Bringing digital mental health to where it is needed most

Mental health technologies, such as apps, clinical texting, social media platforms and web-based tools, have arrived. Channelling these resources to help people with serious mental illnesses, clinicians in need of support, and people in low-and middle-income countries will have the most impact on the global burden of mental illness.

Dror Ben-Zeev and David C. Atkins

There are over 10,000 mental health apps and counting available for public download. But, what if you have a severe and complex condition, such as schizophrenia? What if the clinicians you rely on to provide high-quality care don’t actually do that? Could digital resources help them deliver better services? What if you live in a country with limited technological infrastructure or a cultural context where resource-intensive, English language, Western medicine-based software is ill-suited? Can digital mental health fundamentally improve the global burden of mental illness?

Across North America, Europe and Australia, academic institutions, healthcare systems and start-up companies are offering an array of technology for mental health, from wearable, sensor-enabled mood monitoring to avatar-delivered therapy to two-way texting or video platforms that can connect you to a therapist via your mobile device or tablet computer. Millions of national research dollars have been funneled to support highly innovative mobile health (mHealth) and electronic health (eHealth) initiatives, and their study findings are regularly reported in top-tier peer-reviewed journals. As a research area and business revenue stream, the future of digital mental health seems bright. But whether these novel technologies will herald a true revolution, or simply produce an arsenal of treatment options and gadgetry that fail to address the most burning issues in mental healthcare, remains to be seen. We propose key areas that warrant heightened attention from healthcare, industry and research communities for digital mental health to actualize its full potential.

People with serious mental illness

Severe psychiatric conditions such as schizophrenia and bipolar disorder wreak havoc on the lives of those who suffer from them, their family members and communities. Serious mental illness (SMI) often leads to major impairments that impede individuals’ capacity to function socially, academically and economically. Cognitive impairments, limited literacy and psychiatric symptoms that may directly impede service seeking render people with SMI a particularly challenging population to engage in care. With inadequate support, people with SMI find themselves at the fringes of society. This marginalization compounds their risk for homelessness, medical problems, victimization, drug use, incarceration and suicide. Society pays a hefty price; poorly treated SMI is one of the top contributors to healthcare expenditures worldwide and places a disproportionately large burden on all public-sector funds.

There is one area where the gap between people with SMI and the general population is noticeably narrow: access to mobile technology and interest in digital health. A meta-analysis of studies conducted across several continents has shown that most people with SMI own mobile phones and are interested in mobile treatments. Young adults with SMI use social media to connect with online communities. These digital platforms can serve as democratizers of care and help overcome barriers that block people with SMI from engaging with their communities and traditional services. When the needs and context of people with SMI inform digital treatments, their outcomes have proven to be exceptionally promising.

Illnesses such as breast cancer, amyotrophic lateral sclerosis (ALS) and human immunodeficiency virus (HIV) have celebrity spokespeople and vocal advocates for research and treatment in all walks of life. But the voice of people with SMI is seldom heard at software companies.
and in academia — the hotbeds of digital health development and testing. People with SMI are regularly excluded from research because institutional review boards and investigators believe clinical studies will be safer or simpler without them. If technology is truly going to ‘disrupt’ mental healthcare, these attitudes, biases and practices must not permeate the evolving field of digital mental health. mHealth and eHealth designed to focus on and engage people with SMI rather than bypass them will be the real disruption in the status quo.

Support mental health providers
A diverse set of providers offer care to individuals with mental illness, including primary care doctors, case managers, psychiatric nurses, supportive employment specialists, and, of course, psychiatrists, psychologists and counsellors. A common thread throughout their care is that their conversations with patients are a significant part of the treatment — exemplified in counselling and psychotherapy. These most basic human processes of language and behaviour have historically not been a focus of technology, but that is changing. A foundational problem with behavioural interventions such as psychotherapy is that there are no systematic ways to track whether a mental health provider is ‘doing the right thing’ in sessions or at any particular moment in a conversation. Research suggests that in real-world settings, the quality of counselling can vary dramatically. Whereas evidence-based guidelines define high-quality treatment, there is no performance-based feedback to help providers both learn and maintain the necessary skills to develop expertise. In research settings, mental health sessions are recorded and evaluated by a team of trained raters, but even this performance-based feedback occurs long after a session has been completed; moreover, it is human-intensive and expensive and rarely used in real-world settings.

The basic building blocks of high-quality communication — whether counselling or patient-centred communication — include what is said, how it is said, nonverbal information (for example, facial expressions, posture, eye contact), and the interaction of these sources of information and behaviour over time between therapist and patient. Advances in computational modelling raise the possibility of automating these components. Advances in automatic speech recognition, natural language processing and text-based machine learning allow the direct translation of spoken language recordings to summaries and evaluations of the language of providers. Paralinguistic features, such as prosody, energy and vocally encoded arousal can be used to assess affect and synchrony within therapeutic relationships. Computer vision can be used to assess facial emotion and changes in body posture and gesture. Finally, cloud computing provides a platform for secure data capture, processing and feedback to providers. Similar technology could assist treatment processes, such as writing progress notes via automated session summarization, and could scaffold training and service delivery by paraprofessionals using digital decision support tools.

Digital resources offer a path towards performance-based feedback for providers to promote high-quality care. In addition, such technology must be designed for — and with — providers if it is to be adopted. This is the basic principle of user-centred design, where the smartphone is the iconic example of a technology designed expertly for the end user, and is beginning to be seen in the design of mental health technologies. A user-centred design perspective includes mental health providers not only in the development of user interfaces (that is, what parts of the technology providers see and interact with) but also in determining how the technology fits into their clinical workflows and interacts with existing resources such as electronic health records. Such design thinking and methodologies are critical for usability and practical utility, and will help promote adoption.

Low- and middle-income countries
In much of the world, mental healthcare is grossly underdeveloped or nonexistent. Compounded by poverty, geopolitical oppression and regional conflict, mental health problems affect a larger proportion of the populations in low- and middle-income countries (LMICs) than in developed countries. These challenges combined with limited awareness and stigma around mental illness in LMICs are enormous and serve as major obstacles to governmental attention and resource allocation, not to mention effective care. For those who do seek care, the options are often limited, if not abysmal; they can travel great distances to seek out the few mental health professionals typically located in their countries’ major cities. Alternatively, they might endure locally available ‘therapies’ — practices that can only be described as medieval: kept in cages outside their family homes or outskirts of villages for months or years, chained to trees in prayer centres, seclusion, forced fasting or administration of herbal remedies, or physical abuse meant to drive off demonic spirits. Consequently, these highly vulnerable individuals become even more traumatized, isolated and ill.

LMICs may not have networks of health clinics or cadres of highly trained mental health professionals, but in recent years they have seen an explosion of growth in mobile-cellular and Internet connectivity. Coupled with the creativity and improvisational spirit that is often the hallmark of low-resource settings, these countries have been leapfrogging through the technology development pipeline — skipping landlines and bricks-and-mortar infrastructure to go directly to wireless telecommunication. This opens the doors to exciting opportunities; digital self-management interventions can reach people directly through relatively low-tech short message service (texting) or interactive voice response technologies. mHealth psychoeducation and stigma-busting campaigns can extend to distant communities; non-governmental organizations that are already sending health workers into remote communities can arm them with portable tablets to enable treatment decision support tools in the field. Smartphones can be installed with applications designed for easy navigation via touchscreens to deliver multimedia content pre-loaded onto the device (that is, not requiring on-site Internet access for viewing). In locations with sufficient bandwidth, two-way video consultation between professionals or tele-psychiatry between providers and clients or their family members becomes a viable possibility.

Early work using digital mental health approaches in LMICs suggests these are feasible in supporting treatment, connecting patients or community workers with mental health specialists, and informing mental illness detection and diagnosis by non-experts at local clinics. With technology, we can now reach people who had no access to mental healthcare. Looking forward, we need to determine which treatments can be distilled to their most potent ingredients, modified so that they can be supported by technologies in LMICs, and culturally informed and infused with regionally relevant content. Meaningful engagement of LMIC-based researchers, thought leaders, advocates, and people with lived experience is essential for this work to succeed.

Moving forward, we must match the promise of our technology to the greatest needs in mental illness and healthcare. Digital mental health has proven itself to be highly promising, but we have arrived at an important inflection point. The directions research and development take now will determine the scope, reach and effect of technology on the global burden of mental illness in the years to come. Digital mental health cannot serve only high-functioning, tech-savvy consumers — leaving behind those who are not — if it is to make a
meaningful impact. We must not ignore providers, who need guidance, motivation and support to ensure they can perform their duties effectively. We must not focus solely on technological approaches that can only be delivered in resource-rich environments, leaving behind low-income regions and countries. If we strategically channel the energy, enthusiasm, human capital and resources in the rapidly growing field of digital mental health, it will aid not only those who can access new technology with the greatest ease, but also the people and places that need it the most.

Dror Ben-Zeev* and David C. Atkins

Behavioral Research in Technology and Engineering (BRiTE) Center, University of Washington, Seattle, WA 98195, USA.

*e-mail: dbenzev@uw.edu

Published online: 23 October 2017

https://doi.org/10.1038/s41562-017-0232-0

References


Competing interests

D.B.-Z. has an intervention content licensing agreement and provides consultation to Pear Therapeutics. D.C.A. is a co-founder with equity stake in a technology company, Lyssn.io, LLC, focused on tools to support training, supervision and quality assurance of psychotherapy and counselling.