

MOBILE APPLICATIONS FOR ONCOLOGY CARE IN BRAZIL: AN ASSESSMENT OF QUALITY, CONTENT, AND IMPLICATIONS FOR NURSING

APLICATIVOS MÓVEIS PARA ONCOLOGIA NO BRASIL: AVALIAÇÃO DA QUALIDADE, CONTEÚDO E IMPLICAÇÕES PARA A ENFERMAGEM

APLICACIONES MÓVILES PARA ONCOLOGÍA EN BRASIL: EVALUACIÓN DE LA CALIDAD, CONTENIDO E IMPLICACIONES PARA LA ENFERMERÍA

 Kauan Vinícius da Silva do Nascimento¹
 Antonio Jorge Silva Correa Júnior²
 André Aparecido da Silva Teles³
 Janderson Cleiton Aguiar²
 Camila Maria Silva Paraizo-Horvath²
 Helena Megumi Sonobe³

¹Universidade de São Paulo - USP, Escola de Enfermagem de Ribeirão Preto - EERP, Ribeirão Preto, SP - Brazil.

²Universidade de São Paulo - USP, Escola de Enfermagem de Ribeirão Preto - EERP, Programa de Pós-graduação em Enfermagem Fundamental - PPGEF, Ribeirão Preto, SP - Brazil.

³Universidade de São Paulo - USP, Escola de Enfermagem de Ribeirão Preto - EERP, Departamento de Enfermagem Geral e Especializada - DEGE, Ribeirão Preto, SP - Brazil.

Corresponding Author: Kauan Vinícius da Silva do Nascimento

E-mail: kauan.nascimento@usp.br

Authors' contributions:

Conceptualization: Kauan V. S. Nascimento, Antonio J. S. Correa Júnior; Helena M. Sonobe; **Data Collection:** Kauan V. S. Nascimento; **Investigation:** Kauan V. S. Nascimento; **Methodology:** Kauan V. S. Nascimento, Antonio J. S. Correa Júnior; **Project Management:** Kauan V. S. Nascimento, Antonio J. S. Correa Júnior; **Software:** Kauan V. S. Nascimento; **Statistical Analysis:** Kauan V. S. Nascimento, Antonio J. S. Correa Júnior; **Supervision:** Antonio J. S. Correa Júnior, Helena M. Sonobe; **Validation:** Kauan V. S. Nascimento, Antonio J. S. Correa Júnior, Helena M. Sonobe, André A. S. Teles, Janderson C. Aguiar, Camila M. S. Paraizo-Horvath; **Visualization:** Kauan V. S. Nascimento, Antonio J. S. Correa Júnior; **Writing—Original Draft Preparation:** Kauan V. S. Nascimento, Antonio J. S. Correa Júnior; **Writing—Review and Editing:** Kauan V. S. Nascimento, Antonio J. S. Correa Júnior, Helena M. Sonobe, André A. S. Teles, Janderson C. Aguiar, Camila M. S. Paraizo-Horvath.

Funding: no funding

Submitted on: 02/13/2026

Approved on: 08/16/2026

Responsible Editors:

 Allana dos Reis Moreira
 Tânia Couto Machado Chianca

ABSTRACT

Objetivo: to identify and evaluate the technical quality, usability, and comprehensiveness of the content of mobile applications for oncology health education available in Brazil, as well as their implications for nursing practice. **Methods:** A descriptive, exploratory study with a quantitative approach was conducted in 2025 using the Google Play Store and Apple App Store platforms, as well as Google Search. Applications were identified through a systematic search based on predefined inclusion and exclusion criteria. The identification, screening, and eligibility processes were documented using an adapted PRISMA flow diagram. Application quality was assessed using the Mobile App Rating Scale (MARS), and content was evaluated according to the Cancer Control Continuum. **Results:** Eight applications were included, 87.5% of which were available in English. The mean overall MARS score was 4.03, indicating good quality. The Kid's Guide to Cancer app achieved the highest score (4.68). Content was concentrated primarily on the diagnosis and treatment phases, with gaps in information related to cancer prevention and palliative care. **Conclusions:** The applications demonstrated good technical functionality but limited cultural adaptation and engagement strategies tailored to the Brazilian population. Nursing professionals have an important role in the curation and recommendation of these technologies to support informed use and help mitigate the digital divide.

Keywords: Mobile Applications; Health Education; Oncology Nursing; Medical Oncology; Technology Assessment, Biomedical; Teleoncology; Telenursing; Telemedicine.

RESUMO

Objetivo: identificar e avaliar a qualidade técnica, usabilidade e abrangência do conteúdo de aplicativos móveis para educação em saúde oncológica disponíveis no Brasil e suas implicações para a Enfermagem. **Métodos:** estudo descritivo e exploratório, de abordagem quantitativa, realizado nas plataformas Google, Play Store e App Store em 2025. A seleção dos aplicativos ocorreu por meio de busca sistemática, seguindo critérios de inclusão e exclusão previamente definidos. O processo de identificação, triagem e elegibilidade foi detalhado conforme adaptação do fluxograma PRISMA, sendo a qualidade mensurada pela Mobile Application Rating Scale (MARS) e o conteúdo avaliado segundo o Continuum do Controle do Câncer. **Resultados:** foram incluídos oito aplicativos, com predomínio do idioma inglês (87,5%). A média global de qualidade (MARS) foi 4,03 (boa qualidade), com destaque para o app Kid's Guide to Cancer, que obteve a maior pontuação (4,68). Observou-se concentração de conteúdo nas fases de diagnóstico e tratamento, com lacunas relativas à prevenção e aos cuidados paliativos. **Conclusões:** os aplicativos demonstram boa funcionalidade técnica, mas carecem de adaptação cultural e de estratégias de engajamento para o público brasileiro. A Enfermagem deve atuar na curadoria e prescrição dessas tecnologias, a fim de mitigar a exclusão digital.

Palavras-chave: Aplicativos Móveis; Educação em Saúde; Enfermagem Oncológica; Oncologia; Avaliação da Tecnologia Biomédica; Teleoncologia; Telenfermagem; Telemedicina.

RESUMEN

Objetivo: identificar y evaluar la calidad técnica, usabilidad y alcance del contenido de aplicaciones móviles para educación en salud oncológica disponibles en Brasil y sus implicaciones para la Enfermería. **Métodos:** estudio descriptivo y exploratorio, de enfoque cuantitativo, realizado en las plataformas Google, Play Store y App Store en 2025. La selección de las aplicaciones se realizó mediante búsqueda sistemática, siguiendo criterios de inclusión y exclusión previamente definidos. El proceso de identificación, selección y elegibilidad se detalló conforme a la adaptación del diagrama de flujo PRISMA; la calidad se midió mediante la Mobile Application Rating Scale (MARS) y el contenido se evaluó según el Continuum del Control del Cáncer. **Resultados:** se incluyeron ocho aplicaciones, predominando el idioma inglés (87,5%). El promedio global de calidad (MARS) fue de 4,03 (buena calidad), destacando la aplicación Kid's Guide to Cancer, que obtuvo la puntuación más alta (4,68). Se observó una concentración de contenido en las fases de diagnóstico y tratamiento, con deficiencias en cuanto a prevención y cuidados paliativos. **Conclusiones:** las aplicaciones presentan buena funcionalidad técnica, pero requieren adaptación cultural y estrategias de compromiso para el público brasileño. La Enfermería debe desempeñar un papel en la curaduría y prescripción de estas tecnologías, con el fin de mitigar la exclusión digital.

Palabras clave: Aplicaciones Móviles; Educación en Salud; Enfermería Oncológica; Oncología Médica; Evaluación de la Tecnología Biomédica; Teleoncología; Telenfermería; Telemedicina.

How to cite this article:

Nascimento KVS, Correa Júnior AJ, Teles AAS, Aguiar JC, Paraizo-Horvath CMS, Sonobe HM. Mobile applications for oncology in Brazil: quality assessment, content and implications for nursing. REME - Rev Min Enferm [Internet]. 2026[cited in ----]; 30:e-1607. Available from: <https://doi.org/10.35699/2316-9389.2026.64418>

INTRODUCTION

Cancer is currently a major public health challenge in Brazil. For the 2026–2028 triennium, the *Instituto Nacional do Câncer* (INCA) estimates approximately 781,000 new cancer cases per year⁽¹⁾. The high burden of cancer, concentrated predominantly in the South and Southeast regions⁽²⁾, places increasing pressure on the *Sistema Único de Saúde* (SUS), requiring health care managers and professionals to adopt innovative strategies to ensure comprehensive care for people with cancer. In this context, efforts have been made to incorporate Information and Communication Technologies (ICTs) into health care. In 2020, the Ministry of Health launched the Digital Health Strategy for Brazil 2020–2028, recognizing the role of digital technologies, including mobile applications, in health promotion and the management of the SUS⁽³⁾.

The cancer care trajectory involves multiple challenges across different stages, ranging from prevention, diagnosis, and intensive treatment to survivorship, palliative care, and end-of-life care. People affected by cancer experience significant physical adverse effects and psychosocial distress, requiring ongoing educational support. Evidence indicates that well-informed patients demonstrate better adherence to treatment and improved symptom management, along with lower levels of anxiety and depression⁽⁴⁾.

Traditionally, health education has been provided through brief consultations and printed materials, which are often insufficient to support patients in managing their health needs in their daily lives. In this context, the field of mHealth has emerged, defined by the World Health Organization as “the medical and public health practice supported by mobile devices, such as smartphones and digital assistants”⁽⁵⁾. Mobile health applications (apps) can help overcome geographical barriers by providing personalized information, medication reminders, real-time symptom monitoring, and connections to social support networks.

For nursing, which plays an active role in health education and care management, the digital revolution has expanded the scope of nursing care. Nurses need to extend care beyond the clinical setting and into patients’ homes while promoting self-care, serving as “digital navigators” who identify, evaluate, and recommend reliable digital resources. In Brazil, the use of technology in nursing practice was already increasing before the COVID-19 pandemic⁽⁶⁾.

The Brazilian *Conselho Federal de Enfermagem* (COFEN) has recognized this transformation through

Resolution No. 696/2022, which regulates the provision of nursing services within Digital Health and establishes standards for telenursing⁽⁷⁾. This regulation provides a legal and ethical framework for the use of digital media in nursing consultations, patient monitoring, and health education, supporting the integration of mobile applications and telehealth into the Nursing Process.

However, the integration of mobile applications into clinical practice presents several challenges. The global health app market has often been characterized as a “digital jungle”. Most available apps have not undergone rigorous scientific validation; many do not adhere to evidence-based guidelines and may pose risks to the security and privacy of sensitive health data. In Brazil, language barriers and limited digital health literacy may further exacerbate health inequities when these tools are not culturally adapted to the local context. The lack of validated and accessible applications creates a gap in care that may be filled by misinformation. Therefore, it is essential for the nursing community to play a leading role in evaluating and recommending reliable health applications.

Evidence suggests that oncology nurses value digital resources for continuing education. Qualitative studies indicate that nurses recognize the opportunity to “educate themselves with the help of digital technologies”^(8,9) and consider rapid access to cancer-related educational applications highly relevant to their professional practice.

In this context, the following research question was formulated: What are the technical quality, usability, and content coverage of mobile applications for oncology health education available in Brazil? Accordingly, this study aimed to identify and evaluate the technical quality, usability, and content coverage of mobile applications for oncology health education available in Brazil, as well as their implications for nursing practice. To achieve this objective, validated instruments were used to assess technical quality, engagement, and content coverage, with a focus on their potential applicability within the SUS.

METHOD

This study is a descriptive and exploratory investigation with a quantitative approach, designed to systematically evaluate health technologies in the form of mobile applications. The methodology was based on the principles of Health Technology Assessment (HTA)⁽¹⁰⁾, adapted to the digital context to generate evidence on the functionality and content quality of publicly available applications. To ensure transparency in reporting the

identification, screening, eligibility, and inclusion stages, an adaptation of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram was used exclusively as a reporting framework for the application selection process⁽¹¹⁾.

Search strategy and selection criteria

The search, screening, and data collection stages were conducted between November and December 2025. The study setting encompassed the two major digital distribution platforms used globally and in Brazil: the Google Play Store (Android) and the Apple App Store (iOS). The data collection strategy consisted of two distinct phases. The first phase involved an initial screening conducted on desktop computers through the web interfaces of the respective app stores (play.google.com and apps.apple.com). This approach enabled more comprehensive visualization of app metadata, including full descriptions, developer information, last update date, and screenshots, thereby facilitating the efficient application of the initial exclusion criteria.

The second phase, which involved a detailed functional evaluation, consisted of downloading, installing, and extensively testing the selected applications. A Samsung Galaxy S23 device running Android 16 with the One UI 8 interface was used for this phase. The choice of an Android device was based on the finding that, following the initial screening, all applications eligible for inclusion in the final sample had stable versions compatible with this operating system. The technical literature on mHealth supports this approach when functional equivalence exists across platforms, making the use of multiple devices unnecessary for evaluating content and overall usability⁽¹²⁾.

Search strategy and selection criteria

The search strategy was designed to maximize sensitivity and identify the largest possible number of relevant applications. The search terms “Câncer”, “Oncologia”, “Tumor”, “Neoplasia” and “Saúde oncológica” were entered individually into the search functions of the respective app stores. Given the global nature of app development and the possibility that Brazilian patients with proficiency in a foreign language may use international applications, searches were also conducted using equivalent terms in English (Cancer, Oncology and Neoplasm) and Spanish (Cáncer and Oncología). Application selection followed a

filtering process based on predefined inclusion and exclusion criteria.

Inclusion criteria: applications with the explicit purpose of oncological health education, prevention, or support for patients, caregivers, or survivors (focus on the lay user); availability for free download and installation in Brazilian stores during the collection period; content fully accessible in Portuguese, English, or Spanish; presence of basic educational functionalities available without payment or restricted access (e.g., restricted to patients from a specific hospital).

Exclusion criteria: strictly institutional or commercial applications (e.g., apps for scheduling hospital appointments without educational content, health insurance plans, and virtual stores); software intended exclusively for scientific events, congresses, or symposia (temporary in nature); tools aimed solely at fundraising or donation campaigns; purely recreational games, wallpapers, horoscopes, or visual themes; duplicate applications; tools intended exclusively for professional use (e.g., chemotherapy dosage calculators, technical staging tools, and medical practice guidelines); applications with technical failures that prevent their use (e.g., bugs or unexpected shutdowns) or that are unavailable for download at the time of testing; applications restricted to a single type of cancer (e.g., breast or prostate cancer only).

It was decided to exclude these applications in order to maintain the focus of research in general oncology and to allow the comparison of comprehensive tools, avoiding bias of overrepresentation of the most prevalent pathologies.

Assessment instruments

To ensure objective and multidimensional analysis, two different instruments were used:

Mobile Application Rating Scale (MARS): The original version of the MARS⁽¹²⁾ was used, considered the international gold standard for assessing the quality of health applications (mHealth). The MARS scale has 23 items, distributed in four objective dimensions of quality:

- 1)Engagement (5 items): evaluates whether the app is fun, interesting, customizable, interactive, and appropriate for the target audience;
- 2)Functionality (4 items): analyzes technical performance, ease of use, navigation and responsiveness;
- 3)Aesthetics (3 items): checks layout, graphic quality, and visual appeal of the interface;

4) Information (7 items): examines the quality, quantity and credibility of information, as well as the evidence base (citation of sources).

In addition to the objective dimensions, the scale includes a Subjective Quality section, which assesses interest in continued use and willingness to recommend the app. Each item is scored from 1 (inadequate) to 5 (excellent). The mean of the objective dimension scores constitutes the app's Overall Quality Score.

Oncological Content Checklist: To assess the comprehensiveness of the information, an instrument based on the Cancer Control Continuum of the National Cancer Institute⁽¹³⁾ was used, considering six essential domains:

- 1) Prevention: risk factors, lifestyle, vaccination;
- 2) Screening/Early detection: screening exams, warning signs;
- 3) Diagnosis: explanations of pathology, biopsy and staging;
- 4) Treatment: therapeutic modalities (chemotherapy, radiotherapy, surgery), management of adverse events;
- 5) Survival: rehabilitation, follow-up and post-cancer quality of life;
- 6) End of life/Palliative care: pain management, advance directives, bereavement

The presence of content in each domain was recorded dichotomously (Yes/No), allowing the percentage of coverage across the continuum to be calculated for each application..

Data analysis

The collected data were tabulated and analyzed using Microsoft Excel (version 2008) to characterize the sample and present the MARS scores.

Ethical aspects

According to Resolution No. 466, dated December 12, 2012, issued by the National Health Council⁽¹⁴⁾, this study did not require registration with or approval by a Research Ethics Committee, as it used only publicly accessible data and did not involve human participants or access to identifiable sensitive data.

RESULTS

The initial search process on digital platforms resulted in the identification of 2,208 apps. The sequential application of the screening criteria eliminated most of

the results (n=2,183), which consisted predominantly of games, horoscope apps, or non-health-related tools. Twenty-five apps remained for the eligibility phase (detailed analysis and download). In this stage, 17 apps were excluded for different reasons: duplicity (n=1), restriction to a single type of cancer (n=9), exclusive focus on professionals (n=7), or technical failures. The final sample consisted of eight (8) apps, which fully met the inclusion criteria, as detailed in Figure 1.

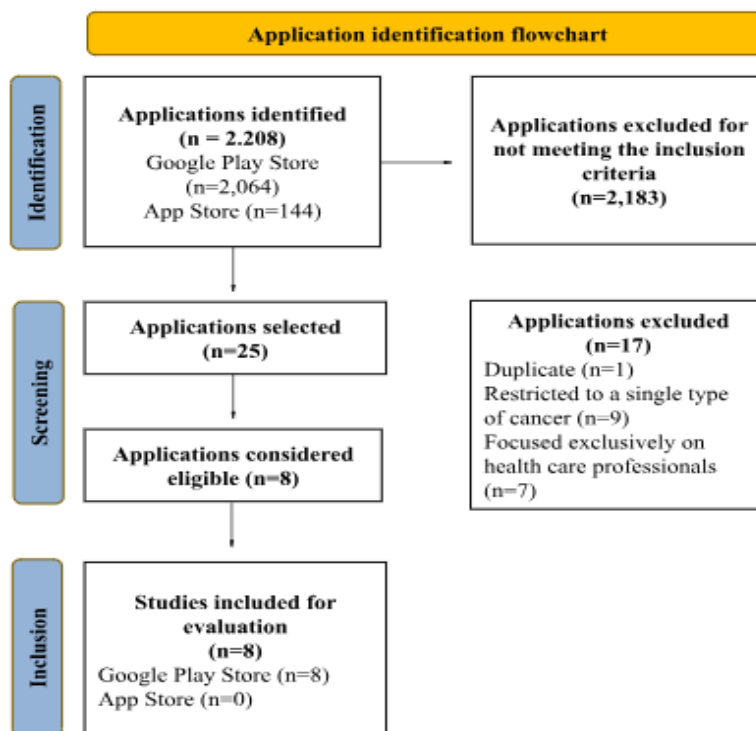
During the initial search of digital platforms, 2,208 applications were identified. The sequential application of the screening criteria, based on title and icon review, excluded the vast majority of results (n=2,183), which consisted predominantly of games, horoscope applications, and tools unrelated to health. This process yielded 25 applications for the eligibility assessment, which involved a detailed review and application download. At this stage, 17 applications were excluded for the following reasons: duplication (n=1), restriction to a single type of cancer (n=9), exclusive targeting of healthcare professionals (n=7), or technical issues. Consequently, the final sample comprised eight applications that fully met the inclusion criteria, as detailed in Figure 1.

The general characteristics of the applications are presented in Table 1, revealing a predominance of internationally developed applications. Six of the eight apps (75%) are available exclusively in English, which may represent a significant language barrier for Brazilian users. Only two apps offer a Portuguese-language interface. Analysis of the developers revealed diverse origins, including government agencies, nonprofit organizations, and health technology companies.

The evaluation of technical quality, using the MARS scale, is shown in Table 2. The overall mean objective quality of the sample was 4.10, indicating a "good" rating. However, the individual analysis revealed important discrepancies

The Kid's Guide to Cancer app, developed by the Australian nongovernmental organization Camp Quality, had the highest overall mean objective quality score (4.68). The app achieved the maximum score (5.0) in the Engagement dimension, reflecting its innovative use of augmented reality, animation, and playful language tailored to a pediatric audience. In contrast, the MFHP: Cancer app, developed by the U.S. Centers for Disease Control and Prevention (CDC) and focused on genetics and family history, had the lowest overall mean score (3.03). Although it received a high score in the Information dimension (4.5), reflecting its scientific credibility, it

Figure 1 – Flowchart for the identification of the applications included in the study, according to the PRIS-MA model(11). Ribeirão Preto, SP, Brazil (2025).



Source: prepared by the authors

received substantially lower scores in Engagement (2.1) and Aesthetics (2.5), indicating limited interactivity and a less visually engaging design

The Functionality dimension showed the greatest consistency and the highest mean score across the applications (Mean: 4.19), suggesting that technical stability and ease of navigation are generally well addressed by current app developers. The Information dimension also received a high mean score (4.28), indicating that, overall, the content was accurate and well described, although it was not always supported by academic references within the user interface.

The analysis of the scope of content, mapped in relation to the Cancer Control Continuum, is detailed in Table 3. The data show a strong concentration of resources in the Diagnosis and Treatment stages, present in almost the entire sample.

OncoApp (Brazil) and Outcomes4me (USA) were the most comprehensive tools, covering 83.5% of the categories along the continuum. OncoApp was distinguished by its inclusion of explicit content on prevention and tailored screening guidelines, an area addressed by only 25% of the apps evaluated.

The End-of-Life/Palliative Care category was the least frequently addressed, appearing in a structured manner in only three apps: BelongAI, Outcomes4me, and, to a lesser extent, OncoApp. Through its artificial intelligence mentoring feature (“Dave”) and community groups, BelongAI provides opportunities for discussion of this topic, although these discussions are less structured than those based on formal protocols. Despite its high technical quality, The Kid’s Guide to Cancer had more limited content coverage (50.1%), focusing primarily on explaining diagnosis and treatment to children, without addressing prevention or end-of-life care. This content profile is consistent with the app’s target audience and pedagogical objectives

DISCUSSION

The findings indicate that the oncology app market has achieved a relatively high level of technological maturity but continues to exhibit important educational gaps. The high overall MARS score suggests that the apps are generally stable and usable⁽¹⁵⁾. However, the findings also point to a mismatch between software functionality and pedagogical potential. Consistent with a study evaluating

Table 1 – General characterization of the mobile applications selected for oncology education.

Application Name	Developer	Origin/Headquarters*	Language	App Store Rating**
MFHP: Cancer	Centers for Disease Control	USA	English	3,6
Vann: by Cancer Survivor	The Vann	-	English	-
Curia	Innoplexus	Germany/India	English/Portuguese	4,8
OncoDiary: Cancer Support	OncoDiary	-	English	5,0
BelongAI Dave - Cancer Mentor	BelongTail (Belong.Life)	USA/Israel	English	4,3
Kid's Guide to Cancer	Camp Quality	Australia	English	-
Outcomes4me Cancer Care	Outcomes4me Inc.	USA	English	4,3
OncoApp	Simonini Software	Brazil	Portuguese	5,0

Source: Research data and supplementary documents.

Subtitle: * Origin identified through the developers' institutional websites. **Average rating (user rating on a 1–5-star scale) reported on the Google Play Store at the time of data collection. (–) Data unavailable or insufficient on the app store.

Table 2 – Classification of mobile applications on oncology according to the criteria of the MARS scale. Ribeirão Preto, 2025 (n = 8).

Application	Engagement	Functionality	Aesthetics	Information	Objective Mean (A-D)
Kid's Guide to Cancer	5,0	4,5	4,8	4,4	4,4
Outcomes4me	3,8	4,6	4,2	5,0	5,0
Curia	4,2	4,3	4,3	4,8	4,8
Vann	4,3	4,0	4,2	3,9	3,9
OncoDiary	4,0	4,2	4,4	3,8	3,8
OncoApp	4,0	4,2	4,0	4,1	4,1
BelongAI (Dave)	4,1	4,75	3,6	3,7	3,7
MFHP: Cancer	2,1	3,0	2,5	4,5	4,5
Overall Sample Mean	3,94	4,19	4,00	4,28	4,28

Source: Survey data.

the quality of apps for the management of postpartum hemorrhage, which reported high functionality but lower engagement and incomplete content⁽¹⁶⁾, our results indicate that most oncology apps have limited interactivity, personalization, and motivational features, such as gamification and virtual communities. These limitations may reduce user engagement and retention and, consequently, the potential educational impact of these apps^(16,17).

Coverage across the cancer continuum remains limited in the Brazilian context. The apps tend to reproduce the traditional emphasis of cancer care on curative treatment, with comparatively less attention to prevention, screening, and palliative care. This pattern highlights a gap in relation to contemporary guidelines, which emphasize the importance of comprehensive, longitudinal, and patient-centered care. Nevertheless, the digital environment offers an opportunity to address this fragmentation by providing information on healthy behaviors, end-of-life care planning, and psychosocial support, areas that remain underrepresented in the apps evaluated.

Another critical issue is the language barrier and digital inclusion. Only two of the eight applications evaluated were available in Portuguese, potentially creating a significant language barrier for Brazilian users. According to the *Instituto Brasileiro de Geografia e Estatística* (IBGE), approximately 10.9% of individuals aged 10 years and older did not use the internet during the reference period in 2024, corresponding to approximately 20.5 million Brazilians without regular internet access and highlighting disparities by region, educational attainment, and income in the use of digital technologies in the country⁽¹⁸⁾. In addition, national studies have reported low levels of digital health literacy among a substantial proportion of the population, which may limit the ability to interpret and apply complex health information. Consistent with a recent study on the role of nursing in the implementation of emerging technologies, these findings underscore digital inclusion as an important determinant of the effectiveness and reach of telemedicine and eHealth interventions^(17,19). Without adequate cultural and pedagogical adaptation, the implementation of digital health

Table 3 – Coverage of oncological content by category of the Cancer Control Continuum..

Categoria do Continuum	OncoApp	Outcomes4me	BelongAI	Curia	Kid's Guide	Vann	MFHP	OncoDiary
Prevenção	Sim	Não	Não	Não	Não	Não	Sim	Não
Rastreamento	Sim	Sim	Não	Não	Não	Não	Sim	Não
Diagnóstico	Sim	Sim	Sim	Sim	Sim	Sim	Não	Não
Tratamento	Sim	Sim	Sim	Sim	Sim	Sim	Não	Sim
Sobrevivência	Sim	Sim	Sim	Sim	Sim	Sim	Não	Sim
Fim de Vida	Não	Sim	Sim	Não	Não	Não	Não	Não
Cobertura Total (%)	83,5%	83,5%	66,8%	50,1%	50,1%	50,1%	33,4%	33,4%

Source: Survey data.

Legend: Yes = Presence of structured content or specific functionality; No = Absence of content.

technologies may inadvertently exacerbate existing inequalities rather than reduce them.

From a nursing perspective, these findings reinforce the need for proactive and critical engagement with digital health. COFEN Resolution No. 696/2022⁽¹⁷⁾ recognizes and regulates telenursing, supporting the incorporation of applications and other information and communication technologies (ICTs) into nursing care, including consultations, remote monitoring, and health education. However, such integration entails ethical and technical responsibilities. Nurses must critically assess and select digital health tools based on criteria such as quality, information reliability, data security, and appropriateness to the patient's characteristics and needs. Nurses also play a key role as mediators among technology, patients, and the multidisciplinary team by integrating information, interpreting and validating digital alerts, and educating patients about the appropriate and safe use of these tools.

In this role as a “digital curator”, the nurse can help mitigate risks by explaining technical terminology, guiding patients toward reliable and safe sources of information, and maximizing the potential benefits of digital tools by incorporating appropriate applications into the therapeutic plan. The Ministry of Health's Telehealth guidelines (Ordinance GM/MS No. 1,348/2022)⁽²⁰⁾ establish requirements for digital health interventions within the Brazilian Unified Health System (SUS), including documentation in the medical record and compliance with the Brazilian General Data Protection Law (LGPD)⁽²¹⁾.

Thus, continuing education in digital health should be incorporated into the professional development of Primary Care and Oncology Nursing teams, as emphasized in the literature on digital competencies in nursing⁽¹⁷⁾. Such training would enable nurses to recommend and incorporate digital health applications into care with the

same level of rigor applied to other therapeutic and clinical tools.

The gaps identified in this study point to opportunities for future research, public policy development, and technological innovation. Rather than simply increasing the number of available applications, future initiatives should prioritize the development of solutions that are culturally adapted to the Brazilian context and aligned with the population's levels of health and digital literacy. In light of the access barriers discussed above, such initiatives should prioritize Portuguese-language applications with simple, accessible interfaces that address not only cancer treatment but also prevention, psychosocial support, and palliative care^(17,20).

Likewise, there is a need to develop national guidelines for the evaluation of health apps that integrate clinical, pedagogical, usability, and accessibility criteria. Nursing professionals can play a leading role in participatory design initiatives involving patients with cancer and family caregivers, contributing to the development and refinement of digital health solutions that are responsive to local needs.

In summary, the engagement of nursing in digital health has the potential to contribute to reducing inequalities in access to health information and care. Mobile technology can serve as an effective tool for comprehensive cancer care when supported by culturally appropriate, inclusive, and accessible solutions that address the diverse regional realities of the Brazilian population.

Study limitations

Among the methodological limitations, the search was restricted to free applications available on the Google Play Store and App Store during the data collection period; therefore, relevant applications that did not meet these criteria may have been missed. In addition, app

content and classifications are dynamic and subject to frequent changes. Thus, the findings reflect the landscape observed during the study period and may become outdated over time. Finally, the content evaluation was based on a checklist derived from official guidelines and did not incorporate users' perspectives regarding which information and features they consider "essential".

Although MARS is a valid and reliable tool⁽¹²⁾, it provides a partial assessment of app quality and involves an element of subjective judgment, which may introduce evaluator bias. In addition, patient-level outcomes were not assessed; therefore, it is not possible to draw conclusions about actual learning gains or clinical improvements resulting from app use. As this study was conducted in Brazil, national conceptual and regulatory criteria applicable to nursing practice and the SUS were adopted, which may limit the generalizability of the findings to other health systems and regulatory contexts. These limitations should be considered when interpreting the results. Future research should strengthen the methodological design by incorporating external validation, larger samples, and assessments of real-world app use and patient outcomes

CONCLUSION

This study found that mobile applications for oncology health education available to Brazilian users generally demonstrate good technical quality and functionality and have the potential to support health education and care. However, substantial heterogeneity was observed in terms of user engagement, content coverage, and adaptation to the needs of the Brazilian context.

The findings showed a predominance of applications developed in English and a concentration of content on cancer diagnosis and treatment, with comparatively limited coverage of essential topics such as prevention, screening, psychosocial support, and palliative care. These gaps may limit the accessibility, reach, and applicability of these technologies across different user groups in Brazil.

Although some applications performed well in terms of information quality, usability, and engagement, few solutions combined technical quality with comprehensive content coverage and linguistic and cultural appropriateness for the Brazilian population.

Overall, the evaluated applications represent promising resources for oncology health education; however, their use should take into account accessibility, content relevance, and users' sociocultural contexts. The findings highlight opportunities for the development of

more inclusive and comprehensive digital health solutions aligned with the needs of the Brazilian Unified Health System (SUS), particularly in the areas of cancer prevention, psychosocial support, and palliative care. Nursing can play an important role in this process through the evaluation, development, implementation, and ongoing assessment of digital health technologies.

REFERENCES

1. Martins LFL, Chaves GV, Oliveira JFP, Sousa LBL, Chagas Neto P, Carvalho FN, et al. Perfil epidemiológico da incidência de câncer no Brasil e Regiões: estimativas para o Triênio 2026-2028. *Rev Bras Cancerol* [Internet]. 2026 [cited 2026 Feb 12];72(2):e-025587. Available from: <https://rbc.inca.gov.br/index.php/revista/article/view/5587>
2. Teixeira TOA, Carvalho LG, Camargo GG, De Domenico EBL. Cancer care in the COVID-19 era and psychosocial impacts on oncology nursing in Brazil. *Ecancermedicalscience* [Internet]. 2021 [cited 2025 Dec 20];15:1331. Available from: <https://pmc.ncbi.nlm.nih.gov/articles/PMC8816500/>
3. Ministério da Saúde (BR), Secretaria-Executiva, Departamento de Informática do SUS. Estratégia de Saúde Digital para o Brasil 2020-2028 [Internet]. Brasília (DF): Ministério da Saúde; 2020 [cited 2025 Dec 20]. Available from: <https://pesquisa.bvsalud.org/portal/resource/pt/biblio-1223543>
4. Silva MEV, Marinho CLA, Schwingel PA, Silva Junior GB, Oliveira JGR, Góis ARS, et al. Percepções do uso de tecnologia mHealth por pacientes em tratamento dialítico. *Texto Contexto Enferm* [Internet]. 2024 [cited 2025 Dec 20];33:e20230321. Available from: <https://doi.org/10.1590/1980-265X-TCE-2023-0321pt>
5. World Health Organization. mHealth: new horizons for health through mobile technologies. Global Observatory for eHealth Serie, v. 3 [Internet] Geneva: WHO; 2011 [cited 2025 Dec 20]. Available from: <https://www.afro.who.int/publications/mhealth-new-horizons-health-through-mobile-technologie>
6. Muniz VO, Mota TN, Sousa AR. Saúde digital à brasileira e a prática clínica em enfermagem: do que estamos falando? *Enferm Foco* [Internet]. 2023 [cited 2025 Dec 20];14:e-202336. Available from: <https://doi.org/10.21675/2357-707X.2023.v14.e-202336>
7. Conselho Federal de Enfermagem (BR). Resolução Cofen nº 696/2022. Dispõe sobre a atuação da Enfermagem na Saúde Digital, normatizando a Telenfermagem [Internet]. Brasília (DF): Cofen; 2022 [cited 2025 Dec 20]. Available from: <https://www.cofen.gov.br/resolucao-cofen-no-696-2022/>
8. Carvalho RB, Chagas MS, Silva ALA. Criação de aplicativo móvel para enfermagem oncológica: uma análise de conteúdo. *Res Soc Dev* [Internet]. 2021 [cited 2025 Dec 20];10(16):e81101623347. Available from: <https://doi.org/10.33448/rsd-v10i16.23347>
9. Carvalho RB, Chagas MS, Silva ALA. Criação de aplicativo móvel para uso na assistência de enfermagem oncológica: uma proposta educacional. *Res Soc Dev* [Internet]. 2021 [cited 2025 Dec 20];10(13):e324101321299. Available from: <https://doi.org/10.33448/rsd-v10i13.21299>

10. Ministério da Saúde (BR). Avaliação de tecnologias em saúde: ferramentas para a gestão do SUS. Série A. Normas e Manuais Técnicos. Brasília (DF): Ministério da Saúde; 2009.
11. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* [Internet]. 2021 [cited 2025 Dec 20];372:n71. Available from: <https://pmc.ncbi.nlm.nih.gov/articles/PMC9798848/>
12. Stoyanov SR, Hides L, Kavanagh DJ, Zelenko O, Tjondronegoro D, Mani M. Mobile app rating scale: a new tool for assessing the quality of health mobile apps. *JMIR Mhealth Uhealth* [Internet]. 2015 [cited 2025 Dec 20];3(1):e27. Available from: <https://mhealth.jmir.org/2015/1/e27/>
13. National Cancer Institute. Cancer control continuum [Internet]. [cited 2025 Dec 20]. Available from: <https://cancercontrol.cancer.gov/about-dccps/about-cc/cancer-control-continuum>
14. Conselho Nacional de Saúde (BR). Resolução nº 466, de 12 de dezembro de 2012. Aprova diretrizes e normas regulamentadoras de pesquisas envolvendo seres humanos [Internet]. Brasília (DF): Conselho Nacional de Saúde; 2012 [cited 2025 Dec 20]. Available from: https://bvsms.saude.gov.br/bvs/saudelegis/cns/2013/res0466_12_12_2012.html
15. Mohammadi Mogharab G, Khajouei R, Norouzkhani N, Esmaeili Z, Bagheri FZ, Mazaheri Habibi MR. Expert evaluation of mobile health apps for breast cancer management: a feature-based analysis using the MARS. *BMC Health Serv Res* [Internet]. 2025 [cited 2025 Dec 20];25:692. Available from: <https://pubmed.ncbi.nlm.nih.gov/40369500/>
16. Silva ÉMA, Oliveira SC, Alves DS. Quality assessment of mobile applications on postpartum hemorrhage management. *Rev Esc Enferm USP* [Internet]. 2024 [cited 2025 Dec 20];58:e20230263. Available from: <https://www.scielo.br/j/reeusp/a/w7Qs8JRNHnMD9wPvrXJp55N/?lang=en>
17. Bomfim MZA, Nascimento IRMA. Atuação do enfermeiro na implementação de tecnologias emergentes no manejo de doenças crônicas: revisão integrativa. *Res Soc Dev* [Internet]. 2025 [cited 2025 Dec 20];14(3):e5814348493. Available from: <https://rsdjournal.org/index.php/rsd/article/view/48493>
18. Instituto Brasileiro de Geografia e Estatística, Pesquisa Nacional por Amostra de Domicílios Contínua – Acesso à Internet e à Tecnologia da Informação e Comunicação (TIC) 2024. Rio de Janeiro: IBGE; 2025.
19. Silva TCE, Rodrigues SA, Oliveira Júnior JCF, Freitas GM, Santos J, Poli MCF et al. Telemedicina e ética do cuidado: o impacto da exclusão digital na relação profissional-paciente. *Aracê* [Internet]. 2025 [cited 2025 Dec 20];7(9):e8312. Available from: <https://periodicos.newsciencepubl.com/arace/article/view/8312>
20. Ministério da Saúde (BR). Portaria GM/MS nº 1.348, de 3 de junho de 2022. Regulamenta as ações e serviços de tele saúde no SUS [Internet]. Brasília (DF): Ministério da Saúde; 2022 [cited 2025 Dec 20]. Available from: <https://www.in.gov.br/en/web/dou/-/portaria-gm/ms-n-1.348-de-2-de-junho-de-2022-405224759>
21. Brasil. Lei nº 13.709, de 14 de agosto de 2018. Dispõe sobre a proteção de dados pessoais e altera a Lei nº 12.965, de 23 de abril de 2014 (Lei Geral de Proteção de Dados - LGPD) [Internet]. Brasília (DF): Presidência da República; 2018 [cited 2025 Dec 20]. Available from: https://www.planalto.gov.br/ccivil_03/_ato2015-2018/2018/lei/113709.htm