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Smartphone Applications for Eating Disorder Treatment

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SMARTPHONE APPLICATIONS CAN BE USED IN THE TREATMENT OF EATING DISORDERS

With the expanding interest in and availability of smartphones, a growing number of mobile health applications (e.g., smartphone "apps") have been designed to provide therapeutic assistance, either as a stand-alone platform[1, 2] or in conjunction with conventional psychotherapy[3, 4]. Capitalizing on the convenience of and advancements in smartphone technology could be an effective method for enhancing the dissemination and quality of eating disorder (ED) treatment. Stand-alone therapeutic apps may provide an especially promising solution to the shortage of ED specialists. Furthermore, these treatment apps may be able to serve individuals who are reluctant to seek standard in-person treatment due to 1) fears of changing their ED symptoms, especially those that are "working" for them in their pursuit of the ideal body image, and 2) shame or secrecy about their ED symptoms. Mobile technology also contains an impressive suite of capabilities that show great promise for revolutionizing the treatment of EDs. Briefly, we will review the specific ways in which therapeutic apps can enhance several important components of ED treatment, such as self-monitoring, clinician contact, in-the-moment intervention, and social support.

THERE ARE SEVERAL APP FEATURES THAT CAN IMPROVE ED TREATMENT

Self-monitoring is a primary component of cognitive behavioural therapy (CBT) for EDs[5], the existing gold-standard treatment approach. Self-monitoring involves tracking (either in written or electronic form) disordered eating behaviours (e.g., food intake, binge eating, compensatory strategies) and thoughts and emotions relevant for treatment. Self-monitoring in sufficient detail can be time consuming and burdensome for many clients, and efforts to create monitoring platforms that are easier to use have the potential to improve compliance. Compared to entering data hours or days later on traditional paper logs, app-driven entry collects information in "real-time", as many people have a smartphone on their person all day. This convenience allows individuals to report on changes in mood, eating behaviour, and other symptoms *as they occur*, which is likely to lead to more complete and accurate information. Increases in self-monitoring can build a better understanding of factors driving symptoms for both users and clinicians. Of note, the capabilities of app sensors (e.g., GPS, internal clock) can allow for the automatic recording of some relevant information, which would minimize client burden. Additionally, apps can utilize web portals that provide clinicians easy access to the information entered by users during their day-to-day life.

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Therapeutic apps can also be used to deliver interventions to people as they go about their daily lives, particularly during moments of need. When faced with strong urges to engage in maladaptive eating behaviours, clients may struggle to recall (let alone attempt to utilize) skills taught in the therapy office. Computerized algorithms can be used to identify particularly high-risk time periods for eating disordered behaviours (e.g., restricting, bingeing, compensatory behaviours), and subsequently provide reminders of the skills taught, as well as step-by-step instructions on how to utilize intervention strategies in moments of high distress. For example, after completing several days of recording, an app might identify that binge episodes tend to occur shortly after the client returns home from work and are more likely to occur on days she reports feeling high levels of stress and has skipped lunch. If a similar constellation of events is observed in the future, the app could send an intervention to her before she gets home from work with suggestions to eat a filling snack, schedule alternative activities incompatible with binge eating, and/or practice restructuring cognitions that exacerbate her stress levels.

Lastly, apps can allow users to provide each other with support and encouragement during the recovery process. Because many individuals with an ED report high levels of shame, stigma, and isolation, the ability to connect with others may be a valuable addition to treatment. Moreover, both receiving and providing assistance through this mechanism could be beneficial.

UNFORTUNATELY, MOST EXISTING APPS ARE NOT TAKING ADVANTAGE OF THESE FEATURES

Though there has been a recent surge in the development of mobile apps for EDs, few are based on evidence-based treatment approaches and even fewer use the cutting-edge technology described above to facilitate and enhance the delivery of evidence-based practices. Our team recently completed a comprehensive review of commercially available apps for eating pathology[6]. We found six apps that were aimed at treatment of EDs, five for ED psychoeducation, and nine that address specific aspects of ED support (including a self-diagnosis tool, a tool for finding referrals, a pro-recovery/support app, assessment tools, and a reference tool for ED clinicians). Unfortunately, our review revealed that only three of the six treatment apps utilized evidence-based treatment components. Instead, the apps' components tended to have little to no research support. Examples of unsupported components include guided imagery, positive affirmations, and generic coping strategies such as "eat something healthy". While these components may be useful in promoting recovery, they should be regarded more cautiously due to the lack of extant research support. Additionally, our systematic review indicated that ED intervention apps are not fully utilizing the advanced capabilities of smartphone apps (e.g. automated data entry, personalized or automatically delivered interventions).

CONSUMERS SHOULD CAREFULLY CHOOSE WHICH APPS TO DOWNLOAD

It is our hope that clients can make use of our review when choosing to download ED treatment apps. Despite the limitations described above, a small number of apps did contain notable features that support their use either as a stand-alone treatment or in combination with in-person treatments. For example, one app, *Recovery Record*, has the capability for users to log food/meal intake (including specific food items eaten), thoughts (through an open text field), and emotions/feelings (through Likert-type scales of overall energy level, overall feelings, and specific emotions such as guilt and anxiety), representing a comprehensive self-monitoring system. *Recovery Record* also allows users to request coping strategies for in-the-moment problems (e.g., negative emotions), which are derived from CBT (e.g., delaying/distraction from an urge) and acceptance-based techniques (e.g., defusion from distressing thoughts, urge-surfing). Users of this app also have access to a social portal where they can post recent activity to an app-wide activity feed and partner with another user to provide and receive support and share coping tactics. A different app, *BeforeIEat*, provides in-the-moment strategies for dealing with urges through audio clips explaining strategies such as urge-surfing, cognitive defusion, distraction, and self-soothing. It is our recommendation that users select apps for download according to evidence base, and be wary of apps that rely on intervention components that have not been scientifically evaluated.

DEVELOPERS SHOULD FULLY UTILIZE AVAILABLE TECHNOLOGY WHEN DESIGNING APPS

Our review also revealed that many existing ED treatment apps are not harnessing available technology that could potentially enhance effectiveness and user satisfaction. First, smartphone apps are well-suited to improve adherence to treatment recommendations outside the therapeutic office. Reminders and motivational messages to complete homework assignments can be provided between sessions[7–9],

thus increasing motivation and compliance with treatment. Second, smartphone apps should allow for real-time tracking of behaviour. Apps can be designed to allow clinicians to assign specific interventions to the user and send targeted supportive and skill-based messages. To the extent that it is possible, app sensors should be used to automatically record location, mood states, physical activity, and other relevant behaviours in order to 1) reduce user burden and 2) inform the delivery of personalized interventions. Apps also have the capability to sync information within or between apps and present instant feedback regarding behaviour patterns to the user. The ability to view and analyze patterns in symptoms and their triggers over time is another method of facilitating behaviour change. Moreover, the advent of machine learning allows for the automatic analysis of behaviour patterns though mathematical modeling of a myriad of factors such as self-reported triggers (e.g., thoughts, feelings, presence of food), mobile phone usage (e.g., time spent on calls, texts, social media), and automated tracking (e.g., GPS, accelerometer information). Using this information, an app can establish causal relations between cues for disordered eating behaviours and then deliver warnings and interventions. As such, future apps should also involve the provision of interventions that are far more tailored to the individual based on the ongoing collection of information about that person[10, 11].

RESEARCHERS SHOULD USE EMPIRICAL TECHNIQUES TO EVALUATE ED TREATMENT APPS

Though some apps have evidence-based components, few (almost none) of the ED treatment apps on the market have been evaluated in the context of a research study. Without this evidence, it is difficult to draw firm conclusions about the benefits of using ED treatment apps, and the role they play in existing ED psychotherapy. This can be highly problematic because it prevents providers from making confident recommendations, and users from making informed decisions. One major barrier to conducting this research is the vastly differing paces of academic research and technology development. Typically, the life cycle of a randomized controlled trial (from conception to publication of results) is anywhere from 5 to10 years. In that time, the technology used at the study's inception is outdated and irrelevant. Thus, researchers might consider seeking funding with a faster turnaround time and shorter project timeline (e.g., National Science Foundation, Small Business Innovation Research). Furthermore, this pace of technology development may require more innovative study designs such as the multiphase optimization strategy (MOST)[12], which incorporates intervention optimization steps into the traditional randomized controlled trial.

CONCLUSION

Mobile apps show promise to enhance the treatment of EDs. They have the power to disseminate treatment to those who cannot (or are unwilling to) engage in in-person treatment. Though further research must be conducted on the effectiveness of these apps, it stands to reason that there are several ways in which they can enhance in-person treatment – through improved self-monitoring, clinician content, in-the-moment intervention, and social support. Unfortunately, there are few apps that are 1) using evidence-based principles and 2) harnessing the ever-increasing power of technology. Therefore, there is much room for improvement by technology developers, and many questions to be answered from a research perspective. In the meantime, consumers should be optimistic for the future of ED treatment apps, but also conservative in which apps they choose to use.

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