



Playful technologies in nursing care for children with cancer: integrative review

Tecnologias lúdicas na assistência de enfermagem a crianças com câncer: revisão integrativa

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ABSTRACT

Objective: to identify, based on scientific productions, which playful technologies have been incorporated by nurses when caring for children during cancer treatment. **Method:** integrative review of studies available in the MEDLINE, SCOPUS, CINAHL, VHL/LILACS, and SCIELO databases in the last ten years, carried out in six stages. **Results:** 16 studies were identified, grouped into three thematic categories: Digital technology as a playful resource in assisting children with cancer; Playfulness through different resources for children with cancer; Use of therapeutic toys in assisting children with cancer. **Conclusion:** diverse playful technologies for approaching children in cancer treatment can be used in care, helping to improve nursing practice in the pediatric context, through a pleasant and participatory perspective for children regarding care processes, procedures, and guidelines. **Descriptors:** Playfulness; Oncology Nursing; Technology; Child

RESUMO

Objetivo: identificar, com base em produções científicas, quais tecnologias lúdicas têm sido incorporadas pelo enfermeiro ao cuidado de crianças durante o tratamento do câncer. **Método:** revisão integrativa de estudos disponíveis nas bases de dados MEDLINE, SCOPUS, CINAHL, BVS/LILACS e SCIELO nos últimos dez anos realizada em seis etapas. **Resultados:** foram identificados 16 estudos agrupados em três categorias temáticas: A tecnologia digital como recurso lúdico na assistência às crianças com câncer; Ludicidade por meio de diferentes recursos ante as crianças com câncer; Uso do brinquedo terapêutico na assistência às crianças com câncer. **Conclusão:** diversificadas tecnologias lúdicas para a abordagem das crianças no tratamento do câncer podem ser empregadas na assistência, colaborando para aperfeiçoar a prática da enfermagem no contexto pediátrico, por meio de uma perspectiva agradável e participativa para as crianças no que tange aos processos de cuidados, procedimentos e orientações. **Descritores:** Ludicidade; Enfermagem Oncológica; Tecnologia; Criança

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INTRODUCTION

Childhood cancer affects children and adolescents between the ages of zero and 19. It is considered rare; however, some studies indicate an increasing incidence, i.e. data from the National Cancer Institute (INCA) estimate for 2023-2025, indicate a total of 7,930 new cases for every one million children and adolescents (zero-19 years).^{1,2}

Cancer treatment is generally long and complex, with several trips to the hospital and frequent hospitalizations, and consists of different therapeutic modalities which often cause restrictions and physical and psychological disabilities.³

In view of this, it can be seen that playing is part of children's universe and is a necessity, a child's right, and one of the activities that promotes their development. Through play, children learn and develop, constructing and deconstructing aspects that are significant to them. Thus, playing awakens stimuli in the physical, emotional, cognitive, and social dimensions. Play transports children to new spaces that provide them with understanding and encouragement to continue growing and learning.⁴

In this context, playfulness is a quality that transfers the idea of relaxation, pleasure, and fun, and refers to the act of playing but is not restricted to it. Playfulness is an important aspect in different health actions, it facilitates children's education and learning and favors interaction and bonding with the professional, making it an important action to be incorporated into nursing care.⁴

Cancer treatment can disrupt children's routines and take them away from everyday activities such as school, socializing with friends, and playing. Enabling play, as well as incorporating playfulness as an essential concept in nursing care for children with cancer, allows new meanings to be constructed during the difficult time of living with the disease.^{3,5}

In the therapeutic journey, children have to undergo different procedures such as tests, chemotherapy radiotherapy, and surgery, for example. The importance of playful elements in nursing processes stands out, given their potential to bring the healthcare team closer together, especially nurses and children.

Playful activities contribute to assertive, individualized, and non-traumatic care, and promote the establishment of bonds and trust between children and the professionals on the nursing team, with a view to humanization and health promotion.⁶

Play in children's environments is seen as essential, and is guaranteed by the Statute of the Child and Adolescent, which emphasizes the importance of play. In this sense, the National Humanization Policy (NHP) stresses the need to build relationships that affirm values, welcome, and comfort for users of health services. With regard to the

hospital environment, the installation of playrooms is a requirement laid down in Law No. 11,104 of March 2005.

Playful care is part of nursing practice since therapeutic play as a technique included in pediatric care is a practice regulated by the Federal Nursing Council (COFEN). Initially, with the publication of Resolution No. 295/2004, updated and revoked by Resolution No. 546 in May 2017, it was established that therapeutic play can be used by members of the nursing team in the care of hospitalized children and their families, these being the legal frameworks that legitimize the work of nurses.⁷

Playfulness, which makes it possible to overcome the centrality of the disease, is also a coping strategy, as it provides welcome, humanization, and attention to children's rights and needs.^{3,5} The term technology transcends the denomination of an object or product; it also includes constituted knowledge⁸. In this study, playful technologies are defined as different means that can be used in nursing care for children with cancer, since there are many ways in which play can be present in health care.

Based on this, diverse uses and purposes can integrate the use of different playful technologies, such as the arts-based approach, games, play, and digital technology resources, depending on their availability and care objectives, in nursing practice. In this way, playfulness can be considered an essential element in caring for children undergoing cancer treatment, and it should be noted that playful technology in the context of care can include different means that can be incorporated by nurses.

OBJECTIVE

The aim of this study is to identify which playful technologies have been incorporated by nurses in the care of children during cancer treatment.

METHOD

This is an integrative literature review, the method of which broadly analyzes a phenomenon of interest by including studies with different designs to address the objective of the review, thus enabling the synthesis of scientific knowledge produced on the issue studied, as well as the practical incorporation of research results.⁹

This review was structured in six stages: 1) delimitation of the guiding question; 2) sampling search procedures; 3) peer selection of studies for sample composition and data extraction; 4) evaluation of the included studies; 5) interpretation of the results; and 6) presentation of the integrative review report with a critical counterpoint to the findings.⁹

The guiding question for the research was based on the acronym PICo, as follows:10 P (population) children with cancer; I (phenomenon of interest) the use of playful technologies in the approach to children undergoing cancer treatment; and Co (Context) nursing care. Thus, the guiding question established for this study was: What are the playful technologies incorporated by nurses in the care of children undergoing cancer treatment?

The search for scientific publications was carried out in December 2022, in the databases Medical Literature Analysis and Retrieval Systems Online (MEDLINE), SCOPUS, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Latin American and Caribbean Health Sciences Literature (LILACS) and the virtual library Scientific Electronic Library Online (SCIELO). The following controlled descriptors were used: Play and Playthings, Reading, Educational Technologies, Folklore, Juvenile Literature, Child, Neoplasms, Oncology Nursing, Nursing, Nurses, and free synonymous terms. Identified by consulting the controlled vocabularies in the Health Sciences Descriptors and Medical Subject Headings (DeCS/MeSH). The descriptors were correlated using Boolean operators to associate the terms (Figure 1).

Base	Search strategy
MEDLINE/ PUBMED	<i>((((Play and Playthings[mh] OR Plaything*[tiab] OR Play*[ti] OR Game*[tiab] OR Puppetry[ti] OR Reading[mh] OR Reading[ti] OR Fairy Tale*[tiab] OR Educational Technologies[mh] OR Educational Technolog*[tiab] OR Educational Strategie*[tiab] OR Playful[tiab] OR Folklore[mh] OR Folklore[tiab] OR Storytelling[tiab] OR Ludic[tiab] OR Toy[tiab] OR Toys[tiab] OR Juvenile Literature[mh] OR Juvenile Literature*[tiab] OR Art[tiab] OR Arts[tiab] OR Movie*[tiab] OR Story[tiab] OR Storie*[tiab] OR Literacy[tiab] OR Orientation*[ti] OR Pets[tiab] OR Animal*[tiab] OR Fun[tiab]) AND ((Child[mh] OR Child*[tiab] OR Pediatric*[tiab] OR Paediatric*[tiab] OR School*[tiab]) AND (Neoplasms[mh] OR Neoplas*[tiab] OR Cancer*[tiab] OR Tumor*[tiab] OR Tumour*[tiab] OR Malignan*[tiab] OR Oncolog*[tiab] OR Drug Therapy[ti] OR Chemotherapy[tiab])) AND (Oncology Nursing[mh] OR Nursing[mh] OR Nurses[mh] OR Nurs*[tiab])) NOT (Adolescen*[tiab] OR Adult*[tiab] OR Breast[ti] OR Cervical[ti]))</i>
SCOPUS	<i>TITLE-ABS("Play and Playthings" OR Plaything* OR Play* OR Game* OR Puppetry OR Reading OR Fairy Tale* OR "Educational Technologies" OR "Educational Strategies" OR Playful OR Folklore OR Storytelling OR Ludic* OR Toy OR Toys OR "Juvenile Literature" OR Arts OR Movie* OR Story OR Storie* OR Literacy OR Pets OR Fun) AND TITLE(child* OR pediatric* OR paediatric*) AND TITLE(neoplas* OR cancer* OR tumor* OR tumour* OR malignan* OR Oncolog* OR "Drug Therapy" OR Chemotherapy OR "Oncology Nursing") AND NOT (PET/CT)</i>
LILACS/ BVS	<i>(ti:("Play and Playthings" OR Plaything* OR Play* OR Game* OR Puppetry OR Reading OR "Fairy Tale" OR "Educational Technologies" OR "Educational Strategies" OR Playful OR Folklore OR Storytelling OR Ludic* OR Toy OR Toys OR "Juvenile Literature" OR Art OR Arts OR Movie* OR Story OR Storie* OR Literacy OR Pets OR Fun OR Brincadeira* OR Jogo* OR Marionete* OR Leitura OR "Conto de Fadas" OR "Tecnologias Educacionais" OR "Estratégias Educacionais" OR Folclore OR Lúdica* OR Lúdico* OR Brinquedo OR "Literatura juvenil" OR Arte OR Artes OR Filme* OR Alfabetização OR Diversão OR Jugar* OR "Cuento de Hadas" OR Juguetón OR Juguete OR Diversión)) AND (tw:(child* OR pediatric* OR paediatric* OR criança* OR nino*)) AND (tw:(neoplas* OR cancer* OR tumor* OR tumour* OR malignan* OR Oncolog* OR "Drug Therapy" OR Chemotherapy OR Quimioterap*)) AND (db:("LILACS"))</i>
SCIELO	<i>(ti:("Play and Playthings" OR Plaything* OR Play* OR Game* OR Puppetry OR Reading OR "Fairy Tale" OR "Educational Technologies" OR "Educational Strategies" OR Playful OR Folklore OR Storytelling OR Ludic* OR Toy OR Toys OR "Juvenile Literature" OR Arts OR Movie* OR Story OR Storie* OR Literacy OR Pets OR Fun) AND TI(child* OR pediatric* OR paediatric*) AND</i>

	<i>(neoplas* OR cancer* OR tumor* OR tumour* OR malignan* OR Oncolog* OR "Drug Therapy" OR Chemotherapy OR "Oncology Nursing")</i>
CINAHL	<i>TI("Play and Playthings" OR Plaything* OR Play* OR Game* OR Puppetry OR Reading OR "Fairy Tale" OR "Educational Technologies" OR "Educational Strategies" OR Playful OR Folklore OR Storytelling OR Ludic* OR Toy OR Toys OR "Juvenile Literature" OR Arts OR Movie* OR Story OR Storie* OR Literacy OR "Pet Therapy" OR Fun) AND TI(child* OR pediatric* OR paediatric*) AND TI(neoplas* OR cancer* OR tumor* OR tumour* OR malignan* OR Oncolog* OR "Drug Therapy" OR Chemotherapy)</i>

Figure 1. Combination of terms in search strategies. Rio de Janeiro (RJ), Brazil, 2022.

The COFEN resolutions, Resolution No. 295/2004 and No. 546/2017 were taken as a basis and, in order to retrieve the most recent publications on the subject of this review, a filter was applied to the time frame to obtain studies published between 2011-2022.

The search and study selection stages were carried out by three reviewers independently, and any disagreements were resolved through discussion to reach a consensus. The EndNote reference manager was used to organize the studies obtained and support the analysis procedures. Managers are facilitators for searches and analyses in different areas.¹¹

Original studies published in national or international journals, in English, Portuguese, or Spanish, on the subject of the incorporation of play technologies by nurses in the care of children undergoing cancer treatment were included. Duplicate publications, theses, dissertations, and studies developed with adult patients were excluded. Studies whose central theme was coping with cancer were excluded because they were far removed from the purpose of this study. With regard to the participation of family members and professionals, the inclusion criteria were studies in which the action implemented was aimed primarily at the child, and those exclusively aimed at family members or professionals were excluded.

Data extraction from the included studies was organized to summarize them, including the following information: authors; year of publication; level of evidence; journal; methodological design; participants; intervention studied; and outcome, which enabled their characteristics to be analyzed in detail and rigorously.⁹

The methodological quality of the qualitative studies and randomized clinical trials was assessed using the Critical Appraisal Skills Programme (CASP).^{12,13} The publications were also assessed for their classification into levels of evidence according to the Rating System for the Hierarchy of Evidence for Intervention Studies, which considers evidence hierarchically as follows: I - evidence from systematic reviews or meta-analyses of relevant randomized clinical trials; II - evidence from well-designed randomized controlled clinical trials; III - evidence from clinical trials without

randomization; IV - evidence from cohort and case-control studies; V - evidence from systematic reviews of qualitative or descriptive studies; VI - evidence generated by qualitative or descriptive studies; and VII - evidence from expert opinion/consensus, authorities or expert committees.¹⁴

When considering the ethical and legal aspects, this study does not require the opinion of the Research Ethics Committee, as it is a literature review and does not involve research with human beings.

RESULTS

When the searches were carried out, a total of 265 studies were retrieved, of which, after reading and applying the criteria, 16 remained (Figure 2). In order to ensure greater reliability, the study selection flow was developed by adapting the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) strategy. This strategy deals with guidelines for the preparation of systematic reviews, the use of PRISMA helps authors, editors and peer reviewers, and different users of reviews in an equitable way, leading to greater transparency and accuracy, facilitating replication, updating of reviews and evidence-based decision making.¹⁵

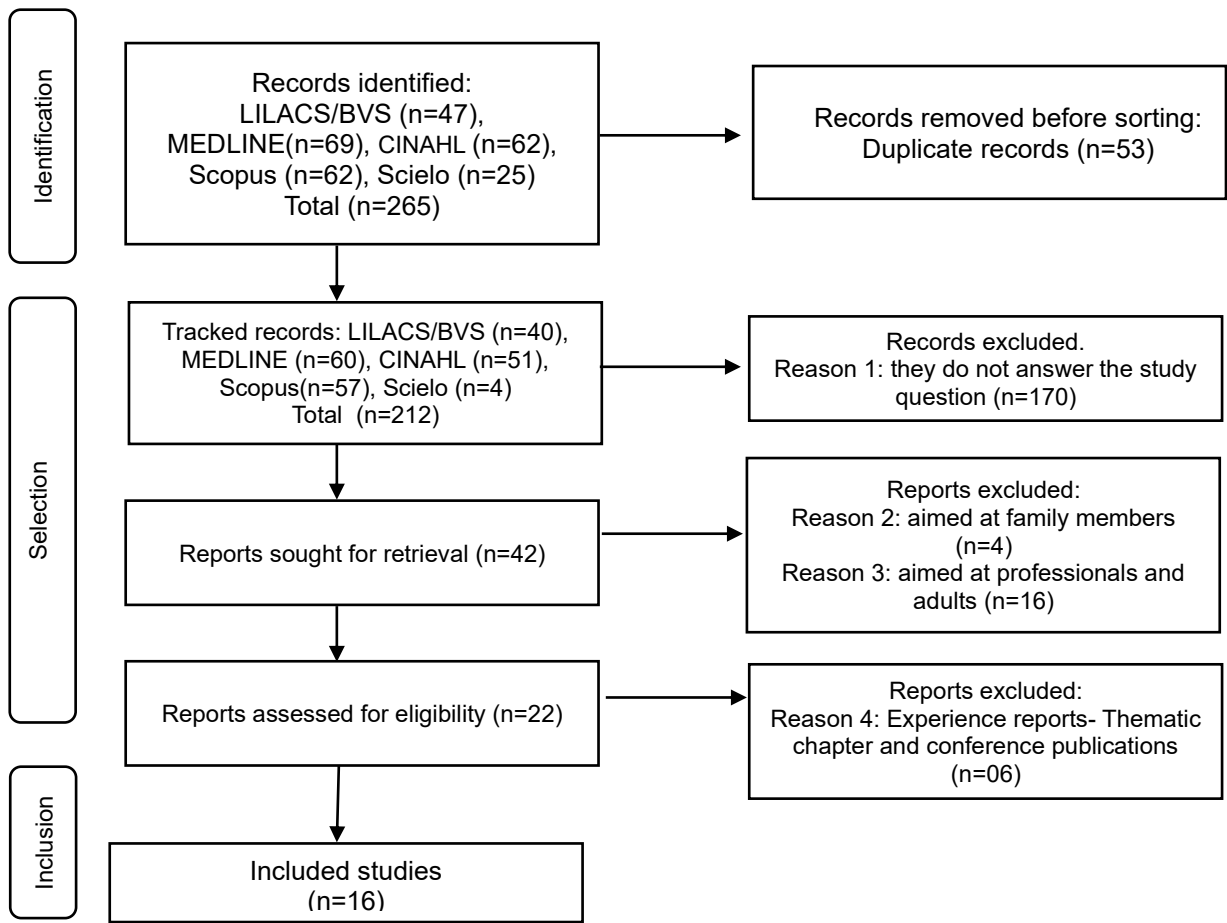


Figure 2. Flowchart adapted from the PRISMA guideline.¹⁵ Rio de Janeiro (RJ), Brazil, 2022.

With regard to the origin of the publication, five studies were identified in national journals and eleven in international journals. All the international studies were published in English.

As for the countries where the research was carried out, Brazil (43.75%); the United States of America (25%); Turkey (18.75%); China (6.25%); and Sweden (6.25%) were identified. Also in this context, it was identified that the approach to children was mainly in inpatient units (68.75%).

Most of the publications occurred after 2016 (81.25%). The predominant age group of study participants was schoolchildren. The majority of the studies only involved children (81.25%); three studies also involved family members (18.75%), who participated to collect data on the characterization of the participants, one study used interviews to assess the feasibility and acceptance of the play technology studied, and one study included a validation stage with expert judges. With regard to cancer treatment, the participants in the studies often received antineoplastic chemotherapy (75%). In this group, (43.75%) the duration of chemotherapy was an inclusion criterion.

Thus, taking into account the evidence from the studies evaluated, three thematic categories emerged: Category 1. Digital technology as a playful resource in the care of children with cancer; Category 2. Playfulness through different resources for children with cancer; and Category 3. Use of therapeutic toys in the care of children with cancer.

The studies included in this review were coded according to the order of their individual evaluation by the authors, and are summarized in chronological organization according to the publication dates for each thematic category (Figure 3).

Cód.	Authors	Journal / Year	Design / Participants Level of evidence	Intervention studied	Outcomes
Category 1: Digital technology as a playful resource in the care of children with cancer					
E14	Yildiz GK, Yildiz S, Yoruk MA, Sevgen S ¹⁶	Eur J Oncol Nurs. 2022	Clinical trial without randomization. Children aged 10 to 16. n = 50 III	App use compared to guidance booklets.	Both methods were considered effective and not superior to the other. The study showed that guidance on chemotherapy can help control symptoms.
E15	Yang DJ, Lu MY, Chen CW, Liu PC, Hou IC. ¹⁷	JMIR Serious Games. 2022	Randomized controlled clinical trial. Children aged 3 to 5 years. n = 16 II	Use of therapeutic video games.	The use of a therapeutic video game can reduce anxiety in preschoolers with Acute Lymphatic Leukemia by supporting professionals in orientation before invasive therapies.
E12	Linder LA, Newman A, Carney KMB, Wawrzynski S, Stegenga K, Chiu YS, et al. ¹⁸	J Pediatr Nurs. 2022	A qualitative-quantitative descriptive study. Children aged 6 to 12. n = 19 VI	Use of mobile app to report symptoms.	Children are able to report their symptoms using the app. Access to the data from the reports can support the promotion of patient-centered care.
E2	Carney KM, Bernier JSH, Iacob E, Lewis M, Linder LI ¹⁹	Eur J Oncol Nurs. 2021	Qualitative descriptive study. Children aged 6 to 12. n = 19 VI	Use of mobile app to report pain.	Using the app articulates information such as the location, intensity, and suffering caused by the pain. It improved the opportunity to understand the pain reported by the children themselves.
E1	Linder LA, Newman AR, Stegenga K, Chiu YS, Wawrzynski SE, Kramer H, Weir C, et al. ²⁰	Support Care Cancer. 2020	Qualitative descriptive study Children aged 6 to 12 n=20 and family members n = 19 VI	Use of mobile application to report symptoms.	The app provides means of reporting children's symptoms, helping to implement a child-centered approach. Its use proved to be viable.
Category 2. Playfulness through different resources for children with cancer					

E13	Rosa VM, Daudt F, Tonetto LM, Brust-Renck PG, Reed JP, Fogliatto FS ²¹	Eur J Oncol Nurs. 2022	Qualitative descriptive study. Children aged 4 to 8. n = 6 VI	Use of make-believe games.	The use of playful interventions improved the children's subjective well-being during their experiences with laboratory and imaging tests.
E16	Amador DD, Mandetta MA ²²	Acta Paul Enferm. 2022	Descriptive study. Children aged 8 to 12, n = 7 Expert judges. n = 5 VI	Use of board games	Play is an important tool in the process of communicating with children.
E4	Frygner-Holm S, Russ S, Quitmann J, Ring L, Zyga O, Hansson M, et al. ²³	J Pediatr Oncol Nurs. 2020	Qualitative and quantitative exploratory study. Children aged 4 to 10 and their families. n = 4 VI	Use of make-believe games.	The study indicates improvements in self-efficacy in care situations, as well as the possibility of increasing children's participation and independence in care actions.
E5	Linder L, Bratton H, Nguyen A, Parker K, Wawrzynski S ²⁴	Oncol Nurs Forum. 2018	Cross-sectional, exploratory, descriptive qualitative study. Children aged 6 to 12. n = 27 VI	Using directed drawing to report symptoms.	The children's drawings include their symptoms and the strategies they use to manage them. The importance of child-centered approaches is emphasized, as is the possibility of incorporating them into care plans.
E3	Lima KYN, Santos VEP ²⁵	Rev Gaúcha Enferm. 2015	Qualitative descriptive exploratory study. Children aged 6 to 12. n = 8 VI	Play activities for hospitalized children.	The study points to the use of games, plays and drawings, the use of computers and technological tools as they incorporate the playful, educational aspect.
Category 3. Use of therapeutic toys in the care of children with cancer					
E10	Aslan H, Erci B ²⁶	Palliat Support Care. 2021	Randomized controlled clinical trial. Children aged 3 to 6 years.	Playing with toys made from medical materials.	Playing relieved the reports of pain related to venous infusions in the experimental group, as opposed to the control group. Various non-pharmacological methods can help relieve pain.

			n=110 II		
E9	Santos VSS, Silva FLEC, Cardoso AS ²⁷	Salusvita. 2019	Quantitative descriptive exploratory study. Preschool and school children. n=10 VI	Instructional therapeutic toy.	The use of therapeutic toys provided greater interaction with the professional and an understanding of treatment procedures. It reduced fears and manifestations of opposition to chemotherapy.
E6	Orhan E, Yildiz S ²⁸	Int J Caring Sci. 2017	Randomized controlled experimental study. Children aged 8 to 12. n=40 II	Instructional therapeutic toys.	Instruction with therapeutic toys before venipuncture procedures helped to reduce anxiety.
E11	Sposito AMP, Montigny F, Sparapani VC, Lima RAG, Silva-Rodrigues FM, Pfeifer LI, et al. ²⁹	Nurs Health Sci. 2016	Qualitative exploratory study. Children aged 7 to 12. n=10 VI	Use of puppets in care.	The use of puppets made it easier for the children to express themselves, it was playful and enjoyable. It provided better communication and minimized withdrawal and the feeling of hierarchy with adults.
E7	Fonseca MRA, Campos CJG, Ribeiro CA, Toledo VP, Melo LL ³⁰	<i>Texto Contexto Enferm.</i> 2015	Qualitative study. Children aged 3 to 6. n = 5 VI	Dramatic therapeutic play.	The therapeutic toy proved to be suitable for assistance. Its functions of facilitating communication, recreation, stimulation, socialization, and learning stand out.
E8	Artilheiro APS, Almeida FA, Chacon JMF ³¹	Acta Paul Enferm. 2011	Exploratory descriptive quantitative study. Children aged 3 to 6 and their families. n=30 VI	Instructional therapeutic play.	The use of therapeutic toys provides greater interaction with professionals. It demystifies, guides, and reduces fears. It enables cooperative behavior, making it easier for children to understand.

Figure 3. Summary of studies. Rio de Janeiro (RJ), Brazil, 2022.

With regard to the level of evidence, only three studies (18.75%) were classified as level II, one study was classified as level III (6.25%), and the remaining studies (75%) were classified as level VI. The assessment according to CASP (Figure 4) indicates that the studies were classified with a low risk of bias.^{12,13}

CASP Item Cod.	1	2	3	4	5	6	7	8	9	10	11
E15	Y*	Y	N**	NI***	Y	Y	Y	Y	NI	NI	S
E12	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-
E1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-
E2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-
E13	Y	Y	Y	Y	Y	NI	Y	Y	Y	Y	-
E16	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-
E3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-
E5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-
E4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-
E7	Y	Y	Y	Y	Y	NI	Y	Y	Y	Y	-
E11	Y	Y	Y	Y	Y	NI	Y	Y	Y	Y	-
E6	Y	NI	Y	NI	Y	Y	Y	Y	NI	Y	Y
E10	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Figure 4. Evaluation of studies according to CASP for qualitative studies and randomized clinical trials. Rio de Janeiro (RJ), Brazil, 2022.

* Y= Yes, ** N=No, *** NI= Not identified

Category 1 was made up of five studies that focused on describing the use of digital technologies that incorporate playfulness as an essential element in the products presented. One point in common between these studies was that the apps were used directly by the children and that they evaluated the reports of symptoms generated by the children themselves. Study E2 carried out a comprehensive validation process with the children and their families. Validation is an important requirement, given the methods of development and suitability.²³

Category 2 was formed by grouping together five studies that evaluated different play technologies. Study E16 identified and validated the use of games, an element also present in study E3, which also discussed games and arts. The designs evaluated in studies E3 and E5 pointed to their use to support and bring nurses and children closer together. In studies E13 and E4, the play technology was the use of dynamic make-believe play guided by specific proposals.

In six studies, the play technology described was the use of therapeutic toys; these studies made up category 3. Studies E6, E8, and E9 evaluated the use of the instructional

therapeutic toy method. Studies E7, E10, and E11 evaluated the implementation of the dramatic therapeutic toy method.

DISCUSSION

The play technologies identified in this review are distinct in their characteristics⁸. Digital play technologies include apps and video games, which incorporate playfulness into digital resources aimed at children. Other play technologies include physical elements, so playfulness is mediated by elements such as toys, pencils, paints, paper, pieces, and games. Some playful technologies can be described as light, such as games and interaction dynamics like make-believe, which also have playfulness as a characteristic, even if physical or digital elements are not present.

Playfulness plays an essential role for children and is an inseparable part of full and humanized nursing care. Cancer treatment, as well as the disease itself, brings various limitations to children. Thus, seeking spaces to incorporate playful technologies can contribute to health promotion, quality of life, and minimizing the psychological and physical consequences of illness. Play permeates care as an inherent part of the care provided to children.³

Thus, in relation to playful technologies, one of the resources evaluated was the use of an app. The integration of playful resources through digital technologies helps to facilitate interaction between patients and professionals.^{19,32} An important benefit of the app was that it provided support for children, encouraging them to tell their own stories in a friendly and less intimidating way.¹⁸⁻²⁰

Digital technology is increasingly present in society. Some studies show that computers are being widely incorporated, with cell phones being the most used equipment, with increasing use related to health needs.^{20,32} Electronic games and activities involving watching television, and videos, using tablets and cell phones are among those most performed and preferred by children.^{17,25,32} Children themselves consider digital and multimedia resources to be an important ally in distraction and fun.^{17,19,25} This reinforces the need to perceive technology as a resource capable of adding positive possibilities and exploring its collaboration with nursing care in different ways.

The versatility of technological resources as an auxiliary tool for implementing health promotion actions is remarkable. The incorporation of different approaches, even through apps, is a strategy also described in other studies. Children generally welcome the use of multimedia resources.^{19,33}

Among the characteristics of the use of digital resources, their usefulness in the different possibilities of informing while entertaining is quite significant.^{33,34} Children tend to identify with the interactive use of digital and multimedia devices and resources, supporting the applicability of this model of interventions.^{16,18,20}

In the case of digital technology, there are recommendations regarding its use by children, justified by the interference of different media in cognitive, psychosocial, and emotional development and exposure to content that is often inappropriate for their age. Family supervision is therefore recommended, as well as limiting/adapting screen time for different age groups.³⁵

It should be noted, however, that if the recommendations for proper use are followed, digital technology can be a useful resource in health actions. It comes in different forms and in addition to applications, resources such as software, games, and videos can also help. Its use is growing, and access to freely available resources is frequent. Some digital and multimedia resources are also capable of bringing education together, harmonizing interactivity and fun.^{18,25,36}

The use of play technologies is diverse and extends beyond digital resources.²⁵ Other studies have shown that games and play can cover aspects related to processes that support children in dealing with the experience of illness and cancer.²²

The use of games and make-believe play has been reported, highlighting that these are well-accepted play technologies capable of providing fun, pleasure, dialog, and information. Their purposes can go beyond entertainment, as they are spaces that allow children to interact, and receive health education and guidance, increasing their motivation for care. Children thus expand their repertoire of reactions, starting from the projection of what they have experienced in the game or play, to which they collaborate by enabling mediation between play and reality.^{22,37}

The arts-based approach was also present as a playful technology, with the description of the use of drawings as a strategy for assistance. Using drawings is generally simple and low-cost, and the necessary materials are often easily accessible and available in pediatric units.

Drawings are a versatile resource. In the case of directed drawing, the proposal is made according to a specific request; on the other hand, drawings can also be free and developed according to the child's ideas and imagination. The benefits described by the use of drawings include, in addition to closer communication, which allows the child to self-express symptoms experienced, both physical and psychosocial, as well as ways of coping,^{24,38} and the possibility of drawings helping to reduce anxiety and stress; manage

acute pain; and identify psychological needs, providing comfort, greater concentration and a sense of well-being.^{24,39}

In the publications evaluated, therapeutic toys are a widely used play technology. This is a technique that has been conceptualized and widely described in studies, and which can be developed by nurses.^{30,31} Therapeutic toys are classified into three types: 1) dramatic toys: which seek, through play, to get to know feelings, as well as help to develop emotional, social, and behavioral skills; 2) instructional toys: their main purpose is to provide children with guidance in an accessible way, generally used before procedures; and 3) empowering toys: they aim to collaborate with activities to facilitate physical development and improvement.^{30,40}

It is the main resource when the purpose is to guide children, highlighting the importance of enlightening children about the practices and procedures related to health care.^{27,28} The instructional therapeutic toy is described as a form of guidance for children undergoing chemotherapy and prior to puncture procedures, highlighting the appropriation of this playful technology also for the relief of anxiety and associated stress.^{27,28,31}

The studies emphasize the value of using dramatic play, as well as the different positive aspects of its application to nursing practice. Of particular note is its help in supporting the creation and maintenance of emotional skills.

Other benefits reported on the use of play technologies were: strengthening the bond with the professional, self-esteem, the free expression of children^{30,41}, and the reduction of anxiety, minimizing feelings of tension, which is an important benefit of its practical use.²⁶ It has also been described as useful in nursing guidance, and in children's understanding and cooperation in the face of the suffering experienced during cancer treatment.^{25, 27,28,31}

As a highlight for nursing practice in caring for children with cancer, effective communication is present in all three categories, with play technologies being a resource that makes it possible to strengthen the bond between health professionals and children. Communication between professionals and children is an essential aspect of pediatric oncology care.²⁹

By considering communication as a basic element in the relationship established between nurse and patient, seeking strategies to get closer to children, and encouraging them to report relevant symptoms, contributes to the effectiveness of nursing practice and favors a comprehensive assessment. Appropriate communication with children helps to understand their conceptions and meanings, including contexts and experiences.²⁴

A study that evaluated convergent actions for listening to children reinforces the importance of effective communication by identifying that parents perceive that children are experiencing more symptoms when compared to children's self-reporting of symptoms.⁴²

In this sense, play technologies are important resources used by nurses to establish communication with children. Activities that involve playing in different ways make it easier for nurses to get closer and interact with children. Communication thus takes place through a connected network, to the detriment of verticality and linearity.^{24,29,42}

Communication is an essential element and underpins different actions in nursing practice. It extends to health education and research activities, for example. In this sense, with regard to communication as a process, listening to children is an essential element, and valuing their narratives contributes to a dialogical, flexible, reflective relationship between professionals and children in general.^{22,30,43}

CONCLUSION

In this study, play technologies were identified as an approach based on arts, make-believe play, games, therapeutic toys, and digital technology resources, which make it possible to incorporate play in different ways, depending on the purposes of nursing care.

In relation to the care process as a whole, playful technologies are intertwined with care, and also help to bring joy, interaction, and comfort to children. The cancer disease carries with it stigmas, with long treatment, permeated by many moments in a hospital environment. Playful technologies of different kinds can be used in nursing care for children undergoing cancer treatment, bringing lightness, interaction, joy, and guidance, being incorporated in different ways.

In the implementation and use of digital technology by children, the use of apps was predominant. Other publications referring to the use of different digital technology tools were scarce, which highlights a possibility to be observed and worked on favorably from a nursing perspective.

Also, in relation to digital technologies for health care, there is a growing trend in different fields and for different purposes, currently driven strongly by the needs and challenges arising from the COVID-19 pandemic. Digital technology for children undergoing cancer treatment can also be considered an allied resource.

It is important to reflect on and encourage practices to include strategies and approaches using playful technologies in care plans and nursing actions aimed at children. The incorporation of play into the care of children undergoing cancer treatment

is an important resource that could be further explored. It has many benefits, both for the professionals, by supporting their practice, and for the children, by transforming the approach to processes and procedures towards a more friendly and participatory perspective.

A limitation of this study, as with other research and reviews, is the possibility of bias, and although the studies were critically assessed by three reviewers, we aimed to minimize this risk as much as possible through the method of conducting the reviewers' rigor.

The few studies identified in this review had a higher level of evidence. It is therefore recommended that new studies be carried out using methodological designs with a higher level of evidence.

CONTRIBUTIONS

All authors contributed equally to all phases of the study: conception of the research project, search, analysis, interpretation, and discussion of the data, as well as writing and critical review of the content with intellectual contribution and approval of the final version of the scientific article.

CONFLICT OF INTEREST

The authors declare that they do not have any conflict of interest related to the article.

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