The Economic Benefits of Mobile Apps for Mental Health and Telepsychiatry Services When Used by Adolescents

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KEYWORDS

- Return on investment • Telemedicine • Telepsychiatry • mHealth
- Mobile applications

KEY POINTS

- Mobile applications for mental health and telepsychiatry provide both direct and indirect benefits.
- Digital tools for mental health positively impact patients, caregivers, and clinicians.
- A common framework of questions can be used to evaluate return on investment, regardless of the nature of the service or tool under consideration.

BACKGROUND

According to a 2015 Pew Research Center poll, 73% of teens have access to a smartphone, 58% have access to a tablet, and 87% have access to a computer.[1] Among early teens, smartphone use is also high, with 64% of boys and 72% of girls age 13 to 14 years having access. Although smartphone use is more common in high-income households, 61% of teens in households earning less than $30,000 per year have access to a smartphone. Traditional racial disparities in access are reversed for smartphones, as 85% of non-Hispanic black teens have access, compared with 71% of non-Hispanic white teens and 71% of Hispanic teens. Smartphone ownership is common among people with mental health conditions, with one study finding an

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ownership rate of 97%. Furthermore, the study found that most patients were interested in using a mobile application (app) to monitor their mental condition.[2]

Because of their ubiquity, mobile tools provide a potential channel for addressing the mental health needs of adolescents. Adolescents have a particularly strong need for mental health interventions, as roughly half of lifetime mental disorders start by the midteens, and three-quarters by the mid-20s.[3] At the end of adolescence, mental disorders are prevalent, with 52.4% of people aged 18 to 29 experiencing any disorder, and 22.3% experiencing 3 or more disorders. Within this age group, anxiety disorders are most common (30.2%) followed by impulse control disorders (26.8%).[4] Given the high prevalence of smartphone ownership and mental disorders among adolescents, mobile tools for mental health have the potential to expand access to care and lower the cost of care for this critical population.

Two distinct types of mobile tools can be used to provide care: mobile apps, which do not require significant clinician involvement and telepsychiatry tools, which link a patient to a clinician. Mobile tele–mental health has been defined "as the use of mobile phones and other wireless devices as applied to psychiatric and mental health practice."[5] Mobile apps can deliver interactive content, collect information, inform users about insights based on findings, and enable users to receive assistance when in crisis. Furthermore, mobile and computer-based tools can be used to facilitate telepsychiatry interactions, in which a user engages in a videochat with a psychiatrist or other mental health professional.

Because there is somewhat limited available scientific research on the efficacy of smartphone apps in addressing mental disorders, it is difficult to fully characterize their return on investment (ROI).[6] Nonetheless, many are likely to be efficacious, as they are either based on well-proven psychometric instruments (like the Patient Health Questionnaire 9 [PHQ-9]) or are similar to Web-based tools, which have undergone more extensive testing. Web-based tools for cognitive behavioral therapy are found to be effective labor-saving mechanisms for helping patients[7] and for training clinicians to help them.[8,9] Just as many Web-based mental health tools were previously desktop software programs, tools that are currently on the Web are being translated into apps. It is likely that the tools will maintain their effectiveness across platforms, as they are built on common principles.

This article qualitatively describes the sources of direct and indirect benefits of mobile apps for mental health and telepsychiatry. Direct (hard) and indirect (soft) benefit impacts are commonly considered in ROI analyses and differ in that direct benefits result from the immediate expenditures and benefits tied to a good or service, whereas indirect benefits result from the activities and changes that are caused by the good or service.[10] By examining the direct and indirect changes in benefits resulting from these tools, the article identifies key measures that can be quantified by subsequent researchers to gauge their return on investment. The sources of direct and indirect benefits of these tools are summarized in **Table 1** and then discussed in the remainder of the article. This article then provides a methodology for evaluating the ROI of mobile apps and telepsychiatry services and summarizes why such analyses have the potential to facilitate the dissemination of these technologies.

MOBILE APPS FOR MENTAL HEALTH

Mobile apps for mental health provide numerous direct and indirect benefits. The nature of the benefits they provide varies by app, and different users will likely receive different benefits as a result of their app use. As mobile apps typically do not require their users to disclose their identities to make an appointment or to obtain a referral