

## **Apps for Those Who Help Themselves: Mobile Self-Guided Interventions for Adolescent Mental Health**

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### **Abstract**

The exponential growth in the use of mobile phones has brought new opportunities for supporting adolescent mental healthcare. Clinical experts increasingly leverage mobile phone technology for patient self-assessments, self-paced mood charting, and virtual coaching. Yet, little has been studied regarding the depth and the breadth of evidence in the area of mobile self-guided interventions and their implications to adolescent mental health. This paper offers a scoping review of current mobile phone use in self-guided interventions for adolescents examines the key design principles in the development of these tools. The findings indicate a range of new challenges and affordances. While mobile tools are welcomed by healthcare professionals as an engaging platform for involving patients in their own care, it is crucial to critically consider ethical issues arising with mobile interventions, such as confidentiality, privacy, and potential loss of control caused by a forced self-surveillance and regulation.

### **Keywords**

mobile phone; mHealth; self-guided interventions; self-help tools; adolescents

### **Background**

Over the last two decades, the field of mobile health (m-Health) has been growing exponentially. The ubiquity of mobile phones and their advanced functionality make them an ideal medium for delivering health information and services. Healthcare providers began using Short Messaging Services (SMS) and mobile phone applications (apps) to make healthcare delivery more cost efficient and to involve patients in their own care. Self-monitoring systems via mobile phones have been implemented widely in the area of physical and behavioral interventions, such as for smoking cessation (Abroms et al., 2011), asthma self-management (Huckvale et al., 2012), and anti-obesity behavior modification (Joo and Kim, 2007). Though slower than the domain of physical health, the adoption of mobile technology for mental health intervention has been on the rise. There are a growing number of mobile phone programs covering a wide array of topic areas including: a mobile mental health assessment tool for youth (Reid et al., 2012); a cell phone app for mood tracking and self-regulation (Morris et al, 2012); and a Cognitive Behavioral Therapy (CBT)-based self-management program for people with depression and anxiety (Harrison et al, 2011).

Despite the rapid growth of mHealth adaptation to mental health, however, there has been little work exploring the depth and the breadth of evidence in the area of self-guided interventions via mobile phones. To remedy the gap in current research, this paper provides an overview of the literature on mobile self-help tools for youth and adolescent mental health and examines key design principles of these self-help tools by looking at the authors' rationales for using mobile phones for interventions. This is followed by a critical discussion of ethical issues arising with mobile interventions. Given the high prevalence of mobile devices and high technological literacy amongst

younger populations<sup>1</sup>, it is crucial to critically consider and examine how mobile phone interventions enhance the logic of self-management and shape young users as self-regulating agents ultimately responsible for their own mental health and well-being.

## Methods

In order to examine the literature on mobile self-help tools for adolescent mental health, this study employed a scoping review methodology first developed by Arskey and O'Malley (2005) and further elaborated by Levac, Colquhoun, & O'Brien (2010). This methodological framework is optimal for investigating a particular area of interest in its infancy, as it enables "mapping" of a field of study and identifying gaps in existing research.

The analytical focus of this study was mental health interventions targeting adolescents and young adults aged 13-24, delivered primarily via mobile phone (either in the form of apps or SMS). Literatures on mobile mental health tools were identified by searching for peer-reviewed, English articles in electronic databases including MEDLINE, EMBASE, PsycINFO, Web of Science, and CINAHL. For grey literature,<sup>2</sup> ProQuest Dissertations and Thesis were searched. Relevant studies were determined by using combinations of the following search terms,<sup>3</sup> including 1) *Cellular Phone, Text Messaging*; 2) *Mental Disorders, Mental Health*; and 3) *Adolescent*. No restrictions were placed on region and date of publication.

The retrieved titles and abstracts were then screened to identify whether they use mobile phones for delivering self-guided interventions for young users aged 13-24 (i.e. mood charting apps), and to exclude those describing physical and behavioral interventions (i.e. diabetes or asthma self-management), those focusing on non-adolescent population, and those not research based. After this process, eligible articles were independently reviewed and relevant information (i.e. design and characteristic of mobile tools, study outcomes, and the positive and negative impacts of mobile tools) was extracted and charted.

Following Arskey and O'Malley's (2005) guidance, we then conducted a thematic analysis to identify key guiding principles in the development of self-help tools and rationales for implementing mobile technology to care. The method of qualitative content analysis (Mayring, 2000) was used to identify themes related to design principles and their expected implications for adolescent mental healthcare. During the process of screening, data extraction, and the thematic analysis, we took a team approach and collaboratively reviewed articles.

## Findings

This scoping study includes 17 articles published from 2008-2013. Due to the nascence of the field, most of reviewed studies were pilot tests or case studies with small samples. The majority of m-Health tools developed to date have focused on helping users monitor their moods (i.e. mood charting app), providing a self-management tool (i.e. Cognitive Behavioral Therapy) to support users' positive mental states, or enabling youth to access their healthcare givers directly through SMS for coordinating appointments. Most studies, though still at a preliminary stage, reported positive effects

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<sup>1</sup> According to 2012 Pew Internet report, 95% of Americans aged 18-29 use cell phones and 66% of them own smartphones (Duggan & Rainie, 2012).

<sup>2</sup> Canadian Institutes of Health Research (CIHR) defines grey literature as "studies that are not formally published in books journals" including "conference proceedings and abstracts, dissertation and theses, project reports, government documents etc" (Grimshaw, 2010).

<sup>3</sup> The search terms and strategies were determined in consultation with a senior librarian at the research institution the authors are affiliated.

of mobile-based tools on users' mental state, such as mitigation of psychological distress and improvements in functional impairment and perceived self-efficacy.

In terms of key design principles, one of the common rationales for using mobile phone was to increase participation and adherence rate to treatment. For example, Matthews et al. (2008) developed a mobile-based mood-tracking app for adolescent and examined its efficacy in comparison with a paper-based mood charts. They reported that adolescents are more likely to complete the mobile-based mood chart than paper diaries, as the mobile app provides them with greater convenience and the sense of autonomy. In another example, researchers use mobile platforms to improve patient-doctor relationship. A cell phone-based self-monitoring tool developed by Reid et al. (2012) is designed specifically for assisting clinicians to use the patient self-monitoring data in their clinical practice. The authors argue that the mobile tool can establish rapport between pediatricians and clients, by saving clinicians' time in performing risk assessments and helping clinicians overcome difficulties engaging young clients reluctant to share sensitive information about their mental health.

## Discussion

The authors of the reviewed articles tend to favor implementing mobile phone tools to clinical practices as a suitable and effective means for facilitating self-monitoring among users. Self-guided interventions are also framed as a way to encourage young patients to participate in their own healthcare and to increase patient compliance rate. However, it is significant to consider the ethical issues arising with mobile interventions. Data recorded by mobile devices is often personal, and as such raises concerns about how it is handled, transmitted and stored. Fear of potential breach of confidentiality and privacy can prevent individuals from using the mobile tools. Moreover, the persistent and compulsive nature of self-monitoring tools means the users are potentially less in control of the ways they interact with interventions, especially when reminder are being used. The ethical issues associated with the implementation of mobile technologies into adolescent mental health warrant further attention in the literature.

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