



DIGITAL TECHNOLOGY FOR HEALTH LITERACY IN POST-HEART TRANSPLANT PATIENTS: SCOPING REVIEW PROTOCOL*

TECNOLOGIA DIGITAL PARA LITERACIA EM SAÚDE EM PACIENTES PÓS-TRANSPLANTE CARDÍACO: PROTOCOLO DE REVISÃO DE ESCOPO

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RESUMO

Objetivo: Descrever diretrizes para o cuidado pós-transplante cardíaco e identificar as principais necessidades dos pacientes, cuidadores e profissionais, além das tecnologias digitais educativas disponíveis para ampliar o conhecimento dos pacientes, cuidadores e profissionais envolvidos no transplante cardíaco. **Método:** Registrado na plataforma Open Science Framework (<https://doi.org/10.17605/OSF.IO/95NYM>), o método seguirá as etapas descritas no Manual de Revisão do Instituto Joanna Briggs, empregando as diretrizes do Checklist PRISMA Extension for Scoping Reviews. A estratégia de busca foi elaborada com base nos descritores DeCS/MeSH e na linguagem natural das bases de dados consultadas (Web of Science, MEDLINE/PubMed, LILACS, EMBASE, SCOPUS, CINAHL, portal CAPES e Google Scholar). Após a busca, os estudos duplicados serão removidos utilizando o gerenciador EndNote e, em seguida, serão exportados para o software Rayyan onde serão analisados títulos e resumos seguidos da leitura do texto completo por revisores independentes às cegas. Qualquer discordância será resolvida por meio da discussão com um terceiro revisor. Os resultados de busca e do processo de inclusão dos estudos serão detalhadamente apresentados na revisão de escopo final e ilustrados através de um diagrama de fluxo PRISMA.

Descritores: Tecnologia Digital; Letramento em Saúde; Transplante de Coração; Educação de Pacientes como Assunto.

ABSTRACT

Objective: Describing guidelines for post-cardiac transplant care and identifying the main needs of patients, caregivers, and professionals, in addition to the available educational digital technologies to expand the knowledge of patients, caregivers, and professionals involved in heart transplantation. **Method:** The method is registered in the Open Science Framework platform (<https://doi.org/10.17605/OSF.IO/95NYM>) and will follow the steps described in the Joanna Briggs Institute Review Manual, employing the guidelines of the PRISMA Extension for Scoping Reviews checklist. The search strategy was based on DeCS/MeSH descriptors and the natural language of the databases consulted (Web of Science, MEDLINE/PubMed, LILACS, EMBASE, SCOPUS, CINAHL, CAPES portal, and Google Scholar). After the search, duplicate studies will be removed using the EndNote manager. Remaining studies will be exported to the Rayyan software, where titles and abstracts will be analyzed, and full texts will be read by independent blind reviewers. Any disagreement will be resolved through discussion with a third reviewer. The results of the search and the study inclusion process will be presented in detail in the final scoping review and illustrated in a PRISMA flow diagram.

Descriptors: Digital Technology; Health Literacy; Heart Transplantation; Patient Education as Topic.

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INTRODUCTION

Heart Transplantation is widely recognized as the most effective intervention in the treatment of Heart Failure. The selection of transplant candidates requires a thorough and periodic evaluation conducted by a multidisciplinary team. This process involves a series of prognostic assessments to determine both the eligibility of patients and the optimal time for their inclusion on the waiting list⁽¹⁾. Although the average survival of adult patients undergoing Heart Transplantation is approximately 11 years, with a survival rate of over 85% in the first year, the annual mortality risk remains around 3.4% per year. Immunosuppression, essential to prevent graft rejection, is associated with additional risks, such as hypertension, diabetes, dyslipidemia, opportunistic infections, kidney failure, and neoplasms⁽²⁾.

Graft rejection is a significant concern after transplantation and is triggered by tissue antigens encoded by the major histocompatibility complex genes and human leukocyte antigens, which are present in every human cell⁽³⁾. Complying with and understanding treatment are crucial to the success of transplantation, including strict compliance with the medication regime, the diet, and lifestyle changes such as regular exercise and cessation of tobacco use. Predictors were identified to monitor treatment failure, as compliance can be difficult to measure accurately⁽⁴⁾.

Health literacy is a crucial element for the management of patients undergoing heart transplantation, as it directly impacts treatment compliance and clinical outcomes. Lack of health knowledge is directly linked to non-compliance with post-transplant treatment, resulting in consequences such as graft rejection and serious clinical complications. Compliance with treatment involves not only the medication regimen, but also healthy habits and the patient's active participation in their self-care. For example, a survey of heart-failure patients revealed that 41.1% had low medication compliance; 55.9% of these had inadequate literacy, highlighting the relationship between literacy and medication compliance⁽⁵⁾.

According to data from the International Society for Heart and Lung Transplantation, organ rejection occurs in approximately 20% of transplant patients during the first year, highlighting the importance of educational interventions that promote self-care and compliance with treatment. Studies show that inadequate health literacy rates are associated with up to a 30% increase in transplant-related complications, including avoidable hospitalization and discontinuation of immunosuppressive treatment. Furthermore, research has shown that patients with inadequate literacy had higher rates of readmission and death within 90 days of hospital discharge⁽⁵⁾.

The use of digital technologies in health education has shown great potential in improving the care of chronic patients. Tools such as mobile monitoring applications, digital learning platforms, and personalized e-learning programs have been widely studied for their ability to promote treatment compliance, facilitate self-care, and reduce preventable complications. One example is the use of educational technologies to train patients and families for complex home care during transition of care in liver-transplant patients⁽⁶⁾.

These technologies become essential resources for strengthening health literacy, helping patients to manage their treatment more effectively and to achieve better clinical outcomes in the post-transplant period.

Due to the complexity of the procedure and the need for family and socioeconomic readaptation after transplantation, including possible biopsychosocial and spiritual complications, patients require comprehensive support from a multidisciplinary team. The team, especially the nursing team, plays a vital role in providing ongoing care⁽⁷⁾.

Guidelines from the International Society for Heart and Lung Transplantation detail monitoring of post-heart transplant care. They recommend that preventive, detection, and treatment measures be implemented transplant recipients⁽⁸⁾. Health education and literacy are essential to promote self-care and ensure treatment compliance among patients with heart disease⁽⁹⁾. The term 'health literacy' refers to a society's ability to provide accurate health information and services, enabling individuals to access, understand, and use this information to make informed decisions. This not only improves individual and public health, but also contributes to the sustainability of health systems. ⁽⁹⁾. Health literacy aims to expand people's cognitive level so that they can utilize health-related information to prevent and manage diseases⁽¹⁰⁾.

According to literature, technological advances and the increasing digitalization of society, digital educational tools have emerged as effective catalysts in promoting health literacy, especially among post-heart transplant patients⁽¹¹⁾. These tools are designed to provide accessible and understandable information, making it easier to educate patients on how to manage their health effectively.

Recognizing the importance of developing digital educational technologies, this scoping review aims to describe specific guidelines for post-cardiac transplant care that will foster health literacy among patients, caregivers, and professionals. It also seeks to identify the main needs of this group and the educational digital technologies available to expand patients' knowledge after heart transplantation.

This review aims to systematically map the main evidence related to the topic, clarify fundamental concepts in literature, their characteristics and associated factors, highlighting gaps in the understanding of the topic. After a preliminary search of PROSPERO, MEDLINE, Cochrane Database of Systematic Reviews, and JBI Evidence Synthesis, no similar scoping or systematic reviews on this topic were found.

METHOD

This scoping review protocol has been registered with the Open Science Framework under DOI number: 10.17605/OSF.IO/95NYM. The development of the method will follow the Joanna Briggs Institute (JBI) Manual, covering the following phases: 1-Definition of the research question; 2-Search for relevant studies; 3-Selection of studies; 4-Evaluation of data; 5-Consolidation, analysis, and display of data⁽¹²⁻¹³⁾. The findings and conclusive report of this review will be described and illustrated using a flow diagram, according to the Checklist Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension (PRISMA-ScR)⁽¹⁴⁾, which is aimed at conducting scoping review research.

Research Question for Review

The question for the scope review was based on the PCC mnemonic structure, which refers to Population, Con-

cept, and Context. Where P: adults who have undergone heart transplantation; C: specific guidelines for post-heart transplant care; C: outpatient care of these patients.

Therefore, the guiding question of this review is: What are the specific post-transplant care guidelines to be included in a digital educational tool to assist in the health literacy of post-cardiac transplant patients treated in the outpatient clinic?

Inclusion Criteria

Population

Individuals over 18 years of age who underwent heart transplant more than 1 year ago.

Concept

Specific guidelines for post-cardiac transplant care, with an emphasis on technological interventions and initiatives aimed at health literacy, such as applications, educational platforms, and digital materials.

Context

This review will cover studies that address adults undergoing transplantation, with an emphasis on post-transplant management and educational strategies aimed at these patients. Studies that explore the impact of educational technologies on the interaction between patients and multidisciplinary teams will also be included.

Exclusion Criteria

- Studies involving target audiences under 18 years of age;
- Studies that do not cover the listed keywords;
- Publications in languages other than Portuguese, English or Spanish.

Types of Sources of Evidence

This scoping review will include studies with quantitative, qualitative, and mixed methods approaches. Additionally, systematic reviews and opinion articles will be considered for inclusion in the proposed review.

Priority was given to studies published in the last five years, but older articles were also included to provide a solid theoretical basis, understand the evolution of knowledge about health literacy and compliance with treatment, and fill possible gaps in recent literature. Furthermore, widely cited and methodologically robust studies continue to be a reference in the area, contributing to a more comprehensive and contextualized analysis of the impact of health literacy on the management of patients undergoing heart transplantation. These provide solid evidence and are considered relevant for the review.

Search Strategy

The search strategy will focus on identifying primary studies, both published and unpublished. Initially, a preliminary

search was carried out in the MEDLINE/PubMed and EMBASE databases to locate relevant articles on the topic. The main concepts of cardiac transplantation, digital educational technology, health literacy, patient education, and outpatient care, together with the keywords in the titles and abstracts of the articles and the index terms used to describe them, were used to develop a comprehensive search strategy for MEDLINE/PubMed. This strategy will be adjusted for each database, incorporating all identified key and index terms. In addition, the reference lists of all selected sources of evidence will be reviewed to identify additional studies. Studies in Portuguese, English, and Spanish will be considered and, when necessary, translated using DeepL Translate.

The databases to be consulted will include MEDLINE/PubMed, the CAPES portal (Coordination for the Improvement of Higher Education Personnel), LILACS, Web of Science, EMBASE, SCOPUS, and CINAHL. To search for unpublished studies and gray literature, theses and dissertation databases will be explored, as well as Google Scholar, using adapted search terms.

Studies will be searched for in indexed databases, using keywords, Boolean operators, such as AND, OR, NOT and other resources specific to each database, to retrieve the most relevant studies on a given topic and to maximize the sensitivity and specificity of the results.

These strategies were designed to ensure the inclusion of studies that address the relationship between health literacy and treatment compliance in patients undergoing heart transplantation - directly aligned with the objectives of the protocol.

Next, Figure 1 presents the initial search strategy. It was specifically developed for the MEDLINE/PubMed database.

Selection of Sources of Evidence

After the search, all studies found will be grouped and imported into EndNote v.20.4.1 (Clarivate Analytics, PA, USA), with duplicates removed. Titles and abstracts will be reviewed by two independent reviewers to ensure compliance with the inclusion criteria established for the review, ensuring consistency (using Microsoft Excel to calculate and evaluate the percentage of agreement between two reviewers).

The full content of the selected studies will be thoroughly examined by two independent reviewers. The reasons for exclusion of articles that do not meet the inclusion criteria will be recorded and incorporated into the scoping review. Any disagreement between reviewers during the selection process will be resolved by consensus or with the participation of a third reviewer. The results of the search and of the study inclusion process will be presented in detail in the final scoping review and illustrated in a PRISMA flow diagram.

Data Extraction

After removing duplicates in EndNote, the selected articles will be imported into Rayyan. Studies will be assessed and selected according to the eligibility criteria by two independent and blinded reviewers. The screening process will be conducted in two stages: Stage 1: Analysis of titles and abstracts; Stage 2: Full reading of the texts of the selected studies.

Search	Search Strategy	Retrieved Studies
#1	("heart transplantation"[Title/Abstract] OR "cardiac transplantation"[Title/Abstract] OR "heart grafting"[Title/Abstract]) AND "postoperative care"[Title/Abstract]	72
#2	((("patient education handout"[Publication Type] OR "patient education as topic"[MeSH Terms] OR ("patient education handout"[Publication Type] OR "patient education as topic"[MeSH Terms] OR "patient education"[All Fields])) AND "health literacy"[Title/Abstract] AND "digital technology"[Title/Abstract]) OR "educational technology"[Title/Abstract] OR "multimedia"[Title/Abstract])	8,066
#3	#1 AND #2	0
Limited to Portuguese, English, and Spanish.		

Figure 1 – Search strategy. Rio de Janeiro, RJ, Brazil, 2024

In case of disagreement between reviewers regarding the inclusion or exclusion of a study, a structured conflict resolution process will be adopted. Decisions will be made based on pre-established criteria. If consensus is not reached, a third reviewer, with expertise in the area, will intervene to evaluate the case independently and issue a final opinion. The third reviewer may also request additional information from the reviewers or carry out a critical reanalysis of the criteria applied, ensuring the consistency and impartiality of the selection process.

Data Analysis and Presentation

Data from selected studies will be analyzed and collected by two independent reviewers, using an Excel table customized for this study and based on the form recommended by JBI to optimize evidence synthesis.

Study characteristics: authors, year of publication, country of origin, title, objective, sample, methodology (type of study, sample size, gender), intervention (when applicable), results, and main conclusions. No assessment of the methodological quality of the studies will be included, since this step is not distributed in scoping reviews, whose objective is to map the available evidence, rather than identify the best evidence to answer a specific question.

Practical implications

The results of this scoping review can be applied to

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develop technological interventions aimed at clinical practice, helping to improve health literacy and consequently the quality of life of heart transplant patients and promoting greater compliance with treatment. It is important to guide the development of solutions such as digital health education platforms, mobile applications to improve treatment compliance, and augmented reality tools for training patients and caregivers. The study will thus provide practical guidelines for the development of innovative solutions, positively impacting the post-heart transplant journey.

After this process is complete, all retrieved study information will be cross-checked. Any discrepancies will be resolved with the intervention of a third reviewer.

*Paper extracted from the Master’s Dissertation entitled “Construção de tecnologia digital educativa como incremento da literacia em saúde em pacientes pós transplante cardíaco”, presented to the Postgraduate Program in Nursing at the Center for Health Sciences of the Federal University of Rio Grande do Norte, Natal, 2022.

CONFLICT OF INTERESTS

The authors have declared that there is no conflict of interests.

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Responsibility for the text in ensuring the accuracy and completeness of any part of the paper: Osorio EG, Guimarães TCF, Prado LM, Pinheiro BS, Correia MG.



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