Guidelines for Designing Mobile Applications for Comprehensive Support of Stomach Cancer Patients in Lima: Medical and Spiritual Assistance

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Abstract. Currently, cancer patients face limitations in accessing technological tools that enable them to comprehensively monitor their illness, receive personalized guidance, and obtain emotional or spiritual support from home. This paper proposes a set of 10 guidelines for the design of a personalized mobile application that provides comprehensive support to patients with stomach cancer. These guidelines are based on a detailed analysis of 31 scientific studies and 10 mobile applications related to the stages of the disease and the challenges faced during treatment. This allows for the implementation of features such as preparation for medical appointments, chemotherapy sessions, adapted nutritional guides, spiritual support, and an AI-assisted chat for specialized medical consultation. This proposal represents an innovation in the field of oncology by integrating emerging technologies with a patient-centered approach. To illustrate the proposed approach, an example of mobile application design using the guidelines is included. Additionally, an experiment was conducted with 10 subjects to measure satisfaction with the web application designed according to the proposed guidelines. It is expected that these guidelines will contribute to the design and development of mobile applications aimed at supporting cancer patients, promoting solutions that improve their quality of life.

Keywords: Mobile application, Stomach cancer, Artificial intelligence, Comprehensive support, Palliative care, Digital health

1 Introduction

Stomach cancer is one of the leading causes of mortality in Peru and ranks among the most prevalent neoplasms, particularly in regions with limited access to specialized oncological services [1,2]. According to the Global Cancer Observatory, 6,380 new cases were reported in Peru in 2022, representing 8.8% of all cancer diagnoses nationally [2]. This high incidence, combined with growing treatment costs which increased by 244.9% between 2012 and 2016 according to the Solidarity Health Fund (FISSAL) imposes a considerable economic burden on the healthcare system and affected families [1]. Beyond the medical implications, stomach cancer profoundly impacts patients' emotional, psychological, and spiritual well-being. Research has shown that addressing these dimensions is essential for improving quality of life and treatment adherence, especially in advanced stages [4,5]. However, most technological interventions and AI-assisted tools developed so far primarily focus on clinical management, often overlooking comprehensive support that includes emotional and spiritual care. In Peru, challenges such as geographic disparities, infrastructural limitations, and budget constraints hinder timely access to quality oncological care, particularly outside Lima and Callao [6]. Furthermore, out-of-pocket health expenditures in the country exceed 28%, exceeding the WHO recommended threshold of 20%, which risks catastrophic financial effects for many households [7]. This context underscores the urgent need for innovative, accessible solutions to support cancer patients in a holistic manner. Mobile health applications powered by artificial intelligence have demonstrated potential to improve treatment adherence, reduce hospital visits, and provide personalized medical recommendations [3]. However, there remains a significant gap in integrating features that attend to patients' emotional and spiritual needs, as well as practical guidance for daily life and treatment preparation.

This paper proposes a set of ten guidelines for designing a personalized mobile application that offers comprehensive support to patients with stomach cancer. These guidelines stem from of 31 scientific literature and 10 mobile applications addressing disease progression, patient challenges, and effective intervention strategies. They encompass thematic focus areas such as spiritual accompaniment and emotional support; design principles including usability, accessibility, and modular architecture; and functional aspects like customized notifications, multimedia educational content, and AI-assisted chatbots for medical inquiries. An illustrative example demonstrates the practical application of these guidelines in a user-friendly mobile platform. Additionally, an experiment was conducted with 10 subjects to measure satisfaction with the web application designed according to the proposed guidelines. This article is structured as follows: Section 2 reviews related work on the proposed guidelines. Section 3 presents the definition of the proposed guidelines. Section 4 designs an illustrative example of the mobile application. Section 5 shows early validation. Finally, Section 6 shows conclusions, limitations, and future research directions.

2 Related works

This section presents a Targeted Literature Review (TLR), aimed at identifying scientific studies, best practices, and relevant features that have been applied in the design of mobile applications intended to provide comprehensive support to cancer patients. The search was conducted in renowned bibliographic databases such as Scopus, Web of Science, and IEEE Xplore, using the following search strings: ("cancer patients" AND "mobile application" AND "artificial intelligence" AND "support") and ("spiritual support" AND "AI" AND "cancer").

Inclusion criteria were: (1) scientific studies focused on clinical and emotional support through mobile applications, and (2) the use of artificial intelligence for treatment personalization or monitoring in oncology. Exclusion criteria were: (1) studies with no practical application (purely theoretical in nature), and (2) solutions focused exclusively on diagnosis, without continuous or comprehensive support in the context of cancer. From an initial pool of 165 scientific studies, 10 were selected for detailed analysis. The most relevant studies are grouped and analyzed below according to their area of contribution.

A. Mobile Applications with Artificial Intelligence for Oncological Support

Borsoi et al. [8] developed an AI platform that assists physicians in clinical decision-making for breast cancer treatment. While technically robust, the platform lacks features related to emotional or spiritual support. Michael et al. [9] introduced a digital application for patients undergoing chemotherapy, demonstrating a 30% reduction in unplanned hospital visits. Despite its positive outcomes, the solution does not offer cancer-stage-specific personalization or spiritual support modules. Laymouna et al. [10] evaluated the use of chatbots in the healthcare sector to assess their effectiveness in primary care by providing automated responses to common clinical queries. The study employed a systematic review methodology, analyzing multiple implementations of chatbots based on natural language processing (NLP). The results showed an average accuracy of 79% in answering frequent questions and an improvement in care availability outside clinical hours. However, the authors identified major limitations, including the chatbots' limited capacity for empathy, insufficient contextual personalization, and a lack of adaptation to specific conditions such as gastric cancer. Khambholja and Chhaya [11] highlighted the importance of emotional support for cancer patients and emphasized how AI could be integrated into spiritual support modules. Nevertheless, research on mobile applications incorporating this approach remains scarce.

In summary, although there are multiple initiatives that use artificial intelligence in mobile health applications for oncology, most of them prioritize diagnosis and treatment [1,8], clinical monitoring [6], or the use of chatbots for emotional support [7,10], often overlooking a comprehensive approach that also considers the patient's spiritual and emotional well-being.

B. Personalization, Monitoring, and Spiritual Support in Digital Health

Zhang et al. [13] proposed an AI-based application for detecting emotional distress in young cancer patients through voice and language analysis. This approach acknowledges the value of the emotional component but does not incorporate nutritional guidance or spiritual care. Charalambous et al. [14] highlighted in their analysis of European oncology policies that spiritual well-being should be considered a key dimension of cancer treatment. However, they also acknowledged the scarcity of technological tools that integrate this aspect. Hung et al. [15] developed an AI system to recommend clinical trials for patients with head and neck cancer. Despite its technical contribution, the system excludes subjective elements such as the patient's emotional or spiritual state. Finally, Gong et al. [16] explored the use of digital twins in personalized healthcare, emphasizing the importance of data integration for decision-making. Nevertheless, such technologies remain inaccessible in resource-limited contexts like Peru.

The reviewed studies show significant advances in the development of mobile applications targeting cancer patients, including clinical, emotional, and technological functionalities. However, there is a notable lack of proposals that comprehensively address the design of applications specifically for stomach cancer patients, incorporating in a structured way the medical, nutritional, emotional, and spiritual components. This review highlights the need to establish a set of design guidelines that address these dimensions in an integrated manner, constituting the main objective of the present study.

C. Design Guidelines and Usability Considerations for Oncology Mobile Applications

Mescher et al. [17] provide practical guidance for healthcare workers on evaluating and implementing mobile health apps, emphasizing usability, security, and patient-centered design principles critical for effective adoption. Their work underscores the importance of adaptable interfaces and personalized user experiences to meet diverse patient needs. Romero-Ayuso et al. [18] studied the usability of a mobile app aimed at enhancing daily activities for breast cancer survivors. Their findings indicate that intuitive navigation, clear visuals, and modular content improve patient engagement and adherence, elements vital for long-term support applications. Laymouna et al. [10], in their review on healthcare chatbots, also highlight the need for incorporating empathetic design and contextual awareness in AI conversational agents, which remain underdeveloped in oncology applications, limiting their support capabilities beyond basic clinical queries. Keten Edis and Kurtgöz [19] emphasize the role of spirituality in coping with cancer and the spiritual care needs of patients and their families. Their qualitative study suggests that digital tools integrating spiritual support can enhance holistic care but require culturally sensitive and adaptable content. Scherrer et al. [20] proposed a hybrid AI approach for aftercare in cancer patients, integrating clinical data with patient-reported outcomes, which demonstrates the potential for combining medical monitoring with emotional and spiritual well-being features. Caiani et al. [6] highlight regulatory and infrastructural challenges in adopting mobile health technologies, calling for scalable, accessible, and cost-effective solutions tailored to local realities.

Together, these studies reinforce the necessity of design guidelines that transcend pure clinical management, embedding user-friendly design, personalized functionalities, and comprehensive emotional and spiritual support into mobile oncology applications.

3 Definition of Guidelines for Mobile Application Design

This section presents a set of 10 guidelines derived from the literature review and analysis conducted for the design of a mobile application aimed at providing comprehensive medical and spiritual support to stomach cancer patients in Lima. The guidelines are based on the analysis of 31 scientific articles and 10 relevant mobile applications that integrate medical, emotional, and/or spiritual support features for oncology patients. These applications include: CanHope, Belong, PatientMpower, CancerAid, CareZone, My Cancer Coach, Vik, LivingWith, OWise, and War On Cancer.

The scientific articles and applications were analyzed using criteria such as user-centered design, interaction design, spiritual support, psychological accompaniment, and the specific needs of cancer patients within digital health environments. From this review, common and effective features were extracted and used as a foundation to establish the proposed mobile application design guidelines. Each guideline is identified with the prefix G followed by a number (e.g., G1, G2, G3, etc.). These guidelines are organized into three main categories: (i) Guidelines for the thematic focus of the application; (ii) Guidelines for mobile application design; and (iii) Guidelines on functionality and usability.

A. Guidelines for the Thematic Focus of the Application

G1: Incorporate personalized spiritual support modules. Several scientific studies agree that spiritual support significantly improves the emotional well-being of cancer patients. Delgado-Guay et al. [1] found that spiritual support in patients with advanced cancer is associated with higher quality of life and reduced use of aggressive treatments. Ichihara et al. [2] reported that spiritual interventions reduced emotional pain and increased inner peace among Japanese oncology patients. Similarly, Magharei et al. [3] demonstrated that guided spiritual sessions decrease anxiety and strengthen a sense of purpose. Applications such as CanHope already include resources like meditations, prayers, and faith-based messages personalized according to the user's beliefs. Therefore, it is recommended that the app include a spiritual section with sacred texts, audio materials, and access to religious leaders as part of a more holistic emotional support system.

G2: Implement an AI-based emotional chatbot for personalized psychological support. The use of artificial intelligence (AI) in emotional accompaniment allows for personalized psychological support for oncology patients. García-Prieto et al. [4] concluded that emotional support improves treatment adherence and reduces anxiety. Borsoi et al. [5] employed predictive AI algorithms to analyze symptoms and emotions reported by users, enabling more timely interventions. In a mixed-methods study, Romero-Ayuso et al. [6] observed that digital emotional journals enhance emo-

tional self-awareness and strengthen the patient-caregiver bond. Similarly, Xu et al. [7] validated an AI system using sensors and mobile questionnaires to detect early signs of depression and anxiety. Applications such as Belong provide digital spaces for patients to express their emotions but lack empathetic automated responses. Therefore, it is proposed to include an AI-based emotional chatbot capable of identifying the user's emotional state through natural language processing (NLP), responding empathetically, and encouraging self-expression. This tool would enable continuous, adaptive, and personalized support within the app.

B. Guidelines for Mobile Application Design

G3: Apply user-centered design with a focus on accessibility and intuitive navigation
The application design should follow a user-centered approach, prioritizing information clarity, ease of navigation, and accessibility for people of various ages and levels of digital literacy. Norman and Draper [8] emphasize that usability is a decisive factor in the adoption of health technologies, especially among vulnerable populations. Recommendations include the use of large buttons, intuitive navigation, minimal and legible text, and easily interpretable icons. Cruz-Ramos et al. [9] note that in mHealth applications, it is essential to include visual guides and tutorials for first-time users, as this reduces the abandonment rate. Similarly, Jiménez-Rodríguez et al. [10], in a study involving older adults, found that adapted design and simple language increased users' confidence and autonomy in using technology. Applications like PatientMpower and OWise incorporate good accessibility practices, such as step-by-step explanatory modules, customizable text sizes, and assisted navigation features that have been positively evaluated by older users. Consequently, it is recommended that the proposed app include a clean interface, adapted to mid-range devices, with options for adjusting text size, intuitive icons, and interactive tutorials to guide patients from their first use. In conclusion, the application should feature easy navigation, large buttons, minimal text, and easily recognizable icons to accommodate users with varying levels of digital literacy. It is also crucial to include visual guides and a permanent help section to support users from their initial interaction with the app. This user-centered design approach enables the creation of an intuitive, accessible, and adaptable interface, significantly increasing the likelihood of adoption and sustained use by oncology patients in diverse contexts

G4: Implement a modular and scalable architecture based on decoupled design patterns. Several studies explore the use of modular and scalable architectures employing design patterns such as Model-View-Controller (MVC) or the Repository pattern to ensure separation of concerns and maintainability. The application should be prepared for future updates, such as adding new support services or integrating with external APIs (e.g., for appointment scheduling or teleconsultations). Obigbesan et al. [1] propose a microservices-based approach for digital health applications where each functional component (such as medical appointments, notifications, or clinical records) is built as an independent module that can be updated or replaced without affecting the entire system. Chimuco et al. [2] emphasize the importance of using clean and decoupled architectures (Clean Architecture) to facilitate integration with external services via API, especially in applications handling sensitive health data.

Additionally, Smith and Lee [3] analyzed scalable architectures in health systems and concluded that modular and layered design significantly improves maintainability and enables agile development in resource-limited settings. In conclusion, it is recommended to implement a modular, scalable, and decoupled architecture based on design patterns such as MVC, Repository, microservices, or Clean Architecture. This approach allows the application to adapt to new functionalities without compromising system stability. It also facilitates integration with external services (such as telemedicine platforms or electronic health record systems), enables progressive updates based on user needs, and ensures better long-term technical maintainability, especially in contexts with variable infrastructure or limited resources.

G5: Use warm and neutral color palettes to promote emotional well-being. The visual design of applications for cancer patients must consider the emotional impact that colors can have. Studies such as López-Cobo et al. [13] show that visual environments with warm and soft colors positively influence users' perception of safety and trust—key factors for the acceptance and continued use of a digital tool. In contrast, saturated or alarming colors can cause stress or lead to rejection. Additionally, Singh and Kumar [14] highlight that in healthcare settings, palettes featuring pastel greens, light blues, and beige tones contribute to a calming effect and reduce anxiety among users. Martínez et al. [15] concluded that these colors foster a user-friendly experience, particularly for vulnerable populations such as oncology patients. Successful applications like Life Manager, CanHope, and PatientMpower use similar palettes, with neutral and pastel tones accompanied by simple, legible iconography. These design choices have been positively rated in usability surveys by patients who value a navigation environment that does not increase their stress or anxiety. In conclusion, it is recommended that the application use a palette of warm, neutral, and low-saturation colors, combined with clear and emotionally neutral iconography, to create a usage environment that conveys calm, trust, and emotional safety—fundamental qualities for patients undergoing cancer treatment.

G6: Ensure compatibility and performance on mid- and low-end devices. Various studies emphasize the importance of mobile health applications being responsive and compatible with a wide range of devices, particularly mid- and low-end Android smartphones, which are predominant in Peru. According to GSMA [16], more than 75 percent of Peruvians use devices with screens smaller than six point five inches and limited processing capabilities. Therefore, it is essential that the application be optimized for performance, loading times, and include offline functionalities to ensure usability in areas with limited connectivity. Research by Müller et al. [17] and Fernández and Pérez [18] has shown that light-weight mobile apps with low memory usage and offline capabilities increase digital inclusion and sustained use, particularly in rural populations or areas with limited infrastructure. Applications such as CancerAid and LivingWith, used in similar contexts, have successfully implemented these strategies, providing a good user experience on mid- and low-end devices. In conclusion, it is recommended that the mobile application be fully responsive, adaptable to various screen sizes (phones and tablets), optimized for efficient performance on technically limited devices, and include offline functionalities. These conditions are key to ensuring broad adoption and sustained use within the Peruvian context.

C. Guidelines on Functionality and Usability

G7: Implement personalized notifications to reinforce adherence and self-care. Several studies highlight the importance of implementing personalized notification systems that allow users to receive configurable reminders about medication, medical appointments, and motivational messages. These notifications should be adjustable in terms of schedule, frequency, and tone to maximize their effectiveness and user acceptance. Kim et al. [19] demonstrated that personalized reminders significantly increase treatment adherence and enhance perceived usefulness of health applications. Michael et al. [20] reported that intelligent apps with notification systems reduce unplanned visits to healthcare services by thirty percent and improve therapeutic adherence. Additionally, Lopez et al. [21] found that well-designed notifications with a focus on usability improve patient experience and reduce the feeling of intrusiveness, especially among older adults. Applications such as Belong and PatientMpower integrate configurable and accessible notification systems, which facilitate use among patients with different levels of digital literacy. Therefore, it is recommended that the application incorporate a system of personalized notifications with clear configuration options, prioritizing an intuitive and user-friendly interface for the target group. In conclusion, a system of personalized and programmable notifications should be implemented, allowing users to set alerts related to medication, medical appointments, self-care activities, or motivational messages. These notifications must adapt to individual preferences in terms of timing, frequency, and content, reinforcing user autonomy and treatment adherence.

G8: Incorporate multimedia educational content to enhance understanding and empowerment. Multiple studies have demonstrated that using educational content in multimedia Multiple studies have demonstrated that using educational content in multimedia formats such as videos, infographics, and audio significantly improves information retention and reduces cognitive overload in cancer patients. According to WHO [22], combining visual and auditory materials facilitates digital health literacy and improves understanding of treatment procedures. In specific investigations, Gómez et al. [23] found that patients who used explanatory videos on procedures and side effects showed greater adherence to treatment and reduced anxiety. Fernández-Rodríguez and Sánchez [24] concluded that auditory and graphic materials tailored to different stages of cancer improve the emotional and cognitive experience of patients. In the OncoCare application, high-resolution videos segmented by cancer stages explain treatments and nutritional recommendations in a clear and accessible way. The app also integrates interactive infographics and audio materials, allowing users to delve into specific topics based on their interests or needs—features that have been positively rated in usability and patient satisfaction studies. Therefore, it is recommended that the application incorporate varied, accessible, and personalized multimedia content to facilitate understanding and empower patients throughout their oncology treatment journey.

G9: Integrate patient-reported feedback and visual tracking of health indicators. Several studies highlight the importance of including systems that allow patients to regularly record mood, pain levels, energy, and other symptoms, enabling continuous and personalized health monitoring. Zhang et al. [4] developed a digital monitoring

system for oncology patients to daily record emotional state and energy levels via a mobile app; this data was then visualized through clear graphs, helping to identify relevant patterns in patient well-being. Similarly, Romero-Ayuso et al. [5] implemented a digital diary using subjective scales to assess pain, emotional state, and functionality, demonstrating through a mixed-methods approach that patients improved their sense of control over their health and communication with healthcare providers. Additionally, Nguyen et al. [6] showed that integrating patient-reported measures with visual dashboards improves patient engagement and facilitates timely clinical interventions in cancer care. Applications like PatientMpower and CancerAid incorporate daily tracking features where users log symptoms and emotions, displaying the data through intuitive graphs and color-coded elements. These tools facilitate self-assessment and provide valuable insights for healthcare professionals to adjust treatments or interventions. Therefore, it is recommended that the application include feedback and visual tracking mechanisms with daily or weekly logs of key variables represented through simple graphs and color-coded elements. This approach supports patient self-management and enhances effective communication with the healthcare team.

G10: Numerous studies emphasize the importance of offering virtual spaces where patients can share experiences, provide advice, and build emotional support networks. These collaborative environments foster empowerment and reduce feelings of isolation. For example, CancerAid has demonstrated that peer interaction on digital platforms significantly improves the emotional well-being of oncology patients. Smith et al. [7] found that moderated online forums contribute to better psychological outcomes by promoting social connection and information exchange. Similarly, Johnson and Patel [8] highlighted that group chats segmented by cancer type and treatment stage facilitate meaningful peer support while ensuring relevant discussions. Furthermore, Lee et al. [9] showed that combining human moderation with automated monitoring algorithms effectively maintains a respectful, safe, and misinformation-free environment. Therefore, it is recommended that the application include virtual community support spaces such as forums and group chats—moderated by both specialized personnel and monitoring algorithms. This ensures a respectful, safe, and supportive environment that fosters empathy and companionship among users.

Table 1 show a **s**ummary of the ten proposed guidelines.

TABLE 1 Summary of the ten proposed guides

Category	Guidelines	Details
Guidelines for the Thematic Focus of the Application	G1	Integrate spiritual support with prayers and biblical passages
	G2	Emotional support via AI chatbots
Guidelines for Mobile Application Design	G3	User-centered design with an accessible interface for older adults
	G4	Visual design using warm palettes, neutral tones, and low saturation with clear iconography.
	G5	Responsive, lightweight app optimized for mid- and low-end Android devices with offline capabilities
	G6	Personalized notification system for medication reminders.
Guidelines on Functionality and Usability	G7	Multimedia educational content (videos, infographics, audio)
	G8	Feedback and health status tracking through daily logs.
	G9	Moderated virtual community support spaces (forums, group chats)
	G10	Virtual community

4 Illustrative Example of the Proposed Guidelines

This section presents an illustrative example of the design of a mobile application aimed at patients with stomach cancer, based on the proposed guidelines. The application seeks to offer comprehensive medical and spiritual support through a friendly, personalized, and accessible interface. The following four guidelines are implemented: G1, G2, G3, and G7. Figure 1 shows the implementation of Guideline G1 reflected in the creation of a specific spiritual support module, designed to provide comprehensive emotional support throughout oncology treatment. This section allows the user to access personalized auditory resources such as guided meditations, mindful breathing exercises, positive visualizations, and healing affirmations, all aimed at reducing anxiety, fostering inner peace, and strengthening a sense of purpose. By incorporating these elements according to the patient's beliefs and needs, the application seeks to humanize the recovery process, promoting deeper and sustained emotional well-being. Figure 2 shows the implementation of Guideline G2, focusing on personalized emotional support through artificial intelligence. Here, the user interacts with an emotional chatbot capable of interpreting their mood from the language used in their messages, offering empathetic responses tailored to their emotional state. This

feature provides continuous, adaptive psychological support, helping to reduce stress and improve emotional self-awareness.

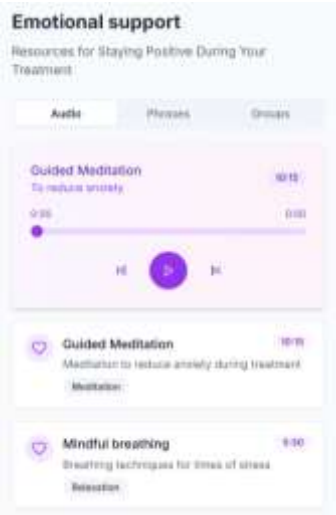

Figure 1. Spiritual support module with personalized resources for the patient's emotional well-being.

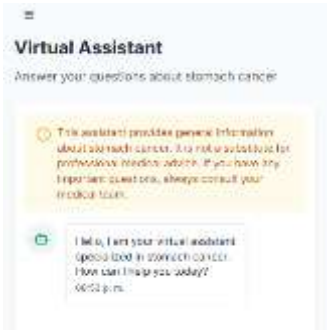

Figure 2. AI-based emotional chatbot for personalized psychological support.

Figure 3 highlights the implementation of Guideline G3, which prioritizes an accessible and user-centered design. The interface features large buttons, intuitive icons, and minimal text, facilitating navigation for users with varying levels of digital literacy. This clear and simple design enhances usability and encourages adoption among diverse patient populations.

Figure 4 shows the implementation of Guideline G7, a personalized notification system designed to reinforce treatment adherence and promote self-care. Users can configure reminders for medication, medical appointments, and motivational messages, tailored to their preferences to maximize acceptance and minimize intrusiveness. This system supports patient autonomy and helps optimize clinical outcomes throughout the treatment journey.

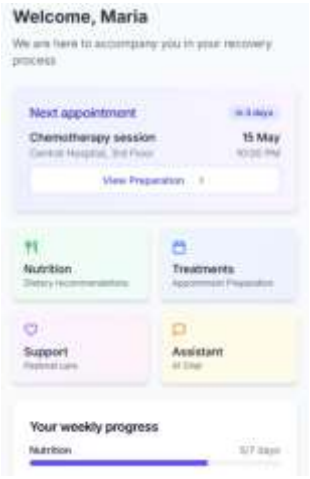

Figure 3. User-centered design focusing on accessibility and intuitive navigation for oncology patients.

Figure 4. Implementation of personalized notifications to reinforce adherence and self-care.

5 Early validation

This section describes an early initial validation (experiment) performed to verify the applicability of the proposed guidelines. The application (see Section 4) seeks to offer comprehensive medical and spiritual support through a friendly, personalized, and accessible interface. The validation involved 10 cancer patients from a hospital in Peru who interacted with the application designed according to the proposed guidelines. The patients are referred as subjects. The researchers provided a brief demonstration and task assignments in each section of the application. Subjects interacted with the application throughout the case by selecting from a list of predefined alterna-

tives. For each correct answer, the subject's score increased, and for incorrect answers, they received instant feedback explaining the correct solution. The subjects gave their consent to participate in the experiment. When subjects finished solving the experimental cases, they completed a satisfaction survey (Satisfaction is defined as the contentment and positive attitudes towards the use of a product) [35]. The satisfaction survey was measured online using a 5-point Likert scale questionnaire based on the framework developed by Moody's [36], which defined a framework (based on the work of Lindland et al. [37]) to evaluate satisfaction in terms of Perceived Ease to Use (PEOU), Perceived Usefulness (PU), and Intention to Use (ITU). This framework has been previously validated and is widely used. The possible answers for each statement in the PEOU, PU, and ITU questionnaire are: Totally disagree, Fairly disagree, Neutral, Fairly agree, and Totally agree. A numerical value is provided to each statement from 1 (Totally disagree) to 5 (Totally agree). Six questions were defined to measure PEOU, the metric was calculated adding the numerical values of the answers and classifying into a rank of five possible values: Rank 1–6: Totally disagree, Rank 7–12: Fairly disagree, Rank 13–18: Neutral, Rank 19–24: Fairly agree, Rank 25–30: Totally agree. For example, if a subject answers 5 questions with Totally agree and 1 questions with Neutral in PU, the result of this metric will be 28 (Totally agree). Six questions were defined to measure PU; the metric was calculated adding the numerical values of the answers that each subject filled in through the eight questions, the result of this addition is classified into a rank with the five possible options: Rank 1–8: Totally disagree, Rank 9–16: Fairly disagree, Rank 17–24: Neutral, Rank 25–32: Fairly agree, Rank 33–40: Totally agree. Six questions were defined to measure ITU, the metric was calculated adding numerical values of the answers and classifying the result into a rank of two possible values: Rank 1–2: Totally disagree, Rank 3–4: Fairly disagree, Rank 5–6: Neutral, Rank 7–8: Fairly agree, Rank 9–10: Totally agree. Figure 5 shows the satisfaction results.

Fig. 5. Satisfaction results

Figure 5 shows a divergent stacked bar of the responses provided by subjects to the questionnaire for this property: For Perceived Ease of Use (PEOU), approximately 43% totally agreed and 50% fairly agreed (over 90% total), suggesting that the majority of subjects considered the application to be easy and potentially useful to use. For Perceived Usefulness (PU), approximately 50% totally agreed and 39% fairly agreed

(over 85% total), suggesting that the majority of subjects considered the application to be useful. For Intention to Use (ITU), approximately 48% totally agreed and 42% fairly agreed (over 90% total), suggesting that the majority of subjects intend to use the application. A minority of subjects are undecided and do not perceive the application as useful.

6 Conclusions and Future Work

This paper presents a set of 10 guidelines for designing a personalized mobile application aimed at providing comprehensive support to patients with stomach cancer. These guidelines are based of 31 scientific articles and the analysis of 10 existing conditioning applications for cancer patients. The recommendations are organized into three main categories: (i) thematic focus of the application, which includes spiritual sections, biblical passages, and emotional support; (ii) design and development aspects, such as ease of navigation, large buttons, minimal text, modular and scalable architecture, and the use of warm color palettes; and (iii) functionality and usability features, including customizable and schedulable notifications, multimedia educational content, feedback and progress tracking, and emotional support spaces. Additionally, an experiment was conducted with 10 subjects to measure satisfaction with the web application designed according to the proposed guidelines. As future work, the following actions are proposed: (i) conduct experimental studies with stomach cancer patients to evaluate the effectiveness of the application implementing these guidelines; (ii) further investigate the specific challenges faced by these patients and explore additional strategies to address their needs in a mobile health context; (iii) analyze and integrate new technological tools that provide emotional and spiritual support, such as interactive relaxation activities and AI-driven chatbots; (iv) establish mechanisms to track patient progress and symptom management over time through the application; and (v) refine and expand the guidelines based on feedback from clinical trials and user experience assessments.

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