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REVIEW ARTICLE

Educational Strategies for Liver Transplant Candidates and Recipients: An Integrative Literature Review

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Abstract: **Objective:** To examine evidence in the literature on educational strategies for liver transplant candidates and recipients. **Methods:** This is an integrative literature review. The literature search was conducted in the following databases: National Library of Medicine and the National Institutes of Health (PubMed), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS) and Embase. The identified records were exported to the EndNote reference manager for organization and removal of duplicates, and subsequently to the web application Rayyan for peer-blinded selection of studies. Two reviewers performed the selection of studies by reading the title and abstract (phase 1) and by reading the full article (phase 2). In both phases, the consensus meeting was held with a third reviewer. Data were analyzed descriptively. **Results:** Among 488 studies identified, seven articles were selected for the knowledge synthesis. Most studies brought health education strategies on medications, nutrition, digital technologies and related to complications, with a focus on transplant patients, identifying significant results for rehabilitation and patient adherence to the proposed treatment. We also observed a predominance of studies that addressed educational strategies with a focus on postoperative complications and that encompassed the multiprofessional areas (three studies), pharmacy (two studies), medicine (one study), and nursing (one study). **Conclusion:** The literature has shown that immunosuppressants, concern for complications, technology, and nutrition are essential in a comprehensive education plan for this clientele. Despite this, a limited number of studies were identified in the national and international literature on educational strategies about liver transplantation.

Descriptors: Learning; Patient Education as Topic; Health Education; Waiting Lists; Transplanted Patients; Liver Transplantation; Review.

INTRODUCTION

Liver transplantation is a highly complex surgical procedure of which success depends on innumerous factors arising from the training and infrastructure of the institution that performs it. It is a resource used with a view to the survival of the patient with irreversible liver disease, where treatment options are almost nonexistent or ineffective.[1]

Given the complications of liver disease, the patient is at high risk of death and becomes a candidate for transplantation, however, it is important to emphasize that the possibility of surgery depends on the availability of organ donors, a factor that, because of the shortage of available organs, becomes an obstacle, reflected in the prolonged wait. Thus, the mortality rate is high in this phase, since the onset of serious complications becomes prone. Extensive evaluation is performed on the patient by means of laboratory tests, cardiovascular evaluation, pulmonary capacity, psychological and social evaluations, and consultations with the multiprofessional

team, with the purpose of ascertaining the existence of contraindications and reducing the risks to the patient. The role of the family is to support the patient throughout the entire process (before, during and after surgery).[2] Added to this, it is important that the patient understands the immunosuppressive therapy needed throughout his or her life and cooperates with it, in addition to the other treatments, to ensure postoperative success.

Patient education is the process that seeks to ensure the understanding of their physical condition, equipping the them for self-care through own or shared resources and experiences. The importance and goal of education is to empower the patient to make decisions related to health care, and to make the necessary changes in order to achieve the best possible health status.[3]

Success in transplantation requires professionals who value prevention and health promotion, managers who support these professionals, and service users (the patients) who achieve and build knowledge, increasing individual and collective autonomy. There are studies that point to several benefits for patients submitted to the health education process, including increased satisfaction and quality of life, improved continuity of care at home, reduced anxiety, promotion of and adherence to the proposed treatment, and the achievement of independence.[4]

The nurse's role involves not only giving directions to the patient when they are absent; it includes assisting the patient to increase skills for self-care. According to international literature, there are several barriers to teaching for nurses, including: lack of competence or confidence in their educational skills; low prioritization of teaching activities by administrators and other staff; environmental infrastructure problems, such as lack of space, privacy, and frequent interruptions; and questioning the effectiveness of education, making it less valued.[5]

The transplant nurse provides specialized care in the promotion and rehabilitation of the health of candidates, recipients, and their families, as well as living donors. The care encompasses treatment, prevention, and rehabilitation of possible liver diseases prior to transplantation, or comorbidities after surgery.[6]

According to the Brazilian Federal Council of Nursing, the nurse responsible for the organ donation process should plan, coordinate, and supervise nursing procedures, as well as plan and implement actions that optimize organ donation and procurement. The nurse who provides care to candidates and recipients is responsible for applying the systematization of nursing care in all phases of the process for both the patient and the family.[7]

Considering that complications exist throughout the entire process, education for candidates and recipients becomes a beneficial strategy for recovery, as well as reducing the risks arising from the surgery. One of the nurses' roles is the administration of medication, especially immunosuppressants, at which point the nurse begins teaching the transplant recipient. Thus, teaching and learning the patient and their families about the correct use of these medications after discharge from the hospital is crucial for the autonomy and independence of those involved, as well as for the prevention of complications.[8]

The teaching must cover nutritional aspects, medication, vital signs measurement, among others, which require the development of cognitive, attitudinal, and psychomotor skills of the patients, ensuring the continuity of care and the active participation of those involved.[9]

After transplantation, recipients need to adapt to a new lifestyle in order to minimize the occurrence of complications such as rejection, infections, and tumors. Therefore, new knowledge needs to be acquired in order for such a change to be effective, including: strategies to prevent the progression of liver damage (such as alcohol intake and nonprescription drugs), restriction of sodium chloride, identification of physical signs and symptoms in cases of abnormalities, etc.[10]

As an example of the relevance of teaching, the role of the multidisciplinary team in raising awareness and maintaining alcohol abstinence before and after transplantation is highlighted, since cirrhosis caused by alcohol represents a significant portion of the cases seen in transplant programs. In this case, individual or group educational interventions, especially those of a cognitive-behavioral and motivational nature, focusing on the emotional, physical, and economic impact, can be of great value in this context, since it is fundamental for pre-transplant health maintenance and post-transplant survival.[11,12]

Given the above, the purpose of this study was to review evidence in the literature on educational strategies for liver transplant candidates and recipients. The relevance of this study is determined by the absence of synthesis in the literature on the proposed theme, as well as by the potential to identify knowledge gaps, with a view to future investigations on health education about liver transplantation applicable in clinical practice.

METHODS

This is an integrative literature review, with the purpose of contributing to the integration of scientific knowledge with professional practice, in the context of health education about liver transplantation. The integrative review consists of a systematic, organized, and critical process, allowing the search, the critical evaluation, and the synthesis of evidence of what is available in the literature

on the topic of interest, having as a final product the current state of knowledge and the identification of gaps that will direct the development of future studies.[13]

The following steps were taken for the present review:

- elaboration of the research question;
- literature search of the primary studies;
- data extraction;
- evaluation of the studies included in the review;
- analysis and synthesis of the results;
- presentation of the review.[14]

The review protocol has been registered in the FigShare repository (available at https://figshare.com/account/home), which can be accessed at https://doi.org/10.6084/m9.figshare.13557614.v1.[15]

For the research question, the following question was proposed: what is the available evidence in the literature on educational strategies that address teaching liver transplant candidates and recipients? To this end, the PICO strategy, an acronym for *patient*, *intervention*, *comparison* and *outcomes*[16], was used to outline the search strategy, as shown in Table 1.

Table 1. Elements of the PICO strategy.

Acronym	Definition	Description
P	Patient or problem	Adult candidates and recipients
I	Intervention or topic of interest	Teaching strategies
C	Comparison or control	Not applicable
O	Outcome or results	Liver transplantation process

In the second phase, the literature search for the primary studies was conducted on the Internet to access the databases: Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS), National Library of Medicine and the National Institutes of Health (PubMed), Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Embase. Medical Subject Headings (MeSH), CINAHL Headings and Health Sciences Descriptors (DeCS), delimited according to each database, were identified to then outline a unique search strategy, adapted for each database listed. Boolean operators AND and OR were used to combine the crossings between the elements of the PICO strategy, in order to obtain a manageable number of studies to conduct the research.

The following search strategy, implemented in the CINAHL database, exemplifies how records were identified: ("Waiting List" OR "Waiting Lists" OR "Transplant Recipient" OR "Transplant Recipients") AND ("Teaching" OR "Teaching Method" OR "Teaching Methods" OR "Educational Technic" OR "Educational Technics" OR "Educational Technique" OR "Educational Techniques" OR "Patient Education as Topic" OR "Patient Education" OR "Education of Patients" OR "Health Education" OR "Learning" OR "Teaching Material" OR "Teaching Materials" OR "Patient Education Handout") AND ("Liver Transplantation" OR "Liver Transplantations" OR "Liver Grafting" OR "Liver Transplant" OR "Liver Transplants" OR "Hepatic Transplantation" OR "Hepatic Transplantations" OR "Liver Recipient" OR "Liver Recipients"). The database search was implemented on January 13, 2021.

For study selection, in order to ensure methodological rigor, after searching the selected databases, the results were exported to the bibliographic reference manager (EndNote, Desktop X7 version), which were organized, and duplicate publications were removed.[17] For the peer-blinded study selection step, with reading of titles and abstracts (phase 1), followed by reading of the studies in full (phase 2), the identified records were exported to the software Rayyan, in which labels were created describing the reasons for exclusion or inclusion of each study. Consensus meeting was held with the participation of a third reviewer for the final selection of each phase.[18]

Among the selection criteria, primary studies that addressed educational strategies for liver transplant candidates and recipients, published in English, Portuguese, and Spanish, in the period between the last five years (2016 to 2020), were included. Furthermore, to ensure rigor in conducting the method, part of the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (Prisma) were followed.[19]

In the data extraction phase of the primary studies included in the integrative review, a script adapted from the literature was employed,[20] which allowed the identification of the study, as well as the methodological characteristics and the main results.

For the evaluation of the studies, two issues were prioritized: the methodological approach (quantitative or qualitative) and the strength of the evidence. To identify the method of each included study, the terminology indicated by the authors themselves was initially used to define the research design of the studies, and when the explicit identification of the method was not present, concepts described in the literature were adopted. [21] Regarding the evidence classification system, the evidence hierarchy classification of Melnyk and Fineout-Overholt was employed,[22] which advocates a different classification regarding the hierarchy of evidence according to the type of clinical question:

- intervention/treatment or diagnostic/diagnostic test;
- of prognosis/prediction or etiology;
- of meaning.

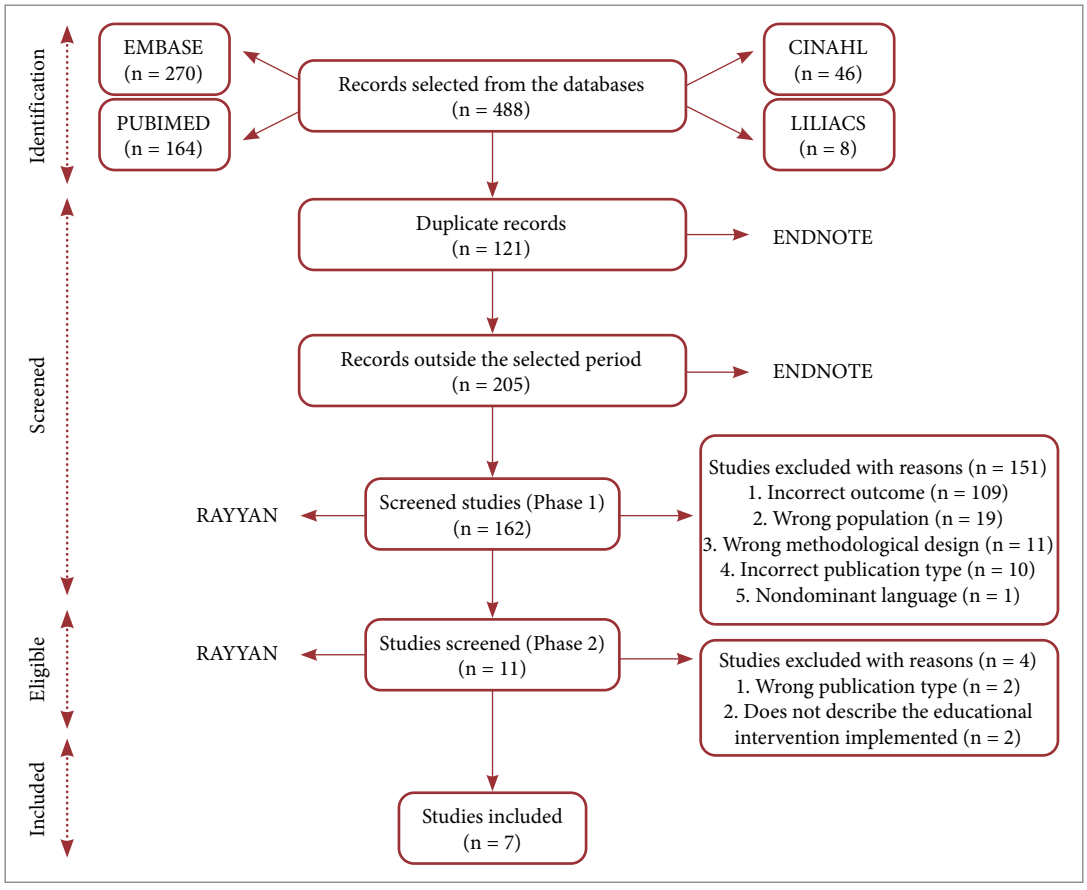
For the analysis and synthesis of the results, the descriptive form was used, considering the characteristics and results of each primary study included in the integrative review. In this step, a summary table was prepared, showing identification data, objective, and main results found in each study.

Finally, in the last step of the review, the disclosure of the results of this study presented data on educational strategies in liver transplant candidates and recipients, as well as methodological limitations, knowledge gaps, and directions for future research on this topic.

RESULTS

Among 488 identified studies, 162 were selected for title and abstract analysis, after removing duplicates (n = 121) and articles outside the period from 2016 to 2020 (n = 205). After a consensus meeting between the reviewers, 11 records were eligible for full reading, resulting in four exclusions (two were secondary studies and two did not describe the educational intervention implemented). The final sample of seven articles for the knowledge synthesis was the result of this phase. Figure 1 demonstrates the flow chart of the process of identifying, selecting, and including studies in the integrative review.

Among the seven selected studies, three were cross-sectional studies,[>23-25] one of quality improvement,[26] one of prospective cohort,[27] one of descriptive correlation[4] and one of qualitative approach. [28] Five studies originated from the United States of America,[4,24,26-28] one from Thailand[23] and one from Brazil.[25] So, only one was published in Portuguese, and the others in the English language.



PubMed: National Library of Medicine and the National Institutes of Health; CINAHL: Cumulative Index to Nursing and Allied Health Literature; LILACS: Literatura Latino-Americana e do Caribe em Ciências da Saúde.

Figure 1. Flowchart of the selection process of the primary studies included in the integrative review adapted from Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA). Ribeirão Preto, SP, Brazil, 2021.

The characterization of the primary studies is presented in Table 2, with the description of the following data: authors and year of publication, language, country, journal name, and topic covered. There was a predominance of studies that addressed educational strategies focused on postoperative complications (n = 3).

Table 2. Characterization of the studies according to title, author, language, country, journal and subject (n = 7).

Identification	Authors' area	Language	Country	Journal name	Topic covered
Asavakarn, 2016[23]	Pharmaceuticals	English	Thailand	Transplantation Proceedings	Medicines
Lima, 2016[25]	Pharmaceuticals	Portuguese	Brazil	Einstein (São Paulo)	Medicines
Chaney, 2018[26]	Multiprofessional team	English	United States	Progress in Transplantation	Nutrition
Leek, 2018[24]	Multiprofessional team	English	United States	American Journal of Transplantation	Postoperative complications
Leek, 2019[27]	Multiprofessional team	English	United States	PlosOne	Postoperative complications
Dols, 2020[4]	Nursing	English	United States	Progress in Transplantation	Postoperative complications
Lieber, 2021[28]	Physicians	English	United States	Liver Transplantation	Digital technologies for education

Table 3 summarizes the studies' objective, method, sample size, and study population, and concludes with the main results. It was observed that most of the studies presented level of evidence VI, according to the hierarchy of evidence classification adopted.[22]

Table 3. Summary of the studies included in the integrative review (n = 7).

Identification	Objective	Method and level of evidence (LE)	Participants characteristics	Main results
Asavakarn, 2016[23]	To implement pharmaceutical educational approach to improve adherence to immunosuppressive therapy and assess the incidence of drug-related problems.	Cross-sectional study LE = VI (clinical question of intervention/ treatment or diagnosis)	50 liver transplant recipients (86 visits); 52.3% were women, and the overall mean age was 58 (SD = 14) years.	After the educational program, the mean total score of the post-transplant knowledge test improved from 3.48 to 13.30 points. The main problems related to medications were non-adherence (8%), adverse reactions (4%), and drug interactions (2%).
Lima, 2016[25]	Describe and analyze the orientation offered at hospital discharge by the pharmacist.	Cross-sectional study LE = VI (clinical question of intervention/ treatment or diagnosis)	74 high liver and kidney transplant recipients; 70.3% were male; 44 liver transplant recipients.	Average of 7.5 (PD = 1.7) drugs per patient (liver transplant). Fifty-nine medication-related problems were identified: 67.8% related to the lack of prescription of the medication needed at discharge. The pharmacist was responsible for the orientation of the prescribed drug treatment: correct mode of use, storage, schedules, drug interactions, and adverse reactions. Delivery of written material with the prescribed pharmacotherapy.
Chaney, 2018[26]	To determine whether supplemental nutrition education improves nutrition among liver transplant candidates. To assess patient adherence to nutritional recommendations.	Quality improvement project (Plan-do-study-act method) LE = VI (clinical question of intervention/ treatment or diagnosis)	Group with telephone follow-up (n = 8), mean age 51; Group with standard care (n = 10), mean age 62.	At the end of the eight-week project period, 4 (66.7%) patients reported weight loss since the nutrition education class. All reported benefits from the phone calls with regard to improved nutritional status.
Leek, 2018[24]	To develop and evaluate the effectiveness of an educational strategy on chronic kidney disease after transplantation among liver transplant recipients.	Cross-sectional study LE = VI (clinical question of intervention/ treatment or diagnosis)	76 liver transplant recipients; Average age 56 years, 71% male.	Knowledge about chronic kidney disease was assessed pre and post educational intervention. The intervention lasted 15 minutes. The average knowledge score after the intervention was 83% compared to the previous period (73%) and was significant ($p < 0.001$).
Leek, 2019[27]	To evaluate the effectiveness and feasibility of an educational tool to improve knowledge about chronic kidney disease among liver transplant recipients with early-stage kidney disease.	Prospective cohort study LE = VI (clinical question of intervention/ treatment or diagnosis)	81 liver transplant recipients; Mean age 56.3 (SD = 11.7) years, and 69.1% were male	The educational intervention focused on knowledge and goal setting based on identified knowledge gaps. Basic functions of the kidney, chronic kidney disease, causes and risks of disease after liver transplantation were topics covered. Patients received personalized booklet with data on recent kidney function, blood pressure, and glycated hemoglobin, as well as goals for self-management for each outcome. Standardized roadmap was developed to standardize the 15-minute educational sessions. Knowledge after the intervention was significantly improved (pre: 71.8 - SD = 16.6%, post: 83.3 - SD = 10.4%; $p < 0.001$).

Continue...

Table 3. Continuation.

Identification	Objective	Method and level of evidence (LE)	Participants characteristics	Main results
Dols, 2020[4]	To compare demographic and clinical characteristics and 30-day readmissions of liver transplant recipients one year before and one year after implementation of educational strategy.	Descriptive correlational study LE = VI (clinical question of intervention/ treatment or diagnosis)	35 liver transplant recipients; Mean age 53.7 (SD = 12.77) years, 60% were male	Educational intervention included standard care with booklet (56 pages), individual instruction, and written test that required 100% correctness before discharge. The new intervention added the setting of goals and activities for the transplanted person, repetition of teaching, among others. The odds of 30-day readmissions in the year before the education intervention were 2.088 times higher than in the year after implementation. The 30-day readmissions were reduced by 16.3% when comparing the results before and after the new educational intervention.
Lieber, 2021[28]	To identify the role of technology in post-transplant recovery, including smartphone usage practices and app preferences, and propose a prototype app.	Qualitative study LE = VI (clinical question of intervention/ treatment or diagnosis)	20 liver transplant recipients; Average age 61 years (range 28 to 68 years), 35% female.	Most (90%) of the participants owned smartphones. They searched for information through search engines (50%) and used games or watched videos (30%) on their smartphones. The most cited use of smartphones to support health recovery involved alarms and reminders to take medications (65%). The majority (80%) were interested in an app about liver transplantation to help with their recovery.

DISCUSSION

The present study searched the literature for available evidence on educational strategies that addressed teaching liver transplant candidates and recipients. Among the results obtained through the selection of studies, it was identified that the proposed theme has a scarcity of educational strategies. The studies brought health education strategies in several areas, focusing on drug treatment, postoperative complications, nutrition, and digital technologies.

A study produced in Thailand sought to analyze the adherence of transplant patients to drug treatment after a pharmaceutical educational approach. This approach is composed of three steps. The first began in the mediate postoperative period, when the patient was clinically fit and able to cooperate, and the importance of medication compliance was emphasized by the clinical pharmacists on the transplant team. Educational tools used include flipcharts, medication pill boxes, daily medication prescription, and drug interaction cards. The second stage took place at discharge, with the presence of the caregiver and members of the health care team, in a meeting to discuss and clarify issues of interest, and at the end the understanding of the patient and caregivers about immunosuppressants was evaluated by means of a questionnaire. Finally, in the third stage, on the first outpatient return (seven days after hospital discharge), the questionnaire was applied again. As a conclusion, it was identified that the program was an effective strategy for achieving medication adherence.[23]

Another study that addressed the topic of medications was developed in Brazil in 2016 with the aim of describing the results of an educational activity implemented by the clinical pharmacist at the discharge of liver and kidney recipients, with a view to patient safety. In this study, the number of pharmaceutical orientations performed, the number of drugs prescribed per patient, drug-related problems, and pharmaceutical interventions were quantified. The clinical pharmacist at the service was responsible for providing guidance on the prescribed treatment, such as the correct mode of administration and storage of the drugs, schedules for taking them, drug interactions or adverse reactions, the process of making the drugs available, and the importance of adherence. In the study, the strategy implemented was adapted according to the level of education and the difficulties of understanding of the transplanted person and the caregiver. The pharmaceutical interventions were performed according to the identified drug-related problems and aimed at their resolution or prevention. Among the interventions, we can highlight the request for inclusion of medications, dose adjustments, adequacy of the dispensing process, and test requests, among others.[25]

With regard to postoperative complications, three studies produced in the United States have addressed educational strategies.[4,24,27] The first evaluated the effect of an educational tool in improving knowledge in liver transplant recipients who have developed chronic kidney disease (CKD). A questionnaire on knowledge of CKD after liver transplantation was administered before and after an educational intervention focusing on CKD. In addition, lifestyle modification goals were discussed and set. This research concluded that the tool improved the recipients' knowledge and brought motivation regarding the goals to prevent kidney diseases, which are common in this clientele.[24]

The second study was conducted by the same group of researchers, whose focus was to examine the effectiveness and feasibility of educational intervention in liver recipients with early-stage CKD. Knowledge about CKD was assessed using the Kidney Disease Knowledge Survey (KiKS-LT) after liver transplantation. The following domains were examined:

- general knowledge of kidney disease;
- risk factors for CKD specific to liver transplantation and knowledge about immunosuppression;
- renal function;
- symptoms of advanced CKD.

For goal setting, an existing tool was adapted based on the knowledge gaps identified in the KiKS-LT. The educational sessions were conducted by the team's clinical pharmacist and averaged 15 minutes in length. Among the topics discussed are the risk factors of liver transplantation in the progression of CKD, the importance of medication adherence, and the goals of managing blood glucose and glycated hemoglobin (if diabetic) and blood pressure (if hypertensive). Each participant set three goals to slow the progression of CKD. Telephone follow-up has also occurred. The results of the study showed improved knowledge and benefits of kidney function in the face of established goals.[27]

Finally, the third study linked to post-transplant complications brought the relationship between nurse-led educational interventions on early readmission of liver recipients. Thus, the study compared demographic and clinical characteristics and readmissions (of 30 days), before and after the implementation of a new educational intervention. The new educational intervention also worked with goal setting between the patient and the nurse and was carried out during and after the transplant, before discharge. The goals for the discharge included:

- to have a caregiver or support person;
- to restore physical condition (drinking appropriate water and food, walking);
- to understand the medicines;
- to promote rehabilitation and the prevention of infection and liver rejection, including pain control and operative wound care;
- to demonstrate understanding with post-transplant follow-up;
- to demonstrate knowledge acquisition.

A poster with the goals before discharge was fixed to the wall of the patient's room and was reviewed daily by the nurse during duty. For each goal achieved, the patient received 1 point, for a maximum of 10 points. The results showed no statistically significant difference in 30-day readmissions (before and after the new educational intervention), although there was a 16.3% decrease in admissions, however the nurses created a process that improved the structure and consistency of patient teaching.[4]

With regard to nutritional aspects, an American study investigated the benefits of teaching nutritional supplementation in severely malnourished liver transplant candidates through a continuous quality improvement initiative (the plan-do-study-act method). The included patients were followed up by telephone calls for nutritional teaching, made two, six and eight weeks after inclusion on the waiting list. Nutritional status was assessed by evaluating changes in weight, food intake, symptoms, and activities of daily living. In the last week of the study, patients were asked about perceived improvement in nutritional status in light of the teaching and phone calls, and adherence to the nutritional recommendations given during the study. The results identified a 42.5% reduction in the number of hospitalizations, and also demonstrated an improvement in the nutritional status of the patients.[26]

Finally, the only study involving digital technologies focused on the development of a prototype for a mobile application (LiveRight Transplant). The American qualitative study, through face-to-face interviews, assessed the challenges experienced by liver transplant recipients and the coping strategies used to overcome such challenges, with a focus on the role of technology, including practices of smartphone use and preference for apps aimed at post-transplant recovery. The most cited use of smartphones to support post-transplant health involved setting alarm reminders to take medications (65%). In addition, more than half of the participants (65%) used MyChart (Epic Systems Corporation, Verona, WI, USA) to communicate with the transplant team. Most participants (80%) were interested in an app to aid in their recovery, with preferences for the following themes: interaction with other transplant recipients, educational information, virtual communication with the transplant team, recording biometric data, and medication updates or reminders.[28]

The information gathered from these interviews subsidized the development of the prototype app called LiveRight Transplant, based on cognitive and social determination theory. The goals of the application were:

- to improve the liver transplant recipient's knowledge through educational information, including postsurgical management, medications, diet, physical activity, infectious risks, and preventive care;
- to improve self-efficacy to take the medicines;
- to provide support structures and coping strategies to promote emotional and psychological well-being;
- to improve communication with the transplant team.[28]

Given the evidence presented here and taking up the question that guided this study—what is the available evidence in the literature on educational strategies that address teaching liver transplant candidates and recipients? —, it was possible to observe that there was a predominance of studies that addressed educational strategies focused on postoperative complications and that encompassed multiprofessional areas. It was also observed that the distribution of studies was concentrated in the United States of America. Considering that this is a country with one of the most developed economies in the world, the educational activities presented need to be adapted to the Brazilian culture.

Another relevant point was the focus of the educational interventions on postoperative complications. It is well known that the success of liver transplantation is related to the waiting period and the clinical conditions of the patient at the time of surgery, which can impact the incidence of complications. So, the longer the time, the greater the chances of complications developing after surgery. Thus, it is possible to identify the importance of developing and implementing educational interventions in order to mitigate or prevent the incidence of complications. In the present review, only one study focusing on the pre-transplant period was identified. Thus, future research in this area is suggested.

Given the above, the importance of educational strategies in teaching liver transplant candidates and recipients is remarkable. Among the results presented, it was demonstrated that the communication between the team and the patient allows the creation of a bond capable of promoting adherence and quality of life both pre- and post-transplant. Thus, nurses, as the professionals who interact for the longest time with liver transplant candidates and recipients, have a key role in the identification of educational needs that potentialize the realization of new studies directed towards strategies and interventions capable of improving adherence to treatment as a whole. We identified few studies on educational interventions implemented by nurses, another suggestion for future research in the area, although the relevance of the multiprofessional team in the success of treatment is unanimous in the studies analyzed.

As for the weaknesses of the method, the search in only four databases stands out, as well as the noninclusion of gray literature, in addition to the restriction of the year of publication (from 2016 to 2020), which may imply the non-identification of studies with the potential to answer the research question proposed here, despite the fact that the main healthcare databases have been selected. Other points to consider are the classification of the strength of evidence, which identified studies with level of evidence VI (n = 6) for the most part, and the assessment of the methodological quality of the included studies, which was not the target of this review.

CONCLUSION

Educational strategies of liver transplant candidates, recipients and the family are key elements of quality care. The literature has shown that immunosuppressants, concern for complications, technology, and nutrition are essential in a comprehensive education plan for this clientele. In addition, the limited existence of studies in the national and international literatures focusing on educational strategies in liver transplantation was identified. Therefore, it was possible to understand the need for further research, considering the importance of teaching in liver transplantation, aiming at the continuity of care, adherence to treatment, and its success, promoting improvement in the quality of life of candidates and recipients.

AUTHORS' CONTRIBUTION

Substantive scientific and intellectual contributions to the study: Prochnon NP and Mendes KDS; **Conception and design:** Prochnon NP and Moreno SEM; **Data collection, analysis and interpretation:** Prochnon NP, Moreno SEM and Mendes KDS; **Article writing:** Prochnon NP, Galvão CM and Mendes KDS; **Critical review:** Prochnon NP, Galvão CM and Mendes KDS; **Final approval:** Prochnon NP, Moreno SEM, Galvão CM and Mendes KDS.

AVAILABILITY OF RESEARCH DATA

All data were generated or analyzed in the present study.

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