

Navigating the Digital Landscape: A Scoping Review of Mental Health App Integration into Clinical Practice

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Navigating the Digital Landscape: A Scoping Review of Mental Health App Integration into Clinical Practice

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Abstract

Background: The global demand for mental health services has significantly increased over the past decade, exacerbated by the COVID-19 pandemic. Digital resources, particularly smartphone apps, offer a flexible and economical means of addressing the research-to-practice gap in mental health care. Clinicians play a crucial role in integrating these apps into mental health care, with guided digital interventions generally considered more effective than standalone apps.

Objective: This scoping review explores mental health practitioners' perspectives on integrating smartphone apps into clinical practice. We ask, "What is known about how mental health practitioners view the integration of smartphone apps into their practice?" Further, this scoping review explored the factors that might influence integration of smartphone apps into practice such as practitioner and client characteristics, app design and functionality and practitioner views.

Methods: A systematic search of three databases yielded 23 studies published between 2018-2023, involving 1,067 practitioners across various mental health disciplines, most predominantly psychologists and psychiatrists. Data were collected on practitioner and client characteristics, app functionality, and factors deemed important or influencing practitioners' opinions about app integration.

Results: The included studies were most likely to explore use of apps outside the clinical session, and focussed on self-management apps for mental health monitoring, wellbeing promotion and assessment. Fewer studies explored use of apps within session, or practitioner-guided apps. Practitioners prioritized app features aligned with the American Psychological Association's evaluation criteria, with most studies valuing interoperability, security and privacy, and engagement.

Conclusions: While practitioners recognise the potential of apps in mental health care, integration into clinical practice remains limited. The review highlights the need for further research on practical implementation, clinical effectiveness, and practitioner training to facilitate the transition from potential to actual use of apps in mental health care settings. Recommendations include evaluating effectiveness of app integration through experimental studies and developing training modules to develop practitioners' digital competencies and confidence in app utilization. Clinical Trial: The protocol was registered via the Open Science Framework (Registration doi: <https://doi.org/10.17605/OSF.IO/VNY7J>)

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Abstract

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Introduction

Background

The global demand for mental health services has increased significantly over the past decade, with the World Health Organisation reporting a 13% increase in the period from 2007-2017 (World Health Organisation, 2022). The COVID-19 pandemic has placed an additional burden on the mental health system, with the prevalence of depression and anxiety disorders alone increasing by 25% (Santomauro et al., 2021). Mental health professionals are struggling to meet this increased service demand, and there is a need for sustainable approaches to support professional care (Holmes et al., 2018; Kazdin and Blase, 2011; Wainberg et al., 2017).

Digital resources offer a flexible, data rich and economical means of addressing the research-to-practice gap (Australian Government Department of Health, 2020; East & Havard, 2015; McGorry et al., 2022; Torous et al., 2020) and can be used to support the full spectrum of mental health care services (Cornish, 2020; Australian Government Department of Health, 2016; Pedrelli et al., 2023; Rickwood, 2012). Among the most rapidly increasing digital resources available in the mental health sphere are smartphone apps. With over 30,000 mental health smartphone apps (MHapps) available to the public, and smartphone ownership penetrating most sectors of the population, MHapps have the potential to be an accessible and scalable adjunct to professional mental health care (De Witte et al., 2021; LeComte et al., 2020; Wies et al., 2021; Moshe et al., 2021; Wasil et al., 2019; Firth et al., 2017a; 2017b). Smartphone apps can also offer quite sophisticated personalization for each user and are reported to be less stigmatizing for many than seeking professional care (Beard et al, 2019; Widnall et al, 2020 2017a; 2017b).

Clinicians are in a unique position to guide the integration of smartphone apps into mental health care. The breadth of their influence is diverse and can include recommending reputable apps to clients to use independently, or using apps in- or out-of-session with ongoing support (Lipschitz et al., 2019; Gindidis et al., 2019). Digital interventions that are guided by a therapist or with in-person feedback are generally regarded to be more effective than self-management or 'stand-alone' apps (Baumeister et al., 2014; Duarte-Diaz et al., 2023; Garrido et al., 2019; Linarden 2019; Moshe et al., 2021; Weisel et al., 2019). This is consistent with the widely accepted notion of a therapeutic alliance being a key mechanism underlying mental health treatment outcomes (Martin et al, 2000). There is, however, some indication that a major benefit of guided digital interventions may be encouraging adherence to the intervention (Baumeister et al., 2014; Mohr et al., 2011), and that the role of

clinician could be reduced to key touchpoints such as onboarding at the end of every other module or on-demand (Baumeister et al., 2014).

The capacity for smartphone app integration into mental health care also depends on the functionality of the app and the level of support it targets across the mental health spectrum. For example, app functions can include informing, recording, sharing data, reminding, communicating and displaying (IMS, 2013; Myers et al, 2020). Levels of support can range from lower (e.g., wellbeing promotion, mood tracking, assessment and psychoeducation) to higher (interventions and relapse prevention) intensity (Gindidis et al., 2019; Rickard et al., 2022). Digital mental health services are most confidently advocated as a low intensity treatment within the stepped-care model, providing health promotion, prevention and early intervention support for sub-clinical populations (Australian Government Department of Health, 2016; Firth et al, 2017a). Digital apps are also generally claimed to be more effective for prevention and mild symptomatology (Morello et al, 2023; Firth et al, 2017a) although some studies have observed stronger effects for individuals with more severe symptoms (Bakker et al, 2019; Seegan et al, 2023). It would be of interest to better understand where mental health practitioners themselves consider app usage to be most acceptable.

Integration of smartphone apps into mental health care must therefore also consider what factors are important to the practitioner. In a survey of general healthcare providers, regulatory body support and an evidence base were ranked as the most important factors affecting practitioners' decisions to incorporate digital tools into their practice (Leigh & Ashall-Payne, 2019). Previous research has also suggested that remote monitoring tools are of particular interest to mental health providers (Schueller et al., 2016). Several evaluation frameworks describe key criteria identified as important to professional regulatory bodies like the American Psychological Association (APA). The APA's criteria for evaluating MHapps include accessibility, privacy and security, evidence base, engagement and interoperability (Henson et al., 2019; Torous et al., 2018). While models such as the APA evaluation framework are critical for shaping regulation of digital tools like smartphone apps, the prioritisation of standards may not necessarily align with what is important for individual practitioners. For example, while accessibility is the fundamental standard for smartphone MHapps, if practitioners are supplying devices or paying for the cost of the app, then this criterion may become less critical. In a recent evaluation of 100 of the most popular MHapps at the time (Rickard et al., 2022), only one of those apps were found to meet all of the five standards expected by the APA evaluation model. The majority lacked basic accessibility, privacy and security features, and only one

met the final criterion of interoperability, which is important for integrating apps into broader mental health care.

Rationale & objectives

The use of smartphone apps among physicians and rehabilitation clinicians has previously been explored in other scoping reviews (Lee et al., 2023; Dicianno et al., 2024); however, to date, no scoping reviews have been conducted on mental health practitioners' integration of smartphone apps into clinical care. The affordances of smartphone apps may vary between different groups of professionals and in different clinical settings (Lee et al., 2023). Accordingly, research from the past six years was examined to answer the broad research question, "What is known about how mental health practitioners view the integration of smartphone apps into their practice?" Further, this scoping review explored the factors that might influence integration of smartphone apps into practice such as practitioner and client characteristics, app design and functionality and practitioner views.

Methods

A scoping review methodology was selected to identify and map key characteristics related to the uptake of smartphone apps by mental health practitioners (Mun et al., 2018). This review was guided by the Preferred Reporting Items for Systematic reviews and Meta-analysis extension for Scoping Reviews (PRISMA-ScR) (Tricco et al., 2018). The protocol was registered via the Open Science Framework (Registration doi: <https://doi.org/10.17605/OSF.IO/VNY7J>)

Search strategy

A search was conducted in September 2023 using three electronic databases (PsycINFO, Web of Science and IEEE Xplore). The search strategy was adapted for each database (see Appendix). Searches were conducted with a combination of terms related to mental health practitioners and smartphone MHapps. These terms were selected following a preliminary review of the literature. Searches were run against the title and abstract, and where possible, subject headings were combined with keywords. The search was restricted to peer-reviewed journal articles written in English and published between 2018 and 2023.

Eligibility criteria

Selection of articles was based on the SPIDER (Sample, Phenomenon of Interest, Design,

Evaluation, Research type) framework (Cooke et al., 2012), as shown in Table 1. This framework was chosen to capture qualitative, quantitative and mixed methods studies.

Table 1

Eligibility criteria

	Inclusion	Exclusion
Sample	Mental health practitioners if more than 25% of the sample were psychologists, psychotherapists, psychiatrists, or counsellors.	- General practitioners, nurses, or other health workers not specific to mental health. - Studies which included both practitioners and other end users (e.g., clients) but did not differentiate results by participant type were excluded.
Phenomenon of Interest	Integration of mental health smartphone apps into practice. Studies exploring the use, consideration, design, or trial of apps were all included.	- Studies focusing on web based MHapps, as opposed to smartphone MHapps. - Studies focusing on only users', rather than practitioners' attitudes, behaviours or experiences towards apps.
Design	- Interviews - Surveys - Observations - Behaviour measures	No original data collected.
Evaluation	Attitudes, behaviours or experiences of mental health practitioners in consideration of, or use of, smartphone app integration into their practice.	- Studies focusing on web based MHapps, as opposed to smartphone MHapps. - Studies focusing on only users', rather than practitioners', attitudes, behaviours or experiences towards apps.
Research Type	- Qualitative - Quantitative - Mixed methods	- Reviews - Commentaries - Opinion pieces

Selection

Searches were managed using EndNote X9 and Microsoft Excel. Duplicates were removed using the EndNote deduplication tool. One reviewer (PK) screened titles and abstracts to exclude obviously irrelevant articles and those identified as reviews, commentaries or opinion pieces. The remaining titles and abstracts were then screened by two independent reviewers (NR and PK). Disagreements were resolved by discussion and where doubt existed, an independent assessment was conducted by a third reviewer (TM). Full texts were independently reviewed by all three authors. PK reviewed 100% of the articles, with NR and TM each reviewing 50% of the articles. Disagreements between each pair of reviewers were resolved by discussion.

Data extraction and analysis

An Excel spreadsheet was created to compile relevant data. Data items were sorted into five categories:

1. Article information: including author, year of publication, country, aim and design.
2. Practitioner characteristics: including sample size, type of practitioner (e.g., psychologist), age and gender.
3. Client characteristics: including age, mental health condition (e.g., depression), population (e.g., clinical).
4. Characteristics of app use: including app name, app purpose (prevention/wellbeing promotion; psychoeducation; monitoring/tracking; assessment/case identification; treatment/intervention; continuing care/relapse prevention; other), app functionality (inform, instruct, record (collects, shares, evaluates, intervenes), remind/alert, communicate, display, guide), patterns of use, in and/or out-of-session and practitioner guided and/or self-managed.
5. Characteristics considered important and/or useful based on APA's criteria: including accessibility, privacy and security, evidence base, engagement, interoperability, and other.

The data charting form was completed by one reviewer (PK) and a random subset (20%) of articles was independently verified for accuracy by NR and TM. Studies were not critically appraised during this review.

Data Synthesis

Study designs and methodologies were diverse so data were synthesised in a descriptive format. Frequencies were determined where possible within variables, and trends were identified where appropriate in a narrative format.

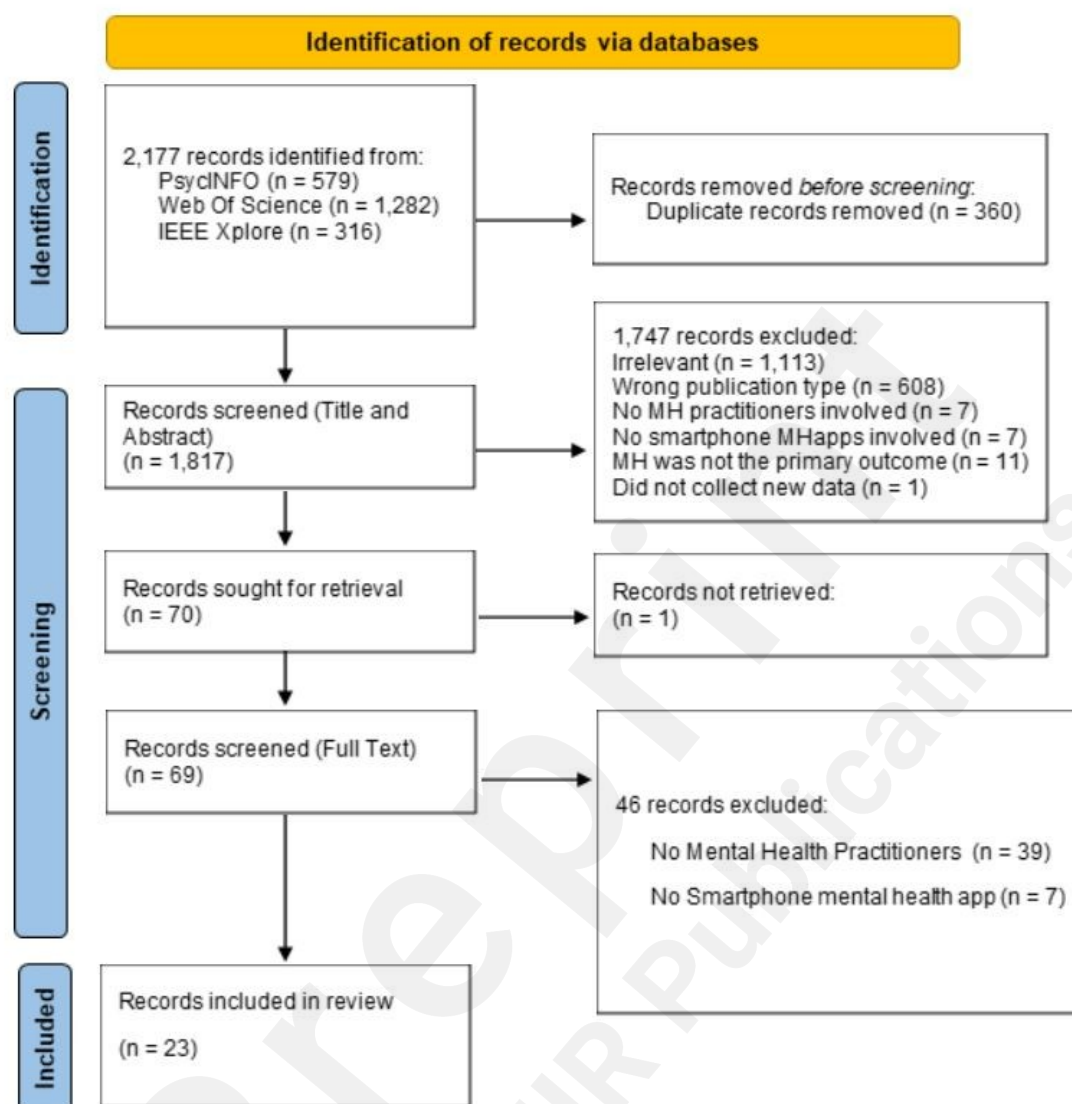
Results

Selection of sources of evidence

The initial search yielded 2,177 records. After removing 360 duplicates, 1,817 titles and abstracts were screened, and 69 full text publications were reviewed. Following full text review, 23 publications were submitted to data extraction (see Figure 1).

Figure 1

PRISMA 2020 Flow Diagram Documenting Literature Search and Outcome of Screening Process



Results of individual sources of evidence & synthesis of results

The full characteristics of the included studies are outlined in Tables 2 to 5.

Table 2

Study Information of Retrieved Studies.

Author	Year	Country	Aim	Design
Adams et al.	2021	US	To develop and perform initial usability pilot-testing of a mobile app designed to augment outpatient behavioural health	- Mixed methods (Pilot) - Semi structured interviews - Questionnaires

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			treatment for adolescents with substance use disorders and co-occurring mental health concerns		
Anastasiadou et al.	2019	Spain	To test the acceptability and feasibility of a mHealth tool for patients with an eating disorder among patients and specialists	• Focus groups	Qualitative
Armstrong et al.	2021	US	To explore youth and mental health provider perspectives on using apps to enhance evidence-based clinical care, with an emphasis on behaviour-tracking apps	• Semi structured interviews	Qualitative
Bucci et al.	2019	UK	To explore frontline staff views regarding the utility and appropriateness of using digital tools in the healthcare pathway for people accessing specialist secondary care mental health services	• Focus groups	Qualitative
Cheung et al.	2023	Canada	To identify the perceived facilitators and barriers to technology-enhanced measurement based care from both patient and provider perspectives	• Quantitative (cross-sectional) • Survey	(cross-sectional)
Dobson et al.	2022	New Zealand	To explore the digital competence of psychologists and their use of digital tools in the practice	• Mixed • Survey	methods
Dubad et al.	2021	UK	To explore the clinical impacts of mobile mood-monitoring in youth with mental health problems	• Mixed • Semi structured interviews	methods
Francese & Attanasio	2023	Italy	To assess (i) the acceptability of an app that monitors mood by images, speech and questionnaire answers for use in clinics and (ii) the patient user experience.	• Questionnaire	Quantitative
Hoffman et al.	2019	US	To test the feasibility of using mental health applications to augment integrated primary care services; solicit feedback from patients and providers to guide implementation, and develop a mental health apps toolkit for system-wide dissemination	• Mixed (longitudinal) • Survey	methods pilot)
Kerst et al.	2020	Germany	To explore the attitudes of health care professionals towards their use of apps for depression in practice	• Survey	Quantitative
Li et al.	2022	Australia	To design a new CBT smartphone app that targets depressive and anxiety symptoms in adolescents	• Survey	Quantitative Survey
Miller et al.	2019	US	To evaluate the use and perceptions of apps among Primary Care Mental Health Integration (PCMH) providers	• Mixed • Survey	methods
Morton et al.	2021	Multiple	To explore clinicians' attitudes towards, and use of apps when working with people with bipolar disorder (BD)	• Mixed • Survey	methods
Naccache et al.	2021	France	To explore early acceptability and user experience of a companion app prototype for adolescents with anorexia nervosa (AN) using user-centered design methods	• Mixed • Semi structured focus group • Questionnaires	methods interviews
Orengo-Aguayo et al.	2018	US	Assess providers' views of the use of technology in the delivery of an empirically supported mental health treatment for adolescents (Trauma-Focused Cognitive Behavioral Therapy; TF-CBT)	• Mixed • Semi structured focus group • Survey	methods interviews

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Patoz et al.	2021	France	To identify, through a user-centred design approach, patient and physician expectations of a hypothetical app dedicated to depression	• Semi-structured interviews	Qualitative
Puhy et al.	2021	US	To investigate whether the mHealth software platform, NeuroFlow, was usable and acceptable for students receiving mental health services and for their treatment providers	• Mixed methods • Focus groups • Questionnaire	
Richards et al.	2018	Australia	To investigate therapist views on their experiences using a technological adjunct (goACT) to traditional, face-to-face psychotherapy	• Focus groups	Qualitative
Rodriguez-Villa et al.	2021	US India	To engage clinicians, and people living with schizophrenia spectrum disorders and their family members in developing new features and co-designing the mindLAMP app and assess its effectiveness in predicting and preventing relapse	• Focus groups	Qualitative
Rothmann et al.	2022	Denmark	To develop and pilot test a telepsychology module for inclusion in the app My Hospital to provide remote psychological counselling to vulnerable adults with either rheumatic diseases or diabetes	• Semi-structured interviews	Qualitative
Stefancic et al.	2022	US	To describe the systematic process of soliciting inputs from clinician stakeholders to develop First Episode Digital Monitoring (FREEDoM), an app-based mHealth intervention	• Semi-structured interviews	Qualitative
Strodl et al.	2020	Australia	To explore the perceptions of PTSD Coach Australia by clinicians with experience in assisting Defence members with mental health problems	• Mixed methods • Focus groups • Semi-structured interviews • Questionnaire	
Wu et al.	2020	US	To understand clinicians' perspectives on patient-generated health data (PGHD) and current mental health apps	• Mixed methods • Semi structured interviews	

1. Studies' characteristics

Publications were distributed fairly evenly across the 6 year period of inclusion (2018-2023) with a peak in 2021 during which 35% of included studies were published (see Table 2). Most studies were from the US (40%), then Australia (13%), with only one or two studies across each of remaining 10 countries. Sample sizes ranged from three (Rothman et al., 2022) to 220 (Miller et al., 2019), with 24 being the median sample size.

The studies' aims covered a wide range of topics related to the use of mobile apps in mental health care, with over half of the studies' primary purpose being to explore perspectives and attitudes of mental health practitioners towards use of mobile apps in clinical practice (12

studies or 52% of retrieved studies). The second most frequent primary purpose reported was developing and testing mobile mental health apps for a variety of conditions (9 studies, or 39% of retrieved studies), with depression the most common, and then general mental health and multiple disorders. One study's primary purpose was to identify facilitators and barriers to the adoption and integration of mobile apps in mental health care, while one study's primary purpose was to assess the clinical impacts and potential benefits of using mobile apps for monitoring symptoms. The studies employed a diverse range of research designs, with a significant portion utilizing qualitative or mixed methods approaches to explore the perspectives, experiences, and needs of stakeholders regarding the use of mobile apps in mental health care. Almost half the studies (11 studies; 48% of total) were mixed methods designs, while eight studies (35% of total) were qualitative designs (involving for example, focus groups, semi-structured interviews). Only four studies (17%) had an entirely quantitative design (involving cross-sectional and longitudinal surveys or questionnaires). Several studies focussed in designing new apps included co-design or user-centered design approaches, which emphasized the involvement of end-users (practitioners, clients, or both) in the development and refinement of mobile apps.

Table 3*Characteristics of Practitioners and Clients in Retrieved Studies*

Characteristics of Practitioners						Characteristics of Clients			
Auth or	Sampl e size	Sample Type	Age Mean (SD)	Gender (%)		Age (SD)	Mean	Mental Health Condition	Populat ion
Ada ms et al.	20	Clinicians with active adolescent Substance Use Disorder treatment caseload (including social workers, counsellors, researchers, psychologists)	• Alpha: 43.3 (7.5) • Beta 2: 37.8 (12.1)	Female (100%)		• Alpha: 15.3 (1) • Beta: 15.9 (1)		Substance use disorders	Clinical
Anas tasia dou et al.	8	• Psychiatrist • Psychologist • Nurse	34.63 (7.21)	Female (75%)		15 (0.5)		Eating disorders	Clinical
Arms trong et al.	12	• Psychologist • Social worker • Psychotherapist	38.42 (5.78)	Female (67%)		18.9 (3.73)		Not reported (General mental health)	Clinical
Bucci et al.	48	Working in Early Intervention for psychosis services (included care coordinators, psychologists, mental health practitioners, team managers) • Support worker • Nurse • Social worker • Psychiatrist • Researcher • Team secretary	36.2 (SD not reported)	Female (56%)		Not reported		Psychosis	Not reported (but is likely clinical)
Cheu ng et al.	108	Healthcare providers currently providing MH services - Mainly psychiatrists (90%), but also included physicians, general practitioners, psychologists,	• 18-29 (4.6%) • 30-39 (12%) • 40-49 (22.2%) • 50-59 (26.8%) • 60+ (34.3%)	Female (40.7%)		• 18-29 (20.5%) • 30-39 (24.4%) • 40-49 (20.6%) • 50-59 (22.9%) • 60+ (13%)		Depression	Clinical

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social workers)							
Dobs on et al.	195	Psychologist	• 24-35 (37%) • 36-45 (30%) • 46-55 (17%) • 56-65 (10%) • 65+ (6%)	Female (88%)	Not reported	Not reported	Not reported
Duba d et al.	6	• Psychiatrist • Nurse • Assistant Practitioner	Not reported	Not reported	20.71 (2.56)	• Psychotic disorders • Mood, panic, eating, and/or anxiety disorders • (Emerging) personality disorders?	Clinical
Fran cese & Attan asio	8	☐ Psychiatrist (4) ☐ Psychologist (4)	43 (6.18)	Not reported	36.24 (14.02)	Depression	Clinical
Hoff man et al.	24	Mostly psychotherapists (50%), but also psychiatrists (13%) and rest care managers.	Not reported	Not reported	36.5	• Anxiety • Stress • Depression • Alcohol use • Tobacco use	Clinical
Kerst et al.	57	• Medical practitioner • Psychologist • Psychotherapist • Occupational therapist • Nurse • Social worker	43 (12.3)	Female (64.9%)	Not reported	Depression	Not reported
Li et al.	32	Mental health professionals - 30% Psychologists, but also included general practitioners, psychiatrists, dieticians, play therapists, social workers, allied health workers, nurses	38.7 (10.4)	Female (81.3%)	14.94 (1.3)	• Depression • Anxiety	• Clinical • Non-clinical
Miller et al.	220	PCMHI providers, almost half were	45.5 (11.1)	Female (78.6%)	Not reported	Apps were used	Not reported

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		psychologists (46.8%).				primarily for insomnia or sleep disturbances (76.4%), stress (75.8%), PTSD (65.9%), depression (65.9%), and/or anxiety (64.3%). Beyond these reasons, providers noted using apps for emotion regulation difficulties, anger, chronic pain, smoking, reintegration challenges, obesity, alcohol use, and brain injury.		
Morton et al.	80	Healthcare Providers: • Psychiatrist • Psychologist • Nurse • Counsellor • Allied Health	44.7 (13.1)	Female (53.8%)	Not reported	Bipolar disorder	Not reported	
Naccache et al.	7	Clinicians: • Psychiatrist • Paediatrician • Nutritionist Physician • Psychomotor Therapist • Nurse	36.7 (7.38)	Female (57.1%)	15.5 (1.07)	Anorexia nervosa	Clinical	
Orenago-Aguayo et al.	65	TF-CBT Providers: • Clinical/Counselling Psychology • Social Work	• Phase 1: 41.88 (10.25) • Phase 2: 39.73 (10.26)	Not reported	Not reported (although we know that the clinicians treated children and adolescents)	Trauma-related conditions	Not reported (but is likely clinical)	

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Pato z et al.	26	Physicians: • Psychiatrist • General Practitioner	45.5 (12.2)	Female (50%)	51.5 (15.5)	Depression	Clinical
Puhy et al.	3	Mental Health Providers: • Psychologist • Counsellor	Not reported	Not reported	16.1 (1.2)	Students reported to sessions with a range of primary presenting problems, the most common of which was depression (44.4%, n = 4), followed by anxiety (n = 1), isolative/wi thdrawn symptoms (n = 1), sleep problems (n = 1), learning disability (n = 1), and other (n = 1).	Clinical; Student s were eligible for the study if they were in need of at least five counseli ng sessions as determin ed by their provider
Rich ards et al.	6	Provisional Psychologist	Not reported	Not reported	Not reported (although we know that the patients were 18 years and older)	Not reported	Not reported (but is likely clinical)
Rodri guez -Villa et al.	53	Mental Health Care Providers: • Nurse Practitioner • Social Worker • Psychiatry Resident • Psychiatrist • Psychologist	• BIDMC: 41 (SD not reported) • AIIMS: 35 (SD not reported) • NIMHANS: 41 (SD not reported)	Not reported	• BIDMC: 32 (SD not reported) • AIIMS: 33 (SD not reported) • NIMHANS: 35 (SD not reported)	Schizophre nia	Clinical
Roth man n et al.	3	Psychologist	Not reported	Not reported	Only reported range = 25- 59 years	Not reported	Patients were referred by nurses or doctors at the outpatie

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							nt clinic to the departm ent's psychol ogists because of psychol ogical challeng es arising from living with chronic rheumati c disease or diabetes Assume Clinical
Stefa ncic et al.	11	First-Episode Psychosis (FEP) Providers: • Team Leader • Psychiatrist • Nurse Practitioner • Social Worker	Not reported	Not reported	Not reported (although we know the clinics provide treatment to adolescents and young adults aged 16-30 years)	Psychosis	
Strod l et al.	63	Mental Health Clinicians: • Psychologist • Social Worker • Nurse • Counsellor/Rehabil itation Worker • Occupational Therapist • General Practitioner • General Medical Officer Clinicians: • Psychiatrist • Clinical Psychologist	• Focus group: 47 (10.5) • Telephone sample: 45.7 (10.5)	• Focus group: Female (73%) • Telephone sample: Female (80%)	Not reported	PTSD/ Trauma	Not reported
Wu et al.	12		Not reported	Female (41.6%)	Not reported	Not reported	Not reported

2. Practitioner and Client information

A range of mental health practitioners were represented in the included studies (see Table 3), with psychologists the most common (in 21 studies) and psychiatrists the next most common (in 13 studies). Practitioner age ranged from 35 to 47 years, and there were more female (40.7% to 100% range) than male or non-binary practitioners represented.

Clients' age ranged from 15 to 52 years, with the most common age range (when reported) being adolescents and young adults (seven studies). The majority of studies (18 of 23 studies) appearing to include clinical samples, although reporting was at times ambiguous. The most commonly reported mental health conditions in the clients sample were mood disorders (depression, anxiety, bipolar disorder) following by general mental health conditions and multiple disorders.

Table 4

Characteristics of App Use in Retrieved Studies

Author	App Name	App Purpose	App Function	In and/or Out of Session	Practitioner Guided and/or Self-Managed	Patterns of Use
Adams et al.	Bright Path	• Prevention/Promotion • Assessment/Case Identification (Designed to present educational content and interactive games and activities that address common factors associated with substance use and mental health disorders in youth)	• Record - Collect • Instruct	Both	Both	Not reported
Anastasiadou et al.	TCApp	• Monitoring/Tracking • Continuing	• Record - Collect, Share • Remind/Alert	Out-of-session	Practitioner guided	Not reported

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		Care/ Relapse Prevention (Designed to bidirectionally connect patients with EDs and their therapists in the periods between medical consultations.)	• Communicate			
Armstrong et al.	N/A	• Monitoring/ Tracking	• Record - Collect	Out-of-session	Not reported	Not reported
Bucci et al.	N/A	• Monitoring/Tracking (Support early intervention of psychosis)	• Record - Collect, Share, Evaluate, Intervene	Out-of-session	Self-managed	Not reported
Cheung et al.	N/A	• Assessment/Case Identification (assess severity, track improvement with treatment, monitor symptom relapse and assess quality of life and side effects of medication)	• Record - Collect, Share, Evaluate	Not reported	Not reported	Not reported
Dobson et al.	N/A	Not reported	Not reported	Not reported	Not reported	Not reported
Dubad et al.	Catch It	• Monitoring/ Tracking	• Record - Collect	Not reported	Not reported	Not reported
Francese & Attanasio	EDApp	• Assessment/Case Identification • Monitoring/ Tracking	• Record - Collect, Share, Evaluate • Display	In-session	Practitioner guided	Not reported
Hoffman et al.	Variety - from Cambridge Health Alliance's mobile app toolkit including Breathe2Relax, Mindfulness Coach, Self-Help for Anxiety Management, CBT-iCoach, MoodTools, T2	• Treatment/ Intervention • Psychoeducation (manage anxiety or stress, help sleep - interventions, but also tracking, education and emotion regulation strategies)	• Record - Collect, Intervene • Inform • Guide	Out-of-session	Self-managed	• 82.6% indicated that they incorporated apps into their clinical work • 25% indicated that they introduced apps to patients 25-50% of the time

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	MoodTracker, QuitforLife						45% indicated that they introduced mobile tools < 25% of the time
Kerst et al.	N/A	Treatment/ Intervention			Not reported	Not reported	21.1% indicated that they used apps in clinical practice before
Li et al.	ClearlyMe	- Treatment/ Intervention (CBT) - Psychoeducation (activities for depression)	Record - Share	Inform - Collect	Out-of-session	Self-managed	Not reported
Miller et al.	The five most commonly used VA-created apps were Mindfulness Coach (67.6%), CBT-i Coach (56%), PTSD Coach (50.5%), Moving Forward (33%), and Stay Quit Coach (29.1%). The top five non-VA apps were Breathe2Relax (49.3%), Virtual Hope Box (22.1%), Tactical Breather (16.2%), MyFitness Pal (15.4%), DreamEZ (10.3%)	Monitoring/ Tracking	- Record - Collect - Remind/Alert - Guide	Inform - Collect	Out-of-session	Self-managed	Most participants reported recommending or using apps with their patients (82.7%). When given options for how they use apps, providers indicated providing a list of apps for their patients to explore (29.3%), recommending an app without instructions or follow-up (26.7%), introducing an app with instructions (e.g., help patients download) but providing no follow-up (24.1%), and fully integrating a mobile app into treatment (24.6%).
Morton et al.	N/A	- Monitoring/ Tracking - Treatment/	Record - Inform	Collect	Not reported	Self-managed	Approximately half of the healthcare

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			Intervention				providers surveyed reported discussing or recommending health apps with patients with BD (n = 39; 48.8%)
Naccache et al.	et	Not reported	• Prevention/ Promotion • Monitoring/ Tracking • Treatment/ Intervention	• Inform Guide • Record - Collect, Evaluate • Remind	Not reported	Self-managed	Not reported
Orengo-Aguayo et al.		N/A	• Prevention/ Promotion • Monitoring/ Tracking • Assessment/ Case Identification	• Remind/Alert • Record - Collect • Communicate • Inform	Both	Practitioner guided	Not reported
Patoz et al.		N/A	• Prevention/ Promotion • Monitoring/ Tracking • Assessment/ Case Identification	• Record - Collect, Share, Evaluate, Intervene • Display • Communicate • Inform Guide • Remind/Alert • Instruct	Out-of-session	Self-managed	Not reported
Puhy et al.		NeuroFlow	• Prevention/ Promotion • Monitoring/ Tracking	• Remind/Alert • Record - Collect, Share, Evaluate, Intervene • Inform Guide • Communicate • Display	Both	Both	Not reported
Richards et al.	et	goACT	• Tracking/ Monitoring • Assessment/ Case Identification	• Communicate • Remind/Alert • Record - Collect, Share	Out-of-session	Both	Not reported
Rodriguez-Villa et al.		mindLAMP	• Continuing Care/ Relapse Prevention	• Record - Collect, Evaluate • Display Guide • Remind/Alert • Inform • Instruct • Communicate	Both	Self-managed	While some providers had recommended apps focused on clinical outcomes such as DBT diary card or CBT applications, most providers had suggested mindfulness applications to people with schizophrenia

							as a means to minimise anxiety and help refocus energy as well as apps for lifestyle modification such as weight loss apps. Most providers did not formally follow up with people with schizophrenia about their experiences with or continued use of a recommended application.
Rothmann et al.	My Hospital	• Prevention/ Promotion • Treatment /Intervention	• Inform	Both	Practitioner guided	Not reported	
Stefancic et al.	First Episode Digital Monitoring (FREEDoM)	• Assessment/ Case Identification	• Record - Collect, Share, Evaluate • Inform • Communicate • Instruct • Display	Out-of-session	Self-managed	Not reported	
Strodl et al.	PTSD Coach	• Prevention/ Promotion • Tracking/ Monitoring • Assessment/ Case Identification	• Inform • Record - Collect, Share • Guide • Remind/Alert	Out-of-session	Both	Not reported	
Wu et al.	31 sleep and mood tracking apps	• Monitoring/ Tracking	• Record - Collect, Share, Evaluate • Display	Out-of-session	Practitioner guided	Not reported	

3. App Characteristics

Almost half the studies (11 of the total of 23; 48%) explored the use of a specific app, with 3 studies (13%) examining a toolkit of apps (see Table 4). The remaining almost half of the studies (39%; 9 studies) explored practitioners attitudes or use of mental health apps more generally.

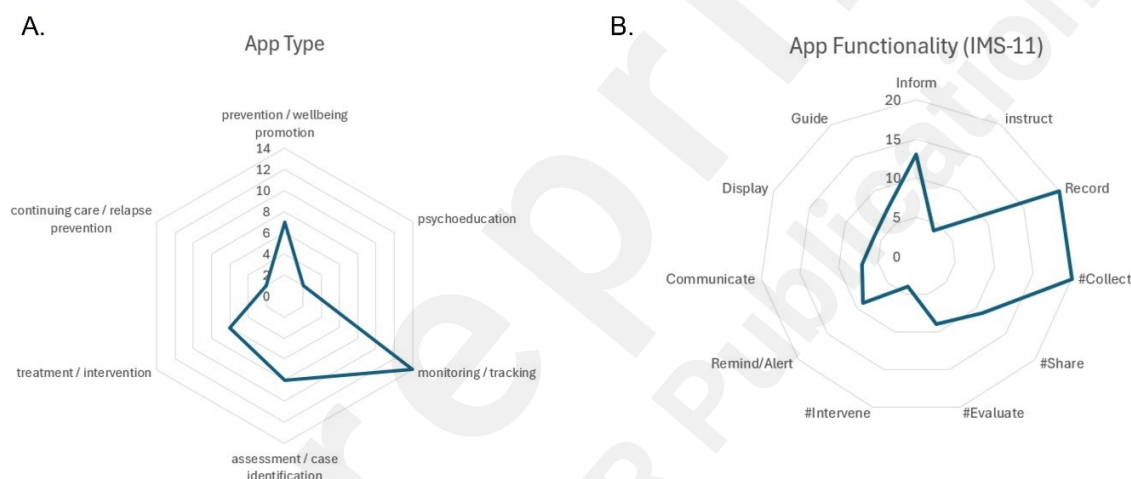
The majority of apps discussed across studies were Monitoring or Tracking apps, followed by Wellbeing promotion/prevention apps and then Assessment or Case identification apps

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(Figure 2A). With regard to app functionality (Figure 2B), most apps (82%) had four or less of the seven IMS app functions. The majority of apps (87%) included a Recording function, and all were Collecting data from users. The next most common function was Informing (57% of apps), followed by Sharing recorded data (48%). The least common functions were Instructing and Intervening on basis of recorded data (each evident in only 17% of apps).

Figure 2

Radar plots of (A) Purpose of apps, and (B) App Functionality.



Apps were used primarily out-of-session (11 of 23 studies; 48%), with five studies (22%) citing app use both in and out of session. Only one study (Francese & Attanasio, 2023) focused on an app used specifically in clinical sessions. The most common management approach reported was self-management (9 studies; 39%), with four studies (17%) reporting both practitioner-guided and self-management, and five studies (22%) were practitioner-guided only. The remainder of studies did not report the management approach.

Only five of the 23 retrieved studies (22%) indicated practitioners' current patterns of using apps with their clients. In four of these five studies, more than half of the practitioner sample had incorporated apps into their practice by either using them or recommending them to clients. In at least four of these studies (Hoffman et al., 2019; Miller et al., 2019; Morton et

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al, 2021; Rodriguez-Villa et al, 2022), the intention was for the apps to be used to self-manage their health, and all of these except the study by Miller et al (2019) describe ‘out of session’ use of apps.

Table 5

APA App Quality Features Prioritised by Practitioners in Retrieved Studies

Author	Accessibility	Security Privacy	& Evidence Base	Engagement	Interoperability
Adams et al.	Yes	Yes	Yes	Yes	Yes
Anastasiadou et al.	Yes	Yes	Yes	Yes	Yes
Armstrong et al.	Yes	Yes	Yes	Yes	Yes
Bucci et al.	Yes	Yes	Not reported	Yes	Yes
Cheung et al.	Yes	Yes	Not reported	Not reported	Not reported
Dobson et al.	Not reported	Yes	Not reported	Not reported	Not reported
Dubad et al.	Not reported	Not reported	Not reported	Not reported	Yes
Francese & Attanasio	Not reported	Not reported	Not reported	Yes	Yes
Hoffman et al.	Yes	Yes	Yes	Yes	Yes
Kerst et al.	Yes	Yes	Not reported	Not reported	Yes
Li et al.	Yes	Yes	Yes	Yes	Yes
Miller et al.	Yes	Yes	Yes	Yes	Yes
Morton et al.	Yes	Yes	Yes	Yes	Yes
Naccache et al.	Yes	Yes	Yes	Yes	Yes
Orengo-Aguayo et al.	Yes	Yes	Yes	Yes	Yes
Patoz et al.	Yes	Yes	Yes	Yes	Yes
Puhy et al.	Not reported	Yes	Yes	Yes	Yes
Richards et al.	Yes	Not reported	Not reported	Yes	Yes

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Rodriguez-Villa et al.	Yes	Yes	Yes	Not reported	Yes
Rothmann et al.	Yes	Not reported	Not reported	Yes	Not reported
Stefancic et al.	Yes	Yes	Yes	Yes	Yes
Strodl et al.	Yes	Yes	Yes	Yes	Yes
Wu et al.	Not reported	Not reported	Yes	Yes	Yes

4. Practitioners' prioritisation of app features mapped onto APA app quality criteria

All five APA criteria were recognised as important across the majority of studies (see Table 5). The criterion most commonly raised was interoperability (20 studies, or 87% of retrieved studies), with key factors including the ability to share data with clinicians or caregivers, integration with electronic health records, supporting in-session and between-session use and compatibility with clinician workflows and systems. For example, Wu et al (2020) highlighted the importance of apps that seamlessly integrate data into electronic health records and support collaborative care, suggesting the value of interoperability for practitioners.

Security and privacy, engagement and accessibility were also commonly cited criteria by practitioners (all of which were cited in 18 of the 23 studies). Security and Privacy concerns included data privacy and confidentiality, security protocols (e.g., passwords, encryption), regulations and liability governing data access and use, and ensuring user privacy when sharing information with clinicians or caregivers. For example, Anastasiadou et al (2019) highlighted concerns about a restrictive healthcare system in Spain that limited the sharing of patient information online, emphasizing the importance of addressing privacy and security concerns. Engagement factors of importance to practitioners included ease of use and user-friendliness, attractive and intuitive design, ability to personalize and customize features, inclusion of reminders and notifications, gamification and interactive elements and provision of feedback and progress tracking. For example, Li et al (2022) emphasized the importance of incorporating interaction patterns and functionalities used in popular social media apps, such as swipe interactions and short videos, to enhance engagement for a youth-focused app. Accessibility included factors associated with smartphone ownership (due to technical resources such as WiFi or cost), availability on multiple platforms, language requirements,

ability to use offline or on-demand, and data storage requirements. While the least mentioned criterion, the importance of an Evidence-base was still cited in 15 studies. Practitioners noted the importance of including credible, reliable, and up-to-date content, the use of validated scales and questionnaires, alignment with clinical practice guidelines, provision of psychoeducation, information being appropriate for specific mental health conditions and information about the underlying science and research. For example, Miller et al (2019) noted that the intention to use apps in the future was influenced by professional training, followed by scientific evidence, suggesting the importance of an evidence base for practitioners.

Other issues identified as important by practitioners beyond the formal APA app quality evaluation model included the importance of clinician training in using the technology to enhance familiarity and confidence in using and recommending apps, the potential impact of apps on therapeutic alliance and treatment outcomes, moderation of app utility by client characteristics including digital literacy, age and motivation, and organisational investment in resources and support for integrating digital mental health into practice.

Given all five APA criteria were raised as important across most studies, it was not possible to discern any patterns or associations between APA criteria raised and client or practitioner characteristics.

Discussion

The aim of this scoping review was to explore what is known about the mental health practitioners' view on integration of smartphone apps into their practice; the factors that may influence such integration including practitioners and clients' characteristics, apps functionality and design and reported use of those apps in practice.

Main findings

Across the 23 included studies, 1067 mental health professional participated with the sample size ranging from three to 220. The participants predominately included psychologists (21 studies), psychiatrists (13 studies) and social workers but also a number of other mental health practitioners, with participants being predominantly females and mid-career based on

their age range (30s and 40s). Those participants practiced across a range of services from specialised clinics (such as eating disorders, psychosis early intervention) to school/tertiary-based counselling units, demonstrating a diverse and representative sample of mental health practitioners and services. Notably, however, 16 of the 23 studies had sample sizes less than 50, and some demographic features such as age or gender were not reported by all studies which limits the degree of generalisability of views to a broader mental health practitioners' population.

From the demographic information included, the participants appear to be predominately experienced and qualified practitioners actively involved in mental health services. Practitioners' clients across the included studies ranged from children to adolescents and adults, predominately from clinical settings and presenting with a range of mental health issues most commonly mood and anxiety disorders (10/23 studies). This is consistent with the prevalence of those mental health conditions in both clinical and community populations which have further increased post COVID-19 (Santomauro et al 2021). The increased prevalence of those common conditions continues to challenge limited health services, access and continuity of care and practitioners' ability to meet the needs of growing number of clients. The consistency in the mental health conditions in the population, and those identified in this review of practitioners who are exploring smartphone apps in their practice, is therefore promising for alignment of support demand and practitioner readiness for integration of digital tools into their practice. Therefore smartphone apps offer a viable potential add-on resource and a self-directed mental health support.

However, much of the current literature on the potential use of smartphone apps in mental health care is predominantly focussed on the *development* of such apps and exploration of perspectives of both practitioners and clients on their *usability* rather than on *actual* usage patterns and clinical *effectiveness*. Across the 23 studies, 13/23 studies reported app use out of sessions, 7/23 in and out of sessions, and 1/23 in session only. It therefore appears that while the use of apps is recognised by practitioners as potentially helpful to their clients, the practice of use remains consistent with stepped care models of mental health care, in which digital technologies are regarded as potentially well suited for self-managed, low intensity support (Pedrelli et al, 2023; Department of Health, 2021) rather than as part of an integrated in-session care plan. This is understandable, given that the primary focus of the apps included across those studies was on wellbeing promotion, tracking/monitoring, psychoeducation,

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early intervention and assessment monitoring, as well as their capacity to collect, record and inform. In contrast, only 17% of those apps functioned within the Higher Intensity range of treatment/intervention or continued care/relapse prevention functions such as ‘instructing’ or ‘intervening’. Apps that offer a greater multi-functionality in their design are more likely to be useful to client-practitioner sessions (Myers et al 2021),

Despite previous literature suggesting practitioner-guided apps are more effective than self-managed or ‘stand alone’ apps (Baumeister et al., 2014; Moshe et al, 2021), the studies identified in this review focussed more on self-management apps. The majority of studies (56%) included self-management apps, with 39% entirely stand-alone. While there is currently still limited evidence of effectiveness for stand-alone apps (Moshe et al, 2021), this delivery mode may be of greater interest to practitioners given the persistent high demand for their services (APA, 2022). Self-management apps also align with models of healthcare that aim to empower patients to participate more in the management of their own health (Flores et al, 2013). Almost half the studies reviewed explored use of apps out-of-session, with a further 22% exploring use of apps both in- and out-of-session and only one study use of apps in-session only. It has been reported that involvement of practitioners in the client use of mental health apps aids effectiveness of those apps in comparison to self-managed or stand alone app use (Garrido et al, 2019, Duarte-Diaz et al, 2023). There is, however, a need for research to capture what that involvement looks like and to what degree it facilitates the effectiveness of the app and its contribution to the clinical sessions. Practitioners are more likely to recommend apps (whether used in- or out-of-session) if there is a clear evidence of how their involvement and the client’s use of the app contributes to the clinical care outcomes.

Given that the majority of mental health apps do not meet all five standards outlined by the APA evaluation model (Rickard et al, 2022), it is understandable that their use by mental health practitioners is still at a potential rather than actual and evidence-based stage. Notably, across the 23 studies reviewed, practitioners raised the importance of app features consistent with those five APA standards, indicating an informed position in their considerations of suitability of apps for integration into mental health care. The most commonly reported feature of apps that practitioners identified as important was Interoperability (cited in 20 studies). This is consistent with digital tools being used as an adjunct rather than alternative to professional care, and providing practitioners with information that may contribute to their

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in-session interactions with the client. Integration of assessment and monitoring data into electronic records may also provide new insights which may not be possible with more manual recording of less regular data points. Security and privacy, Engagement and Accessibility were each cited in 18 studies. The high importance placed on security and privacy demonstrates practitioners' awareness of the importance of practice requirements relating to clients' clinical notes, if and how those data may be shared with others, and risks associated with digital storage of sensitive data. The equally high importance of Engagement and Accessibility criteria reflect practitioners' awareness that mental health apps must be designed and distributed in a way that does not exclude any sociodemographics, and encourages uptake and sustained use. While Evidence base was the cited in the fewest number of studies, it was still clearly valued. This reflects a need for mental health apps to be credible and developed by trusted sources, and for the function and outcomes of the app to be aligned via systematic evaluation. Other criteria raised by practitioners beyond the APA model covered a wide range of factors across the studies, some specific to the unique contexts and populations in their study but predominantly the need for training in selection and use of apps in a clinical context and the relevant technical support. Those are important practical considerations in facilitating progression from potential to actual use of apps in clinical settings.

To progress the potential integration of mental health apps into clinical sessions, it may be informative to understand the context of clinical sessions that include assessment, formulation, treatment plan, monitor of progress and self-directed tasks between sessions. In addition, it would be helpful to include information on which APA standards a mental health app meets in app stores, or some other mental health register, to assist selection for a particular client with a particular mental health condition. Without a closer alignment between what may aid sessions and a client's in and out of session support, self-development and psychoeducation, there may be too many apps for practitioners to choose from without a clear sense of how useful those apps may be or how to measure their add-on effectiveness.

Overall, the 23 studies included in this review provide an informative understanding of what practitioners consider important in the design and function of mental health apps if they were to use or integrate their use in their clinical sessions. Further research is required to capture what that use may look like in practice and if using particular apps provides additional benefit to the clinical session and the therapeutic output, or provide support in between sessions that

may otherwise be lacking. Given the constraints of limited mental health services, anything that may be added to the sessions' content (i.e. review of app collected data) or between sessions (i.e. client and practitioner's engagement with the app) has to have a clear add-on clinical value.

Limitations

This scoping review is not without limitations. This review focussed on mental health professionals only – a similar review could be undertaken with other health professionals who work with mental health issues in a different therapeutic context (such as general practitioners, nurses, other allied health practitioners) and may have different potential usability of available apps. The quality of included studies was also not assessed as this was a scoping not a systematic review and therefore relied on descriptive rather than evaluative presentation of those studies.

Notwithstanding these limitations, the 23 studies offer an overview of a number of potentially useful mental health apps that could be integrated into clinical practice ranging from between-session monitoring/tracking data to interactive relapse prevention apps that may provide a useful between-session engagement and within-session progress-informing data. This scoping review has identified that practitioners are interested in use of low intensity support apps outside of sessions, which is aligned with the stepped care model and two key points: addressing the support gaps between sessions, critical to retention and relapse prevention; and empowering clients to self-manage some aspects of their health. As a way forward, it is recommended that the potential use of some apps be explored in a clinical setting using well-structured experimental designs to assess suitability, usability and effectiveness of those apps beyond their potential and *ad hoc* use. A good starting point may be integrating the use of apps outside of sessions but with a review of their use, clients' perception of usefulness and, where relevant, review of data during sessions similar to the common practice of giving clients homework (for example, new skills to practice, daily mood-monitor sheets or behaviour tracking).

For practitioners who would like to utilise mental health apps, it is recommended that they base their selection of apps on the APA's standards as a starting point, focusing on apps that align with particular aspects of client's care plan (such as relaxation for anxiety, or daily pleasant activities for mood) and then determine how they may like to integrate them in their

clinic sessions (for example, for psychoeducation or monitoring symptoms). Some practitioners may find reviewing apps against the APA's standards relatively straightforward especially if they are comfortable users of digital technology. Others however, may require some support given there is a large variation in digital competencies with many having a low awareness and knowledge (Dobson et al, 2022; Kerst et al, 2020; Hoffman et al, 2019) and confidence in suggesting apps to their clients (Morton et al, 2021). It is therefore recommended that educational training modules or workshops are developed to inform use of mental health apps in practice starting with low intensity apps selection for use between session to high intensity apps for within sessions for more advanced digital technology-user practitioners. Such training needs to address commonly raised concerns by both practitioners and clients, including accessibility, safety, and potential side-effects (Patoz et al, 2021) and build practitioners' self-efficacy in use of apps with their clients (Morton et al, 2021).

Conclusion

This scoping review has provided valuable insights into mental health practitioners' perspectives on integrating smartphone apps into their practice. The findings reveal that practitioners are interested in the potential of these digital tools, particularly for self-management and out-of-session support, aligning with stepped care models of mental health care. The use of mental health apps is an untapped resource that can support both practitioners and clients in improving engagement and implementation of care plan strategies (Strodl et al 2020) and a reciprocal responsibility for mental health management (Richards et al, 2016). This may be particularly relevant for practitioners who are regular users of digital technologies who can be at the forefront of apps integration into practice, and practitioners whose clients are highly engaged with technology as a health self-management resource. However, the actual integration of apps into clinical practice remains limited, with practitioners emphasizing the importance of app features such as interoperability, security, privacy, engagement, and accessibility. This review highlights a gap between the potential and actual use of mental health apps in clinical settings, suggesting a need for further research to explore the practical implementation and effectiveness of these tools in therapeutic contexts. To facilitate the adoption of mental health apps in clinical practice, it is recommended that:

1. Practitioners base their app selection on established standards, such as those outlined by the APA.
2. Educational training modules or workshops be developed to enhance practitioners' digital competencies and confidence in using apps with clients.

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3. Well-structured experimental designs be employed to assess the suitability, usability, and effectiveness of apps in clinical settings.
4. App developers and researchers work towards aligning app functionalities with specific therapeutic needs and contexts.

As the field of digital mental health continues to evolve, ongoing collaboration between practitioners, researchers, and app developers will be crucial in realizing the full potential of smartphone apps as valuable adjuncts to traditional mental health care.

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Running Head: App integration into mental health practice

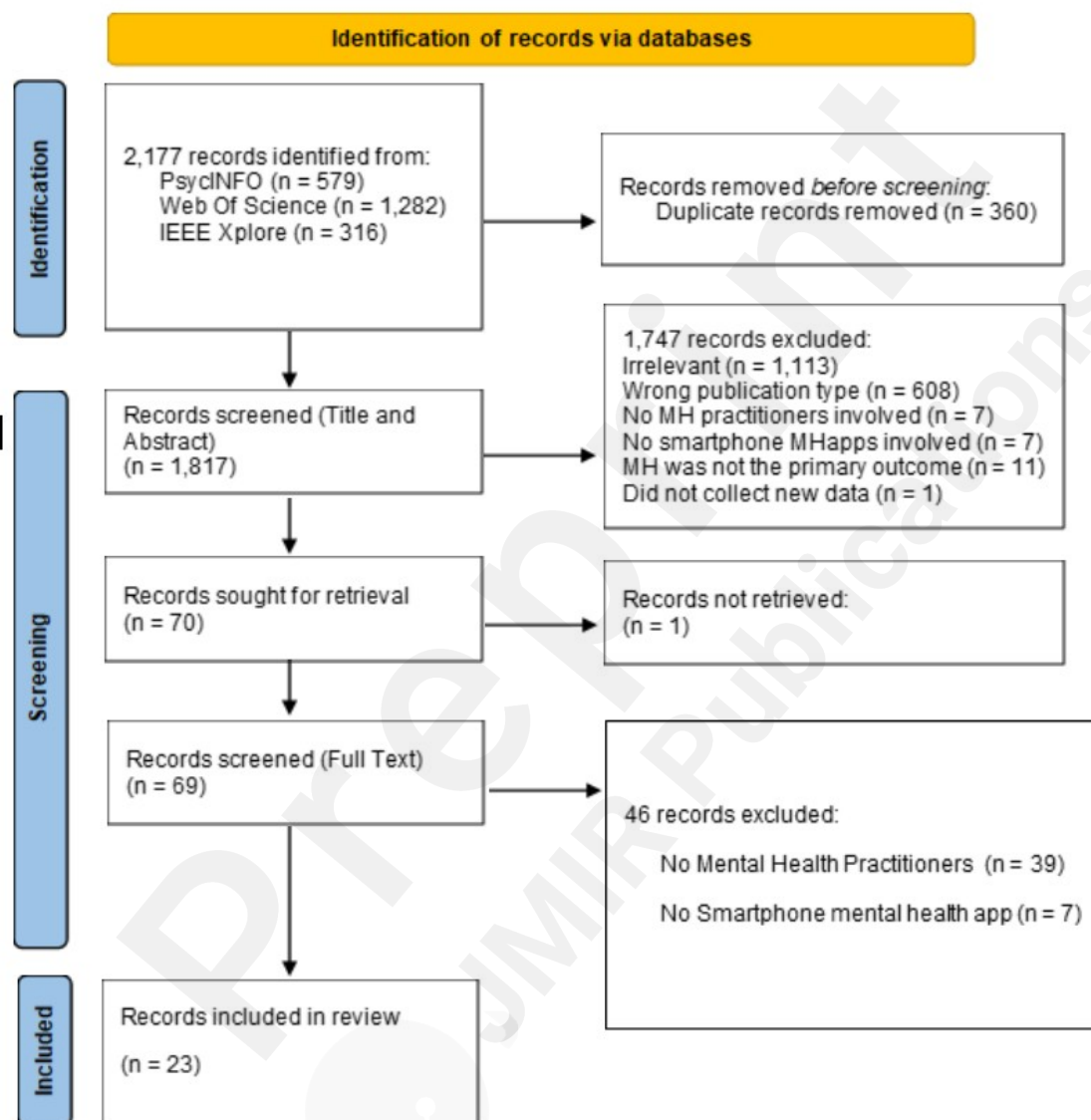
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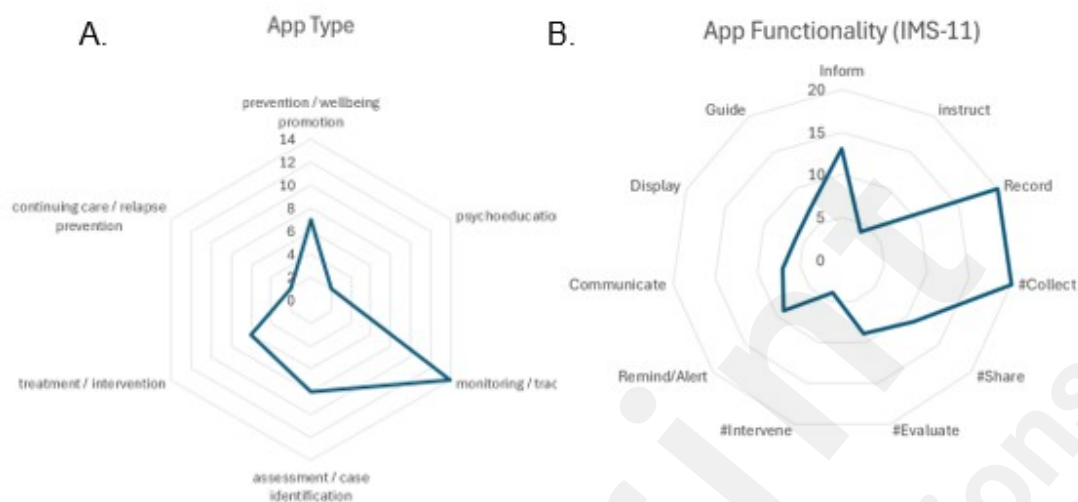
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Figure 1

PRISMAQ 2020 Flow Diagram Documenting Literature Search and Outcome of Screening Process



Running Head: App integration into mental health practice



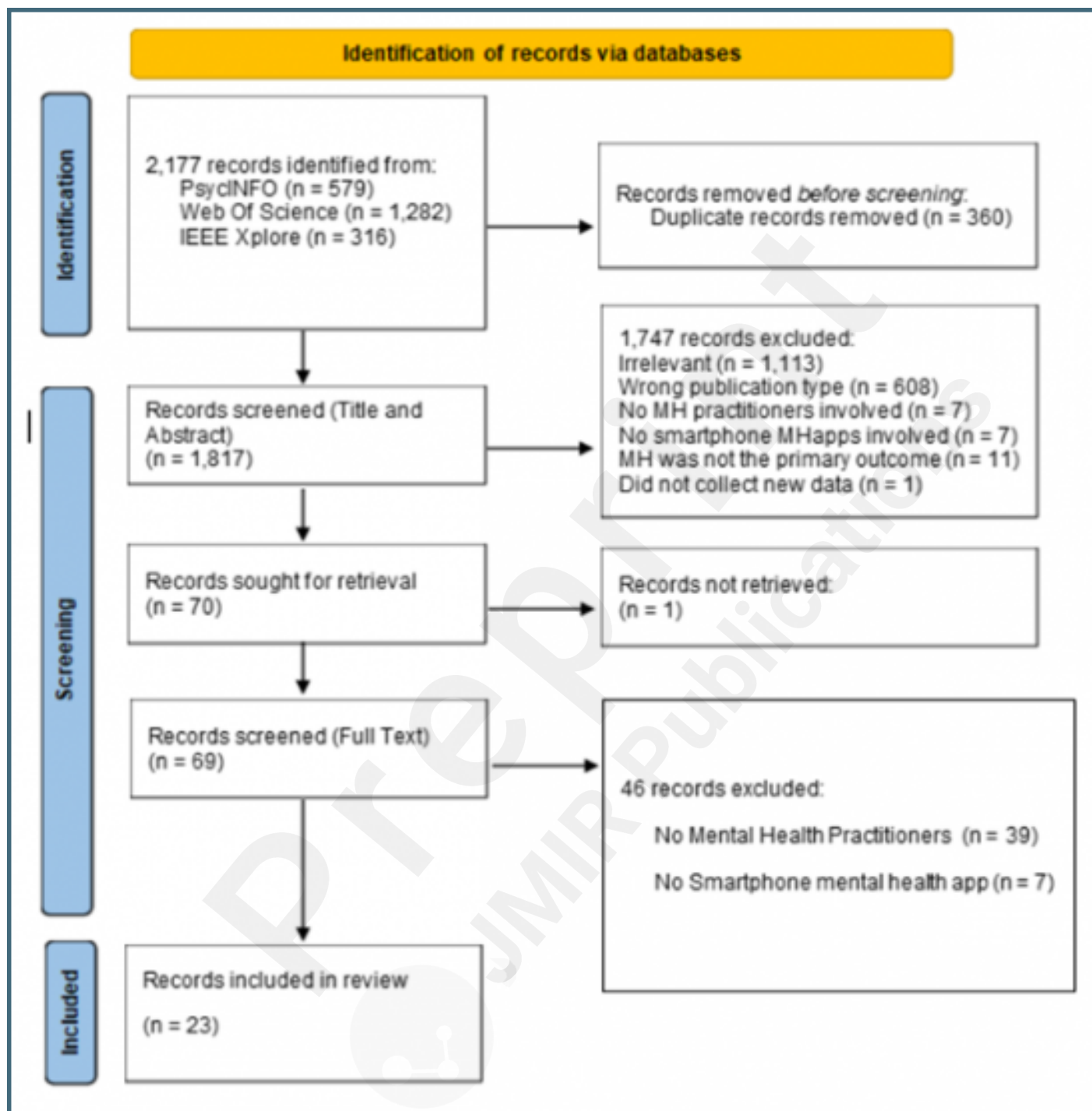
Supplementary Files

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Figures

PRISMA 2020 Flow Diagram Documenting Literature Search and Outcome of Screening Process.



Radar plots of (A) Purpose of apps, and (B) App Functionality.

