, with several highlighting strong satisfaction with these interventions[18]. Another reason for greater satisfaction was the perception that the educational program was tailored to patients' individual needs[31]. One study also noted feelings of empowerment as participants took an active role in their self-care[19]. along with a marked awareness of their responsibility for their own health status[29].

In another study, involving a technology-based lifestyle modification program that included 12 weeks of remote, interactive, and personalized health coaching, participants expressed dissatisfaction with the brevity of the program, noting that it had been very helpful—especially during the post-transplant period when they were largely confined to the hospital. They highlighted the social value of the program, as it allowed them to share experiences and observe other kidney transplant recipients' journeys. They considered this support group highly beneficial, providing emotional support without the need to leave home[30].

DISCUSSION

Health education is a fundamental practice that becomes even more relevant in the context of transplantation. According to Rochera A, this practice has not always been a priority

Tabla 2. Intervenciones sanitarias realizadas.

AUTHOR	INTERVENTION
Naile Akşit.[17]	Patient information form; pre- and post-test; medication monitoring form; measurement of tacrolimus blood levels; and a training leaflet. Questionnaire used: Immunosuppressive Therapy Adherence Scale.
Amelia R. Cossart, et al.[18]	Patient interviews.
Piotr Ostrowski, et al.[19]	Anonymous questionnaire with items related to medication aspects.
Zaw Thet, et al.[20]	Integrated skin cancer education program.
Ida Lillehagen, et al.[21]	Observation of 19 learning sessions.
Jac Kee Low, et al.[22]	In-person meeting with patients and a series of six phone calls every 2 weeks. Questionnaire used: MEMS® (Medication Event Monitoring System).
Yue-Harn Ng, et al.[23]	Evaluations at transplantation and at 6 months post-transplant.
Elisa Oliveira Marsicano, et al.[24]	Non-adherence scale, collateral report, and blood levels of immunosuppressants. Questionnaire used: BAASIS (Basel Assessment of Adherence to Immunosuppressive Medications).
Colugnati, et al.[25]	Psychological/psychiatric assessment; evaluation of patients' perceived health status; and an interview on immunosuppressive medications.
Concetta De Pasquale, et al.[26]	Specific questionnaire (including questions about skin type, transplant date, type and number of transplanted organs, immunosuppressive medication history, and education received about increased skin cancer risk during the peri-transplant period).
Emese Gellén, et al.[27]	Kidney Transplant Recipients Knowledge Questionnaire and the General Self-Efficacy Scale.
Kristin Hjorthaug Urstad, et al.[28]	Questionnaire used: SMAQ (Simplified Medication Adherence Questionnaire).
G. Costa-Requena, et al.[29]	Electronic monitoring, blood levels of immunosuppressants, patient interviews, self-reports, refills, pill counts, physician judgment.
Stephanie Belaiche, et al.[30]	Technology-based lifestyle modification program
Cheryl A. Gibson, et al.[31]	Interviews (40–60 minutes in duration).
Allison Williams, et al.[32]	Healthcare professionals participated in focus groups across five transplant units.

for health professionals[33]. However, thanks to professional and legal demands regarding responsibility in the nursing profession, the philosophy related to the "patient's right to know" has evolved.

Virginia Henderson states that "to have health, it is necessary to have information." It is impossible to enjoy good health without understanding how to preserve it, care for it, or restore it[33].

Under this premise, this review shows that educational interventions achieve quality and effectiveness when they are tailored to the individual context of each patient. By adopting an integrated approach, health education can be personalized to meet the specific needs of each patient[20,21,32]. Therefore, it is crucial to explore each individual's personal perceptions when implementing effective support strategies[18], as well as to consider the use of new technologies as a tool to promote education[30].

Of note, various factors associated with variables such as age, gender, educational level, ethnicity, or donor type influence the degree to which these interventions are followed and adhered to, especially those related to immunosuppressive medication[23-25,28,29]. Regarding adherence to immunosuppressive therapy, other authors such as Ruiz-Calzado R report that variables such as gender, employment status, or race are not significantly influential. However, factors such as age, treatment complexity, and certain psychological aspects are more relevant[34]. These factors may vary widely, and it is essential to understand their impact on the experience of kidney transplant recipients to design effective, personalized interventions. Other influential aspects studied highlight that the importance of maintaining adherence is a shared responsibility between the patient and the medical team, although this is often limited by time constraints or may become unidirectional[32].

Despite the presence of complications such as stress and feeling overwhelmed by the complexity of the new medication regimen and lifestyle changes[18,19,22,30], or issues such as lack of personalized attention[21,25] and misinformation accompanied by myths regarding treatment[17], other authors emphasize that the difficulties faced after transplantation were insignificant vs the gratitude patients felt for being able to live 1 more day[35].

In the results of this review, a high level of overall satisfaction with the interventions was observed, especially when these were tailored to individual needs[31]. This was largely due to the empowerment patients experienced when receiving such interventions[19]. However, De Pasquale

et al. found that transplant recipients often struggle to express their deeper psychological needs. They identified emotional constriction in 100% of patients and difficulties in interpersonal relationships and anxiety in 70% of them[36].

Of note, as mentioned in one study, that all patients would recommend the program they received to other transplant recipients[30].

Limitations of the study

One of the main limitations of this study is the limited amount of bibliographic information available on the topic and the difficulty in finding articles that matched it. Currently, nursing research in this area is limited. This lack of specific studies restricts the availability of data and scientific evidence to support and improve clinical practice in patient care, underscoring the need to promote and support further research in the nursing field.

Another limitation to note is the considerable variability in the results of some studies.

Practical considerations

Health education for kidney transplant recipients is crucial due to the high prevalence of this condition in society and its significant impact on the quality of life and safety of these individuals. It is vital to ensure that patients understand the importance of following the prescribed immunosuppressive regimen, including correct medication administration, adherence to scheduled dosing times, and prevention of interruptions in therapy.

Nurses play an essential role in this process, thanks to their proximity and close relationship with patients. The work of informing, educating, and raising awareness carried out by nursing professionals is indispensable to empower patients and help them manage their new lives in the best way possible.

In light of the results of this review, health education interventions are shown to be a fundamental tool in the comprehensive care of kidney transplant recipients, particularly due to their effectiveness in improving knowledge, promoting healthy behaviors, and fostering responsibility in treatment adherence. Moreover, these interventions are more effective when they are designed in an individualized and integrated manner, taking into consideration the biopsychosocial sphere of the kidney transplant recipient, as they also strengthen autonomy, independence, and confidence to face the challenges of this new stage of life.

It would be advisable to implement health education interventions in routine clinical practice, ensuring that they are culturally sensitive and respect patient autonomy. Equally important is to investigate the effectiveness of these interventions, especially from the perspective of nursing.

Conflicts of interest

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