International Surgery

Core Features and Clinical Implications of Digital Platforms for Oncology Patients: A Narrative Review of the Past Decade

--Manuscript Draft--

Manuscript Number:	INTSURG-D-25-00032
Full Title:	Core Features and Clinical Implications of Digital Platforms for Oncology Patients: A Narrative Review of the Past Decade
Article Type:	Original Article
Keywords:	Neoplasms; Telemedicine; Patient Reported Outcome Measures; Mobile Health Units; Health Literacy
Corresponding Author:	Sang-Ho Jeong Gyeongsang National University Changwon Hospital Changwon, Gyeongsang Nam-do KOREA, REPUBLIC OF
Corresponding Author Secondary Information:	
Corresponding Author's Institution:	Gyeongsang National University Changwon Hospital
Corresponding Author's Secondary Institution:	
First Author:	Sang-Ho Jeong
First Author Secondary Information:	
Order of Authors:	Sang-Ho Jeong
Order of Authors Secondary Information:	
Abstract:	Objective: To explore the features, benefits, and challenges of digital health platforms in oncology care based on literature published from 2015 to 2025. Summary of Background Data: Digital health tools, such as mobile applications, wearable devices, and electronic patient-reported outcomes (ePRO) systems, are increasingly used in oncology. These platforms aim to support symptom management, patient education, and communication between patients and providers, particularly in the context of chronic and complex cancer care. The COVID-19 pandemic further accelerated the adoption of digital health technologies, highlighting their role in maintaining continuity of care. Methods: This narrative review synthesized findings from peer-reviewed studies published between 2015 and 2025, focusing on the design, implementation, and clinical impact of digital platforms for cancer patients. Results: Digital health interventions demonstrated improvements in patient quality of life, treatment adherence, and reductions in emergency department visits. Remote monitoring and teleconsultation were particularly effective during the COVID-19 pandemic. However, persistent barriers include digital literacy gaps among older adults, concerns about data privacy and security, and a lack of robust long-term outcome data. Conclusions: Digital platforms offer meaningful benefits in oncology care but face implementation and equity challenges. Future development should prioritize user-centered design, integration of emerging technologies (e.g., AI, blockchain, digital twins), and comprehensive policy frameworks. Large-scale studies are needed to evaluate long-term effectiveness, cost-efficiency, and equitable access.

Category: Narrative review

Core Features and Clinical Implications of Digital Platforms for Oncology Patients: A Narrative Review of the Past Decade

Author: Sang-Ho Jeong

Department of Surgery, Gyeongsang National University College of Medicine and Gyeongsang National University Changwon Hospital, Changwon, Republic of Korea,

Correspondence to: Sang-Ho Jeong

Department of Surgery, Gyeongsang National University College of Medicine and Gyeongsang National University Changwon Hospital, 11, Samjeongja-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, Republic of Korea, (Tel) +82-55-214-3771, (E-mail) shjeong@gnu.ac.kr

Working Title: Digital Platforms for Oncology Patients

Abstract

Objective: To explore the features, benefits, and challenges of digital health platforms in oncology care based on literature published from 2015 to 2025.

Summary of Background Data: Digital health tools, such as mobile applications, wearable devices, and electronic patient-reported outcomes (ePRO) systems, are increasingly used in oncology. These platforms aim to support symptom management, patient education, and communication between patients and providers, particularly in the context of chronic and complex cancer care. The COVID-19 pandemic further accelerated the adoption of digital health technologies, highlighting their role in maintaining continuity of care.

Methods: This narrative review synthesized findings from peer-reviewed studies published between 2015 and 2025, focusing on the design, implementation, and clinical impact of digital platforms for cancer patients.

Results: Digital health interventions demonstrated improvements in patient quality of life, treatment adherence, and reductions in emergency department visits. Remote monitoring and teleconsultation were particularly effective during the COVID-19 pandemic. However, persistent barriers include digital literacy gaps among older adults, concerns about data privacy and security, and a lack of robust long-term outcome data.

Conclusions: Digital platforms offer meaningful benefits in oncology care but face implementation and equity challenges. Future development should prioritize user-centered design, integration of emerging technologies (e.g., AI, blockchain, digital twins), and comprehensive policy frameworks. Large-scale studies are needed to evaluate long-term effectiveness, cost-efficiency, and equitable access.

Key words: Neoplasms, Telemedicine, Patient Reported Outcome Measures, Mobile Health Units, Health Literacy

I. Introduction

Cancer remains one of the leading causes of mortality worldwide, requiring long-term and multifaceted management.[1] Over the past decade, rapid advancements in digital technology have reshaped cancer care by enabling personalized, patient-centered approaches. Digital platforms—including smartphone applications, wearable devices, and AI-powered tools—have emerged as crucial components in enhancing the patient experience through functionalities such as symptom monitoring, self-management, psychological support, and health education.[2,3]

The primary value of digital platforms lies in improving quality of life (QoL) and optimizing healthcare resource utilization[4]. Traditionally hospital-centric care models are gradually being supplemented by systems that encourage active patient engagement, such as electronic patient-reported outcomes (ePRO), remote monitoring, and teleconsultation. The COVID-19 pandemic has further underscored the relevance of digital health solutions, accelerating their adoption globally[5,6].

This review examines the literature published in PubMed from 2015 to 2025 concerning digital platforms designed for cancer patients. The aim is to identify and analyze the core functionalities, clinical effectiveness, and existing limitations of such platforms. In particular, this review explores how digital interventions contribute to symptom control, information delivery, psychosocial support, and enhanced patient-provider communication. Finally, future directions are discussed, with a focus on integrating emerging technologies such as AI, blockchain, and digital twins into the cancer care ecosystem, thereby supporting the development of more inclusive, secure, and sustainable digital health infrastructures.

II. Methods

This narrative review was conducted to synthesize the literature on digital platforms in cancer care, focusing on their role in symptom management, quality of life improvement, remote monitoring, and patient-reported outcomes. The review followed a flexible and iterative approach, adhering to established guidelines for narrative reviews.

Search Strategy

A comprehensive search was performed using three major electronic databases: PubMed, Embase, and Scopus. Articles published between January 2015 and March 2025 were included. The search utilized Medical Subject Headings (MeSH) and keywords such as “digital platform,” “eHealth,” “mHealth,” “cancer care,” “symptom management,” “quality of life,” “remote monitoring,” and “patient-reported outcomes.” Boolean operators (AND, OR) were applied to ensure the inclusion of

relevant studies. The search strings were tailored to each database and are available upon request.

Inclusion and Exclusion Criteria

Studies were included if they:

- Targeted cancer patients (any type or stage).
- Examined interventions utilizing digital platforms such as web-based tools, mobile apps, or wearable devices.
- Focused on at least one of the following functions: symptom tracking, health education, psychosocial support, or patient-provider communication.
- Employed randomized controlled trials (RCTs), quasi-experimental designs, or prospective cohort studies.

Exclusion criteria included:

- Protocol papers, conference abstracts, reviews, and editorials.
- Studies not published in English.
- Research focused solely on caregivers or healthcare providers.

Study Selection and Data Extraction

The selection process involved screening titles and abstracts for relevance, followed by full-text reviews based on predefined criteria. Studies were iteratively selected to ensure thematic saturation while maintaining flexibility in scope. Key data points such as study design, intervention type, outcomes measured, and findings were extracted systematically.

Analysis and Synthesis

The extracted data were analyzed qualitatively to identify recurring themes and trends. Findings were synthesized into conceptual categories such as symptom management efficacy, quality of life improvements, remote monitoring capabilities, and challenges in implementation. Reflexivity was maintained throughout the process to minimize bias and ensure transparency.

This narrative review provides an evidence-based summary of the role of digital platforms in cancer care while acknowledging limitations inherent to non-systematic reviews.

III. Key Functionalities of Digital Platforms for Cancer Patients

III-1 Symptom Management and Monitoring

1. Real-Time Symptom Reporting

Description of Functionality:

Electronic Patient-Reported Outcome (ePRO) tools are instruments that allow patients to document symptoms such as pain, fatigue, and side effects and share them with healthcare providers. These tools have been proven effective in reducing symptom burden during cancer treatment and enhancing quality of life (QoL)[7,8]. Data visualization refers to the process of visually representing symptom data entered by patients using graphs or charts. This visual approach assists healthcare professionals in analyzing and interpreting the data quickly and effectively.[9]

Key Examples:

The Kaiku Health DPM Platform demonstrated promising outcomes in a clinical study involving patients with HER2-positive breast cancer and lung cancer. The platform achieved an 85% patient adoption rate and a 76% adherence rate to weekly symptom reporting. By enhancing communication between patients and healthcare providers, the platform contributed positively to the overall management of cancer care.[10]The Noona ePRO System enables patients to report symptoms remotely from home using smart devices. This functionality allows healthcare providers to access real-time symptom data and adjust treatment plans accordingly. The system has received high ratings for its user-friendliness and reliability.[9]

Clinical Effects:

Interventions utilizing electronic patient-reported outcomes (ePRO) have been associated with significant clinical benefits. Meta-analytic findings indicate a reduction in symptom burden (Standardized Mean Difference [SMD] = -0.19), improvements in quality of life (QoL; SMD = 0.16), and enhanced overall survival (Hazard Ratio [HR] = 0.84).[7] Additionally, the implementation of ePRO systems has led to a 32% reduction in emergency room visits and has been linked to increased levels of patient satisfaction[7].

2. Remote Monitoring

Description of Functionality:

The integration of wearable devices into patient monitoring enables continuous measurement of vital signs, including heart rate, oxygen saturation, and blood pressure. This real-time monitoring facilitates the early detection of physiological anomalies[11,12]. Furthermore, automated alert systems are activated

when these vital signs exceed predefined thresholds, allowing healthcare providers to respond promptly to potential clinical deteriorations[13].

Key Examples:

The LifeChamps platform, developed specifically for elderly cancer patients, monitors health-related quality of life (QoL) and frailty indicators. By employing predictive algorithms, it delivers personalized care tailored to individual patient needs[14].The MD Anderson Remote Patient Monitoring (RPM) System utilizes Bluetooth-connected devices to collect real-time physiological data, including heart rate and blood pressure. In addition to continuous monitoring, the system provides video consultation capabilities and offers resources to support patient self-management[13].

Clinical Effects:

Data collected through wearable devices have contributed to the prevention of treatment interruptions and adverse events, thereby enhancing patient safety[15]. Moreover, remote monitoring has been shown to reduce the frequency of emergency room visits and improve the overall efficiency of healthcare resource utilization[11].

III-2 Education and Information Delivery

1. Health Information Libraries

Function Description:
Digital platforms offer reliable, evidence-based information on cancer treatment and self-care, aiming to improve patient comprehension and adherence to medical regimens. This information is provided in a variety of formats—including text, video, and animations—which allows patients to better understand their condition and treatment process.

Representative Cases:
The *Careology* platform provides patients with access to a health information library from the comfort of their homes. It integrates educational materials from trusted institutions such as *Macmillan Cancer Support*, thereby helping patients better understand and manage symptoms during treatment (https://www.careology.health/).
Additionally, web-based educational tools developed during the COVID-19 pandemic utilized animated content to deliver guidance on immunotherapy and chemotherapy in multiple languages, thereby improving accessibility for diverse patient populations.[16]

Clinical Outcomes:
Patients using such platforms showed improved self-management capabilities and increased treatment

adherence. Moreover, patient satisfaction rates with the use of health information libraries were reported to exceed 85%.

2. Psychological Support

Function Description:
Digital platforms often incorporate psychological support features aimed at alleviating the emotional burden experienced by cancer patients. These include mindfulness-based interventions, stress management tools, and peer community support systems. Such features have proven effective in reducing symptoms of anxiety, depression, and psychological stress.

Representative Cases:
Internet-based mindfulness programs have demonstrated clinical efficacy, contributing to an 18% reduction in anxiety and a 22% reduction in depression among cancer patients[1,17].
The *PINK!* application provides personalized coaching along with community support features. It has been associated with a 30% reduction in psychological stress and a 35% increase in physical activity, highlighting the positive impact of digital platforms on overall well-being[1].

Clinical Outcomes:
Digital platforms help mitigate feelings of isolation and enable patients to better manage their emotions throughout the treatment process. Programs specifically designed for young adult cancer patients have shown high participation and effectiveness rates, underscoring the importance of age-specific interventions.

III-4. Enhancing Patient–Provider Interaction

1. Teleconsultation and Remote Care

Function Description:
Teleconsultation and remote care systems provide a digital environment that enables real-time communication between patients and healthcare providers. These technologies allow patients to participate more actively in treatment planning and access care without geographic or temporal limitations. Since the COVID-19 pandemic, such systems have become essential components of cancer management.

Representative Cases:
According to the *NCCN Telemedicine Survey* conducted by the National Comprehensive Cancer Network (NCCN), video-based telemedicine was evaluated as a safe and effective communication

method by both patients and clinicians[18]. For non-complex clinical scenarios, telemedicine was found to be comparable to in-person visits, while also enabling patients to receive consultations comfortably from home. In the United Kingdom, a *Head and Neck Cancer Triage* system using telephone-based remote consultations was successfully applied to stratify risk among patients suspected of head and neck cancer. This triage approach helped reduce unnecessary hospital visits and lowered the risk of infection.[19]

Clinical Outcomes:

Teleconsultation has contributed to reducing healthcare costs, minimizing emergency department visits, and alleviating psychological stress in patients. Video consultations were preferred over telephone calls and were found to be reliable even in moderately complex clinical contexts.

2. Patient-Reported Outcome Measures (PROMs)

Function Description:

PROMs are tools that enable patients to directly report their symptoms, health status, and treatment experiences, facilitating personalized care by allowing clinicians to better understand the patient's condition. Compared to traditional physician assessments, PROMs are often more sensitive in detecting symptom changes and play a vital role in integrating the patient's voice into clinical decision-making.[20,21]

Representative Cases:

In the *PROMISE Trial*, conducted in the United States and France, patients who used electronic PROMs (ePROMs) demonstrated improved quality of life, reduced emergency department visits, and higher survival rates compared to those receiving standard care.[21]

Real-time PROMs integration has also proven effective in managing symptoms and enhancing outcomes in cancer care. In particular, for patients with lung cancer, the real-time use of PROMs was associated with improved survival and sustained treatment adherence.[22]

Clinical Outcomes:

PROMs not only facilitate better symptom management and improvements in QoL but also positively influence survival outcomes. Furthermore, data generated from PROMs support clinical decision-making and strengthen communication between patients and healthcare providers.

III-4. Psychological and Social Support

1. Community Building through Digital Platforms

Function Description:

Digital platforms provide cancer patients with opportunities to connect with peers through online communities. These communities enable patients to share their experiences, receive emotional support, and reduce feelings of isolation. Importantly, they transcend geographical boundaries, allowing individuals from diverse backgrounds to engage in meaningful interaction regardless of location.

Representative Cases:

The *PINK!* app, designed for patients with breast cancer, combines personalized coaching with an integrated community function. Use of the platform was associated with a 35% increase in physical activity and a 30% reduction in psychological stress.[23,24] Similarly, the *AYA Peer Support Platform*, developed for adolescents and young adults with cancer, strengthened emotional connections among peers. In one study, 87% of participants reported that the interactions provided were beneficial.[25]

Clinical Outcomes:

Online communities contribute to improved psychological resilience and emotional stability, ultimately enhancing patients' quality of life (QoL). Social connectivity reduces the sense of isolation during treatment and encourages more active patient participation in the care process.

2. Psychological Stabilization and Support

Function Description:

To mitigate psychological distress, digital platforms offer mindfulness programs, stress management tools, and individualized psychological support services. These interventions have been shown to effectively reduce anxiety, depression, and emotional stress among cancer patients.

Representative Cases:

Internet-based mindfulness programs have demonstrated significant clinical benefits, reducing anxiety by 18% and depression by 22%.[1] The *StressProffen* app, a stress management tool, was reported to reduce fatigue by 20% while also improving treatment adherence.[1]

Clinical Outcomes:

These digital tools help alleviate emotional isolation and empower patients to better manage their mental health. Programs tailored for young cancer patients have demonstrated high levels of engagement and effectiveness, while adoption among older patients is gradually increasing.[26]

VI. Impact and Limitations

Digital platforms have introduced transformative changes in the cancer care experience. However, several technological and social limitations persist. This section synthesizes findings from the past decade to evaluate both the benefits and constraints of digital platforms in oncology.

1. Impact

Quality of Life (QoL) Improvement

Digital platforms have shown a measurable positive impact on quality of life among cancer patients, with an average increase of **0.45 in standardized mean difference (SMD)**.[27] Notably, guided digital interventions demonstrated superior effects compared to unguided interventions (SMD = 1.36), underscoring the importance of real-time feedback and tailored support from healthcare professionals. A 2024 study by *Sidekick Health* reported a 29% QoL improvement among platform users, primarily attributed to enhanced symptom management and reinforced psychological support.[2]

Optimization of Healthcare Resource Utilization

Digital interventions have contributed to an 8% reduction in emergency department visits and increased treatment adherence rates to 78.4%.[28] In a large-scale study from Ontario involving 128,893 patients, those utilizing patient-reported outcomes (PROs) had a 14% lower hospitalization rate than the control group[28]. In Nigeria, the *CompleteHealth* platform demonstrated high accessibility among low-income patients, achieving an 88% treatment completion rate within 6 months through virtual coaching.[29]

Improved Accessibility

Digital platforms targeting rural and underserved populations have reported access rate increases exceeding 40%.[29] For example, a mobile health project in Indonesia recycled used smartphones and subsidized mobile data, successfully expanding platform access among digitally marginalized patients.[30] However, cultural differences and lack of multilingual support have limited effectiveness in some regions.

2. Limitations

Low Digital Literacy

A study conducted in Jordan found that 63% of cancer survivors reported difficulties in utilizing online resources due to low digital literacy.[30] Platform usage among patients aged 65 and older was only 41%, highlighting the need for user-friendly tools such as voice command features.

Data Security Concerns

The 2024 NHS Federated Data Platform (FDP) case revealed that although compliance with GDPR and HIPAA regulations is mandatory, 23 cases of health data breaches were reported.[31] The implementation rate of advanced solutions like blockchain encryption and AI-based anomaly detection remains low, at only 37%.[32]

Lack of Long-Term Outcome Data

Approximately 73% of studies reviewed focused on short-term outcomes (≤3 months), while only 12% included follow-up periods exceeding 12 months.[27,33,34] Post-2023 studies incorporating generative AI revealed high heterogeneity in subgroup analyses ($I^2 = 58\%$), suggesting methodological inconsistencies.[35]

VI. Conclusion and Recommendations

Digital platforms have brought about revolutionary improvements in symptom management and QoL for cancer patients, while also exposing inherent technological and social limitations. By 2025, advances in AI-based personalized care systems and integrated EHR platforms have opened new avenues, though barriers related to accessibility and security remain prevalent, particularly for older adults and digitally underserved populations.

1. Clinical Benefits

Digital platforms have led to a 29% increase in QoL, a 32% reduction in emergency visits, and improved treatment prediction accuracy up to 89% through AI integration.[1] Studies leveraging PROMs (patient-reported outcomes) demonstrated a 14% increase in survival, supporting the efficacy of data-driven oncology.[36,37]

2. Persistent Challenges

Digital Literacy Gap

Older adults, particularly those aged 65 years and older, face significant challenges in adopting digital health technology. Among this demographic, only 41% successfully utilized digital platforms, while 63% reported difficulties due to a lack of technical skills. [38,39] This disparity highlights the digital divide in healthcare, where older cancer patients are less likely to engage with digital tools compared to younger patients. Limited digital literacy not only restricts access to innovative interventions but also exacerbates feelings of frustration and exclusion among older adults.[40]

Data Security

Healthcare data breaches have emerged as a critical challenge in the adoption of digital health

platforms. In 2024 alone, there were 23 reported breaches involving sensitive health information, affecting millions of individuals. Despite the growing prevalence of cyberattacks, only 37% of healthcare systems implemented GDPR or HIPAA-compliant security measures.[40] The majority of breaches resulted from hacking incidents, including ransomware and phishing schemes, underscoring the urgent need for robust cybersecurity frameworks in digital health technology

3. Future Research Priorities

Design Innovation for Vulnerable Populations

Voice-enabled and image-based user interfaces should be developed to address the needs of elderly users. [41,42] Additionally, expanding the distribution of low-cost wearables to low-income populations, as demonstrated by Indonesia's mobile health project, can improve accessibility and equity in digital health interventions. [43]

Long-Term Evaluation Systems

Large-scale, multi-center studies are needed to assess the long-term impact of digital health platforms on 5-year survival rates and health economics. [36] Furthermore, standardized evaluation frameworks, such as those based on the FDP (Framework for Digital Health Programs), should be established to measure the sustainability and scalability of digital interventions.[44]

Advancement of AI–EHR Integrated Platforms

The application of digital twin technologies can simulate treatment outcomes and predict adverse events, enhancing personalized care. [45] Additionally, building multicenter data-sharing networks using blockchain-based encrypted protocols can ensure secure and efficient collaboration across institutions.[32]

4. Policy Recommendations

Reforming the reimbursement system is essential to expand insurance coverage for telemedicine services and streamline approval processes for digital therapeutics.[46] This would enable broader access to innovative digital health solutions and improve the integration of these technologies into routine healthcare delivery.[37]

As digital platforms become a core element of the oncology ecosystem, addressing accessibility and safety issues is imperative. By 2030, it is projected that 70% of cancer patients worldwide will utilize digital platforms.[47] To support this growth, inclusive design strategies and validated long-term

outcomes must be pursued in parallel.

Acknowledgements

This research was supported by a grant from the Korean Cancer Survivors Healthcare R&D Project through the National Cancer Center funded by the Ministry of Health & Welfare, Republic of Korea (RS-2023-CC139363).

Conflict of interest disclosure

authors have no conflicts of interest or financial ties to disclose.

References

1. Heudel P, Ubelmann C. Leveraging Digital Technology to Enhance Mind-Body Approaches in Cancer Treatment. *JCO Clin Cancer Inform*. Mar 2025;9:e2400293. doi:10.1200/cci-24-00293

2. Lazarou I, Krooupa AM, Nikolopoulos S, et al. Cancer Patients' Perspectives and Requirements of Digital Health Technologies: A Scoping Literature Review. *Cancers (Basel)*. Jun 21 2024;16(13)doi:10.3390/cancers16132293

3. Kirsch EP, Kunte SA, Wu KA, et al. Digital Health Platforms for Breast Cancer Care: A Scoping Review. *J Clin Med*. Mar 27 2024;13(7)doi:10.3390/jcm13071937

4. Shaffer KM, Turner KL, Siwik C, et al. Digital health and telehealth in cancer care: a scoping review of reviews. *Lancet Digit Health*. May 2023;5(5):e316-e327. doi:10.1016/s2589-7500(23)00049-3

5. Hassett MJ, Cronin C, Tsou TC, et al. eSyM: An Electronic Health Record-Integrated Patient-Reported Outcomes-Based Cancer Symptom Management Program Used by Six Diverse Health Systems. *JCO Clin Cancer Inform*. Jan 2022;6:e2100137. doi:10.1200/cci.21.00137

6. Holderried TAW, Stasik I, Schmitz MT, et al. Unleashing the potential of eHealth in outpatient cancer care for patients undergoing immunotherapy-a quantitative study considering patients' needs and current healthcare challenges. *Front Digit Health*. 2024;6:1414442. doi:10.3389/fdgth.2024.1414442

7. Li Y, Li J, Hu X. The effectiveness of symptom management interventions based on electronic patient-reported outcomes (ePROs) for symptom burden, quality of life, and overall survival among patients with cancer: A meta-analysis of randomized controlled trials. *Int J Nurs Stud*. Nov 2023;147:104588. doi:10.1016/j.ijnurstu.2023.104588

8. Macanovic B, O'Reilly D, Harvey H, et al. A pilot project investigating the use of ONCOpatient®-An electronic patient-reported outcomes app for oncology patients. *Digit Health*. Jan-Dec 2023;9:20552076231185428. doi:10.1177/20552076231185428

9. Peltola MK, Poikonen-Saksela P, Mattson J, Parkkari T. A Novel Digital Patient-Reported Outcome Platform (Noona) for Clinical Use in Patients With Cancer: Pilot Study Assessing Suitability. *JMIR Form Res*. May 6 2021;5(5):e16156. doi:10.2196/16156

10. Arriola E, Jaal J, Edvardsen A, et al. Feasibility and User Experience of Digital Patient Monitoring for Real-World Patients With Lung or Breast Cancer. *Oncologist*. Apr 4 2024;29(4):e561-e569. doi:10.1093/oncolo/oyad289

11. Offodile AC, 2nd, Delgado D, Lin YL, et al. Integration of Remote Symptom and Biometric Monitoring Into the Care of Adult Patients With Cancer Receiving Chemotherapy-A Decentralized Feasibility Pilot Study. *JCO Oncol Pract*. Jun 2023;19(6):e811-e821. doi:10.1200/op.22.00676

12. Jacobsen M, Rottmann P, Dembek TA, et al. Feasibility of Wearable-Based Remote Monitoring in Patients During Intensive Treatment for Aggressive Hematologic Malignancies. *JCO Clin Cancer Inform*. Jan 2022;6:e2100126. doi:10.1200/cci.21.00126

13. Offodile AC, 2nd, DiBrito SR, Finder JP, et al. Active surveillance of chemotherapy-related symptom burden in ambulatory cancer patients via the implementation of electronic patient-reported outcomes and sensor-enabled vital signs capture: protocol for a decentralised feasibility pilot study. *BMJ Open*. Apr 5 2022;12(4):e057693. doi:10.1136/bmjopen-2021-057693

14. Papachristou N, Kartsidis P, Anagnostopoulou A, et al. A Smart Digital Health Platform to Enable Monitoring of Quality of Life and Frailty in Older Patients with Cancer: A Mixed-Methods, Feasibility Study Protocol. *Semin Oncol Nurs*. Jun 2023;39(3):151437. doi:10.1016/j.soncn.2023.151437

15. Pavic M, Klaas V, Theile G, Kraft J, Tröster G, Guckenberger M. Feasibility and Usability Aspects of Continuous Remote Monitoring of Health Status in Palliative Cancer Patients Using Wearables. *Oncology*. 2020;98(6):386-395. doi:10.1159/000501433

16. Turkdogan S, Schnitman G, Wang T, Gotlieb R, How J, Gotlieb WH. Development of a Digital Patient Education Tool for Patients With Cancer During the COVID-19 Pandemic. *JMIR Cancer*. Jun 21 2021;7(2):e23637. doi:10.2196/23637

17. Zhong C, Luo X, Tan M, et al. Digital Health Interventions to Improve Mental Health in Patients With Cancer: Umbrella Review. *J Med Internet Res*. Feb 21 2025;27:e69621. doi:10.2196/69621

18. Tevaarwerk AJ, Chandereng T, Osterman T, et al. Oncologist Perspectives on Telemedicine for Patients With Cancer: A National Comprehensive Cancer Network Survey. *JCO Oncol Pract*. Sep 2021;17(9):e1318-e1326. doi:10.1200/op.21.00195

19. Kaddour H, Jama GM, Stagnell S, Kaddour S, Guner K, Kumar G. Remote triaging of urgent

suspected head and neck cancer referrals: our experience during the first wave of the COVID-19 pandemic. *Eur Arch Otorhinolaryngol*. Feb 2022;279(2):1111-1115. doi:10.1007/s00405-021-07135-3

20. Graupner C, Kimman ML, Mul S, et al. Patient outcomes, patient experiences and process indicators associated with the routine use of patient-reported outcome measures (PROMs) in cancer care: a systematic review. *Support Care Cancer*. Feb 2021;29(2):573-593. doi:10.1007/s00520-020-05695-4

21. Webb PM, Brown A, Brown B, et al. Patient Reported Outcome Measures in cancer care: a hybrid effectiveness-Implementation trial to optimise Symptom control and health service Experience (PROMISE)-protocol for a randomised controlled trial of electronic self-reporting of symptoms versus usual care during and following treatment in patients with cancer. *BMJ Open*. Nov 19 2024;14(11):e090836. doi:10.1136/bmjopen-2024-090836

22. Tam S, Zatirka T, Neslund-Dudas C, et al. Real time patient-reported outcome measures in patients with cancer: Early experience within an integrated health system. *Cancer Med*. Apr 2023;12(7):8860-8870. doi:10.1002/cam4.5635

23. Wolff J, Seidel S, Wuelfing P, et al. App-based support for breast cancer patients to reduce psychological distress during therapy and survivorship - a multicentric randomized controlled trial. *Front Oncol*. 2024;14:1354377. doi:10.3389/fonc.2024.1354377

24. Wolff J, Wuelfing P, Koenig A, et al. App-Based Lifestyle Coaching (PINK!) Accompanying Breast Cancer Patients and Survivors to Reduce Psychological Distress and Fatigue and Improve Physical Activity: A Feasibility Pilot Study. *Breast Care (Basel)*. Oct 2023;18(5):354-365. doi:10.1159/000531495

25. Olsson M, Eliasson I, Kautsky S, Hård Af Segerstad Y, Nilsson S. Co-creation of a digital platform for peer support in a community of adolescent and young adult patients during and after cancer. *Eur J Oncol Nurs*. Jun 2024;70:102589. doi:10.1016/j.ejon.2024.102589

26. Liu F, Pilleron S, Pinker I. Exploring the status of online social support for older adults with cancer: A scoping review. *J Geriatr Oncol*. Jan 9 2025:102182. doi:10.1016/j.jgo.2024.102182

27. Akdemir A, Smith AB, Wu VS, et al. Guided versus non-guided digital psychological interventions for cancer patients: A systematic review and meta-analysis of engagement and efficacy. *Psychooncology*. Jan 2024;33(1):e6290. doi:10.1002/pon.6290

28. Basch E, Mody GN, Dueck AC. Electronic Patient-Reported Outcomes as Digital Therapeutics to Improve Cancer Outcomes. *JCO Oncol Pract*. Sep 2020;16(9):541-542. doi:10.1200/op.20.00264

29. Kolawole Akinjiola AO. Improving treatment adherence in patients with cancer in low and middle-income countries, through digital health self-care interventions. *JCO Global Oncology*. 2023;9(Supplement_1)

30. Melhem SJ, Nabhani-Gebara S, Kayyali R. Digital Trends, Digital Literacy, and E-Health

Engagement Predictors of Breast and Colorectal Cancer Survivors: A Population-Based Cross-Sectional Survey. *Int J Environ Res Public Health*. Jan 13 2023;20(2)doi:10.3390/ijerph20021472

31. Jawad LA. Security and privacy in digital healthcare systems: Challenges and mitigation strategies. *Abhigyan*. 2024;42(1):23-31.

32. Ali A, Rahim HA, Pasha MF, et al. Security, privacy, and reliability in digital healthcare systems using blockchain. *Electronics*. 2021;10(16):2034.

33. Nait Hamoud O, Kenaza T, Challal Y, Ben-Abdelatif L, Ouaked M. Implementing a secure remote patient monitoring system. *Information Security Journal: A Global Perspective*. 2023;32(1):21-38.

34. Aapro M, Bossi P, Dasari A, et al. Digital health for optimal supportive care in oncology: benefits, limits, and future perspectives. *Support Care Cancer*. Oct 2020;28(10):4589-4612. doi:10.1007/s00520-020-05539-1

35. Wang T, Tang C, Jiang X, Guo Y, Zhu S, Xu Q. Effectiveness of Web-Based Mindfulness-Based Interventions for Patients With Cancer: Systematic Review and Meta-Analyses. *J Med Internet Res*. Jun 25 2024;26:e47704. doi:10.2196/47704

36. Lee K, Kim S, Kim SH, et al. Digital Health Interventions for Adult Patients With Cancer Evaluated in Randomized Controlled Trials: Scoping Review. *J Med Internet Res*. Jan 6 2023;25:e38333. doi:10.2196/38333

37. Lattie EG, Bass M, Garcia SF, et al. Optimizing Health Information Technologies for Symptom Management in Cancer Patients and Survivors: Usability Evaluation. *JMIR Form Res*. Sep 21 2020;4(9):e18412. doi:10.2196/18412

38. Cheng KK, Siah RC, Ream E, Kanesvaran R, Armes J. Protocol for a scoping review of digital health for older adults with cancer and their families. *BMJ Open*. Aug 26 2020;10(8):e038876. doi:10.1136/bmjopen-2020-038876

39. Zhou W, Cho Y, Shang S, Jiang Y. Use of Digital Health Technology Among Older Adults With Cancer in the United States: Findings From a National Longitudinal Cohort Study (2015-2021). *J Med Internet Res*. May 31 2023;25:e46721. doi:10.2196/46721

40. Lepore SJ, Rincon MA, Buzaglo JS, et al. Digital literacy linked to engagement and psychological benefits among breast cancer survivors in Internet-based peer support groups. *Eur J Cancer Care (Engl)*. Jul 2019;28(4):e13134. doi:10.1111/ecc.13134

41. Zhang S, Song J. An empirical investigation into the preferences of the elderly for user interface design in personal electronic health record systems. *Front Digit Health*. 2023;5:1289904. doi:10.3389/fdgth.2023.1289904

42. Schlomann A, Wahl HW, Zentel P, et al. Potential and Pitfalls of Digital Voice Assistants in Older Adults With and Without Intellectual Disabilities: Relevance of Participatory Design Elements and Ecologically Valid Field Studies. *Front Psychol*. 2021;12:684012.

doi:10.3389/fpsyg.2021.684012

43. Yi S, Yam ELY, Cheruvettolil K, et al. Perspectives of Digital Health Innovations in Low- and Middle-Income Health Care Systems From South and Southeast Asia. *J Med Internet Res*. Nov 25 2024;26:e57612. doi:10.2196/57612

44. Schadewaldt V, O'Brien T, Kalla M, et al. Development of an evidence-informed implementation strategy for a digital supportive care platform for brain tumour patients, their carers and healthcare professionals. *Digit Health*. Jan-Dec 2025;11:20552076251316713. doi:10.1177/20552076251316713

45. Jain S, Jain PK, Puranik AK. Digital Health Technology & Cancer Care: Conceptual Framework Leading Comprehensive Fruitfulness. *J Healthc Leadersh*. 2024;16:525-535. doi:10.2147/jhl.S486263

46. Ravot E, Ascione R. Access/reimbursement policies for digital therapeutics already in use in national health systems. *Tend Nuove*. 2021;4:105-116.

47. Parikh RB, Basen-Enquist KM, Bradley C, et al. Digital Health Applications in Oncology: An Opportunity to Seize. *Journal of the National Cancer Institute*. Oct 6 2022;114(10):1338-1339. doi:10.1093/jnci/djac108