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Opportunities to Integrate Mobile App–Based Interventions Into Mental Health and Substance Use Disorder Treatment Services in the Wake of COVID-19

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Abstract

The COVID-19 pandemic has heightened concerns about the impact of depression, anxiety, alcohol, and drug use on public health. Mobile apps to address these problems were increasingly popular even before the pandemic, and may help reach people who otherwise have limited treatment access. In this review, we describe pandemic-related substance use and mental health problems, the growing evidence for mobile app efficacy, how health systems can integrate apps into patient care, and future research directions. If equity in access and effective implementation can be addressed, mobile apps are likely to play an important role in mental health and substance use disorder treatment.

Keywords

mobile app; mindfulness; COVID-19; alcohol; anxiety; sleep

Introduction

There is evidence that anxiety, depression, and substance use have increased during the COVID-19 pandemic. Mobile apps to manage these problems were increasingly popular even before the pandemic and have emerged as a viable strategy to reach people who otherwise have limited treatment access. In this review, we describe how the digital health landscape has been shaped by the pandemic and highlight how mobile apps can be useful in the context of health services. We focus specifically on how health systems can integrate apps into patient care, implementation challenges, and directions for future research.

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Declaration of Conflicting Interests

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Increases in Anxiety, Depression, and Substance Use Problems During the Pandemic

The pandemic has heightened prior public health concerns about the impact of mental health, alcohol, and other drug use problems on population health, due to both risk of acquiring COVID-19 and in response to infection control measures such as closure of schools and businesses. Most surveys have shown an increase in stress, anxiety, and depression,^{1,2} and these symptoms may linger even as the pandemic recedes.³ For example, the May 2021 Household Pulse Survey, designed to track pandemic-related impacts, found that 26% of adults in the United States had symptoms of anxiety disorder based on the Generalized Anxiety Disorders-2 (GAD-2) scale compared with 8% of adults in January–June 2019.⁴ An earlier report (June 2020) found disproportionately higher rates of mental health conditions, substance use, and suicidal ideation among Hispanic and Black Americans, young adults, essential workers, family caregivers of adults, and those with preexisting mental health conditions.⁵ Alcohol sales increased significantly between April 2019 and June 2020 and were greater among larger households, younger adults, households with children under 18 years old, and ethnic minorities.⁶ These data suggest that increases in mental health and substance use problems are largely due to the pandemic.

Treatment Access Challenges

Recent mental health utilization patterns have been consistent with an increased treatment need for those with anxiety, depression, and substance use disorders.⁷ Despite this increase in demand for services, substantial barriers limit access to care. Even prior to the pandemic, it was estimated that fewer than one third of those with a substance use disorder or mental health problem ever initiated treatment.^{8–10} When applying a health equity lens, these access challenges become even more concerning. Prior to the pandemic, the lowest rates of utilization of mental health care services were in low-income and racial and ethnic minority populations. These same groups were disproportionately affected by COVID-19; they experienced higher mortality rates and increased likelihood of working essential jobs that put them at greater risk for COVID-19 exposure and related economic consequences.¹¹

Lack of insurance coverage and access to mental health services is a longstanding problem¹ that the Affordable Care Act has only partly addressed.¹² In the context of COVID-19, there has been a substantial shift to telehealth.^{13,14} This transition has generally been seen as positive by both patients and providers.¹⁵ However, health systems have not been able to meet the demand for services, and access to care remains dependent on reliable, high-speed internet access. Preexisting racial/ethnic and socioeconomic disparities in health care access have contributed to poor mental health and substance use disorder treatment and to worse COVID-19 clinical outcomes.^{16,17} Pre-pandemic, only 10% of Americans used telehealth, and 75% were unaware that it was an option.¹⁸ However, by early April of 2020, 80% of primary care consult visits were conducted *via* telehealth. Problematically, the number of visits by minority groups, patients over 65, Medicaid recipients, and non-English language-preferring patients showed a disproportionate decrease.¹⁹ This discrepancy is partly explained by lack of sufficient internet access, which varies due to costs of internet-enabled devices, limited data plans, lack of Wi-Fi, and challenges using smartphone features such as downloading apps.²⁰ Strategies to mitigate further widening of the digital divide long term require multi-sector approaches including policies that promote affordable,

high-speed internet access in communities, improvements in the usability of telehealth, and appropriate guidance or training for patients using these services to increase digital health literacy.^{21–23}

The existing disparity in accessing health services using technology may extend to mental health apps for certain groups who lack familiarity or comfort with digital tools: older people, those with more functional or psychiatric impairment, patients without prior mental health treatment, and individuals with lower educational attainment may be less able to access virtual care options.^{24–26} A very small percentage of evidence-based apps have been translated or developed in Spanish or other languages. Cost may also persist as a barrier. Many higher-quality apps would be expected to charge for use instead of pursuing strategies that reduce security or quality, such as by selling user data or displaying advertisements. Unfortunately, traditional insurance and related payment models are in the early stages of exploring coverage for digital health, leaving vulnerable communities without financial support for these services.

Mobile Apps May Enhance Access to Care

In this context, the COVID-19 pandemic has coincided with—and perhaps further fueled—a proliferation of mobile apps to address mental health symptoms and problematic substance use.^{27,28} Early survey data suggest a correlation between community infection rates and individual depression rates and use of digital mental health therapies.²⁹ Mobile apps have been promoted to address COVID-related stress, mitigate mental health access problems, and extend the impact of live services either as supplemental freestanding tools, services that link patients to therapists (through live or asynchronous therapies), or as chat bots.^{30,31}

Mobile apps based on mindfulness skills training and cognitive-behavioral therapy principles have been promoted by health systems (eg, the Veterans Affairs Health Care System³² and Kaiser Permanente³³) as well as marketed directly to consumers. One large survey found that use of mindfulness practice among Calm subscribers has helped to mitigate mental health symptoms during the pandemic,³⁴ and another study found that apps may increase treatment engagement for members of populations reluctant to participate in traditional mental health and substance use disorder services due to economic obstacles or stigma.³⁵

Although the digital divide may still exist for computer and email access for marginalized groups, the gap is narrowing in regard to mobile phones³⁶ and the pandemic has introduced diverse populations to telehealth and digital app treatments. Research shows that over 80% of Latinx individuals have access to the internet *via* a mobile device and report an interest in using mobile apps to improve their health,³⁷ making this modality of intervention feasible. Smartphone applications translated and adapted for Spanish-speaking populations with alcohol and other substance use disorders have shown promise for assisting with recovery, engagement in treatment, and accessing quality information.³⁸

Evidence Base for Mobile Apps

Evidence for the efficacy and effectiveness of mobile apps is limited but growing. Studies of mental health apps and other digital therapies (eg, computer or web-delivered treatment) have found that interventions for depression, anxiety, and substance use concerns (eg,

psychoeducation, activity tracking and scheduling, and mindfulness practice) can be adapted to electronic modalities that provide less intensive attention from human therapists, with some evidence for efficacy.^{39–49} Mobile apps have shown small to medium effects on outcomes related to mental health conditions such as depression and anxiety.^{50,51} Clinical trial evidence in favor of apps is limited by common weaknesses including high participant disengagement and the use of non-active control conditions that do not adequately account for a “digital placebo effect.”^{52,53} Furthermore, apps may be inappropriate for conditions that require greater accountability and monitoring or relationships with providers.³¹

Apps have also been developed to help treat substance use problems. ReSET-O, which has FDA authorization as a digital therapeutic for opioid use disorder, uses cognitive behavioral and contingency management principles.⁵⁴ A similar app offered by the same company, ReSET, targets all substances. Both products aim to improve abstinence and outpatient treatment retention. Other substance use disorder-specific apps include A-CHESS for alcohol use disorders⁵⁵ and the National Cancer Institute’s quitSTART smoking cessation app.⁵⁶ Many apps targeting unhealthy alcohol or other substance use have been studied; efficacy data indicate potential benefits but are limited by common study limitations such as small samples, potential for bias, and lack of balance in comparison conditions.⁵⁷ Evidence for seven youth-focused apps to reduce unhealthy alcohol use did not show conclusive evidence of benefits in a 2020 review; results for adult populations (12 apps) were more mixed.⁵⁸ Most of the apps in these reviews were not available in online app stores.

Notably, efficacy data have not kept pace with the explosion of mental health apps now available to consumers. Many mental health apps aligned with research evidence (eg, developed in academic settings or by government agencies) have not been widely distributed, and large numbers of commercially available apps lack supporting evidence and may even promote risky behavior.^{58,59} Much of the research evaluating apps has been carried out by individuals who were either involved in the development of the app being studied, stood to gain financially, or had other potential conflicts.⁶⁰ To help individuals access apps likely to benefit them, there is a need for standardized frameworks to characterize the quality and impact of mental health mobile apps and to drive dissemination. Several tools such as the Mobile App Rating Scale (MARS)⁶¹ have been proposed to evaluate app quality and effectiveness, taking into account dimensions of functionality, accessibility, data privacy and security, interoperability, aesthetics, engagement, content quality, and evidence base.^{61,62}

Integration Into Health Care

There is potential for mobile mental health and substance use-related apps to complement and extend the impact of traditional care models. Apps can augment psychotherapy with opportunities to learn or practice coping skills, capture valuable self-monitoring data related to mood or motivation, and anticipate treatment setbacks from passively collected user data (eg, through artificial intelligence algorithms that detect mental health status changes associated with typing patterns, geolocation, or social behaviors).⁶³ In an integrated approach, providers can “prescribe” an app to a patient to target a particular need and use app data to monitor progress, inform treatment planning, and coordinate care between

mental health and other specialties. VA studies have found that integration of health apps with provider- or peer-delivered services can facilitate goal-oriented care and support app engagement to reduce unhealthy alcohol use.^{64,65}

Achieving optimal integration requires the development and implementation of multiple clinical processes in domains such as searchable directories or formularies of high-quality apps⁶⁶; methods to match app recommendations to patients using clinical decision supports; electronic health record documentation processes to record clinician decision-making and follow-up related to apps; and strategies for integration of app data into the electronic health record for use during patient care.⁶⁷ Providers and health systems must contend with a shifting landscape of available apps.⁶⁸ The generally unregulated status of mental health apps⁶⁹ and the unclear value of app store user reviews have sparked new approaches for endorsing apps and cataloguing recommendations. One Mind PsyberGuide⁷⁰ provides an alternative source for user and mental health expert reviews and can be useful in staying up to date on new developments. Some professional organizations have created frameworks to help providers assess mobile apps themselves. For example, the American Psychiatric Association,⁷¹ the US Department of Veterans Affairs,³² and the UK Royal College of Physicians Health Informatics Unit⁷² have developed guidelines and checklists to assist in mobile app evaluation.

Health systems are in the early stages of integrating mobile apps into care, building their own apps, vetting lists of commercially available apps, and purchasing subscriptions for patients.^{32,33} For example, Kaiser Permanente increased engagement rates for their curated set of mental health apps (available at no cost to members) by implementing procedures and training for clinicians to recommend specific apps during visits, including a “tear sheet” that lists app features and with follow-up messages providing download links.³³ New companies are also beginning to emerge to assist with the interface between traditional healthcare systems and app-based treatments that enable the embedding of app “prescribing” in clinical workflows and allowing clinicians to monitor and engage with patients around app use. These strategies may boost effectiveness through greater engagement, a persistent problem for mental health apps, which often lose the majority of users within 2 weeks.⁷³ Through the process of vetting and recommending apps, health systems can increase app credibility and user trust, a hypothesized driver of engagement.^{74–76} Integrating clinician feedback into app use has also been associated with greater engagement and effectiveness.^{77,78}

Directions for Future Research

Mobile application-based mental health tools have proliferated but much remains unknown about their short-term efficacy and potential for sustained impact on substance use and mental health symptoms. In one recent review of mental health disorder apps, only 16% of app studies were randomized controlled trials, and there was little repetition of studies for the same app and condition to verify results.⁷⁹ Things are changing quickly however, as shown by the significant number of NIH-funded clinical trials using mobile app-based interventions recently completed or in process.⁸⁰ Long-term impacts also remain unclear, including how to sustain engagement when patients have completed trials or lose interest over time, best strategies for implementation, and how to integrate app data into electronic

health records in a way that can enhance communication and overall patient care while not creating additional burden on providers. It is unknown if health systems or individuals will be willing to pay for apps long term. Risks to patients remain a concern, as app privacy policies are often lacking⁸¹ and apps may be inadequate to assist patients during a mental health crisis.⁸² Sustainability of the apps themselves is unknown: several apps included in systematic reviews are no longer available several years later, and app startups frequently run out of funding or get purchased by other companies.

Important implementation research questions also remain. These include how to best integrate apps into primary vs specialty care, how to match patients with appropriate apps across a range of symptom severity, and how to meet both patient and provider needs for appropriate access to clinical information in electronic health records. Privacy concerns also need further attention. For example, a 2014 Military Medicine article⁸³ concluded that mental health app developers must consider patient safety with full informed consent regarding the limitations of the app, privacy protection, and information about efficacy studies. However, for the larger consumer marketplace, no such regulations exist, and therefore, integration of protected health information into apps from clinicians and vice versa may be problematic. Further research is also necessary to develop and determine both the implementation and effectiveness of translated or culturally adapted apps for underserved and racial/ethnic minority populations and for designing appropriate strategies to address socioeconomic barriers to digital health access and use, including re-evaluating traditional models for healthcare reimbursement.

Summary

Mobile app use is a fast-growing area in behavioral health care, with potential to extend the impact of live or in-person mental health and substance use disorder services. Apps may help address chronic poor access to services, along with increasing the mental health workforce and enhancing the value of health insurance. While apps may function well as an extension or adjunct to patient care, they should not become a replacement for investing in traditional services and systems. Interest in apps has been growing over the course of the COVID-19 pandemic and is likely to be sustained given the potential to standardize treatments and increase access. With further gains on issues of equity in access and effective implementation, mobile apps are likely to be an important component of the mental health and substance use disorder treatment landscape for the foreseeable future.

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