Review Article

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Android & iOS Health Apps for Track Physical Activity and Healthcare

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ABSTRACT

In recent years, there has been a surge in the number of applications for mental health (also known as MHapps) that have been developed and are now available to users of smartphones. MHapps and other technology-based solutions have to play an essential part in the future of mental health care; nevertheless, there is no one guide for developing evidence-based MHapps. MHapps have the potential to play a vital part in the future of mental health care. Many of the MHapps that are now available either need to contain features that would significantly enhance their functionality or have poorly optimize could be better. In addition, the creators of MHapps rarely undertake or publish experimental validation of their apps based on trial and error. A prior systematic review found that many of the hundreds of MHapps on the market had any evidence at all that was based on clinical trials. Using data collected from the Android app market as a source of observation, this study aimed to evaluate the impact of information cues on users' uptake of anxiety-related apps.

Key words: Mobile Health, MHapps, Physical Activity, Mental Health

INTRODUCTION

A smartphone is an upgraded mobile phone that also operates as a portable computer and can run applications designed for computer use. Smartphones have become an integral part of the daily lives of a sizeable number of the world's population in just the past decade, whether in their personal, social, or professional lives (Ballamudi, 2016). In the United States, more than half of the population possesses a smartphone, and among those who do, 83 percent say they never leave home without their device. This high number of checks reflects how smartphone apps may establish, reward, and maintain intense routines regarding their use. Apps can also perform behavior change interventions, which can help users improve their physical health in various ways, including encouraging them to exercise more.

In recent years, many applications for mental health, sometimes known as, have been developed and made available to those who use smartphones. The purpose of these apps is to improve mental health and well-being by doing a variety of things, such as assisting in the recovery from mental illness and promoting healthy behaviors that are helpful to emotional health. A recent public survey indicated that 75% of 525 respondents would use their mobile phone for self-management and mental health monitoring if the service was free (Tracy, 2012). This finding is evidence of the excellent demand for MHapps, which can be seen as proof of the strong demand for MHapps.

MHapps and other technology solutions have the potential to play a significant role in the future of human mental health care, making mental health support more readily available and lowering the obstacles that prevent people from seeking assistance. Given that, only a tiny percentage of persons who struggle with issues related to their mood or anxiety ever seek professional assistance, inventive solutions to the challenge of self-management of mental health problems are particularly essential (Thaduri et al., 2016). Even when people are aware of their challenges and willing to seek assistance, getting support regarding geography, finances, or social connections can be challenging.

Smartphones are not limited by location, and their use is often conducted secretly by a single person. This indicates that smartphone applications have the potential to be incredibly adaptable and appealing to users, with the users' interaction being protected in complete secrecy. Help can be obtained by downloading and using a mental health application (MHapp), an excellent option for users who desire autonomy, like young adults. Users also prefer materials for self-help support if supplied via a medium they are already comfortable with, such as a personal smartphone. Because smartphone apps are usually constantly available to users, they can be utilized in virtually any setting and almost under any circumstances. Users of these apps can remind themselves throughout the day of ongoing goals and motivations, and they can also be rewarded when they meet the goals they set for themselves.

On the other hand, many MHapps do not make the most of the capabilities and advantages of cell phones. The design ideas responsible for the enormous success of many different app categories, such as social networking and mobile health apps, have not been implemented in mental health applications. In addition, evidence-based criteria created for other self-help interventions for mental health have not been applied to many MHapps yet. For instance, many already available MHapps target particular diseases and assign a diagnosis to those who use them. It has been argued by a significant amount of research that this labeling procedure can be both detrimental and stigmatizing. There also appears to be a need for more appreciation for the importance of experimental validation among those who work on MHapps. According to the findings of Donker et al., many of the hundreds of MHapps currently on the market need more experimental data. Only five mobile applications (apps) were found to have supporting data from randomized controlled trials (RCTs) after their review was conducted. A review of the app stores maintained by Apple and Google as of January 2014 reveals that none of these RCT-supported apps are now offered for sale to individual customers.

For an approach to mental health to be successful, there needs to be a systematic procedure of experimental testing that guides its development. When presenting an evidence-based intervention to the general public, it is essential to consult the appropriate theories of engagement and implementation. However, such a study is not being conducted at this time. To effectively direct the creation of future MHapps and RCTs, it would be beneficial to have a set of recommended principles that are evidence- and theory-based and are supported by validated claims. A review of the relevant research reveals that there are several approaches to enhancing the design, validation, and overall efficacy of mobile health applications (MHapps).

APPS FOR MENTAL HEALTH

The frequency and impact of mental diseases are significant worldwide, and it is still a struggle to provide adequate mental health treatments to millions of people in need. While there is growing empirical support for web-based interventions, mobile interventions are just entering their formative years (Mani et al., 2015). Mobile health, often known as mHealth, is a relatively new sector within the science of medicine that uses wireless technologies, such as mobile phones and other devices. The proliferation of mobile application technology has ushered in new possibilities. The smartphone owner can maintain a constant connection to the Internet using the device (Dekkati et al., 2016). The computing power offered by smartphones and applications is on par with that of personal computers and software but with the added benefit of portability.

The number of people using smartphones is rising alarmingly and currently accounts for 25 percent of all Internet traffic. A recent study conducted in Australia found that 88 percent of survey respondents utilize websites or applications on their mobile phones, and the study also anticipated that 92 percent of survey respondents would own smartphones by October of this year. By 2017, it is expected that there will be 269 billion downloads of mobile applications worldwide. The use of smartphones is particularly prevalent among young people: According to research published in May 2013 by the Australian Communications and Media Authority, 89% of persons in the age group 18-24 have a smartphone, and 83% of people in this age group had downloaded an application within the prior six months. In addition, young people have a positive attitude toward using e-technologies as credible sources of health information. A recent poll found that 39% of young people had used the Internet to look up information on a mental health problem that they are experiencing. E-technologies are becoming increasingly widespread, which has several implications; one is that they may provide a medium that might help young people become more conscious, which can improve their overall well-being (Thaduri, 2018).

An astounding 1.4 million apps are currently available for download from the Apple Store, and more than 35,000 of them are connected to health. However, beyond the evaluations and ratings provided by users, there is very little information accessible regarding the reliability or usefulness of these programs. Mobile health applications must provide users with beneficial results and offer high-standard information (Desamsetti, 2018). For instance, there is emerging evidence for the positive impacts of face-to-face mindfulness-based training programs; however, it is uncertain if mindfulness applications can give the same advantages as face-to-face programs (Bakker et al., 2016). After searching many databases (ERIC, MEDLINE, PsycINFO, Web of Science, and ProQuest), the sole randomized controlled trial investigating the effectiveness of a mindfulness training app (Headspace) was found.

The current research consisted of a comprehensive analysis of mindfulness-based mobile applications (apps), an evaluation of the quality of these applications based on an expert rating scale, and a description of the characteristics of the apps that received the highest ratings (Desamsetti, 2016a).

CHALLENGES IN MENTAL HEALTH APP ADOPTIONS

Apps designed specifically for mental health can perform a variety of roles, ranging from facilitating recovery from mental diseases to motivating positive actions that contribute to better emotional health. For instance, many applications available for mental health can help with professional practice, facilitate communication in real-time, or offer psychoeducation. However, due to the delicate nature of the topic, the adoption of applications for mental health is quite different from the adoption of other types of apps. It is possible to blame the persistent social stigma, which has been there for a very long time, for the sensitivity of matters about mental health (Litayem et al., 2015). This is the most prevalent reason people do not seek mental health care or support. Previous research has revealed that young people utilize mental health applications to escape the social stigma of mental illness. However, many currently available mental health apps are directed toward specific users and identify them according to their condition (Desamsetti & Mandapuram, 2017). This not only has the potential to worsen the stigma, but it also has the potential to hinder users' uptake of mental health apps.

Because there are no clear guidelines, regulations (for example, the Health Insurance Portability and Accountability Act [HIPPA] or the Food and Drug Administration [FDA]), or recommendations for users to select mental health apps, another challenge in the adoption of mental health apps is that users may find it difficult and overwhelming to choose the appropriate app from the hundreds of choices that are available on the app market. Another obstacle in adopting mental health apps is that there is no clear guideline or recommendation for users to select mental health apps. Users of the Android app shop, for instance, can only sort apps by rating or price when browsing apps in the store. The Android app market needs a more robust mechanism for filtering apps (Ballamudi & Desamsetti, 2017). A user may need to look through all of the apps displayed on a search results page to locate an application that would assist them in feeling less anxious. Another choice available to users is to have the system randomly select an application that may or may not meet their requirements. The availability of more and more mental health applications on the market has brought to light an important and pressing issue: how to assist users in selecting and identifying the "right" app for their mental health wellness. However, before building trustworthy mechanisms to help users adopt mental health apps, it is essential to have a solid understanding of the adoption of mental health apps from the users' point of view.

APP ADOPTION AS A HEURISTIC PROCESS

Adopting a mobile application can be conceptualized as a selection procedure within the framework of a computer-mediated setting, in which users base their selections on a range of information signals. Because humans have bounded rationality, people frequently use a heuristic approach to absorb information rather than a systematic one when making judgments. This is because heuristics are more intuitive. Heuristics are "process-oriented strategies" that enable people to make judgments more quickly and cost-effectively by lowering the required cognitive work. When using a heuristic approach, people evaluate and integrate fewer information cues and simplify the principles by which they weigh information cues (Thaduri, 2017). Heuristics include three stages in the selection process: the first is searching, the second is pausing, and the third is deciding. For instance, while choosing an app, users may search app titles they are already familiar with and then finish the search once they have sorted the available apps into categories of either titles they recognize or do not recognize. Nevertheless, during a heuristic process, an individual may rely on several information cues rather than just a single cue rather than depending on just one cue (Holtz et al., 2017). Therefore, it is essential to consider the different implications that information cues can have on the adoption of apps by users.

Previous research has found that a range of information cues, such as prices, ratings, reviews, rankings, installs, names, descriptions, features, and privacy concerns of apps, might influence users' choices when adopting mobile applications (apps). A study by Dogruel et al., which is most relevant to ours, further points out that when users know what type of apps they need, they often employ the simple "take the first" heuristic approach, which is predominantly influenced by apps' titles and crowdsourcing-based cues such as ratings and rankings of apps (Desamsetti, 2016b). This is because users are likelier to use the approach when they know what apps they need. Users will only look for extra information (such as reviews and functions) if they need clarification on the rating and ranking cues provided.

According to the findings of the previously conducted study, several significant indicators play a role in the app selection and adoption procedure. However, there is currently a shortage of published research on how users choose and integrate mental health apps into their lives. We still do not understand the kind of information cues that have a relational impact on users' adoption of mental health apps. This is because users' app adoption differs depending on the types of apps. Due to the sensitive nature of the mental health field, we are interested in learning whether the primary cues (such as app titles, ratings, and rankings) identified in earlier research continue to play an essential role in app adoption as far as we first work that focuses on investigating the relationship between information cues and adoptions of mental health apps (Deming et al., 2018).

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APPS FOR CHRONIC ARTHRITIS

Chronic arthritis (CA) is an umbrella term covering inflammatory rheumatic and musculoskeletal disorders such as rheumatoid arthritis (RA), osteoarthritis (OA), and spondyloarthritis (SpA). Rheumatoid arthritis, osteoarthritis (OA), and spondyloarthritis (SPA) are all types of arthritis. The incidence of CA is very high. According to medical professionals, arthritis affects one out of every five adults in the United States (Geuens et al., 2016). The processes of inflammation and destruction resulting in joint discomfort, swelling, stiffness, instability, mutual destruction, or bone ankylosis leading to progressive immobility are often associated with CA. These illness processes are primarily responsible for limiting one's ability to carry out day-to-day tasks like walking, cleaning, and working. To combat RA and SpA, disease-modifying antirheumatic medications (DMARDs) that are proven to be efficacious have just been accessible.

On the other hand, they necessitate a long-term commitment on the part of the patient to closely follow up on illness parameters by the treating physician and other health experts, in addition to compliance with the pharmaceutical regimen and other therapeutic ideas. Physical therapy programs are recommended as an additional treatment option for all CA patients to enhance many areas of physical fitness, including cardiovascular endurance, muscle, posture, movement control, and range of motion (Lal, 2016). There is a lot of data to demonstrate that physical activity has many positive effects. Unfortunately, 35 and 75 percent of people diagnosed with CA do not follow their therapist's suggestions about physical exercise. Personal barriers (such as a lack of motivation) and environmental barriers (such as a lack of qualified staff and facilities) are additional factors that contribute to a lower rate of therapy adherence among arthritis patients. Arthritis-specific barriers include pain and disability. Patients undoubtedly require assistance managing their disease and maintaining their exercise regimens, which must be met.

Mobile health apps, often known as mHealth, could be a solution to helping CA patients. "The Mobile applications that assist consumers in self-management of overall wellness, disease, and disease management" is one definition of what is meant by the term "health app." These applications represent further developments in telehealth, as they allow for the performance of remote interventions and make it possible to perform them at any time and in any location. Evaluating gait in rheumatic diseases, for instance, or the logging of pain and physical condition, are two examples of the clear benefits of mobile health apps for the treatment, assessment, and self-management of CA. The proliferation of mobile phones, specifically smartphones, is a critical factor in developing health-related applications. Numerous experts in the field of cancer have determined that there is a definite need, as well as an opportunity, for mobile phone apps that address educational, lifestyle, and therapy interventions to facilitate delivery and boost patient involvement. In addition, there has been a demand for a more deliberate design of these apps, beginning with the needs of CA patients and addressing the motivations of CA patients for utilizing health apps (Lal, 2015). This is a call that has been made. When designing for people with comorbidities such as chronic pain, depression, and weariness, unique problems regarding continuous motivation must be addressed (Jones & Moffitt, 2016). This study aims to investigate how to boost the motivation of cancer patients to utilize mHealth apps and, more specifically, how to do so by including "persuasive principles." The provision of praise and reminders, imitation of social agents, the provision of "social support," and the enhancement of "system credibility" are all examples of specific design strategies that fall under the category of persuasive principles. By incorporating clear principles, health apps have the potential to transform into supportive tools that motivate and stimulate users to achieve or keep up with targeted behavior (Dekkati & Thaduri, 2017). It has been stated that the design of existing health applications does not make "conscious" use of any persuasive concepts in their construction. The design and development of applications used in health care are frequently approached as "black boxes," meaning that the technology is functional. Still, the design itself is not evidence-based or based on behavior change (Lal & Ballamudi, 2017). Because of this, the resulting technology might not have much of an effect on how health care is delivered.

APPS FOR OBESITY TREATMENT

Mobile applications (apps) that track and record a person's level of physical activity (PA), analyzing the consequences of popular features for the treatment of obesity in the general population.

Obesity Prevalence: The prevalence of obesity in the USA, defined as a BMI of 30 kg/m2 or higher, did not change between 1960 and 1980, but increased by 8.0 percentage points over the next decade (22.9% in 1988–1994), 30.5% in 1999–2000, and 33.8% in 2007–2008. More recent data shows a slowing or leveling off of these trends, with 35.9% of US adults obese in 2009–2010, similar to 2003–2008 and 2011–2012 projections. Although speculation, this shows that recent intervention attempts, such as the development and execution of more practicable and attractive programs (e.g., electronic-based programs), may be slowing obesity's rise (Hsiao-Ying et al., 2017).

Consequences of obesity: Due to the high number of obese adults in the US, reducing obesity rates is a public health priority. Obesity is linked to hyperlipidemia, hypertension, insulin resistance, gallbladder disease, respiratory, orthopedic, and cancer.

Standard methods to treat obesity: Standard obesity treatment includes examination and management. To determine obesity and obesity-related disease risk, doctors will examine waist circumference and BMI. Combining these measurements with their general health state helps decide management options. Dietary modification, PA promotion, behavior therapy (e.g., self-monitoring, stress management, problem-solving, cognitive restriction, and social support), medication, and weight loss surgery may be used, depending on the individual.

Role of PA in treating obesity: PA is the foundation of behavioral weight reduction treatment, even if any of the above treatments may help treat obesity. Energy expenditure exceeds energy intake for a specific time, causing weight loss. Regular PA improves weight loss by increasing fat loss and decreasing fat-free mass loss. Compared to diet alone, PA may help attenuate weight loss-related metabolism deficits by preserving or increasing fat-free mass, metabolically more active than fat mass.[8] A substantial dose of PA (60–90 minutes daily of at least moderate intensity PA) is recommended to sustain weight loss. Hence, PA may assist in preparing the individual to maintain weight loss. The evidence also suggests that PA may affect other energy-balance activities, such as nutrition. By affecting neurocognition, PA may indirectly affect health habits like eating. Executive function, which controls self-regulation and goal-setting, is increased by PA. PA may help people monitor and regulate their intake and curb harmful, impulsive eating.

Traditional PA interventions: Many "traditional" multicomponent strategies have been used to promote PA, including informational approaches (e.g., increase activity-related cognitive skills), point-of-decision prompts (e.g., elevator signs), community-wide campaigns, mass media campaigns, environmental and policy approaches (e.g., provide environmental opportunities through policy changes), and behavioral and social approaches. Goal setting, social support, self-reward, problem-solving, relapse prevention, and self-monitoring are behavioral and social approaches to PA (Dehling et al., 2015).

Text messaging has become standard in mHealth interventions in the last two decades. Four reviews studied Mobile phone text messaging for health care interventions to promote health habits. Text messaging was well-received and improved clinical results in several trials, although methodological flaws and small sample sizes were noted (Lal et al., 2018). In a systematic review, Buchholz et al. found ten adult PA text messaging intervention studies. Interventions included sending PA text messages, combining text messages with instructional materials, 26, 27, and health care provider and staff counseling. Two experiments used text messaging and the Internet. All studies gave suggestions via text. PA text messaging intervention trials showed promising results in improving PA levels. However, they needed more protocol specifics, making replication and implementation challenging.

CONCLUSION

Apps designed specifically for mental health treatment and intervention have the potential to be a highly effective tool. Developing an app-searching system that can direct users to select the appropriate apps for their mental well-being and help them do so is a challenging problem. Because downloading apps is a heuristic process, information signals are crucial in the adoption process. We evaluated the relationship between information cues and users' app adoptions using observational data gathered from within an app market. Our goal was to understand better the impact that information cues have on the adoption of apps by users. We found that the pricing of the app, its rating, and the reviews written about it are significant markers for anxiety app adoption (Wong et al., 2014).

Conversely, it has yet to be apparent how app permissions and category hints will affect the outcome. The significance of app titles in terms of users' choice of anxiety applications and their use of such apps was one of the most important things we learned from our research. Our work demonstrates interesting phenomena and provides insight into the information cues and anxiety app adoptions, which will help provide better solutions for the future design of search mechanisms for mental health apps. Even though there is still a long way to go before designing an effective search mechanism for mental health apps, our work demonstrates these phenomena and provides insight.

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