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Living SMART — A randomized controlled trial of a guided online course teaching adults with ADHD or sub-clinical ADHD to use smartphones to structure their everyday life

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ABSTRACT

Objective: To evaluate an online intervention for adults with ADHD that aimed to improve organizational skills and attention with the help of smartphone applications.
Method: Participants (n = 57) were recruited and assessed through questionnaires and telephone interviews. Diagnoses of ADHD were confirmed for 83% of the participants, 5% most probably had the diagnoses, and 12% did not fulfill all diagnostic criteria despite high levels of symptoms. Participants were randomized between the intervention (n = 29) and a wait-list control group (n = 28). The 6-week intervention involved support from a coach in finding a routine for organizing everyday life with the help of smartphone applications. The primary outcome measure was ASRS Inattention. Secondary outcomes were ASRS sub-scale Hyperactivity and measures of depression, anxiety, stress, quality of life and general level of functioning. Blind evaluators also assessed improvement in organization and inattention at post treatment.
Result: The participants receiving the Living Smart course reduced their average scores on ASRS-Inattention from 28.1 (SD = 4.5) to 22.9 (SD = 4.3) which was a significantly larger reduction than found in the control group. 33% of participants were considered clinically significantly improved according to the blind evaluator, compared to 0% in the control group. The same results were found when only participants with a confirmed diagnose were included in the analyses.
Conclusion: Adults with ADHD seem to be able to use smartphone applications to organize their everyday life and can be taught how to do this via online interventions.

1. Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most commonly diagnosed behavioral disorders for children and adolescents and often persists to affect 2–4% of the adult population (Biederman et al., 2011; Schilling et al., 2011). Adults with ADHD have an increased risks of engaging in criminal activities and drug use and abuse (Carpentier et al., 2011; Schilling et al., 2011) and develop anxiety and mood disorders more often, (R. Kessler and Adler, 2006). They are also in increased risk of showing suicidal behavior (Impey and Heun, 2012), and more often suffer from impairment in academic achievement and social performance (de Graaf et al., 2008). Core symptoms include difficulties in regulating attention, activity level, and impulses, along with impairments in working memory and executive functioning. Adults with ADHD often have difficulties planning and organizing life, perceiving time, performing multiple tasks simultaneously, staying organized and completing activities (Bálint et al., 2009; Barkley, 2002; Faraone et al., 2003). Because of the impairments associated with ADHD, effective treatment for adults is important.

The majority of adults diagnosed with ADHD are offered pharmacological treatments as the major treatment option and few patients are offered psychological treatment following completion of neuropsychiatric assessment and diagnosis (R. Kessler and Adler, 2006). However, pharmacological treatment is not sufficiently effective for 20–50% of adults, who do not experience satisfying symptom reduction, or find it difficult to take the medication because of side effects (Wilens et al., 2002). Cognitive behavioral therapy (CBT) has shown promising results in treating symptoms of ADHD. (Bramham et al., 2009; Emilsson et al., 2011; Mongia and Hechtman, 2012; Ramsay and Rostain, 2011; Safren et al., 2005; Weiss et al., 2012). A recent meta-analysis comparing psychosocial interventions and medication for adolescents with ADHD showed that behavior therapy produced the greatest effects on impairment and that medication

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produced the greatest effects on symptoms. Cognitive enhancement trainings were not effective treatments for ADHD in adolescence (Sibley et al., 2014).

One of the most commonly used treatment manuals has been developed by Stevenson et al. (2003). One of the main features in Safren's treatment is to improve the patients' organizational skills like planning, time management and to start and finish tasks.

To help the patients structure their life, the use of aids such as timers, a weekly schedule, agenda/calendar, reminders, shopping lists and schedules for cleaning, laundry etc. are common (Franck and Andréasson, 2003; Fernell, 2008; Hallberg, 2009). Tools like these are readily available on smartphones. According to Hallberg (2009) alarm functions, text messages, calendars, "to-do-lists", GPS, music, games, calculator, voice memos, and camera are all features that are useful for individuals with ADHD. Major advantages of the smartphone are that it is always accessible for most people and that the phone does not look like a treatment tool which can reduce the stigma of being dependent on an aid (Davies et al, 2002). Several of these tools are available in their analog form as parts of Safren's CBT treatment (2005), most notably calendar and to-do-lists. A review of which IT tools adults with ADHD desired found that tools that give support for organization, structure and scheduling and coordination of activities was the most desirable (Fernell, 2008). It was also important to use already established communication media such as a mobile phone or a laptop (Fernell, 2008). A project in which adult students with ADHD and Aspergers syndrome learned to use a smartphone-based calendar synchronized with a computer showed a reduction in stress for the participants (Steindal and Michelsen, 2011).

Internet-based CBT (ICBT) has received good scientific support for several disorders (Andrews et al., 2010; Cuijpers et al., 2010). ICBT has the advantage of requiring less therapist time and being more accessible (Andersson, 2009). ICBT interventions are structured as online-courses including a number of modules with text, homework assignment, and quizzes and utilizes the same methods as traditional face-to-face CBT. A CBT intervention for adults with ADHD consisting of a self-help book, three therapist-led sessions, and weekly telephone calls with coaches to guide the participants through the program have previously shown promising effects on ADHD-symptoms with 36% in the clinical group reporting a clinical relevant reduction in symptoms which was significantly more than a wait-list control (Stevenson et al., 2003). Recently, Pettersson et al. (2014) published a trial where an internet-based self-help CBT intervention for adults with ADHD was supported in two different ways; by automatic e-mail prompts combined with non-active therapist support (i.e. the patients had to initiate the contact with the therapist) and by weekly group sessions led by a therapist. The results were promising in that both types of support provided a significantly better outcome than a wait-list control, but the study was underpowered (largest group n = 18) and was not informative about differences about the two treatment groups. To date there has been no randomized controlled trial evaluating the effect of internet-delivered interventions utilizing the form of active therapist support that is generally more effective (Johansson and Andersson, 2012) or teaching adults with ADHD to use smartphones to specifically target their problems with inattention and deficits in organizational skills. Combining smartphone applications such as calendars and to-do-lists with technical instructions and teaching strategies on how to use them in one's everyday life are probably more efficacious than using the applications without the strategies or the strategies without the applications.

The purpose of this study is to evaluate if an internet-based course, Living Smart, can teach adults with ADHD and pronounced current difficulties with inattention to use smartphone applications in order to improve their everyday organizational skills and if this will decrease their problems with inattention compared to a wait-list. The effects on hyperactivity, general mental health, stress, and overall functioning will also be evaluated.

2. Method

2.1. Design

Participants were randomly assigned on a 1:1 ratio to either the internet-based course with support (Living Smart) or to a wait-list control group. The control condition later received the online course without support. The study was approved by the local research ethics review board in Stockholm (identifier number 2012334314) and was registered at ClinicalTrials.gov with the Identifier: NCT01663610. Participation in the study was voluntary and all participants provided informed consent to participate and were not given any economical compensation for participating.

2.2. Procedure and measurement overview

Individuals interested in the study first filled out a screening questionnaire via a secure internet platform where the participants first created their own log in. This was followed by a structured telephone interview with a preliminary diagnostic assessment, confirmation of diagnoses through medical records (when these were available), a decision on inclusion or exclusion, and finally randomization. Before and after the intervention all participants filled out questionnaires on the internet platform. Participants in the intervention group also filled out the primary measure once a week during the intervention. Furthermore, blind evaluators made a structured interview and assessment at post-treatment.

2.3. Participants and recruitment

Recruitment was conducted through postings on a patient association website, status updates at Facebook sharing information on where to sign up, and via the website of the ICBT unit (www.internetpsykiatri.se) within the Stockholm County Council, a routine care setting for internet-based treatment and the base for the current trial.

The study's target group was adults over the age of 18 in Sweden with a diagnosis of ADHD and judged to currently have pronounced problems with organization and inattention. Since citizens from all Sweden were included and the timeframe and resources for the trial were limited, a complete neuropsychiatric assessment was beyond the scope of this trial. It was thus decided to relay on previous diagnostic assessments made in regular care and in cases where this could not be used to confirm diagnosis, a structured assessment to identify participants with 'probable diagnosis' was performed (see section 'Diagnostic assessment'). Participants with a probable diagnose and current pronounced deficits in organizational skills and attention were included in the study.

2.3.1. Inclusion criteria

a) confirmed or probable diagnosis of ADHD,
b) current problems with organizing daily activity and inattention defined as 17 or more points on the ADHD Self-Report Scale (ASRS; R. C. Kessler et al., 2005) subscale for Inattention (items 1–4 and 7–11),
c) has access to a smartphone (android or Iphone) with internet access,
d) at least 18 years,
e) speaks, writes and read Swedish, and
f) cannot foresee any practical barriers to participation such as travels or medical operations.

2.3.2. Exclusion criteria

g) has a high alcohol or drug use assessed by the AUDIT/DUDIT and assessment interview,
h) somatic or psychiatric problems that are directly contraindicated or seriously hamper the implementation of the treatment (eg, psychotic disorders),