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How to cite

LUIU, Anna Laura et al. ADHD Mobile App Feasibility Test for Adults. In: Studies in Health Technology and Informatics, 2018, vol. 255, p. 247–251. doi: 10.3233/978-1-61499-921-8-247

This publication URL: https://archive-ouverte.unige.ch/unige:128921
Publication DOI: 10.3233/978-1-61499-921-8-247

Decision Support Systems and Education
J. Mantas et al. (Eds.)

doi:10.3233/978-1-61499-921-8-247

ADHD Mobile App Feasibility Test for Adults

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Abstract. Attention-deficit hyperactivity disorder (ADHD) is characterized by inattention and/or hyperactivity/impulsiveness. For many adults, ADHD remains undiagnosed and/or untreated impacting their quality of life. There is a growing interest to use mobile technology interventions as a complementary support for mental health issues. Mobile apps could be usefully personalized for helping adults in managing ADHD issues. The aim of this study is to examine perceived helpfulness, ergonomics and willingness to use of an ADHD mobile app based on the PAPM model. A sample of 6 ADHD patients tested the ADHD mobile app prototype and were interviewed about their satisfaction and the perceived helpfulness of the app. Data indicate that participants were very satisfied with ADHD app and perceived it as being moderately to very helpful regarding their ADHD symptoms. These findings suggest that the app has the potential to be an effective self-management tool for ADHD.

Keywords. consumer behavior, attention deficit hyperactive disorder, qualitative research, telemedicine, software design

1. Introduction

Attention-deficit hyperactivity disorder (ADHD) is a neurodevelopment disorder characterized by inattention, impulsiveness and hyperactivity (motor restlessness). ADHD persists into adulthood in about two-thirds of individuals, with an estimated prevalence in adults ranging from 1% to 6% [1, 2]. At adulthood, the disease is linked to a number of risk taking behaviors, such as drug and alcohol intake or misconduct issues [3]. Also, ADHD adults encounter severe difficulties in organizing and planning activities, achieving goals [4] and possess a very limited sense of time leading to poor time management [5]. As consequence adults with ADHD possess often low educational attainment and income, experience emotional and social problems [6], have difficulties to inhibit impulses and seek for increased reward and sensation seeking behaviors [7]. Effective treatment of adults' ADHD improves symptoms, emotional lability, and daily life functioning resulting in favorable outcomes (e.g. safer driving, reduced compulsive behaviors) [8].

A multi-modal approach combining pharmacotherapy, cognitive behavioral therapy and psycho-education is considered as the most successful strategy to manage ADHD in adult [9]. Behavioral interventions for ADHD are supported by self-monitoring in both

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time and emotional management. Self-monitoring increases self-awareness about targeted behavior and outcomes in relation to certain goals [10]. In addition, self-awareness can act as a warning system, indicating for example whether a risk of dysfunctional behavior is increasing.

Mobile phone apps have the potential to facilitate greater self-awareness through psycho-education, leading to improved self-management skills and better health condition [11]. Also, sharing results on social network allows real-time feedbacks among multiple individuals with similar health interests [12]. Therefore mobile technology interventions to change behavior could be usefully personalized for ADHD in adults.

We choose the Precaution Adoption Process Model (PAPM) among different behavior change models to support our app since its stages of behavior change are based, among others, on awareness construct. Behavior change unfolds through a series of stages involving specific change processes. PAPM specifies 7 stages: 1) unaware; 2) aware but no thought of adopting precautions; 3) thinking but undecided; 4) decided against adopting the precaution; 5) decided to adopt but have not yet acted; 6) acted on their decision to adopt: and 7) for some behaviors, maintenance may be needed. Each stage represents specific patterns of behaviors, beliefs, and experiences that must be leveled for transition. Since PAPM considers awareness as the initial step to change behaviors, we decided to develop the app based on psycho educational format based on the hypothesis that increased level of knowledge will motivate patient to change their behaviors. The particular implementation of PAPM for ADHD relies on tailored messages, advices, information, exercises and feedbacks. For example tailored messages are meant to trigger both interest and motivation. Users who are contemplating a new behavior to adopt could receive a message highlighting the pros of changing. Motivation for using will be fostered through positive rewarding. In order to maintain a healthy behavior simple exercises are proposed to the user. We selected: attention, planning, impulsivity, memory, and emotions regulation as ADHD dimensions where psycho-education could be implemented. Therefore, for each dimensions, PAPM stages are unfolded in the app.

The aim of this study was to examine perceived helpfulness, ergonomics and willingness to use of our ADHD mobile app. In addition, it aimed to explore and recommend any important aspect to assist developers in decisions regarding those apps.

2. Method

2.1. Sample

6 patients aged between 20-55 years old diagnosed with ADHD were recruited from the Psychiatric Department of Geneva, Switzerland. All participants gave their informed consent. At the time of the study participants were involved in a working group based on Cognitive-Behavioral Therapy.

2.2. Design

The design of this research includes a qualitative method. Following app utilization, roughly 20 minutes each, adults were individually interviewed by a professional psychologist. Seven open questions constituted the semi-structured interviews in order to explore three dimensions: perceived helpfulness, ergonomics and willingness to use.

Content analysis of participant feedback was conducted to serve as exploration step of the results. Data were analyzed manually by the authors in a deductive way through thematic analysis. We first transcript the audios, developed themes, and then generated categories. Participants' comments were translated from French to English.

3. Results

3.1. Perceived Helpfulness

Almost all patients, 5/6, thought that being informed on ADHD could be helpful. P1: "*…I guess that increasing knowledge motivate us to better manage our issues…; P3:"It is useful… we would have immediate answer on our troubles…*"; P4: "*It would be useful even for people without ADHD issues…*". A lady struggling with attention issues explicitly expressed the desire to have scientific data P6: "*You know, we read a lot on ADHD here and there on internet but you never know which information is reliable…then short and precise information helps to not get lost among many stimuli…*" P5: "*It would be helpful in giving me some tips on emotions management. Once I had to call the doctor for my anxiety. Doctor suggested putting fresh water on my neck and wrists in order to low my blood pressure and gave me some explanation about it … It worked out … it would be nice to know some tips like this…*".

Among memory, attention, impulsiveness, emotions regulation and planning, 5/6 of patients were interested in using the app to manage their emotional issues; 4/6 attention, 2/6 needed help in all the domains mentioned above. One patient wished more psycho education on sexuality P3: "*if you are taking medicaments this affects your libido going down, and as consequence, affects the relation with your partner…*"

3.2. Ergonomics

All patients asked to have less content to read. 2/6 of patients would be more motivated in using the app if information is released through short messages plus images and/or video. P6: "*I get tired if have too many things to read. Just a short sentence with some image, possibly on the same page would be perfect." P2: "I cannot focus for long, few words will be enough.*" More than half users stated that they are more likely to do some exercise if results are followed by short explanation or either if they can rate their performance. P4: "I *like to challenge myself but then I'd love a feedback…like an explanation or if I win anything…*" 4/6 of patients don't mind about colors and graphic styles, only 2/6 expressed explicit comments: P4: "*Personally I find sad to read things on a white background…*" and P6 said: "*I would prefer to read message on a black and white style or maximum 3 colors not more. I get excited if I see many colors and at the end I get distracted…*"

3.3. Willingness to Use

In order to maintain a certain healthy behavior achieved simple exercises were proposed. More than half patients said that they need to be motivated to do exercises. Playful aspects, clinical information and helpful tips resulted to be the elements to trigger their willingness to use it. P1: "*As long as it triggers my curiosity, like true/false game for*

example, I will use it…". P6: "*Once I did the exercise I would need to see my progresses, just to monitor myself and increasing myself knowledge…on anxiety issues for example. For example, rating how much a certain event triggers my anxiety would make me more aware on which events scared me…*"

2/6 of patients would share the app on social media only if they consider the information as powerful. The others 2/6 are not into social media; 1/6 prefers to keep his issues private while P3 would be happy to share his progress. P3: "*Yes, why not… I could even compare myself results with someone who has got my same issues…*"

All patients are willing to pay for it as long as it useful.

4. Conclusion

In this study we tested our ADHD app prototype for adults.

The majority of our sample stated that increasing awareness could help them to better manage ADHD issues.

Analysis of ergonomics provided us with elements we need to change. Due to the short attention issues, messages structure should be simpler, shorter and essential, possibly released as slogan.

The evaluation of willingness to use showed how rewarding users is important to motivate them in doing exercise as well as seeing their progresses. ADHD adults don't seem to be much into social media sharing but they would be willing to pay for using the app.

Limitations of this study include small sample, which could undermine internal and external validity, so that a greater sample of users may result in additional thematic categories.

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