European Journal of Cancer Care

WILEY

RESEARCH ARTICLE OPEN ACCESS

Healthcare Professionals' Perceptions of the Implementation of Psychosocial eHealth Tools in Oncology: A Qualitative Study

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Received: 17 July 2025 | **Revised:** 2 February 2026 | **Accepted:** 17 February 2026

Academic Editor: Keval Patel

Keywords: cancer | eHealth | healthcare professionals | implementation | qualitative | supportive care

ABSTRACT

Purpose: As medical demography evolves, with patients living longer, cancer mortality declining, and quality of life gaining importance over survival, eHealth tools such as mobile apps and websites have emerged to support psychosocial care in addition to addressing medical needs. Yet, implementing these tools in cancer care remains complex, affected by multilevel factors ranging from intrinsic motivation and digital literacy (micro) to institutional culture, funding, and health policy (macro). A key limitation may be that many digital tools are not codeveloped between researchers and clinicians, leading to poor transferability. This study aimed to explore healthcare professionals' perspectives on the implementation of digital supportive care tools for patients with cancer and their relatives.

Method: A qualitative study was conducted using semistructured interviews held via videoconferencing with healthcare professionals practicing in oncology. Data were analyzed using an inductive thematic analysis.

Results: Forty-three healthcare professionals participated. Four main themes emerged: (1) the oncology care context (e.g., workforce shortages, digital healthcare evolution, and geographic disparities); (2) perceived benefits of eHealth tools for patients, caregivers, and providers; (3) desired features and content of such tools (e.g., reliable information, interactive exercises, and symptom tracking); and (4) barriers and facilitators to implementation, including intrinsic motivation, digital access, and institutional support.

Conclusions: Healthcare professionals recognize the potential of eHealth tools to support patients with cancer and their relatives. However, effective implementation requires early involvement of end users and context-specific strategies to ensure these tools are truly integrated into cancer care pathways.

1 | Introduction

In recent years, technological advancements in healthcare have rapidly accelerated, making eHealth a key factor in enhancing care quality [1, 2]. The World Health Organization [3] defined eHealth as "the use of information and communications technology in support of health-related fields." It comprises

telemedicine, electronic medical records, and online applications and involves a commitment to taking a connected approach to health services [4]. Some tools are aimed primarily at medical factors, such as monitoring the side effects of treatments and enabling quicker patient management, while other tools prioritize patients' quality of life over their quantity of life [5]. Hence, the effectiveness and implementation of eHealth psychosocial tools need to be assessed [6].

eHealth psychosocial tools can enhance traditional care by transforming how individuals manage their health, giving them greater control over or empowerment in their care [7]. To address the psychosocial impact of cancer, such as emotional distress, numerous psychosocial eHealth interventions have been developed that target both the individual and their relatives. These include interventions focused on emotional regulation for patients with cancer [8], support for families [9], and couples [10].

Moreover, eHealth interventions have been shown to improve communication with healthcare professionals (HCPs) [11], enhance patients' trust, and strengthen their self-care skills [12]. Beyond patient benefits, these interventions also support HCPs by reducing their anxiety and workload, for example, through electronic monitoring of patient-reported outcomes [13]. Fewer eHealth psychosocial tools are specifically designed for relatives, even though the literature highlights that they face a range of psychosocial burdens [14] and may even experience higher levels of emotional distress than the patients themselves [15]. To date, there are no conclusive results for their effectiveness for relatives [16].

While there is a growing need for supportive care [17], there are currently several obstacles to supportive care in healthcare institutions, such as a shortage of HCPs [18], burnout among them [19], or unequal access to care [20]. Nonetheless, some studies have explored HCPs' perspectives of the development and implementation of eHealth tools. In a study [21], HCPs identified several barriers and facilitators of eHealth implementation, grouped into three categories: technical (e.g., security and a lack of support); environmental and organizational (e.g., funding and political obstacles); and individual (e.g., cognition, motivation, and trust). Evidence also reported success factors, such as patient empowerment or improved healthcare quality, as well as failure factors, including privacy concerns, security, or workflow issues [22]. However, these factors are context-specific, and each context presents unique characteristics; as such, all else is not equal, and outcomes cannot be assumed to generalize across different settings. Hence, understanding the complex relationships and interdependencies among variables in varied and changing contexts is crucial. eHealth involves complex interactions among stakeholders (i.e., patients, caregivers, and HCPs), health systems, and eHealth itself [23]. Some literature has suggested that a multilevel approach will improve our understanding of the interactions among factors while considering social and environmental contexts [24]. Notably, in adult oncology care, no study has focused on the perspectives of various HCPs about the facilitators and barriers involved in the implementation of eHealth tools, despite their pivotal role in both adoption and effective implementation [25].

Hence, the aim of this study is to identify HCPs' perspectives on the implementation of digital supportive care tools that can help patients with cancer and their relatives.

2 | Materials and Methods

2.1 | Study Design and Ethics

This study was preregistered on the OSF (https://doi.org/10.17605/OSF.IO/FZJ94). This is a qualitative exploratory study with semistructured interviews exploring HCPs' perspectives about eHealth supportive care tools and their implementation in clinical practice. The research methodology used in this study complied with the Consolidated Criteria for Reporting Qualitative Research [26].

Ethical approval was provided by the Research Ethics Committee (Ref. No. [2023-699-S11]), in accordance with the General Data Protection Regulation.

2.2 | Participants

Eligible participants were HCPs working with patients with cancer in an adult oncology department or in private practice in France, aged over 18 years, and fluent in French. No exclusion criteria were formulated.

2.3 | Procedure and Interviews

We used a convenience sampling approach combined with open dissemination to recruit participants. The study was disseminated through two modalities: an invitation email sent to various HCPs and posts on social networks (LinkedIn). In addition, some participating HCPs were invited to refer colleagues who might be interested in the study or to forward the invitation email to them. A contact list of HCPs ($n = 8000$ HCPs with whom we were not familiar before recruitment) practicing in an adult oncology department was created by searching for publicly available email addresses online. This list included both medical (e.g., physician, nurse, and pharmacist) and psychosocial professionals (e.g., psychologist, social worker, and dietitian). Eligible participants were randomly (based on their workplace and profession) emailed. Interviews occurred concurrently with recruitment, and the recruitment process ended through a reflective assessment, which determined that the richness and sufficiency of the collected material had been reached [27].

Participants were invited to contact Ambre Naeyaert if they were interested in participating. They subsequently received an information letter, and a videoconference interview was scheduled upon agreement to participate. The interviews were conducted by Ambre Naeyaert between December 8 and April 19, 2024. Ambre Naeyaert is a female PhD student in psychology trained in qualitative methods, and participants were informed of her professional background and research role prior to the interviews, which may have influenced interview dynamics and responses.

On the day of the interview, participants were reminded of the study's purpose and procedure, and we obtained their oral consent to participate in the study. Before the interview officially began, participants' sociodemographic data were collected, including their gender, age, profession, working time per week with patients with cancer and/or the relatives of patients with cancer, the number of years of practice in oncology or with patients with cancer or their relatives, and their place of practice. Thereafter, a semistructured interview was conducted that followed an interview guide, which was preliminarily tested with

two HCPs to ensure its clarity. The interview guide was developed by the research team with the aim of exploring HCPs' perceptions, experiences, and expectations regarding the use of eHealth tools in oncology care. Its development was guided by the study objectives and an exploratory qualitative approach, allowing participants to freely express their views. The guide was pilot tested with two HCPs to ensure clarity and relevance, and minor adjustments were made accordingly. All interviews started with the standardized prompt inviting participants to imagine a hypothetical digital supportive care tool designed to assist patients with cancer and their relatives, accessible via a phone, tablet, or computer, and how they could implement it in their clinical practice.

Remote interviews (via videoconferencing) were conducted by Ambre Naeyaert and Julie Haerinck, audio recorded (but not video recorded), and transcribed verbatim.

2.4 | Data Analysis, Research Team, and Reflexivity

An inductive approach using a thematic analysis following Braun and Clarke's [27] methodology was realized by a team of researchers in health psychology: Ambre Naeyaert (PhD student, female), Julie Haerinck (MSc Student, female), and Valentyn Fournier (PhD, male); supervised by Kristopher Lamore (PhD, male), a senior researcher with 10 years of expertise in qualitative methods. The analysis adopted a contextualist epistemological position, which assumes that participants' accounts provide insight into their lived experiences while recognizing that these experiences and the meanings attached to them are shaped by broader professional, organizational, and social contexts [28]. This approach was considered particularly appropriate for exploring HCPs' perceptions, as it allows for an interpretation of individual perspectives in relation to the structural and institutional conditions within which they practice.

The analysis [27] followed six phases: (1) familiarization with the data through repeated reading and note-taking; (2) initial codes were generated inductively, staying close to participants' language (e.g., "the ideal with this type of platform is to optimize the link between community and hospital care" was coded as "optimization of the community-hospital link," contributing to the subtheme "eHealth tools"); (3 and 4) codes were collated and reviewed to identify and refine themes; (5) themes were then clearly defined and named; and finally, (6) illustrative quotations were selected to produce an interpretative narrative linking the themes to the research question, to help produce a report of the results. Throughout the analytical process, reflexivity was maintained through regular discussions among the researchers, enabling critical reflection on how their professional backgrounds and assumptions could influence the interpretation of the data.

Bracketing methods [29, 30] were also employed, which involved setting aside personal biases, pre-existing knowledge, and assumptions, and taking notes throughout the analysis. This method allowed us to recognize and critically reflect on our preconceptions and involvement in the research.

All authors have expertise in health psychology, except for Ambre Naeyaert, who holds a master's degree in clinical psychology specializing in trauma and psychotherapy.

To enhance the trustworthiness of the qualitative analysis, established criteria for qualitative rigor proposed by Lincoln and Guba [31] were used. Credibility was supported by the inductive and iterative analytic process, close engagement with the data, and the use of illustrative quotations grounded in participants' accounts. Dependability was ensured through a transparent and systematic analytic procedure and regular discussions among the research team throughout the analysis. Confirmability was addressed through reflexive practices and bracketing, allowing researchers to critically examine how their assumptions and professional backgrounds may have influenced interpretations. Finally, transferability was facilitated by providing a detailed description of the study context, participants, and analytic process, enabling readers to assess the applicability of the findings to other settings.

3 | Results

3.1 | Participants' Characteristics

Forty-four interviews were conducted. One participant was excluded from the study due to a technical issue with the audio recording. The final sample consisted of 43 HCPs (28 females and 15 males) from different professional backgrounds, most of whom were physicians (41.90%). The average age of participants was 43.93 years (SD = 10.19). Most participants were clinically practiced in a public hospital or comprehensive cancer care center ($n = 34$). Participants had an average of 14.10 years (SD = 8.21) of experience in oncology. Participants' characteristics are detailed in Table 1. The mean duration of interviews was 37.03 min (SD = 9.89; range: 17–40 min).

3.2 | Thematic Analysis

Four main themes and 19 subthemes (see Figure 1) emerged from the analysis. Theme 1 addressed the current context of oncology, highlighting the challenges and barriers faced. In response to these challenges, Theme 2 outlined the potential benefits of eHealth tools for all participants. Then, Theme 3 addressed the content of these tools, and Theme 4 was focused on exploring the factors related to the tools' implementation. All themes and subthemes are illustrated with quotes presented in Tables 2, 3, 4, and 5. The results of the thematic analysis are summarized in Figure 1. To maintain the confidentiality of participants, they were assigned pseudonyms. Each HCP approached the aspects of the themes based on their specific knowledge and needs. While doctors had a more medically centered perspective of the design of tools (e.g., telemonitoring and tools for managing side effects), support care professionals (i.e., psychologists, social workers, and dietitians) took a broader approach, considering other aspects of patient support. The expression of these ideas primarily reflected their HCP-related needs, focusing on tools that could truly serve them in their daily practice.

All quotations are attributed to participant codes to protect anonymity; no information on profession or gender is disclosed.

3.2.1 | Theme 1: The Current Oncology Context—Barriers and Challenges Faced by HCPs

Participants described a range of obstacles in the current oncology context and the challenges they encounter in their daily practice. Geographical barriers were frequently mentioned,

TABLE 1 | Participant characteristics.

Characteristic	Category	*n* (%) or mean ± standard deviation
Total number of participants		43
Age (years)		43.93 ± 10.19
Gender	Male	15 (34.88%)
	Female	28 (65.12%)
Profession	Physician	18 (41.86%)
	Psychologist	9 (20.93%)
	Nurse	6 (13.95%)
	Health executive	4 (9.30%)
	Social worker	2 (4.65%)
	Physiotherapist	1 (2.33%)
	Pharmacist	1 (2.33%)
	Researcher–clinician	1 (2.33%)
	Dietitian	1 (2.33%)
Percentage of oncology work per week	5%–25%	3 (6.98%)
	30%–50%	6 (13.95%)
	60%–80%	11 (25.58%)
	90%–100%	23 (53.49%)
Years working with patients with cancer	Mean ± standard deviation	14.10 ± 8.21
	0–5 years	4 (9.30%)
	6–10 years	12 (27.91%)
	> 10 years	27 (62.79%)
Place of work	Public hospital	31 (72.09%)
	Private hospital	7 (16.28%)
	Clinical practice	5 (11.63%)

particularly the distance to "support care centers" (HCPs 09), revealing how such structural constraints limit patient access to supportive care.

The rapid digital transformation of healthcare also emerged as a prominent challenge. While eHealth tools were generally perceived as useful, participants reported feeling overwhelmed by the sheer number of tools available, noting "which one to choose among the many that exist"(HCPs 14). This illustrates how the proliferation of digital solutions can complicate integration into practice and contribute to professional uncertainty.

Alongside the digital expansion, participants highlighted that patients and their relatives are often "overwhelmed by the huge number of documents" (HCPs 12) provided throughout their care journey, reflecting a sense of being drowned in information from both digital sources and HCPs.

Workforce limitations further exacerbate these challenges. Participants noted shortages of professionals such as "psychologists," "physiotherapists," or "oligotherapists" (HCPs 09), underscoring how insufficient staffing can delay or restrict access to supportive care for patients and their relatives.

Gaps in professional knowledge were also reported, as participants recognized that "a lack of knowledge" (HCPs 17) can influence the quality and completeness of information shared with patients, potentially affecting care and communication.

Communication barriers were another recurring subtheme. Participants described situations where patients' needs were inhibited or, although "verbalized but [were] not heard" (HCPs 13), remained unaddressed, illustrating the difficulties in ensuring that patient concerns are fully recognized and met.

Participants discussed these challenges in relation to how eHealth tools (see Theme 2) may help in overcoming them.

3.2.2 | Theme 2: The Benefits of eHealth Tools

Across interviews, participants emphasized the potential benefits of eHealth tools for multiple stakeholders (i.e., patients, their relatives, and HCPs), particularly in relation to overcoming the barriers described in Theme 1.

For patients with cancer, eHealth tools were perceived as valuable for screening and follow-up care. They could help "to detect them [patients] earlier" (HCPs 43), demonstrating their potential for early identification and timely management of treatment side effects (e.g., fatigue, nausea, anxiety). Due to the increasing transition toward outpatient care, participants reported that eHealth tools could enhance patient monitoring by providing additional support and "potentially alleviating some of the anxiety and stress" (HCPs 37). Peer support through forums was also considered beneficial, although participants emphasized that such spaces require moderation, reflecting an ambivalence between the supportive value of forums and the potential risks of unmoderated interactions. In addition, participants saw benefits in improving communication between patients and HCPs during oncological consultations. By allowing patients to "select certain topics" (HCPs 33) they wish to discuss beforehand, the tools could facilitate more focused and effective discussions with HCPs.

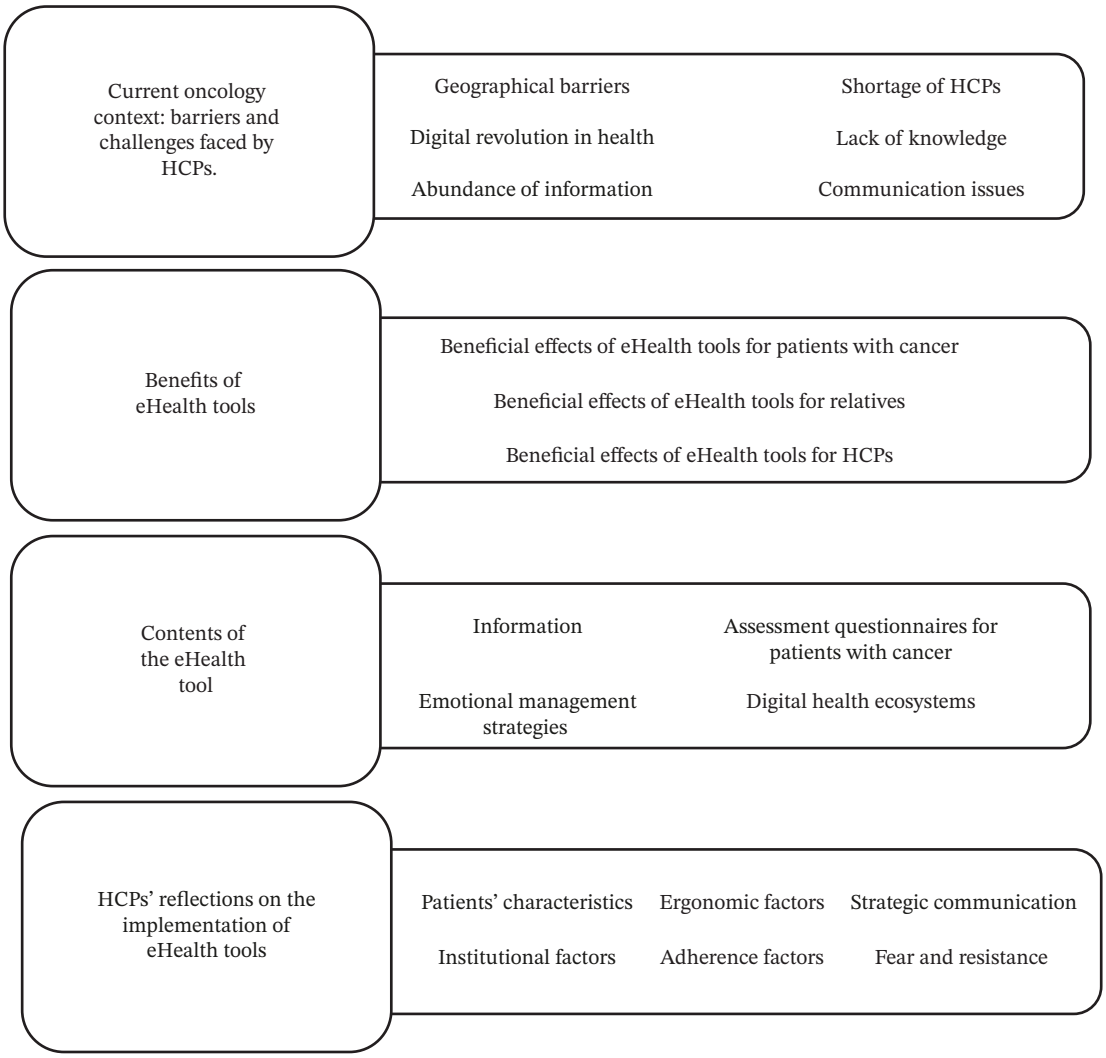

FIGURE 1 | List of themes and subthemes.

TABLE 2 | The current oncology context: barriers and challenges faced by HCPs.

Subtheme	Representative quote [free translation from verbatim French]
Geographical barriers	*HCPs 09: The problem is with the support care centers; they are very far away. If he doesn't live nearby, he won't travel 2 hours for supportive care*
Digital revolutions in health	*HCPs 14: The limit of these tools is that there can't be too many of them because then you don't know which one to choose among the many that exist*
Abundance of information	*HCPs 12: We provide a huge number of documents, and that's a lot of information*
Shortage of HCPs	*HCPs 09: We don't have enough psychologists; we don't have enough physiotherapists; we don't have oligotherapists; we don't have people who can provide this care*
Lack of knowledge	*HCPs 17: There are often aspects, which due to a lack of knowledge on the part of healthcare professionals, are not discussed with the patient [...] and so I think we miss out on a lot of things*
Communication issues	*HCPs 13: We realize that there are many needs that are not expressed by the patients themselves, which may emerge during the interviews or be verbalized but not heard*

Relatives were also identified as important beneficiaries of eHealth tools. Participants noted that these tools could provide resources, guidance, and support, including "a list of organizations and associations" (HCPs 13), helping caregivers navigate available services more effectively. Tools could also "connect caregivers with other caregivers" (HCPs

TABLE 3 | The benefits of eHealth tools.

Subtheme	Representative quote [free translation from verbatim French]
Beneficial effects of eHealth tools for patients with cancer	*HCPs 43: To detect them earlier. For the quality-of-care aspect. To detect it as soon as possible and address it promptly* *HCPs 37: It could be reassuring to know that there is something, a support system, or someone who will respond to questions within a short timeframe, potentially alleviating some of the anxiety and stress* *HCPs 33: By going through the tool, the patient could select certain topics they wish to discuss during the next consultation. The healthcare professional would have this information in advance, which would help facilitate the discussion*
Beneficial effects of eHealth tools for relatives and family	*HCPs 13: Perhaps this eHealth tool could also consider the needs of caregivers, not just patients, and provide information about what resources are available. For example, it could offer a list of organizations and associations, providing information about and directories for existing resources* *HCPs 20: A tool that would connect caregivers with other caregivers* HCPs 34*: Because at least there is this aspect of using the tool together, which motivates them not to be alone [...] to reduce stress on the family, especially for caregivers who have to manage many things*
Beneficial effects of eHealth tools for HCPs	*HCPs 16: It would, for example, help prevent the use of emergency services for care* HCPs 39: *Given the current context, this tool must be effective and support the human element [...] it should help them save time* *HCPs 18: Ideally, since we're talking about the primary care physician, on this kind of platform, it's about optimizing the coordination between community care and the hospital* HCPs 22: *Psychological support could also be beneficial for us {...] it helps in our relationship with patients and also helps us take a step back from difficult situations*

TABLE 4 | Theme 3: the content of eHealth tools.

Subtheme	Representative quote [free translation from verbatim French]
Information	*HCPs 38: A bit of theory is needed for each treatment [...] It's important to have the information that accompanied each treatment, each stage of treatment, such as surgery, chemotherapy, radiotherapy, and hormone therapy* *HCPs 37: Educational information about how to react to a symptom, a reminder for how to take a painkiller, knowing who called at the right time, knowing who raised the alert*
Emotional management strategies	*HCPs 28: Simple relaxation techniques, breathing exercises, basic things that can be done in moments of stress* *HCPs 26: Short self-hypnosis tutorials*
Assessment questionnaires for patients with cancer	*HCPs 06: A more subjective assessment of one's sense of self-efficacy in relation to the sick person* *HCPs 19: It could be interesting to conduct an evaluation between two consultations to understand what difficulties the patient experienced during their inter-treatment period, for example, or what would come up in the following consultation*
The digital health ecosystem	*HCPs 19: Short films or slideshows explaining the disease itself, the treatments, and side effects could be useful. They might also provide initial advice for managing care at home, including information about the most common side effects* *HCPs 08: Virtual reality glasses are also interesting. They provide hospitalized individuals with a way, even in the medium or long term, to briefly escape their room and visit or revisit places, countries, landscapes,* etc. HCPs 43: *This would allow patients to share photos of their wounds, facilitating follow-up care with nursing teams* HCPs 21*: A brief reminder the day before the injection or 2 days before the blood test*

TABLE 5 | Theme 4: HCPs' reflections on the implementation of eHealth tools.

Subtheme	Representative quote [free translation from verbatim French]
Patients' characteristics	*HCPs 31: Age may seem like a barrier, but it isn't always. There are older patients. I have patients who are even 80 years old, who come with their tablet and show me photos of their grandchildren and are accustomed to using the tablet. After that, even older patients are getting used to cell phones. What counts is not chronological age but functional age* *HCPs 17: The patients need to be at least somewhat cognitively intact, meaning they should understand how to use the tool. This is important for patients who might have any impairments or higher cognitive function disorders*
Institutional factors	*HCPs 06: So, in fact, it's about finding the time, the dedicated time we need to give to patients, in addition to our professional practice. We don't always have this dedicated time. This lack of dedicated time is really a negative point* *HCPs 43: The doctor cannot manage all the available alerts. Therefore, it might be necessary to have advanced practice nurses or care pathway nurses dedicated to this task. Not everything can be automated. I believe that the use of advanced practice nurses is relevant*
Ease-of-use factors	*HCPs 21: Something that will be much more engaging and simpler than reading a 40-page manual [...] It needs to be easily accessible in terms of time so they can quickly find their answer*
Adherence factors	*HCPs 30: Train teams so that they understand the benefits of doing this. It seems essential to me* *HCPs 11: I think the added value would be to develop it with doctors so that we can really identify together what would be relevant for the patient*
Strategic communication	*HCPs 43: A flyer that would be handed out systematically at the first appointment with the patient* *HCPs 30: The staff who are most often in contact with patients at a day hospital are not the doctors but rather the nurses who are there to connect the infusion, disconnect the infusion, recheck, take the blood pressure again. In the end, they have a relationship with the patient that's perhaps a little more familiar than that of the doctor, and they can hand out the flyer if they feel there's an opportunity to do so*
Fear and resistance	*HCPs 13: The limitations would also include anything that could unfortunately create additional work for the healthcare providers* *HCPs 08: It should simply be specified that it is not there to replace, but to complement. We will never replace the doctor's visit, or the time spent with them* HCPs 07: *There is a limitation, because when it is relative who completes the questionnaire, it is not the patient themselves. Consequently, the relative will also reflect their own view of the situation, which is not what we are seeking* HCPs 19: *The limitations of the forum are that it contains only misleading information; there needs to be someone to moderate it. That's the only problem*

20) and reinforce the motivation to use the tool together, "and not to be alone" (HCPs 34), while helping to manage "familial stress" (HCPs 34), by alleviating some of their caregiving burden.

HCPs themselves were recognized as benefiting from eHealth tools as digital care assistants. By supporting patients who do not require in-person consultations, the tools could prevent "the use of emergency" services (HCPs 16) and contribute to "saving time"(HCPs 39), allowing HCPs to focus on patients most in need and supporting daily care activities. Participants emphasized that for these tools to be useful, they must enhance collaboration among hospital-based professionals and "between community care and the hospital" (HCPs 18), while also providing psychological support to help them "take a step back from difficult situations" (HCPs 22).

3.2.3 | Theme 3: The Content of eHealth Tools

Participants provided suggestions for content that could be implemented in the eHealth tool.

Participants emphasized the need for comprehensive, validated, and accessible information, both medical regarding "each treatment and each stage of treatment" (HCPs 38) and "educational information" (HCPs 37) (e.g., return to work, supportive care services, or nutritional guidance). Simplified educational materials with links to reliable sources, like the French National Cancer Institute (https://www.cancer.fr/), were recommended to dispel misconceptions and enhance patient understanding.

Participants suggested incorporating exercises for emotional management to mitigate the psychological impact of cancer. Proposed activities included nonpharmacological interventions

like relaxation techniques, cardiac coherence, and others, "basic things that can be done in moment of stress" (HCPs 28). Video guidance was considered useful to enhance accessibility and support engagement.

Participants deemed evaluation components essential for assessing and adapting care. Suggestions included (1) medical evaluations of treatment side effects, toxicities, and symptoms; (2) experiential self-assessments, such as "one's sense of self-efficacy" (HCPs 06) to identify the evolving needs of patients and their relatives; (3) supportive care and quality-of-life assessments, such as questionnaires addressing chronic pain or nutritional needs; (4) postconsultation assessments to evaluate knowledge retention and to identify "what difficulties the patient experienced during their inter-treatment period" (HCPs 19), thereby improving the effectiveness of consultations and enabling more in-depth evaluations than time constraints usually allow during face-to-face appointments.

Finally, participants discussed the digital health ecosystem. They envisioned an eHealth platform incorporating visual media such as "short films or slideshows" (HCPs 19) for educational and emotional purposes. Videos could be used to recap consultations, explain treatments, or guide emotional management practices, while images (e.g., photo language) could support emotional expression. Emerging technologies like "virtual reality glasses" (HCPs 08) were also mentioned as ways to enhance patient engagement, provide personalized guidance, and create immersive learning or therapeutic experiences supporting both emotional and informational needs.

To maximize functionality, participants stressed the importance of interoperability and centralized health data systems. These would enable secure information exchange, for instance, allowing patients to "send photos of their wounds" (HCPs 43) to HCPs. Other features could include medical document uploads, prescription tracking, remote monitoring (e.g., dietary habits or insulin doses), and teleconsultation capabilities. Integrated alerts and reminders like "the day before the injection" (HCPs 21) would enhance long-term user engagement and allow for timely responses from HCPs.

3.2.4 | Theme 4: HCPs' Reflections on the Implementation of eHealth Tools

In this last theme, participants reflected on the implementation of eHealth tools in clinical practice, highlighting both opportunities and challenges. Overall, participants expressed cautious optimism, noting that while eHealth tools have the potential to enhance care, their successful implementation requires careful attention to design, training, communication strategies, and ethical safeguards.

Participants noted that patients' characteristics, such as age, individual vulnerabilities, or socioeconomic disparities, can influence the use of the eHealth tool. While age was seen as a potential barrier, a patient's "functional age" is considered more important than their "chronological age" (HCPs 31). To effectively use the tool, "patients need to be at least cognitively intact" (HCPs 17), indicating that cognitive impairments, disabilities, and unequal access to technology are key challenges, particularly for individuals with lower digital literacy.

Institutional and economic factors were also seen as critical considerations. Time constraints, staffing, task distribution, and financial resources were mentioned. Participants shared the "lack of dedicated time" (HCPs 06) to take on the additional responsibilities linked to eHealth tools, which could be unmanageable, especially for physicians. This underscores the importance of support from other HCPs with more dedicated time, such as psychologists or advanced practice nurses.

Ease of use and user-centered design were emphasized as essential for successful adoption. Tools should be simple, personalized, and "easily accessible in terms of time so they [patients and/or relatives] can quickly find their answer" (HCPs 21), while minimizing cognitive load and ensuring clear language. Participants also stressed the value of engaging HCPs in the development process. They highlighted the importance of "train teams" (HCPs 30) and involving staff to "identify together what would be relevant for the patient" (HCPs 11) to foster ownership and facilitate integration into practice.

Communication strategies for introducing eHealth tools were seen as important. Participants suggested visual materials like "flyers" (HCPs 43) to support introduction, while noting that initial consultations, particularly at diagnosis, are not ideal moments for introducing new tools. They recommended presenting the tools later in the care trajectory, when patients are better prepared. Collaborative, multidisciplinary approaches were considered essential, with nurses playing a central role because they are "there to connect the infusion, disconnect the infusion, recheck and take the blood pressure again" (HCPs 30), alongside other support professionals, to ensure consistent use across care teams.

Finally, participants expressed some resistance toward eHealth implementation. Ethical concerns were raised, including data confidentiality, the potential overburdening of HCPs by "additional work" (HCPs 13), and the risk of reducing patients to their illnesses, illustrating the need to balance technological support with human-centered care. Participants feared that eHealth tools might eventually replace human interactions and emphasized that they should "complement" (HCPs 08)—not replace—human interactions to prevent dehumanization. Concerns were also expressed about relatives potentially influencing patient responses by reflecting "their own view of the situation" (HCPs 07) during home use, which could bias assessments. Additionally, participants noted the risk of "misleading information" (HCPs 19) in forums and online chats, highlighting the importance of content moderation to ensure safe and accurate support.

4 | Discussion

In this study, we aimed to qualitatively explore the perspectives of HCPs in oncology about the implementation of eHealth tools to support patients and relatives. We discussed the challenges faced by HCPs and the potential of incorporating eHealth and their medical and psychosocial content into oncology. By examining the key factors related to the implementation of eHealth tools, our results highlight potential obstacles and key drivers for promoting the adoption of eHealth, particularly of engaging HCPs.

Our findings revealed that HCPs in oncology are aware of the current challenges in supportive care that the eHealth tools can

aid in overcoming, especially in terms of psychosocial issues. eHealth supportive care tools can aid in overcoming geographical barriers, as highlighted in a study [32], which suggested that eHealth innovations may help in addressing the issue of medical deserts. The COVID-19 pandemic significantly accelerated the digital revolution in healthcare [33]. Additionally, the digital revolution expanded healthcare access but caused information overload, resulting in poor information management and stress [34]. The healthcare landscape is facing a shortage of HCPs, as mentioned by our participants. For example, in 2012, 21% of institutions specializing in oncology in France did not have a psychologist or psychiatrist specializing in psycho-oncology [35]. No more recent data are available, but the shortage of mental health professionals specializing in oncology remains problematic. As shown by our results and the literature, the lack of knowledge about supportive care among HCPs can lead to insufficient information sharing and unmet patient needs, which affects their ability and confidence in providing supportive care in oncology settings [17, 36]. This lack of knowledge could also reflect the absence of consensus on the definition of supportive care in the literature [37].

As mentioned by our participants and corroborated in several studies, eHealth presents many benefits for patients: improved knowledge [38], quality of life [38], communication with HCPs [39], self-efficacy [40], treatment adherence and compliance [41], and proactive shared decision-making [42]. It also promotes a patient-centered care model by encouraging greater patient involvement in care planning and enhancing treatment effectiveness [11, 43]. Regarding HCPs, eHealth also offers benefits by improving interprofessional collaboration [44] and saving time through real-time data collection, targeting consultations in relevant clinical situations [45].

The content of eHealth tools is also a key issue that our participants discussed. Participants highlighted the importance of keeping eHealth content concise, as too much information was a common source of dissatisfaction, also reported in a study [46] on a self-management program for advanced cancer patients and their families. Furthermore, the literature suggests that information alone may not be enough, and additional support mechanisms are required to drive behavior change [47–49]. Although tools should be personalized [50], many eHealth solutions lack effective tailoring [51]. Although cancer care generally follows a common continuum, each diagnosis presents a unique experience, making it challenging for a single digital tool to address all individual needs [52].

In this qualitative study, participants identified key factors for effective digital tool implementation: individual characteristics of patients and HCPs, institutional factors, tool-related factors, and strategies to promote engagement and adherence. Effective implementation thus requires reliance on an ecological model, a framework which helps to understand the complex interactions between individuals and their environment at multiple levels [53].

While an ecological framework provides a comprehensive understanding of the interactions between individuals and their environment, it is equally crucial to consider how the eHealth tool aligns with the established organizational culture. This alignment is essential for effective implementation [22]. National guidelines recommend process evaluations to understand how new interventions are implemented, the mechanisms driving their effects, and environmental factors that may hinder their effectiveness [54]. One key factor affecting implementation is variability, as effectiveness can differ across individuals and settings, as well as due to challenges with delivery methods, HCPs, organizational barriers, and financial structures.

Although our participants emphasized that eHealth tools should be used as a complement and not a replacement for human interaction, some studies have shown that patients have positive attitudes toward self-assistance interventions [43, 55], which are considered to be as effective as in-person interventions [56]. However, as an author pointed out, “We are not treated by technical knowledge alone, but also, and primarily, by a human being—the provider—who establishes a relationship of exchange with the patient” [57].

4.1 | Study Limitations

Our study had some limitations. First, we focused solely on HCPs with or without eHealth expertise, which may have influenced their feedback based on their clinical knowledge rather than practical, user-centered insights. Their responses could have reflected idealistic views or requests, as they are experts in care, not tool design. Second, while we used an inductive approach to allow for flexible exploration, the diversity of HCPs (e.g., physicians, nurses, and psychologists) suggests that tools must be tailored to specific professionals’ needs. Third, there may also have been sampling bias, with physicians being overrepresented. This study also included a limited number of nursing professionals, which may be related to differences in professional practices and the lower use of eHealth tools among nursing staff in France, or to recruitment constraints rather than workforce distribution. Further studies should explore the impact of profession-related factors on eHealth tool adoption and use. In particular, research could focus more specifically on nursing staff, who play a central role in patient care and family interactions and may have more dedicated time than physicians, to understand their engagement with eHealth tools and their specific needs.

4.2 | Research Perspectives

When creating and implementing new interventions, intervention research approaches recommend relying on ecological and multilevel contextual approaches [58]. These approaches recognize the importance of considering various contexts and levels of influence (e.g., individual, organizational, societal) to ensure that the intervention is tailored to the specific needs of the target population. Involving all stakeholders at every stage of intervention design is crucial [59]. The earlier they are involved, the more impactful the innovations will be [60], as they will address the needs of the future users rather than being driven by a form of technocentrism, where technology takes precedence over individual needs [61].

For future eHealth tool development, we recommend a systemic approach, like the ecological model framework [51], to ensure the successful implementation of these tools. This approach should comprise the early-stage involvement of all stakeholders in the design process, continuous feedback loops throughout the implementation phase, and adaptation to contextual factors such as organizational culture and available resources. To represent

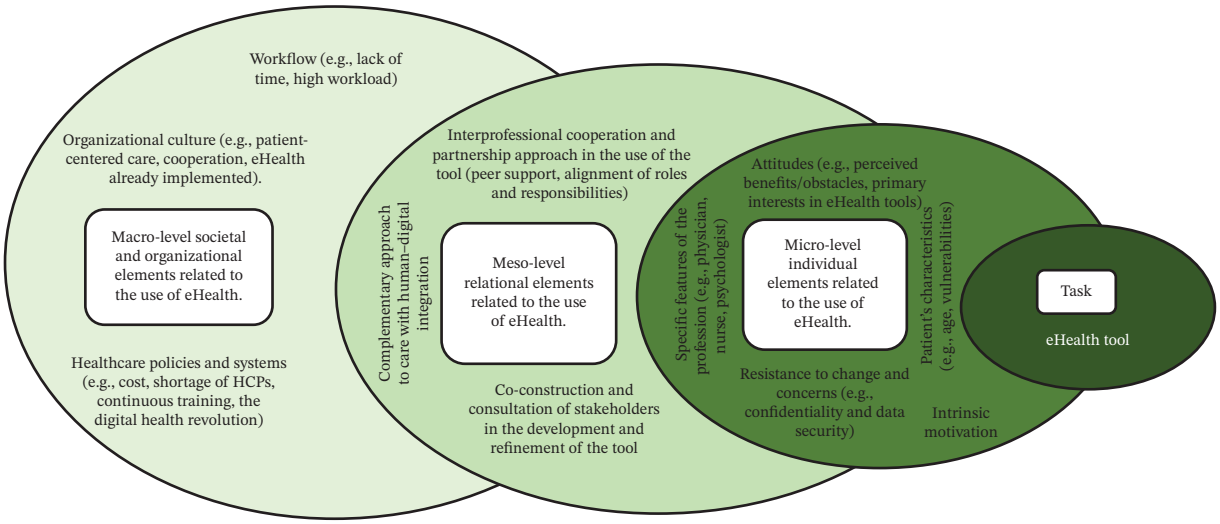

FIGURE 2 | Multilevel integrative model: factors influencing the implementation and use of eHealth from healthcare professionals' perspectives.

this, we developed a model based on our study results and inspired by the recommendations of the literature [62], which advocated for a multilevel perspective to be assessed in future studies. This approach is essential for effectively targeting interventions within these complex networks, as illustrated in Figure 2.

This model represents the importance of the context in which the eHealth tool is implemented at three levels: micro, meso, and macro. First, the micro level refers to the individual factors related to the use of the eHealth tool. Key factors include intrinsic motivation (i.e., if users are initially motivated, this could promote future adoption) and attitudes with positive or negative valence (e.g., perceived benefits or obstacles). However, resistance may arise due to concerns over ethics (e.g., confidentiality and data security). Hence, those in different healthcare professions—for example, physicians, nurses, or psychologists—may adopt the tool to varying degrees based on their specific needs and how they support patients with cancer. Second, the meso level focuses on relational aspects related to the use of the eHealth tool. This relational aspect highlights an important human factor, ranging from a participatory approach in the discussions around the tool's development and refinement to collaboration among professionals during its use (with role rotation among professionals), and, most importantly, a dyadic approach integrating both human and digital elements, rather than simply a one-dimensional digitalization. Finally, at the macro level, broader contextual factors might affect clinical practice. These include workload (e.g., time constraints, as noted by physicians), organizational culture (e.g., cooperation and prior eHealth use), and health policies (e.g., staff shortages and high costs). A lack of guidance in choosing tools and the need for ongoing training may also discourage tool adoption. We thus hypothesize that the components at each level may influence each other, both at the same level and across levels. For example, initial adoption or resistance to eHealth tools at the micro level may affect the intrinsic motivation of HCPs and their collaboration at the meso level. Likewise, collaboration dynamics at the meso level may be influenced by the existing organizational culture at the macro level. Future studies should aim to refine and test this model to verify the relationships among these levels and ensure the model's validity. To our knowledge, no study has focused specifically on the factors that promote the implementation of eHealth in clinical practice, particularly from the perspective of HCPs.

5 | Conclusion

This study allowed us to determine HCPs' perspectives on the development and implementation of eHealth tools to support patients with cancer and their relatives. As key figures in the adoption and dissemination of these tools, HCPs play a crucial role in integrating eHealth into care pathways. Our results show the potential of eHealth to optimize care, but its success requires a cultural transition and careful consideration of use contexts. However, this transition necessitates a redefinition of the healthcare system and a cultural transformation. To be effective, eHealth tools must promote collaboration among stakeholders and enhance human interactions. Finally, our findings emphasize the need to examine all mediators, moderators, and confounding factors that could influence the successful implementation and effectiveness of eHealth tools. That is, eHealth interventions need to incorporate solid theoretical models and a consideration of the specific context of care to be sustainably implemented in healthcare environments.

Author Contributions

Ambre Naeyaert: conceptualization, methodology, investigation, project administration, formal analysis, software, and writing–original draft and review and editing; Valentyn Fournier: conceptualization, methodology, formal analysis, and review and editing; Lisa Laroussi-Libeault: conceptualization, formal analysis, and review and editing; Julie Haerinck: conceptualization, investigation, formal analysis, and writing–review and editing; Pauline Justin: conceptualization and review and editing; Christelle Duprez: conceptualization and review and editing; Pascal Antoine: conceptualization and review and editing; Delphine Grynberg: conceptualization and review and editing; Kristopher Lamore: conceptualization, funding acquisition, methodology, project administration, software, supervision, validation, visualization, and writing–review and editing.

Acknowledgments

We wish to acknowledge all the healthcare professionals who took the time to participate in this study. The SCALab laboratory is part of the ONCOLille Institute. This work was funded by the French National Cancer Institute (Institut National du Cancer, Grant INCA/16136) in collaboration with the Université de Lille, the SCALab laboratory, the ONCOLille Institute, and the Centre Oscar Lambret that support the research chair "opsyrii" innovations in psycho-oncology and intervention research. Ambre Naeyaert also obtained a PhD funding from the Université de Lille to conduct this study.

Funding

This work was funded by the French National Cancer Institute (Institut National du Cancer, grant INCA/16136) in collaboration with the Université de Lille, the SCALab laboratory, the ONCOLille Institute, and the Centre Oscar Lambret that support the research chair "opsyrii" innovations in psycho-oncology and intervention research, INCA/16136; Ambre Naeyaert also obtained a PhD funding from the Université de Lille to conduct this study.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

This study was preregistered on Open Science Framework (OSF). Codes, themes, and subthemes supporting the findings of this study are openly available on the OSF repository (https://doi.org/10.17605/OSF.IO/FZJ94). The datasets analyzed during the current study are available upon request.

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