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EFFECTIVENESS, ACCESSIBILITY, AND LIMITATIONS OF DIGITAL MENTAL HEALTH INTERVENTIONS IN THE POST-COVID-19 ERA: A SCOPING REVIEW OF REVIEW-LEVEL EVIDENCE

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ABSTRACT

The COVID-19 pandemic accelerated the uptake of digital mental health interventions (DMHIs), including telepsychiatry, internet-delivered cognitive behavioural therapy, smartphone-based applications, and other digitally mediated forms of support. In the post-pandemic period, these interventions are increasingly discussed as durable components of mental health systems, although they should not be treated as a single intervention class. This scoping review of review-level evidence examines the effectiveness, accessibility, and limitations of DMHIs after COVID-19, with particular attention to clinical outcomes, acceptability, adherence, and equity. Reporting was informed by the PRISMA extension for scoping reviews (PRISMA-ScR).

Current review-level evidence suggests that selected DMHIs may reduce symptoms of depression and anxiety, particularly when interventions are structured, grounded in established psychotherapeutic models, and supported by coherent delivery pathways. Telepsychiatry appears to have a distinct and comparatively mature role in extending service reach and facilitating psychiatric assessment in routine and emergency settings. By contrast, evidence for self-guided apps, waiting-list interventions, and AI-enabled conversational agents remains more heterogeneous and should be interpreted more cautiously. Across the literature, acceptability is often more favourable than sustained adherence, and accessibility gains may coexist with persistent inequalities related to socioeconomic position, disability, geography, digital literacy, privacy, and illness severity. Interpretation is further limited by heterogeneity of intervention types and outcome definitions, likely overlap among primary studies across reviews, the absence of a formal overlap analysis, and the lack of a formal item-by-item critical appraisal. Overall, DMHIs may be clinically useful under specific conditions, but their post-pandemic role is best understood as complementary and pathway-dependent.

KEYWORDS

Digital Mental Health; Telepsychiatry; Telemedicine; Mental Health Apps; Digital Divide; Post-COVID-19

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1. Introduction

The COVID-19 pandemic forced a rapid restructuring of mental health care delivery and accelerated the integration of telemedical modalities into routine services. Services that had previously relied predominantly on face-to-face assessment, psychotherapy, and follow-up were compelled to adopt video, telephone, web-based, and app-mediated models of care within a very short period. This was not a marginal change in format. It represented a structural reorganisation of access pathways, triage patterns, continuity arrangements, and, in many settings, the threshold for entering treatment. In Europe, policy and health-system documents suggest that telehealth has remained part of post-pandemic service planning and broader digital health strategy; however, these documents should be interpreted as contextual rather than as empirical evidence of clinical effectiveness or sustained utilisation [1,2].

This persistence is not difficult to explain. Mental health systems in many countries continue to face workforce shortages, long waiting times, uneven geographic distribution of clinicians, and pressure to create more flexible pathways of care. Digital models may appear attractive because they can reduce travel burden, lower opportunity costs, extend contact beyond the clinic, and in some contexts improve access to specialist input. However, the strategic case for digital health is strongest when implementation is linked to infrastructure, accessibility standards, and local service integration rather than to technology deployment alone [1,2].

Post-pandemic research has also moved the field beyond the early assumption that any form of digital delivery is inherently progressive or efficient. The clinically relevant question is no longer whether digital mental health interventions can be used at all, but under what circumstances they may confer meaningful benefit, for whom, and with what trade-offs. Review-level evidence suggests effectiveness for selected

interventions, particularly in depression and anxiety. The magnitude and certainty of benefit, however, vary across modalities, settings, and populations [3,5,14].

Part of the difficulty in interpreting this literature is that digital mental health is not a single intervention category. The term encompasses telepsychiatry, guided and unguided internet-delivered psychotherapy, mobile applications, symptom-monitoring tools, waiting-list bridge interventions, and, more recently, digital conversational agents and other AI-enabled modalities. These interventions differ in therapeutic intensity, the degree of clinician involvement, implementation burden, and probable mechanism of action. As the field expands beyond emergency telehealth towards apps, virtual reality, and generative AI, methodological rigour and clinically precise framing become increasingly important [13,14].

The most consistent review-level evidence concerns structured interventions grounded in established psychotherapeutic models, particularly in depression and anxiety. Benefits from looser or less specified digital tools are less reliably demonstrated. This is particularly evident for CBT-based digital therapies and for app-based interventions that retain a clear therapeutic architecture rather than functioning as loosely defined wellness tools. Plessen et al. reported evidence supporting the effectiveness of digital interventions for depression, while also showing that analytical decisions can shift pooled estimates from small to medium effects [3]. Valentine et al., in a meta-analysis of 92 randomised controlled trials, found that mental health apps were associated with improved clinical outcomes compared with controls, but also documented major inconsistency in how engagement was defined and reported [5]. An umbrella review in The Lancet Digital Health similarly concluded that digital health interventions show promise across several mental health disorders, while emphasising variability in effect size and quality of evidence [14].

Acceptability and adherence represent a second central line of inquiry. A digital intervention may be credible, convenient, and acceptable to patients while still failing to achieve sufficient exposure to produce clinical benefit. Lau et al. found that digital mental health interventions for depression and anxiety were generally acceptable, with most included studies reporting positive acceptability; however, the overall quality of this evidence was moderate rather than high [4]. In digital mental health, positive user perception does not automatically translate into sustained therapeutic use. If participants discontinue a programme early, complete few modules, or engage sporadically, clinical effect may diminish. Review-level evidence therefore points to adherence as one of the field's main translational bottlenecks [4,5].

A third major issue is equity. Digital delivery is frequently described as improving access, and in some respects that is true. It can reduce distance, travel time, and scheduling barriers. Yet digital care also depends on device ownership, internet connectivity, privacy, digital literacy, and disability-inclusive design. For this reason, digital services can improve convenience while still reproducing or worsening structural inequities. Vakkalanka et al. documented persistent disparities in telehealth use for mental health and substance use disorders during the pandemic, including lower uptake among rural residents, older adults, and Black or African American populations in several studies [7]. WHO and WHO/ITU guidance further emphasises that telehealth systems should be designed so that they remain usable for people with disabilities and compatible with assistive technologies, but this should be treated as guidance rather than as empirical review-level evidence [6].

This concern is particularly relevant in psychiatric populations. Wong et al. reported in a global meta-analysis that smartphone ownership and internet use in people with psychiatric disorders increased substantially over time, but did not reach universal inclusion [8]. Complementary evidence on inequalities in mobile health utilisation suggests that disparities persist not only at the level of initial access, but also across adoption, adherence, and long-term maintenance [21]. In practical terms, a digital-first pathway may still systematically miss some of the patients with the greatest need.

Telepsychiatry occupies a distinct place within this broader field. Unlike self-guided apps or low-intensity digital tools, telepsychiatry preserves direct clinician involvement while changing the mode of interaction. This may partly explain why it appears to have become one of the more clinically mature and normalised branches of digital mental health. Review-level evidence from emergency settings suggests that telepsychiatry can improve access to psychiatric expertise, shorten waiting time for psychiatric evaluation, and in some pathways reduce hospital admission, although its effects on broader operational outcomes remain mixed [11]. Its value therefore lies not in perfectly reproducing every feature of in-person contact, but in improving continuity, reach, and timely specialist input within real-world systems of care [11,13].

Recent literature also shows that the field is becoming more population-specific. Reviews now increasingly address young people, university students, workplace settings, low- and middle-income countries, and culturally diverse populations [16,17,18,19,20,22]. This is a useful development because digital mental

health is unlikely to perform uniformly across different clinical, social, and infrastructural contexts. Services that appear scalable in principle may prove difficult to implement reliably when usability, trust, language, cultural adaptation, or continuity of follow-up are inadequate [12,16,17,22].

Post-COVID evidence no longer supports dismissing digital mental health as emergency improvisation, nor does it support treating it as a universal replacement for conventional care. A more precise reading of the evidence is that some digital mental health interventions may be clinically useful, but only under specific conditions. It depends on intervention structure, adherence, accessibility, population fit, safety procedures, and integration into coherent service pathways [3,4,5,7,8,13,14].

The present review synthesises review-level evidence on the effectiveness, accessibility, and limitations of digital mental health interventions in the post-COVID-19 era. The review focuses particularly on four linked dimensions: clinical effectiveness, acceptability, adherence, and accessibility. By examining these domains together, the manuscript seeks to provide a clinically grounded account of where digital mental health is most useful, where its limitations are most apparent, and how it should be interpreted within contemporary mental health care.

2. Methodology

This manuscript was conducted as a scoping review of review-level evidence concerning digital mental health interventions in the post-COVID-19 era. The review was designed to identify recurrent themes and clinically relevant patterns across effectiveness, acceptability, adherence, telepsychiatry, accessibility, equity, and implementation, rather than to provide a formal umbrella review with full quantitative harmonisation across included reviews. Reporting was informed by the PRISMA extension for scoping reviews (PRISMA-ScR). The review process did not include preregistration, a full itemised exclusion log, or a formal overlap analysis of primary studies across included reviews. Full database-specific search strategies were not reproduced for every source searched, and no formal item-by-item critical appraisal tool was applied. The synthesis should therefore be interpreted as a structured scoping review of review-level evidence.

2.1 Review question and objectives

The main review question was: How effective, accessible, and clinically sustainable are digital mental health interventions in the post-COVID-19 era, and what limitations affect their real-world usefulness?

Post-pandemic digital mental health cannot be judged on symptom outcomes alone. Clinical usefulness also depends on acceptability, adherence, accessibility, and fit within service pathways. The specific objectives of the review were to evaluate review-level evidence on clinical effectiveness, particularly for depression and anxiety; to examine acceptability and adherence; to synthesize evidence on telepsychiatry, accessibility, and digital inequity; and to identify the main methodological and implementation limitations that should temper interpretation of current claims regarding post-pandemic digital mental health [3,4,7,8,11,13,14].

2.2 Information sources and search strategy

The principal search source was PubMed/MEDLINE, supplemented by targeted searching of JMIR, The Lancet Digital Health, npj Digital Medicine, and BMJ Open. Selected WHO and WHO Europe materials were also retained where they provided contextual or policy-relevant guidance, especially in relation to digital health framing and accessibility, but these documents were not treated as empirical review-level evidence of clinical effectiveness.

Search terms combined concepts relating to digital mental health, telepsychiatry, telehealth, internet-delivered therapy, smartphone applications, depression, anxiety, adherence, acceptability, accessibility, equity, and digital divide. The search period covered January 1, 2020 to April 2, 2026. The initial search strategy was broad and was subsequently narrowed during screening to identify review-level publications directly relevant to the clinical and implementation questions of the manuscript.

Because the search process combined database searching with targeted supplementary searching, it was also used to identify important review articles that may not be captured reliably by a single generic search string, particularly umbrella reviews, population-specific reviews, and topic-specific syntheses in areas such as young people, workplace interventions, lower-resource settings, and inequalities in mobile health utilisation [13,14,16,17,18,19,20,21].

To improve transparency, the search process was documented in an appendix as a transparent search summary. This included the date range, main concepts, and representative searches used to identify the included body of review-level evidence. Although this approach improves auditability, it does not replace a full database export archive or full per-database search strategy and should therefore be interpreted as transparent but not exhaustive in the sense expected of a comprehensive umbrella review [9].

2.3 Eligibility criteria

Eligible publications included review-level evidence relevant to at least one of the following domains: clinical effectiveness, acceptability, adherence, telepsychiatry, accessibility, equity, digital divide, implementation, or safety.

For interpretive clarity, included sources were grouped into three functional categories: (1) empirical review-level evidence, including systematic reviews, meta-analyses, umbrella reviews, scoping reviews, and overviews of reviews addressing clinical, implementation, or access-related outcomes; (2) narrative or expert framing sources, used to contextualise developments in digital mental health, service design, and emerging modalities; and (3) policy or contextual guidance sources, used to frame system context, accessibility, governance, or implementation considerations.

Interventions of interest included telepsychiatry, video-based tele-mental health, internet-delivered cognitive behavioural therapy, smartphone-based mental health applications, digital bridge interventions delivered during psychotherapy waiting periods, conversational agents, and related digital modalities intended to prevent, monitor, support, or treat mental health symptoms or disorders.

Exclusion criteria were editorials, commentaries, viewpoint papers without evidence synthesis, technical descriptions of apps or platforms without clinical or implementation outcomes, protocols without results, and publications not focused on mental health outcomes or access-related implementation issues.

2.4 Study selection and screening workflow

Records identified through database and targeted journal or platform searches were logged and screened at title and abstract level. Full texts were then assessed for conceptual fit, methodological level, and direct relevance to the review question. Preference was given to review-level evidence that synthesised post-2020 studies or explicitly addressed the transition from pandemic to post-pandemic care [9].

Across the documented workflow, 61 records were identified through database and targeted searching. After removal of duplicates and clearly irrelevant records, 43 publications underwent title and abstract screening. Twenty-one full-text articles were then assessed for eligibility. Twelve sources were prioritised for interpretive weighting in the main synthesis, while additional review-level and contextual sources were used to support population-specific, implementation-oriented, and policy-oriented sections.

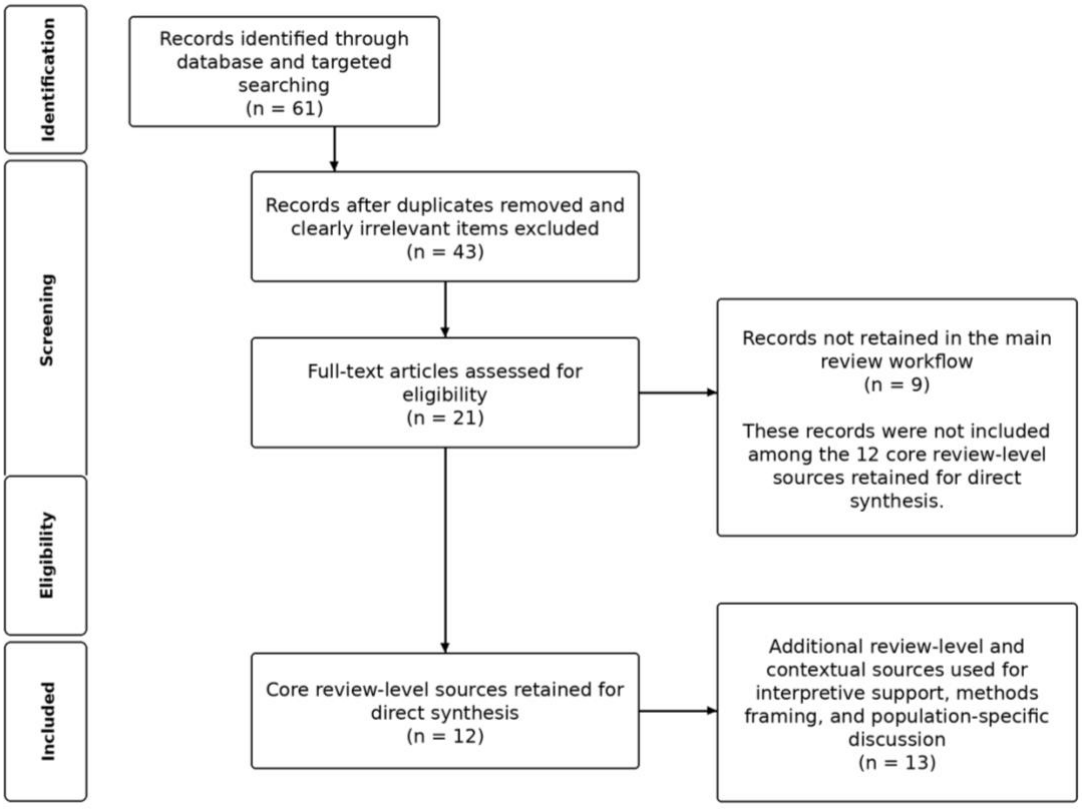

Fig. 1. *Search and screening workflow for the scoping review of review-level evidence.*

Note. This figure summarises the documented search and screening workflow used in the present scoping review of review-level evidence. It is presented as a PRISMA-ScR-informed workflow summary rather than as a formal systematic review flow diagram.

Table 1. Summary of the search and screening workflow

Stage	Number	Interpretive role
Records identified through database and targeted searching	61	Initial review-level and contextual evidence pool
Records remaining after removal of duplicates and clearly irrelevant items	43	Screening pool
Full-text articles assessed for eligibility	21	Eligibility assessment set
Core review-level sources retained for direct synthesis	12	Main interpretive weighting set
Additional contextual sources used for interpretation and special populations	13	Supplementary support for methods framing, implementation, and population-specific discussion

Note. This table provides a compact summary of the search and screening workflow shown in Figure 1. The distinction between the 12 core sources and the additional 13 sources reflects interpretive weighting in the present scoping review of review-level evidence, rather than formal hierarchical inclusion versus exclusion.

2.5 Synthesis method and appraisal approach

A de novo meta-analysis was not performed because the included sources varied substantially in intervention type, clinical population, comparator conditions, supervision level, and definitions of engagement. A structured narrative synthesis was therefore used. Findings were organised under the following domains: clinical effectiveness, waiting-list or bridge care, acceptability, adherence, telepsychiatry, equity and digital divide, cultural adaptation, population-specific developments, and implementation, safety, and governance [9].

No formal item-by-item critical appraisal tool was applied. Interpretive caution was instead based on review design, scope, consistency of reported findings, and the presence or absence of clear methodological reporting.

3. Results

3.1 Study characteristics

The final synthesis drew on a mixed review-level evidence base that included systematic reviews, meta-analyses, umbrella reviews, scoping reviews, and selected contextual or policy documents. To preserve interpretive clarity, the manuscript distinguishes between empirical review-level evidence, narrative or expert framing sources, and policy or contextual guidance documents. WHO and WHO/ITU documents were used primarily to frame accessibility, governance, and system context, whereas empirical claims regarding symptom outcomes or comparative effectiveness were derived from review-level research syntheses [3,4,5,7,8,10,11,12,14,16,17,18,19,20,21,22,23,24].

Most of the empirical evidence came from high-income settings, although several recent reviews focused specifically on low- and middle-income countries, university students, children and adolescents, and workplace populations. Across the literature, cognitive behavioural therapy remained the dominant therapeutic backbone of many digital interventions, whereas adherence, implementation quality, and safety procedures were described less consistently [4,16,17,18,19,20,22,24].

Several included reviews likely shared overlapping primary studies, particularly for CBT-based internet interventions and app-based tools for depression and anxiety. No formal overlap analysis was performed.

Recurring positive findings across these reviews should therefore be read as convergent signals from a partially shared evidence base, not as independent replication [3,4,5,14].

3.2 Clinical effectiveness in depression and anxiety

Overall, current review-level evidence suggests that some digital mental health interventions may improve outcomes in depression and anxiety, although effect sizes vary and depend heavily on intervention design, comparator choice, degree of guidance, and population. The most consistent signals appear to come from structured interventions derived from established psychotherapeutic models, particularly guided or otherwise clearly specified CBT-based approaches, as well as some app-based interventions evaluated in randomised trials [3,5,14].

Plessen et al. examined 125 randomised controlled trials comprising 32,733 participants and showed that pooled estimates for digital depression interventions remained in the small-to-moderate range across 3,638 parallel meta-analytic specifications, although effect size estimates varied meaningfully with analytic choices and study characteristics [3]. Similarly, the meta-analysis by Valentine et al., based on 92 randomised controlled trials, reported a pooled effect of Hedges' $g = 0.43$ for mental health apps relative to controls, while also identifying 25 non-equivalent engagement metrics and complete non-reporting of engagement data in 24% of included studies [5].

Therapeutic benefit appears to depend more on intervention structure and content than on digital delivery alone. Benefit appears most credible when digital interventions retain structured therapeutic content, have a plausible treatment mechanism, and are used consistently enough to deliver a meaningful intervention dose [3,5,14].

3.3 Digital interventions as waiting-list or bridge care

One of the clearer post-pandemic use cases for digital mental health interventions is support during waiting periods for face-to-face psychotherapy. Review-level evidence suggests that some digital bridge interventions may reduce distress or symptom burden while patients are waiting for specialist care, particularly in systems with long treatment delays [10].

That conclusion should remain limited. Such interventions should be viewed primarily as interim or adjunctive support rather than as evidence of equivalence to full psychotherapy. In stepped-care pathways, they may still be clinically useful during periods that would otherwise involve minimal or no active support, but the underlying evidence does not justify treating waiting-list DMHIs as consistently effective across settings [10,14].

3.4 Acceptability

Acceptability is generally more favourable than long-term adherence. In the major review of digital mental health interventions for depression and anxiety, most included studies reported positive acceptability, although the overall quality of this evidence was only moderate [4].

This should be interpreted carefully. Positive acceptability indicates that patients often consider these interventions reasonable, convenient, or acceptable to try. It does not establish that they will continue to use them for long enough to derive durable clinical benefit. Acceptability is better treated as an early implementation signal than as proof of effectiveness in routine care [4,5].

3.5 Adherence and engagement

Adherence remains one of the central translational barriers in the field. Review-level evidence repeatedly indicates that many users discontinue interventions early, engage unevenly, or complete only part of the intended programme [4,5].

These engagement problems are unlikely to be reducible to usability alone. In many digital mental health interventions, benefit depends on repeated participation, module completion, behavioural practice, or sustained self-monitoring. When engagement declines rapidly, the intervention may deliver too little therapeutic exposure to function as intended. These difficulties may partly reflect symptom-related barriers such as low motivation, avoidance, cognitive burden, or fluctuating functioning, rather than interface design alone [4,5,15].

Comparison across interventions is further complicated by how differently engagement is measured. Logins, time on platform, modules completed, response rates, and retention are not interchangeable and treating them as such inflates the apparent comparability of digital tools. Until engagement is reported more consistently, comparisons between digital platforms and delivery models will remain methodologically fragile [5].

3.6 Telepsychiatry

Telepsychiatry occupies a distinct position within digital mental health because it preserves direct clinician involvement while changing the mode of delivery. In that sense, it does not replace psychiatric care so much as reconfigure how psychiatric care is provided. This may partly explain why telepsychiatry appears to be one of the more clinically mature and system-compatible branches of digital mental health [11,13].

Evidence from emergency settings suggests that telepsychiatry can shorten waiting time for psychiatric evaluation and may reduce hospital admission in some care pathways, although effects on total emergency department length of stay remain variable [11]. These findings suggest that telepsychiatry can improve access to psychiatric expertise without improving every downstream service metric to the same extent.

Its value lies less in reproducing every feature of face-to-face contact and more in improving triage, continuity, reach, and timely specialist input. At the same time, complex assessment, severe behavioural disturbance, or situations requiring rich observational data may still favour in-person review [11,13].

3.7 Accessibility, equity, and digital divide

The promise of digital mental health is often framed in terms of improved access. However, access and equity are not interchangeable. A service may be widely available and still be used less often, or less effectively, by socially or clinically disadvantaged groups. Review-level evidence from the pandemic and post-pandemic period shows persistent disparities in telehealth use associated with rurality, age, race, and broader structural disadvantage [7,21].

WHO and WHO/ITU accessibility guidance adds an important practical dimension by emphasising that telehealth systems should be usable by people with disabilities, including those requiring accessible interfaces and compatibility with assistive technologies. These documents provide an important normative framework for accessibility and inclusive design, but they should be interpreted as policy-oriented guidance rather than as empirical evidence of downstream clinical benefit [6].

The digital divide in psychiatric populations has been quantified more directly in the global meta-analysis by Wong et al., based on 48 study samples and 10,324 participants. Smartphone ownership rose from 32% in 2012–2013 to 77% in 2020–2021, and daily internet use from 30% to 58%, but digital inclusion remained incomplete [8]. These findings directly challenge the assumption that most psychiatric patients are reliably connected and able to participate in digital-first care pathways. Equity should therefore be treated not as a secondary implementation concern, but as a condition of clinical usefulness within post-pandemic digital mental health care [6,7,8,21].

3.7a Severity-related barriers to digital engagement and the role of digital navigators

The digital divide in mental health is not exhausted by questions of devices, connectivity, or technical access. Illness burden itself may become a barrier to digital participation. Patients with marked depression, cognitive slowing, psychomotor retardation, anxiety-related avoidance, disorganisation, or unstable social circumstances may be among those least able to initiate, sustain, or benefit from self-directed digital care. Patients with the greatest need may therefore also be those for whom digital-first pathways function least well in practice.

Device ownership metrics alone fail to capture these barriers. A patient may possess a smartphone and still remain effectively excluded from digital care because concentration, motivation, privacy, trust, literacy, or day-to-day instability prevent sustained engagement. In the absence of practical implementation support, digital-first pathways risk becoming selective pathways, with uptake skewed toward patients who are more organised, more digitally confident, or less functionally impaired.

One response to this problem has been the growing interest in digital navigators. The Society of Digital Psychiatry has identified digital navigator programmes as a practical implementation priority, locating many barriers to digital psychiatry not only in technology itself but also in relational, organisational, and educational factors. In this model, navigators do not replace clinicians. Their role is pragmatic: troubleshooting, literacy support, app selection, expectation-setting, and support for sustained use of tools that might otherwise remain underused or abandoned [27,29].

The empirical base remains preliminary, but it is no longer purely speculative. Alon et al. described a digital navigator training programme involving 80 participants from 21 organisations and reported that the training was feasible, acceptable, and needed. The curriculum included digital literacy support, app evaluation and recommendation, and interpretation of smartphone-derived data. These findings do not establish downstream clinical effectiveness, but they do suggest that a supporting workforce for digital engagement can be trained pragmatically outside highly specialised research settings [28].

Digital navigation is best understood as implementation infrastructure, not as a therapeutic modality in its own right. It may help narrow the gap between formal platform availability and actual use, particularly for patients who would otherwise disengage early or never begin. Even so, the current evidence remains stronger on feasibility and implementation logic than on hard clinical outcome benefit. Digital navigation is better framed as a plausible and increasingly structured response to inequitable uptake, without implying that the problem has been solved [27,28,29]. These considerations also extend beyond technical access and adherence to questions of trust, cultural fit, and the social conditions under which digital care becomes usable in practice.

3.8 Cultural adaptation and population fit

Digital accessibility is not only technical but also cultural. Reviews addressing telepsychiatry in Indigenous and racial or ethnic minority populations show that services may improve access and rapport, but only when they are adapted appropriately to the context of the population served [12].

Cultural fit, trust, language, and community involvement determine whether nominal access becomes care that is actually used. This has broader implications for post-pandemic service design. Rapid scale-up under emergency conditions was understandable. The next phase requires refinement, adaptation, and closer attention to the populations for whom digital pathways are intended [12,16,17,18,22].

3.9 Evolution of the field beyond crisis deployment

Post-pandemic evidence shows that digital mental health is expanding beyond emergency telehealth into a broader ecosystem that includes smartphone-based treatment, self-guided interventions, prevention-focused tools, workplace programmes, youth-oriented interventions, and AI-enabled conversational agents [13,14,15,18,19,20,23,24].

This expansion reflects both the maturation of the field and the persistence of unmet mental health need. At the same time, it increases the importance of methodological discipline. Rapid innovation creates pressure to overinterpret promising findings from interventions that remain heterogeneous, variably evaluated, or difficult to implement safely at scale. The most useful recent literature combines symptom outcomes with implementation concerns such as engagement, access, fidelity, and safety, while keeping modality-specific distinctions explicit [5,13,14,22,23].

Table 2. Summary of selected review-level evidence included in the synthesis

Source	Review type	Population / scope	Size of evidence base	Key quantitative finding	Main limitation
Plessen et al. [3]	Multiverse meta-analysis	Depression-focused digital interventions	125 RCTs; 32,733 participants; 3,638 parallel meta-analytic specifications	Effects remained in the small-to-moderate range across analytic specifications	Effect estimates varied with methodological choices
Lau et al. [4]	Systematic review	Depression and anxiety	143 studies	Most included studies reported positive acceptability	Moderate evidence quality; acceptability does not ensure adherence
Valentine et al. [5]	Systematic review and meta-analysis	Mental health apps across disorders	92 RCTs	Pooled effect Hedges' g = 0.43; 25 engagement metrics identified; 24% of studies did not report engagement data	Major inconsistency in engagement measurement and reporting
Huang et al. [10]	Systematic review	Patients waiting for psychotherapy	Review-level synthesis	Suggests potential value of digital interventions as interim support during waiting periods	Does not establish equivalence to full psychotherapy

Source	Review type	Population / scope	Size of evidence base	Key quantitative finding	Main limitation
Shalev et al. [11]	Scoping review	Emergency settings	Review-level synthesis	Suggests shorter time to psychiatric evaluation and possible reduction in admission in some pathways	Operational outcomes remain mixed
Wong et al. [8]	Global meta-analysis	Psychiatric populations globally	48 study samples; 10,324 participants	Smartphone ownership rose from 32% to 77%; daily internet use from 30% to 58% across time periods	Digital inclusion remained incomplete and varied across diagnoses and settings
Crocamo et al. [14]	Umbrella review	Cross-disorder mental health conditions	16 meta-analyses of RCTs	Effects varied by diagnosis and certainty level across conditions	Dependent on the quality and overlap of included meta-analyses
Madrid-Cagigal et al. [20]	Systematic review and meta-analysis	University students with mental health difficulties	21 RCTs	Cohen's d = 0.55 for depression and d = 0.46 for anxiety	Heterogeneity in implementation and intervention format
Feng et al. [23]	Systematic review and meta-analysis	Young people using AI conversational agents	Review-level synthesis	Hedges' g = 0.74 for subclinical depressive symptoms; no statistically significant benefit for anxiety or general stress	Effects appear selective rather than general across symptom domains
Rahsepar Meadi et al. [25]	Scoping review	Conversational AI in mental health	101 publications	Privacy/confidentiality concerns in 61.4% of publications; safety-related concerns in 51.5%	Literature is dominated by normative discussion, with limited primary empirical data
Wang et al. [26]	Systematic review	Generative AI in mental health	79 studies included from 783 screened records	Highlights rapid post-2023 growth and the central role of privacy, fairness, safety, and governance	Real-world deployment and safety assurance remain limited
Alon et al. [28]	Empirical implementation study	Community-based organisations	80 participants from 21 organisations	Demonstrates feasibility and acceptability of digital navigator training	Does not establish downstream clinical effectiveness

3.10 Population-specific developments

Several recent reviews indicate that the next phase of digital mental health research is becoming more population-specific. In university students with established mental health difficulties, digital interventions appear beneficial overall. Madrid-Cagigal et al., synthesising 21 randomised controlled trials, reported effect sizes of Cohen's d = 0.55 for depression and d = 0.46 for anxiety, while also noting heterogeneity in implementation and differential effects across guided and fully automated formats [20]. In workplace settings, umbrella review evidence suggests potential usefulness, but also highlights the limited quality of many underlying reviews, which argues against overstatement [19].

Evidence from lower-resource settings is also expanding, although it remains less mature. Reviews focused on low- and middle-income countries describe meaningful potential for digital interventions, while also emphasising barriers related to fidelity, infrastructure, cultural adaptation, retention, and reporting quality. These issues should not be read straightforwardly as evidence of poor clinical efficacy. They are more plausibly interpreted as indicators of implementation fragility and unequal readiness [16,17].

In children, adolescents, and young adults, the literature is broadening beyond simple symptom-tracking tools towards prevention, social anxiety interventions, and AI-supported conversational systems. The overall signal remains mixed. Feng et al. reported a relatively strong effect for subclinical depressive symptoms (Hedges' g = 0.74), but no statistically significant benefit for anxiety or general stress outcomes, which argues against treating conversational agents as a uniform therapeutic class [23].

3.11 Implementation, safety, and service integration

One recurrent lesson from the post-pandemic literature is that implementation quality may determine whether digital mental health interventions move from promising research findings into reliable service delivery. Interventions that appear clinically plausible may still fail in practice if referral pathways are unclear, if the expected level of support is poorly defined, or if there is no practical route to step up care when symptoms worsen [13,14,22].

This has direct implications for safety. A clinically responsible digital model should specify crisis pathways, procedures for suicidality or acute deterioration, and clear escalation mechanisms when low-intensity digital support is no longer sufficient. This is particularly important for users with severe mental illness, marked functional instability, or limited capacity for self-directed engagement. In such groups, unsupervised or weakly supervised use may be less appropriate in some cases and may risk delaying access to higher-intensity care [11,13,14,22].

Safety also depends on data governance and accountability. Digital tools often process sensitive mental health information, but the governance arrangements surrounding monitoring, escalation, responsibility, and data use may be under-specified. Digital mental health should not be framed as a self-sufficient substitute for accountable care. It is more clinically defensible when embedded within services that retain explicit responsibility for risk assessment, follow-up, escalation, and oversight [6,11,13,14].

3.12 Generative AI, clinical responsibility, and evaluative standards

Generative artificial intelligence introduces a different risk profile from earlier digital mental health tools. Unlike structured apps that deliver fixed or semi-structured therapeutic content, large language model–based systems generate dynamic responses that may appear relational, adaptive, and clinically informed without possessing stable therapeutic reasoning or formal clinical accountability [25,26].

The review-level literature is expanding rapidly, but it remains methodologically uneven. In a scoping review of ethical challenges surrounding conversational artificial intelligence in mental health care, Rahsepar Meadi et al. identified 101 publications and found that the literature was dominated by normative discussion, whereas only a small minority of studies generated primary empirical data. Transparency, responsibility, privacy, safety, and therapeutic role were the most frequently discussed themes, with privacy and confidentiality concerns appearing in 61.4% of the included publications and safety-related concerns in 51.5%. At the same time, the evidence base remained predominantly normative rather than empirical [25].

A systematic review by Wang et al. reached a similar conclusion from a broader GenAI perspective. After screening 783 records, the authors included 79 studies spanning diagnosis and assessment, therapeutic tools, and clinician support. Publications increased sharply after 2023 and were concentrated largely in depression and suicidality, yet evidence for real-world deployment and safety assurance remained limited. Their GenAI4MH framework placed privacy and security, information integrity and fairness, user safety, and ethical governance at the centre of implementation. The central translational challenge has thus shifted from conversational plausibility alone to the establishment of frameworks that preserve clinical accountability, manage patient deterioration safely, and remain auditable when failures occur [26].

In mental health settings, the consequences are practical and immediate. Systems that simulate therapeutic dialogue should not be treated as functionally equivalent to clinician-led care merely because they are responsive or subjectively engaging. Any deployment involving psychologically vulnerable users requires predefined procedures for suicidality, acute deterioration, psychotic content, severe affective instability, and requests that exceed system scope. Crisis pathways, escalation procedures, and human override mechanisms therefore belong to the intervention architecture itself, not to a secondary layer of implementation [25,26].

Evaluation has now become central to the field. The Society of Digital Psychiatry has proposed a three-pronged road map centred on education, digital navigators, and AI, with standards development positioned as

a field-level priority. The same agenda highlights the need for more transparent benchmarking initiatives, including MindBench.ai, intended to support structured assessment of reasoning, safety, and representativeness in psychiatric applications [27].

The same caution applies to newer evaluative proposals for structured benchmarking and appraisal. Their value lies in moving assessment beyond surface plausibility towards empathy, cultural awareness, and therapeutic consistency. None currently constitutes a validated guarantee of clinical readiness. Responsible GenAI deployment still requires explicit boundary-setting, transparent benchmarking, and retained human accountability. This is especially relevant in settings where conversational fluency may be misread by users as evidence of competence, safety, or therapeutic authority [25,26,27].

4. Discussion

The evidence synthesised here supports a cautious but clinically relevant conclusion. Digital mental health interventions appear to have retained a role after COVID-19, but the literature does not justify treating all DMHIs as a single, uniformly effective, or universally scalable class of intervention. More precisely, some modalities appear useful under specific conditions, whereas others remain constrained by weaker evidence, lower adherence, narrower applicability, or unresolved implementation and safety concerns [1,3,5,13,14].

One of the more useful distinctions in the literature is between interventions that digitalise delivery and those that attempt to digitalise therapeutic content itself. Telepsychiatry preserves clinician involvement while changing the mode of contact, which may explain why it appears easier to normalise within clinical systems. By contrast, self-guided apps, waiting-list interventions, and conversational agents carry more of the therapeutic burden themselves and therefore require more cautious interpretation [11,13,14,23].

Adherence remains a major translational constraint. Positive acceptability does not guarantee sustained use, and sustained use does not guarantee durable benefit. Moreover, the current evidence base does not support a single explanatory model for disengagement. It is plausible that attrition reflects an interaction between intervention design, treatment burden, symptom severity, motivation, cognitive load, and contextual barriers [4,5,15].

Equity is best understood as a condition of usefulness rather than a secondary implementation issue. Digital mental health may reduce travel and scheduling barriers, but this does not automatically make it equitable. Device access, connectivity, private space, disability access, literacy, trust, and severity-related functional barriers all shape whether nominal availability becomes real access. For that reason, a digital-first pathway may expand care for some groups while remaining poorly aligned with the needs of others [6,7,8,21].

The literature increasingly points away from technology-centred thinking and towards pathway-centred thinking. The clinically relevant question is less whether a tool is digital than whether it fits the patient, the disorder, the severity, the care setting, and the local system. Digital tools are most credible when they are embedded within a pathway that includes triage, escalation, and alternatives for patients who cannot or do not wish to engage digitally [10,11,13,14].

The interpretation of recurring positive findings should also remain methodologically restrained. Several included reviews likely drew on overlapping sets of primary studies, and no formal overlap analysis was performed. Repeated positive signals across reviews therefore strengthen plausibility, but they should not be treated as fully independent replication. From a systems perspective, the post-pandemic case is strongest for digital complementarity, not digital replacement [3,4,5,14].

4.1 Implications for clinical practice

For clinicians, the most practical implication is that digital mental health interventions should be selected and recommended as clinical tools rather than generic consumer products. That means matching intervention type to diagnosis, symptom severity, cognitive load, digital access, and patient preference. A guided CBT-based programme for mild-to-moderate depression is not clinically equivalent to an unguided mood app offered to a socially unstable patient with severe illness, and the two should not be evaluated, prescribed, or reported as if they were the same [3,4,14,15].

For health systems, implementation should include explicit monitoring of engagement, dropout, subgroup uptake, and pathways of escalation. It is not enough to know how many patients were offered a digital service. Services also need to know who used it, who discontinued it, who could not access it, who deteriorated, and who required escalation to higher-intensity care [5,6,7,8,11,21].

4.2 Implications for future research

Future research should prioritise longer follow-up, clearer definitions of engagement, and more consistent reporting of adherence metrics. Trials should also report implementation outcomes more carefully, including accessibility, cultural adaptation, subgroup-specific uptake, and safety procedures. Without that information, real-world effectiveness will continue to be easy to overestimate [5,13,14,22].

Research should also move beyond simple comparisons of digital versus non-digital formats. More informative study designs would compare levels of guidance, intensity of clinician involvement, hybrid versus standalone care, and strategies for improving retention in higher-risk populations. Emerging areas such as AI conversational agents should be evaluated with the same clinical caution applied to other mental health interventions [13,14,23,24].

Finally, future reviews should report overlap between included primary studies more explicitly and distinguish more clearly between guided, minimally guided, and unguided interventions. Those distinctions are clinically meaningful and likely account for part of the variability too often attributed only to broad intervention category [3,5,14].

4.3 Service design, ethics, and governance

The service design implications are clear, but they still require caution in interpretation. If digital mental health is implemented as a loosely connected consumer-style offer with minimal linkage to ordinary psychiatric care, it may result in uneven uptake, weaker continuity, and reduced accountability. Implementation within stepped-care or hybrid-care models, with transparent thresholds for escalation and explicit clinical oversight, appears more defensible. This is especially relevant for patients with social adversity, severe symptoms, or limited capacity for self-directed engagement [6,7,10,11,13,14].

Ethically, digital mental health should be assessed by the same standards as any other clinical intervention. Convenience does not remove the need for evidence, clarity of indication, informed use, follow-up, and accountability for harm. Narrative field-level syntheses of emerging modalities, including AI-enabled tools, are useful for framing the direction of the field, but they should not be interpreted as equivalent to high-certainty evidence of broad clinical effectiveness or safety [13,23].

One governance issue remains especially important: transparency about who is left out. Even strong digital programmes may fail to reach patients with low literacy, unstable housing, cognitive impairment, sensory disability, or poor internet access. Services therefore need active monitoring of exclusion as well as uptake. Without it, digital innovation can expand apparent access while leaving the patients with the greatest need functionally outside the system. From a public health perspective, this remains one of the most important unresolved issues in the post-COVID digital mental health system [6,7,8,21].

5. Limitations

This review has several limitations. First, it is a scoping review of review-level evidence rather than a de novo synthesis of all primary studies, which means that conclusions are constrained by the scope, quality, and overlap of the included reviews. Second, the digital mental health literature is heterogeneous in intervention type, target population, comparator condition, and outcome measurement. Third, the review was not preregistered, did not include a full itemised exclusion log, did not report full database-specific search strategies for every source, did not apply a formal item-by-item critical appraisal tool, and did not perform a formal overlap analysis of included primary studies [9,13,14].

Another limitation is that post-pandemic digital mental health research still overrepresents higher-income settings and selected clinical populations. Evidence for lower-resource settings, severe illness, and harder-to-reach groups is improving, but remains less mature than the evidence base for common mental disorders in better-resourced systems [7,8,16,17,21].

6. Conclusion

Digital mental health interventions appear to have become a durable part of post-COVID-19 mental health care, but their role should be interpreted with specificity. Review-level evidence suggests usefulness for some modalities, especially telepsychiatry, selected structured psychotherapeutic interventions, and some pathway-integrated digital supports for depression and anxiety. However, DMHIs should not be treated as a single intervention class, and findings from one modality should not be generalised automatically to others such as self-guided apps, waiting-list interventions, or AI conversational agents [3,5,10,11,14,23].

Their value is conditional, not universal. It appears to depend on intervention structure, degree of guidance, adherence, accessibility, population fit, safety procedures, and implementation quality. These are not peripheral technical issues but central determinants of whether digital interventions are helpful in practice [4,6,7,8,13,14].

The most defensible post-pandemic conclusion is that digital mental health should be treated primarily as a conditional adjunct within accountable care pathways, not as a universal replacement for in-person mental health services.

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Conflict of Interest Statement: No conflicts of interest to declare.

Appendix A. Search Log and Source Coverage Summary

Date range searched: January 1, 2020 to April 2, 2026.

Primary search domains: PubMed/MEDLINE; targeted journal and platform searches in JMIR, The Lancet Digital Health, npj Digital Medicine, and BMJ Open; selected WHO/WHO Europe documents used only as contextual or policy-oriented guidance.

Representative search 1 (PubMed style): ("digital mental health" OR telepsychiatry OR telehealth OR "mental health app*" OR iCBT) AND (depression OR anxiety OR psychiatry OR psychotherapy) AND (COVID-19 OR post-pandemic OR post-COVID).

Representative search 2: (telehealth AND mental health AND equity AND "systematic review").

Representative search 3: (digital mental health AND adolescents AND low- and middle-income countries AND review).

Representative search 4: (mental health apps AND engagement AND meta-analysis).

Appendix B. Appraisal note

No formal item-by-item critical appraisal tool was applied in this scoping review. Interpretive caution was based on review design, scope, consistency of reported findings, and the clarity of methodological reporting across included sources.

Appendix C. Source classification and interpretive function

Appendix C distinguishes between empirical review-level evidence, narrative/expert framing sources, policy/contextual guidance sources, and methodological framework sources. It also indicates whether each source was used mainly in the central synthesis or primarily as contextual, population-specific, implementation-oriented, or methodological support. This distinction is intended to clarify interpretive function and to avoid treating policy or narrative sources as equivalent to empirical review-level evidence.

Reference	Source type	Interpretive function in this manuscript
1	Policy/contextual guidance	Supplementary support; contextual or policy framing only, not empirical effect evidence
2	Policy/contextual guidance	Supplementary support; contextual or policy framing only, not empirical effect evidence
3	Empirical review-level evidence	Core interpretive weighting set; core evidence for depression-focused interventions
4	Empirical review-level evidence	Core interpretive weighting set; acceptability evidence, not adherence proof
5	Empirical review-level evidence	Core interpretive weighting set; apps, efficacy, and engagement heterogeneity
6	Policy/contextual guidance	Supplementary support; contextual or policy framing only, not empirical effect evidence
7	Empirical review-level evidence	Core interpretive weighting set; telehealth equity and utilisation disparities

Reference	Source type	Interpretive function in this manuscript
8	Empirical review-level evidence	Core interpretive weighting set; digital divide in psychiatric populations
9	Methodological framework	Supplementary support; methodological framework for reporting/appraisal language
10	Empirical review-level evidence	Core interpretive weighting set; waiting-list or bridge intervention evidence
11	Empirical review-level evidence	Core interpretive weighting set; telepsychiatry in emergency settings
12	Empirical review-level evidence	Core interpretive weighting set; cultural adaptation and population fit
13	Narrative/expert overview	Supplementary support; narrative field-level framing for implementation and emerging modalities
14	Empirical review-level evidence	Core interpretive weighting set; umbrella review tempering broad claims across disorders
15	Empirical review-level evidence	Supplementary support; population-specific, implementation-oriented, or contextual support
16	Empirical review-level evidence	Core interpretive weighting set; LMIC implementation and reporting gaps
17	Empirical review-level evidence	Supplementary support; population-specific, implementation-oriented, or contextual support
18	Empirical review-level evidence	Supplementary support; population-specific, implementation-oriented, or contextual support
19	Empirical review-level evidence	Supplementary support; population-specific, implementation-oriented, or contextual support
20	Empirical review-level evidence	Core interpretive weighting set; university student evidence with quantitative synthesis
21	Empirical review-level evidence	Supplementary support; population-specific, implementation-oriented, or contextual support
22	Empirical review-level evidence	Supplementary support; population-specific, implementation-oriented, or contextual support

Reference	Source type	Interpretive function in this manuscript
23	Empirical review-level evidence	Core interpretive weighting set; AI conversational agent evidence, interpreted cautiously
24	Empirical review-level evidence	Supplementary support; population-specific, implementation-oriented, or contextual support
25	Empirical review-level evidence	Supplementary support; ethical and governance challenges of conversational AI in mental health
26	Empirical review-level evidence	Supplementary support; GenAI applications in mental health, with emphasis on safety, privacy, and governance
27	Narrative/expert overview	Supplementary support; field-level roadmap for education, digital navigators, benchmarking, and AI governance
28	Empirical implementation evidence	Supplementary support; feasibility and acceptability of digital navigator training in community-based settings
29	Narrative/expert overview	Supplementary support; translational and implementation framing for the evolving role of digital navigators

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