Wearable Devices for Mental Health: Knowns and Unknowns

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Can a wearable device improve mental health outcomes?

Today’s ubiquitous fitness trackers come in a variety of forms—most contain an accelerometer to measure movement and use that information to estimate steps taken and calories burned. Many devices now include other sensors, such as a heart rate sensor, a sleep tracker, a skin conductance sensor, a light sensor, and more. Smartwatches often contain numerous sensors like those in fitness trackers but combine more computing power and connection capabilities. Many smartwatches can send and receive digital messages and download apps. Regardless of the device, all wearables collect personal data on health indicators that they share with the user.

Can a wearable device improve mental health outcomes?

The potential of wearable devices for health in general and mental health in particular is broad. Berra and colleagues\(^1\) stated “regular physical activity is one of the most powerful health promoting practices that physicians and other health care professionals can recommend for patients.” Anything that can help mental health patients partake in more physical activity will have tremendous benefits. Combined with the strong evidence for the effectiveness of physical activity in ameliorating numerous psychiatric symptoms, the potential of wearable devices to help patients with mental illness be more active is exciting. Patients with serious mental illness have an obesity rate twice that of the general population and, on average, their life expectancy is 10 to 25 years shorter than that of the general public.\(^2\) This early mortality largely results from chronic medical conditions such as diabetes, cardiovascular disease, and hypertension. Devices that can increase physical activity will have a positive impact and may help patients live longer.

The potential to gather real-time physiological data from fitness trackers, with the addition of symptom surveys from smartwatches, is powerful. There is increasing interest in using real-time patient data as biomarkers of illness. The concept of “digital phenotyping” may help redefine how we diagnose, monitor, and treat mental illness.\(^3\) Real-time patient data can serve as an objective marker of condition severity and treatment response.

© shutterstock.com  It is also easy to imagine how wearable devices might offer medication reminders to patients; encourage and nudge patients toward healthy habits; and even provide adjunctive coaching to help with sleep, exercise, and fitness. The ability of smartwatches, and some fitness trackers as well, to offer real-time feedback and reminders may help with treatment adherence. Moreover, many of these devices include social features that allow users to form or connect in groups and begin fitness partnerships or challenges.

Will patients with mental illness want to use wearable devices?

Early evidence suggests that wearables can be used successfully across many diverse populations. A study sponsored by AARP suggests that older adults are interested in wearable devices: 25% of activity trackers are owned by those aged 55 years or older. In this study, 77% of participants found activity trackers useful and 45% reported that they increased motivation for healthier living.\(^4\)

Depression, bipolar disorder, and schizophrenia don’t seem to be barriers to wearable device use.
either. A small study of 10 subjects (6 with depression, 1 with bipolar disorder, and 3 with schizophrenia) demonstrated that adherence to wearable devices was high (89%) and that all participants reported high satisfaction with the devices for help with motivation, goal setting, social connectivity, self-monitoring, and ease of use.2

**CASE VIGNETTE**

“Do you think using a wearable fitness tracker will help with my symptoms and medication side effects?” Alex is a 35-year-old man who received a diagnosis of schizophrenia at age 24. After several medication trials, his symptoms are now well controlled with an antipsychotic. Although he still experiences subtle cognitive deficits, weight gain is his chief concern today. Despite many attempts to eat healthy and lose weight, he feels stuck and asks if his psychiatrist recommends that he get a wearable device—and if so, which one is best.

**Drawbacks of wearable devices**

Cost is a barrier, especially when coupled with not knowing whether the device will be helpful. The range of prices for fitness trackers is broad—some devices cost about twenty dollars, and others cost hundreds of dollars or more. Selecting the right device can be difficult, and little evidence is available to guide consumers.

Although much of the research on wearable devices is based on earlier actigraphy work, there is still much we do not know about wearable devices for psychiatry. In many ways, wearable devices for psychiatry are in a similar position to smartphone apps, which hold high potential for psychiatry; however, many unknowns are coupled with scarce clinical data.

There is strong evidence that many individuals who acquire these devices stop using them after several months.5 The reasons for stopping to wear these devices include simple loss of interest, not finding enough value in use, and misplacing the device or the charger. We currently lack data on which patients are most likely to engage and stick with a wearable device—or whether short-term use in and of itself provides value. We have little experience of what happens when psychiatry patients learn their baseline activity level with a wearable device and if or how that may change activity levels.

Psychiatrists have the ability to influence patients’ use of wearable devices but must do so with caution. In one study, 44.3% of patients reported health care advice from their physician to use a wearable device would be a strong incentive to buy one.6 However, those who are given a wearable device as a gift or as part of a corporate wellness program may not be as motivated to use it compared with someone who buys one on his or her own. Given that the potential of wearables is to help with long-term and chronic illnesses, how to motivate patients to use the devices for the long term is a question that still needs to be answered.

Another concern about wearable devices is their accuracy and safety.7 Wearable devices do not meet the same rigorous standards as medical devices. Fitbit, one of the largest manufacturers of wearables, recently clarified that their wearable devices are not medical in the face of a pending lawsuit regarding reported inaccuracies in digital monitoring by their devices.8 While manufacturers continue to develop new chips and sensors that will make wearable devices more powerful, it is important to remember that popular press and industry reports are not a substitute for clinical evidence or FDA approval.9 The medical literature on the effectiveness of wearables to demonstrate health outcomes and influence behavior change is still nascent, although likely to quickly evolve.

Psychiatrists also need to be mindful of privacy and patient data security concerns when using digital devices—including wearable devices. While the Health Insurance Portability and Accountability Act (HIPAA) is complex (and beyond the scope of this article), a wearable device is generally not covered under HIPAA unless the clinician has a business-associate agreement with the manufacturer of the device. For example, if a clinician suggests a patient use a certain device or even provides a patient with that device, the manufacturer of that device is not a business associate of that clinician and thus HIPAA is not applicable. However, as soon as the patient provides the clinician with data gathered from the wearable device, the clinician has a responsibility to keep that data secure and in compliance with HIPAA.

The fact that the vast majority of wearable devices are used outside of HIPAA presents another challenge in the form of data security and privacy. Without strong regulation, users’ personal health data may be sold, traded, and marketed. Reading the terms and conditions carefully is increasingly important. Both legal and privacy concerns must be weighed before advocating for wearable devices in clinical care.

There are other questions when considering wearable devices for mental health, such as which devices to use, for which populations, how to introduce them or encourage their use, and how to
gauge effectiveness. Making clinical sense of wearable device data can be challenging, with little research to guide interpretation and data visualization often difficult. As health care providers, we need to look at wearable devices as a new tool that offers both promise and pitfalls. Just as we would not recommend a novel medication or new therapy to a patient without data on the risks, benefits, and effectiveness—we need to apply the same scientific and clinical mindset to wearable devices.

**Conclusion**

Regarding Alex's question about a fitness tracker—there is no simple answer. No single device or manufacturer has separated itself in a clinical manner. There is still much we do not know about how patients will use these wearable devices and how useful the resulting data will be. Thus, a frank conversation that outlines the potential benefits of increased activity for Alex and a discussion of drawbacks, such as lack of proven effectiveness, potential data validity, and security concerns, would be a good starting point. Working to ensure patients like Alex are informed of both the benefits and the risks of wearable devices is a first step when considering the use of these devices. As the clinical evidence evolves and we learn which patients can benefit most from wearable devices and exactly how much the devices can help, we can have a different conversation with Alex. But for now, staying informed and up-to-date on research will ensure psychiatrists are able to provide patients with accurate and balanced information.

**Significance for the Practicing Psychiatrist**

**Disclosures:**

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**References:**


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