Developing Informational Content for a Website for Caregivers of Cancer Patients Undergoing Chemotherapy

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Abstract

Background: Family caregivers of people undergoing chemotherapy often become "second patients," shouldering complex medical, emotional, and logistical responsibilities while struggling to find trustworthy and practical information online. Although caregiver-focused cancer websites exist, many are not structured around caregivers' real-world information needs and everyday tasks.

Objective: This study aims to explore the chemotherapy-related information needs of family caregivers and use these insights to propose themes that should be presented for a caregiver education website.

Methods: Qualitative research, data were collected through focus group discussions with 18 participants. Data collection included the exploration, development, and feasibility of a detailed mobile-based E-PIC (Electronic Program of Caring Intervention) application for caregivers of cancer patients undergoing chemotherapy. Eleven participants, including nurses, oncologists, health technologists, and caregivers, conducted detailed interviews using the Delphi Method.

Results: In this study, 11 themes were obtained that need to be present in the website for caregivers, including content that helps caregivers overcome challenges, helps meet emotional, spiritual, educational needs, daily care at home, caregiving interventions, challenges in accessing health system services, overcoming stigma, E-PIC format and features, relevance of affordability, evaluation and support for E-PIC sustainability.

Conclusion: Designing navigation based on real caregiver tasks, flows, and concerns rather than solely on medical taxonomy can improve the searchability, trustworthiness, and usefulness of online chemotherapy education for families.

Keywords: cancer; chemotherapy; family caregiver; information architecture

Introduction

Chemotherapy serves as a fundamental element in cancer treatment globally and is known to be effective for certain types of cancer (Kafayat A et al., 2020). This treatment entails the administration of cytotoxic medications aimed at destroying cancer cells and inhibiting their reproduction. It can range from curative measures to palliative care and is typically administered either intravenously or orally (Mahabub H et al., 2023). However, it presents various challenges. As noted by Elmusrati, M.S., & Ashammakhi, N. (2018), it is crucial to weigh the benefits against significant side effects when considering chemotherapy options. Additionally, Kifle, Z. D. et al. (2021) emphasize ongoing issues such as drug resistance and the non-selective distribution of drugs within tissues.

Moreover, the responsibility of providing chemotherapy care often falls to family caregivers. Research indicates that the burden placed on these caregivers during chemotherapy ranges from moderate to severe levels, significantly impacting their mental and physical health. Approximately 70.22% of caregivers reported experiencing mild to moderate burden, while 21.38% faced moderate to severe burden (Mishra, S., et al., 2021). Similarly, Jafaar, A. Y., & Amen, M. R. (2022) found that 45.5% of caregivers experienced moderate burden and 29% reported severe burden.

Key factors influencing caregiver burden include patient dependence on the caregiver, duration of daily care required, the nature of the relationship between caregiver and patient, and chronic illnesses affecting the patient (Zuo, Y. et al., 2020). Furthermore, there is a strong correlation between caregiver burden and increased levels of depression and anxiety (Hadiati, T. et al., 2025), with caregivers reporting a decline in quality of life across emotional, mental, and physical aspects.

To mitigate this stress for caregivers, solutions such as training in problem-solving skills show promise (Ayar, P. et al., 2021). Additionally, providing tailored information that meets caregivers' specific needs can help ease their caregiving responsibilities.

Information needs of caregivers for cancer patients often remain unmet, which is linked to increased anxiety, stress, and depressive symptoms, as well as a decline in overall quality of life. A lack of understanding regarding the disease and its treatment can result in significant anxieties, diminished problem-solving abilities, and decreased confidence among both caregivers and care recipients (Kim & Yi, 2015)

Moreover, an analysis of online health information reveals that many cancer-related websites prioritize biomedical narratives and clinical viewpoints over practical information that genuinely addresses the everyday requirements of caregivers (Sedrak et al., 2018)

For users with high levels of stress or limited health literacy, poorly structured content can lead to confusion or information overload (Wu et al., 2025) (Lillie et al., 2023).

This disorganized information contributes to cancer information overload (CIO), where individuals feel inundated by the available data on cancer. Such issues are particularly pronounced among those with low health literacy who struggle to navigate complex information, ultimately resulting in heightened anxiety and poor medical decision-making (Park et al., 2025).

Numerous cancer-related resource websites tend to focus on professional or biomedical perspectives concerning disease classification and treatment protocols. However, these do not adequately address the real-life challenges faced by caregivers daily, such as navigating the healthcare system or managing stress. Caregivers themselves may also feel overlooked and inadequately prepared (Shin et al., 2018).

Research into caregiver experiences highlights the importance of providing clear guidelines and accessible educational materials. Nevertheless, there is limited research directly linking these insights to design choices regarding the information architecture of websites tailored for caregivers (Merchán-Baeza et al., 2023). Evidence indicates that research methodologies like two-round Delphi studies and participatory design can enhance the development of health website content that aligns with caregiving models and user preferences.

This study had two aims:

1. To explore in depth the chemotherapy-related information needs of caregivers.
2. To translate these qualitative insights into a proposed content for caregiver education websites on chemotherapy.

Methods

Study Design

This study employed a qualitative descriptive design using a Delphi design with two rounds. Delphi 1 was conducted to capture experiences and information needs in the participants' own words and generate practice-oriented recommendations. Delphi 2 was conducted to establish consensus on the results obtained from Delphi 1. Semi-structured interviews were complemented by a participatory workshop that included an open card sorting exercise to inform content that would be displayed on the website of patient caregivers undergoing chemotherapy. Data collection was through FGDs with 11 participants, with questions that had been tested for expert validity with a result of 0.9. This study has also received ethical approval from the Faculty of Health, Universitas Respati Yogyakarta, with number 069.3/FIKES/PI/VII/2025

Setting and Participants

The study was conducted at an oncology center that provides outpatient chemotherapy services for adults with cancer who are undergoing chemotherapy.

Inclusion criteria for caregivers:

1. Age ≥ 35 years
2. Identified by the patient as a primary family caregiver
3. Providing home care to a patient currently receiving or within 6 months of completing chemotherapy
4. Able to participate in an interview in the study language

Inclusion criteria for professional staff:

1. Age ≥ 35 years
2. Oncology nurse
3. Oncology specialist
4. Nutritionist
5. Psychologist
6. Pharmacist Minimum length of service 10 years

Data Collection

Semi structural in-depth interviews and the Delphi Method with a panel of experts (Doctor, nurses, psycho-oncologists, health technology experts, and caregivers).

Individual interviews with nurses, psycho-oncologists, health technology experts, and caregivers (45–75 minutes) explored:

1. Need to overcome caregiver challenges in caring for clients undergoing chemotherapy
2. Caregiver's emotional needs
3. Caregiver's spiritual support needs
4. Caregiver's educational needs
5. Daily Care at Home
6. Caring Interventions Needed for Caregiver (10 Caritas)
7. Challenges in Accessing Healthcare Services
8. Overcoming Stigma
9. E-PIC Format and Features
10. Application Accessibility Relevance
11. E-PIC Evaluation and Sustainability Support

Clinician interviews focused on frequently asked caregiver questions, common safety issues, and perceived gaps in existing education materials.

All interviews were audio-recorded and transcribed verbatim.

Participatory In-depth interview

A group of four caregivers, four clinicians, one specialist, and one programmer attended a two-hour workshop. In this workshop, participants were asked 57 questions that suggested several topics for program development. These subjects were issues such as: (“Addressing caregiver challenges when supporting clients undergoing chemotherapy, recognizing caregivers' emotional needs, exploring spiritual support requirements for caregivers, identifying educational needs of caregivers, Daily home care practices, Necessary caregiving interventions (10 Caritas), Difficulties in accessing healthcare services, Strategies for overcoming stigma”).

The relevance and features of the E-PIC format and application accessibility. In an open card sort, participants:

1. Grouped the cards in ways that “made sense” to them.
2. Gave each group a label in their own words.
3. Discussed missing topics and confusing labels.

Notes and photos of the clustered groups were collected as IA design data.

Data Analysis

The two-round Delphi method employed a qualitative descriptive approach in this study. The first round focused on examining participants’ experiences and their informational needs to inform, and derive practice-based recommendations. In the second round, consensus was sought on the findings. Data were collected by a focus group discussion (FGD) of 11 participants, using an expert-validated instrument that delivered reliability of 0.9 and the study gained ethical approval. Reflexive thematic analysis of all

interview transcripts began with familiarization to generate initial codes related to information needs, search behavior, and presentation preferences. Next, these codes were distilled into candidate themes, and were further honed through group discussion and narrative comparisons with narratives by caregivers and clinicians. Outputs from participatory workshops such as open-card sorting activities were incorporated into the final stages to directly associate insights from themes with decisions on information architecture, such as naming categories and how to design navigation. The data triangulation across sources and methods lent credence to this study, member checking with three of the caregivers for validation and peer debrief sessions with a UX specialist and an oncology nurse educator, all played key roles in ensuring the credibility of the study. A rigorous audit trail was prepared documenting the full analytical journey and the evolution of the information architecture model.

Ethical Considerations

Ethical clearance was granted by the Faculty of Health at Respati University in Yogyakarta, under the reference number 069.3/FIKES/PI/VII/2025. Participants gave their informed consent in writing and were free to withdraw from the study at any point. To ensure confidentiality, all names and identifying information were omitted from the transcripts.

Results

The results of this study include an explanation of the characteristics of respondents and themes regarding information content that should be presented on websites for caregivers of cancer patients undergoing chemotherapy.

Table 1. Participants' characteristics

Variabel	**Participant**		
		Frequency	**Percent**
Sex	Female	14	77,7
	Male	4	22,3
Education	Dr. Sp. PD.Subsp. HOM (K)	1	7,14
	Ph.D	1	7,1
	S. Gz., M.Si	2	14,2
	Ns.	8	64,5
	S. Farm., Msc	1	7,1
	M. Psi., Psikolog	1	7,1
	High school graduate (caregiver)	4	22,2
Profesion	Specialist and Consultant	1	5,5
	Professional Nurse	9	56,0
	Nutritionist	1	5,5
	Pharmacist	1	5,5
	Psychologist	1	5,5
	Caregiver	4	22,0

Table 1 presents the characteristics of the 18 participants involved in the research. The gender distribution indicates a significant predominance of female participants, who represent 77.7%, in contrast to male participants at 22.3%. This imbalance enhances the study's relevance regarding gender influence,

suggesting that the findings will primarily reflect female perspectives. However, it also introduces a limitation, as the analysis may lack diversity in male viewpoints.

In terms of professional backgrounds, the sample features a well-rounded multidisciplinary team. Professional nurses constitute the largest group, making up 56.0% (9 individuals), followed by caregivers at 22.0% (4 individuals). Additionally, there is representation from specialist doctors, nutritionists, pharmacists, and psychologists, each contributing one individual, or 5.5%.

Table 2.

No	Tema	Sub tema	Very impor-tant (6) Fr (%)	Impor-Tant (5) Fr (%)	Moderate Importance (4) Fr (%)	Less im-Portant (3) Fr (%)	Unim-port-ant (2) Fr (%)	Mean ± SD	Agree-men
1	**Need to overcome caregiver challenges in caring for clients undergoing chemotherapy**	1.1 Lack of Health Knowledge and Education	1 (9,1%)	7 (63,6%)	2 (18,2%)	1 (9,1%)	0 (0%)	4,7±0,7	✓
		1.2 Barriers to Healthcare Access and Logistics	1 (9,1%)	1 (9,1%)	3(27.3%)	4(36.4%)	2(18.2%)	3,5±1,2	✓
		1.3 Physical Side Effects in Patients	3(27,3%)	6(54,5%)	2(18,2%)	0 (0%)	0 (0%)	5,09±0,7	✓
		1.4 Emotional Distress in Patients and Caregivers	2(18,2%)	7(63.6%)	2(18,2%)	0 (0%)	0 (0%)	5,0±0,6	✓
		1.5 Limitations in Home Care Management	2(18,2%)	5(45.5%)	3(27,3%)	1(9,1%)	0 (0%)	4.7±0,9	✓
		1.6 Concerns about Therapy Safety	3(27,3%)	2(18,2%)	3(27,3%)	2(18,2%)	1(9,1%)	4.3±1.3	✓
2	**Caregiver's emotional needs**	2.1 Patient Psychology and Expectations in Treatment	5(45.5%)	4(36.4%)	2(18,2%)	0 (0%)	0 (0%)	5.2±0,7	✓
		2.2 Burden and Support for the Caregiver	2(18,2%)	5(45.5%)	3(27,3%)	1(9,1%)	0 (0%)	4.7±0,9	✓
		2.3 Emotional Support within the Family.	5(45.5%)	4(36.4%)	2(18,2%)	0 (0%)	0 (0%)	5,2±0,78	✓
		2.4 Emotional Skills and Information Needs for Caregivers	4(36.4%)	4(36.4%)	3(27,3%)	0 (0%)	0 (0%)	5,0±0,8	✓

3.	**Caregiver's spiritual support needs**	3.1 Need for Spiritual Activities	3(27,3%)	5(45.5%)	3(27,3%)	0 (0%)	0 (0%)	5,0±0,7	✓
		3.2 Fulfillment of Timely Worship	4(36.4%)	4(36.4%)	2(18,2%)	1(9,1%)	0 (0%)	5.0±1	✓
		3.3 Community-Based Social Support	5(45.5%)	4(36.4%)	2(18,2%)	0 (0%)	0 (0%)	5.2±0,7	✓
		3.4 Strengthening Values and Religious Guidance	4(36.4%)	3(27,3%)	3(27,3%)	1(9,1%)	0 (0%)	4.9±1	✓
		3.5 Spiritual Influence on Emotional Condition	5(45.5%)	5(45.5%)	1(9,1%)	0 (0%)	0 (0%)	5.3±0, 6	✓
4.	**Caregiver's educational needs**	4.1 Need for Education and Information	8(72,7%)	3(27,3%)	0 (0%)	0 (0%)	0 (0%)	5.7±0,4	✓
		4.2 Psychological and Spirituality Needs	7 (63,6%)	3(27,3%)	1(9,1%)	0 (0%)	0 (0%)	5,5±0,6	✓
		4.3 Managerial Needs and Strategies for Managing Burnout	7 (63,6%)	3(27,3%)	1(9,1%)	0 (0%)	0 (0%)	5,5±0,6	✓

Based on Table 2, the sub-theme of "Need for Education and Information" (4.1) was ranked as the highest, as it received the greatest mean score (Mean = 5.7 ± 0.4). It was considered “Very Important” (72.7%) and “Important” (27.3%) by 100% of the panel. This emphasizes the foundational position of knowledge deficit as a major challenge. Likewise, sub-themes associated with "Psychological and Spirituality Needs" (4.2) and "Managerial Needs and Strategies for Managing Burnout" (4.3) were also connected as the second-highest mean score (Mean = 5.5 ± 0.6), with more than 90% of participants in the top two categories. In the theme of spiritual needs, "Spiritual Influence on Emotional Condition" (3.5) placed significantly high (Mean = 5.3 ± 0.6). This collection of high-rated items suggests that the panel considers informational, psycho-emotional, and spiritual support critical in response to interventions. The least common sub-theme, "Barriers to Healthcare Access and Logistics" (1.2) had the lowest mean score (Mean = 3.5 ± 1.2) and the highest dissimilarity of opinions (SD = 1.2). Though 36.4% of the participants rated it as “Less Important” and 18.2% as “Unimportant,” a composite of 18.2% still regarded it as “Very Important” or “Important.” This indicates that systemic and logistical obstacles are seen as a variegated problem which may vary by region or institutions. “Concerns about Therapy Safety” (1.6) also exhibited relative ambivalence (Mean = 4.3), with the second highest standard deviation (SD = 1.3), suggesting a lack of strong agreement about what makes it urgent.

Table 3.

No	Tema	Sub tema	Very important (6) Fr (%)	Important (5) Fr (%)	Moderate Importance (4) Fr (%)	Less important (3) Fr (%)	Unimportant (2) Fr (%)	Mean ± SD	Agreemen
5.	**Daily Care at Home**	5.1 Influence of Social and Economic Factors on Care	7 (63,6%)	2(18,2%)	1(9,1%)	1(9,1%)	0 (0%)	5,3±1,0	✓
		5.2 Caregiver's Role in Patient's Daily Activities (ADL)	3(27,3%)	5(45.5%)	3(27,3%)	0 (0%)	0 (0%)	5,0±0,7	✓
		5.3 Management of Chemotherapy Side Effects	8(72,7%)	3(27,3%)	0 (0%)	0 (0%)	0 (0%)	5.7±0,4	✓
		5.4 Need for Psychological Support for Patient and Caregiver	5(45.5%)	3(27,3%)	3(27,3%)	0 (0%)	0 (0%)	5,0±0,7	✓
		5.5 Adjustment of Nutritional Intake	6(54,5%)	2(18,2%)	3(27,3%)	0 (0%)	0 (0%)	5.2±0,9	✓
		5.6 Maintenance of Caregiver's Health	5(45.5%)	3(27,3%)	2(18,2%)	1(9,1%)	0 (0%)	5,0±1,0	✓
6	**Caring Interventions Needed for Caregiver (10 Caritas)**	6.1 Providing Family and Community Support in Healthcare	6(54,5%)	3(27,3%)	2(18,2%)	0 (0%)	0 (0%)	5,3±0,8	✓
		6.2 Providing Effective Health and Treatment Management	5(45.5%)	6(54,5%)	0 (0%)	0 (0%)	0 (0%)	5,4±0,5	✓
		6.3 Addressing Family's Limited Understanding of Health Facilities	2(18,2%)	6(54,5%)	3(27,3%)	0 (0%)	0 (0%)	4,6±1,1	✓
		6.4 Providing Support for Caregiver's Feelings and Pressure	5(45.5%)	3(27,3%)	1(9,1%)	1(9,1%)	1(9,1%)	4,9±1,3	✓

	6.5 Providing Access and Technology for Health Communication	5(45.5%)	4(36.4%)	1(9,1%)	1(9,1%)	0 (0%)	5,1±0,9	✓
	6.6 Forms of Caring (social & emotional support, family education & learning, meeting basic needs, with affection, genuine presence, empathy, hope, open communication)	9(81,8%)	2(18,2%)	0 (0%)	0 (0%)	0 (0%)	5,8±0,4	✓
	6.7 Principles of Caring (spirituality, religiosity, family support, and social systems)	7 (63,6%)	2(18,2%)	2(18,2%)	0 (0%)	0 (0%)	5,4±0,8	✓

Based on the Table 3, among participants in the Daily Care at Home theme, the "Management of Chemotherapy Side Effects" (5.3) was the most important of any of the daily care concerns, with a mean score rate for importance (5.7 ± 0.4); it was unanimously agreed upon by 100% of panelists as "Very Important" (72.7%) or "Important" (27.3%). "Influence of Social and Economic Factors" (5.1: Mean=5.3) and "Adjustment of Nutritional Intake" (5.5: Mean=5.2) were also found to be at the top of the list of practical needs rated. Sub-themes including caregiver role in the activity of daily living (5.2), psychological support (5.4) and caregiver self-in-charge health maintenance (5.6) were consistently highlighted as important (Mean=5.0). In terms of Caring Interventions, the more extensive concept "Forms of Caring" (6.6) including social, emotional, and familial support, and the presence of care taking by caregivers was deemed the one most significant aspect in the study as a whole, with a mean value 5.8 ± 0.4 and 100% consensus. Intermediate and core interventions like "Providing Effective Health Management" (6.2: Mean=5.4) and interventions that were based on "Principles of Caring" (6.7: Mean=5.4): such as spirituality and support for the family, were equally strongly identified. Despite their agreement, the “Addressing Family's Limited Understanding of Health Facilities” (6.3: Mean=4.6) and “Providing Support for Caregiver's Feelings” (6.4: Mean=4.9) were rated at moderate importance, and the highest SD (1.1, 1.3) were reported respectively, which demonstrate the most discrepancy in the results. To conclude, Delphi results validate a core set of needs that highlight the practical management of treatment side effects and the need for holistic, empathetic forms of caring. While effective health management and spiritually/principle-based interventions were also seen as important, specific aspects of education and emotional support, although agreed upon by all experts, have been perceived by specialists to also be critical: they were preferred at levels that vary widely in levels.

Table 4.

No	Tema	Sub tema	Very impor-tant (6) Fr (%)	Impor-Tant (5) Fr (%)	Moderate Importance (4) Fr (%)	Less im-Portant (3) Fr (%)	Unim-port-ant (2) Fr (%)	Mean ± SD	Agree-men
7	**Challenges in Accessing Healthcare Services**	7.1 Limitations and Complexity of the Healthcare Support System	3(27,3%)	4(36.4%)	3(27,3%)	1(9,1%)	0 (0%)	4,8±0,9	✓
		7.2 Administrative and Referral Complexity	3(27,3%)	4(36.4%)	1(9,1%)	3(27,3%)	0 (0%)	4,6±1,2	✓
		7.3 Time Constraints and Queuing in Services	4(36.4%)	2(18,2%)	4(36.4%)	1(9,1%)	0 (0%)	4,8±1,0	✓
		7.4 Additional Financial Burden Outside BPJS Coverage	5(45.5%)	1(9,1%)	3(27,3%)	2(18,2%)	0 (0%)	4,8±1,2	✓
		7.5 Need for Psychological Support and Nutritional Adaptation	4(36.4%)	3(27,3%)	3(27,3%)	1(9,1%)	0 (0%)	4,9±1,0	✓
		7.6 Access to Transportation and Support Facilities	2(18,2%)	5(45.5%)	3(27,3%)	1(9,1%)	0 (0%)	4,7±0,9	✓
8.	**Overcoming Stigma**	8.1 Interprofessional Collaboration Education	6(54,5%)	5(45.5%)	0 (0%)	0 (0%)	0 (0%)	5,5±0,5	✓
		8.2 Cultural and Humanistic Approaches in Health Communication	5(45.5%)	5(45.5%)	1(9,1%)	0 (0%)	0 (0%)	5,3±0,6	✓

Based on the Table 4, participant' considered "Overcoming Stigma" as more important than systemic problems of access. "Interprofessional Collaboration Education" (8.1) was highlighted as a key strategy, scoring the highest mean in this sample (5.5 ± 0.5) from all levels, with 100% of experts indicating that (54.5%) it was "Very Important" and (45.5%) that it was "Important." Similarly, "Cultural and Humanistic Approaches in Health Communication" (8.2) was highly favoured (Mean = 5.3 ± 0.6). This implies that experts see addressing attitudinal and communication barriers as a top priority intervention topic. In contrast, the six sub-themes of "Challenges in Accessing Healthcare Services" (Theme 7) were rated with fair moderate importance, and mean scores were found between 4.6 and 4.9. Although agreement was reached, the large standard deviations (0.9–1.2) hint at substantial variation in the expert position on the perceived urgency of these logistical and systemic issues. Note that "Administrative and Referral Complexity" (7.2) had the lowest mean (4.6) and the highest percentage of "Less Important" ratings (27.3%). "Additional Financial Burden Outside Insurance Coverage" (7.4), despite its relatively moderate average (4.8), was given the highest (45.5%) "Very Important" level of importance, establishing this item as a point of concern for a substantial part of the panel. To summarize, the Delphi results show a clear hierarchy of priorities. Experts concurred that preventing stigma through professional education and sensitive communication are among their most important strategies. In contrast, specific barriers experienced within the healthcare system (administration, queues, transport, etc.) were found to be significant challenges, but the level of agreement around their topical importance for the intervention focus was significantly lower and less uniform, indicating that their salience may be context-specific.

Table 5

No	Tema	Sub tema	Very impor-tant (6) Fr (%)	Impor-Tant (5) Fr (%)	Moderate Importance (4) Fr (%)	Less im-Portant (3) Fr (%)	Unim-port-ant (2) Fr (%)	Mean ± SD	Agree-men
9.	**E-PIC Format and Features**	9.1 Monitoring of patient's condition status	6(54,5%)	4(36.4%)	1(9,1%)	0 (0%)	0 (0%)	5,4±0,6	✓
		9.2 Education for caregiver (Cancer process, Treatment, Care, Nutrition such as monitoring, intake and nutritional status, drug side effects)	8(72,7%)	3(27,3%)	0 (0%)	0 (0%)	0 (0%)	5,7 ±0,4	✓
		9.3 Psychological & Spirituality Support	6(54,5%)	3(27,3%)	0 (0%)	2(18,2%)	0 (0%)	5,1 ±1,1	✓
		9.4 Facilitation of alternative/substitute menu choices, preparation methods	6(54,5%)	3(27,3%)	1(9,1%)	1(9,1%)	0 (0%)	5,2 ±1,0	✓
		9.5 Access to emergency information, communication, transportation	6(54,5%)	3(27,3%)	1(9,1%)	0 (0%)	1(9,1%)	5,1 ±1,2	✓
		9.6 Videos and modules are needed	7 (63,6%)	2(18,2%)	1(9,1%)	0 (0%)	1(9,1%)	5,1 ±1,5	✓
		9.7 Patient security and privacy	7 (63,6%)	2(18,2%)	0 (0%)	1(9,1%)	1(9,1%)	5,0 ±1,6	✓
		9.8 Management of drug side effects and burnout	9(81,8%)	1(9,1%)	0 (0%)	0 (0%)	1(9,1%)	5,5 ±1.2	✓
10.	**Application Accessibility Relevance**	10.1 Open-source application, easy to access, and free of charge	10(90,9%)	1(9,1%)	0 (0%)	0 (0%)	0 (0%)	5,9±0,3	✓
		10.2 Collaboration with hospital and educational institutions	9(81,8%)	2(18,2%)	0 (0%)	0 (0%)	0 (0%)	5,8±0,4	✓
11.	**E-PIC Evaluation and Sustainability Support**	11.1 Indicators for improvement of caregiver knowledge and skills	8(72,7%)	3(27,3%)	0 (0%)	0 (0%)	0 (0%)	5,7±0,4	✓

	11.2 Indicators for psychological and spiritual improvement for caregiver	5(45.5%)	6(54,5%)	0 (0%)	0 (0%)	0 (0%)	5,4±0,5	✓
	11.3 Hospital and Community support is very important	4(36.4%)	7 (63,6%)	0 (0%)	0 (0%)	0 (0%)	5,3±0,5	✓

Based on Table 5, the assessment findings reveal a mean score of 5.9 ± 0.3 concerning the perceived necessity for the application. The tool, described as "open-source, easily accessible, and free of charge" (10.1), received a "Very Important" rating from 90.9% of the panelists. Collaboration "with hospitals and educational organizations" (10.2) was also regarded as essential, with a Mean score of 5.8. Moreover, "Education for the caregiver" (9.2) and the integration of "Indicators for improvement of caregiver knowledge" (11.1) were identified as vital elements (Mean = 5.7 each), reinforcing the program's primary role in knowledge transfer.

Additionally, several practical considerations were strongly endorsed. The "Management of drug-related side effects and burnout" (9.8) was deemed very important by 81.8% of panelists (Mean = 5.5). Priorities also included "Monitoring of the patient's condition" (9.1) and "Psychological & spiritual improvement indicators" (11.2), both scoring a Mean of 5.4 each. The consistent score for 'Hospital and Community support' (11.3, Mean = 5.3) reflects the panel's belief that the new application should function within an existing support framework rather than serve as a replacement.

Consensus was achieved across all items; however, some displayed greater variability in ratings indicated by higher standard deviations. Items like "Patient security and privacy" (9.7, SD = 1.6), "Videos and modules" (9.6, SD = 1.5), and "Access to emergency information" (9.5, SD = 1.2) recorded mean scores ranging from approximately 5.0 to 5.1. The distribution of ratings suggests that while most panelists found these aspects significant, a minority—between 9.1% and 18.2%—assigned lower importance to them, indicating that these features are viewed as more context-dependent compared to fundamental educational and management functions.

Discussion

The study confirmed a gender bias in the sample (77.7% female), aligning with evidence that women are more frequently involved in caregiving roles, particularly in advanced cancer care. The predominance of women as professional nurses within the multidisciplinary team was also associated with higher levels of stress, anxiety, and depression among female caregivers. These findings highlight the need for gender-sensitive interventions, especially psychological support for female caregivers, as well as further research on the experiences of male caregivers (Ketcher et al., 2020).

The priority given to education and information needs corresponds with the health literacy framework. Variations in perceptions of access barriers and therapy safety—reflected by a low average score (3.5) and high standard deviation (1.2)—reveal the complexity of health literacy and indicate unequal access to healthcare services, particularly among groups with limited infrastructure or vulnerable socioeconomic conditions (Abel et al., 2024). The finding of a strong connection between the dimensions of "Psychological and Spirituality Needs" and "Managerial Needs and Strategies for Managing Burnout" provides robust empirical confirmation of the current consensus in the literature. This finding aligns with meta-analyses and systematic reviews that consistently report a significant negative relationship between workplace spirituality—encompassing aspects of meaning, purpose, and a sense of community—and levels of burnout (Dubey & Bedi, 2024).

Research supports your finding that experts prioritize communication skills. A confirms that competencies like interprofessional collaboration and maintaining therapeutic relationships are deemed essential for digital health settings, extending the importance of these attitudinal factors (Wiljer dkk., 2025).

The high perceived need score (mean 5.9 ± 0.3) for this application, particularly with its open-source, easily accessible, and free-of-charge characteristics, indicates that panelists consider accessibility and financial sustainability to be crucial factors. This finding is closely aligned with research in the field of digital health,

which emphasizes that user acceptance is strongly influenced by perceived usefulness and ease of access. Studies in the Journal of Medical Internet Research indicate that successful mHealth solutions often emphasize user-centered design and eliminate cost barriers, as this can expand reach and promote health equity (Zhou et al., 2019).

Psychological/spiritual signs of improvement as indicators (Mean=5.4) mirrors a whole care model found in Palliative & Supportive Care. More studies show that caregivers commonly navigate life with existential concern and search for meaningfulness and tools that recognize and track these dimensions help provide broader supports beyond task-based metrics (Graham et al., 2020)

Conclusion

The proposed information content, based on the themes of understanding chemotherapy, managing side effects, coordinating daily care, protecting caregiver well-being, and fostering trust, addresses stigma and challenges in caregiving, and provides insights into the web content that should appear within the application. Implementing this caregiver-centered information architecture has the potential to improve the usability, relevance, and safety of digital chemotherapy educational resources for families.

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