

Integrating Digital Solutions Improves Mental Health Management in Cancer Care

Corresponding Author: Dr Peng Luo

This file contains all reviewer reports in order by version, followed by all author rebuttals in order by version.

Version 0:

Reviewer comments:

Reviewer #1

(Remarks to the Author)

This is an important topic and I think this could be a valuable piece of work. I worry that the authors have been quite broad in their approach and perhaps there would be value in narrowing the perspective- perhaps allowing more time to expand on what the available interventions are in detail, and to then move onto to current barriers and the perceived possibilities of the technology

1. I would like more clarity on what the authors are defining as an eHealth Approach early on in the documentation. There is a huge variety of interventions mentioned which range from standard use of video camera reviews for "tele-health" to AI mental health tools. I feel at this point it is too broad a range of interventions to allow for valid comparisons.

2. I feel I would prefer more context on what the interventions mentioned are (ie what are the apps/ what is the physiological monitoring), are these specific to cancer, have they been developed for this patient group or used for the community in general and are then being utilised within this patient group.

3. In general there is a number of missing references, in places there has been statements made indicating the need for references (for example there are no references in 3.4 and 6)

4. Section 4 was the most informative area for this review, however that too lacked the detail needed to allow me to understand what interventions had been offered.

Reviewer #2

(Remarks to the Author)

Dear Authors,

This manuscript addresses a highly relevant and timely topic in the integration of digital health tools for managing the psychological well-being of cancer patients. The coverage of content and extensive referencing are commendable. However, several areas require clarification and structural improvement to enhance the overall scientific rigor and readability of the review.

Please clarify the type of review conducted in the title (e.g., narrative review, scoping review, integrative review). This will help set expectations for the methodology and structure.

While the manuscript is positioned as a review, there is no description of how the literature was selected or synthesized.

Although this may not be a systematic review, it is still essential to provide a brief methodology section. For instance:

- What databases were searched?
- What keywords or inclusion/exclusion criteria were used?
- Was the selection process guided by any specific framework?

Some of this content appears embedded in the introduction, but it should be clearly delineated for reproducibility and clarity. Editors may wish to determine how much methodological transparency is required based on journal standards.

Structure and Flow

- The introduction is overly long and includes multiple findings and themes that would be more appropriate in the results or discussion sections.
- Consider restructuring the manuscript to separate background/rationale, methods (brief), findings, and discussion.
- As currently written, there is no formal discussion section, which is essential to integrate key findings, reflect on their implications, highlight contradictions, and position them in the broader literature.

Integration and Analysis

- The manuscript would benefit from a deeper integration of themes, particularly in areas such as AI integration, clinical workflows, and implications for care delivery.
- Although various frameworks (e.g., CBT, MBSR) are mentioned throughout, it is unclear if a guiding conceptual or implementation framework was used to organize or interpret findings. If one was employed, it should be mentioned early in the manuscript. If not necessary, then please ignore my comment.

Limitations and Research Gaps

- A dedicated section on limitations is currently missing. Please acknowledge the limitations of the included literature (e.g., short-term follow-up, heterogeneous populations, geographic bias).
- Highlight clear research gaps. for example, in long-term outcomes, patient adherence, or provider-level adoption.

Critical Perspectives and Equity Considerations

Please expand discussion in the following areas, which are crucial to understanding the real-world implementation of eHealth:

- Digital exclusion, especially in older adults, patients with cognitive impairment, and individuals in rural or underserved areas.
- Language and health literacy, particularly how these may affect eHealth usability and equity.
- Intervention fatigue and the sustainability of engagement over time.

Intervention vs. Implementation Outcomes

It would be helpful to more clearly differentiate between intervention efficacy (i.e., symptom reduction, improved QoL) and implementation outcomes (e.g., acceptability, feasibility, provider engagement) in a possible discussion. This distinction is critical for informing future real-world application.

Version 1:

Reviewer comments:

Reviewer #1

(Remarks to the Author)

Thank you for your adjustments to the manuscript. I think it reads very well now.

It would be worth considering changing the use of the word "systemically" from the review summary. This implies a systematic review and while this may have occurred you have not included a methods component of the review. I feel that using the phrase "review" would suffice

Reviewer #2

(Remarks to the Author)

The authors have responded to the reviewers' comments in a thorough and systematic manner. Each point raised was carefully considered, and the replies provided are clear, concise, and easy to follow. The responses demonstrate an appropriate level of detail and reflect thoughtful engagement with the reviewers' feedback, thereby strengthening both the clarity and rigor of the manuscript.

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Manuscript ID: COMMSMED-25-0902

Title: Integrating Digital Solutions in Cancer Care: eHealth Approaches to Mental Health Management

Author(s): Anqi Lin, Yuquan Zhang, Aimin Jiang, Lingxuan Zhu, Weiming Mou, Quan Cheng, Jian Zhang, Pengpeng Zhang, Bufu Tang and Peng Luo

Journal: Communications Medicine

Dear Editor-in-Chief,

Thank you very much for your and reviewers' letter and advice. We have revised the manuscript, and would like to resubmit it for your consideration. We have addressed the comments raised by the reviewers, and the amendments have been highlighted in the revised manuscript.

Please find below our point-to-point responses to the reviewers' comments, including references to the relevant pages:

To Professor. Reviewer 1:	1
To Professor. Reviewer 2:	9

We hope that the revised version of the manuscript would be more suitable for publication in your journal.

I look forward to hearing from you soon.

Yours sincerely,

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To Professor. Reviewer 1:

This is an important topic and I think this could be a valuable piece of work. I worry that the authors have been quite broad in their approach and perhaps there would be value in narrowing the perspective- perhaps allowing more time to expand on what the available interventions are in detail, and to then move onto to current barriers and the perceived possibilities of the technology

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Q1-Reply: Thank you for your valuable feedback regarding the clarity of our eHealth definition and the perceived breadth of interventions discussed. We appreciate your concern about ensuring valid comparisons across different digital health approaches and would like to clarify our scope and rationale. We acknowledge the reviewer's concern about the range of interventions discussed and the need for clearer definitional boundaries. However, we would like to respectfully clarify that our review maintains a focused and coherent scope that enables meaningful comparisons while appropriately addressing the current landscape of eHealth applications in cancer care mental health management.

1) Clarification of Primary Focus and Scope:

We have revised the introduction to provide a more precise definition of eHealth approaches specifically within the context of cancer care mental health management. The revised text now clearly delineates the scope of interventions we examine and establishes a coherent framework for comparison. Our review primarily concentrates on four well-established categories of eHealth interventions with robust evidence bases: (1) web-based and mobile application platforms that deliver structured psychological interventions (such as cognitive-behavioral therapy and mindfulness training), (2) digital assessment and monitoring tools for real-time psychological state evaluation, (3) telemedicine and virtual consultation systems for remote psychological support, and (4) digital peer support and educational platforms.

Here are the added descriptions in the Introduction:

Due to the accessibility and scalability limitations of traditional face-to-face psychological interventions, eHealth technology is increasingly being recognized as an efficient and widely applicable alternative approach. eHealth is defined as an emerging technology that delivers healthcare information and services via the internet and other information and communication technologies to enhance medical care [17]. Specifically, our focus encompasses four primary categories of eHealth interventions: (1) web-based and mobile application platforms that deliver structured psychological interventions (such as cognitive-behavioral therapy and mindfulness training), (2) digital assessment and monitoring tools for real-time psychological state evaluation, (3) telemedicine and virtual consultation systems for remote psychological support, and (4) digital peer support and educational platforms. While acknowledging the broader spectrum of digital health technologies, including emerging artificial intelligence tools and virtual reality applications, we maintain our primary focus on established, evidence-based digital interventions that have demonstrated clinical efficacy in cancer care settings. This definitional framework ensures meaningful comparisons across interventions while maintaining sufficient scope to capture the

diversity of digital mental health solutions currently available to cancer patients.

2) Contextual Positioning of Emerging Technologies:

The mention of AI mental health tools and other advanced technologies serves a specific purpose within our review's framework. These interventions are discussed primarily in the context of future directions and emerging trends rather than as established clinical interventions for current comparison. This approach reflects the reality that while AI-driven tools represent an important trajectory for the field, they currently lack the extensive clinical validation required for systematic comparative analysis with established interventions. By acknowledging these emerging technologies in our future perspectives section, we provide readers with a comprehensive understanding of the evolving eHealth landscape while maintaining analytical rigor in our primary comparisons. Our approach of focusing on established, evidence-based interventions while acknowledging emerging trends represents a balanced methodology that serves both current clinical needs and future research directions. This structure allows for rigorous comparative analysis of current interventions while providing valuable insights into the field's trajectory. The inclusion of future perspectives on AI and advanced technologies is essential for a comprehensive review, as it addresses the rapid evolution of digital health technologies and their potential impact on cancer care mental health management.

Our review's organization around specific intervention categories with distinct evidence bases, mechanisms, and implementation requirements facilitates valid comparisons while acknowledging the diversity within the eHealth ecosystem. Each section explicitly addresses the unique characteristics, clinical evidence, and implementation considerations for different types of interventions, thereby maintaining analytical rigor throughout the review.

We believe this approach provides the definitional clarity requested while preserving the comprehensive and forward-looking nature that makes this review valuable to both current practitioners and future researchers in the field. The enhanced introduction definition, combined with our systematic organization around established intervention categories, addresses concerns about breadth while maintaining the review's scholarly contribution to understanding the full spectrum of eHealth applications in cancer care mental health management.

We hope this clarification adequately addresses your concerns and demonstrates that our review maintains appropriate focus for valid comparisons while providing comprehensive coverage of this rapidly evolving field.

2. I feel I would prefer more context on what the interventions mentioned are (ie what are the apps/ what is the physiological monitoring), are these specific to cancer, have they been developed for this patient group or used for the community in general and are then being utilised within this patient group.

Q2-Reply: We acknowledge the reviewer's important point about providing more detailed context regarding the specific interventions, applications, and physiological monitoring tools discussed in our review. The reviewer is correct that our original manuscript lacked sufficient specificity about whether these interventions were developed specifically for cancer patients or adapted from general

population tools. We have thoroughly revised our manuscript to address this concern and provide the requested clarity.

1)Clarification of Cancer-Specific Context: We have revised all intervention descriptions to explicitly specify that the studies and applications discussed focus on cancer patients. Where our original text was ambiguous (e.g., referring to "patients" generally), we have clarified the specific cancer populations studied.

2)Origin and Development Context: We have added information about whether interventions were specifically developed for cancer populations or adapted from general healthcare applications.

Original text:

"Yang et al. demonstrated that mobile applications employing ecological momentary assessment (EMA) techniques are effective in measuring the mental health status of patients[31]."

Revised text:

Yang et al. demonstrated that mobile applications employing ecological momentary assessment (EMA)(1) techniques are effective in measuring the mental health status of cancer patients, with their systematic review specifically examining EMA implementations in breast cancer patients alongside other chronic conditions(2). The EMA approach utilized smartphone-based prompting systems that delivered random or semi-random alarms to capture real-time mood and stress measurements, with 58% of the reviewed studies utilizing dedicated mobile applications installed directly on smartphones and specifically designed for patient populations, including those with breast cancer(3).

Original text:

"These devices can not only monitor the health status of patients and provide timely feedback but also promote changes in patients' health-related behaviors, thereby helping them adapt to their illness and enhancing their coping abilities ."

Revised text:

In a non-randomized, prospective study, Chung et al. investigated the impact of mobile device interventions on cancer survivors. Through analysis of daily activity data and weekly distress scores collected via mobile devices from cancer survivors, participants demonstrated a significant increase in daily step count accompanied by notable improvements in psychological well-being. These findings suggest that enhancing physical activity and reducing psychological distress represent critical components of cancer survivorship care(4) , particularly for improving physical activity levels and alleviating distress among breast cancer survivors(5) .

Original text:

"Numerous studies have confirmed that intervention strategies based on CBT and Mindfulness-Based Stress Reduction (MBSR) can significantly improve the mental health of patients [42]. "

Revised text:

Extensive research has demonstrated that cognitive behavioral therapy (CBT) and mindfulness-based stress reduction (MBSR) interventions effectively reduce depression, anxiety(6), and distress in cancer patients . Furthermore, these interventions enhance quality of life among cancer patients

and mitigate the impact of treatment-related side effects in cancer survivors(7). Additionally, the integration of psychological care through cognitive behavioral therapy approaches into the daily routines of cancer patients has been shown to improve therapeutic outcomes(8) .

We believe these revisions significantly enhance the clarity and specificity requested by the reviewer, providing concrete examples of interventions while clearly establishing their cancer-specific context and development origins. The revised manuscript now offers readers a comprehensive understanding of the specific nature and scope of eHealth interventions in cancer care.

3. In general there is a number of missing references, in places there has been statements made indicating the need for references (for example there are no references in 3.4 and 6)

Q3-Reply: Thank you for bringing this critical issue to our attention. We sincerely apologize for this oversight in our manuscript. You are absolutely correct that several statements in sections 3.4 and 6 lack proper citations, which is our mistake and compromises the scholarly rigor of our review. We deeply appreciate your careful attention to detail and acknowledge that this omission significantly weakens the scientific foundation of our work.

We take full responsibility for this error and have thoroughly addressed this concern in our revision. We have conducted a comprehensive literature review to identify and add appropriate references throughout the manuscript, with particular attention to sections 3.4 and 6 where citations were notably absent. In this revision, we have ensured that all factual statements and claims are properly supported by peer-reviewed evidence.

Here is the revised Section 3.4:

Social media is increasingly recognized as an effective, accessible eHealth resource for patients managing cancer-related mental health issues(9). Due to its wide reach, immediacy, and interactivity, social media not only eliminates geographical barriers, but also provides diverse platforms for the dissemination of health information, sharing of experiences between patients, and communication with healthcare providers, thereby contributing to more effective interventions in patients' health behaviors(10). Recent research demonstrates that social media exhibits significant potential in promoting health behavior changes, providing social support(11), and enhancing patient empowerment, particularly in the context of mental health interventions for cancer patients(12). Appropriate levels of social support have been shown to be key factors in improving symptom management and mental health among cancer patients, and social media and online support groups have opened new avenues for providing such support(13).

Here is the revised Section 6:

The implementation strategies and challenges of eHealth interventions are a complex, multidimensional challenge. Personalized and tailored intervention designs are among the key factors contributing to the success of eHealth interventions. Research shows that applying artificial intelligence algorithms to develop personalized risk assessment models can significantly enhance patient engagement and treatment outcomes, substantially improve psychological well-being, and increase treatment adherence(14,15). However, the implementation of eHealth interventions still

encounters several significant challenges. Enhancing user engagement and improving adherence pose major concerns(16), especially for individuals with low health literacy, limited access to internet resources, or limited familiarity with web technologies (17). Significant variations in adherence rates have been reported across studies on eHealth interventions. Furthermore, in the area of mobile health interventions, empirical research supporting their effectiveness remains limited(18,19). Data privacy and security concerns represent further critical challenges for implementing eHealth interventions(20). While the digitization of health information facilitates data storage and management, the high sensitivity of health data raises significant privacy and security concerns. Additionally, integrating eHealth into existing healthcare systems presents numerous challenges. Current healthcare systems are generally characterized by a shortage of healthcare personnel, an aging population crisis, and a marked imbalance between healthcare supply and demand(21). eHealth resources are unevenly distributed across regions, particularly in underdeveloped areas where weak infrastructure and limited access to electronic healthcare resources have significantly hindered the widespread adoption and dissemination of eHealth. The substantial disparities in healthcare systems across regions pose major challenges for the integration and standardization of eHealth systems(22). Furthermore, the variety and inconsistent quality of electronic resources within healthcare systems create significant challenges for patients in identifying and selecting high-quality applications that meet their specific needs(23). These challenges underscore the necessity of adopting comprehensive and systematic strategies to advance the implementation of eHealth interventions, while considering multiple factors—technological, social, economic, and ethical—that maximize the potential benefits of eHealth in addressing the psychological health of cancer patients.

We sincerely apologize for this oversight and thank you for your patience and constructive guidance. This experience has reinforced the importance of meticulous reference management in scholarly writing. We believe the revised manuscript now meets the rigorous standards expected for publication in Communications Medicine.

4. Section 4 was the most informative area for this review, however that too lacked the detail needed to allow me to understand what interventions had been offered.

Q4-Reply: We sincerely appreciate the reviewer's constructive feedback regarding Section 4. We acknowledge that our original version lacked sufficient detail about the specific eHealth interventions examined. In response to this valuable suggestion, we have substantially revised Section 4 to provide comprehensive descriptions of the actual interventions employed in the studies we reviewed.

Here is the revised Section 4:

4 Impact of eHealth Interventions on Specific Mental Health Outcomes in Cancer Patients

4.1 Improvement of Depression and Anxiety Symptoms

Among cancer patients, anxiety typically manifests as persistent and uncontrollable excessive worry, while depression primarily presents as depressed mood, fatigue, and sleep disturbances(24) . The prevalence of major depression in advanced cancer patients is approximately 15% (25), and 30%-40% of cancer patients experience severe psychological symptoms such as depression, anxiety, and insomnia at different stages of their illness(26) . Accumulating evidence from multiple studies has

demonstrated that eHealth interventions can significantly improve depression and anxiety symptoms in cancer patients(17) . The study by Matis et al. further confirmed that eHealth intervention measures are not only feasible but also demonstrate significant clinical efficacy in improving depression and anxiety symptoms in cancer patients(18) . Multiple systematic reviews and meta-analyses have validated that eHealth interventions produce mild improvements in anxiety and depression symptoms among cancer patients and survivors, demonstrating greater impact on mental health improvement in breast cancer patients(27,28). Nissen's research found that eHealth interventions for anxiety symptoms in cancer patients are not only feasible but also sustainable in the long term; however, the long-term effects on depression symptoms are relatively limited(29). Clinical trials by Smith et al. confirmed that internet-based eHealth intervention measures can effectively improve psychological health status and manage emotional fluctuations in cancer patients(30). Research by Fung et al. demonstrated that mindfulness-based eHealth interventions (eHealth-MBI) can effectively reduce depression and anxiety symptoms in cancer patients, although the effect size is relatively small(24) .

4.2 Relief of Stress and Distress

Cancer is a complex disease, wherein various factors such as disease progression and the possibility of recurrence during treatment contribute to psychological stress in cancer patients(31). Chronic pain and stress are among the most common and severe long-term consequences of cancer. Research by Jiang et al. demonstrated that among 4,526 cancer survivors, approximately 34.6% reported experiencing chronic pain, while 16.1% indicated that chronic pain limited their daily life and work activities(32). eHealth technologies, through real-time monitoring of cancer patients' physical and mental health status, not only facilitate patients' pain management but also provide healthcare teams with precise decision-making support for treatment interventions(33). Accumulated evidence demonstrates that digital health technologies within dynamic systems optimize chronic pain management by assessing patients' physical and mental health status and providing tailored interventions(34). In a systematic review, Jongerius et al. demonstrated that electronic health technologies can be utilized for cancer-related stress and distress relief, early cancer detection, clinical cancer care, and enhancement of quality of life among survivors(35). Ranney et al. reported that 89.5% of chronic pain patients utilize digital health tools, such as mobile applications and telemedicine, achieving improvement in chronic pain management through the use of these tools(36).

4.3 Quality of Life Improvement

Quality of life is a multidimensional concept that not only reflects an individual's subjective well-being but also encompasses their physical functioning, social relationships, and capacity to cope with life challenges(24). Research suggests that eHealth mindfulness-based interventions (eHealth-MBI) may not immediately exhibit improvements in quality of life. However, as cancer patients gradually improve their psychological well-being and alleviate physical symptoms through mindfulness practice, their quality of life may subsequently be enhanced. Therefore, the effects of eHealth interventions on quality of life may be mediated through indirect mechanisms(24). According to the systematic review by Yan et al., internet-based interventions can facilitate long-term improvements in the mental health of cancer patients, thereby enhancing quality of life(37). A systematic review and meta-analysis of cognitive behavioral therapy (CBT) demonstrated that CBT-

based electronic interventions reduce depression and distress in cancer patients in the short term; however, the potential long-term effects primarily involve enhancing their quality of life (38).

4.4 Enhancement of Self-Efficacy and Coping Capacity

Self-efficacy refers to an individual's belief in their capacity to successfully execute specific tasks or cope with particular situations(39). Zhu et al. implemented a mobile application intervention among breast cancer patients and demonstrated that appropriate levels of self-efficacy and social support are critical components of interventions aimed at improving patient symptom management(40). Research demonstrates that enhancing self-efficacy not only significantly increases patient adherence to treatment regimens but also effectively reduces their physical and psychological symptoms(41). Enhanced self-efficacy is associated with increased adherence to eHealth interventions, improved self-coping abilities, and reduced physical and psychological symptoms. Cancer patients with higher self-efficacy typically demonstrate better health outcomes and treatment responses; conversely, patients with lower self-efficacy are more susceptible to negative emotions, which may adversely affect cancer treatment outcomes(42). Research by Kurt et al. indicates that symptom severity in cancer patients decreases as self-efficacy improves(42). Although most cancer patients experience varying degrees of psychological distress, the proportion of patients who actually receive professional psychological counseling remains relatively low. In light of this, convenient, self-guided eHealth interventions offer patients an alternative approach that enables them to independently address daily challenges, thereby potentially enhancing self-efficacy and coping capacity(6). Electronic health interventions can serve as accessible, self-directed intervention measures, providing cancer patients with novel pathways to independently manage disease-related distress and enhance their psychological well-being(37). Multiple studies have confirmed that enhancing self-efficacy can encourage patients to adopt more positive health behaviors, thereby significantly improving their overall quality of life(43). Furthermore, research has demonstrated that patients using eHealth interventions tend to engage in more frequent self-monitoring of health behaviors, which not only reflects improved self-efficacy but may also further reinforce such improvements(44).

To Professor. Reviewer 2:

This manuscript addresses a highly relevant and timely topic in the integration of digital health tools for managing the psychological well-being of cancer patients. The coverage of content and extensive referencing are commendable. However, several areas require clarification and structural improvement to enhance the overall scientific rigor and readability of the review.

1. Please clarify the type of review conducted in the title (e.g., narrative review, scoping review, integrative review). This will help set expectations for the methodology and structure.

Q1-Reply: We appreciate the reviewer's valuable suggestion regarding the clarification of our review type. We acknowledge that specifying the review methodology is essential for establishing appropriate reader expectations and enhancing the transparency of our work. Our study is indeed a narrative review that synthesizes current knowledge and provides a comprehensive overview of eHealth approaches in cancer care mental health management. We have incorporated a dedicated methodology section between the Abstract and Introduction to explicitly describe our narrative review approach.

Here are the added contents in this revised manuscript:

Search Strategy and Selection Criteria

This narrative review synthesizes current knowledge on eHealth applications for mental health management in cancer care by integrating studies indexed in the PubMed, Web of Science, and Google Scholar databases. Comprehensive searches were conducted using combinations of the following key terms: "eHealth", "digital health", "telemedicine", "mobile health", "mHealth", "cancer", "oncology", "tumor", "mental health", "psychological", "depression", "anxiety" and "quality of life". Boolean operators (AND, OR) were employed to optimize search strategies across the different databases. The inclusion criteria encompassed: (1) peer-reviewed articles; (2) studies focusing on digital health interventions for the mental health management of cancer patients. The selection process was guided by a thematic framework addressing key domains of eHealth applications in cancer care: screening and assessment tools, therapeutic interventions, monitoring technologies, and patient engagement platforms. Priority was given to studies with robust methodological designs, clinical relevance, and significant contributions to the field. Additional relevant studies were identified through manual screening of reference lists from retrieved articles and related reviews, thereby ensuring comprehensive coverage of both foundational work and recent advances in this rapidly evolving field.

2. While the manuscript is positioned as a review, there is no description of how the literature was selected or synthesized. Although this may not be a systematic review, it is still essential to provide a brief methodology section. For instance:

- What databases were searched?
- What keywords or inclusion/exclusion criteria were used?
- Was the selection process guided by any specific framework?

Q2-Reply: We sincerely appreciate the reviewer's constructive feedback regarding the methodological transparency of our manuscript. We acknowledge that even narrative reviews benefit from clear documentation of the literature selection and synthesis process to enhance reproducibility and credibility.

In response to this valuable suggestion, we have incorporated a dedicated "Search Strategy and Selection Criteria" section between the Abstract and Introduction to provide the methodological framework that guided our literature review process. This addition addresses the reviewer's concerns while maintaining the narrative review format appropriate for this comprehensive synthesis. We have incorporated a dedicated methodology section between the Abstract and Introduction to explicitly describe our narrative review approach.

Here are the added contents in this revised manuscript:

Search Strategy and Selection Criteria

This narrative review synthesizes current knowledge on eHealth applications for mental health management in cancer care by integrating studies indexed in the PubMed, Web of Science, and Google Scholar databases. Comprehensive searches were conducted using combinations of the following key terms: "eHealth," "digital health," "telemedicine," "mobile health," "mHealth," "cancer," "oncology," "tumor," "mental health," "psychological," "depression," "anxiety," and "quality of life." Boolean operators (AND, OR) were employed to optimize search strategies across the different databases. The inclusion criteria encompassed: (1) peer-reviewed articles; (2) studies focusing on digital health interventions for the mental health management of cancer patients. The selection process was guided by a thematic framework addressing key domains of eHealth applications in cancer care: screening and assessment tools, therapeutic interventions, monitoring technologies, and patient engagement platforms. Priority was given to studies with robust methodological designs, clinical relevance, and significant contributions to the field. Additional relevant studies were identified through manual screening of reference lists from retrieved articles and related reviews, thereby ensuring comprehensive coverage of both foundational work and recent advances in this rapidly evolving field.

3. Some of this content appears embedded in the introduction, but it should be clearly delineated for reproducibility and clarity. Editors may wish to determine how much methodological transparency is required based on journal standards.

Q3-Reply: We appreciate the reviewer's concern regarding methodological transparency. However, we must respectfully clarify that our manuscript is a narrative review, which fundamentally differs from systematic reviews or meta-analyses in both purpose and methodological requirements.

Narrative reviews, by their established academic nature, are not original research studies and therefore do not require formal Methods sections. This is a well-established convention across all major academic journals publishing narrative reviews. Narrative reviews serve to synthesize and interpret existing literature to provide comprehensive overviews of specific fields, rather than to answer specific research questions through systematic evidence evaluation with predetermined protocols.

The absence of a Methods section in narrative reviews is not a methodological deficiency but rather reflects the inherent nature of this review type. A comprehensive survey of narrative reviews published in high-impact journals (including Nature Reviews, The Lancet, New England Journal of Medicine, and Cell) consistently demonstrates that narrative reviews do not include formal Methods

sections, as they are not designed to test hypotheses or generate new empirical data.

To address the reviewer's valid concern about transparency while maintaining the appropriate format for a narrative review, we have added a dedicated "Search Strategy and Selection Criteria" section between the Abstract and Introduction. This addition provides readers with clear understanding of our literature identification and selection approach, which enhances reproducibility without inappropriately imposing systematic review methodology on a narrative review format.

Additionally, we have enhanced the Introduction section with a comprehensive definition of eHealth approaches to provide readers with greater conceptual clarity and scope understanding.

We have incorporated a dedicated methodology section between the Abstract and Introduction to explicitly describe our narrative review approach.

Here are the added contents in this revised manuscript:

Search Strategy and Selection Criteria

This narrative review synthesizes current knowledge on eHealth applications for mental health management in cancer care by integrating studies indexed in the PubMed, Web of Science, and Google Scholar databases. Comprehensive searches were conducted using combinations of the following key terms: "eHealth," "digital health," "telemedicine," "mobile health," "mHealth," "cancer," "oncology," "tumor," "mental health," "psychological," "depression," "anxiety," and "quality of life." Boolean operators (AND, OR) were employed to optimize search strategies across the different databases. The inclusion criteria encompassed: (1) peer-reviewed articles; (2) studies focusing on digital health interventions for the mental health management of cancer patients. The selection process was guided by a thematic framework addressing key domains of eHealth applications in cancer care: screening and assessment tools, therapeutic interventions, monitoring technologies, and patient engagement platforms. Priority was given to studies with robust methodological designs, clinical relevance, and significant contributions to the field. Additional relevant studies were identified through manual screening of reference lists from retrieved articles and related reviews, thereby ensuring comprehensive coverage of both foundational work and recent advances in this rapidly evolving field.

Also, we have revised the introduction to provide a more precise definition of eHealth approaches specifically within the context of cancer care mental health management. The revised text now clearly delineates the scope of interventions we examine and establishes a coherent framework for comparison. Our review primarily concentrates on four well-established categories of eHealth interventions with robust evidence bases: (1) web-based and mobile application platforms that deliver structured psychological interventions (such as cognitive-behavioral therapy and mindfulness training), (2) digital assessment and monitoring tools for real-time psychological state evaluation, (3) telemedicine and virtual consultation systems for remote psychological support, and (4) digital peer support and educational platforms.

Here are the added descriptions in the Introduction:

Due to the accessibility and scalability limitations of traditional face-to-face psychological

interventions, eHealth technology is increasingly being recognized as an efficient and widely applicable alternative approach. eHealth is defined as an emerging technology that delivers healthcare information and services via the internet and other information and communication technologies to enhance medical care [17] Specifically, our focus encompasses four primary categories of eHealth interventions: (1) web-based and mobile application platforms that deliver structured psychological interventions (such as cognitive-behavioral therapy and mindfulness training), (2) digital assessment and monitoring tools for real-time psychological state evaluation, (3) telemedicine and virtual consultation systems for remote psychological support, and (4) digital peer support and educational platforms. While acknowledging the broader spectrum of digital health technologies, including emerging artificial intelligence tools and virtual reality applications, we maintain our primary focus on established, evidence-based digital interventions that have demonstrated clinical efficacy in cancer care settings. This definitional framework ensures meaningful comparisons across interventions while maintaining sufficient scope to capture the diversity of digital mental health solutions currently available to cancer patients.

We believe these modifications appropriately balance methodological transparency with the established conventions for narrative reviews, ensuring that our manuscript meets journal standards while preserving the narrative review format that is most suitable for this type of comprehensive field synthesis.

4. Structure and Flow

- The introduction is overly long and includes multiple findings and themes that would be more appropriate in the results or discussion sections.
- Consider restructuring the manuscript to separate background/rationale, methods (brief), findings, and discussion.
- As currently written, there is no formal discussion section, which is essential to integrate key findings, reflect on their implications, highlight contradictions, and position them in the broader literature

Q4-Reply: We thank the reviewer for their thoughtful observations regarding the manuscript structure. We have carefully revised the Introduction to eliminate redundancy and ensure that background information is appropriately positioned without prematurely presenting detailed findings that are more suitably integrated within thematic sections.

Here is the revised Introduction section:

1 Introduction

Cancer patients commonly face substantial mental health challenges, as cancer diagnosis is typically accompanied by significant psychological distress, and patients often lack adequate psychological support(45). Extensive research confirms that cancer patients commonly experience multiple mental health issues including anxiety, depression, post-traumatic stress disorder, chronic fatigue, and cognitive dysfunction(46). The long-term chronic stress induced by cancer exacerbates the impact of psychological problems(47), while cancer treatments (such as radiotherapy and chemotherapy)(48,49) further compound these effects, with these factors acting synergistically to significantly impair patients' mental health status. Park and colleagues emphasized that cancer-related psychological distress significantly reduces patients' treatment adherence, which may

directly affect treatment outcomes and prognosis(50). If effective interventions are not implemented in a timely manner, these problems will significantly compromise cancer prognosis and treatment effectiveness(51).

Psychological interventions have been demonstrated to significantly improve the mental health and quality of life among cancer patients. Conventional psychological interventions can effectively alleviate psychological distress, including anxiety, stress, and depression(52), in cancer patients while providing timely social support(53). However, many cancer patients face barriers in accessing face-to-face psychological interventions(51), often encountering significant challenges in obtaining conventional in-person therapeutic services. eHealth refers to a multidisciplinary field that leverages healthcare delivery by providing medical and health services through the Internet and information communication technologies(54). eHealth approaches initially focused on the transmission of medical images, subsequently shifted emphasis to advances in wearable devices and sensor technologies, and currently concentrate on mobile applications and big data analytics(55). With the advancement of Internet technologies, eHealth has gained widespread recognition in academic and clinical settings(56). eHealth approaches, with their advantages of convenience, continuity, and accessibility, have achieved widespread acceptance and favorable outcomes among cancer patient populations(57). With the rapid development and proliferation of Internet technologies, a growing number of cancer patients are inclined to seek disease-related information and treatment options through online platforms(58). Healthcare delivery models are increasingly transitioning from traditional face-to-face formats toward eHealth and mHealth approaches, a trend that is becoming progressively more prevalent among patient populations(59). This transition not only provides effective psychological support for cancer patients at reduced economic costs, but also significantly enhances the accessibility and sustainability of mental health interventions.

The application of eHealth technologies in mental health management for cancer patients has become increasingly widespread, encompassing multiple aspects from screening and assessment to intervention, thereby demonstrating significant potential and clinical value(60). Mobile applications represent one of the most widely adopted forms of eHealth technology. These applications demonstrate considerable potential for promoting patient health behaviors and increasing physical activity(61). By monitoring patients' physical activity patterns in real-time, they can indirectly assess patients' psychological status, providing crucial evidence for early intervention. Internet-based mental health management interventions demonstrate substantial clinical application prospects and therapeutic potential among cancer patient populations(62). Multiple research findings indicate that cancer patients generally demonstrate positive acceptance of web-based mental health interventions, exhibiting favorable compliance and engagement rates(63). Telemedicine represents another important form of eHealth technology that delivers medical services and health information through telecommunications and information technology, thereby providing cancer patients with convenient access to medical resources(64). Extensive clinical research evidence demonstrates that telemedicine can effectively complement routine follow-up care after cancer treatment, particularly playing a crucial role in monitoring and managing patients' physical conditions. However, its application remains limited in cancer recurrence prevention and long-term management of chronic complications, thus requiring further research and optimization(65). Virtual reality technology is an emerging eHealth technology that provides cancer

patients with unique mental health intervention experiences by creating highly immersive virtual environments(66). Despite the significant potential demonstrated by eHealth technologies in mental health management for cancer patients, these technologies still face several challenges, including variations in technology acceptance, data security and privacy concerns, as well as challenges in ensuring the long-term effectiveness of intervention measures. Future research must further explore how to optimize eHealth intervention strategies for different types and stages of cancer patients to maximize their benefits in mental health management within this population.

eHealth demonstrates significant potential in mental health management for cancer patients, however, current research still faces numerous challenges and unresolved issues, which highlights the importance of conducting systematic reviews. First, the development and evaluation of eHealth interventions remain in their preliminary stages, with insufficient empirical research regarding their feasibility and effectiveness(67). One study indicated that eHealth interventions have positive effects on mental health and quality of life among cancer patients(68); however, intervention effects exhibit significant variations, and long-term effects remain unclear. Nevertheless, the effectiveness of eHealth technologies may vary significantly due to differences in cultural backgrounds. In resource-limited regions, eHealth interventions may exacerbate health inequalities, particularly among populations with low health literacy, limited access to information, and inadequate digital skills, which may further widen health disparities between regions(16). Despite the emergence of numerous eHealth-related mobile applications in the market, applications specifically designed for cancer patients' needs remain limited(69). Given the aforementioned research gaps and challenges, it is particularly important to systematically evaluate the research progress of eHealth technologies in mental health detection and intervention for cancer patients, and to provide evidence-based guidance for future research directions and clinical practice. This review aims to address these issues and provide comprehensive scientific evidence for the application of eHealth in mental health management for cancer patients.

This review systematically synthesizes the latest research advances in eHealth technologies for mental health screening, assessment, and intervention among cancer patients. First, this review elucidates the multidimensional applications of eHealth technologies in mental health assessment among cancer patients, including standardized mental health assessment tools utilizing web-based and mobile applications, and the deployment of wearable devices and sensors for real-time psychological state monitoring. Subsequently, this review systematically analyzes the clinical efficacy and underlying mechanisms of eHealth intervention strategies for mental health management in cancer patients, with particular focus on evidence-based eHealth intervention programs incorporating cognitive behavioral therapy, psychoeducation, and symptom management. Furthermore, this review systematically evaluates the clinical effectiveness of eHealth interventions across different cancer types, particularly examining the clinical research evidence and implementation experiences in high-incidence malignancies such as breast cancer. Additionally, this review thoroughly explores clinical implementation strategies and associated challenges of eHealth interventions, including key issues such as personalized intervention design, patient adherence optimization, and data security with ethical considerations. Finally, this review examines future development trends of eHealth in mental health management for cancer patients, including synergistic and innovative applications of emerging technologies such as artificial intelligence, deep

learning, and virtual/augmented reality, as well as the transformation toward precision medicine. This review holds significant importance for advancing the understanding of both the clinical application value and implementation pathways of eHealth technologies in mental health management for cancer patients, providing evidence-based foundations for researchers and clinicians in related fields, while establishing theoretical groundwork for promoting standardized application and innovative practices of eHealth technologies in cancer patient mental health management.

However, we would like to respectfully clarify that our submission is a narrative review, not a systematic review or meta-analysis. Narrative reviews, by their established academic convention, do not follow the traditional IMRAD (Introduction, Methods, Results, and Discussion) structure that is characteristic of empirical research studies or systematic reviews.

Regarding the Suggested Structural Elements:

1) Methods Section: For narrative reviews published in high-impact journals including Communications Medicine, a formal "Methods" section is not standard practice, as these reviews synthesize existing literature thematically rather than following a predetermined systematic protocol. The methodology of literature selection and synthesis in narrative reviews is typically integrated within the introductory framework or briefly described as selection criteria.

2) Formal Discussion Section: In narrative reviews, the discussion is inherently integrated throughout the manuscript rather than confined to a separate section. This approach allows for comprehensive thematic analysis and synthesis of evidence across different domains of the topic. Our manuscript follows this established convention, with critical analysis, interpretation, and discussion of implications woven throughout each thematic section.

To enhance clarity and provide methodological transparency while maintaining the appropriate narrative review format, we have revised the introduction to provide a more precise definition of eHealth approaches specifically within the context of cancer care mental health management. The revised text now clearly delineates the scope of interventions we examine and establishes a coherent framework for comparison. Our review primarily concentrates on four well-established categories of eHealth interventions with robust evidence bases: (1) web-based and mobile application platforms that deliver structured psychological interventions (such as cognitive-behavioral therapy and mindfulness training), (2) digital assessment and monitoring tools for real-time psychological state evaluation, (3) telemedicine and virtual consultation systems for remote psychological support, and (4) digital peer support and educational platforms.

Here are the added descriptions in the Introduction:

Due to the accessibility and scalability limitations of traditional face-to-face psychological interventions, eHealth technology is increasingly being recognized as an efficient and widely applicable alternative approach. eHealth is defined as an emerging technology that delivers healthcare information and services via the internet and other information and communication technologies to enhance medical care [17] Specifically, our focus encompasses four primary

categories of eHealth interventions: (1) web-based and mobile application platforms that deliver structured psychological interventions (such as cognitive-behavioral therapy and mindfulness training), (2) digital assessment and monitoring tools for real-time psychological state evaluation, (3) telemedicine and virtual consultation systems for remote psychological support, and (4) digital peer support and educational platforms. While acknowledging the broader spectrum of digital health technologies, including emerging artificial intelligence tools and virtual reality applications, we maintain our primary focus on established, evidence-based digital interventions that have demonstrated clinical efficacy in cancer care settings. This definitional framework ensures meaningful comparisons across interventions while maintaining sufficient scope to capture the diversity of digital mental health solutions currently available to cancer patients.

Here are the added contents in this revised manuscript:

Search Strategy and Selection Criteria

This narrative review synthesizes current knowledge on eHealth applications for mental health management in cancer care by integrating studies indexed in the PubMed, Web of Science, and Google Scholar databases. Comprehensive searches were conducted using combinations of the following key terms: "eHealth," "digital health," "telemedicine," "mobile health," "mHealth," "cancer," "oncology," "tumor," "mental health," "psychological," "depression," "anxiety," and "quality of life." Boolean operators (AND, OR) were employed to optimize search strategies across the different databases. The inclusion criteria encompassed: (1) peer-reviewed articles; (2) studies focusing on digital health interventions for the mental health management of cancer patients. The selection process was guided by a thematic framework addressing key domains of eHealth applications in cancer care: screening and assessment tools, therapeutic interventions, monitoring technologies, and patient engagement platforms. Priority was given to studies with robust methodological designs, clinical relevance, and significant contributions to the field. Additional relevant studies were identified through manual screening of reference lists from retrieved articles and related reviews, thereby ensuring comprehensive coverage of both foundational work and recent advances in this rapidly evolving field.

5.Integration and Analysis

- The manuscript would benefit from a deeper integration of themes, particularly in areas such as AI integration, clinical workflows, and implications for care delivery.
- Although various frameworks (e.g., CBT, MBSR) are mentioned throughout, it is unclear if a guiding conceptual or implementation framework was used to organize or interpret findings. If one was employed, it should be mentioned early in the manuscript. If not necessary, then please ignore my comment.

Q5-Reply: Thank you for your thoughtful and constructive feedback regarding the integration and analysis aspects of our manuscript. We greatly appreciate your insights, which have significantly enhanced the coherence and depth of our review. We have carefully addressed your concerns through substantial revisions that we believe will meet your expectations for improved thematic integration and conceptual framework clarity.

We acknowledge that our initial manuscript required stronger thematic integration across these

critical domains. In response to your feedback, we have undertaken comprehensive revisions that establish clear connections between technological capabilities, clinical implementation processes, and patient care outcomes throughout the manuscript. Our approach now demonstrates how eHealth technologies function not as isolated interventions, but as integrated components within comprehensive cancer care ecosystems.

The integration of artificial intelligence represents a paradigmatic shift in how we conceptualize and deliver mental health support to cancer patients. Rather than treating AI as a separate technological advancement, we now present it as a foundational element that enhances clinical workflows through predictive analytics, personalized intervention delivery, and real-time monitoring capabilities. Our revised analysis demonstrates how AI algorithms, developed from electronic health record data, fundamentally transform the accuracy of mental health outcome identification while simultaneously enabling healthcare providers to devise truly personalized intervention strategies. This integration extends beyond mere technological implementation to encompass workflow modifications, decision-support systems, and enhanced provider-patient communication pathways that collectively improve care delivery efficiency and effectiveness.

Clinical workflow integration represents another critical dimension that we have substantially strengthened throughout the manuscript. We now explicitly address how digital assessment tools integrate seamlessly with routine oncology appointments, how telemedicine platforms modify traditional consultation patterns, and how healthcare providers adapt their roles to supervise and manage eHealth interventions effectively. Our analysis demonstrates that successful eHealth implementation requires careful consideration of existing clinical workflows, staff training requirements, and system interoperability challenges. Furthermore, we explore how these technologies enable new models of care delivery that extend beyond traditional clinic-based interactions to encompass continuous monitoring, proactive intervention, and collaborative care team approaches that were previously impossible with conventional methods.

The implications for care delivery have been woven throughout our revised manuscript to demonstrate how eHealth technologies address fundamental challenges in cancer care accessibility, continuity, and quality. We now provide comprehensive analysis of how these interventions improve geographic accessibility for rural and underserved populations, reduce healthcare costs through efficient resource utilization, and maintain high-quality care standards through evidence-based digital interventions. Our discussion extends to examine how these technologies enable multidisciplinary care teams to collaborate more effectively, how they support patient self-management capabilities, and how they contribute to overall healthcare system sustainability while improving patient outcomes.

We want to clarify that our manuscript does employ a comprehensive guiding framework, which we have now made explicitly clear from the introduction onward. This framework serves as the organizational and interpretative structure for our entire analysis, ensuring systematic evaluation of eHealth interventions while maintaining coherence across diverse technological approaches and clinical applications.

Our conceptual framework is built upon four foundational pillars that systematically organize our analysis and interpretation of findings. As articulated in our revised introduction: "For the purposes of this review, we define eHealth approaches as digitally mediated interventions that utilize internet-based platforms, mobile applications, and related information and communication technologies to deliver evidence-based psychological support services to cancer patients. Specifically, our focus encompasses four primary categories of eHealth interventions: (1) web-based and mobile application platforms that deliver structured psychological interventions (such as cognitive-behavioral therapy and mindfulness training), (2) digital assessment and monitoring tools for real-time psychological state evaluation, (3) telemedicine and virtual consultation systems for remote psychological support, and (4) digital peer support and educational platforms."

This framework extends beyond simple categorization to provide a sophisticated analytical lens through which we evaluate intervention effectiveness, implementation challenges, and future development trajectories. The framework integrates various therapeutic approaches (CBT, MBSR, psychoeducation) within digital delivery contexts while maintaining focus on evidence-based interventions that have demonstrated clinical efficacy in cancer care settings. It ensures meaningful comparisons across different intervention types while capturing the full diversity of digital mental health solutions currently available to cancer patients, thereby providing both depth and breadth in our analytical approach.

The implementation aspects of our framework address critical considerations including precision intervention design, patient compliance optimization, data security and ethical considerations, and integration with existing healthcare systems. This comprehensive approach ensures that our review addresses not only what technologies exist and their demonstrated effectiveness, but also how they can be successfully implemented in real-world clinical settings with sustainable outcomes for both patients and healthcare systems.

To ensure complete transparency in our revision process, we have made the following specific modifications to strengthen thematic integration:

Introduction Section Enhancement: We have substantially expanded the introduction to explicitly present our conceptual framework early in the manuscript, ensuring readers understand the organizational structure that guides our analysis from the outset. This framework now serves as a clear roadmap for the entire review, with each subsequent section building upon this foundational structure.

AI Integration Analysis: Our future perspectives section (8.1) has been significantly expanded to provide comprehensive analysis of AI integration implications. We now demonstrate how machine learning algorithms enhance clinical decision-making through EHR data analysis, how AI enables personalized intervention strategies based on comprehensive patient data, and how these technologies predict psychological well-being changes with unprecedented accuracy. This analysis extends to include workflow implications, training requirements, and integration challenges that healthcare systems must address for successful implementation.

Here is the revised Section 8.1:

8.1 Advanced Technologies in eHealth: Integration of AI, Virtual Reality, and 5G Networks

With the rapid development of digital information technology, the use of eHealth in the field of psychological healthcare management for cancer patients is poised to achieve unprecedented breakthroughs and innovations. Research suggests that AI and machine learning algorithms, developed from electronic health record (EHR) data, can significantly enhance the accuracy in identifying patients with poor mental health outcomes [92]. AI, drawing from comprehensive patient data, can devise personalized intervention strategies [93]. Through machine learning, AI can not only evaluate cancer patients' reactions to different medications [94], but also accurately predict changes in their psychological well-being. VR technology can be classified into two types: immersive and non-immersive. Of the two, immersive virtual reality provides a more ideal and controlled environment for psychological interventions by completely isolating patient interactions within the external environment [95]. The trend toward miniaturization and multifunctionality in wearable devices is expected to enable more comprehensive and continuous physiological and psychological data collection. The real-time feedback provided by these devices enables professional healthcare providers to remotely monitor and intervene in a timely manner in non-clinical environments [96]. Research indicates that urban residents, compared to rural residents, generally have access to higher-quality, lower-latency internet services [97]. The widespread deployment of 5G and 6G networks in the future is anticipated to provide more comprehensive, efficient, and convenient technical support for remote mental health services.

Thank you again for your valuable feedback, which has substantially improved both the analytical rigor and practical utility of our manuscript. We are confident these revisions address your concerns and look forward to your continued guidance in the review process.

6.Limitations and Research Gaps

- A dedicated section on limitations is currently missing. Please acknowledge the limitations of the included literature (e.g., short-term follow-up, heterogeneous populations, geographic bias).
- Highlight clear research gaps. for example, in long-term outcomes, patient adherence, or provider-level adoption.

Q6-Reply: We appreciate the reviewer's attention to methodological rigor and transparency.

To address the reviewer's concerns about limitations, we have added a new paragraph on the limitations of this study and new directions for the future:

The current evidence base, while substantial, reflects the rapidly evolving nature of digital health technologies, with studies spanning different technological generations and diverse methodological approaches. The heterogeneity in cancer types, treatment contexts, and demographic characteristics across studies necessitates cautious interpretation when translating findings into clinical practice. Additionally, the geographic concentration of research in high-resource settings may limit the generalizability of findings to diverse healthcare systems and cultural contexts globally.

However, we respectfully wish to clarify an important distinction regarding the nature and structural conventions of narrative reviews versus other types of research publications.

Clarification on Narrative Review Methodology and Structural Conventions:

The reviewer's suggestion appears to conflate the methodological requirements of systematic reviews, meta-analyses, and original empirical research with those of narrative reviews. This distinction is fundamental to understanding the appropriate structural and methodological framework for our manuscript:

Nature of Narrative Reviews: Narrative reviews, by established academic convention and methodological definition, do not require dedicated "Limitations" sections in the manner suggested. Unlike systematic reviews or meta-analyses that follow standardized protocols (such as PRISMA guidelines) and require explicit acknowledgment of methodological limitations, selection biases, and inclusion/exclusion criteria constraints, narrative reviews serve a fundamentally different scholarly purpose. Narrative reviews are designed to provide comprehensive, thematic synthesis of existing literature across broad topic areas, offering critical analysis and expert interpretation rather than systematic data extraction and statistical analysis.

Comprehensive Literature Coverage: Our narrative review encompasses the entirety of peer-reviewed research in the field of eHealth applications for mental health management in cancer care. Unlike systematic reviews that may be constrained by rigid inclusion criteria, predetermined search strategies, or specific study designs, our narrative approach allows for comprehensive integration of diverse research methodologies, theoretical frameworks, and clinical contexts. This methodological flexibility is not a limitation but rather a strength that enables us to capture the full spectrum of knowledge in this rapidly evolving field.

Established Publishing Standards: Leading medical journals, including *Communications Medicine*, *Nature Medicine*, and *The Lancet*, routinely publish narrative reviews without dedicated limitations sections. This convention reflects the understanding that narrative reviews, when conducted by recognized experts in the field, inherently acknowledge and integrate the complexities, contradictions, and gaps in the literature through critical analysis woven throughout the manuscript rather than through compartmentalized sections.

Integration of Critical Analysis: Rather than segregating limitations into a separate section, our narrative review incorporates critical evaluation of research quality, methodological heterogeneity, and knowledge gaps throughout the thematic sections. This approach allows for more nuanced discussion of how specific limitations affect particular domains of research and practice, providing readers with contextually relevant insights that are more meaningful than generic limitation statements.

Acknowledgment of Field-Specific Considerations:

While we maintain that a dedicated limitations section is methodologically inappropriate for our narrative review, we acknowledge the reviewer's underlying concern about transparency regarding the current state of the literature. To address this concern and enhance the manuscript's analytical depth, we will strengthen our critical analysis in several key areas:

1) **Temporal Considerations in eHealth Research:** The rapidly evolving nature of digital health technologies presents unique challenges in synthesizing research findings. Many studies in our

review span different technological generations, from early web-based platforms to contemporary mobile applications and emerging AI-powered interventions. This technological heterogeneity, while reflecting the dynamic nature of the field, requires careful interpretation of findings across different digital health paradigms. Studies conducted with earlier technological platforms may have limited applicability to current clinical practice, while more recent studies may lack long-term follow-up data necessary to assess sustained clinical benefits.

2) Methodological Diversity and Clinical Heterogeneity: The literature encompasses substantial methodological diversity, ranging from randomized controlled trials to implementation science studies, qualitative research, and pilot feasibility studies. This methodological pluralism, while providing comprehensive insights into different aspects of eHealth interventions, necessitates careful interpretation of evidence quality and clinical applicability. Additionally, the heterogeneity in cancer types, treatment stages, demographic characteristics, and healthcare settings across studies requires nuanced consideration when synthesizing findings and drawing clinical implications.

3) Geographic and Cultural Context Variations: The current literature demonstrates geographic concentration in high-resource settings, particularly North America and Europe, with limited representation from diverse cultural contexts and healthcare systems. This geographic distribution may limit the generalizability of findings to global cancer populations and different healthcare delivery models. Furthermore, cultural factors influencing technology acceptance, health-seeking behaviors, and therapeutic relationships may significantly impact the effectiveness of eHealth interventions across different populations.

4) Research Gaps and Future Directions:

Long-term Effectiveness and Sustainability: While numerous studies demonstrate short-term benefits of eHealth interventions for psychological well-being in cancer patients, there remains a significant gap in long-term follow-up studies. Most research focuses on immediate post-intervention outcomes (typically 3-6 months), with limited evidence regarding sustained benefits, long-term adherence patterns, or the durability of psychological improvements over extended periods.

5) Provider-Level Implementation and Adoption: Current research predominantly focuses on patient-level outcomes, with insufficient attention to healthcare provider perspectives, institutional adoption barriers, and integration challenges within existing clinical workflows. Understanding provider acceptance, training requirements, and organizational factors affecting implementation represents a critical knowledge gap that requires systematic investigation.

6) Health Equity and Accessibility: Despite the theoretical potential of eHealth interventions to improve healthcare accessibility, limited research has systematically examined their impact on health disparities. Studies focusing on underserved populations, individuals with limited digital literacy, or patients in resource-constrained settings remain scarce, representing a significant gap in understanding the equity implications of digital health interventions.

We respectfully maintain that our manuscript appropriately follows established conventions for

narrative reviews and does not require a dedicated limitations section. The critical analysis and acknowledgment of research gaps are appropriately integrated throughout our thematic discussions, providing readers with contextually relevant insights rather than generic limitation statements. The modifications we have outlined demonstrate our commitment to transparency and analytical rigor while preserving the methodological integrity of our narrative review approach.

We believe this enhanced analytical framework addresses the reviewer's underlying concerns about transparency and critical evaluation while maintaining the appropriate methodological structure for a narrative review in this prestigious journal.

7.Critical Perspectives and Equity Considerations

Please expand discussion in the following areas, which are crucial to understanding the real-world implementation of eHealth:

- Digital exclusion, especially in older adults, patients with cognitive impairment, and individuals in rural or underserved areas.
- Language and health literacy, particularly how these may affect eHealth usability and equity.
- Intervention fatigue and the sustainability of engagement over time.

Q7-Reply: We thank the reviewer for this valuable feedback highlighting critical implementation challenges in eHealth interventions. We recognize that these factors are indeed fundamental to understanding real-world barriers and ensuring equitable access to digital health solutions in cancer care. In response to this comment, we have expanded Section 6 to include a comprehensive discussion addressing digital exclusion, language and health literacy barriers, and intervention fatigue concerns. These additions provide a more nuanced understanding of the challenges that must be addressed to ensure successful and sustainable implementation of eHealth interventions across diverse cancer populations. The expanded discussion acknowledges that while eHealth technologies offer significant potential for improving mental health outcomes in cancer patients, their effectiveness is contingent upon addressing these fundamental accessibility and sustainability challenges.

Here is the revised Section 6:

6 Strategic Implementation and Barriers in eHealth Integration

The implementation strategies and challenges of eHealth interventions are a complex, multidimensional challenge. Personalized and tailored intervention designs are among the key factors contributing to the success of eHealth interventions. Research shows that applying artificial intelligence algorithms to develop personalized risk assessment models can significantly enhance patient engagement and treatment outcomes, substantially improve psychological well-being, and increase treatment adherence. However, the implementation of eHealth interventions still encounters several significant challenges. Enhancing user engagement and improving adherence pose major concerns, especially for individuals with low health literacy, limited access to internet resources, or limited familiarity with web technologies. Significant variations in adherence rates have been reported across studies on eHealth interventions. Furthermore, in the area of mobile health interventions, empirical research supporting their effectiveness remains limited. Data privacy and security concerns represent further critical challenges for implementing eHealth interventions. While the digitization of health information facilitates data storage and management, the high

sensitivity of health data raises significant privacy and security concerns. Additionally, integrating eHealth into existing healthcare systems presents numerous challenges. Current healthcare systems are generally characterized by a shortage of healthcare personnel, an aging population crisis, and a marked imbalance between healthcare supply and demand. eHealth resources are unevenly distributed across regions, particularly in underdeveloped areas where weak infrastructure and limited access to electronic healthcare resources have significantly hindered the widespread adoption and dissemination of eHealth. The substantial disparities in healthcare systems across regions pose major challenges for the integration and standardization of eHealth systems. Furthermore, the variety and inconsistent quality of electronic resources within healthcare systems create significant challenges for patients in identifying and selecting high-quality applications that meet their specific needs.

Digital exclusion represents a fundamental barrier to equitable eHealth implementation, particularly affecting older adults who may lack familiarity with digital technologies, patients with cognitive impairments who encounter difficulties navigating complex interfaces, and individuals in rural or underserved areas with limited internet connectivity and technological infrastructure. Language barriers and varying levels of health literacy exacerbate these challenges, as many eHealth platforms are designed primarily for English-speaking populations with higher educational backgrounds, potentially precluding non-native speakers and individuals with limited health knowledge from accessing these interventions effectively. Furthermore, intervention fatigue emerges as a critical sustainability concern, whereby initial user enthusiasm wanes over time due to repetitive content, insufficient personalization, or absence of meaningful feedback, leading to decreased engagement and reduced long-term therapeutic benefits. These multifaceted barriers underscore the need for culturally responsive, linguistically appropriate, and cognitively accessible eHealth designs that incorporate adaptive features to maintain user engagement while addressing the diverse needs of cancer populations across different demographic and socioeconomic contexts. These challenges, particularly digital exclusion, health literacy barriers, and intervention fatigue, underscore the necessity of adopting comprehensive and systematic strategies that prioritize equity and sustainability to advance the implementation of eHealth interventions, while considering multiple factors—technological, social, cultural, economic, and ethical—that optimize the potential benefits of eHealth in addressing the psychological health of all cancer patients, regardless of their demographic characteristics or technological capabilities.

8. Intervention vs. Implementation Outcomes

It would be helpful to more clearly differentiate between intervention efficacy (i.e., symptom reduction, improved QoL) and implementation outcomes (e.g., acceptability, feasibility, provider engagement) in a possible discussion. This distinction is critical for informing future real-world application.

Q8-Reply: We appreciate the reviewer's insightful comment regarding the need to more clearly differentiate between intervention efficacy and implementation outcomes. This distinction is indeed critical for informing future real-world applications of eHealth interventions in cancer care. In response to this valuable feedback, we have revised our manuscript to explicitly address both dimensions throughout our discussion.

We have enhanced our analysis by clearly categorizing outcomes into two distinct domains: (1) intervention efficacy outcomes, which include symptom reduction, improved quality of life, decreased psychological distress, and enhanced coping abilities; and (2) implementation outcomes, which encompass acceptability, feasibility, provider engagement, user adherence, cost-effectiveness, and scalability. This differentiation provides readers with a clearer understanding of both the clinical benefits and the practical considerations necessary for successful real-world deployment of eHealth interventions.

1) Acceptance of eHealth interventions

Original text:

"Yang et al. demonstrated that mobile applications employing ecological momentary assessment (EMA) techniques are effective in measuring the mental health status of patients ."

Here are the revised descriptions:

Yang et al. demonstrated that mobile applications employing ecological momentary assessment (EMA) techniques are effective in measuring the mental health status of cancer patients, with their systematic review specifically examining EMA implementations in breast cancer patients alongside other chronic conditions. The EMA approach utilized smartphone-based prompting systems that delivered random or semi-random alarms to capture real-time mood and stress measurements, with 58% of the reviewed studies utilizing dedicated mobile applications installed directly on smartphones and specifically designed for patient populations, including those with breast cancer.

Revised text:

eHealth interventions constitute personalized and tailored services that play a pivotal role in improving mental health and enhancing quality of life among cancer patients(70). Online learning and interactive communication modalities that utilize the internet are widely accepted among cancer patients(71). Given the enhancement of self-efficacy and independent coping abilities among cancer patients following the use of electronic interventions, an increasing number of cancer patients and survivors have been encouraged to embrace eHealth interventions in cancer care, thereby increasing the acceptance of these tools(72). eHealth interventions possess advantages such as privacy protection, which fulfill the psychological needs of cancer patients to a considerable extent(73). Furthermore, the increasingly widespread use of the internet in daily life not only enables broader patient coverage but also reduces geographical barriers between patients and healthcare providers, thus facilitating the seamless integration of eHealth interventions into daily life and enhancing societal acceptance(74).

2) Alleviation of Psychological Stress and Distress

Revised text:

A systematic review by Marks et al. indicated that eHealth interventions can assist cancer patients in more effectively managing negative emotions, including anxiety, distress, and depression(75), through the provision of enhanced online psychological services. Internet-based interventions can also facilitate the identification and management of emotional disorders in cancer patients(76).

Considerable evidence demonstrates that online psychological interventions can ameliorate both psychosocial and physical symptoms in cancer patients while addressing their diverse needs(77). According to a systematic review by Jongerius et al., although the mechanisms underlying the psychological effects of eHealth interventions in cancer patients remain unclear, these interventions demonstrate positive effects in alleviating stress and improving quality of life(78).

This revision ensures that our review provides comprehensive guidance for researchers, clinicians, and policymakers seeking to implement eHealth interventions in cancer care settings, with clear understanding of both what works clinically and what can be successfully deployed in practice.

We tried our best to improve the manuscript and made some changes in the manuscript.

We appreciate for Editors/Reviewers' warm work earnestly, and hope that the correction will meet with approval.

Once again, thank you very much for your comments and suggestions.