Effects of Internet-delivered cognitive behaviour therapy for anxiety and mood disorders

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AUTHORS’ SUMMARY
The Internet has revolutionized access to health information and made communication over long distances easier. This article reviews the use of the Internet for delivery of cognitive behaviour therapy. As a starting point the concept of guided self-help is introduced. We next present the treatment approach and different protocols briefly. Next, Swedish studies on panic disorder, social phobia, and depression are summarized using meta-analytic techniques. Implementation in regular clinical setting is discussed with a focus on efficacy versus effectiveness, training of therapist, combined treatments, and cost-effectiveness. We conclude that Internet treatment is likely to become a treatment option for suitable patients in the future.

Introduction
The Internet is rapidly spreading as a means to communicate, obtain, and exchange information. A substantial proportion of the activity on the Internet is devoted to health issues, and this also pertains to psychological problems such as anxiety and depression (1). Information technology in general and Internet technology in particular present challenges for the health care system. First, patients use the Internet to obtain medical information (2). Second, they might join groups on the Internet for support (3). Third, actual consultations are being handled from a distance via the Internet (4). In this paper we will give an overview of another use of the Internet, namely the provision of minimal contact psychological treatment for anxiety and depression. As several studies in this area have been conducted in Sweden, we will mainly focus on the Swedish research. However, experiences from Australia, Germany, USA, the Netherlands, and the UK will be mentioned. A meta-analytic summary of the published Swedish controlled trials will be provided, and a discussion on dissemination, effectiveness, and implications for the training of therapists will be included.

The concept of guided self-help
The term self-help implies that patients are doing the treatment on their own with no assistance. A self-help intervention can be defined as a psychological treatment, in which the patient takes home a standardized psychological treatment and works it through more or less independently. In a standardized psychological treatment, a patient can read step-by-step what he can do to apply a generally accepted psychological treatment to himself or herself. The standardized psychological treatment can be written down in book form, but it can also be available through other media, such as a personal computer, CD-ROM, television, video, or the Internet. Contacts with therapists are not necessarily required for the patient to complete the therapy. If there are contacts with a therapist, these contacts are mainly supportive or facilitative, are not aimed at developing a traditional relationship between therapist and patient, and are only meant to support the working through of the standardized psychological treatment. It could, however, involve guidance on where to seek help and advice regarding other matters if needed, such as medical consultations. Contacts with therapists can be by personal contact, by telephone, by e-mail, or any other communication method. In reality, however, self-help often requires assistance from a therapist or counsellor (5). In many studies on guided self-help this has been in the form of telephone contact (6), but there are also examples of other forms of support, for example by having group meetings.
The critical feature of guided self-help is that the treatment is mainly text-based, with possible interactive features in computer-delivered treatments (e.g. graphics for illustration). In guided self-help the amount of clinical input is reduced compared to traditional psychological treatment. However, the time spent by the client/patient is not less, which can be a source of misunderstanding of the treatment approach. In fact, guided self-help can in some circumstances be even more time-consuming for the patient, as texts are used in homework assignments, and the patient can continuously report on progress and get faster feedback if exercises fail (which should be compared with waiting for the next therapy session in live treatment, or trying to contact the therapist via phone). While work-sheets and various forms of registration are standard goods in regular cognitive-behaviour therapy (CBT), guided self-help also includes reading assignments. Moreover, a patient receiving guided self-help can easily return to previous chapters (or modules) in the text material, which can be regarded as an advantage compared to ordinary treatment which more commonly requires that the patient remembers the content of previous sessions (unless being asked to summarize, alternatively being provided with summaries from the therapist, or if the session is recorded on an audiotape). Most applications of guided self-help are brief treatment protocols, but not different from face-to-face treatments per se in terms of length. Hence, a guided self-help treatment for panic disorder might be very similar to a therapist-led manualized panic treatment. The main difference lies in the way the material is presented and that the exercises and actual exposures are done by the patients themselves (possibly with the assistance of a friend or relative), and not in a therapy room or together with the therapist in real life settings.

Development of a new treatment approach

The development of Internet-delivered CBT is preceded by the empirical support for text-based interventions (i.e. bibliotherapy) and computerized cognitive-behaviour therapy (CCBT). In a sense Internet-delivered CBT can be regarded as a form of CCBT. However, according to one definition of CCBT the defining feature is that the computer makes at least some of the treatment decisions and replaces the therapist in that respect (7). This is hardly the case in guided self-help with a self-help text (even when the text and the interaction are handled via the Internet). Instead, it can be claimed that the patient makes most of the crucial treatment decisions and “is his own therapist” (for example, when to approach a feared situation or when to sit down and read the next text module). This is a crucial distinction to make, as most successful applications of Internet-delivered CBT have not been CCBT if we use the proposed definition. In other words, it is likely that automated programmes lag behind in terms of effect sizes (8), but there is no reason per se that an increasing amount of contact with a therapist in Internet treatment cannot be delegated to the computer. The question is how much and what kind of interaction we can replace with the computer.

Internet-delivered CBT sprang out of the Internet revolution and the increasing use of e-mail and websites for communication and information. The first initial studies were conducted in the late 1990s when people still did not have broadband access. This required that the time the patient was on the Internet had to be kept at a minimum. The basic idea in the early studies was to use minimal contact self-help interventions, often referred to as bibliotherapy, which had been tested in randomized trials and found to be effective (9). The main change was to present text and handle correspondence via the Internet. Since then things have changed rapidly, and it is now possible to implement more complicated web solutions and interactive systems as patients and the population as a whole to a greater extent have broadband access. Consequently, there are now Internet programmes available that are more interactive and require less therapist input (10), but as mentioned they have so far not been found to result in equal effects. The Swedish programmes are less automated and provide more therapist input. Overall, there are variations in how therapist contact is handled in different programmes. Differences can also be seen in the amount of interaction with the computer, and the length and complexity of the texts in the programmes. There is no standard for the provision of minimal contact Internet-delivered CBT, and as the evidence base grows this will be an important task for the future.

More or less standard is the use of the Internet for collecting questionnaire data. This development occurred in parallel with the treatment approach. Increasingly, studies have shown equal if not superior psychometric properties of web-based questionnaires (11). Although patient preferences may lag behind (many still prefer paper and pencil tests), there are now few reasons against using the web for data collection of self-reports. Of importance for this review is the observation that web administration of questionnaires pre- and post-treatment (12) have yielded similar results as paper and pencil administration...
of the same questionnaires when evaluating the same programme for the same condition (13).

To diagnose psychiatric disorders over the Internet has been less promising (14), which very much mirrors the difficulties involved with self-reported psychiatric diagnoses (15). However, for screening purposes self-report can be accurate for certain diagnoses (16). Hence, the Internet can be used for screening, but more definitive psychiatric diagnoses require direct contact with a clinician. In the more recent Swedish trials, diagnoses have been made using the structured interview for the DSM-IV (17).

Protocols
At present several protocols have been developed for anxiety and mood disorders. Various other protocols have been developed and tested in Sweden, for example for headache (18), insomnia (19), chronic pain (20), and tinnitus (21), but fall outside of the scope of this review. With regard to the psychiatric conditions protocols have been tested for panic disorder (22–25), with a similar protocol being developed in Australia (26–28). Moving on to social phobia, a programme developed in Sweden has been tested in a series of trials (12,13,29). Other research groups in the United States (30) and in the Netherlands (31–33) have developed protocols for post-traumatic stress. We are aware of protocols for specific phobia and generalized anxiety disorder showing promising results in two trials, but these have not been published yet. There are several protocols developed for major depression and elevated levels of depressive symptoms (34), with one developed in Sweden (35). Studies have been reported by a group in Australia (36), in the Netherlands (37), two groups in the United States (38–40), but there are on-going studies by other groups, for example in the Netherlands. Another venue not covered in this paper is the use of Internet CBT for prevention of anxiety (41) and eating disorders (42). The evidence base grows rapidly, and there are other protocols and treatments for other conditions which have not been mentioned. Overall, the picture that emerges is that of a new way to deliver psychological treatment that is increasingly supported by controlled trials.

A meta-analytic summary of the Swedish studies
A recent meta-analysis summarized the effects of Internet-delivered CBT (8). For the present paper we extracted the effects from the six published Swedish trials (12,13,22,23,25,35) on depression and anxiety disorders covered in that meta-analysis. To calculate pooled mean effect sizes, we used the computer program Comprehensive Meta-analysis (version 2.2.021). As is common procedure in meta-analyses, effect sizes (Cohen’s d) were calculated by subtracting (at post-test) the average score of the control group ($M_c$) from the average score of the experimental group ($M_e$) and dividing the result by the pooled standard deviations of the experimental and control group ($SD_{c,e}$). As a guide-line for interpretation, effect sizes of 0.80 and higher can be assumed to be large, while effect sizes of 0.50–0.80 are moderate, and lower effect sizes are small (43). Effect sizes below 0.20 are virtually irrelevant. Both a fixed effects model and a random effects model were tested (44). While there were few studies we calculated the Q-statistic as an indicator of heterogeneity. We also calculated the F statistic which also indicates heterogeneity, but expressed in percentages. The lower the percentage the lower heterogeneity, and percentages below 25% indicate low heterogeneity (44). Moreover, as in the original meta-analysis, we tested for publication bias by inspecting the funnel plot on primary outcome measures (effects on depression and anxiety at post-test), and by Duval and Tweedie’s trim and fill procedure (45), which yields an estimate of the effect size after the publication bias has been taken into account. Results for the included studies are presented in Table 1 and in Figure 1. Mean effect size was $d = 0.91$ (95% CI: 0.68 – 1.14), both in the fixed and the random effects model. Heterogeneity was absent, $Q = 3.24$, $p = 0.66$; $F^2 = 0$. Duval and Tweedie’s trim and fill method gave no indication of publication bias (no difference between estimated and actual effect size).

Is it reasonable to implement?
Not covered in the meta-analytic summary provided above is a trial in which live CBT was compared with Internet-delivered CBT for panic disorder (24). No differences of clinical relevance were observed and both treatments were found to be effective. An on-going effectiveness trial on panic disorder has been completed, and the data indicate that the treatment works with people who have not been recruited from the community via mass media, but who are regular patients in mental health care. This is a crucial issue when considering implementation of Internet-delivered CBT, since the distinction between efficacy (how a treatment works in a randomized trial with recruited participants) and effectiveness (how the same treatment works in a more regular clinical setting) is regarded as important (46). To our knowledge there are yet few if any effectiveness studies on Internet-delivered CBT where patients have been referred from a clinical setting and not
Table 1. Description of the studies included in the meta-analytic summary.

<table>
<thead>
<tr>
<th>First author, year of publication (reference)</th>
<th>Recruitment; Main inclusion criterion</th>
<th>Intervention: Number of modules; Therapist involvement</th>
<th>n</th>
<th>Control group</th>
<th>TAU allowed</th>
<th>Follow-up</th>
<th>Attrition rate</th>
<th>Post-treatment comparisons</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andersson et al. 2005 (35)</td>
<td>Community recruitment; depression cut-off on CIDI-SF</td>
<td>5; monitoring &amp; feedback</td>
<td>117</td>
<td>Participation in on-line discussion group</td>
<td>Yes, stable medication; not CBT</td>
<td>Post-treatment &amp; 6 months</td>
<td>27%</td>
<td>Intervention with participation in on-line discussion group versus participation in on-line discussion group</td>
<td>0.9</td>
</tr>
<tr>
<td>Andersson et al. 2006 (13)</td>
<td>Community recruitment; social phobia live SCID</td>
<td>9; monitoring &amp; feedback + 6 hours of group sessions</td>
<td>64</td>
<td>Waiting list</td>
<td>Yes, stable medication; not CBT</td>
<td>Post-treatment &amp; 1 year</td>
<td>3%</td>
<td>Intervention versus waiting list</td>
<td>0.8</td>
</tr>
<tr>
<td>Carlbring et al. 2001 (22)</td>
<td>Community recruitment; panic disorder Internet</td>
<td>6; monitoring &amp; feedback</td>
<td>41</td>
<td>Waiting list</td>
<td>Yes, stable medication not CBT</td>
<td>Post-treatment</td>
<td>12%</td>
<td>Intervention versus waiting list</td>
<td>0.99</td>
</tr>
<tr>
<td>Carlbring et al. 2003 (23)</td>
<td>Community recruitment; panic disorder live SCID</td>
<td>6; monitoring &amp; feedback</td>
<td>22</td>
<td>Applied relaxation via Internet</td>
<td>Yes, stable medication not CBT</td>
<td>Post-treatment</td>
<td>27% CBT, 18% applied relaxation</td>
<td>Intervention versus applied relaxation</td>
<td>0.33</td>
</tr>
<tr>
<td>Carlbring et al. 2006 (25)</td>
<td>Community recruitment; panic disorder telephone SCID</td>
<td>10; monitoring &amp; feedback + weekly short phone calls</td>
<td>60</td>
<td>Waiting list</td>
<td>Yes, stable medication; not CBT</td>
<td>Post-treatment &amp; 9 months</td>
<td>5%</td>
<td>Intervention versus waiting list</td>
<td>1.1</td>
</tr>
<tr>
<td>Carlbring et al. 2007 (12)</td>
<td>Community recruitment; social phobia telephone SCID</td>
<td>9; monitoring &amp; feedback + weekly short phone calls</td>
<td>57</td>
<td>Waiting list</td>
<td>Yes, stable medication; not CBT</td>
<td>Post-treatment &amp; 1 year</td>
<td>2%</td>
<td>Intervention versus waiting list</td>
<td>1.08</td>
</tr>
</tbody>
</table>

Note: TAU = treatment as usual; CIDI-SF = Composite International Diagnostic Interview Short Form; SCID = Structured Clinical Interview for DSM-IV; CBT = cognitive behaviour therapy.
via advertisement or the web. One difference, however, is an effectiveness study on tinnitus (47), where findings from a control efficacy study were replicated (21).

The dissemination of Internet-delivered CBT necessitates several steps before actualization. First, a programme must first be developed and evaluated in a more experimental setting (e.g. university). Before entering a clinic, adjustments of the programmes may be needed and safe data handling must be secured. A second issue concerns training of therapists. While most of the Swedish studies reviewed above have had therapists at the M.Sc. level, but with supervision from experienced CBT clinicians, it is yet an open question how well this new treatment would work in the hands of individual therapists who might not have basic training in CBT. Moreover, delivery and management of clients in Internet-delivered CBT could possibly involve other professions. This would require more research on the provider of the treatment. Ingredients commonly regarded as important for psychotherapy, such as therapeutic alliance, have not been found to be convincingly related to outcome in Internet-delivered CBT (48), and overall it is possible that this new treatment format should be measured against other standards than traditional psychotherapy research. When it comes to implementation, however, it is worth mentioning that all treatment ingredients are presented in the self-help texts. We also know that while therapist input is needed, it does not have to be very extensive.

A future challenge consists of outlining treatment standards for the delivery of Internet CBT.

In clinical practice, it is very likely that Internet CBT will be delivered in association with prescribed antidepressants. While medication has not been used as an exclusion criterion in the Swedish trials, patients who have not been on stable medication (e.g. recently begun) have regularly been excluded. Since it is common to prescribe medication for anxiety and depression in regular health care, the combination of Internet CBT and medication deserves special attention. A final issue regarding implementation deals with cost-effectiveness. While this has been targeted in preliminary reviews of CCBT incorporating some studies on Internet-delivered CBT (49), there is a need for more detailed studies on costs in relation to benefit in real life clinical setting.

Conclusions

The Internet is now in the hands of a majority of people in the Western world and is used widely. This has opened up new possibilities to bridge distances and to increase access to evidence-based psychological treatments. Research on anxiety and mood disorders of mild to moderate severity suggests that Internet-delivered CBT with the guidance of a therapist can lead to improvements of equal size as following the traditional formats of psychotherapy. However, the amount of therapist contact and how well this new treatment works for more severe patients is unclear. Future challenges involve implementation and monitoring of outcome in regular clinical settings, developing standards for how the treatment should be delivered, investigation of combined treatments, and finally cost-effectiveness.

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