"The general idea is that Internet-based cognitive behavior therapy (ICBT) should reflect the content of conventional CBT, but is administered as a form of therapist-guided self-help delivered via the Internet. The ICBT treatment consists of modules or chapters, each corresponding to a session in conventional CBT, which the patients gain gradual access to as they progress through the treatment. As CBT is disorder-specific,... the content of the modules varies across disorders."

Internet-based cognitive behavior therapy for anxiety and depression

by N. Lindefors, E. Hedman, and B. Ljótsson, *Sweden*



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Anxiety disorders and depression are highly prevalent, often chronic if untreated, and associated with severe suffering, functional disability, and reduced quality of life. Cognitive behavior therapy (CBT) has been shown to be an effective treatment, but is accessible to only a few. In the last decade, Internet-based CBT (ICBT)—self-help CBT with online therapist contact—has demonstrated promising results in the treatment of anxiety disorders and depression. The present paper presents an overview of the field of ICBT for anxiety disorders and depression. We define ICBT and provide a brief report on the state of the evidence, including cost-effectiveness. The main conclusion is that ICBT is an effective, well-documented and cost-effective treatment for anxiety disorders and depression. It is ready for implementation on a large scale.

Medicographia. 2012;34:346-351 (see French abstract on page 351)

Anxiety disorders and depression are highly prevalent psychiatric disorders affecting a majority of the adult population in Western countries at some point during the lifespan.[1-3] For the affected individual, the consequences are severe, including functional disability, reduced quality of life, and risk of developing other psychiatric and somatic disorders.[2,4-11] From a societal perspective, anxiety disorders and depression constitute a substantial economic burden for society in terms of, for example, sick leave, worsened somatic health, increased health care utilization, and risk of disability pension.[9,12-14]

During the last 45 years, cognitive behavior therapy (CBT) has gone from being a promising new treatment to the most well-established psychological treatment for anxiety disorders and depression.[15] In several hundreds of randomized controlled trials (RCTs), CBT has been shown to be effective in treating these disorders[16,17] and is a first-line treatment for these conditions. This is due to superior treatment effects in combination with high safety. In general, long-term follow-up studies indicate that improvements gained after CBT endure over several years (for example, see reference 18). In combination with relatively low intervention costs, CBT is thus a highly promising treatment from a societal cost-effectiveness perspective.

However, accessibility to CBT is limited. Lack of trained therapists and remote location of outpatient clinics in areas with low population density result in few being offered effective psychological treatment in rural areas.[19] Thus, there has been a large need for developing treatments in which therapist time can be used more efficiently.

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With the advent of the Internet, a new a kind of treatment was made possible—Internet-based CBT (ICBT). Building on the well-documented effects of self-help treatment for anxiety,[20] the general idea was to administer CBT in the form of self-help over the Internet with online therapist contact. The results from the first RCT in which ICBT was tested for headache showed that this treatment was feasible and efficacious, with promising effect sizes.[21] Since then, the research on ICBT for anxiety disorders and depression has been performed at a remarkable pace. To date, more than 25 RCTs have been conducted by independent research groups on anxiety disorders and depression alone.[22]

The aim of this paper is to provide an overview of ICBT for anxiety disorders and depression (primarily focusing on the work conducted in Sweden). More specifically, we describe what ICBT is, its applications, the role of the therapist, and the current state of the evidence, including health economic data. Finally, we discuss strengths and limitations of ICBT and potential future directions.

Definition of ICBT

Several forms of computerized CBT have been developed, making it difficult to speak of ICBT as one clearly defined treatment. These treatments have differed in several aspects, including technical solutions, degree of therapist contact, and diagnostic procedures.[23] In the present paper, we focus on the model of ICBT that was originally developed in Sweden, which to date is the most well-researched paradigm. In Sweden, the research on ICBT was pioneered by Professors Gerhard Andersson and colleagues (Linköping University), Per Carlbring and colleagues (Umeå University), and for subsequent clinical implementation research, Professor Nils Lindefors and colleagues (Karolinska Institutet). Internationally, research groups in the Netherlands and Australia have also produced numerous studies on this format of ICBT. The general idea is that ICBT should reflect the content of conventional CBT, but is administered as a form of therapist-guided self-help delivered via the Internet. The ICBT treatment consists of modules or chapters, each corresponding to a session in conventional CBT, which the patients gain gradual access to as they progress through the treatment. The total amount of text is generally equivalent to 100-175 text pages. As CBT is disorder-specific, in terms of treatment and treatment models, the content of the modules varies across disorders.

Throughout the treatment, patients have regular contact with an online therapist that provides guidance in terms of feedback on homework exercises, advice on how to conduct the treatment, and answers to questions. The therapist also provides surveillance of the pace of treatment progress and grants patient access to the text modules. The therapist is highly trained in CBT, often a licensed psychologist, and has the same treatment responsibility as in conventional CBT.

The term "guided self-help" refers to the relatively limited therapist contact of ICBT as defined here. Often, the therapist spends 5-10 minutes weekly per patient, which is about 10%-20% of the time required by face-to-face CBT. This means that the patient carries a very large part of the responsibility, hence the term "self-help." Therapist contact is provided online through a messaging system resembling e-mail. In general, there is no face-to-face or telephone contact between therapist and patient. Along with the module content and the therapist contact, ICBT often also entails online worksheets, which the patient can use to report daily activities of relevance for the treatment, such as thoughts and emotions in certain situations. The worksheets also provide an important information source for the therapist who can use these to follow the progress of the therapy.

As the content of the treatment is disorder-specific, the diagnostic procedure prior to treatment start is of great importance. In fact, as the structure of ICBT is much more static than face-to-face CBT, we view it as even more important that the patient is correctly diagnosed. That is, the psychologist does not have the same flexibility to compensate for misclassification and to adapt the content of the treatment once therapy has started. For a schematic of typical patient flow through a clinical ICBT process, see *Figure 1 (page 348).*

Role of the therapist

Several studies indicate that treatment outcome is improved when therapist contact is included in ICBT. For example, a meta-analysis by Palmqvist and coworkers showed that there was a strong correlation between amount of therapist time spent in studies of ICBT and the improvement demonstrated posttreatment.[24] In addition, a meta-analysis by Spek and coworkers showed that ICBT studies that did not include any therapist contact produced markedly lower effect sizes (Cohen's d=0.24) than studies that included therapist contact (d=1.00).[25]

However, the role of the therapist is somewhat different compared with conventional CBT. As the only way of communication is through e-mail–like text messages summing up to around 5 to 10 minutes per week, the most important func-

SELECTED ABBREVIATIONS AND ACRONYMS

CBGT	cognitive behavioral group therapy
CBT	cognitive behavioral therapy
DSM-IV	*Diagnostic and Statistical Manual of Mental Disorders, fourth edition*
ICBT	Internet-based cognitive behavior therapy
ICER	incremental cost-effectiveness ratio
NNT	number needed to treat
PTSD	posttraumatic stress disorder
RCT	randomized controlled trials

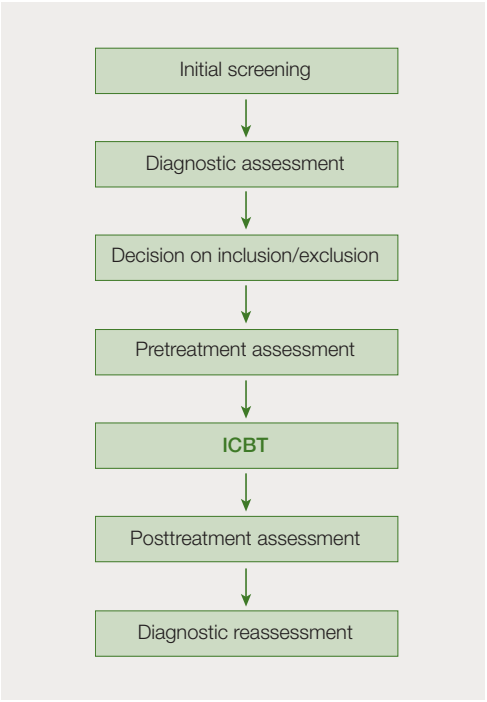


Figure 1. *Patient flow through a typical clinical ICBT process.*

This example is tested in the Internet-based cognitive behavior therapy (ICBT) clinic Internetpsykiatri.se at the Psychiatric Clinic Southwest, Karolinska University Hospital (Huddinge).

tion of the therapist is to provide encouragement and to guide patients through the text material. In fact, 2 studies by Titov, Robinson, and coworkers, in which patients were randomly assigned to a skilled CBT therapist or to a technician without clinical experience, showed that participants in both treatment conditions made large and equivalent improvements.[26,27] Moreover, although therapeutic alliance is considered to be an important factor in determining the outcome in face-to-face psychotherapy,[28] a study of ICBT for posttraumatic stress disorder (PTSD) by Knaevelsrud and coworkers failed to show a meaningful relationship between treatment outcome and the early alliance between the patients and online therapists.[29]

Thus, it seems to be important to include therapist assistance in ICBT. However, judging from the evidence at hand it does not seem to be important that the therapist is highly skilled nor that a therapeutic alliance in the traditional sense is crucial for treatment success. We believe that the firm structure of ICBT makes the between-therapist variability in terms of therapeutic skills, treatment adherence, and even online-interpersonal skills less important than in traditional face-to-face CBT.

Despite these results, we still recommend that ICBT should always entail supervision by a clinical psychologist. This is because expertise is needed in complex cases and when patients significantly deteriorate during treatment, eg, a sudden increase in suicidal ideation. In addition, developing and refining the treatment modules is a very important part of clinical ICBT work, and this cannot be carried out without in-depth knowledge in theory and practice of CBT.

Applications

◆ *Anxiety disorders*

ICBT treatment packages have been developed and tested for the large majority of anxiety disorders according to the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV).*[30] Specific disorders include social anxiety disorder,[31] panic disorder,[32] generalized anxiety disorder,[26] PTSD,[33] severe health anxiety (hypochondriasis),[34] and obsessive-compulsive disorder.[35] In addition, ICBT for anxiety disorders and depression has been tested within a transdiagnostic approach.[36] In nearly all studies, ICBT has been administered to patients of at least 18 years of age. A few studies have investigated the effects of ICBT in children with disorders. In a recent meta-analytic review, Calear and coworkers found 2 studies using ICBT in the treatment of anxiety disorders and 1 study investigating ICBT for depression.[37]

◆ *Depression*

One of the first disorders for which an ICBT treatment was developed was major depression. To our knowledge, all conducted RCTs aimed at treatment of depression have so far been carried out in mild-to-moderately depressed patients.[38] Our own anecdotic clinical experiences support the possibility to use ICBT for severe depression as well. We have found no studies of ICBT for dysthymia or the bipolar disorders.

◆ *Other conditions*

It is important to underscore that Internet-delivered treatment programs have been developed and tested for a large number of disorders besides anxiety disorders and depression. These are irritable bowel syndrome,[39] insomnia,[40] chronic pain,[41] bulimia nervosa,[42] compulsive gambling,[43] and obesity.[44]

Evidence of ICBT

As stated above, the scientific evidence supporting ICBT has been increasing rapidly within the last decade. In a recently published meta-analysis of ICBT for anxiety disorders and depression, Andrews and coworkers report the findings of 22 RCTs of ICBT.[45] For reference in interpreting the following estimates, an effect size >0.80 can be regarded as indicative of a large effect.[46] For social anxiety disorder (8 RCTs), the overall effect size was 0.92 *(g)* with a number needed to treat (NNT) of 2.39. For panic disorder (6 RCTs), the average effect size was *g*=0.83 (NNT=2.26). For general anxiety disorder (2 RCTs), the average effect size was *g*=1.12 (NNT=1.75). For major depression (6 RCTs), the average effect size was *g*=0.78 (NNT=2.39). We have found 5 RCTs reporting the effects of ICBT for PTSD where effect sizes ranged from 0.47 to 1.39.[33,47-50] As for severe health anxiety, only 1 RCT has been published so far.[34] In that study, effect sizes on the primary outcome measure were between 1.94 and 2.09.[34] In the field of obsessive-compulsive disorder, only 2 open trials have been published so far.[35,51] In those studies, within-group effect sizes have ranged from 1.3 to 1.6.

Taken together, the accumulated evidence clearly indicates that ICBT is an effective treatment for anxiety disorders and depression. This is underlined by the 5 RCTs that did not find any difference in treatment effect between face-to-face CBT and ICBT for social anxiety disorder[31,52] and panic disorder.[53-55]

◆ *Health economy*

As ICBT requires a relatively limited amount of therapist time, it is a promising treatment from a cost-effectiveness perspective. Cost-effectiveness is often expressed in so-called incremental cost-effectiveness ratios (ICERs), which is a measure that combines the additional costs with the additional net benefits of a new treatment compared with an alternative.[56] In a cost-effectiveness study comparing ICBT with cognitive behavioral group therapy (CBGT) for social anxiety disorder, we found that ICBT was highly cost-effective as it yielded large effects and equivalent effect sizes compared with CBGT while being less costly.[57] Taking a societal perspective, ie, considering direct as well as indirect costs, we found that patients in both treatments had significantly reduced their costs at follow-up. However the ICER was –$7046 indicating that for every additional improvement achieved when administering ICBT instead of CBGT (ICBT was slightly more effective), societal costs were reduced by more than $7000.[57] We have found the same encouraging results when investigating the cost-effectiveness of ICBT for irritable bowel syndrome.[58]

Strengths and limitations of ICBT

We view the advent of ICBT for anxiety disorders and depression as highly important, as the strengths of ICBT are legion. First, ICBT is clearly effective, meaning that it significantly reduces anxiety and depressive symptoms. Second, ICBT requires little therapist time, which means that health care resources can be used more efficiently. Ultimately, this means that ICBT can be a way of increasing availability to CBT. Third, ICBT can bridge long distances between clinic and patient. Fourth, as the patient and therapist can work with the treatment at their own pace and at time points that are most suited for them, ICBT is very flexible and reduces the need for the patient to take time off from work. It also means that the phenomenon of cancelled appointments has been abolished in the health care context of ICBT. Fifth, ICBT seems to be cost-effective, meaning that ICBT could be a way of using limited health care resources in a way that enables greater accessibility to effective treatment.

As for limitations, there are relatively few in comparison with conventional CBT. However, there are some important drawbacks. These include the fact that one needs to have access to a computer and an Internet connection. One also needs to be able to read and write in the same language as the therapist. A third limitation, as stated above, is that it is even more essential than in conventional CBT to have a diagnostic procedure that is of high quality. If a patient suffers from PTSD, but is misclassified and receives treatment for social anxiety disorder, it is nearly impossible to adjust for this if the therapist detects the misclassification during treatment. Finally, from a therapist perspective, the reinforcement experienced from having truly helped a patient in conventional CBT can hardly be achieved in ICBT. This means that when administering ICBT, the health care provider needs to make sure that the therapist can be motivated by other forms of incentives. Our experience is that one such incentive that ICBT offers is a great possibility for integrating research into ones clinical work.

Future directions

There are several potential avenues for future research. One major path will most certainly be the expansion of ICBT to child psychiatry. We also predict that ICBT will be used in combination with other treatments. This could be within a stepped-care context or in simultaneous combination. A novel line of pharmacological treatment combination will be to add D-cycloserine[59] to ICBT as a means to enhance the effect of ICBT. There is also room for much improvement of ICBT in combination with smartphone applications. Such applications could be used to remind the patient to register behaviors or to practice new skills learned in therapy.

Finally, perhaps the most important future direction is to make sure that ICBT is accessible to the many suffering from anxiety disorders and depression. We strongly believe that ICBT, within a time frame of 10 years, will be a standard feature of psychiatry in every industrialized country. Or at least we hope it will be. ■

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Keywords: *anxiety disorder; conventional cognitive behavior therapy; cost-effectiveness; depression; "guided self-help"; Internet-based cognitive behavior therapy*

THÉRAPIE COGNITIVE COMPORTEMENTALE PAR INTERNET POUR L'ANXIÉTÉ ET LA DÉPRESSION

Les troubles de l'anxiété et de la dépression ont une prévalence élevée, deviennent souvent chroniques s'ils ne sont pas traités et sont associés à une souffrance importante, à une incapacité fonctionnelle et à une qualité de vie diminuée. La TCC (thérapie cognitive comportementale) est un traitement efficace mais peu de personnes y ont accès. Ces 10 dernières années, une auto-TCC/TCCI (TCC par internet) à l'aide d'un contact en ligne avec un thérapeute, a montré des résultats prometteurs dans le traitement des troubles de l'anxiété et de la dépression. Cet article présente une vue d'ensemble de l'utilisation de la TCCI dans ces deux pathologies, en donne une définition et résume l'état des preuves ainsi que le rapport coût/efficacité. En conclusion, la TCCI est un traitement efficace, bien documenté et rentable de l'anxiété et de la dépression. Il est temps de procéder à sa mise en place à grande échelle.