TEXTO & CONTEXTO enfermagem

TEXT & CONTEXT NURSING TEXTO & CONTEXTO ENFERMERÍA

EDUCATIONAL TECHNOLOGIES FOR CAREGIVERS IN THE CONTEXT OF PEDIATRIC ONCOLOGY HOSPITAL UNITS: A SCOPING REVIEW

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ABSTRACT

Objective: mapping the scientific evidence about the use of educational technologies for caregivers in the context of Pediatric Oncology hospital units.

Method: this is a scoping review based on the PRISMA-ScR recommendations and on the Joanna Briggs Institute methodology. The search was performed by two independent reviewers in 12 national and international data sources. Publications available in full and free of charge in electronic means were included, with no language or time restrictions. Abstracts were excluded, as well as letters to the editor, opinion articles, books, monographies, dissertations, theses, blog postings, and theoretical and reflection articles. Data analysis was descriptive, with elaboration of charts and absolute and relative frequency statistics.

Results: the final sample was comprised by 15 studies published between 2010 and 2020 and mainly from developed countries. Apps and videos were the predominant educational technologies, followed by printed materials, contributing to increasing the caregivers' knowledge about the disease and cancer treatment, symptom management and side effects of the chemotherapy drugs. In addition, when compared to printed materials, the videos showed a reduction in the caregivers' anxiety levels. The professionals most involved with the technologies were nurses and physicians.

Conclusion: it was possible to map that apps and videos are the main educational technologies that are being developed to instruct caregivers, addressing diagnosis and treatment of child-youth cancer, symptom management and self-care promotion.

DESCRIPTORS: Educational technology. Caregivers. Neoplasms. Child. Adolescent. Hospital units.

TECNOLOGIAS EDUCACIONAIS PARA CUIDADORES NO CONTEXTO DE UNIDADES HOSPITALARES DE ONCOLOGIA PEDIÁTRICA: REVISÃO DE ESCOPO

RESUMO

Objetivo: mapear as evidências científicas sobre o uso de tecnologias educacionais para cuidadores no contexto de unidades hospitalares de Oncologia Pediátrica.

Método: trata-se de uma *scoping review,* com base nas recomendações PRISMA-ScR e metodologia do Instituto Joanna Briggs. A busca foi realizada em 12 fontes de dados nacionais e internacionais, por dois revisores independentes. Foram incluídas publicações disponíveis na íntegra e gratuitamente em meio eletrônico, sem restrição de idiomas e sem recorte temporal. Foram excluídos resumos, cartas ao editor, artigos de opinião, livros, monografias, dissertações, teses, postagens em blogs, artigos teóricos e de reflexão. A análise dos dados ocorreu de forma descritiva, sendo elaborados quadros e estatística com frequência absoluta e relativa.

Resultados: a amostra final de 15 estudos, publicados entre os anos de 2010 e 2020 e oriundos, principalmente, de países desenvolvidos. Os aplicativos e vídeos foram às tecnologias educacionais predominantes, seguidos pelos materiais impressos, contribuindo para aumentar o conhecimento dos cuidadores sobre a doença e tratamento oncológico, manejo dos sintomas e efeitos colaterais dos quimioterápicos. Ademais, os vídeos demonstraram redução do nível de ansiedade dos cuidadores quando comparados com materiais impressos. Os profissionais que mais estiveram envolvidos com as tecnologias foram os enfermeiros e médicos.

Conclusão: foi possível mapear que os aplicativos e vídeos são as principais tecnologias **educacionais** que estão sendo desenvolvidas para orientação dos cuidadores, abordando o diagnóstico e tratamento do câncer infantojuvenil, manejo dos sintomas e promoção do autocuidado.

DESCRITORES: Tecnologia educacional. Cuidadores. Neoplasias. Criança. Adolescente. Unidades hospitalares.

TECNOLOGÍAS EDUCATIVAS PARA CUIDADORES EN EL CONTEXTO DE UNIDADES HOSPITALARIAS DE ONCOLOGÍA PEDIÁTRICA: REVISIÓN DE ALCANCE

RESUMEN

Objetivo: mapear las evidencias científicas sobre el uso de tecnologías educativas para cuidadores en el contexto de unidades hospitalarias de Oncología Pediátrica.

Método: se trata de una revisión de alcance basada en las recomendaciones PRISMA-ScR y en la metodología del Instituto Joanna Briggs. Dos revisores independientes realizaron la búsqueda en 12 fuentes de datos nacionales e internacionales. Se incluyeron publicaciones disponibles en su texto completo y en forma gratuita en medios electrónicos, sin restricciones de idiomas ni recorte temporal. Se excluyeron resúmenes, cartas al editor, artículos de opinión, libros, monografías, disertaciones, tesis, *posts* en blogs, y artículos teóricos y de reflexión. El análisis de los datos fue descriptivo, y se elaboraron cuadros y estadísticas con frecuencias absolutas y relativas.

Resultados: muestra final de 15 estudios publicados entre 2010 y 2020 y principalmente realizados en países desarrollados. Las *apps* y los videos fueron las tecnologías educativas predominantes, seguidas por los materiales impresos, lo que contribuyó a aumentar el conocimiento de los cuidadores sobre la enfermedad y el tratamiento oncológico, el manejo de los síntomas y los efectos colaterales de los fármacos quimioterapéuticos. Además, los videos demostraron que reducen el nivel de ansiedad de los cuidadores en comparación con los materiales impresos. Los profesionales que más se involucraron con las tecnologías fueron los enfermeros y los médicos.

Conclusión: fue posible mapear que las *apps* y los vídeos son las principales tecnologías educativas en actual desarrollo para orientar a los cuidadores, abordando el diagnóstico y tratamiento del cáncer infantojuvenil, el manejo de los síntomas y la promoción del autocuidado.

DESCRIPTORES: Tecnología educativa. Cuidadores. Neoplasias. Niño. Adolescente. Unidades hospitalarias.

INTRODUCTION

The field of Pediatric Oncology involves providing care to children and adolescents with cancer, which affects the child-youth population aged from zero to 19 years old. In this light, child-youth cancer can be understood as a group of several diseases that have in common the proliferation of abnormal cells, mainly affecting blood cells and supporting tissues; for that reason, the predominant types are leukemias (28%), Central Nervous System tumors (26%) and lymphomas (8%)[1].

It is noted that, each year, cancer affects more than 300,000 children/adolescents at the global level, with an increase in underdeveloped countries[2]. In Brazil, child-youth cancer is the leading cause of death (8% of the total) due to disease among children and adolescents aged from 1 to 19 years old, only surpassed by deaths due to external causes[3].

In addition, child-youth cancer does not present risk factors well evidenced in the literature, as in the case of adults, and the main symptoms can be similar to other pathologies, which contributes to delays in diagnosis. Added to the statistics, this fact turns child-youth cancer into a major challenge for Pediatric Oncology services, mainly for the hospital units that are involved with the diagnosis, treatment and monitoring of children/adolescents, as well as their families[2].

In this context, child-youth cancer causes significant repercussions for the life not only of the child/adolescent, but for their caregiver, who goes a long way until the diagnosis is made, needing to change their routine to adapt to a new reality[4]. It is evidenced that, at treatment initiation, caregivers lack information both about the disease and regarding its treatment. In addition to that, due to the impact caused by the child-youth cancer diagnosis, there is difficulty on the part of the caregiver to associate the guidelines that are provided by the health professionals[5].

In this way, cooperative groups that study child-youth cancer recognize the importance of health education for patients, family members and caregivers in Pediatric Oncology services, and encourage the development of research studies aimed at facilitating understanding by those involved in the cancer treatment process, as well as they also highlight nurses' role as educators of the patient/family[6–10].

From this perspective, the use of educational technology emerges, which allows incorporating resources that can contribute to strengthening the teaching-learning process and achieve educational goals[11]. Thus, in the form of printed materials or audiovisual resources, educational technologies have been identified as essential for the development of activities related to health education, contributing to knowledge acquisition by patients, family members and caregivers in different practice contexts[12].

In Pediatric Oncology, educational technologies can be incorporated at the beginning of the cancer diagnosis and treatment or before performing procedures that are necessary during the treatment of child-youth cancer, in order to expand the knowledge of the patient, family member and caregiver, ease learning and reduce the anxiety related to lack of knowledge about the disease. In view of the importance of educational technologies, it is necessary to discuss more about their incorporation in Pediatric Oncology hospital units, given that this is where caregivers spend most of their time during the cancer treatment of children/adolescents[13].

Based on the above, the study is justified due to the need to investigate the educational technologies developed and that are used to elucidate the gaps in the knowledge of caregivers of children and adolescents with cancer in Pediatric Oncology services. Thus, the study aims at mapping the scientific evidence about the use of educational technologies for caregivers in the context of Pediatric Oncology hospital units.

METHOD

This is a Scoping Review developed following the guidelines set forth in the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) international guide[14] and those by the Joanna Briggs Institute (JBI) Reviewers Manual[15], with its research protocol registered in the *Open Science Framework* platform (https://osf.io/jnfz9/).

The following stage structuring was chosen to devise this study, as conceived by Arksey and O'Malley: (1) definition of the research question; (2) identification of relevant studies; (3) selection and inclusion of studies; (4) data organization; and (5) compilation, synthesis and report of the results[16].

It is noted that, as a first step, a survey was conducted in the scientific bibliography to detect reviews with a similar research scope. The following platforms were consulted: International Prospective Register of Systematic Reviews (PROSPERO), Open Science Framework (OSF), The Cochrane Library, JBI Clinical Online Network of Evidence for Care and Therapeutics (COnNECT+) and Database of Abstracts of Reviews of Effects (DARE). The results revealed non-existence of publications with a similar objective as the one of this review.

The PCC (Population, Concept and Context) mnemonic rule was used to formulate the research question, as indicated by the JBI. Such being the case, the following was defined: P - Caregivers of children and adolescents; C - Educational technologies in health; and C - Hospital units. From this starting point, the following research question was formulated: "which are the educational technologies developed for caregivers in the context of Pediatric Oncology hospital units?".

For the search and identification of studies, the descriptors indexed in DeCS and MeSH were consulted, in order to adapt the searches to Portuguese and English, establishing the following, respectively: "*Cuidador*", "*Criança*", "*Tecnologia Educacional*", "*Educação em Saúde*", "*Oncologia*", "*Neoplasias*", "*Unidades Hospitalares*"; "Educational Technology", "Caregivers", "Child", "Adolescent", "Medical Oncology", "Neoplasms", "Hospital Units". The following keywords were used: "*Câncer*/Cancer" and "*Serviços de Saúde*/Health Services". The "*AND*" and "*OR*" Boolean operators were used to cross the descriptors and keywords.

The search for articles was conducted in August and September 2021, in the following databases: PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Scopus, Web of Science, Science Direct, *Literatura Latino-Americana e do Caribe em Ciências da Saúde* (LILACS), Cochrane Library, Wiley Online Library, Gale Academic Onefile and Google Scholar, as well as in the Scientific Electronic Library Online (SCIELO). For the Gray Literature (theses and dissertations), the Theses and Dissertations Catalog of *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* (CAPES) was used. The search was carried out on the Journals Portal of *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* (CAPES), through remote access via the *Comunidade Acadêmica Federada* (CAFe) platform, a tool made available by *Universidade Federal do Rio Grande do Norte* (UFRN).

It is noted that the search strategy was adapted according to the specificities of each source used; however, the combinations between the descriptors were kept and time and language restriction filters were not added, as shown in Chart 1.

In order to select the articles, the following inclusion criteria were adopted: publications available in full and free of charge in electronic media, without language time restrictions. Abstracts were excluded, as well as letters to the editor, opinion articles, books, monographies, dissertations, theses, blog postings, and theoretical and reflection articles.

Initially, the methodological process followed to select and include the studies consisted in identifying the publications in the sources using the inclusion and exclusion criteria. Screening and inclusion of studies were performed by two independent evaluators, simultaneously and on different electronic devices, in addition to reading the selected studies in full. The differences found between

the reviewers during the selection process were mediated through meetings between them and, after a discussion, it was decided to include the study in the review or to exclude it. It is also noted that a reverse search was performed in the references of the articles selected to identify possible relevant studies to comprise the results.

After selecting the studies, for data organization and extraction , the authors created a spreadsheet in Microsoft Excel® with information such as: author and year of the study, country of publication, method design, intervention used, type of educational technology, professionals involved with the educational technology, and main results of the studies.

Chart 1 - Search syntaxes employed in the data sources. Natal/RN, Brazil, 2021.

Data Sources	Search Syntaxes
SCOPUS	*TITLE-ABS-KEY (caregivers) AND TITLE-ABS-KEY (child OR adolescent) AND TITLE-ABS-KEY (health AND education OR educational AND technology) AND TITLE-ABS-KEY (medical AND oncology OR neoplasms OR cancer) AND TITLE-ABS-KEY (hospital AND units OR health AND services)*
Web of Science	*((((TS=(Caregivers)) AND TS=(Child OR Adolescent)) AND TS=(Health Education OR Educational Technology)) AND TS=(Medical Oncology OR Neoplasms OR Cancer)) AND TS=(Hospital Units OR Health Services)*
PubMed	*(((((Caregivers) AND (Child OR Adolescent)) AND (Health Education OR Educational Technology)) AND (Medical Oncology OR Neoplasms OR Cancer)) AND (Hospital Units OR Health Services)*
Science Direct	*(Caregivers) AND (Child OR Adolescent) AND (Health Education OR Educational Technology) AND (Medical Oncology OR Neoplasms) AND (Hospital Units OR Health Services)*
CINAHL	*Caregivers AND (Child OR Adolescent) AND (Health Education OR Educational Technology) AND (Medical Oncology OR Neoplasms OR Cancer) AND (Hospital Units OR Health Services)*
SCIELO	*(*Caregivers) AND (Child OR Adolescent) AND (Health Education OR Educational Technology) AND (Medical Oncology OR Neoplasms OR Cancer) AND (Hospital Units OR Health Services)*
LILACS	*Caregivers [Words] and Child OR Adolescent [Words] and Health Education OR Educational Technology AND Medical Oncology OR Neoplasms OR Cancer AND Hospital Units OR Health Services [Words]*
Wiley Online Library	*"Caregivers" anywhere and "Child OR Adolescent" anywhere and "Health Education OR Educational Technology" anywhere and "Medical Oncology OR Neoplasms OR Cancer" anywhere and "Hospital Units OR Health Services" anywhere*
Cochrane	*(Caregivers) in Title Abstract Keyword AND (Child OR Adolescent) in Title Abstract Keyword AND (Health Education OR Educational Technology) in Title Abstract Keyword AND (Medical Oncology OR Neoplasms OR Cancer) in Title Abstract Keyword AND (Hospital Units OR Health Services) in Title Abstract Keyword*
Gale Academic Onefile	*(Caregivers) AND (Child OR Adolescent) AND (Health Education OR Educational Technology) AND (Medical Oncology OR Neoplasms OR Cancer) AND (Hospital Units OR Health Services)*
Google Scholar	*(Caregivers) AND (Child OR Adolescent) AND (Health Education OR Educational Technology) AND (Medical Oncology OR Neoplasms OR Cancer) AND (Hospital Units OR Health Services)*
Theses and Dissertations Catalog (CAPES)	*(Cuidadores) AND (Crianças OR Adolescente) AND (Educação em Saúde OR Tecnologia Educacional) AND (Oncologia OR Neoplasia OR Câncer) AND (Unidades Hospitalares OR Serviços de Saúde)*

Regarding the level of evidence and degree of recommendation, according to the Oxford Center for Evidence-based Medicine, the lower the number presented by the study, the better its level of evidence, while studies with an "A" rating are considered to be of higher relevance, presenting a higher degree of recommendation[17].

Data analysis was descriptive, with elaboration of charts and absolute and relative frequency statistics.

It is noted that this study was not submitted to any Research Ethics Committee (*Comitê de Ética e Pesquisa*, CEP), as all the data included in this review are of public access.

RESULTS

A total of 19,034 studies were identified in the data sources; however,11,258 articles were not accessible, leaving 7,771 for the screening process. Subsequently, the titles and abstracts of the articles were read, with exclusion of 7,714 because they were not related to the theme, totaling 57 articles assessed for eligibility. After reading the articles' full texts, 46 were excluded for not answering the research question, thus leaving 11 articles. It is noted that four articles were included in the reverse search, totaling a final sample comprised by 15 articles, as presented in the flowchart (Figure 1).

Regarding the year of publication, 2015 stood out for representing four (26.6%) of the studies selected, followed by 2019 with three (20%) studies, 2010, 2016 and 2020 with two (13.3%) studies each, and 2017 and 2018 with one (6.6%) study each.
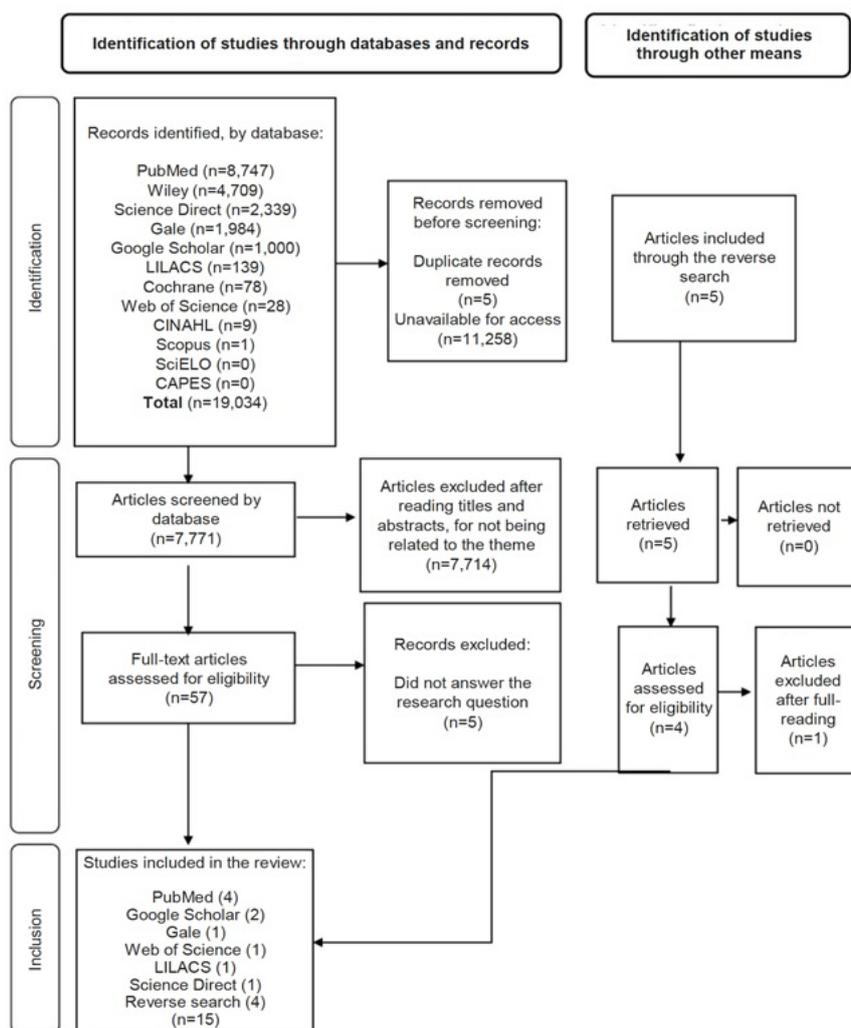

Figure 1 - PRISMA 2020 flowchart, adapted for this scoping review. Natal/RN, Brazil, 2021.

Furthermore, in relation to the country of origin of these articles, there was prevalence of the United States of America (USA), which obtained four (27%) publications, followed by the United Kingdom with three (20%), Brazil with two (13.3%), Iran with two (13.3%) and Germany, Australia, Chile and Indonesia with one (6.6%) publication each.

The study design of the experimental type corresponded to the predominant class in the sample, representing six (40%) articles, followed by descriptive studies with four (26.5%) articles, scoping reviews with two (13.3%) articles, and systematic, cohort and methodological studies with one (6.6%) article in each category.

In addition to that, according to the methodology adopted in each study, there were five (33.3%) publications with level of evidence 2C, four (26.6%) with 1B, three (20%) with 2A, and three (20%) with 2B. In relation to the degree of recommendation, 11 (73.3%) and four (26.6%) publications obtained degrees B and A, respectively, as shown in Chart 2.

Chart 2 - Characterization of the publications according to the year of publication, country of origin, data source, type of study, level of evidence and degree of recommendation of the studies included in the scoping review. Natal/RN, Brazil, 2021. (N=15)

ID* – Author (Year)	Country/ Data source	Type of Study/LE†/DR‡
E1 - Hamdan et al. (2020)[7]	Saudi Arabia PubMed	Experimental 1B/A
E2 - Clercq et al. (2020)[18]	USA Google Scholar	Scoping review 2A/B
E3- Nova, Allenidekania and Agustini (2019)[19]	PubMed Australia	Experimental 1B/A
E4- Uzun and Kucuk (2019)[20]	Turkey *Gale Academic Onefile*	Experimental/ 2B/B
E5- Mehdizadeh et al. (2019)[21]	Iran Web of Science	Scoping review 2A/B
E6- Mueller et al. (2018)[22]	USA Google Scholar	Descriptive 2C/B
E7- Fazelniya et al. (2017)[23]	Iran PubMed	Experimental 1B/A
E8- Lopes and Shmeil (2016)[24]	Brazil LILACS	Experimental 2B/B
E9- Morrison et al. (2016)[25]	USA Reverse search	Descriptive 2C/B
E10- Maza et al. (2015)[26]	Chile Science Direct	Experimental 1B/A
E11- Majeed-Ariss et al. (2015)[27]	United Kingdom PubMed	Systematic Review 2A/B
E12- Wang et al. (2015)[28]	USA Reverse search	Descriptive 2C/B
E13- Kock et al. (2015)[29]	United Kingdom Reverse search	Descriptive 2C/B
E14- Salles and Castro (2010)[30]	Brazil LILACS	Methodological 2C/B
E15- Mostert et al. (2008)[31]	Indonesia Reverse search	Cohort 2B/B

*ID: Identification of the article; †LE = Level of Evidence; ‡DR = Degree of Recommendation

Regarding the type of educational technology, there was predominance of apps and videos, obtaining five (33.3%) and three (20%) results, respectively. The others corresponded to social media platforms, a manual, a mobile technology, an interactive game, a software program, lectures and a booklet, each one representing 6.6%.

Regarding the professionals involved with the educational technology, seven (58.3%) nurses and physicians were among the results, in addition to a multidisciplinary team, scientists, Information Technology professionals and software engineers, with one (6.6%) result for each category. The type of technology and the professionals involved, as well as the main results of the studies that used these technologies, are described in Chart 3.

Chart 3 - Mapping of the results according to identification of the studies, type of educational technology, professionals involved in development of the technology and main results. Natal/RN, Brazil, 2022.

ID*	Type of educational technology	Professionals involved	Main results
E1[7]	Video Leaflet	Physicians	Multimedia materials, such as educational videos, are useful for learning and reducing anxiety in caregivers of children/adolescents with cancer, when compared to the conventional methods applied before intrathecal chemotherapy.
E2[18]	Social media platforms	Physicians	Cancer treatment optimization at all the support levels, from provision of information and adherence to the treatment to diet and interventions with physical exercises.
E3[19]	Video	Nurses	Considerable increase in the caregivers' knowledge after multimedia-based education.
E4[20]	Manual	Nurses	Increase in the caregivers' knowledge; training about the chemotherapy treatment and its effects should be provided before initiating chemotherapy.
E5[21]	App	Physicians	It increases patients' and family members' access to education and to reliable and suitable information about the disease.
E6[22]	Mobile technology	Physicians	The caregivers wanted medical knowledge and management apps, as well as for symptom management and medication reminders; most of the caregivers use the mobile technology with minimal barriers.
E7[23]	Educational interactive game	Nurses	An effective strategy to teach self-care behaviors and interact with the patients, reducing the fear and anxiety related to the effects of chemotherapy.
E8[24]	Software program	Nurses	It assists nurses in devising guidelines for caregivers; it improves quality of the information; it eases interpreting and adhering to the recommendations.
E9[25]	App	Multidisciplinary team	Uncertainty at the beginning of diagnosis is perceived globally, and apps aimed at education in health offer a potential benefit for the family members of children with cancer.
E10[26]	Lectures Manual	Nurses	Increase in the knowledge of the parents that were offered the educational program; There was no effect on the anxiety levels.

Chart 3 - Cont.

ID*	Type of educational technology	Professionals involved	Main results
E11[27]	App	Physicians and information scientists	Support for Clinical management; Monitoring of the chemotherapy symptoms; Self-care promotion.
E12[28]	App	Physicians, nurses and software engineers	The caregivers appreciated the idea of using a smartphone app to gain more knowledge and receive more support; need for information and knowledge to care for the children at home.
E13[29]	App	Information Technology professionals	It offers structured and personalized information about the late effects of childhood cancer and monitoring examinations.
E14[30]	Booklet	Nurses	Importance of enjoying access to the material at treatment initiation; all the information is considered positive and clarifying.
E15[31]	Video	Physicians	Structured information about leukemia, its treatment and chemotherapy; treatment refusal decreased and event-free survival was significantly increased among poor families; better knowledge is still required to manage treatment toxicity.

*ID: Identification of the article.

The studies showed that the use of educational technologies such as videos, apps and printed materials increases caregivers' knowledge about the cancer diagnosis and treatment process. When parameters such as reduction in the caregivers' anxiety were evaluated, the videos showed a significant result when compared to the printed materials.

DISCUSSION

The results pointed to the main educational technologies that are being produced and gradually introduced in Pediatric Oncology hospital units, emphasizing the collaboration for the health education process, as they ease understanding and reinforce the guidelines provided by the professionals[32–33].

In relation to the development and use of technologies for health education, developed countries have shown significant progress, where there is more willingness to employ modern technologies in the health area, which can be observed in this review, where most of the educational technologies described were from articles belonging to developed countries, such as the USA and the United Kingdom[9,20,22,25,27].

It is worth noting that studies carried out in Brazil on educational technologies have also been published, mainly involved with the development of booklets and software programs[32]. However, there is an evident need to broaden the health professionals' view for the production of educational technologies, mainly in developing countries, given the reduced number of publications that were evidenced in the current study.

In the Pediatric Oncology context, educational technologies aimed at clarifying the disease and treatment are being used mainly by nurses and physicians. It is noted that nurses play a role as health educators and are directly involved with the guidelines on chemotherapy treatment, side effects, hygiene habits, food and general care measures, developing resources that assist in the health education process. Thus, nurses' role as educators can be attributed to their greater involvement with the use of educational technologies[34].

Another point to be highlighted is the incorporation of Digital Information and Communication Technologies (DICTs) in health education. Both medical and nursing education increasingly interact with the use of technologies that stimulate learning. Thus, since training, physicians and nurses have direct contact with the DICTs, facilitating the use of educational technologies in the work environment[35–36].

Among the educational technologies, apps and videos were the most cited in the publications. It is noted that health technologies, such as apps, are gaining popularity and have the potential to be beneficial to patients and family members due to their easy access, low cost and availability of reliable information about the disease and treatment[21,25].

The main apps that are being developed for caregivers address the health education process on cancer treatment, symptom evaluation, social support, clinical management, monitoring of chemotherapy side effects and self-care promotion[21,25,27–29].

It is also evidenced that the families of children/adolescents with cancer wanted to have access to an app that offered information about the disease and treatment of their children[25], as well as for the management of symptoms and medications[22,28]. Apps that allow parents to communicate with health professionals, with answers to questions and recommendations, promote parents' self-confidence to care for children with cancer[21].

In addition to apps, it is noted that, by using appealing and dynamic resources, educational videos are also important tools for the health education process in Pediatric Oncology, contributing to learning in a playful way[31]. Using videos contributes to autonomy and to the adoption of care practices, mainly due to the interaction with images and sound, making it possible to understand the content presented[7,19,31].

The themes addressed by the videos were related to health education for the diagnosis of child-youth cancer and cancer treatment[7,19,31]. From this perspective, the study by Mostert et al. (2008)[31] stands out, in which he compared the outcome of the Acute Lymphoblastic Leukemia (ALL) treatment before and after the introduction of a parental education program, using an educational video to instruct the caregivers. It was observed that treatment refusal was reduced and that event-free survival increased significantly.

A difference is noticed between the studies regarding the reduction of anxiety with the use of educational technologies. Through the use of resources such as educational videos and games, it was possible to achieve a significant reduction in anxiety[7,23]. However, when printed materials were applied, there was no significant effect on the caregivers' anxiety level[26].

It is noted that there are other factors that can influence the level of anxiety in caregivers of children with cancer; for example, social, economic and family factors must be taken into account during the educational interventions. Another important point is related to choice of the educational technology, in which it is necessary to observe the needs and the context in which the individual is inserted[7].

Most of the studies highlight the importance of using educational technologies before therapeutic procedures, as in the case of chemotherapy administration, to obtain positive results[5,7,19,26–31].

Other aspects, such as increased knowledge of parents or caregivers about the disease and treatment, improved adherence to the treatment, better quality guidelines and reduction of fear and anxiety, stood out as the main benefits related to educational technologies[7,18–31].

In addition, there was an increase in the caregivers' knowledge about the effects of chemotherapy, risk of infection, oral hygiene and adequate nutrition for children/adolescents with cancer[18,20].

It is noted that the caregivers showed minimal barriers to using apps, videos and printed materials; for example, the data limitation for accessing mobile technologies. They showed interest in receiving information and knowing more about the disease and treatment, as well as about caring for their children when they were discharged home[19,22,26,28].

Some apps and videos were still in their development phase or were being evaluated as to the caregiver's interest in using a tool as support during cancer treatment, and it was necessary to enable their implementation in Pediatric Oncology services[22,28–29].

It should be noted that there are still few interventions using educational technologies for caregivers of children, with the need to develop resources that may support the parents and families that care for children with cancer[19,28].

In summary, the results of this review collaborate to the scientific community, as they allowed mapping the main studies on the theme, highlighting the importance of developing and incorporating educational technologies in Pediatric Oncology services to ease the health education practice, as well as to contribute for greater participation of caregivers in coping with the disease and cancer treatment. This review can help health professionals devise educational strategies that ease communication of the guidelines aimed at the diagnosis and treatment of child-youth cancer.

The following are pointed out as study limitations: the number of articles unavailable for access, which may have reduced the sample. In relation to the limitations on the use of educational technologies, it is noted that, for the apps and software programs, it is necessary for hospital units to have Internet access for caregivers. In addition, it is necessary to implement measures to prevent infection when handling technological devices.

CONCLUSION

The study allowed mapping that apps and videos are the main educational technologies that are being developed to instruct caregivers of children and adolescents in Pediatric Oncology hospital units. The main themes of educational technologies involved health education focused on the diagnosis and treatment of child-youth cancer, evaluation and management of symptoms and side effects of chemotherapy, and self-care promotion.

When compared to printed materials, videos and apps have significant potential to meet the caregivers' needs, given that they provide information in a dynamic way, using resources such as animation and sound to fix the content, which allows for knowledge acquisition.

However, it is noted that most of the educational technologies described in the study were being tested with the caregivers, not allowing to highlight which specific platform, video and app best meets the needs of patients, caregivers and family members.

As for the results of the studies, educational technologies expand caregivers' access to health education, contributing to enhanced caregiver confidence in facing the challenges associated with cancer treatment.

Thus, it is necessary that these technologies be incorporated into Pediatric Oncology services, especially in developing countries, where there is a significant increase in child-youth cancer, showing that the theme needs to be explored to enable the implementation of technologies in Pediatric Oncology services.

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NOTES

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