



Review article

Can smartphone mental health interventions reduce symptoms of anxiety? A meta-analysis of randomized controlled trials



Joseph Firth^{a,*}, John Torous^{b,c,1}, Jennifer Nicholas^{d,e}, Rebekah Carney^a, Simon Rosenbaum^{d,e}, Jerome Sarris^{f,g,h}

^a Division of Psychology and Mental Health, Faculty of Biology, Medicine and Health, University of Manchester, UK

^b Department of Psychiatry, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, United States

^c Harvard Medical School, Boston, MA, United States

^d Black Dog Institute, UNSW Australia, Australia

^e School of Psychiatry, Faculty of Medicine, UNSW Australia, Australia

^f Department of Psychiatry, University of Melbourne, The Melbourne Clinic, Melbourne, Australia

^g Centre for Human Psychopharmacology, Swinburne University of Technology, Hawthorn, Australia

^h NICM, School of Science and Health, University of Western Sydney, Australia

ARTICLE INFO

Keywords:

e-health

mhealth

Apps

Panic disorder

Anxiety disorders

Obsessive-compulsive disorder

ABSTRACT

Background: Various psychological interventions are effective for reducing symptoms of anxiety when used alone, or as an adjunct to anti-anxiety medications. Recent studies have further indicated that smartphone-supported psychological interventions may also reduce anxiety, although the role of mobile devices in the treatment and management of anxiety disorders has yet to be established.

Methods: We conducted a systematic review and meta-analysis of all randomized clinical trials (RCTs) reporting the effects of psychological interventions delivered via smartphone on symptoms of anxiety (sub-clinical or diagnosed anxiety disorders). A systematic search of major electronic databases conducted in November 2016 identified 9 eligible RCTs, with 1837 participants. Random-effects meta-analyses were used to calculate the standardized mean difference (as Hedges' g) between smartphone interventions and control conditions.

Results: Significantly greater reductions in total anxiety scores were observed from smartphone interventions than control conditions ($g = 0.325$, 95% C.I. = 0.17–0.48, $p < 0.01$), with no evidence of publication bias. Effect sizes from smartphone interventions were significantly greater when compared to waitlist/inactive controls ($g = 0.45$, 95% C.I. = 0.30–0.61, $p < 0.01$) than active control conditions ($g = 0.19$, 95% C.I. = 0.07–0.31, $p = 0.003$).

Limitations: The extent to which smartphone interventions can match (or exceed) the efficacy of recognised treatments for anxiety has yet to be established.

Conclusions: This meta-analysis shows that psychological interventions delivered via smartphone devices can reduce anxiety. Future research should aim to develop pragmatic methods for implementing smartphone-based support for people with anxiety, while also comparing the efficacy of these interventions to standard face-to-face psychological care.

1. Introduction

Anxiety disorders are among the most prevalent mental health conditions worldwide, affecting up to 29.8% of the population over the course of a year (Baxter et al., 2013). These disorders impair quality of life and impact negatively upon people's ability to function in society and to maintain employment (Mendlowicz and Stein, 2000; Waghorn et al., 2005), all of which contributes to the severe economic and

societal burden of anxiety disorders (Baxter et al., 2014). Furthermore, many individuals experience sub-clinical anxiety conditions and symptoms which again impair quality of life and functioning (Haller et al., 2014). Symptoms include frequent nervousness, pervasive worry and pessimistic thoughts, and can develop into full-threshold anxiety disorders if left untreated (Haller et al., 2014).

A core element of treatment for many anxiety disorders is pharmacological including selective serotonin reuptake inhibitors (SSRIs),

* Correspondence to: Division of Psychology and Mental Health, University of Manchester, Room 3.306, Jean McFarlane Building, Oxford Road, Manchester M13 9PL, UK.

E-mail address: joseph.firth@postgrad.manchester.ac.uk (J. Firth).

¹ joint first authors.

serotonin-norepinephrine reuptake inhibitor (SNRIs), or benzodiazepines (Baldwin et al., 2005). However, various psychological interventions have also proven effective for reducing symptoms of anxiety, when used either in addition to or instead of pharmacological treatment. Examples include cognitive behaviour therapy (Deacon and Abramowitz, 2004), relaxation training (Norton, 2012), and mindfulness (Vøllestad et al., 2012). Unfortunately, such interventions may be inaccessible for many people, due to difficulties obtaining and attending appointments from remote locations, costliness, or unavailability through health services (Gunter and Whittal, 2010).

Recently, ubiquitous internet access and the spread of computerized technologies have presented new methods for providing such interventions. Evidence has indicated that computerized versions of various cognitive and/or behavioural therapies can provide efficacious, remote treatment for anxiety disorders, and reduce symptoms with similar efficacy to face-to-face treatments (Andrews et al., 2010; Cuijpers et al., 2009). Interest in using computerized interventions to improve mental health has recently increased with the dawn and rapid uptake of smartphone technologies (Firth et al., 2016). The wide-scale uptake and pervasive usage of these devices has the potential to revolutionize current methods for gathering and using data in mental healthcare (Torous and Baker, 2016). Furthermore, an array of mental health ‘apps’ are already available for tracking anxiety and delivering digital interventions which can even be tailored to individual needs (Coulon et al., 2016; Shen et al., 2015).

However, despite the rapid growth and great potential of this research area, there has been no systematic evaluation of the empirical evidence for using smartphones in the treatment of anxiety. Thus, this meta-analysis was conducted to examine the efficacy of smartphone-supported psychological interventions for reducing symptoms of anxiety. We also aimed to use sub-group analyses along with a systematic review of studies to explore which types of smartphone interventions were most efficacious, and in what context. The findings of this study will therefore indicate the overall utility of smartphone interventions in the management of anxiety, and inform the design of future interventions as smartphone technology continues to advance.

2. Methods

This systematic review and meta-analysis followed the PRISMA statement for transparent and comprehensive reporting of methodology and results (Moher et al., 2009).

2.1. Search strategy

We searched the following electronic databases for this review: Cochrane Central Register of Controlled Trials, Health Technology Assessment Database, Allied and Complementary Medicine (AMED), Health Management Information Consortium (HMIC), Ovid MEDLINE, Embase, and PsycINFO from inception to November 2016. The search was structured according to the PICO framework (Schardt et al., 2007) using a variety of search terms relevant to anxiety disorders/symptoms along with terms for smartphone interventions to capture all potentially eligible results. The search terms used are displayed Supplement 1. Reference lists of retrieved articles were also searched and a search of Google Scholar was conducted using similar key words to identify any additional relevant articles.

2.2. Eligibility criteria

Only English-language research articles were included in the review. We aimed to include all randomized controlled trials (RCTs) reporting changes in anxiety following mental health interventions delivered via smartphone devices. Since we aimed to examine the effects of smartphone interventions on all forms of anxiety (sub-clinical or diagnosed anxiety disorders), eligibility was not restricted by

diagnostic status, medication usage, or any other sample characteristics (such as age or gender). Studies recruiting participants from the general population or clinical settings were eligible for inclusion.

Intervention eligibility was judged by three independent investigators (JF, JN, and JT), and any discrepancies were resolved through discussion until mutual agreement was reached. For the purposes of this review, smartphones were classified as any mobile phone device with at least 3G internet connectivity and the capacity to run downloaded applications (‘apps’). We included all studies which aimed to improve mental health and/or psychological well-being using smartphones as a primary mode of delivery for the intervention, and compared this to a control condition, using random allocation of participants. However, only interventions which had a duration of at least 1 week were included in the analysis, meaning single-session studies which only measured changes in state anxiety before-and-after a single usage of a smartphone app were excluded. Multi-component interventions which incorporated smartphones as a key aspect of a broader computerized or face-to-face interventions were eligible, provided that the smartphones were used to deliver some form of psychological treatment/support (rather than only assessing adherence or outcomes of the broader intervention).

Studies with either waitlist control conditions or active comparators were eligible for inclusion, provided that the comparison condition did not deliver a mental health intervention using a smartphone device. Studies which compared smartphone interventions to anti-anxiety medications, i.e. by randomizing participants to either smartphone or medication conditions, were also eligible. Where reported study data was insufficient to determine eligibility, the corresponding authors were contacted twice over a period of 8 weeks to request the necessary information.

2.3. Data extraction

A systematic data extraction tool was used to extract the following from each study:

- (i) *Study details*: Including; sample size (n), mean age of participants (years), sample characteristics (general or clinical population, inclusion criteria, diagnoses), and trial design (cross-over vs. parallel designs, trial quality).
- (ii) *Smartphone intervention*: Length (weeks), frequency (instructions given for usage), details (summary of intervention and psychological theories/techniques used), additional components (e.g. face-to-face or computerized aspects), details of control conditions (waitlist/inactive, attention-matched or non-inferiority active comparator).
- (iii) *Effects on overall anxiety*: This was defined as the total score on the primary outcome of any clinically-validated rating scale used for assessing symptoms of anxiety. Where studies applied more than one relevant measure of anxiety without specifying a primary outcome, data from changes in each measure was extracted to calculate a mean total change. Studies which measured anxiety only as a secondary outcome were also included in the main analysis, although our systematic review of studies examined the differential effects of smartphone interventions specifically targeting anxiety vs. those which targeted other aspects of mental health.
- (iv) *Effects on specific anxiety symptoms*: Changes in individual aspects of anxiety (e.g. nervousness, panic, hyperventilation), assessed using specific measures was also extracted for narrative synthesis.

2.4. Statistical analyses

The meta-analyses were conducted in Comprehensive Meta-Analysis 2.0 (Borenstein et al., 2005) using a DerSimonian-Laird random-effects model (van der Kemp et al., 2012) to account for heterogeneity between studies. The mean change scores in total anxiety for smartphone

Download English Version:

<https://daneshyari.com/en/article/5721925>

Download Persian Version:

<https://daneshyari.com/article/5721925>

[Daneshyari.com](https://daneshyari.com)