



Innovating CBT and Answering New Questions: the Role of Internet-Delivered CBT

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Abstract

Internet-delivered cognitive behavior therapy (ICBT) was developed in the late 1990s, and since then, a large number of studies have been conducted. Many programs have been developed and sometimes implemented, and ICBT has become a major way to investigate and innovate CBT including important questions regarding mechanisms and moderating factors. The aim of this narrative review was to comment on the treatment format, the evidence behind ICBT, innovations, and finally challenges. ICBT has been developed and tested for a range of conditions including both psychiatric and somatic health problems and also transdiagnostic problems like loneliness and poor self-esteem. Meta-analytic reviews suggest that guided ICBT can be as effective as face-to-face CBT and by using individual patient data meta-analytic methods (IPDMA), it is now possible have better power for the search of moderators. There are also several reports of how well ICBT works in regular clinical settings, mostly replicating the results reported in efficacy studies. Cost-effectiveness has also been documented as well as studies using qualitative methodology to document client and clinician experiences. In terms of innovation, there are now studies on problems for which there is limited previous face-to-face research, and one major advancement is the use of factorial design trials in which more than one independent variable is tested. Finally, ICBT has the potential to be useful in times of crisis, with the COVID-19 pandemic being one recent example. Future challenges include use of artificial intelligence in both treatment development and possibly treatment delivery. Another urgent priority is to reach less favored parts of the world as most studies and programs have been tested and implemented in Western countries. In conclusion, ICBT is now an established as a way to develop, test, and deliver CBT.

Keywords Internet-delivered Treatment · Meta-analysis · Face-to-face · Innovations · Pilot RCT

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Introduction

In the history of psychotherapy, there have been several advances, and the development of cognitive behavior therapy (CBT), including its many versions, has arguably been one of the major achievements in both clinical science and implementation (Tallis, 1998). In spite of this, numerous clients will never have the chance to receive CBT (Shafraan et al., 2009). The development of self-help versions of CBT including numerous self-help books opened up one possibility, with many studies supporting guided self-help (P. L. Watkins, 2008), but it was first with the advent of the Internet that the development and testing of evidence-based self-help versions of CBT took off (Andersson, 2018). This development has meant that more people in need of CBT can be reached even if there will always be a time and place for face-to-face services and clients and clinicians who prefer regular delivery of CBT either individually or in groups. But for many clients and clinicians, modern information technology can serve as a complement and even replacement in order to increase access to CBT. In this paper, I will briefly describe Internet-delivered CBT (ICBT), the empirical status of the treatment format, innovations that are being made including answers to new questions, and finally priorities for research and clinical service delivery.

What Is Internet-Delivered CBT?

The use of information technology in CBT is complicated by inconsistent terminology and also different technological solutions (Smoktunowicz et al., 2020). As the Internet can be used for many purposes including information seeking and communication, it can be hard to define what we mean with the term ICBT. With an increasing use during the COVID-19 pandemic years, CBT can be delivered in the video conference format, with online delivery via programs like Zoom (or other solutions of which there are many). This is not guided self-help but rather another way to deliver face-to-face CBT. Interestingly, in spite of the fairly long history of video therapy, the evidence base is much less than for Internet-delivered guided self-help programs (Varker et al., 2019). Added to that, there is a long history of telephone delivery of CBT (Leach & Christensen, 2006) and, as mentioned earlier, guided self-help using books. Moreover, there is much research on virtual reality and to some extent serious games. The most spread format of CBT techniques is smartphone applications of which there are 1000 s, but with the caveat the most apps have no evidence behind and some for which there is empirical support are not available. Added to the use of smartphones, we have sensors and ecological momentary assessment tools. The treatment format I will review here can include smartphone delivery but is usually best described as guided self-help with book length of treatment material (often described as modules or lessons), with added online features like videos and quiz, and finally often supported by a clinician using a secure communication solution (Vlaescu et al., 2016). It should be mentioned that several treatment protocols in which

different technologies and support formats are blended exist, for example, virtual reality and Internet-delivered self-help CBT (Ma et al., 2021) and blended treatments in which ICBT is blended with face-to-face sessions (Erbe et al., 2017). In this paper, I will mainly focus on guided ICBT in the self-help format (Andersson & Berger, 2021), which overall is more close to what previously was called bibliotherapy and mainly consists of text material with added features.

A few more words should be mentioned on the treatment format. Not only has it been around now for at least 25 years, but has also spread to different cultures and languages than just Western (Spanhel et al., 2021), adapted and developed for different populations (see below), and finally been implemented on a large scale in some places in the world (Titov et al., 2018).

What About the Evidence?

With a rapidly increasing evidence base, the empirical support for ICBT is hard to summarize, but in Table 1, a list of examples of conditions for which there are ICBT programs and RCTs is presented. For many of these conditions, there are also systematic reviews and meta-analysis, for example on health conditions (Mehta et al., 2019) and more specific conditions like chronic pain (Buhrman et al., 2016). In addition, studies have included other outcomes than just symptoms such as quality of life (Maj et al., 2023) and knowledge acquisition (Berg et al., 2019). There are also systematic reviews on different forms of Internet interventions, for example with psychodynamic orientation (Lindegaard et al., 2020) and acceptance and commitment therapy (Han & Kim, 2022). Here, I focus on ICBT and different ways to evaluate the evidence.

I start with the important question if guided ICBT works as well as face-to-face CBT. There are several meta-analyses investing this question, but a recent update was by Hedman-Lagerlöf et al. (2023). This was the third update of previous meta-analyses, and by including more recent controlled trials directly comparing the two formats, a total of 31 trials were analyzed, with 16 different conditions being included. The pooled effect size $g=0.02$, which is a zero difference further supporting the finding that therapist-guided ICBT, yields similar effects as face-to-face CBT.

A second way to analyze effects is to collect many data sets and conduct individual patient data meta-analyses (IPDMA). There are both pros and cons with this approach (Stewart & Tierney, 2002). One advantage is the increased power when testing predictors of outcome and moderators. One disadvantage occurs when data are missing in the sense that researchers do not provide data sets, for example because of regulations and other constraints. One example of an IPDMA based on Swedish studies focused on response and remission rates following ICBT for different conditions like anxiety, depression, and somatic conditions (Andersson et al., 2019a). Based on a total of 29 studies and 2866 patients, the criteria of reliable change index (RCI $z=1.96$) showed that 65.6% of the patients receiving treatment were classified as achieving recovery. Adding the requirement of substantial improvement showed that 35.0% were classified

Table 1 Examples of conditions for which guided Internet-delivered CBT has been tested in research (randomized controlled trials)

Psychiatric conditions	Somatic conditions/health problems	Other
Depression (including postpartum depression)	Headache	Couples therapy
Bipolar disorder	Tinnitus	Parent training
Panic disorder	Diabetes	Stress problems
Social phobia	Insomnia	Perfectionism
Specific phobia	Childhood encopresis	Burn-out
Mixed anxiety/depression	Chronic pain, including rheumatoid arthritis and fibromyalgia	Procrastination
Health anxiety	Cancer (mainly breast cancer)	Bereavement
Obsessive–compulsive disorder	Irritable bowel syndrome	Infertility distress
Generalized anxiety disorder	Erectile dysfunction and other sexual disorders	Body dissatisfaction
Post-traumatic stress disorder	Hearing loss	Grief
Pathological gambling	Chronic fatigue	Loneliness
Bulimia and eating disorders	Multiple sclerosis	Low self-esteem
Body dysmorphic disorder	Obesity	COVID-19 distress
Drug addictions including smoking	Dizziness	Self-criticism
Attention deficit hyperactivity disorder	Spinal cord injury	Informal caregivers distress
Psychosis	Neurological disorder (e.g., epilepsy)	
	Atopic dermatitis	

as reaching remission. In a related IPDMA focusing on deterioration, it was reported that 5.8% in the treatment and 17.4% in the control conditions reported deterioration, also using RCI as criteria (Rozental et al., 2017). Finally, a separate IPDMA was conducted focusing on non-response (Rozental et al., 2019). Of the treated participants ($n=2118$), 26.8% were classified as non-responders defined as having less than a reliable improvement (RCI of $z < 1.96$). Summarizing across the three IPDMAs, it can be inferred that of those receiving ICBT across different conditions, 35.0% reach remission, and additional 31% recovery (total 66%), 27% show non-response, leaving a small number 6% showing deterioration. These findings could indicate outcomes of studies not conducted in Sweden and what is found following face-to-face CBT, but it cannot be taken for granted. There are several many other IPDMAs on ICBT (Karyotaki et al., 2021), and this is a field that is expanding given the relatively good data quality of ICBT trials.

A third way to obtain an overview of the effects of ICBT is to conduct umbrella reviews on existing systematic reviews/meta-analyses (Fusar-Poli & Radua, 2018). One example was an umbrella review on 9 meta-analytic reviews out of a total of 618 meta-analytic reviews identified (Andersson et al., 2019b). The analysis included 166 studies used in the meta-analyses and moderate to large between-group effect sizes for meta-analyses on panic disorder, social anxiety disorder, generalized anxiety disorder, post-traumatic stress disorder, and major depression was reported.

A fourth important question is whether ICBT works in regular clinical settings. One fairly recent review summarized the effects in 19 nonrandomized pre-post design studies conducted in routine care (Etzelmueller et al., 2020). They reported outcomes with a pooled within-group effect Hedges' $g=1.78$ for depression and $g=0.94$ for anxiety studies. There are other effectiveness studies (Lee et al., 2023), but it may still be too early to conclude that ICBT works as well in routine care as in research settings (Moshe et al., 2021) even if the largest data set reported from the MindSpot Clinic in Australia shows large effects (Titov et al., 2020).

A fifth way to obtain in-depth knowledge about ICBT is to conduct qualitative studies. A comprehensive view of such studies can be obtained by conducting a qualitative systematic review and meta-synthesis, which was done on a total of 24 qualitative studies (Patel et al., 2020). The authors reported three key themes including descriptive subthemes. The three themes were (a) initial motivations and approaches to Internet interventions, (b) personalization of treatment, and finally (c) the value of receiving personal support in Internet interventions. In particular, the latter theme is important in therapist-guided ICBT. There are also qualitative studies on how therapists experience delivering ICBT (Børtveit et al., 2023).

Finally, a sixth question that has been investigated is if ICBT is cost-effective. A recent review of 36 studies reporting economic evaluations showed that guided ICBT was likely to be cost-effective in the treatment of depression and anxiety (Kählke et al., 2022).

In sum, several aspects of ICBT have been focused in research and the overall quality of the research fares well when contrasted against standard face-to-face research (Schuster et al., 2021).

Innovations

Many CBT researchers consider randomized controlled trials as the final or late phase of treatment research following careful development and initial testing (Clark, 2004). Research on ICBT has changed the scene, and it is now possible to develop and test new interventions for new target groups more rapidly given the lower costs of conducting ICBT trials compared to regular trials. Theory and initial groundwork are still very important, but one example of this is the observation that ICBT researchers publish “pilot-RCTs” instead of smaller open studies that were more common earlier in the history of CBT. The speed of treatment development is also more rapid, and I will here provide a few examples of treatment programs for clinically relevant psychological problems for which there is limited previous research on face-to-face CBT. I will briefly describe four examples of such programs.

The first target problem is procrastination which was originally a module in tailored ICBT but later expanded into a full treatment program and tested in controlled trials (Rozental et al., 2015). In one of the first studies, a 10-week treatment was tested. The study included 150 participants randomized to guided ICBT, unguided ICBT, or to a waitlist condition. While results showed no statistical significant difference between the two active conditions, but the treatment was superior against waitlist with moderate to large between-group effects on measures of procrastination (Cohen’s d ’s ranging between 0.50 and 0.81).

The second target problem is loneliness, a condition known to be associated with poor mental health and recognized as a major health problem (Cacioppo & Patrick, 2008). In a pilot RCT on an 8-week ICBT program, 73 participants were included (Käll et al., 2020). Results were promising when compared against waitlist, with a between-group effect of Cohen’s $d=0.77$ on the primary loneliness measure. A subsequent study confirmed the findings and also showed the ICBT was slightly superior to an interpersonal psychotherapy Internet intervention (Käll et al., 2021).

A third example of a problem-focused ICBT program was created and tested for persons who suffer from severe self-criticism (Krieger et al., 2019). The researchers created an 8-week compassion-focused intervention including mindfulness and recruited 122 participants who were randomized to intervention or care as usual. Results were promising with a between-group effect size of $d=0.79$ on the main outcome measuring anxiety and depression symptoms, but also on secondary measures including a scale measuring self-compassion ($d=1.21$). They also reported 6-month follow-up data showing maintained effects.

My fourth example is a program for adolescents who suffered from low self-esteem. The idea came from clinical observations when running ICBT trials for adolescents with depression and anxiety. In the study, a new program including both generic and specific CBT components was developed and tested in a pilot RCT (Berg et al., 2022). A total of 52 adolescents aged 15–19 years were recruited and randomly allocated to 7 weeks of therapist-supported ICBT or to a waitlist control condition. Results showed a large between-group effect at post treatment on the main self-esteem outcome measure $d=1.18$.

Another line of research has taken advantage of the possibility to include more participants in trials and to study components of interventions and their possible interactions by doing factorial design trials (E. R. Watkins & Newbold, 2020). I will give two examples. The first study tested two independent variables: (1) with or without an optional 4-week extension of support following an 8-week therapist-assisted transdiagnostic ICBT program for anxiety and depression and (2) with or without an optional booster lesson (Hadjistavropoulos et al., 2022). The study included 434 participants. Several process-related outcomes were reported (for example those assigned to extension sent more messages to their therapist), but overall, there was a lack of between-group effects and interactions.

My second example is a factorial design trial on depression. This study tested the role of own choice versus prescription of tailored treatment modules, support on demand versus scheduled support, and finally the role of having the clients being the target for supervision (Andersson et al., 2023). The treatment period was 10 weeks, and results from post treatment and a 2-year follow-up were reported. Apart from the large within-group effects commonly seen in ICBT trials, an unexpected finding was that the self-tailored treatment was slightly better than the clinician-tailored treatment ($d=0.26$). Effects were largely maintained at a 2-year follow-up. One important lesson learned from the existing factorial design trials is that researcher needs to carefully consider the independent variables tested and the power to detect effects. Weak independent variables may be important to study for theoretical reasons, but while non-inferiority (establishing that are no differences) is interesting from a clinical point of view, it requires very large samples if small differences are expected. Thus, trials need to be planned with independent variables that are likely to make a major difference. In one recent factorial design trial, it was found that therapist guidance lead to better treatment adherence and slightly better outcomes (Bur et al., 2022), which could serve as an example of a know factor that often has been found to make a difference (e.g., therapist support).

Priorities

I will here comment on research priorities and how ICBT can be adapted in times of crisis. This includes the importance of making CBT available for more persons across the world.

Finally, I will briefly comment on technological developments and in particular artificial intelligence.

We have just recently experienced a dramatic pandemic which changed the scene for distance technology not only being an alternative but often the only way to access CBT (Wind et al., 2020). The COVID-19 pandemic lead to much research, and one example I mention here is a pilot RCT trial that was conducted during the first summer after the pandemic appeared (Aminoff et al., 2021). In this small pilot trial, 52 persons with elevated distress linked to experiences of the pandemic were included and randomly assigned to treatment or waitlist control conditions. The treatment was tailored based on current concerns (e.g., stress, anxiety, and insomnia) and lasted for 7 weeks. Results at post treatment were positive with moderate to large effects

on most measures, for example depression (Cohens $d=0.63$) and stress ($d=1.04$). When I write this text, the war in Ukraine is still ongoing, and a large number of people suffer with many refugees residing in countries like Poland. In terms of mental health, the possibility to provide digital support is an urgent priority (Goloktionova & Mukerjee, 2021). A related challenge and priority is to disseminate ICBT to other parts of the world than Western settings, a call that has been made many times (Munoz, 2010). We are now in a situation where different ICBT programs are translated and culturally adapted for non-Western languages (e.g., Arabic), which has the potential to speed up this process (Fairburn & Patel, 2017).

My final priority is more of a question mark as we now enter an era with increased use of big data and artificial intelligence (AI) tools, including conversational agents and rapid ways to generate text and pictures (Carlbring et al., 2023). Machine learning methods have been in use for while in prediction research (Lenhard et al., 2018), but if we will be able to use AI as a way to support clients is still uncertain, not the least because of legal requirements and informed consent.

Summary and Concluding Remarks

In sum, ICBT can now be regarded as evidence based, and while not suitable for everyone, it is often the case that ICBT with guidance can work as well as face-to-face therapy. ICBT can be a way to move CBT research forward as there are many aspects of CBT that has not been focused on much such as the role of learning and memory (Harvey et al., 2014) and many clinically relevant psychological problems (e.g., dealing with crises) that may either be best treated using transdiagnostic approaches or with more specific and tailored approaches. Further, most research in psychotherapy overall and also ICBT has included well-educated persons, and it is a challenge for the future to show that we can help people with less resources and lower educational level.

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Declarations

Conflict of Interest The author has published books on the topic reviewed. No other conflict of interest.

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