



## Review article

# Internet- and mobile-based depression interventions for people with diagnosed depression: A systematic review and meta-analysis



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## ABSTRACT

**Background:** To summarize and critically evaluate the effectiveness of internet- and mobile-based interventions (IMIs) for depression in adults with a diagnosed depression.

**Methods:** Preregistered systematic review of RCTs investigating internet- and mobile-based interventions (IMIs) targeting adults with diagnosed depression. IMIs had to be compared with waitlist, attention placebo, other IMIs or other (face-to-face) therapies. A comprehensive search of primary studies was conducted. Study selection and data extraction was done by two independent researchers. Primary outcome was symptom severity of depression. Furthermore, treatment response, depression remission, treatment adherence, anxiety and quality of life were investigated. Random-effects meta-analyses were conducted where possible, as well as pre-planned subgroup and sensitivity analyses.

**Results:** Database search resulted in 4858 references, of which 19 studies were eligible for inclusion and provided data on 29 IMIs. IMIs showed beneficial effects on depression severity when compared to waitlist conditions at the end of treatment (pooled standardized mean difference (SMD)  $g = -0.90$ , 95% CI  $-1.07$  to  $-0.73$ ,  $n = 10$ ). The comparison between different IMIs did not result in any superiority or inferiority. All IMIs reduced depression symptoms from pre- to post-treatment (within group SMD range  $-2.24$ ;  $-0.64$ ,  $n = 29$ ) and from pre-treatment to follow-up assessments (SMD range  $-3.07$ ;  $-0.93$ ,  $n = 27$ ).

**Conclusion:** IMIs significantly reduce depression symptoms in adults with diagnosed depression at the end of treatment and at follow-up assessments when compared to waitlist conditions. These findings argue for IMIs to be recommended in depression treatment guidelines.

## 1. Introduction

Depressive disorders, are highly prevalent with 12-month prevalence rates ranging between 5.8% and 10.7% (Baumeister and Härter, 2007). Depression is associated with substantial impairment (Saarni et al., 2007; Üstün et al., 2004), high economic costs (Berto et al., 2000; Greenberg and Birnbaum, 2005) and has been identified as major reason for illness-related disability worldwide (Vos et al., 2013).

Treatment for depression, particularly psychotherapy and psychopharmacotherapy, has been shown to be effective for people with depression (Cuijpers et al., 2012, 2010b; Khan et al., 2012). However, the majority of affected individuals remain untreated either because they do not seek help or do not have the ability to receive adequate treatment. There are many possible reasons, e.g. fear of stigmatization, low perceived need, desire to handle the problem on one's own, want of confidence in health care system (Andrade et al., 2014; Roness et al., 2005; Saxena et al., 2007).

Providing Internet- and mobile based interventions (IMI) may be a promising strategy overcoming some of the aforementioned obstacles and thereby improving mental health care. Some previous meta-analyses investigated the effectiveness of internet- or computer-based interventions for depression (Andersson and Cuijpers, 2009; Andrews et al., 2010; Cowpertwait and Clarke, 2013; Richards and Richardson, 2012; Spek et al., 2007). Pooled standardized mean differences of Cohen's  $d = 0.32$  (Spek et al., 2007) to Hedges'  $g = 0.78$  (Andrews et al., 2010) for the interventions compared to waitlist, treatment as usual and placebos and mainly waitlist have been reported. Thereby, larger effect sizes have been consistently reported for guided interventions compared to unguided interventions (Baumeister et al., 2014b; Cowpertwait and Clarke, 2013; Richards and Richardson, 2012).

However, notwithstanding the extensive evidence base on the effectiveness of depression IMI with several systematic reviews published during the last years, former reviews lack some important information which the present systematic review aims to overcome: First and most

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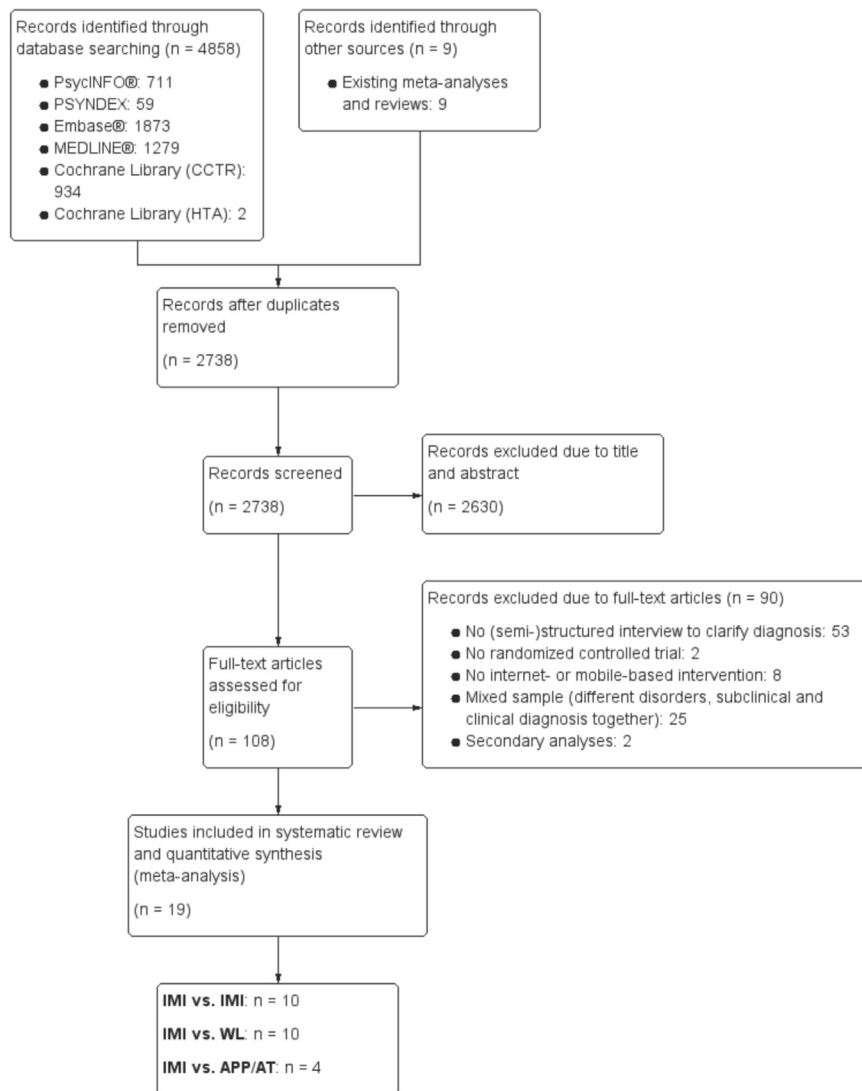


Fig. 1. Flow chart presenting search and selection process.

importantly, all except for one of the earlier reviews (Andrews et al., 2010) focused on people with depressive symptoms rather than those with a diagnosed depression. The latter is what most health care systems require to be present for depression care being provided. Accordingly, treatment guidelines such as the UK National Institute for Health and Clinical Excellence (NICE) (2009) or the German S3 guideline for depression (DGPPN et al., 2015) prefer evidence from randomized clinical trials that focused on clinical depression samples. Second, previous reviews only focused on the short-term effectiveness or were inconclusive regarding long-term effects. Third, since the last comprehensive review many new trials have been published so an updated synthesis of the evidence seems warranted. Fourth, no review up to date has investigated the effects of IMIs on specific clinical relevant outcomes in depression treatment beside depression severity, such as treatment response and depression remission.

The present systematic review aims to overcome these limitation and will investigate the short- and long-term effectiveness of IMIs in adults compared to non active (no treatment, waitlist, attention placebo) or active control on depression severity, treatment response, remission, anxiety and quality of life in adults with secured clinically diagnosis of Major Depressive Disorder. In summary the following review questions are addressed:

1. Are IMI for depression effective in adults with a diagnosed depression?
  - a) Are IMIs more effective than no-treatment, (attention/psychological) placebo or waitlist conditions?

- b) Are IMIs as effective as non-internet- and non-mobile-based interventions?
- c) Are some IMIs more or less effective than other IMIs?
2. Are there confounding variables that impact the effectiveness of IMIs for depression in adults with a diagnosed depression?

## 2. Methods

### 2.1. Protocol and registration

Review methods, eligibility criteria and strategy for data analysis were determined in advance and reported in a study protocol available at (<https://osf.io/7aw2m>). The systematic review and meta-analysis was registered at PROSPERO (registration number: CRD42016039679).

### 2.2. Eligibility criteria

The present review included randomized controlled clinical trials published before June 2016 examining adult samples with a reliably diagnosed depressive disorder (i.e. major depression and/or persistent depressive disorder/dysthymia). IMIs were defined as any psychotherapeutic program targeting depressive disorders, provided in an online or mobile setting, defined as online-, internet-, web-, or mobile-based. Only interventions for individuals were included. The interventions may vary concerning the amount of external guidance provided to

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