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Implementing a digital solution to support cancer patients with mental health co-morbidities: A need for ai-driven first-line support strategies

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CITATION

Michelsen C. Implementing a digital solution to support cancer patients with mental health co-morbidities: A need for ai-driven first-line support strategies. *Psycho-Oncologie*. 2026; 20(1): 4444.
<https://doi.org/10.18282/po4444>

ARTICLE INFO

Received: 27 April 2025
Revised: 23 June 2025
Accepted: 16 July 2025
Available online: 9 January 2026

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Abstract: Cancer remains a leading cause of morbidity and mortality worldwide, imposing significant physical, emotional, and economic burdens on patients and healthcare systems. Beyond the direct physiological challenges of treatment, individuals with cancer often experience profound psychosocial distress, including symptoms of depression and anxiety, which can hinder treatment adherence and coping capacity. Despite evidence that psychosocial interventions can enhance overall well-being and sometimes even survival rates, integration of mental health into oncology care faces obstacles such as workforce shortages, stigma, and geographical barriers. To strengthen the scientific contribution of this work, we now (i) clarify that the paper presents a mixed methods development evaluation protocol rather than a purely conceptual proposal, and (ii) summarize preliminary feasibility data collected in two European cancer centers ($n = 96$; see Section 5). Based upon the feasibility study, this paper proposes-empirically based pilots- to measure a digital mental health triage solution underpinned by artificial intelligence (AI). By embedding routine psychosocial screening into oncology workflows, patients are stratified into low, moderate or high-risk tiers. Low and moderate tiers receive AI guided self-management resources; high-risk patients are referred rapidly to specialist care. Psychological distress was assessed at baseline and after four weeks using the 51-item Empowerment for Participation mini assessment (EFP Mini), highly correlated with both GAD-7 and PHQ-9. Group 1 (Cohort & Self-assessment only) achieved a modest but statistically significant reduction in total distress scores ($\Delta = -28.8 \pm 54.6$; 95% CI $[-54.36, -3.24]$; $t(19) = -2.36$; $p = 0.029$), Group 2 (self-assessment with Ai support) showed a non-significant trend toward improvement ($\Delta = -22.8 \pm 39.3$; 95% CI $[-50.90, 5.30]$; $t(9) = -1.84$; $p = 0.10$), and Group 3 (self-assessment with the blended AI + human coaching arm yielded a large, clinically meaningful decrease ($\Delta = -121.7 \pm 55.3$; 95% CI $[-161.26, -82.14]$; $t(9) = -6.96$; $p < 0.001$), with a one-way ANOVA confirming significant differences across groups ($F(2, 37) = 12.79$; $p < 0.001$). Potential benefits, implementation challenges and regulatory implications-including the forthcoming EU AI Act-are critically examined. This paper explores the methodological considerations, potential benefits, and implementation challenges associated with an AI-driven mental health triage system in oncology. Future directions include long-term evaluations of effectiveness, cost-benefit analyses, and culturally sensitive adaptations across diverse healthcare settings.

Keywords: Cancer support; anxiety; depression; psychological support; workforce shortages in healthcare; mental health triage.

1. Introduction

1.1. The global cancer burden and psychosocial implications

Cancer continues to be a major global health concern, with approximately 19.3 million new cases and nearly 10 million deaths estimated worldwide in 2020 [1–3]. Factors such as aging populations, lifestyle risks, and limited access to early detection

contribute to the rising incidence of malignancies. Alongside these trends, the psychosocial toll of a cancer diagnosis is profound. Patients often face intense anxiety regarding prognosis, invasive treatment regimens, financial hardship, and disruptions to family and social roles [4].

Meta-analyses have highlighted that cancer patients experiencing significant psychological distress-ranging from mild mood fluctuations to severe depression-have a higher risk of poor quality of life, reduced treatment adherence, and poorer clinical outcomes [5,6]. These findings align with broader literature indicating that 20%–30% of cancer patients meet diagnostic criteria for psychiatric disorders, most commonly depression and anxiety [7,8].

1.2. The bidirectional relationship between physical and mental health in oncology

The interplay between cancer and mental health is inherently reciprocal. The rigors of cancer therapies can precipitate or exacerbate mental health issues, while untreated depression or anxiety can lead to diminished motivation, poorer engagement with treatment, and delayed help-seeking for symptoms of recurrence or disease progression [8]. Evidence also indicates that psychosocial distress can compromise immune function and potentially influence disease trajectories [9]. Integrating psychological care into oncology is thus a critical component of holistic, patient-centred treatment.

1.3. Limitations of current in-person mental health interventions in oncology

Despite recognition of the value of psychosocial support in cancer care, numerous barriers curtail its consistent provision:

- **Shortage of Specialized Professionals:** Many oncology clinics lack access to psycho-oncologists or mental health clinicians trained in cancer care [10].
- **Geographical Disparities:** Rural regions and underserved communities often lack comprehensive psychosocial services, forcing patients to travel long distances [11].
- **Stigma and Cultural Norms:** In some cultures, seeking mental health care remains stigmatized, dissuading patients from proactively seeking help [12,13].
- **Financial Constraints:** High out-of-pocket costs or restricted insurance coverage can limit utilization of psychosocial services [14].

1.4. The need for a scalable, digital solution

Advancements in digital health offer promising avenues for alleviating these challenges. Telehealth platforms, web-based interventions, and AI-driven applications can facilitate early psychosocial screening, continuous monitoring, and cost-effective support across geographical boundaries [15–18]. Automated screening via smartphone applications or web portals can systematically track emotional symptoms, prompting timely interventions if critical thresholds are reached. AI can tailor interventions to individual profiles, minimizing patient/client mental health challenges and reducing

the burden on mental health professionals and ensuring that high-risk patients receive specialized attention.

1.5. Objectives of the paper

This paper proposes an AI-driven digital mental health triage and support solution adapted to the unique needs of oncology populations and their families. Specifically, it aims to:

- 1) Highlight the clinical and psychosocial imperatives for incorporating mental health triage into cancer care.
- 2) Illustrate how AI-based risk stratification can streamline early detection of psychological distress and ensure more targeted support.
- 3) Describe a tiered approach wherein moderate-risk patients receive AI-guided coaching, while high-risk patients benefit from expedited referral to mental health professionals.
- 4) Concrete data from current My-E-Health clients and their families, that voluntarily approached My-E-Health for support, after receiving a cancer diagnosis, as well as a possible pilot with AstraZeneca, M42, or another medical establishment. The first has concrete examples and specify study components have already been empirically tested (screening adherence, user acceptability, short-term symptom change) versus those still under investigation (12-month cost-effectiveness).

2. Background and conceptual framework

2.1. Insights from meta-analyses and psycho-oncology research

Meta-analyses consolidate evidence that psychosocial and holistic care interventions significantly enhance emotional well-being, quality of life, and in some cases, even survival among cancer patients [19]. Integrated psychosocial support—delivered through face-to-face counselling or digital means—consistently lowers levels of depression and anxiety. Patients receiving structured psychosocial care have better adherence to chemotherapy and radiation regimens [20].

2.2. Significance of early triage and tailored interventions

Detecting and addressing mental health challenges early in the cancer journey can prevent distress from escalating, potentially reducing the need for intensive psychiatric interventions [21–24]. A systematic, AI-driven triage system can categorize patients into low-, moderate-, or high-risk groups based on regular screening data, ensuring that psychosocial resources are efficiently deployed [16].

- Low-Risk: Self-managed online modules and psychoeducational content.
- Moderate-Risk: AI-guided counselling and digital cognitive-behavioural therapy (CBT) tools.
- High-Risk: Prompt referral to mental health specialists and/or psycho-oncology clinics.

2.3. Role of digital platforms and ai coaches in oncology

Digital health platforms enable continuous psychosocial monitoring. By integrating validated short-form instruments—such as the EFP Mini and Bereavement Assessments from My-E-Health, Patient Health Questionnaires like (PHQ-9), (GAD 7) or the Distress Thermometer—oncology care teams can maintain real-time awareness of each patient’s emotional status [24–26]. AI-driven chatbots or “coaches” can provide immediate, context-specific feedback, guide patients through relaxation exercises, and foster adaptive coping strategies. When the algorithm detects an alarming escalation in distress, it alerts clinical staff for timely intervention. However, taking a safety-first approach, AI agents should be boxed and limited to their specific tasks, for example, building dynamic individual portfolios based upon criteria related to the objectives. These criteria should be delineated to the context, psychometrics, biometrics, history, AI Chats, associated risks, medical and psychological journal, and others [26].

Added Value over Existing Support

Cancer-Specific Contextualization: Unlike general-purpose platforms (Wysa, etc.), the proposed system ingests oncology-specific data into the patient AI Portfolio. My-E-Health uses at least four dynamic AI portfolios:

- (1) Medical status Portfolio—tumour type and stage, treatment modality (surgery, chemo, radiation), side-effect profiles (pain, fatigue, neuropathy), hospitalization/hospice status, and prognostic indicators—to tailor its risk stratification and recommendations [26].
- (2) Psychological Status Portfolio—current assessment status, history, trends, and specific deviations for all taken assessments and questions [26].
- (3) AI Coaches/Chatbot Sessions—current session and historical perspectives, changes and summaries for each of their 18 AI coaches within the framework [26].
- (4) AI Scribes—Auto generated AI scribes to support the clinical staff when doing online support sessions with clients. These are automatically scribed into a standard medical journal called a SOAP (Subjective, Objective, Assessment, Plan/Prognosis). Clinicians must approve the entire scribe before it can be saved into the journal. These can be edited [26].

In addition, other added values include Dyadic and Family Focus: We model not only the patient’s symptom network (anxiety, depression, maladaptive coping, anticipatory grief) but also caregiver/family distress, bereavement risk, and end-of-life planning needs, providing synchronized support pathways for both patients and their significant others. **Integrated Clinical Workflow:** By embedding routine psychosocial screenings into oncology appointments and electronic health records, our platform closes the loop between digital assessment, synchronous human coaching, and referral to psycho-oncology services—avoiding the “self-help silo” common to stand-alone chatbots [26].

Cancer-Patient-Specific Data and Modelling

Symptom-Interaction Networks: We capture multi-dimensional symptom systems (e.g., fatigue ↔ sleep disturbance ↔ mood) via a Garmin smartwatches and other devices. This can leverage network analytic techniques to identify central drivers in a patient’s distress (change in Heart rate Variability, Heart rate, breathing etc.) [26–

28] signature—information that general chatbots, which treat symptoms independently, miss.

In short, Prognostic and Treatment Variables can incorporate objective clinical metrics (e.g., neutrophil counts, performance status scores, time since diagnosis), the model learns to distinguish patterns of distress in “healthy” users from those in oncology patients whose anxiety or depression may be pharmacologically or physiologically mediated. Holistic, Stage-Sensitive Interventions and depending on disease phase—active treatment, remission, palliative care, or bereavement—the system dynamically adjusts its recommended interventions (e.g., mindfulness modules during chemo, legacy-building exercises in hospice, grief counselling post-loss). Together, these enhancements ensure that our AI-driven triage and support platform delivers truly personalized, clinically integrated mental health care for cancer patients and their families—far beyond the capabilities of existing, general-purpose AI chatbots.

3. Proposed methodological framework for implementation

3.1. Expanding the digital triage ecosystem: Lessons from “My E-Health” as a probable standard

A fundamental challenge in implementing AI-driven mental health triage systems in oncology is creating an ecosystem that integrates seamlessly with existing healthcare infrastructures while maintaining user-friendliness. One of the more established digital healthcare platforms in the U.K. and Scandinavian countries, My E-Health, offers insights that may serve as benchmarks for oncology-centric mental health triage using the same ISO 27001-certified code-base and secure-messaging layer, but adds cancer-specific modules [26]. Developed initially to support patients with chronic illness and mental health conditions, My E-Health employs a multi-layered framework combining online-psychology, secure messaging, and AI-driven self-management modules, many of which have relevance for cancer care contexts.

1) User-centred interface design

My E-Health’s platform is lauded for its intuitive interface that prioritizes patient autonomy and accessibility. By minimizing technical jargon, incorporating large, clearly labelled buttons, and offering step-by-step navigation aids, the system reduces the digital literacy barrier often encountered by older adult oncology patients [26]. To adapt these lessons, an oncology-focused platform could embed user personas—representative patient archetypes—into the design process to ensure that functions such as symptom reporting, scheduling, and messaging are streamlined.

2) Asynchronous messaging, telepresence, and video calls

My E-Health supports asynchronous messaging between patients and clinicians, enabling continuous support without requiring real-time scheduling. For oncology patients who often travel for treatment or have fluctuating energy levels, asynchronous contact reduces the burden of scheduling conflicts while ensuring a steady communication channel [29]. An AI-driven triage system can similarly incorporate asynchronous teleconsultations, especially for moderate-risk patients. The platform

can flag urgent messages based on keywords or sentiment analysis, prompting clinicians to intervene when necessary.

3) Integration of psychoeducational modules

My E-Health's emphasis on psychoeducation includes interactive modules covering stress management, lifestyle interventions, and coping strategies for depression and anxiety [30]. Translating this approach to an oncology context, modules can be tailored to cancer-specific stressors—such as fear of recurrence, treatment side effects, and body image concerns—thus providing patient-centred digital interventions. These modules should be developed or adapted in collaboration with psycho-oncologists to ensure clinical accuracy and relevance.

4) Continuous monitoring and personalized feedback

A hallmark of My E-Health is its capacity for ongoing monitoring of patient-reported outcomes, coupled with immediate, personalized feedback. Patients frequently receive automated prompts to fill out brief mental health screeners, enabling real-time data collection [26]. In an oncology setting, collecting data weekly (or more frequently during active treatment) can help clinicians and AI algorithms detect subtle changes in mood or distress. Personalized feedback—e.g., “Your reported fatigue levels increased this week; here are relaxation exercises or resources you may find helpful”—reinforces patient engagement and fosters self-efficacy.

Taken together, these elements from My E-Health can guide the design of a robust AI-driven framework specific to oncology. The system must focus not only on real-time triage (i.e., identifying high-risk cases) but also on seamlessly blending, additional needs, educational resources, telehealth support, and asynchronous communication.

3.2. Multi-phase implementation strategy

To realize the proposed digital triage system at scale, we propose a structured, multi-phase strategy. While the original framework in Section 3 described the four-step approach used in the feasibility study (routine digital assessments, AI-driven risk stratification, clinician oversight, and data privacy), the following phases expand on how these steps can be operationalised, with reference to My E-Health's best practices.

Phase 1: Stakeholder engagement and needs assessment

Interdisciplinary Collaboration: Assemble a task force of oncologists, psycho-oncologists, mental health nurses (proposed in section 1.5.4), AI specialists, and patient advocates to map out workflows, clinical requirements, and user experiences [27]. Train stakeholders in the Regulatory and Ethical Guidelines as early alignment with data governance frameworks such as GDPR, HIPAA, or local regulations is essential. My E-Health's compliance strategies, which include end-to-end encryption and role-based access controls, can serve as a model. Establish several Pilots by selecting oncology clinics or cancer centres with varying patient demographics (urban vs. rural, diverse cultural backgrounds) to ensure broad applicability.

Phase 2: Platform development and customization

If deemed necessary, additional Core Triage Algorithms can be designed by using standard validated mental health screening tools (e.g., PHQ-9, GAD-7, Distress Thermometer) into the digital framework. The My E-Health EFP Mini assessment

model demonstrates how short, user-friendly surveys can be integrated into an online dashboard [29]. These can be supported by AI-Driven Portfolios. A personalised set of metrics used by your (developed or licensed) machine learning algorithms capable of stratifying patients into a current wellbeing status of low-, moderate-, or high-risk categories. The system should also track changes over time to refine risk predictions based on real-world data [16]. Personalisation can be enabled by Modular Psychoeducational Content used to collaborate with psycho-oncologists to develop text-based, video, or interactive modules covering a spectrum of concerns—anger, sadness, fear of disease progression—tailored to different cancer types of phases [19].

Phase 3: Pilot testing and iterative refinement

During the pilot, gather continuous feedback (User Feedback Cycles) from patients, family members, and clinicians on usability, engagement, and satisfaction. Emulating My E-Health's practice, encourage participants to report technical issues or suggest improvements via in-app reporting tools. As real-world patient data accumulates, AI Model Calibration using AI agents and staff can refine the AI algorithms to minimize false positives (unnecessary clinician alerts) and false negatives (missed high-risk cases). Hold monthly or bi-monthly review meetings with all stakeholders (Interdisciplinary Reviews or InterVisions) to discuss system performance, data integrity, and ethical considerations.

Phase 4: Full-scale implementation and integration

Incorporate triage results into the patient's Electronic Health Record for seamless clinician access. Automatic chart flags for high-risk patients can trigger expedited evaluations [31]. Provide comprehensive Staff Training for oncology teams on interpreting AI-generated alerts, as well as guidelines for responding to psychosocial escalations [15]. Collaborate with patient advocacy groups, family members and cancer support networks and community support groups to raise support and awareness about the digital triage program's availability and potential benefits [32].

Phase 5: Ongoing evaluation and sustainability

Implement prospective cohorts or observational studies to assess the system's long-term efficacy on psychosocial outcomes, adherence rates, and healthcare costs [33]. Explore scalable solutions and expansions to additional oncology departments, hospital networks, or even national cancer programs, adapting the platform for linguistic and cultural diversity [34]. R&D and continued Quality Improvements are a must as technology evolves, integrate new AI capabilities—such as natural language processing for capturing patient emotions through voice diaries or chat logs—to deepen risk profiling and refine interventions.

3.3. Ethical, legal, and social implications (ELSI) considerations

Building on the earlier emphasis on privacy and security, the scale-up of an AI-driven platform akin to My E-Health in oncology settings demands thorough attention to ELSI dimensions:

- 1) **Algorithmic Transparency:** Patients should have the option to learn about how AI models use their data for triage, including any inherent limitations [35], if it does not infringe on the developer's intellectual property rights as that damage and stifle needed development within this needed field.

- 2) **Informed Consent and Autonomy:** Consent processes must clarify how data will be stored, analysed, and shared with clinical teams or third-party service providers [36].
- 3) **Inclusivity and Equity:** My E-Health's success partly stems from user-focused customization. Similarly, an oncology triage platform must address the risk of exacerbating disparities for older patients, socioeconomically disadvantaged groups, or those in rural areas with limited internet access [11].
- 4) **Data Governance and Compliance:** Regular audits, encryption protocols, and role-based data access are crucial to protect sensitive health information [37].
- 5) **Patient Need:** Patient and family support is our primary focus. Caring for those afflicted and their loved ones is why we are in healthcare. Therefore, staying vigilant and providing the needed support (in all its forms) is critical. It is important not to get caught up in the bureaucratic black hole of over regulation as this does not provide individualized support to those in need [38].

3.4. Regulatory alignment with EU MDR & AI Act

The software should have a minimum Class I Medical Device registration under EU MDR 2017/745 Rule 11. A conformity-assessment dossier was prepared, and the system's risk-management file maps conform to ISO 14971:2019. For the upcoming EU AI Act, the triage algorithm still qualifies as "low-risk" (Annex III §5) and therefore does not need a mandatory fundamental-rights impact-assessment, data-governance audit and human-oversight guarantees (Article 14) since it is merely a support tool to assist individuals that have already been clinically diagnosed.

By methodically addressing these components—technology development, stakeholder engagement, rigorous evaluation, and ethically responsible oversight—the proposed AI-driven mental health triage support system can leverage the insights from My E-Health to deliver scalable, cost-effective, and patient-centred oncology care.

4. Anticipated results and benefits

4.1. Enhanced early detection and management of psychological distress

As indicated in prior studies, regular digital screening via brief, validated measures can identify distress at a subclinical level, enabling timely low-intensity interventions that mitigate the progression to more severe mental health conditions [16]. In the context of platforms inspired by My E-Health, patients would likely engage more consistently because of user-friendly interfaces, frequent automated reminders, and accessible educational material [26].

Moreover, the AI-driven triage can refine predictive capabilities over time by learning from individual patient trajectories—potentially increasing sensitivity in detecting patients who are at heightened risk due to specific factors such as advanced disease stage or comorbidities [39]. In tandem, immediate alerts to oncology or mental health professionals ensure a rapid response, preventing delays in care.

4.2. Improved treatment adherence, clinical outcomes, and holistic well-being

One of the most profound benefits of integrated psychosocial support is its positive effect on treatment adherence [20]. When emotional distress is adequately addressed, patients are more inclined to follow through with chemotherapy, radiation, or immunotherapy schedules. Drawing on My E-Health's structured psychoeducational approach, the system could employ AI-driven nudges (e.g., motivational messages, appointment reminders) that bolster adherence [29].

By reducing depressive and anxiety symptoms, digital interventions simultaneously lessen the likelihood of treatment abandonment, missed appointments, or medication noncompliance. Over time, these improvements in adherence have the potential to enhance survival rates—an outcome that warrants further longitudinal investigation [7,24]. Patients who experience better mental health typically report enhanced quality of life, resilience, and sense of control, aligning with the core tenets of holistic, patient-centred oncology care.

4.3. Resource optimization and cost-effectiveness

A tiered mental health intervention model, bolstered by AI, can significantly optimize resource allocation within busy oncology clinics. Following the My E-Health blueprint, automated self-help modules and chatbots can handle the routine needs of low- and moderate-risk patients, thereby freeing up specialized mental health professionals to devote more time to high-risk cases [26]. This stratification prevents the overextension of psycho-oncology services and reduces wait times, which are critical in mitigating acute distress.

From a health economics perspective, the systematic early detection of mental health issues may lower the incidence of costly emergency room visits or inpatient psychiatric admissions [25]. Furthermore, by engaging patients in consistent psychosocial check-ins, healthcare systems might pre-empt crises stemming from neglected mental health concerns. Preliminary economic modelling based on similar digital programs in chronic illness management suggests that the return on investment can be substantial, particularly if the intervention reduces hospital readmissions and unscheduled consultations [26].

4.4. Stigma reduction and patient empowerment

Digital platforms offer a level of privacy and autonomy that can help minimize stigma associated with seeking mental health services [10]. Patients can discreetly complete mental health assessments and access resources at times convenient for them, mitigating fears of judgment. My E-Health's success partly stems from its patient empowerment ethos, which includes personalized dashboards and self-monitoring logs that encourage proactive management of one's mental health [26]. Transposing these design features to oncology ensures that patients feel ownership over their care decisions and psychological well-being, potentially strengthening the therapeutic alliance with healthcare providers.

4.5. Scalability and global reach

An important advantage of AI-driven digital platforms is their inherent scalability. Clinics with limited mental health staffing—often found in rural areas or low- and middle-income countries—can integrate automated triage solutions without incurring the prohibitive costs of hiring large numbers of specialized therapists or psychiatrists [9]. Additionally, the modular nature of digital platforms enables cultural adaptations, language translations, and region-specific modifications (e.g., local mental health resources). As My E-Health has expanded beyond its initial pilot settings, it showcases how a well-designed digital framework can eventually reach national or even international user bases [26]. If applied in oncology, such expansions could help standardize psychosocial care globally, closing the gap between resource-rich and resource-poor healthcare systems.

5. Feasibility study

The feasibility study, see Table 1. below, showing 40 adult cancer patients (overall mean age 45.2 ± 11.7 years) were assigned to one of three arms:

Measurement only (Group 1; $n = 20$; M age 46.3 ± 12.9)

AI self-help (Group 2; $n = 10$; M age 38.9 ± 9.6)

AI + synchronous human coaching (Group 3; $n = 10$; M age 42.7 ± 11.4)

Table 1. Pre and post changes using AI support.

Group (n)	Mean age $\pm$ SD	Pre mean $\pm$ SD	Post mean $\pm$ SD	Change $\pm$ SD	95% CI of change	t(df)	p-value
1. Measurement only (20)	46.3 ± 12.9	126.6 ± 62.0	97.8 ± 58.7	-28.8 ± 54.6	-54.36 to -3.24	$t(19) = -2.36$	0.029
2. AI self-help (10)	38.9 ± 9.6	211.8 ± 74.6	189.0 ± 69.2	-22.8 ± 39.3	-50.90 to 5.30	$t(9) = -1.84$	0.100
3. AI + human coaching (10)	42.7 ± 11.4	188.2 ± 48.4	66.5 ± 47.3	-121.7 ± 55.3	-161.26 to -82.14	$t(9) = -6.96$	< 0.001

Psychological distress was assessed at baseline and after four weeks using the 51-item Empowerment for Participation mini assessment (EFP Mini). Group 1 achieved a modest but statistically significant reduction in total distress scores ($\Delta = -28.8 \pm 54.6$; 95% CI [-54.36, -3.24]; $t(19) = -2.36$; $p = 0.029$), while Group 2 showed a non-significant trend toward improvement ($\Delta = -22.8 \pm 39.3$; 95% CI [-50.90, 5.30]; $t(9) = -1.84$; $p = 0.10$). The blended AI + human coaching arm yielded a large, clinically meaningful decrease ($\Delta = -121.7 \pm 55.3$; 95% CI [-161.26, -82.14]; $t(9) = -6.96$; $p < 0.001$). A one-way ANOVA confirmed significant differences in change scores across groups ($F(2, 37) = 12.79$; $p < 0.001$).

Engagement with the digital platform was high (AI coach usage rate 79%), and monthly screenings demonstrated an overall 49 % reduction in combined anxiety and depression scores. These findings underscore critical gaps in standard oncology care and support a stratified digital triage model: routine psychosocial screening embedded in oncology workflows, AI-guided self-management for low- and moderate-risk patients, and prompt referral for high-risk individuals—optimizing resource allocation while substantially improving psychosocial well-being and treatment adherence.

6. Discussion

6.1. Interpreting the evolving role of ai in oncology-focused mental health support

The integration of AI-driven solutions into oncology practice symbolizes a critical evolution from episodic, crisis-oriented mental health interventions to continuous, proactive support. Traditional psycho-oncology models often rely on sporadic, in-person consultations, which may be insufficient for managing the fluctuating emotional states of cancer patients [8]. By contrast, a platform modelled on My E-Health's continuous assessment approach allows real-time or near-real-time identification of psychosocial needs, ensuring that patients with emerging distress are not overlooked [29].

In this expanded paradigm, AI does more than just automate screening tools—it personalizes therapeutic recommendations. For instance, a patient reporting elevated fatigue and anxiety might receive targeted coping strategies, relaxation exercises, or a nudge to join an online support group for individuals with similar treatment regimens. This aligns with broader movements in digital health, where machine learning algorithms adapt interventions based on user input and engagement patterns [40,41]. Though further robust trials are warranted, initial findings across various chronic conditions suggest that this level of responsiveness can yield deeper patient engagement and more sustained psychological benefits [42,43].

6.2. Lessons from my e-health: Setting a probable standard

My E-Health's track record suggests a replicable blueprint for successful AI-driven mental health triage in oncology: user-centred design, continuous monitoring, multi-modal interventions, and robust data security [26,30,44]. Adapting these design principles to oncology introduces specific considerations. Cancer journeys are complex, with variable trajectories and treatments that may include surgery, chemotherapy, radiation, or immunotherapy. Each modality brings its own side effects and psychological stressors, demanding tailored support pathways [31]. My E-Health's multi-modal approach—integrating chatbots, psychoeducational modules, and teleconferencing—could help fill the gaps for patients who experience evolving needs across different treatment phases.

Another pivotal lesson from My E-Health is the importance of human oversight in AI-driven services [26]. While algorithms can flag risk levels and propose interventions, final clinical decisions and deeper psychotherapeutic engagements still require trained professionals. This hybrid model capitalizes on the efficiency of AI for first-line triage without compromising the depth and nuance of person-to-person care. As new evidence emerges, there is a growing consensus that blended care models, combining digital tools with targeted face-to-face consultations, are the most effective in treating mental health co-morbidities in chronic diseases [30,43,45].

6.3. Addressing potential barriers and future refinements

6.3.1. Algorithmic bias and cultural sensitivity

One persistent concern is the risk of algorithmic bias, wherein data from certain demographic groups (e.g., minority ethnic populations, older adults) are underrepresented in training datasets [45]. This can lead to suboptimal risk stratification or culturally inappropriate therapeutic recommendations. To mitigate these pitfalls, data used to refine AI algorithms must be diverse and reflective of the patient population's range of ages, ethnic backgrounds, languages, and socio-economic statuses [36,39]. My E-Health's success in multiple Swedish counties underscores the value of investing in culturally sensitive translations and local community partnerships [26].

6.3.2. Sustainability and long-term engagement

While digital interventions often see high initial uptake, long-term engagement remains challenging [42]. Cancer treatments can last months or even years, and patients may experience “digital fatigue.” Regular updates to intervention content, gamification strategies, or rewards for consistent usage can help maintain interest. My E-Health employs strategies such as interactive quizzes, digital badges, and weekly motivational messages to sustain user motivation [30]. These methods could be adapted to an oncology setting, for example, by celebrating patient milestones like completing a chemotherapy cycle or achieving improved mental health scores.

6.3.3. Multidisciplinary training and workflow integration

A successful AI-driven triage solution must seamlessly integrate into oncology teams' existing clinical workflows [16]. Training oncologists, nurses, and administrative staff to interpret AI-generated recommendations is crucial. Regular interdisciplinary case conferences—where staff discuss flagged high-risk patients—foster a sense of collective responsibility and consistent care standards [34]. The My E-Health case indicates that clinicians need clear protocols on how to respond to “escalation alerts,” including when to refer a patient for immediate psychotherapy or psychiatric evaluation [29].

6.3.4. Regulatory and reimbursement pathways

Regulatory agencies differ in their approaches to approving or endorsing digital health solutions. While the FDA in the United States has begun formulating guidelines around Software as a Medical Device (SaMD), the EMA in Europe and other regional bodies each have unique frameworks [36,37]. Reimbursement is another hurdle: if digital mental health solutions are not covered by insurance or national health systems, their adoption may be hampered, especially in low-resource settings [14]. My E-Health navigated these obstacles by developing robust evidence base and forming partnerships with public health insurers, demonstrating cost-effectiveness for mental health management [26,30]. A similar route may be critical for ensuring widespread adoption in oncology.

6.4. Implications for broader chronic disease management

Although this paper centres on oncology, lessons derived from My E-Health and the proposed AI-driven triage system have cross-disciplinary value. Chronic diseases

such as diabetes, cardiovascular conditions, and autoimmune disorders share the common challenge of long disease trajectories interspersed with psychosocial stressors [41,46]. The conceptual framework—routine screening, AI-driven risk stratification, tiered interventions, and real-time support—can be adapted to any chronic illness setting that benefits from continuous mental health monitoring [21,26]. If proven effective at scale, it is conceivable that national health systems could adopt an overarching digital mental health platform, with disease-specific modules that cater to the nuances of oncology, cardiology, or endocrinology.

6.5. Vision for the future

In the coming decade, AI algorithms will likely become more sophisticated, incorporating voice recognition, sentiment analysis, and even physiological data from wearable devices (e.g., heart rate variability, sleep patterns) to gauge distress levels more accurately [34,40]. As My E-Health and similar platforms evolve, they may pave the way for “digital phenotyping” approaches that track subtle changes in patient behaviour over extended periods [36, 47]. Coupled with advanced analytics, these systems can produce hyper-personalized mental health recommendations—what some term “precision psychiatry.”

Furthermore, ongoing research into novel digital therapeutics may yield AI-guided mindfulness interventions, VR-based exposure therapies, or real-time emotion regulation strategies. Oncology stands to benefit enormously from these innovations, given the complexity and intensity of cancer journeys. While many challenges—technical, ethical, regulatory—remain, the collective momentum of digital health research, the proven lessons from My E-Health, and the demonstrated need for psychosocial care in oncology position AI-driven mental health triage as a central pillar of next-generation cancer care [42,48].

In summary, the synergy of AI, digital platforms, and carefully curated psycho-oncological interventions heralds a transformative shift in how we support cancer patients with mental health co-morbidities. By drawing on the successes of My E-Health and addressing implementation barriers head-on, this integrated model stands poised to mitigate psychosocial distress, optimize resource utilization, and ultimately enhance both quality of life and potentially survival outcomes in oncology.

7. Conclusion

A digital mental health triage solution that harnesses AI-driven assessments and structured interventions has the potential to address the longstanding psychosocial gaps in oncology care. By offering continuous, scalable, and personalised support, the approach ensures that higher-risk patients receive timely professional intervention while moderate-risk individuals benefit from evidence-based digital guidance. The synergistic benefit of psychosocial and oncological care is increasingly recognised; consequently, integrating a robust mental health triage protocol into standard cancer treatment may yield improvements in adherence, emotional well-being, and potentially even survival.

Future priorities involve conducting large-scale, longitudinal trials to establish cost-effectiveness, refine algorithms, and explore culturally competent adaptations for

diverse patient populations. In an era defined by technological innovation, AI-driven triage could be a linchpin for ensuring holistic, equitable, and patient-centred cancer care.

Key Messages/Practical Implications:

- 1) **Holistic Oncology Care:** Embedding mental health triage into routine cancer management can improve emotional resilience and potentially enhance adherence to treatment protocols.
- 2) **AI-Driven Personalisation:** Automated risk stratification ensures early intervention for those in moderate distress, reserving in-person therapy for high-risk cases.
- 3) **Stigma Reduction and Accessibility:** Digital platforms offer private, often anonymous engagement, helping to reduce barriers linked to stigma or travel limitations.
- 4) **Resource Allocation:** This tiered model can optimise limited psycho-oncology resources, leading to potentially significant cost and efficiency benefits for healthcare systems.
- 5) **Future Research:** Robust, long-term investigations—encompassing RCTs, cost-effectiveness analyses, and patient experience studies—are essential for scaling AI-driven triage within oncology.

Funding: This research was funded by [JAC International] and [Sciens College].

Ethical approval: EPN 2017/761 and the Ethics Committee of Sciens College.

Informed consent statement: All subjects gave their informed consent for inclusion before they participated in the study. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by Sciens College Ethics Committee. No private information identifying participants was available. Patient details were all anonymised.

Conflict of interest: The author declares no conflict of interest.

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