

**HEALTH EDUCATION IN HEMODYNAMICS SERVICES: AN INTEGRATIVE REVIEW****EDUCACIÓN PARA LA SALUD EN SERVICIOS DE HEMODINÁMICA: UNA REVISIÓN INTEGRADORA****EDUCAÇÃO EM SAÚDE NOS SERVIÇOS DE HEMODINÂMICA: UMA REVISÃO INTEGRATIVA**<sup>1</sup>Flávia Rocha da Silva Santos<sup>2</sup>Rodrigo Sousa de Miranda<sup>3</sup>Roberta Georgia Sousa dos Santos<sup>4</sup>Tarciso Feijó da Silva<sup>5</sup>Maria da Soledade Simeão dos Santos<sup>6</sup>Verônica Caé da Silva Moura

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**Submission:** 20-03-2025**Approval:** 14-07-2025**ABSTRACT**

**Objective:** To identify in scientific publications the educational actions carried out by nursing for patients treated in hemodynamics services. **Methodology:** Integrative, descriptive review, carried out in the Virtual Health Library, with a time frame between 2014 and 2024, using a combination of the Descriptors: “Health Education”, “Nurses”, “Nursing”, “Hemodynamics”, “Cardiac Catheterism”, “Angioplasty”, “Hospital Cardiology Service” and “Hemodynamics Service”. **Results:** A total of eight articles were published, with the largest number in 2016 and 2017. All articles were published in nursing journals. Well-informed patients have greater safety, better adherence to recommendations, and fewer complications, highlighting the importance of health education as a tool for promoting self-care and preventing complications. **Final Considerations:** When preparing patients for procedures, it is essential to provide guidance on lifestyle changes, promoting long-term quality of life. The implementation of new educational technologies and research centers focused on developing more comprehensive and effective methods may be able to reaffirm the role of nursing as a transformative agent in health promotion in highly complex services.

**Keywords:** Health Education; Nursing; Hemodynamic; Cardiac Catheterization.

**RESUMEN**

**Objetivo:** Identificar en publicaciones científicas las acciones educativas realizadas por enfermería para pacientes atendidos en servicios de hemodinámica. **Metodología:** Revisión integrativa, descriptiva, realizada en la Biblioteca Virtual en Salud, con un horizonte temporal comprendido entre 2014 y 2024, utilizando una combinación de los Descriptores: “Educación para la Salud”, “Enfermeras”, “Enfermería”, “Hemodinámica”, “Cateterismo Cardíaco”, “Angioplastia”, “Servicio de Cardiología Hospitalaria” y “Servicio de Hemodinámica”. **Resultados:** Se obtuvieron un total de ocho artículos publicados, siendo el mayor número en los años 2016 y 2017. Todos los artículos fueron publicados en revistas de enfermería. Los pacientes bien informados experimentan una mayor seguridad, un mejor cumplimiento de las recomendaciones y una reducción de las complicaciones, destacando la importancia de la educación sanitaria como herramienta para promover el autocuidado y prevenir lesiones. **Consideraciones finales:** Al preparar a los pacientes para los procedimientos, es fundamental brindar orientación sobre cambios en los hábitos de vida, promoviendo la calidad de vida a largo plazo. La implementación de nuevas tecnologías educativas y centros de investigación encaminados a desarrollar métodos más integrales y eficaces pueden reafirmar el papel de la enfermería como agente transformador en la promoción de la salud en servicios de alta complejidad.

**Palabras clave:** Educación en Salud; Enfermería; Hemodinámica; Cateterismo Cardíaco.

**RESUMO**

**Objetivo:** Identificar nas publicações científicas as ações educativas realizadas pela enfermagem para pacientes atendidos nos serviços de hemodinâmica. **Metodologia:** Revisão integrativa, descritiva, realizada na Biblioteca Virtual em Saúde, com recorte temporal entre 2014 e 2024, utilizando-se combinação dos Descritores: “Educação em saúde”, “Enfermeiros e Enfermeiras”, “Enfermagem”, “Hemodinâmica”, “Cateterismo cardíaco”, “Angioplastia” “Serviço Hospitalar de Cardiologia” e “Serviço de Hemodinâmica”. **Resultados:** Obteve-se ao total oito artigos publicados, com maior quantitativo nos anos de 2016 e 2017. Todos os artigos foram publicados em periódicos de enfermagem. Pacientes bem informados apresentam maior segurança, melhor aderência às recomendações e redução de complicações, evidenciando a importância da educação em saúde como uma ferramenta de promoção do autocuidado e prevenção de agravos. **Considerações Finais:** No preparo dos pacientes para os procedimentos é imprescindível orientar sobre as mudanças de hábitos de vida, promovendo a qualidade de vida a longo prazo. A implementação de novas tecnologias educacionais e núcleos de pesquisa voltados para o desenvolvimento de métodos mais abrangentes e eficazes podem ser capazes de reafirmar o papel da enfermagem como agente transformador na promoção da saúde em serviços de alta complexidade.

**Palavras-chave:** Educação em saúde; Enfermagem; Hemodinâmica; Cateterismo cardíaco.



## INTRODUCTION

Coronary artery disease (CAD) is a public health problem that has seen a high number of occurrences in Brazil over the past ten years, resulting in hospitalizations and deaths. According to "Global Burden of Disease (GBD) estimates for 2021, the age-standardized mortality rate for CAD was 67.1 (95% CI, 60.9-71.0) per 100,000 inhabitants in Brazil" <sup>(1:5)</sup>. The Unified Health System (SUS) spends approximately R\$1 billion annually on cardiovascular procedures, with CAD ranking first as the leading cause <sup>(1)</sup>.

CAD is characterized by more than one condition in which atherosclerotic plaques form in the coronary arteries, obstructing blood flow to the heart. It is a progressive disease that can lead to acute myocardial infarction (AMI) and even death. However, it is a condition that can be prevented and/or controlled with healthy lifestyle habits and appropriate outpatient follow-up <sup>(1,2)</sup>.

Hemodynamics is the service that offers diagnostics, preventive evaluation, and therapeutic interventions within cardiology, vascular, and neurology clinics, using radiography, specific catheters, and contrast for visualization of the areas. It utilizes technologies of varying densities and requires teams prepared for routine procedures and potential urgent/emergency situations. Common services offered in this department include angioplasties, angiograms (diagnostic catheterizations), and balloon valvuloplasties. These procedures represent significant scientific advancement, as it

is possible to perform important cardiac interventions without the need for surgery <sup>(3)</sup>.

Within the field of hemodynamics, nurses perform various functions, both pre-, intra-, and post-procedure. This includes providing guidance on the care patients should take during the procedure, their clinical condition before, during, and after the exam, managing the department, scheduling appointments, securing the necessary materials, participating in patient preparation and positioning on the table for procedures, and making referrals and appropriate admissions to the post-anesthesia care unit (PACU) <sup>(3)</sup>.

Cardiovascular diseases, including CAD, are preventable conditions and can be avoided or controlled through healthy lifestyle habits such as physical exercise, healthy eating, quitting harmful habits like smoking and alcohol consumption, and weight control. Therefore, health education is a key ally in preventing CAD <sup>(2,4)</sup>.

All of this guidance can be provided by nurses through health education, a concept that aims to promote health through accurate information, aiming for social and individual well-being<sup>(5)</sup>. This guidance is crucial for patients who already have CAD and require a procedure in the catheterization department, as well as for those who visit the department for a diagnostic procedure, as there is a chance they will need new approaches if lifestyle habits remain unchanged.

Nurses, in addition to their technical responsibilities, also perform managerial duties,

working alongside the team to guide and prepare patients before, during, and after catheterization procedures. They must also propose care actions that fully meet the patient's needs. The coordinator at the institution must provide appropriate training to the nursing team, in addition to implementing safety protocols <sup>(6)</sup>.

In this context, the objective of this article is to identify, in scientific publications, educational actions carried out by nurses for patients treated in the catheterization department.

## METHODS

An integrative, descriptive, qualitative review of the scientific literature, using the following steps: identification of the research topic and question; inclusion/exclusion criteria;

definition of information and categorization; evaluation; interpretation of results; and review and synthesis of knowledge <sup>(7)</sup>. The review sought to answer the following question: What educational actions are performed by nurses for patients treated in hemodynamic services?

Data collection was conducted from October to November 2024 in the Virtual Health Library in the Nursing Database (Bdenf) and Latin American Literature in Health Sciences (Lilacs), applying the Health Sciences Descriptors (DeCS) "Health Education," "Nurses," "Nursing," "Hemodynamics," "Cardiac Catheterization," "Angioplasty," "Hospital Cardiology Service," and the alternative term "Hemodynamics Service," both individually and in combination (Table 1).

**Table 1** – Presentation of the descriptors and their intersections in the databases used in the research. Rio de Janeiro, RJ, Brazil, 2024.

Database	Descriptors (crossing)	Studies found
BDENF e LILACS	("Hemodinâmica") AND ("Enfermagem")	7
	("Educação em saúde") AND ("Enfermagem") AND ("Serviço de hemodinâmica")	6
	("Enfermeiros e enfermeiras") AND ("Serviço de hemodinâmica")	3
	("Enfermeiros e enfermeiras") AND ("Hemodinâmica") AND ("Educação em saúde")	1
	("Educação em saúde") AND ("Serviço hospitalar de cardiologia")	5
	("Educação em saúde") AND ("Hemodinâmica")	12
	("Cateterismo cardíaco") AND ("Educação em saúde")	10
	("Angioplastia") AND ("Educação em saúde")	7

("Angioplastia") AND ("Enfermagem") AND ("Hemodinâmica")	5
("Hemodinâmica") AND ("Enfermagem") AND ("Educação em saúde")	11
("Cateterismo cardíaco") AND ("Enfermagem")	41
("Angioplastia") AND ("Educação em saúde") AND ("Enfermagem")	3

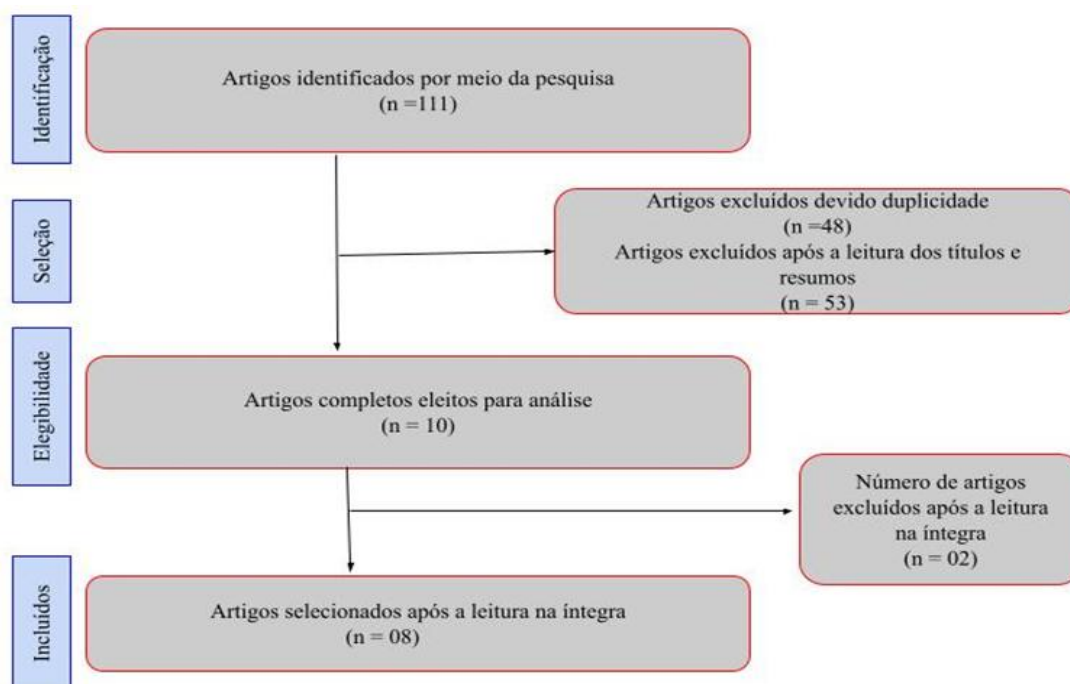
**Source:** Prepared by the authors (2024).

The inclusion criteria were scientific articles available online, in full text, and in Portuguese, English, or Spanish. The time frame considered was productions published in the last ten years (2014-2024). The exclusion criteria included editorials, review studies, reflection studies, theses, dissertations, and those not aligned with the review question.

Initially, descriptors combined in two or three with the Boolean operator "AND" were used, yielding 111 results. Of these, 48 duplicate

articles were excluded, and 53 were excluded after reading the titles and abstracts. Ten full articles were selected to assess eligibility, considering their suitability for meeting the study objectives. After reading the full texts, the final sample consisted of eight publications. It is noteworthy that this study also adhered to the PRISMA methodology (Figure 1).

**Figure 1** - Flowchart of the literature research and selection process, Rio de Janeiro/RJ, Brazil, 2024.



**Source:** Prepared by the authors (2024).

The analysis was performed by thematic content, a technique that allows organizing and interpreting the collected data, identifying central themes and patterns that emerge from the reviewed texts, enriching the discussion and conclusions of the review <sup>(8)</sup>. Two thematic categories of analysis were constructed.

## RESULTS

The final study sample consisted of eight articles that met the eligibility criteria, as shown in Table 2.

**Table 2** - Summary of the results of the articles selected for the study by title, database, number of authors, journal, and year of publication, with the main results obtained, Rio de Janeiro, RJ, Brazil, 2024.

N	ARTICLE TITLE	DATABASE	N OF AUTHORS	MAGAZINE / YEAR OF PUBLICATION	MAIN RESULTS RELATED TO THE STUDY
1	Health education technology for hemodynamic users about coronary angiography: a descriptive study <sup>(9)</sup>	BDENF	5	Revista de Enfermagem UFPE Online/ 2016	<p>“The choice of this educational practice (booklet) was made because it was considered that the acquisition of illustrative material, with guidelines based on the needs raised in the research carried out, would be easy to accept and use, in addition to always being available to answer user questions, because, when talking about Health Education, it is necessary to emphasize that all efforts need to</p> <p>be focused on preventing, promoting and recovering health.”</p>
2	Preparation and validation of an information manual on cardiac catheterization <sup>(10)</sup>	BDENF / LILACS	3	Acta Paulista de Enfermagem/ 2016	<p>“The manual was developed and considered valid by nurses and patients. The manual can be used by various institutions with the profile of these patients, with the aim of instructing them on the procedure.”</p>
3	Educational activity with patients undergoing coronary	BDENF	2	Revista de Enfermagem UFPE	<p>“Patients valued the educational activity, highlighting the importance of the guidance</p>

	angioplasty <sup>(11)</sup>			Online/ 2017	provided prior to angioplasty, which reduced the fear and anxiety experienced by both patients and their families. The guidance on healthy lifestyle habits was relevant, with a focus on changing some eating habits, but there were also initiatives regarding physical activity and smoking cessation. All study participants reported some change, however small, in their lifestyle habits.”
4	User misinformation and opportunity for nursing <sup>(12)</sup>	BDENF	2	Revista de Enfermagem UFPE Online/ 2017	“Participants were gathered in the waiting room itself and then approached by the nurse on duty to listen to nursing instructions and watch the support video, before discussing them.”
5	Patients' understanding of nursing guidelines for cardiac catheterization: a qualitative study <sup>(13)</sup>	BDENF / LILACS	3	Cogitare Enfermagem/ 2019	“We improved the written guidelines for cardiac catheterization and preparations for the procedure, which are provided to patients when scheduling their exam. We also planned to produce an educational video to be shown pre-procedure as a communication tool with patients, family members, and companions.”
6	Nursing consultation before cardiac catheterization procedure: assessment of patient satisfaction <sup>(14)</sup>	LILACS	6	Revista de Enfermagem UERJ/ 2021	The study demonstrated the importance of nursing consultation prior to the cardiac catheterization procedure to clarify doubts and alleviate expectations about the exam. He also highlighted the need for re-evaluation and continuous improvement of processes that should be part of the service routine.
7	Reducing anxiety related to cardiac catheterization:	LILACS/ BDENF	4	Acta Paulista de Enfermagem/ 2023	“The educational component's activities aimed to provide perioperative guidance to the





	acceptability of complex intervention (15)				patient and were based on educational material previously validated by other authors. The musical component consisted of genre-neutral music, MusiCure® 8 Peace, delivered through headphones. EMIRA was administered in a single session before the OR, while the patient was still in the emergency room.”
8	Knowledge and feelings of people before cardiac catheterization procedure (16)	BDENF/ LILACS	6	Revista Pesquisa Cuidado é Fundamental /2024	“There is a deficit in pre- and post-exam educational guidelines, given that they are based solely on the need for fasting before the exam, care that precedes the procedure and especially that after cardiac catheterization are of fundamental importance for safety during the procedure and to mitigate possible complications.”

**Source:** Prepared by the authors (2024).

Regarding the database, four articles were found in LILACS and BDENF, three only in BDENF, and one only in LILACS. Regarding authorship, there was no pattern in the number of authors, with only one article having four authors and one having five authors, and the others having two articles with the same number (two, three, and six authors) each.

The publications were published between 2016 and 2024, with 2016 and 2017 having the highest number, with two publications each. The years 2019, 2021, 2023, and 2024 each had one publication, while 2018 and 2020 had no eligible publications.

Regarding the journals, all articles were published in nursing journals, three productions

were published in the UFPE Nursing Journal, two in the Acta Paulista de Enfermagem, one in the Pesquisa Cuidado é Fundamental Journal, one in the Nursing Journal and one in Cogitare Enfermagem.

## DISCUSSION

### Pre-Procedure as a strategic moment for educational actions in hemodynamic services

All articles highlighted pre-procedure educational activities as important for nursing staff to implement in hemodynamics services.

Nurses play a key role in preparing patients for procedures in the hemodynamics department. However, there is a lack of understanding among patients regarding the



instructions they are receiving during the hemodynamics pre-procedure, with professionals' main focus being on providing guidance on physical preparation for the exam <sup>(16)</sup>.

Nursing education should go beyond guidelines such as the required fasting time, medications that should be discontinued and those that can be taken before the procedure, the removal of prosthetics and jewelry, and general guidelines such as the need to bring bed linen and a companion on the day of the exam <sup>(13,16)</sup>. It should also primarily address the procedure itself, explaining that the patient will be awake, the puncture site will be cleaned and anesthetized, a long catheter will be inserted through one of the arteries (radial or femoral) that will lead to the coronary arteries in the heart, and contrast will be used to visualize them.

It should also be explained that after the exam is completed, a pressure dressing will be applied to prevent bleeding at the site <sup>(10)</sup>. It is also necessary to address the environment, what the patient may feel, the duration, the need for the exam, and the associated risks <sup>(10,13)</sup>.

In strategic settings, nurses work privately during nursing consultations and as part of a team, in waiting areas, where they will approach patients and their companions, family members, and support network to provide clarification and answer questions about the upcoming exam <sup>(12-14)</sup>. This strategy provides greater comfort and reduces anxiety and fear among patients <sup>(11)</sup>, in addition to fostering a bond between the professional and the patient.

During the nursing consultation, it is possible to determine possible future complications related to the upcoming exam/procedure, identifying other health problems that may prevent or require more attention during or after the exam. It is important to inform the patient and family of the risks <sup>(17)</sup>.

Verbal guidance to patients is essential to ensure they understand the necessary care and the risks involved. Patients often arrive at the catheterization department with some knowledge about the procedures, whether acquired through internet access, their own experiences, or those of close friends <sup>(9,16)</sup>.

Therefore, it is essential that nurses use this information as a basis for promoting effective, evidence-based health education, strengthening patients' confidence and aligning their expectations with safe practices. This educational process, conducted in a clear and individualized manner, contributes to better adherence to guidelines and safety in the procedures performed <sup>(9)</sup>.

### **Technologies, resources and educational strategies in health adopted by nursing in hemodynamic services.**

A patient's understanding of the guidance provided is closely linked to how they receive the information and how much of the content was presented and explained to them. Therefore, using different approaches to deliver health education is the best way to ensure patient understanding.



With this in mind, it's important to use different technologies to help patients understand all the steps, care instructions, and risks of each procedure. Nursing professionals can and should use soft and soft-hard technologies as the main focus of educational activities. Soft technologies focus on welcoming, qualified listening, and building bonds, while soft-hard technologies involve the use of technical-scientific knowledge and specific protocols <sup>(18)</sup>.

Soft technologies allow nurses to understand the patient's subjective needs, such as fears, doubts, and individual limitations, fostering an environment of trust and active participation. They also promote autonomy and are frequently applied in group dynamics or qualified listening.

Soft-hard technologies, composed of technical-scientific knowledge and pedagogical resources (such as videos or pamphlets), are used to reinforce learning and facilitate the understanding of health information. They are essential for the transmission of safe, evidence-based information about procedures, pre- and post-intervention care, and risk factor management. By combining these approaches, nurses not only empower patients to practice self-care but also strengthen adherence to guidelines, contributing to better clinical outcomes and a higher quality of life.

Audiovisual resources, in a school context, use images and audio to support pedagogical processes. Examples include videos, infographics, and music used for teaching <sup>(19)</sup>.

These resources range from concrete to abstract, according to a scale proposed by Edgar Dale, which classifies materials from the most realistic to the most symbolic. Their importance lies in offering dynamic and integrated learning support, acting as a facilitator, but never as an end in itself <sup>(20)</sup>.

Nurses can use these teaching resources to exchange knowledge with patients, family members, and their support network, ensuring health promotion and a greater understanding of the concepts covered <sup>(21)</sup>.

The production of educational videos is increasingly common, where care can be built with verbal guidance and images of materials, the environment, and other important information regarding the procedure and post-procedure. The video can be made available on televisions in healthcare waiting rooms, reassuring patients and their families about what will happen, or by displaying a QR code that allows patients to access the instructions whenever they need to review them <sup>(13,22)</sup>.

Other strategic resources include printed materials such as booklets, folders, pamphlets, and manuals, which, if they include graphic images, help visualize certain instructions and the environment where the procedure will be performed. Furthermore, it ensures that verbal information is not lost, allowing patients to return for a follow-up appointment if they forget any instructions <sup>(9)</sup>.

In addition, another tool for managing anxiety that helps with understanding situations is music. Although a recent topic in Brazil, the

use of music is still little explored in healthcare, but it has great therapeutic potential. This tool, supported by scientific evidence, brings a sense of comfort and calm to patients, reassuring them and helping them understand the information provided prior to procedures <sup>(23)</sup>.

Another important factor to consider is that, regardless of the approach used, the language must be appropriate for the target audience and their level of knowledge <sup>(10,11)</sup>. Patients experience improved comprehension when addressed in more than one way, especially when verbal and nonverbal language are used in conjunction with each other <sup>(13)</sup>. From the analysis of the articles studied, it is possible to say that, for the most part, users receive only one form of guidance and end up with a gap in understanding about their condition and what they will be subjected to.

Nursing professionals should always be vigilant in verifying that the patient truly understood the instructions, using some assessment method, such as asking questions about the topic discussed, to develop a new approach if the current approach is not effective. Likewise, it is necessary to assess patient satisfaction with the instructions provided <sup>(14)</sup>.

Nursing professionals can include in their planning certain topics or key points for improving educational activities to be implemented in hemodynamic services with patients and their families/support network, such as:

- Focus on what will happen during the procedure, the risks, and the lifestyle

changes necessary after leaving the service <sup>(13)</sup>.

- Greater attention should be paid to patients' fears regarding the procedure itself and its results, in order to implement care that alleviates their fear and anxiety and that of their support network.
- Educational activities regarding lifestyle changes should be planned, with the hope that after careful and comprehensive guidance, patients will achieve improvements in their overall health.
- Attention should be paid to reevaluating the materials used to provide guidance to patients and their families, knowing that studies are constantly being conducted to improve healthcare services and care <sup>(10)</sup>. The nursing team should also focus on providing guidance on measures to prevent complications and manage patients' conditions, knowing that patients demonstrate greater initiative in changing their habits when well-informed about their condition and what they should do to improve or maintain their positive condition <sup>(11)</sup>.

Although most articles do not address educational actions carried out with a focus on daily life after hemodynamic procedures are performed, these are essential for the public in this sector, considering that, for the most part, they are people with chronic conditions in which healthy lifestyle habits are essential for a positive prognosis.

## FINAL CONSIDERATIONS

The Unified Health System (SUS) spends a considerable amount annually on cardiovascular procedures, with most cardiac

conditions caused by chronic factors and poor lifestyle habits.

It is plausible to assert that within hemodynamic services, it is possible and necessary to conduct educational activities for patients undergoing cardiac procedures, to provide greater security regarding what will happen and promote true autonomy through knowledge. To improve their lifestyle habits after the procedure, it is also necessary to focus on health education regarding prevention and control measures for post-procedure quality of life, which has not been addressed according to most of the studies analyzed.

The nursing team must be trained to provide patients with all the important information regarding the procedure they will be referred for. They must be familiar with the environment and explain how it works to promote patient familiarity. They must have knowledge of the procedure to manage the patient before, during, and after the exam. They also need a comprehensive understanding of these patients to guide them toward improving their lifestyle habits, knowing that this is essential for a positive prognosis.

Current literature is lacking in studies demonstrating the educational activities developed in these services and their impact on the lives of those who use them. The limited literature shows very similar results, but lacks a focus on innovation and the search for new, effective teaching methods for this population.

Currently, digital technology is present in all settings, and nurses must utilize it to

improve the care they provide. Educational activities are no different, requiring ongoing awareness of new developments and the adoption of increasingly modern methods to make health information more accessible to hemodynamic service users.

The use of oral guidance alongside educational materials is essential for users' understanding of the information provided. Using images, videos, and texts, patients will be equipped with information and will feel more confident in the team and the procedures to be performed. It is clear that the ideal is to combine more than one approach, but this is not currently the case in the literature.

Given the above, one possibility for implementation in services would be the creation of a digital guidance platform that explains: how the pre-procedure should be performed, the physical preparation of patients, and the reasons for performing the procedure; what will occur during the exam, how it will be performed, the environment, and the average duration; necessary post-procedure care, the length of hospital stay, what they can eat, and what activities they can do; guidance on adjusting lifestyle habits after the exam; and, finally, the possibility of scheduling a follow-up appointment for patient follow-up and monitoring of changes in habits.

Finally, it is essential to implement research centers and improve health teaching methods for hemodynamic services, focused on updating and preparing sector staff to receive and manage patients in the best possible way,

providing the best guidance for their time there and for their life afterward.

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**Funding and Acknowledgments:**

This research did not receive funding.

**Authorship Criteria (Author Contributions)**

Substantial contributions to the study design, planning, and data collection were made by: Santos FRS, Moura VCS. Data analysis and/or interpretation were made by: Santos FRS, Miranda RS, Santos RGS, Santos MSS, Moura VCS. Writing and/or critical review and final approval of the published version were made by: Santos FRS, Miranda RS, Santos RGS, Silva TJ, Santos MSS, Moura VCS.

**Conflict of Interest Declaration:**

Nothing to declare

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