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Digital Mental Health Services: Moving From Promise to Results

Bethany A. Teachman, Alexandra L. Silverman and Alexandra Werntz, *University of Virginia*

The papers in this special series make a compelling case for the value of digital mental health services (DMHS; including technology-based interventions, assessments, and prevention programs) to help address some of the currently unmet needs in mental health care. At the same time, the papers highlight the work that needs to be accomplished for DMHS to fulfill their promise. We review the papers' contributions in terms of (a) the imperative to increase access to evidence-informed, high-quality care, especially for underserved populations, both in the United States and globally; (b) ways to use DMHS to improve the ways that clinical care is provided to make treatment provision more effective and efficient; and (c) the current state of the research on DMHS for emotional disorders. We then consider lessons learned and recommendations to move the field forward, such as increasing (and making transparent) the research base on DMHS, adopting regulatory standards for DMHS, attending carefully to training issues for DMHS and best practices for dissemination and implementation, designing specifically for digital platforms, and being intentional about efforts to reduce disparities regarding who benefits from DMHS.

N early half the U.S. population will meet diagnostic criteria for a mental illness during their lifetime (Kessler et al., 2005), yet fewer than half of those in need of mental health care will actually receive an adequate dose of a high-quality, evidence-informed intervention (Substance Abuse and Mental Health Services Administration, 2020). Relying on in-person treatment with a professional mental health care provider will never be sufficient to address the enormous gap between those who need care and those accessing care. The prevalence of mental health problems is simply too high. Thus, if we want to reduce the burden of mental illness, we need to consider innovative models of delivering services that can expand access to care (Kazdin & Blase, 2011). As argued in this special series, digital mental health services (DMHS; including technology-based interventions, assessments, and prevention programs) can be one important piece of the complex puzzle that is needed to reduce the treatment gap.

The papers in this special issue recognize the remarkable progress made in the past two decades on advancing DMHS, while also highlighting the many important challenges facing the field that need to be addressed for DMHS to fulfill their promise. We (loosely) organize the papers into those that focus on (a) the imperative to increase access to care, especially for underserved populations, both in the United States and globally; (b) ways to use DMHS to improve the ways that clinical care is provided to make treatment provision more effective and efficient; and (c) the current state of the research on DMHS for emotional disorders and ways to move this work forward. After reviewing the exciting contributions by the authors in these domains, we consider lessons learned from the papers as a whole and how they can inform recommendations for the field and directions for future research.

Articles Promoting Greater Access to Care

Ramos and Chavira (2022) argue that DMHS have the potential to reduce racial and ethnic mental health disparities by addressing many of the traditional barriers to mental health care (e.g., lack of available providers, transportation, time, cost) that disproportionately impact racial and ethnic minorities. The authors highlight that most DMHS have been tested primarily among non-Latinx White individuals, which raises significant concerns about the generalizability of these findings among racial and ethnic minorities. Nevertheless, their review of 46 papers in

which DMHS were disseminated among racial and ethnic minorities indicates that the use of DMHS with racial and ethnic minorities (culturally adapted or not) is a viable clinical approach that has potential to reduce traditional barriers to care. Ramos and Chavira also provide clinical recommendations for using DMHS with racial and ethnic minorities that are consistent with other papers in the special series, outlining the need for providers to (a) first develop a case conceptualization and intervention plan to guide the use of DMHS as a part of treatment; (b) assess the feasibility of a technological service delivery approach based on the availability and reliability of the client's devices; (c) assess their own comfort level (i.e., whether they need additional training) and their client's comfort level with the use of DMHS; (d) consider cultural factors that may interfere with or enhance the use of DMHS; and (e) reflect on ethical, legal, and privacy issues, some of which can be especially relevant for racial and ethnic minorities (e.g., consequences of a lack of privacy for a person who is undocumented). Finally, Ramos and Chavira highlight the general need for further evaluation of the efficacy of DMHS approaches among racial and ethnic minorities, and examination of whether these approaches do in fact address traditional barriers to treatment.

Muñoz (2022) offers insight from his career on the urgency of using DMHS to address the burden of mental illness across the globe and disparities in access to care. He asserts that health care is a universal human right, and given that psychologists are health care providers, our field has the obligation to develop, evaluate, and disseminate affordable interventions for preventing and treating mental illness. Muñoz describes how psychologists should "give psychology away" (Miller, 1969) by harnessing the potential that digital, nonconsumable (i.e., reusable) interventions have. By using examples from his own research on depression treatment and prevention, as well as smoking cessation, he describes how he built a career on studying ways of scaling prevention and treatment interventions across the world. He describes different methods of disseminating free psychological interventions (e.g., massive open online interventions [MOOIs]) and notes that attrition is a major limiting factor. However, Muñoz reframes this and notes that even when attrition rates are high, the number of individuals benefiting from free, digital interventions is usually larger than would have been possible with consumable interventions (a session of in-person, therapist-directed cognitive-behavioral therapy is a typical example of a consumable intervention because it cannot be administered to another person again without cost). Muñoz also calls on psychologists to consider the health dis-

parities that may be perpetuated by these interventions, including differential access based on language, income, resources, and location.

Articles Outlining Ways to Improve Clinical Practice

Schueller et al. (2022) focus on the need for resources to help mental health providers develop the skills required to use mobile health applications ("apps") in their clinical practice. Drawing on the key learning objectives from the Department of Defense's Mobile Health Training Program (Armstrong et al., 2018), Schueller et al. introduce five core competencies for providing mobile health: (a) understanding and being able to evaluate the evidence in support of mental health apps, especially in relation to the client's needs; (b) knowing the key steps involved in integrating mobile health into traditional clinical care; (c) recognizing security and privacy issues related to the use of mental health apps, and communicating with the client about safeguards and potential risks; (d) identifying ethical issues related to the use of technology in mental health care and taking steps to resolve those issues; and (e) considering the potential cultural factors at play for both the client and provider (e.g., cultural appropriateness of the app, variations in data plans and Internet access, comfort with technology). They suggest several future directions, including further systematic evaluation of both technological and human intervention components to help optimize the use of technology in clinical contexts, increased formal training in technology-enhanced care, and improving the ease of mobile app use for providers (i.e., making it easier to identify apps that are a good match for the client). Schueller et al. conclude that the potential of mobile apps to increase treatment effectiveness and efficiency cannot be realized without first developing a workforce that is proficient in their use.

Continuing this focus, Koerner et al. (2022) discuss how technology can be employed to support training and sustained use of evidence-based practice in clinical care settings. They first outline three challenges that mental health providers face in delivering evidence-based practice: (a) lack of available research evidence to inform routine clinical decisions; (b) reliance on error-prone clinical judgments without objective feedback on the relationship between clinical judgments, interventions, and client outcomes; and (c) practical difficulties in developing the expertise needed to provide the broad range of evidence-based interventions relevant to the diverse needs of clients in a generalist practice. Koerner et al. outline critical steps to efficiently and effectively implement evidence-based

practice and provide examples to illustrate how technology can be used within this framework to support training and supervision needs. For example, technology can be used to support measurement-based care by making it easier to cue and administer regular measures of treatment progress. Further, online trainings (i.e., webinars, e-learning) and supervision that employ active learning strategies, such as modeling, skill rehearsal, and immediate performance feedback, can be used to train and reinforce the sustained use of evidence-based practices. Additionally, machine learning algorithms offer future promise to support evidence-based clinical decision making—DMHS may allow nonspecialist providers to learn about evidence-based practices alongside their clients. These recommendations stand out for the ways they illustrate how technology can directly help providers optimize delivery of care.

Using the Fogg behavior model (Fogg, 2009), Muroff and Robinson (2022) describe how technology can be leveraged to enhance adherence and engagement with cognitive-behavioral therapy. The Fogg behavior model posits that our behaviors are affected by our level of motivation and the ease with which we can engage in the target behavior—the model outlines how different types of prompts (e.g., "signal" prompts to remind or notify participants to perform a behavior) can help address barriers to engagement. The model thus provides a framework for understanding how individuals can increase desired behaviors that may otherwise be challenging to implement. Muroff and Robinson also provide a detailed description of how the Fogg behavior model can be used within the context of cognitive-behavioral therapy by both the clients and therapists, and describe how technology (e.g., smartphone apps) can be used in relatively straightforward ways to increase the likelihood of positive therapy outcomes. One example highlights how a client and therapist can work together to make completing between-session thought logs easier (e.g., downloading an app for completing thought logs and recording voice memos in session of conversations between the therapist and client so the client can remember how to complete the logs). The authors note that limitations of the Fogg behavior model are that it does not account for cultural context and has not been rigorously tested within mental health settings, so additional research is necessary to understand whether the behavioral principles outlined by Fogg are appropriate for diverse clinical and cultural contexts. However, Muroff and Robinson provide a compelling case for how individuals' motivation and ease of engagement can be enhanced by technology with the goal of improving mental health outcomes.

Articles Moving Research on DMHS for Emotional Disorders Forward

Khanna and Carper (2022) provide an overview of the current landscape of DMHS for youth anxiety, with a focus on future directions for research, dissemination, and implementation. They suggest that DMHS may help bridge the gap in access to care, and may also confer additional advantages of increased treatment integrity (i.e., DMHS provide standardized treatment elements the same way to all users), implementation of learned skills outside of the therapeutic setting (i.e., ability to practice skills in daily life), and ease of data collection (i.e., DMHS can seamlessly integrate with technology to afford researchers rich data for treatment monitoring). They highlight the broad range of DMHS being used (though frequently not evaluated) with anxious youth, and note that these DMHS can be delivered as a stand-alone service or supported by a clinician. Khanna and Carper also point to serious limitations in the field that have slowed DMHS from fulfilling their clinical potential, including limited outcome data for the vast majority of DMHS for anxious youth, and a lack of legal, ethical, and regulatory standards to guide their use. Moreover, the field knows little about how to disseminate DMHS so that they will be appealing to providers and their patients.

Finally, Himle et al. (2022) outline the current evidence and future directions for DMHS for depression. They describe meta-analyses that suggest that computer-based cognitive-behavioral therapy (vs. various control conditions) for depression has large effects on treatment outcomes for adults and youth, and may be most beneficial with added human support. However, results for computer versus smartphone interventions for depression differ on whether added human support improves outcomes, and research has not yet examined DMHS compared to antidepressants. Himle et al. outline both the ways that DMHS for depression can increase access to care, including being available any time and reducing the need for trained mental health professionals, while also pointing to critical limitations that still need to be addressed for DMHS to achieve their promise. In particular, DMHS are not yet completely accepted by potential users or providers, attrition rates remain high, and research trials have largely neglected individuals with suicidal ideation, older individuals, individuals who have low income, and individuals in rural communities—all critical populations that need to be better served to reduce the treatment gap. Himle and colleagues conclude by describing a new DMHS for depression, EntertainMeWell, which is a customizable program designed to be entertaining for users, as they follow a character as she navigates life

challenges using cognitive-behavioral therapy principles.

Lessons Learned and Recommendations

The articles in this special series have nicely showcased both the advantages and disadvantages of using DMHS and raise many open questions. There can be little doubt at this stage that DMHS *can* be effective (and in some cases, equally as effective as in-person therapy; Andrews et al., 2018), but researchers, mental health professionals, and consumers are not currently making the most of the opportunities that DMHS provide. Given the increased openness to novel models of delivering care as a result of the COVID-19 pandemic, we have a unique window to advance the research and practice of DMHS that should not be squandered. Building our DMHS toolkit; expanding the research base; and developing clear dissemination, implementation, and evaluation plans are especially critical now given the increased need for services in light of the brutal psychological impact of the pandemic for many people (Khan et al., 2020). To that end, we consider lessons learned from the thoughtful papers in this special series and corresponding recommendations for both future research and capacity building so DMHS can demonstrably improve the quality of, and access to, much-needed mental health care.

Lesson 1: Not All DMHS Are Created Equal (aka Show Me the Data!)

DMHS reflect a very broad and heterogeneous class (see Khanna & Carper, 2022), including mobile apps, web-based programs, telehealth, virtual reality, active and passive mobile sensing, and artificial intelligence applied to social media traces, among many other examples. Further, DMHS vary tremendously on the extent of human support involved, the problem areas targeted, the extent to which they draw from a strong empirical evidence base, and whether or not they have been rigorously evaluated. Thus, any overly general claims about DMHS as a whole should be greeted with considerable skepticism, as such generalities likely obscure important differences among various DMHS (i.e., we want to avoid "Dodo bird"-style conclusions like those that have made it hard to recognize meaningful differences across psychotherapy outcomes; Hofmann & Lohr, 2010). As Schueller and colleagues (2022) point out, in one study of depression apps that purported to deliver cognitive-behavioral therapy or behavioral activation, only 10% of the apps reviewed were in fact consistent with the evidence-based principles underlying these treatments (Huguet et al., 2016). More generally, the vast majority of the approx-

imately 20,000 available mental health apps have never been empirically evaluated, so we know little about their efficacy or effectiveness.

Recommendations

DMHS need to be empirically evaluated and the evidence base needs to be readily discoverable. Funding agencies like the National Institute of Mental Health need to fund and incentivize the evaluation of existing, popular DMHS by supporting far more industry plus academic partnerships. Moreover, information on the evidence base (or lack thereof) for DMHS needs to be far more accessible to the public. Initiatives like One Mind PsyberGuide (https://onemindpsyber guide.org/) that review existing DMHS and describe their evidence base are enormously valuable but cannot possibly cover the range of available programs. As such, we need to support more research on DMHS, in addition to reporting on the research base in ways that are meaningful and understandable to health care providers and the general public.

Lesson 2: Regulation Can Help Promote High–Quality DMHS and Reduce Risk of Harm

Related to Lesson 1, the current state of the field of DMHS is shockingly unregulated. It is reasonably easy to share a new mental health app in the Apple store, for instance, and while this has a positive side in terms of reducing barriers to accessing new innovations, it also means there are an overwhelming number of mental health apps to choose from and virtually no guidance on how to make those choices in an informed way. Amazingly, given the many thousands of mental health apps, only five currently have Food and Drug Administration (FDA) clearance (see Schueller, 2021). Without some additional regulation and established standards, it becomes increasingly difficult to determine which DMHS are likely to be efficacious and have strong privacy protections, and which may have no effect or even iatrogenic effects.

Recommendations

Regulations and national standards are needed regarding measurement and reporting of efficacy, rates of iatrogenic effects, data protections and privacy, and equity-related concerns (e.g., whether DMHS are accessible for people with disabilities, known as 508 compliant; see Schueller, 2021). There needs to be a clear way to determine whether claims made match the available data. The DMHS industry has grown at a breakneck pace, but its generativity currently far outstrips its accountability. We know from the mental health litera-

ture, more generally, that credibility of an intervention is a reliable predictor of outcomes (Constantino et al., 2018). Without regulations and national standards, DMHS as a class will quickly lose credibility. Fortunately, as Khanna and Carper (2022) describe, other nations and international organizations have made more progress on standards and regulations than the United States has, so a national effort does not need to start from scratch.

Lesson 3: If You Build It, They Will (Not Necessarily) Come (aka Don't Ignore Dissemination and Implementation Science)

Despite the appeal of the old *Field of Dreams* movie quote "If you build it, he will come," the evidence does not suggest that simply making DMHS available will lead to broad uptake, especially by mental health professionals who already have established practice pathways. A survey of mental health providers indicated that mobile apps were being incorporated by less than 1% of providers into their practice (Schueller et al., 2016), which is very discouraging on one level, but perhaps unsurprising given that providers generally receive no training on how to integrate DMHS into their practice. For DMHS to realize their promise and improve clinical care, lessons from dissemination and implementation science need to be taken seriously.

Recommendations
Developers of DMHS, clinic directors, and other stakeholders need to do more than simply recommend DMHS. Models of dissemination and implementation, such as the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework (Gaglio et al., 2013), are needed to better integrate DMHS into existing health care pathways and increase the appeal for providers. As Koerner and colleagues (2022) outline, ongoing supervision and support for using DMHS in clinical practice will be needed, along with situating DMHS within established measurement-based care systems. There are also clear opportunities for training in the use of DMHS to be integrated into clinical training programs (e.g., masters, doctoral, or internship programs) and available as part of continuing education credits. More generally, as articulated by Khanna and Carper (2022), direct-to-consumer marketing research is needed to understand how DMHS may best be presented to providers, payers, patients, and families to increase support and adoption. Audience segmentation work (Purtle et al., 2020) that can determine which messages resonate with different target groups

will be especially important to monitor for disparities in uptake of DMHS.

Lesson 4: Reducing Disparities in Who Benefits From DMHS Will Need to Be Intentional

There are many reasons to hope that DMHS can help increase access to care and reduce disparities in the availability and quality of care. For example, while dropout rates from in-person interventions tend to be higher among racial and ethnic minority clients (compared to non-Latinx White clients; e.g., Chavira et al., 2014), some research suggests similar dropout rates across groups for DMHS (Price et al., 2013). Further, as Ramos and Chavira (2022) describe, there are a number of studies suggesting equivalent outcomes for in-person versus DMHS across a range of racial and ethnic groups. That said, the research base is simply not sufficient at this stage to make broad conclusions, and a 2018 meta-analysis of therapist-guided DMHS found that racial and ethnic minority clients benefited less from the interventions than did non-Latinx White clients; Karyotaki et al., 2018). While therapist-guided DMHS differ in important ways from stand-alone digital programs, the findings make clear that we cannot simply assume that DMHS will work equally well across different groups.

Recommendations
Increasing reach and appeal of DMHS to underserved populations, ensuring equitable access to care (e.g., broadband access, accessibility for people with disabilities, usability across devices), and determining what drives differential impacts will be essential so that DMHS do not perpetuate health disparities that have plagued the health care system. Far more research is needed to evaluate under what conditions and for what reasons disparate outcomes occur across groups (e.g., Does variation in mental health stigma, level of acculturation, or other factors account for subgroup differences in outcomes?). More generally, to meet the needs of diverse communities, developers should adopt a user-centered design approach (Mao et al., 2005; Ondersma & Walters, 2020) to creating and adapting DMHS. This process incorporates the perspectives of persons with lived experience, community members, and leaders, and encourages their participation in the development, evaluation, and dissemination of programs. This can help address important questions about when cultural tailoring or adaptation of DMHS is needed. Of course, transparency about populations served and gains achieved as a function of different group memberships (e.g., variations in

gender identity) or different resource availability (e.g., those who have access to computers vs. those who are smartphone dependent or those who lack reliable Internet access) is essential. Many of the authors in this special series have advocated for a "digital mental health apothecary" that offers a broad suite of DMHS and makes the supporting data for each program public, including differential outcomes across various marginalized versus privileged groups (see Muñoz et al., 2018). Efforts like this that are intentional and transparent about improving and tracking access and effectiveness across diverse groups will be key to reducing the likelihood of disparities becoming entrenched in DMHS.

Lesson 5: DMHS Needs to Optimize Design for the Selected Delivery Platform

Design for DMHS needs to center the delivery model and consequent user experience, rather than trying to re-create what happens in therapy sessions in the digital format. One concern, as Khanna and Carper (2022) note, is that some elements common to in-person therapy do not readily translate in their typical form to most digital modalities (e.g., live exposure exercises in the context of anxiety treatments). Another concern is that the typical in-person therapy session of 1 hour per week does not align at all with typical technology use patterns (e.g., When was the last time you sat and did a single focused task on your phone for 1 hour straight?). This requires researchers to determine the necessary and sufficient mechanisms of change for a problem area, creativity on the part of designers, and close collaboration with the targeted end users to determine how to optimally deliver those mechanisms using technology.

Recommendations

Far more research is needed on mechanisms of change so that it is clearer what elements are most critical for DMHS to be effective. Further, the rise in user-centered design needs to continue and be expanded. The field simply has to stop assuming it has all the answers for how DMHS will work best for a given community and person—we have to partner with key stakeholders to learn their dynamic contexts, needs, and strengths. A related open question, as Himle and colleagues (2022) discuss, concerns when including human support will improve DMHS outcomes—for which devices, users, and types of DMHS will be needed, and at what intensity, frequency, format, and so forth? Investing heavily in this research is necessary because the answers about needed human support speak directly to the scalability of the programs given

that human support is a limited resource. More generally, there are myriad questions needing further study to improve design for DMHS in order to increase engagement and effectiveness. For instance, the field needs to learn when and what types of gamification will be helpful (vs. hurt credibility) and how this needs to vary based on user characteristics (e.g., effective gamification elements are likely to vary for an 18- vs. 70-year-old). An interdisciplinary approach can help guide these investigations as expertise tied to marketing, human–computer interaction, psychology of motivation and behavior change, engineering, data science, and so forth are all needed to move the field forward. Offering more trainings, funding, and other incentives to make these interdisciplinary collaborations easier to achieve will help the field make faster progress. Similarly, as Muroff and colleagues (2022) discuss, there are established models of persuasive design (e.g., Fogg behavior model) that can support activation and sustained engagement in highly targeted ways.

Conclusion

The potential benefits of advancing dissemination and implementation of DMHS are enormous but those benefits need to be well articulated and data driven. The articles in this special series make clear the considerable progress that has been made in advancing DMHS, but also make clear the work that remains to make a more compelling case for DMHS. Investment in research and development, along with a shared commitment to rigor, transparency, open science, equity, and careful monitoring, will be needed to build a compelling case that DMHS should be a key element of our mental health care toolbox moving forward. We hope that in the not-too-distant future, the research and the field will have advanced such that a case can confidently be made that DMHS are cost-effective, well regulated, safe, widely and equitably accessible, and can prevent the worsening of mental health problems. We are thankful to the authors of the articles in this special series for taking important steps to help make this case by highlighting both the progress made and critical gaps to be addressed.

To this end, as Himle and colleagues (2022) outline, cost-effectiveness analyses that compare DMHS to in-person or other approaches are needed to meaningfully make the case that DMHS should be integrated into existing care pathways. Further, the field has to establish shared standards and be accountable to some form of regulation, or the public will lose trust, which will damage the opportunity for DMHS that are data driven and adhere to best practices (e.g., surrounding privacy) to be embraced. Relatedly, the field has to show that it is self-correcting—this means treating seri-

ously the data indicating high rates of attrition from many DMHS and improving the ways we engage users across time. More generally, we need to be able to make the case for safety and use reliable methods to detect harmful effects. This means systematically tracking and reporting harms in terms of outcomes, loss of confidentiality or privacy, and so forth. Moreover, as noted, more research is needed to strengthen the case that DMHS will in fact increase access to care, especially for underserved populations. The accumulating data are helping to make a persuasive argument about the potential to increase access, and this needs to be a key focus for future research. Finally, as Muñoz (2022) notes, we need to demonstrate that DMHS can fulfill their promise to identify warning signs for mental health problems earlier than occurs in most traditional care models, and further, that delivery of DMHS can then help prevent full onset of a disorder or reduce severity and impairment.

We close by highlighting the final case that can and needs to be made for DMHS—the ethical case for using DMHS to improve our health care system. Existing mental health care systems are not effectively reducing the burden of mental illness, either in the United States or globally. Most people do not receive the care they desperately need, highlighting that new delivery models are essential to change this pattern. DMHS are clearly only one component of the solutions needed to improve mental health care and far more research is needed to understand when and under what conditions a given DMHS will be effective. Yet, the potential for personalized, scalable care that can be delivered when and where a person most requires help needs to be harnessed and fully evaluated. As Muñoz (2022) notes, DMHS "can thus help reduce human suffering beyond our local settings, and contribute to making health care a universal human right". It is time to make that right a reality.

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Address correspondence to B. A. Teachman, Ph.D., Department of Psychology, University of Virginia, 1023 Millmont Street, Charlottesville, VA 22903. e-mail: bteachman@virginia.edu.