Health technologies for the education of individuals with intestinal stoma: a scoping review

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ABSTRACT

Objective: To map the scientific evidence related to health technologies aimed at the education of adults and older adults with intestinal stoma in the hospital setting. Method: A scoping review conducted in accordance with the recommendations of the JBI and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses – extension for Scoping Reviews. Studies conducted by nurses, in any language, without time restrictions, and with different methodological designs were included. Searches were carried out in five databases. Data were based on thematic and statistical analyses. Results: The studies highlighted multiple technologies for individual education, such as verbal instructions, printed textual materials, multimedia resources, demonstrations, and hands-on practices focused on self-care, etc. Conclusion: The technologies adopted for the development of the teaching-learning process are organized in diverse formats. These tools are essential for disseminating knowledge and promoting self-care, contributing to improvements in the context of health promotion, prevention, and rehabilitation. This study provided a synthesis of existing educational resources, supporting nursing professional practice through the mapping and analysis of their applications.

KEYWORDS: Biomedical technology. Environmental health education. Colostomy. Ileostomy. Enterostomal therapy.

Tecnologias em saúde para educação da pessoa com estomia intestinal: revisão de escopo

RESUMO

Objetivo: Mapear as evidências científicas relacionadas às tecnologias em saúde voltadas para a educação de adultos e idosos com estomias intestinais no ambiente hospitalar. Método: Revisão de escopo conforme recomendações do JBI e Itens de Relatórios Preferenciais para Revisões Sistemáticas e extensão de Meta-Análises para Revisões de Escopo. Foram incluídos estudos conduzidos por enfermeiros, em qualquer idioma, sem restrição temporal, com diferentes delineamentos metodológicos. As buscas ocorreram em cinco bases de dados. Os dados foram fundamentados em análises temáticas e estatísticas. Resultados: Os estudos evidenciaram múltiplas tecnologias para a educação do indivíduo, como instruções verbais, materiais textuais impressos, fontes de multimídia, demonstrações e execuções de práticas voltadas para o autocuidado, entre outros recursos. Conclusão: As tecnologias adotadas para o desenvolvimento do processo de ensino-

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aprendizagem estão organizadas em arranjos diversificados. Tais ferramentas são essenciais para difundir o conhecimento e promover o autocuidado, desenvolvendo melhorias no contexto de promoção, prevenção e reabilitação da saúde. Este estudo possibilitou uma síntese dos recursos educacionais existentes, subsidiando a prática profissional do enfermeiro, por meio do mapeamento e da análise de suas aplicações.

DESCRITORES: Tecnologia em saúde. Educação em saúde. Colostomia. Ileostomia. Estomaterapia.

Tecnologías sanitarias para la educación de personas con estomas intestinales: una revisión del alcance

RESUMEN

Objetivo: Mapear la evidencia científica relacionada con las tecnologías en salud dirigidas a la educación de adultos y personas mayores con estoma intestinal en el ámbito hospitalario. Método: Revisión de alcance realizada de acuerdo con las recomendaciones del JBI y de *Preferred Reporting Items for Systematic Reviews and Meta-Analyses – extension for Scoping Reviews*. Se incluyeron estudios realizados por enfermeros, en cualquier idioma, sin restricción temporal y con diferentes diseños metodológicos. Las búsquedas se llevaron a cabo en cinco bases de datos. Los datos se analizaron mediante abordajes temáticos y estadísticos. Resultados: Los estudios destacaron múltiples tecnologías para la educación individual, como instrucciones verbales, materiales textuales impresos, recursos multimedia, demostraciones y prácticas guiadas orientadas al autocuidado, entre otras. Conclusión: Las tecnologías utilizadas para el desarrollo del proceso de enseñanza-aprendizaje se organizan en diversos formatos. Estas herramientas son esenciales para la difusión del conocimiento y la promoción del autocuidado, contribuyendo a mejoras en el contexto de la promoción de la salud, la prevención y la rehabilitación. Este estudio proporcionó una síntesis de los recursos educativos existentes, apoyando la práctica profesional de enfermería mediante el mapeo y análisis de sus aplicaciones.

DESCRIPTORES: Tecnología biomédica. Educación en salud ambiental. Colostomía. Ileostomía. Estomaterapia.

INTRODUCTION

Health technologies are conceptualized as all interventions developed to promote health[1]. These resources are diverse, offer multiple forms of use and objectives, and depend on the interaction among health professionals, users, and managers[2].

Literature identifies 3 classifications of technological resources:

1. Soft technologies, related to the professional's approach and welcoming attitude toward the user;
2. Soft-hard technologies, concerning professional knowledge applied in work activities;
3. Hard technologies, related to equipment, materials, and any products developed for use in care delivery and organizational processes[3].

In the care of individuals with stomas, the integrated use of the three types of technologies (soft, soft-hard, and hard) stands out, given the complexity of the care process, which encompasses the biopsychosocial and spiritual dimensions of these individuals. In view of this complexity, the use of diverse, updated resources adapted to each person's needs is essential to promote comprehensive, humanized, and effective care in the hospital setting[3,4].

A stoma is an internal communication between the body and the external environment resulting from a surgical intervention. An intestinal stoma is the condition in which effluents from the digestive system are drained into a collection device, understood as a fundamental technology for individuals with a stoma[4].

Among the various types of intestinal diversions, the intestinal elimination stoma is commonly found and may be a colostomy or an ileostomy, depending on its anatomical location[4].

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In the United States of America, the number of individuals with stomas ranges from 750,000 to 1,000,000[5]. In Brazil, it is estimated that there are 400,000 people with elimination stomas[6].

The main causes of intestinal diversion are related to neoplasms affecting the colon and rectum, inflammatory bowel diseases, and accidents[7].

Colorectal cancer ranks third in the prevalence of neoplasms in Brazil, with higher incidence in the Southeast region. An estimated 45,630 new cases are projected for the 2023-2025 period, making it the most common type of neoplasm in both sexes and creating increased demands for the health system[8].

Adapting to the diagnosis of a condition that compromises well-being and quality of life, such as malignant neoplasms, which often require the creation of a stoma, demands coordinated interventions from health professionals, family support, public policies, and other relevant factors. It is therefore a complex and multifaceted process that affects the biopsychosocial and spiritual dimensions of this population[9].

In this context, to meet the specific needs of these individuals, the use of technologies aimed at the educational approach to people with an intestinal stoma is a relevant strategy. This approach should be carefully assessed and, when appropriate, incorporated by the nursing team in order to promote well-being and autonomy in this population[10].

In Brazil, Ordinance No. 400 of November 16, 2009, issued by the Ministry of Health, is an important public policy that establishes guidelines for the care of individuals with stomas, including the promotion of activities related to health education, particularly with regard to the training of health professionals[11].

Educational activities should be developed by health professionals, especially nurses, to guide individuals with a stoma on self-care, proper use of collection devices and adjuvant products, protection of the peristomal skin, and healthy lifestyle habits, among other aspects[7,11].

In this context, tertiary care, the level of health care at which surgical procedures are performed, must be structured to adequately receive these individuals and provide health technologies. In addition, the nurse's approach to individuals with a stoma is essential at all perioperative stages and should occur as early as possible[12].

Considering the relevance of this topic, a preliminary search on the object of study was conducted in November and December 2023 in the databases Medical Literature Analysis and Retrieval System Online (MEDLINE) via PubMed, International Prospective Register of Systematic Reviews (PROSPERO), Cochrane Library, and JBI Evidence Synthesis. However, no current or ongoing review studies on this topic were identified.

This study is justified by the diversity of technologies that can be used to develop health education actions aimed at individuals with a stoma, making it necessary to map them in a systematic way. Furthermore, given the projected increase in the incidence of colorectal neoplasms, a rise in the number of individuals with intestinal stomas is expected. In this context, investigations addressing the adaptation process of this population are essential, with emphasis on promoting quality of life and strengthening comprehensive care, particularly through the educational process, so that individuals can achieve autonomy in self-care.

OBJECTIVES

The objective of this study was to map the scientific evidence related to health technologies aimed at the education of adults and older adults with intestinal stomas in the hospital setting.

METHODS

Type of review

This is a scoping review conducted using the methodology of the JBI and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses – extension for Scoping Reviews[13,14]. The research protocol is registered in the Open Science Framework under DOI 10.17605/OSF.IO/4DUS6. As a review study, this research did not require evaluation by a research ethics committee.

Eligibility criteria

To develop the guiding research question, the PCC mnemonic (Population, Concept, and Context) was adopted. The population consisted of adults and older adults with an intestinal elimination stoma, the concept of interest included studies addressing health technologies, and the context examined was the hospital setting. Thus, the following review question emerged: which studies address health technologies aimed at the education of adults and older adults with an intestinal stoma in hospital care?

Studies conducted by nurses, available in any language, without time restrictions, and with different types of approaches and methodological designs were included. Review studies addressing the implementation of health technologies in the care of individuals with a stoma were excluded to avoid duplication in technological approaches. In addition, studies addressing both intestinal and urinary elimination stomas (mixed or wet stomas) were not included, as they exceeded the exclusive scope of intestinal stomas.

Information sources

The literature review was conducted in PubMed, Scopus, Embase, CINAHL, and LILACS databases as well as in the Brazilian Digital Library of Theses and Dissertations (BDTD) for grey literature. Search terms related to the PCC acronym were combined to identify scientific evidence capable of answering the research question proposed in this study.

Study selection and data collection

The search was conducted on February 2, 2024, in 2 stages. The first stage took place in the scientific databases, using descriptors and search terms extracted from controlled vocabularies: *Descritores em Ciências da Saúde*, Medical Subject Headings, and Embase Subject Headings.

The following descriptors were used to develop the search strategies: "surgical stomas"; "stoma"; "colostomy"; "cecostomy"; "ileostomy"; "teaching"; "education"; "learning"; "health education"; "biomedical technologies"; "patients". Synonyms or equivalent terms for each descriptor were also included. To properly combine descriptors and search terms, the Boolean operators OR and AND were used. The Boolean operator NOT was also applied to exclude studies not relevant to the topic of interest.

The second stage, conducted in the BDTD, included the selection of gray literature studies that met the inclusion criteria of this review. The development of the search strategies followed the recommendations of the Peer Review of Electronic Search Strategies.

After completing the searches, all identified scientific production was grouped and imported into the EndNote® reference manager to remove duplicates. Subsequently, selection was performed using the Rayyan® software. The processes of study selection and data collection and analysis were conducted by two independent reviewers. In cases of disagreement, a third reviewer was included to resolve discrepancies.

Table 1 presents the search strategies developed for each adopted database, with the support of a librarian.

Summary of results

Regarding data interpretation, the research team conducted an in-depth analysis and presented a narrative summary. Descriptive and content analyses were used across all selected studies to extract the technologies used in the education of individuals with a stoma.

The presentation of results, in a summary table, included tabulated details of the extracted data and a narrative synthesis aligning the findings with the objectives of the review.

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Table 1. Search strategies and respective databases used for the scoping review. Rio de Janeiro (RJ), Brazil, 2024.

Search strategies	
PubMed	(Surgical Stomas[mj] OR Ostomy[mj] OR Colostomy[mj] OR Cecostomy[mj] OR Ileostomy[mj] OR Ostom*[tiab] OR Stoma[tiab] OR Stomas[tiab] OR Colostom*[tiab] OR Cecostom*[tiab] OR Sigmoidostom*[tiab] OR Ileostom*[tiab]) AND (Teaching[mj] OR Education[mj] OR Learning[mj] OR Health Education[mj] OR Teaching[ti] OR Education*[ti] OR Learning[ti] OR Biomedical Technology[mj] OR Technolog*[ti]) AND (Patients[mj] OR Patient*[tiab]) NOT (Tracheostom*[tiab] OR Thoracostom*[tiab])
Scopus	TITLE-ABS ("Surgical Stomas" OR Ostomy OR Ostomies OR Stoma OR Stomas OR Colostom* OR Cecostom* OR Sigmoidostom* OR Ileostom*) AND TITLE("Health Education" OR Teaching OR Education* OR Learning OR Technolog*) AND TITLE- ABS(Patient OR Patients) AND NOT TITLE- ABS(Tracheostom* OR Thoracostom*) AND (LIMIT-TO(DOCTYPE, "ar") OR LIMIT-TO(DOCTYPE, "re"))
Embase	('stoma'/exp OR 'stoma':ti,ab OR 'stomas':ti,ab OR 'ostomy'/exp OR 'ostom*':ti,ab OR 'colostomy'/exp OR 'colostom*':ti,ab OR 'cecostomy'/exp OR 'cecostom*':ti,ab OR sigmoidostom*:ti,ab OR 'ileostomy'/exp OR 'ileostom*':ti,ab) AND ('health education'/mj OR 'health education':ti OR 'education'/mj OR 'education*':ti OR 'learning'/mj OR 'learning':ti OR technolog*:ti) AND ('patient'/exp OR 'patient*':ti,ab) AND [embase]/lim NOT ([embase]/lim AND [medline]/lim) AND ('article'/it OR 'review'/it) NOT 'tracheostomy'/exp OR 'thoracostomy'/exp OR 'tracheostom*':ti,ab OR 'thoracostom*':ti,ab)
CINAHL	("Surgical Stomas" OR Ostomy OR Ostomies OR Stoma OR Stomas OR Colostom* OR Cecostom* OR Sigmoidostom* OR Ileostom*) AND TI("Health Education" OR Teaching OR Education* OR Learning OR Technolog*) AND (Patient OR Patients) NOT TI(Tracheostom* OR Thoracostom*)
LILACS?BDENF/ IBECS	("Surgical Stomas" OR Ostomy OR Ostomies OR Stoma OR Stomas OR Colostom* OR Cecostom* OR Sigmoidostom* OR Ileostom* OR Estoma OR Estomas OR Ostomia*) AND (ti:("Health Education" OR Teaching OR Education* OR Learning OR Technolog* OR Educa* OR Ensino OR Ensinamento* OR Aprendiza* OR Tecnolog* OR Enseñanza* OR Aprendizaje*)) AND (Patient OR Patients OR Paciente*) AND (db:("LILACS" OR "BDENF" OR "IBECS"))
BDTD	("Surgical Stomas" OR Ostomy OR Ostomies OR Stoma OR Stomas OR Colostom* OR Cecostom* ORSigmoidostom* OR Ileostom* OR Estoma OR Estomas OR Ostomia*) AND ("Health Education" OR Teaching OR Education* OR Learning OR Technolog* OR Educa* OR Ensino OR Ensinamento* OR Aprendiza* OR Tecnolog*) AND (Patient* OR Paciente*)

RESULTS

Database searches identified 865 records, which were exported to the EndNote® reference manager. After removing 300 duplicates, 565 records remained. Following the application of eligibility criteria, 2 reviewers selected 180 studies for full-text reading, of which 162 were excluded. Thus, 18 studies[15-32] were included in this review, as shown in Figure 1. The selected studies were published between 1992 and 2023.

The publications included research from Iran (4), the United States of America (3), Brazil (3), Taiwan (2), Turkey (1), Saudi Arabia (1), Singapore (1), South Korea (1), Norway (1), and the United Kingdom (1). Table 2 presents the main technologies explored by the authors of these publications and the total number of citations in this review.

DISCUSSION

Health education is an essential practice widely developed in health services, aimed at promoting the acquisition of knowledge that supports improvements in health promotion, prevention, and rehabilitation[33].

From this perspective, the implementation of technologies, combined with the nurse's technical-scientific knowledge, enables the optimization of the teaching–learning process through more effective and accessible processing, storage, and dissemination of knowledgel[33].

Thus, an educational intervention should be carried out with the introduction of continuous and dynamic technologies, considering the cultural diversity of patients treated in health institutions. To achieve this, different processes, products, and methods should be used to promote interaction among those involved in care[34].

It is also necessary to consider the reality of the setting in which the educational intervention takes place, taking into account the availability of human, physical, and material resources[15].
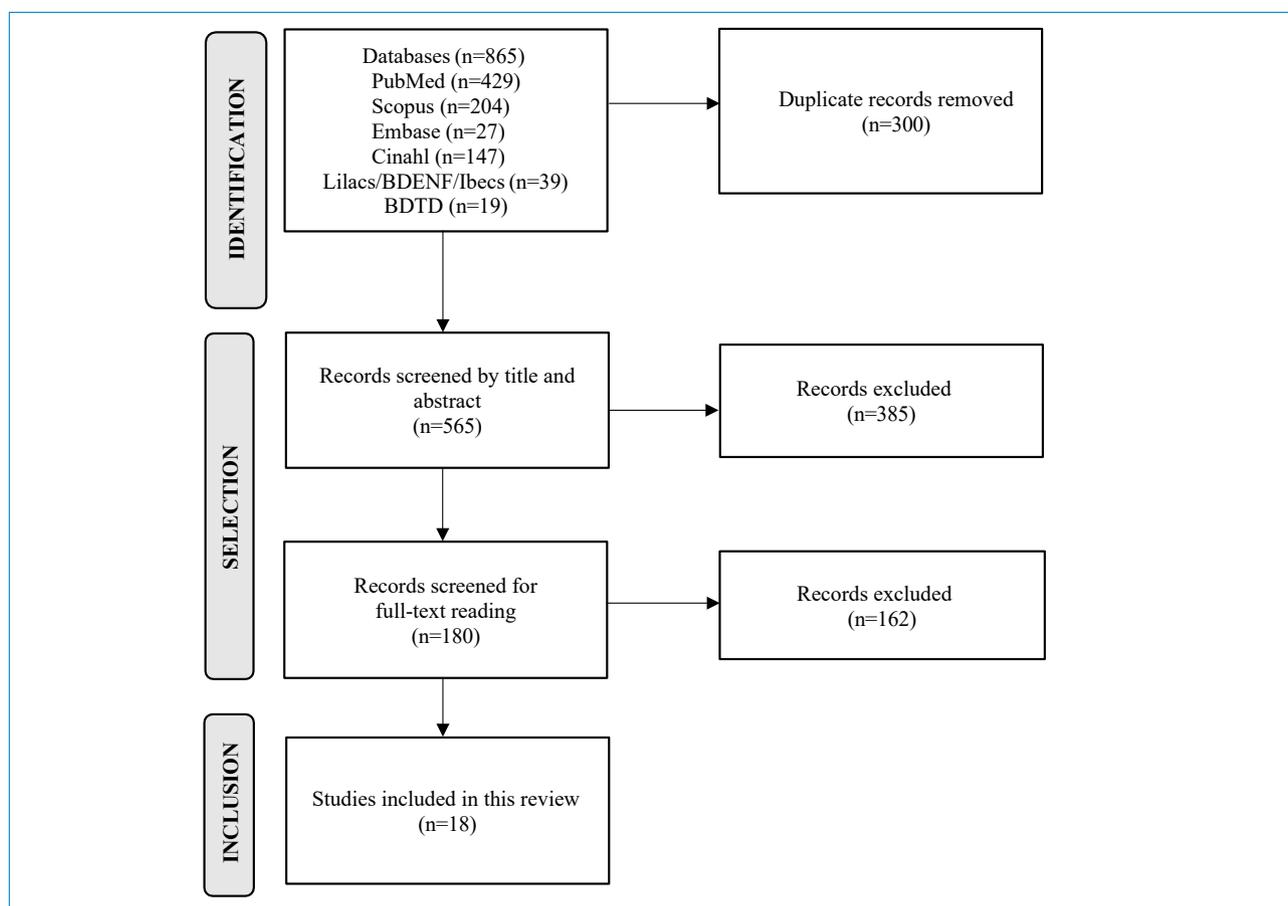
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Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses – extension for Scoping Reviews flow diagram, according to the JBI. Rio de Janeiro (RJ), Brazil, 2024.

Table 2. Characteristics of the studies according to the technology used, authors, and frequency of occurrence in the literature. Rio de Janeiro (RJ), Brazil, 2024

No.	Main technologies explored	Authors (A) who cited the use of the technology	Total citations
1	Verbal instructions	A15, A16, A17, A18, A19, A20, A21, A22, A23, A24, A25, A26, A27, A28	14
2	Printed textual materials	A16, A17, A18, A19, A20, A22, A23, A24, A25, A26, A27, A28, A29	13
3	Demonstrations and hands-on practices focused on self-care	A16, A17, A18, A19, A20, A21, A23, A24, A25, A26	10
4	Multimedia educational resources (text, image, audio, video, and animation)	A15, A17, A20, A30	4
5	Slide-based lectures	A16, A20	2
6	Group discussions	A16, A17, A20, A26	4
7	Use of illustrative figures	A17, A24, A27	3
8	Testimonials and interactions with other individuals with stomas	A15, A25, A26	3
9	Dialogical approach through the nursing process based on self-care	A29	1
10	Educational computer software available on CD-ROM	A31	1
11	Internet-based information sources	A15	1
12	Mobile app	A32	1
13	Stoma-related and other artificial technologies	A20	1
14	Learning verification checklist	A22	1

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The dialogical approach is characterized as a traditional health intervention based on communication and verbal guidance. This technology may be considered soft due to the interaction between the professional and the user, through the development of interpersonal relationships and the production of subjectivity. It may also be classified as soft-hard because of the application of clinical knowledge and the implementation of protocols, among other tools that rely on dialogue with the professional[3].

In addition, aspects such as accessibility, socioeconomic conditions, cultural values, and the individuality of the person and their family were highlighted by studies in this review as factors to be considered when implementing a dialogical approach[16-18,22,28].

One study identified lack of time among nurses and other professionals as a barrier to the use of this technology for dialogue with the target population[19]. Furthermore, concerns and other negative feelings among users and family members associated with the context of living with a stoma may limit the personal interaction required[19].

Another strategy to promote learning is the use of support groups for individuals with stomas, which enable interaction with other users, exchange of experiences, social engagement, and dissemination of information by the nurse to the group[35].

In addition, studies in this review highlight that when technological resources are used in an approach that includes both the person with a stoma and their family member, favorable outcomes in health education and overall well-being are observed[15,16,26]. This practice aligns with recommendations in national and international guidelines[36,37].

Other resources, such as printed textual materials, showed favorable outcomes in promoting education for individuals with an intestinal stoma[22,24,28]. These technologies were presented in formats such as checklists, booklets, folders, posters, pamphlets, and leaflets.

These tools highlight the creativity of nurses in developing essential instruments that translate the knowledge needed by individuals with an intestinal stoma[23,28] However, it should be noted that printed materials do not replace other technologies and educational methods; rather, they should be used alongside other interventions[28].

Limitations related to the use of printed textual tools include dependence on the individual's interest in reading, the exclusion of illiterate individuals, and the focus on biological aspects while overlooking subjective dimensions of the human experience[19,23].

It is also important to consider which material is most appropriate for the teaching process. Studies in this review identified fundamental factors to be considered, such as the use of appropriate, accessible, and easy-to-understand language as well as the amount of information to be delivered[17,25,27,28].

In one field study, hospitalized individuals raised concerns about the excessive volume of educational information provided during consultations with health professionals. They also indicated a lack of language appropriate for different age groups, with a stereotyped focus on older adults that excluded younger individuals. These factors created challenges in understanding what was being taught[38].

In contrast, another study reinforced the need to tailor informational tools for older adults, considering that the etiologies leading to surgical procedures that create stomas are often associated with advanced age[29].

Another aspect identified in the studies was the focus of health education on developing practical skills related to self-care and stoma management. Studies addressing this strategy reported satisfactory results in the teaching-learning process through practical demonstrations, the use of realistic simulation equipment, or other methods. These approaches promoted self-care and supported health maintenance, autonomy, empowerment, and comfort for the user[16,17,20].

The presence of contemporary technological advances is also evident in the integration of care with modern and dynamic technologies, particularly those that connect users to the internet. The use of online resources was identified as a strategy to be used by nurses[15].

However, although online sources of information are important for promoting self-care, one study found that videos available in the public domain may contain inaccuracies and omissions in the content presented. Therefore, it is necessary for professionals to critically evaluate online materials before recommending them[39].

It is important to highlight that the stomal therapy nurse is the specialist trained to educate users throughout the perioperative period involving the creation of intestinal stomas, and this specialized knowledge makes this professional

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highly qualified[12,36]. Studies in this review reinforced that this professional significantly contributes to the teaching-learning process for individuals and their families, highlighting the importance of including this specialist in conjunction with the use of technologies[12,15,18-20,22-25,31].

Therefore, given the wide range of technologies that can be associated with care, it is essential that nurses be familiar with the various tools available for health education[12].

Furthermore, it is fundamental that biopsychosocial and spiritual needs be addressed through care that considers the person and their family holistically, going beyond a disease-centered approach focused solely on biological aspects[16].

Study limitations

This study was limited by the initial selection of studies based on titles and abstracts, which carries the risk of missing relevant material for the review. Additionally, only studies available in full text were analyzed. Nevertheless, this is a methodological limitation inherent to scoping reviews.

Recommendations

Future review studies are recommended to map educational tools aimed at mixed stomas, that is, diversions that simultaneously involve fecal and urinary elimination, highlighting the strategies used by nurses in the teaching-learning process.

CONCLUSION

This study mapped the technologies most commonly used by nurses in the health education process for individuals with intestinal stomas. The synthesis provides implications for the professional practice of both generalist and specialist nurses by identifying the various strategies available for application in educational nursing interventions and encouraging critical reflection on the individual use of these resources.

Therefore, nurses should analyze the resources available in their health institutions and identify the most appropriate technology for the target population. Considering cultural, age-related, gender-related, and other biopsychosocial demands is essential for making appropriate technological choices.

Health education practices support the acquisition of new knowledge, promote decision-making, and strengthen autonomy and self-care among individuals and their support networks. Thus, it is essential that educational actions be developed within the hospital care setting.

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