# Non-pharmacological Approaches in the Depression Treatment - Strengths and Weaknesses of Mobile Applications Use

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**Abstract.** As the prevalence of mental illnesses such as depression and anxiety continues to grow, clinicians have turned to mobile applications as tools for aiding and supporting their patients' treatment. These applications can be especially helpful for teenagers and young adults suffering from mental illness due to their frequent use of technology as a means of communication. Depression is the fourth frequent cause of death. It can affect almost anybody, including children. In most cases non-pharmacological treatment is preferred since it is less invasive, has fewer side-effects and sometimes it is also less expensive. The paper aims to explore the effectiveness of the use of mobile applications, which is demonstrated clinically and consequently, the focus is also put on the criteria evaluating the quality, strengths and weaknesses of current mobile health applications. The results show that clinical trials confirm some positive effects of mobile applications, however the evidence is rather low and further monitoring is needed.

**Keywords:** Health · Mobile applications · Depression · Treatment

## 1 Introduction

At present mental disorders affect approximately 450 million people around the world [1]. Depression disorder is probably the most serious one. Nowadays, depression as a type of chronic disease represents a global threat and burdens economic and social systems of both individuals and governments worldwide [2–4]. This concerns also the costs on pharmacological and non-pharmacological treatment. Nevertheless, in most cases non-pharmacological treatment is preferred since it is less invasive, has fewer side-effects and sometimes it is also less expensive. One of these non-pharmacological approaches is the so-called mHealth (mobile health); the use of mobile devices for the practice of medicine and public health.

According to the World Health Organization report [5], mHealth is a globally adopted technology. Employers, too, recognise that facilitating employees' health maintenance is advantageous and reported successful trials for mental health issues. In addition, many current m-health initiatives focus on outdated, unidirectional models of patient communication (e.g., exclusively collecting data, providing information or

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sending reminders) [5]. The use of mobile technologies, in particular, is rapidly evolving within the field of tele-mental health. mHealth is conducted on "mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices" [6].

The purpose of this article is to explore the most recent randomized controlled clinical trial studies which prove efficacy of the use of mobile applications in the diagnostics or treatment of depression. Consequently, the focus is also put on the criteria evaluating the quality, strengths and weaknesses of current mobile health applications. In conclusion, the authors list the main strengths and weaknesses of mobile applications in the diagnosis and treatment of depression.

## 2 Methods

The methods used in this study include a method of literature search of the studies focused on the impacts of individual applications for people with depression and on the specification of criteria evaluating quality of these applications. After removing redundancies, abstracts were analyzed by two research workers and other irrelevant articles were excluded from the content point of view. Eventually, 11 full-text research studies were analyzed. Since technologies develop fast and not all the applications for patients with depression are specified in research studies, other Internet sources were used.

## 3 Use of Mobile Applications in the Treatment of Depression

As the prevalence of mental illnesses such as depression and anxiety continues to grow, clinicians have turned to mobile applications as tools for aiding and supporting their patients' treatment. These applications can be especially helpful for teenagers and young adults suffering from mental illness due to their frequent use of technology as a means of communication. Health applications for depression – criteria of effectiveness However, it is very crucial to choose the right ones, which can meet certain criteria. According to [7], mHealth applications must be safe, accurate, effective, secure, and protect privacy to be used by patients, recommended by health care professionals, and eventually reimbursed [8].

In the study by [7] these criteria were discussed in a more detail and the applications assessed according to three measures of effectiveness: perceived effectiveness, research evidence base for an app, and whether or not the app claimed that the effectiveness was tested [8]. The key criteria with respect to depressions seem to be as follows: password protection, number of consumer ratings, explicit privacy policy.

Another criteria also include: interactiveness/feedback, encryption, basis of research, software support, import/export capabilities, developer contactable, personalization, specificity of intervention, source of funding for research, discloses potential risks, effectiveness (perceived), continuous availability of data, effectiveness tested (claimed by app), ease of use, advertising policy stated and errors and performance issues [7, 8].

According to [9], the smartphones should support built-in Bluetooth HDP for standard Bluetooth communication with medical devices. This will enable the smartphone applications to work with medical devices from different vendors. Other technical specifications which appear to be quite important are: long battery life, sufficiently large screen size, fast data input, virus-free computer, no magnetic interference with medical devices, efficient patient-physician interactions, avoidance of loss or theft, and data privacy and security [9].

The privacy and security concerns of storing or communicating patient data with smartphones should be addressed cautiously. These security features of smartphones, while not available for all devices, may be useful: data backup, encryption of stored patient data, remote wiping to destroy all data on a device in case of loss or theft, and securely encrypted wireless data transmission over WiFi [10–12] applications.

Finally, personal data must be considered when using the mobile applications, which is also closely connected with the rules of handling these data. In many ways, these areas are not still legally specified. According to [13], when using an application, the following criteria must be specified: compliance with privacy (user should be informed how or for how long his/her data are stored), security (protection against viruses), accuracy of content, safety (the app provides information on the proper way of using it. It warns the user against possible health dangers (side effects) related to the use of the app for different purposes or without following the suggested protocol).

Figure 1 below illustrates the principal criteria of applications quality for the treatment of depression discussed in most of the research studies.

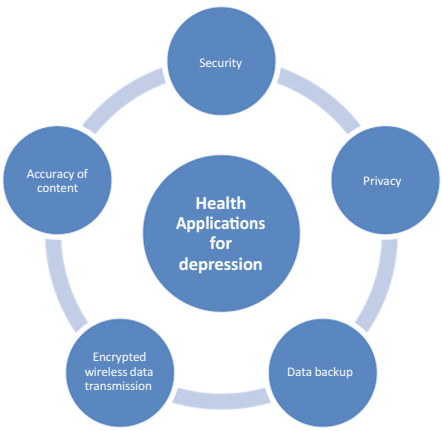


**Fig. 1.** Criteria of applications quality for the treatment of depression

## 4 Discussion and Conclusion

The number of mobile health applications is rapidly growing thanks to the rapid development of these technologies worldwide. As far as the treatment and diagnosis of depression disorders are concerned, there is a general support for their use [14]. Since it

is quite a new field of research, more clinical trials are needed to prove efficacy of mobile health applications for the treatment and diagnosis of depression. This is in fact questioned in many studies, e.g., [15]. As Andersson and Titov [16] state, the Internet based programs supported by an experienced therapist can monitor and support patients before a crisis starts to develop. However, these interventions must be of good quality and sufficiently stimulating to engage patients with depression. In addition, their privacy data should be protected.

Generally, more promotion of the benefits of mobile health applications for the treatment and diagnosis of depression is needed. East and Harvard [17] propose several ways of improving this:

- raise awareness of evidence-based applications;
- infuse mental health mobile applications into graduate counsellor education;
- disseminate information about mobile health applications during clinical staff meetings;
- integrate mobile health applications into therapy; and
- publish research in this filed and present it at conferences.

Table 1 below summarizes the main strengths and weaknesses of using mobile health applications for the treatment and diagnosis of depression.

**Table 1.** The main strengths and weaknesses of using mobile health applications for the treatment and diagnosis of depression

| Strength | Weaknesses |
|---|---|
| • clinical trials show promising results; improvement of treatment accessibility;<br>• patient empowerment;<br>• efficient self-monitoring tools for patients in the early stages of the disease;<br>• suitable supporting therapies;<br>• cost-effectiveness;<br>• reduction of hospital institutionalization and care;<br>• lowering of prevention costs;<br>• reduction of visits, examinations at the doctor;<br>• cut of labor costs | • a lack of data security;<br>• a lack of standards;<br>• insufficient data backup;<br>• resistance from traditional healthcare providers;<br>• low awareness of benefits mobile applications for the treatment of depression;<br>• a lack of evidence-based programs |

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