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# Cost-effectiveness of internet-based cognitive behavior therapy for obsessive-compulsive disorder: results from a randomized controlled trial

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ABSTRACT

Obsessive-compulsive disorder (OCD) is a common and disabling disorder. Although evidence-based psychological treatments exists, such as cognitive behavior therapy (CBT), the cost-effectiveness of CBT has not been properly investigated. In this trial, we used health economic data from a recently conducted randomized controlled trial, where 101 OCD patients were allocated to either internet-based CBT (ICBT) or control condition (online support therapy). We analyzed treatment effectiveness in relation to costs, using both a societal- (including all direct and indirect costs) and a health care unit perspective (including only the direct treatment costs). Bootstrapped net benefit regression analyses were also conducted, comparing the difference in costs and effects between ICBT and control condition, with different willingness-to-pay scenarios. Results showed that ICBT produced one additional remission for an average societal cost of $931 and this figure was even lower ($672) when narrowing the perspective to treatment costs only. The cost-utility analysis also showed that ICBT generated one additional QALY to an average price of $7186 from a societal perspective and $4800 when just analyzing the treatment costs. We conclude that ICBT is a cost-effective treatment and the next step in this line of research is to compare the cost-effectiveness of ICBT with face-to-face CBT.



## 1. Introduction

Although cognitive behavior therapy (CBT) for obsessive-compulsive disorder (OCD) has shown efficacy in numerous randomized trials, with overall large effect sizes (Gava et al. 2007), treatment availability is still low and only a fraction (5–8%) of the patients actually receives this treatment (Blanco et al. 2006; Torres et al. 2007). An Internet-survey by Marques et al. (2010) also showed that, of those OCD patients who had received psychological treatments, the majority (67%) had actually received non-evidenced based treatments. Both financial- and logistic factors were found to be significant barriers to treatment seeking and many patients reported stigma-related reasons for not seeking help, such as shame and fear of discrimination. Another reason for the low accessibility of CBT could be the current lack properly trained therapists within the health care system (Larsson, Kaldo, & Broberg, 2010; Mataix-Cols & Marks, 2006; Shapiro, Cavanagh, & Lomas, 2003). Thus, although CBT is effective in reducing OCD symptoms, it is not accessible for the majority of those in need, a problem referred to as the treatment-demand gap (Kohn, Saxena, Levav, & Saraceno, 2004).

One possible solution to overcome the problem of treatment accessibility could be to use internet-based CBT (ICBT; Andersson, 2009). ICBT mimics traditional CBT in every respect, the only difference being the way the treatment is delivered. In ICBT, the patient, instead of going to a clinic, logs on to a secure website and works with written self-help materials and homework assignments, which are closely monitored by a clinician. As in regular CBT for OCD, the main treatment component is exposure with response

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prevention (ERP), which the patients are instructed to practice repeatedly until fear, rituals and avoidance subside (Abramowitz, Taylor, & McKay, 2009). ICBT has been shown to be effective for several other psychiatric and somatic conditions (Hedman, Ljotsson, & Lindefors, 2012) and the treatment effects are in general much better when supported by a therapist (Cuijpers et al. 2011; Cuijpers, Donker, van Straten, Li, & Andersson, 2010). ICBT carries important advantages compared to conventional face-to-face CBT, primarily that that it can overcome geographical and practical barriers for the patient and also that the therapist can treat four to five times more patients (Andersson, 2009). There are today a handful of studies showing that ICBT is an effective treatment for OCD. Two of these are uncontrolled studies (Andersson et al. 2011; Wootton et al. 2011) and two are randomized controlled trials (Andersson et al. 2012; Wootton et al. 2013), showing effect sizes similar to those obtained in face-to-face CBT and also sustained long-term effects (Andersson et al. 2014). Thus, ICBT seems to be an acceptable and effective treatment that may increase accessibility for OCD patients to receive effective care.

Cost-effectiveness analysis is a form of health economic evaluation where the treatment effects are analyzed in relation to the associated costs. There are two ways of doing cost-effectiveness analysis. One way is to use symptom specific measures and relate this to the cost change, that is, how much must the society to be willing to pay for one additional remission. Another way to estimate the cost-effectiveness of a treatment is to use a generic outcome, such as quality of life (also known as cost-utility analysis). Research about cost-effectiveness is important because it aids policy-makers in deciding what treatments that give the optimal output, in relation to both costs and efficacy. Assuming that health care resources are limited, cost-effectiveness studies thus enables that more patients can achieve clinical improvement and increased quality of life (Drummond, Sculpher, Torrence, O'Brien, & Stoddart, 2005). There is no consensus regarding the definition of a cost-effective treatment, but in the western world, a treatment that can generate an additional quality adjusted life year (QALY) at a cost below 50 000 USD is generally considered cost-effective (Grosse, 2008).

ICBT has been shown to be a highly cost-effective treatment for a range of clinical disorders (Hedman et al. 2013; Hedman et al. 2011) but research regarding cost-effectiveness of ICBT for OCD is lacking and health economic evaluation of face-to-face CBT for OCD is scarce. An early study by Ginsberg and Marks (1977) evaluated the societal cost impact of a 16 h CBT program and found a 35–61% decrease in medical consumption after receiving treatment. Furthermore, the intervention was associated with reduced time off work for both patients as well as relatives. A more recent study by McCrone et al. (2007) compared computer-aided CBT (CCBT) with face-to-face CBT. Results showed that although CCBT showed less efficacy compared to face-to-face CBT, the cost-effectiveness benefited CCBT due to lower treatment costs. However, a major limitation in this study was that societal costs were excluded from the analysis, for example, other medical costs sick leave and work cut-back. In recent trial by Tolin, Diefenbach, and Gilliam (2011), the authors evaluated a stepped care program (first low intensive treatment, then regular face-to-face CBT) vs. regular treatment (i.e. 17 sessions face-to-face CBT). Results showed that both groups had significant responder rates (67% in the stepped care vs. 50% in the regular ERP group) but the stepped care group was associated with both lower direct treatment- as well as indirect societal costs (Diefenbach & Tolin, 2013; Tolin et al., 2011). There is, to our knowledge, no published data on the cost-effectiveness of ICBT for OCD. The aim of this study was therefore to investigate this issue from a societal as well as from a care provider perspective. We hypothesized that ICBT would be cost-effective compared to a basic attention control intervention.

## 2. Methods

### 2.1. Trial design

We used health economic data which were obtained in a randomized controlled trial, where 101 OCD subjects were allocated to either ICBT, or to a control condition consisting of an online support therapy contact ($n=101$) (Andersson et al., 2012). Assessment points were pre- and post-treatment and at 4-month follow-up. As the control condition was immediately crossed over to ICBT, we had no experimental control at the 4-month follow-up. The study design with assessment points is visualized in Fig. 1. The trial was approved by the regional ethics review board in Stockholm, Sweden (clinicaltrials.gov, registration ID: NCT01347099).

### 2.2. Participants

Adults with a principal diagnosis of OCD, according to the DSM-V-TR (American Psychiatric Association., 2000), were eligible for participation in the study. Concurrent use of psychotropic medication was allowed, if it had been stable for at least two months prior to inclusion. Exclusion criteria were (a) extreme or minimal OCD severity (i.e. more than 31 or less than 12 on the Yale-Brown Obsessive-Compulsive Scale; Y-BOCS; Goodman et al. 1989), (b) symptoms primarily associated with hoarding and (c) severe comorbidity (i.e. bipolar disorder, psychosis, alcohol- and drug abuse or acute suicidal ideation). Demographics are shown in Table 1.

### 2.3. Treatments

The experimental group was given a 10-week ICBT treatment comprising about 100 pages of written self-help material, including well-established interventions such as psycho-education, cognitive restructuring and exposure with response prevention. The treatment program was adapted to fit each patient's subtype of OCD (i.e. washing, checking, symmetry, violent thoughts). Patients reported their work with homework assignments weekly and got written feedback from a therapist. The therapists were master level psychology students in their final year of training. SMS reminders and phone calls were used if the participant had not logged in for a week or more. Patients in the control group received internet-based support therapy. Supportive therapy has been shown to be effective for various mental disorders (Hunot, Churchill, Silva de Lima, & Teixeira, 2007; Litz, Engel, Bryant, & Papa, 2007; Ward et al. 2000) and the main idea with this treatment was to have a basic control over attention effects and possible alleviating effects in having

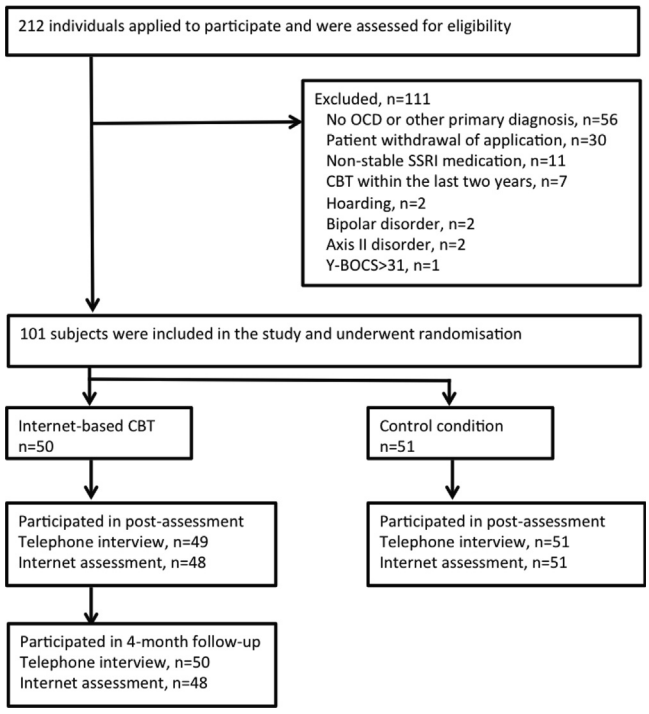


**Fig. 1.** Study flowchart.