Internet-Delivered Psychological Treatments

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Abstract

During the past 15 years, much progress has been made in developing and testing Internet-delivered psychological treatments. In particular, therapist-guided Internet treatments have been found to be effective for a wide range of psychiatric and somatic conditions in well over 100 controlled trials. These treatments require (*a*) a secure web platform, (*b*) robust assessment procedures, (*c*) treatment contents that can be text based or offered in other formats, and (*d*) a therapist role that differs from that in face-to-face therapy. Studies suggest that guided Internet treatments can be as effective as face-to-face treatments, lead to sustained improvements, work in clinically representative conditions, and probably are cost-effective. Despite these research findings, Internet treatment is not yet disseminated in most places, and clinical psychologists should consider using modern information technology and evidence-based treatment programs as a complement to their other services, even though there will always be clients for whom face-to-face treatment is the best option.

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INTRODUCTION

The Internet is likely here to stay for a long time, and it has already changed our lives in many ways. We use the Internet for many purposes, including searching for information, communicating, paying bills, buying things, and numerous other tasks for both work and leisure. The growth in applications of the Internet in our society has motivated a dramatic increase in the number of people who are connected, and in many parts of the world, nearly all adults have Internet access (**http://www.internetworldstats.com**). Although a "digital divide" exists, with more people connected in the Western world than elsewhere, the Internet is increasingly accessed via mobile telephone in other parts of the world, such as Africa and South America. The implications for clinical psychology are numerous. For example, before the Internet, clinicians would visit a library or consult a colleague to obtain information, whereas today information can be accessed online in just seconds. Researchers can find and read the most recent literature in their fields online, and there has been a strong push toward making information (and research) freely available on the Internet, which has implications for evidence-based practice. Perhaps even more significant is the fact that clients and their significant others search for information on disorders as well as treatment options. Finally, a growing research base suggests that the Internet can be used for the assessment and treatment of clinical conditions, which is the topic of this review.

Unfortunately, many different terms are used to describe similar Internet treatment formats, and, conversely, similar terms are sometimes used to describe different treatments (Barak et al. 2009). Interventions involving the Internet are called web-based treatment, online treatment, computerized psychotherapy, digital interventions, e-therapy, Internet-delivered cognitive-behavioral therapy (ICBT), and Internet interventions, among other diverse terms (Barak et al. 2009). Moreover, some terms that are used are linked to specific programs, technical platforms—such as Interapy (Lange et al. 2003) and Deprexis (Meyer et al. 2009)—or smartphone-based applications (so-called apps) with specific brand names (Donker et al. 2013). In addition, treatments that previously required direct contact within a lab or clinic, such as virtual reality and computerized

attention training (Carlbring et al. 2012), are increasingly being delivered via the Internet. It is likely that treatment programs that were presented on CD-ROM, such as Beating the Blues for depression (Proudfoot et al. 2004), now are being replaced by similar (even identical) programs that are presented over the Internet. Internet use offers some immediate benefits. First, it is possible to communicate with clients either in real time (for example, via chat) or asynchronously (for example, with email in a closed, secure platform). Second, although evidence clearly suggests that clinician-supported treatments yield larger effects and less dropout than automated treatments (Baumeister et al. 2014), several tasks can be delegated to the computer, such as automatic reminders, and some fully automated treatments are as effective as guided interventions for a proportion of clients (Titov et al. 2013). In addition, it is possible that the interactivity of the programs and the game-like procedures would result in more effective automated Internet treatments (Andersson 2014).

Several authors have proposed definitions of Internet-supported psychological treatments. One example is Barak and colleagues (2009), who suggested the following: "A web-based intervention is: a primarily self-guided intervention program that is executed by means of a prescriptive online program operated through a website and used by consumers seeking health- and mental-health related assistance. The intervention program itself attempts to create positive change and or improve/enhance knowledge, awareness, and understanding via the provision of sound health-related material and use of interactive web-based components" (p. 5). Barak and colleagues use the term web-based intervention, but increasingly the term Internet-based intervention is used, and online intervention is another frequently used term. Another definition with a more narrow perspective defines therapist-guided ICBT as "a therapy that is based on self-help books, guided by an identified therapist which gives feedback and answers to questions, with a scheduling that mirrors face to face treatment, and which also can include interactive online features such as queries to obtain passwords in order to get access to treatment modules" (Andersson et al. 2008a, p. 164). Since the time that definition was proposed, the Internet has changed, and today more people have broadband access to the Internet through their tablets and smartphones, which enhances opportunities to stream treatment videos. In this article, I review how the Internet can be used in psychological treatment and then provide examples of studies showing that Internet-delivered psychological treatments can be effective, in particular when they are guided by a clinician or supportive coach.

TREATMENT FORMAT AND PROCEDURES

In this section, I provide an overview of how Internet-delivered psychological treatments can be presented and highlight key issues that differentiate Internet-delivered psychological treatments from regular face-to-face treatments. I do this by describing the procedures from a client perspective, even if the term patient or research participant also could be used. By necessity, my description is derived from experiences I have from my own work with different web-based platforms in collaboration with colleagues, including a range of clinical implementations in Sweden and other countries, including Australia (Andersson 2014).

Treatment Platform

Internet-delivered treatments usually require an online treatment platform, although examples exist of email therapy with little or no website involvement. In fact, some early studies used email and standard word-processed documents only (Ström et al. 2000), but since then secure online platforms have been used to access treatment and for communication between client and

researcher/clinician. For a client, the online environment resembles systems used when paying bills online; that is, the systems are encrypted and often use a double authentication procedure at login. Given the risk of revealing sensitive information, data security is important to consider. Secure and encrypted communication is used to reduce the probability of identity theft. Secure systems not only require a personal password to log in, but also supply a unique single-use password that is sent automatically to the client's cell phone (or via a separate card reader). The use of secure systems is an everyday experience for many clients, but it can be problematic for individuals with limited computer knowledge (e.g., some older persons). It is preferable that the client communicates with the clinician within a closed system and not through the client's personal email. If email and text (SMS) messages are used, they must be designed so that they would not cause harm if someone were to read the message without the client's approval. Thus, the identity of the sender should not reveal what the message is about. An example of an acceptable message is a simple reminder, such as "You have a message in your inbox." The continuing evolution of technology will bring new challenges to security.

This leads us to the question of how treatment delivered via a secure Internet platform differs from treatment delivered through face-to-face contact with a clinician. Each treatment system offers advantages as well as disadvantages. Advantages include client access to records of communication with the clinician within the platform. This is rarely the case in face-to-face treatments unless psychotherapy sessions are recorded and the recording is sent home with the client. Depending on the format, clients can communicate with the clinician in real time, which removes the restriction of having to wait for the next therapy appointment. Asynchronous contact has the advantage that there is no need for scheduled appointments, and the client can get answers and feedback more rapidly. Asynchronous contact also enables the clinician to consult colleagues for supervision before providing feedback to the client. However, one potential disadvantage is that the lack of direct contact makes it harder to detect misunderstandings and negative reactions that would have been observed during a regular therapy session. Indeed, so-called ruptures in therapeutic contact may occur even in text-based communication, and therapists are less able to immediately repair ruptures via Internet-delivered treatments. Another limitation is the possibility that a client will become obsessive about the communication and misinterpret the meaning of the interaction. However, to date little evidence indicates that this commonly occurs, and if it did occur, the most likely outcome would be that the client would drop out from treatment.

Assessment Procedures

Computerized assessment procedures are not new, but the Internet has made it much easier to collect data using computers. There is a body of literature on the psychometric properties of online administration of commonly used self-report measures in clinical psychology (Andersson 2014). For many instruments, psychometric validations have been published on online administration; these validations show that psychometric properties such as internal consistency, factor structure, and test-retest reliability transfer well from paper-and-pencil to online administration. These instruments include commonly used measures in depression, anxiety, and health psychology research (Andersson 2014). The advantages of online administration include the ability to (*a*) arrange questionnaires so that items are unlikely to be skipped or missed (as sometimes happens in paper-and-pencil tests), (*b*) provide progress bars to visualize progression through the measure, and (*c*) implement adaptive testing. An example of the latter would be to ask screening questions and proceed with more questions only if the client is identified as having a problem. This is, of course, possible with paper-and-pencil questionnaires as well (e.g., with instructions such as "skip over and go directly to page 4") but it is more reliable with computerized testing. Scoring of questionnaires

is facilitated, and in clinical practice, measures can be linked to the treatment. For example, if the client scores higher on a measure of suicidal intent, the system can be set to flag the responsible clinician, who then can react immediately. Weekly assessments within the treatment portal also facilitate process research and provide the therapist with feedback on client progress. Feedback in the form of graphs can also be presented to the client within the system, for example, in stress management programs. However, as with all self-administered measures, there is a risk that clients will misunderstand questionnaires. When test results such as weekly measures are presented in the form of graphs, it may be important to provide additional information (e.g., "Read here for more information on how weekly measures should be interpreted") or direct therapist feedback.

Self-reported questionnaire assessments rarely, if ever, can replace a clinical interview if the aim is to generate a probable diagnosis. We found this when we compared computerized screening against an in-person interview (Carlbring et al. 2002), and we subsequently decided to interview research participants in trials in which the goal is to include clients with a particular diagnosis [for example, social anxiety disorder (SAD)]. Interestingly, although telemedicine is a strong field, few studies exist on using online video conferencing systems for psychiatric interviews and treatment, which is probably because such systems demand greater computer resources than most people had in the early days of psychological Internet research (the late 1990s to mid 2000s). Now that broadband access to the Internet is more widely available, videoconferencing interviews may become more common. Security issues need to be considered, and the use of easily available services such as Skype is not recommended. In our own research, we have added the functionality of video chat in the closed treatment platform. The American Psychological Association has developed practice guidelines for telepsychology (**http://www.apapracticecentral.org/ce/guidelines/index.aspx**), but constant update of guidelines is needed to keep pace with the fast rate of technology change.

In addition to work examining questionnaire assessments, also relevant for clinical psychology is a literature on online tests of cognitive function and information-processing biases (Andersson 2014). Smartphone technology has contributed to the emergence of a new field, sometimes referred to as m-health, which involves ecological momentary assessment and a range of methods to collect data from clients, including self-report, activity monitoring, and sensor data on physiological functions such as heart rate.

Treatment Contents

A range of procedures and different forms of treatments have been used when psychological treatments have been transferred from face-to-face to Internet delivery. For instance, although most treatment programs and studies have been informed by cognitive behavioral therapy (CBT), examples of treatments that are not directly informed by CBT also exist, such as psychodynamic Internet treatment (Johansson et al. 2012a), interpersonal psychotherapy (Dagöö et al. 2014), and mindfulness-based treatment (Boettcher et al. 2014b).

The first component to consider when devising Internet-based treatments is the mode of treatment delivery. Most studies and treatment programs have mainly relied on text, either as downloadable PDF (Portable Document Format) files and/or presented on the screen. Because users may access the treatment from different portals, it is best to ensure that the treatment view will adapt (that is, will be responsive) to fit the device on which it is presented, for example, one view for a smartphone and another for a computer screen. When I started doing Internet treatment research, it was not possible for clients to stay online long enough to read a lengthy self-help text, but now it is achievable with broadband access. Nevertheless, many clients prefer to have the option to download text for printing. It is now both inexpensive and easy to present streamed videos (for example, online lectures) and audio files and to illustrate programs with pictures. Interactive

features, such as completing a quiz before moving on to the next part of the treatment, have been available for a long time. We recently addressed security issues with the launch of a secure video chat solution within the closed treatment platform. Thus, treatment contents can be delivered as prepared text (in different languages), streamed videos, audio files, interactive programs, and email-based individualized instructions to clients. Further, discussion forums (given information consent and monitoring by a clinician) can be used for more group-based Internet interventions. The use of mobile technology enables the real-time registration of homework.

The second component is content, or in other words, what comprises the actual treatment. The majority of treatment programs and studies have been based on CBT self-help materials (Andersson 2014), which can be of book length. Sometimes the more-or-less same self-help text has been found to function both as guided Internet treatment and as bibliotherapy (for example, for panic disorder), but it is important to note that Internet administration has advantages over pure bibliotherapy. Internet treatments can easily be adapted and divided, and the Internet can be used to send reports on homework assignments. What is referred to in face-to-face psychotherapy as a "session" is rather called a treatment "module" or "lesson" in Internet treatments. Again, text is often supplemented with extra material such as videos, but the main component is often the text. The duration of Internet treatments vary but often resemble manualized psychotherapy (in particular CBT) in that the number of treatment weeks is determined beforehand. Typically, a treatment may last between 5 and 15 weeks, depending on the condition treated, and sometimes is a bit shorter in duration than similar face-to-face treatments. In ICBT, the treatment typically begins with educational elements (psychoeducation) and ends with relapse prevention/termination. In between are modules that are based on treatment manuals for specific disorders, such as chronic pain or depression, and other conditions for which psychological treatments are regarded as suitable. Treatment modules may vary in length, from short summaries to texts of more than 20 pages. Illustrations and case examples are often included. Homework assignments are included in the modules, for example, when to do relaxation training and exposure exercises.

As with all literature, writing good treatment texts is more than a mere presentation of facts and instructions. Texts should convey empathy and understanding of the client, who needs to recognize that the treatment is about him or her (Andersson 2014). Because no therapist is present to adapt the material, the texts used also need to be easy to understand while still covering the important information and the range of experiences that may be present for persons with a particular problem. For example, clients with posttraumatic stress disorder (PTSD) may have widely different experiences and symptoms, and these need to be taken into account when preparing the texts. Modules should as much as possible fit all types of clients, from highly educated people to individuals who may have experience difficulty reading and understanding instructions and who may benefit from online lectures, short summaries, and good examples (for example, written examples of how homework registrations should be completed). Clients differ, and those who have difficulties with the text can go back and read it again, take short breaks, and ask their supporting clinician (discussed below) for clarifications. Apart from the security issues related to dealing with clients, Internet treatment is not unlike online education, a form of instruction offered by many universities around the world, which comprises web lectures, downloadable texts, online interactions with teachers and/or other students, and a clear deadline for completion.

Internet treatments are usually linear and have a set structure derived from ordinary treatment manuals and self-help books. However, optional modules and tailoring were proposed early as a way to handle the problem of comorbidity and the fact that some symptoms/problems may not be shared by all clients within a diagnostic category. For example, approximately half of clients with tinnitus (ringing or other sounds in the ears) have sleep problems, some extreme noise sensitivity, and some severe hearing problems, which led to the development of an Internet treatment that

was partly fixed and partly tailored according to symptom profile (Andersson et al. 2002). A similar solution tailored ICBT for anxiety and depression, conditions that overlap and occur in association with a range of other problems that a client may wish to work with (for example, stress management). Available treatment modules for a wide range of different problems and conditions were rewritten to suit the tailored transdiagnostic format, and this form of treatment has shown promising outcomes when tested in trials (Carlbring et al. 2010). Basically, tailored ICBT starts with a fixed psychoeducation focus and ends with relapse prevention, but in between the treatment is set up according to a case formulation and client preferences. Another way to tailor is to provide easy versus more difficult modules that are based on the client's education level and motivation. It is also possible to tailor by translating modules into different languages. An alternative model developed in Australia is based more on a transdiagnostic approach (Titov et al. 2010b), but within that system, optional treatment texts are presented, which render the differences between the transdiagnostic and tailored ICBT models less marked than it would appear from the descriptions in research papers.

A third component of Internet-based treatment planning is the role of a clear deadline for treatment completion. In contrast to face-to-face psychotherapy where a treatment contract may specify a limited number of sessions, early Internet studies (and many existing unguided treatments) had no clear endpoint, and clients could continue with the treatment as long as they wanted (Andersson et al. 2009a). Studies noted that a clear deadline and a scheduled interview dramatically reduced the dropout rate. For example, in an early trial on Internet-delivered treatment for recurrent headache, more than half of the participants dropped out (Ström et al. 2000). This study, together with other trials in which no therapist support was given, had a negative impact on the reputation of Internet treatments and led one investigator to state that such treatments always experience huge dropout rates (Eysenbach 2005). However, when guidance and a clear deadline for treatment/study completion are given, clients do not tend to drop out any more than they do in face-to-face trials, and adherence appears to be no different (van Ballegooijen et al. 2014). For example, in a recent headache trial (designed to provide a direct comparison with the early headache trial), 86% of clients provided posttreatment data, which is a fairly typical figure when guidance and a deadline are included (Andersson 2014).

Internet treatment programs differ from face-to-face therapy in four ways. Face-to-face treatments can vary—for example, they can include text material as adjuncts to the live sessions (even full-length books as support)—but their delivery usually does not include much text. The first difference is thus the obvious role of learning support in Internet treatments, as clients in face-to-face therapies rarely recall 100% of their sessions (usually much less), and unless they are provided with recorded sessions to bring home, clients find it difficult to remember the session content. Indeed, the role of learning and memory in CBT has been highlighted as a neglected factor (Harvey et al. 2014), and it is likely that it is easier for clients to repeat sessions (e.g., see a film again, read the module a second time) in Internet treatment than it is to repeat what was said in a face-to-face treatment (even when handouts are provided). On the other hand, there is a risk that clients do not engage enough in Internet treatment compared to when seeing a therapist, but it could also be the other way around. One example would be arousal during a session for a person with SAD who enters a group treatment. It is possible that the anxiety experienced during the early psychoeducation group sessions limits comprehension, whereas in Internet treatment for SAD there would be less arousal in this phase (because the client reads texts and does this alone). Even if exposure exercises are more or less the same, and as in face-to-face treatments the actual exposure is done in real settings and not in front of the computer, the learning phase of the treament differs. More research is needed to determine whether any differences exist between face-to-face and Internet treatments in terms of memory of the treatment and comprehension.

The second difference relates to therapist drift and therapists not adhering to the treatment manual (Waller 2009). Although it is possible for a supporting clinician to drift from the modules in Internet treatment, the actual treatment content stays the same and does not change. This can lead to reduced flexibility in the treatment (although to a lesser extent in tailored Internet treatments), but at least errors of omission are less likely to be caused by the treatment even if clients deliberately can decide not to complete a part of the intervention (the therapist will not detect this). Indeed, a qualitative study on experiences of ICBT for depression found that a proportion of clients did not engage in the treatment although they still read all materials (Bendelin et al. 2011). This problem can occur in face-to-face treatments as well when clients do not do any homework and remain unchanged in spite of attending therapy sessions.

The third difference relates to convenience and the problems experienced by some clients in face-to-face therapies who cannot fit in their sessions during office hours (when most therapists prefer to have sessions). In Internet treatments, clients often choose to work with their treatment outside of office hours. They may, however, need to wait to get feedback from their online therapist if they ask a question, but the wait is rarely as long as in face-to-face treatments, when the next session may be scheduled many days or even weeks later. The final difference discussed here (although many others exist) is the role of stigma and self-efficacy. It may be less stigmatizing to engage in Internet treatment than it is to visit a therapist, in particular for clients who have problems that are less severe and who would never seek face-to-face therapy. If all goes well, it is probably the case that a client who has completed an Internet treatment attributes most of the success to him- or herself. Even when guidance and support are given during the treatment, there is much less therapist contact in Internet treatment than in regular face-to-face treatment, and thus clients are more likely to regard success as a consequence of their own hard work.

Therapist Involvement

Several systematic reviews have found that guided Internet treatments tend to be more effective than unguided treatments (see, e.g., Baumeister et al. 2014). However, automated reminders and other functions not requiring human interaction can be included in guided treatments, and there is not a sharp distinction between guided and unguided treatments; programs for some conditions (for example, insomnia) probably require little guidance, whereas for other conditions (for example, major depression), more guidance and support from a human may be required. It is important to note that automated treatments with no human interaction can be effective for a proportion of users/clients (Leykin et al. 2014) and can definitely reach more people at a low cost, although they hardly can serve as an alternative to face-to-face treatment and may also lead to increased uptake of face-to-face services (Christensen et al. 2006). Consequently, in many applications and controlled studies, a clinician guides the client through the treatment (Andersson 2014). The guidance is usually in the form of answers to questions, encouragement, and feedback on homework assignments (Andersson 2014). Guidance is also commonly not provided in real time but rather in the form of email (within the treatment platform). A majority of the correspondence in guided Internet treatments tends to be in the form of encouragement and support (Sanchez-Ortiz et al. 2011) and typically consists of short text messages sent about once a week, which means that the therapist may spend about 15 minutes per client each week (for example, in a 10-week treatment program). Some treatment programs include structured writing assignments, which take longer for therapists to read and comment on (Lange et al. 2003). Some studies have also provided guidance via brief scheduled telephone calls (Andersson et al. 2003), and examples exist of chat-based real-time Internet treatment (Kessler et al. 2009), which takes more therapist time and requires scheduling. There are still few examples of guidance via video conferencing, where a therapist and a client

communicate using web cameras, but given a secure connection, this could be a suitable treatment alternative for clients who are less comfortable with text interaction. Instead of increasing the amount of guidance and support given, it is possible that just providing support on request would be sufficient for some clients. Such a system would resemble a call center, and therapists would be on standby to respond to questions and provide feedback when clients ask for it. Preliminary data suggest that this form of support can work, although more research is needed (Rheker et al. 2015). Another option is to use laypersons to provide support, with experienced clinicians supervising and being prepared to take over more severe cases. Evidence suggests that support from a technical perspective is just as effective as therapeutic support (Titov et al. 2010a), which could impact the dissemination of Internet treatments because it implies that laypersons could be trained to provide support. However, it also raises ethical issues regarding client responsibility and safety.

It is interesting to compare therapist-guided Internet-delivered psychological treatment to regular face-to-face treatment. First, several studies show that ratings of therapeutic alliance are high in Internet treatment studies (Sucala et al. 2012), although patient ratings of the alliance rarely correlate with treatment outcome (Andersson et al. 2012c). It is, however, a very different form of alliance, as the clients have much less information on which to base their ratings. Second, although differences between therapists and their competence probably exist in Internet treatment, just as they do in face-to-face treatments, studies to date do not suggest that differences between how therapists handle the contact with their clients explain much variance in treatment outcome (Andersson 2014). A third difference relates to the format and the risk that therapists could find Internet treatment boring in comparison with face-to-face therapist. One solution to possible boredom when implementing Internet treatment in regular clinics is to have clinicians work with both face-to-face and Internet treatment. It is even more likely that Internet and face-to-face services will be blended in the future (Månsson et al. 2013).

Ethical Aspects and Negative Outcomes

Several ethical issues must be considered when providing Internet-delivered psychological treatments; these ethical issues are determined by the legal requirements in each country (including research ethics), professional guidelines, and whether the aim is to provide treatment or information/prevention (Andersson 2014). When there is a direct contact between a client and a care provider, ethics considerations are similar to those of a regular clinical practice (compared to an open-access, unguided program with no direct contact with the user). Guidelines proposed in a paper by Dever Fitzgerald and colleagues (2010) are based on guidelines from the international Universal Declaration of Ethical Principles for Psychologists (Int. Union Psychol. Sci. 2008). Some recommendations become critical when Internet treatments are about to be disseminated, but overall, dimensions that should be considered are (*a*) respect for the dignity of persons and peoples, (*b*) competent caring for the well-being of persons and peoples, (*c*) integrity, and (*d*) professional and scientific responsibilities to society (Andersson 2014, Dever Fitzgerald et al. 2010). The numerous ethical aspects that are relevant depending on where and how Internet treatments are provided include data security (discussed previously) and client safety (ensuring that professionals contact the client if elevated levels of suicidal intent are identified). Differences between countries exist; for example, in the United Kingdom and in Sweden, publicly funded health care is regulated but few restrictions are placed regarding where practice is permitted, whereas in the United States, there are more strict regulations regarding treating clients only in jurisdictions in which a psychologist holds a license.

An important ethical aspect that often has been neglected is the possibility of negative outcomes following psychological treatments. Literature on this topic relating to Internet treatments has

CENTRAL POINTS TO CONSIDER WHEN USING THE INTERNET TO DELIVER PSYCHOLOGICAL TREATMENTS

1. A stable and secure online treatment platform is necessary for delivering psychological treatment as well as for communication with the client. It is important to ensure that the platform does not crash and works on a variety of systems, such as computers, tablets, and smartphones.
2. Reliable and secure assessment procedures must be integrated into the treatment platform. Self-reported assessments may need to be complemented with face-to-face or telephone services.
3. Development of the treatment should rely on previously published face-to-face manuals and self-help books. Even if most of the material is presented as easy-to-read text, consider using movies and sound files as well.
4. Therapists are often needed to enhance outcomes through client support, advice, and clarifications. Automated treatments are less suitable for severe psychological disorders but can be used as a complement to other services as well as for prevention.
5. Ethical and legal issues as well as negative outcomes need to be considered when establishing a service that delivers psychological treatment via the Internet.

recently emerged, along with recommendations to report negative outcomes in trials (Rozental et al. 2014). For example, one study using data from four large clinical trials (total $N = 558$) revealed that 9.3% of patients reported negative effects (Rozental et al. 2015). Qualitative content analysis was used to explore the patients' responses to open-ended questions regarding their negative experiences in order to assess whether the negative effect was related to the treatment. Results yielded two broad categories (patient-related negative effects and treatment-related negative effects) and four subcategories of negative effects (insight and increased symptom, and implementation and format). In a report on SAD, 19 of 133 participants (14%) described unwanted negative events that they related to the treatment (Boettcher et al. 2014a). Increasingly, negative effects are being reported in Internet treatment trials, and although they are rather infrequent and often relatively mild in nature, their documentation is important (Rozental et al. 2014).

Although differences exist between face-to-face and Internet treatments with regard to ethical issues and side effects, the treatments share assumptions and have some similarities. Internet-delivered psychological treatment is fairly new, so it should be easier to implement ethical guidelines and establish good reporting standards of negative outcomes. In addition, all text interaction between a client and a clinician is documented, which facilitates investigation of unwanted outcomes. Essential issues in Internet-delivered psychological treatment are summarized in the sidebar titled Central Points to Consider When Using the Internet to Deliver Psychological Treatments.

EMPIRICAL FINDINGS

In this section, I review trials of Internet-delivered psychological treatments. When available, I refer to systematic reviews, with the main focus on therapist-supported treatments. It is not possible to cover all programs and studies, but examples are provided for a broad range of conditions. Several target populations are mentioned, but most studies have been with adult clients, and to a lesser extent with children, adolescents, or older adults. Moreover, most studies have been conducted in Europe, Australia, or the United States, but some studies are from other parts of the world (e.g., Japan). I first comment on efficacy studies, with a focus on controlled trials and, if available, long-term outcomes. I address studies in which face-to-face treatments have been directly compared

Table 1 Conditions for which guided Internet-delivered psychological treatment 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	Burnout
Mixed anxiety/depression	Chronic pain	Procrastination
Health anxiety	Cancer	Bereavement
Obsessive-compulsive disorder	Irritable bowel syndrome	Infertility distress
Generalized anxiety disorder	Erectile dysfunction	Body dissatisfaction
Posttraumatic stress disorder	Hearing loss	Grief
Pathological gambling	Chronic fatigue	
Bulimia and eating disorders	Multiple sclerosis	
Body dysmorphic disorder	Obesity	
Drug addictions	Smoking	
Attention-deficit/hyperactivity disorder		

with Internet treatments (Andersson et al. 2014c). Effectiveness and cost-effectiveness studies are covered as well. An overview of the conditions for which Internet-delivered psychological treatments have been developed and tested in controlled trials is presented in **Table 1** (expanded from Andersson 2014). The list is not exhaustive, as new studies are published every month and several trials are as yet unpublished, but the table conveys the range of conditions studied.

Research Findings on Anxiety Disorders

Although most anxiety disorders have been studied using ICBT, other treatments have been used as well, including psychodynamic Internet treatment (Andersson et al. 2012b), mindfulness (Boettcher et al. 2014b), and attention bias modification (Carlbring et al. 2012). Several reviews are available, and in a recent Cochrane review on ICBT for anxiety disorders, the authors mention in the abstract: "This is a fast-moving area; we plan to update this review shortly, incorporating these new studies" (Olthuis et al. 2015, p. 1). In their review, they include 30 studies, with 2,181 participants. Of these studies, 50% had been conducted in Sweden. Overall, Olthuis and colleagues (2015) report large effects and conclude that therapist-supported ICBT appears to be an effective treatment for anxiety in adults. It should be added that Cochrane reviews are strict, and trials of lower quality and trials that were not CBT-based were not included.

For panic disorder with or without agoraphobia, eight trials were included in the Cochrane review (Olthuis et al. 2015). The first controlled trials were conducted in Sweden (Carlbring et al. 2001) and Australia (Klein et al. 2006). Overall, effects in comparison with a wait-list control have been large in these and in subsequent trials, as well as in trials on panic symptoms (Silfvernagel et al. 2012). Dropout rates generally have been low, but one exception is a trial from the Netherlands on panic symptoms, in which few participants completed the treatment (van Ballegooijen et al. 2013). Long-term effects have been reported, and at least three studies that directly compare face-to-face with guided ICBT show equivalent outcomes (Bergström et al. 2010, Carlbring et al. 2005, Kiropoulos et al. 2008).

SAD, which was formerly known as social phobia, is the anxiety disorder for which the most controlled trials have been conducted, and 11 trials are included in the Cochrane review (Olthuis

et al. 2015), although at least twice as many have been published. The first ICBT trial was from Sweden (Andersson et al. 2006), but many trials have since then been conducted in Australia (Titov et al. 2008), Switzerland (Berger et al. 2009), and Sweden (Tillfors et al. 2011), and there is also one trial from Spain (Botella et al. 2010). The Swedish treatment has been translated into Romanian and tested in a controlled trial that shows large between-group effects (Tulbure et al. 2015). Generally large treatment effects, low client dropout, and sustained long-term effects up to five years after treatment have been reported (Hedman et al. 2011c). The one exception is the small treatment effect found for Internet-delivered attention bias modification (Carlbring et al. 2012). There are no published trials on psychodynamic Internet treatment for SAD, but one trial in Sweden has recently been completed and shows promising outcomes. Finally, there are trials showing equivalent findings in direct comparisons of Internet treatment with face-to-face CBT (Andrews et al. 2011, Botella et al. 2010, Hedman et al. 2011b). Thus, independent research groups have found that it is highly likely that SAD responds to guided ICBT.

Generalized anxiety disorder has been studied as well, and four trials were included in the Cochrane review (Olthuis et al. 2015). The first trial was conducted in Sweden, but because of a delay in publication, the trial included a three-year follow-up (Paxling et al. 2011). The first trial in Australia was conducted about the same time but published earlier (Titov et al. 2009). One trial compared psychodynamic guided Internet treatment against ICBT and showed equivalent outcomes (Andersson et al. 2012b). To my knowledge, no direct comparison with face-to-face treatment has been published. Effects in the available trials have been moderate to large and stable, but adherence has varied, and in the first Swedish trial a substantial proportion of participants did not complete the treatment, although they completed the follow-up assessments (Paxling et al. 2011).

Only one trial on PTSD was included in the Cochrane review, but more have been published (Amstadter et al. 2009). PTSD is a condition that could be less responsive to Internet treatment; conversely, it could be more responsive because clients may feel less pushed than they feel during live exposure sessions. Several studies have been conducted using the Dutch "Interapy" program (Lange et al. 2003), and controlled studies from Germany (Knaevelsrud & Maercker 2007), the United States (Litz et al. 2007), Sweden (Ivarsson et al. 2014), and Australia (Spence et al. 2011) show moderate to large effects. Long-term effects up to one year posttreatment have been documented, but there are no published direct comparisons between guided ICBT and face-to-face treatment or any studies on treatments other than ICBT. Adherence and dropout rates have varied.

Few controlled trials have examined ICBT for obsessive-compulsive disorder (OCD) (with no study included in the Cochrane review). As with PTSD, this could be a condition for which face-to-face CBT would be clearly superior. This did not appear to be the case from the three controlled trials published to date (Andersson et al. 2012a, 2015; Wootton et al. 2013), as large effects were observed, and the effects appeared to be durable (Andersson et al. 2014a). Two trials are from Sweden and one from Australia. However, there are no direct comparisons with face-to-face CBT and no studies on treatments other than ICBT.

Severe health anxiety (formerly known as hypochondriasis) has been studied in two Swedish trials with large effects (Hedman et al. 2011a, 2014a). As with OCD, more studies are needed. Severe health anxiety is a condition that is stigmatizing; thus, Internet-delivered therapy is likely to increase access to treatment.

In spite of the fact that specific phobias are common, only two small Swedish trials have been published, with one on spider phobia (Andersson et al. 2009b) and the other on snake phobia (Andersson et al. 2013c). These were small trials in which guided ICBT was compared to one-session exposure treatment. The behavioral approach test results favored the face-to-face treatment, but this was not the case for the questionnaire measures. The two trials should be regarded as preliminary and need to be replicated (one was included in the Cochrane review).

Several controlled studies on mixed anxiety and depression have used either transdiagnostic (Titov et al. 2010b) or tailored (Carlbring et al. 2010) approaches. These studies have not yet been systematically reviewed, but results to date are promising, with moderate to large effects. One trial showed that tailored ICBT for anxiety disorders was as effective as diagnosis-specific ICBT (Berger et al. 2014).

Research Findings on Mood Disorders

Guided Internet-delivered psychological treatment has been tested in many trials with clients diagnosed with major depression or subclinical depressive symptoms. Several reviews of this literature have been published (Richards & Richardson 2012). A recent review that included studies published in the period between January 2013 to September 2014 found that as many as 11 controlled trials on Internet treatment for depression had been published only on guided treatments (Andersson et al. 2014b). That review also compiled the studies that had directly compared face-to-face and ICBT within the same trial (four trials). The overall random effects size was Hedge's $g = 0.12$ in the direction of favoring guided ICBT, but it was not significant. As concluded in the Cochrane review on anxiety disorders, the literature in this field is expanding rapidly. After the early controlled trials on guided ICBT were completed (Andersson et al. 2005), several controlled trials followed. Guided ICBT for depression has been found to work in controlled trials from Australia (Perini et al. 2009), Switzerland (Berger et al. 2011), Germany (Wagner et al. 2014), the Netherlands (Ruwaard et al. 2009), the United Kingdom (O'Mahen et al. 2014), and the United States (Mohr et al. 2013). Several formats of ICBT have been tested as well, such as email therapy (Vernmark et al. 2010), acceptance-oriented CBT (Carlbring et al. 2013), and smartphone-delivered CBT together with Internet support (Ly et al. 2014). Trials have been published on psychodynamic Internet treatment (Johansson et al. 2012a) and physical exercise (Ström et al. 2013). With regard to comorbidity, a study showed that tailored ICBT was better than standard ICBT for clients with more severe symptoms (Johansson et al. 2012b). Long-term outcomes have also been reported (Andersson et al. 2013b), and adherence and dropout rates appear to be the same as those for face-to-face treatments (van Ballegooijen et al. 2014).

Although there are many controlled studies on mild to moderate depression, whether Internet treatment is effective for more severe forms of mood disorder remains an open question. A patient-level meta-analysis indicated that more symptomatic clients benefited from self-help treatment (Bower et al. 2013), but clients with severe symptoms have been excluded from most trials. Internet-delivered relapse prevention was effective for persons with residual depression in one trial (Holländare et al. 2011), but no studies have yet shown convincing effects on bipolar disorder or dysthymia.

Research Findings on Somatic Disorders

Previously published reviews have examined the large number of trials on Internet treatments for somatic problems (Cuijpers et al. 2008, Hedman et al. 2012). A few of these conditions are briefly discussed here (see **Table 1** for a listing of other somatic conditions). In the field of chronic pain alone (including headache), many trials have shown small to moderate effects. The first studies on guided Internet treatment for headache (Ström et al. 2000) and chronic pain (Buhrman et al. 2004) were most likely from Sweden, and since then many other studies have followed. Tinnitus is a problem for which Internet-delivered CBT was developed early (Andersson et al. 2002), and this treatment had been disseminated in the year 1999 in Sweden in regular specialist health care. A recent meta-analytic summary showed moderate effects on tinnitus-related distress (Andersson

2015), and the treatment has also been translated and tested in Germany. In addition to CBT, an acceptance-oriented version of CBT has been developed (Hesser et al. 2012). Insomnia is a common problem and is often comorbid with many other disorders. Several researchers have developed Internet treatments for insomnia, and the first of these studies was conducted in Sweden (Ström et al. 2004). Several other programs have been developed since 2004, for example, in the United States (Ritterband et al. 2009) and the Netherlands (van Straten et al. 2014), but not all programs have been therapist guided. In a recent trial, guided ICBT was compared with group-based CBT and showed similar outcomes (Blom et al. 2015). Irritable bowel syndrome is a debilitating disorder for which there are now controlled trials on Internet-delivered CBT. The first controlled study was from the United States (Hunt et al. 2009), and four controlled trials have been conducted in Sweden; these studies show moderate to large effects (Ljótsson et al. 2010, 2011a,b, 2014). Other somatic conditions have been investigated as well, such as cancer, diabetes, sexual problems, hearing loss, and multiple sclerosis. Studies have also examined health behavior problems such as obesity and smoking. Not all have yielded treatment effects as large as those for the psychiatric conditions. For example, effects were small in a controlled trial from Sweden on ICBT for erectile dysfunction (Andersson et al. 2011).

Overall, it is probably correct to assume that guided Internet treatments for somatic conditions are about as effective (or ineffective) as face-to-face treatments (in the studies in which this comparison has been made). However, there is room for improvement, and it is possible that the most suitable clients are the ones with comorbid psychological distress for which tailored approaches might be feasible.

Internet Treatment for Other Conditions

Internet treatment has been developed for a few additional conditions and problems. For example, several studies have been conducted on Internet treatments for eating disorders (Loucas et al. 2014), and they show promising findings. An interesting approach is to focus on problems that are not necessarily associated with a specific diagnosis. In Sweden, a trial on stress management was conducted early (Zetterqvist et al. 2003), and there are controlled trials on perfectionism (Arpin-Cribbie et al. 2012), procrastination (Rozental et al. 2015), and infertility distress (Haemmerli et al. 2010), to give a few examples. Modules for problems such as loneliness and procrastination can be very useful, in particular for the tailored approach to Internet treatment mentioned previously.

Effectiveness and Cost-Effectiveness

It is reasonable to ask whether the findings observed in the efficacy trials can be replicated in more ordinary clinical settings with patients not being recruited via advertisement. These are commonly referred to as "effectiveness studies," and they examine whether a treatment works in real-world settings and in situations that clinicians encounter in their daily, routine practice (Hunsley & Lee 2007). A recent systematic review of ICBT effectiveness studies examined four controlled trials and eight open studies, involving a total of 3,888 patients (Andersson & Hedman 2013); the studies were on panic disorder, SAD, generalized anxiety disorder, PTSD, depression, tinnitus, and irritable bowel syndrome. Since that review was completed, further effectiveness studies have been published on, for example, depression (Hedman et al. 2014c) and social phobia (El Alaoui et al. 2015), and large datasets have been published from Canada (Hadjistavropoulos et al. 2014) and Australia (Titov et al. 2015). Taken together, these uncontrolled and controlled studies clearly suggest that Internet-delivered psychological treatments are effective in regular

health care. However, that the treatments tend to be delivered via centralized treatment centers, such as the Internet Psychiatry Unit at Karolinska University Hospital in Stockholm, Sweden.

Another issue concerns costs and cost-effectiveness, which can be difficult to measure because costs can be viewed from a societal perspective as well as from a treatment perspective. Thus, the costs of all types of health services as well as costs associated with production losses are included in such calculations. In one review, the authors found eight studies in which data on cost-effectiveness had been provided (Hedman et al. 2012). All studies were on ICBT. In the studies comparing ICBT to wait-list controls, the average probability of ICBT being a cost-effective treatment was 57% at a willingness to pay of zero. This suggests that ICBT is a cost-effective intervention compared with no treatment, even if society is unwilling to pay for additional cases of improvement. More recent studies confirm this observation, both when ICBT is compared with face-to-face therapy (Hedman et al. 2014b) and with a primary care setting (Bergman Nordgren et al. 2014).

KNOWLEDGE GAPS

Many outstanding uncertainties and knowledge gaps remain in this field. First, it has not yet been firmly established that guided Internet treatments are as effective as face-to-face treatments, although an increasing number of comparative studies find effect sizes similar to those of face-to-face trials (Andersson et al. 2014c). This relates to the second outstanding question, which concerns the predictors, moderators, and mediators of treatment outcome. The literature on predictors of outcome is growing, but still lacking are consistent findings and a clear message regarding moderators that would help us determine which client is suitable for Internet versus face-to-face treatment (Andersson et al. 2008b). For example, studies have failed to show that genetics predict outcome (Andersson et al. 2013a), and clinical characteristics such as symptom level, gender, and age are not consistently related to outcome. The ease of collecting weekly measures in Internet treatment studies makes it possible to study mediators of outcome, in particular in trials comparing two active treatments (Hesser et al. 2014). This may lead to insights regarding mechanisms of change, and given the relatively large sample sizes in Internet trials, sufficient statistical power can be obtained. Interesting findings may emerge by using brain-imaging techniques to predict outcome, although such techniques are still in their infancy (Månsson et al. 2015), and it will take some time before they can be useful in ordinary clinical settings. A third gap concerns client and clinician preferences and attitudes. Some studies suggest that clients may be more positive than clinicians when it comes to Internet-delivered treatments (Andersson 2014), particularly treatments for children and adolescents, and it is important to note that differences between countries may exist. For example, clinicians and clients in the United States may be less positive than Australians and Swedes (Mohr et al. 2010). Finally, research in this field is remarkably fast, partly because many time-consuming tasks in regular clinical trials are handled more rapidly in Internet trials, including recruitment via the Internet and completion of measures without the aid of a research assistant (which could be described as a "Toyota factory" equivalent way of running clinical trials). This speeds up the research process dramatically, but it also means that the right questions must be asked in research. For example, a recent trial investigated the added value of the medication D-cycloserine versus placebo as an adjunct to ICBT for OCD (Andersson et al. 2015). The trial is probably the largest to date in this emerging field of combining medication and CBT in association with exposure treatments. I suspect that too much research has been done with a focus on how regular psychotherapy works at the expense of investigating the unique variables that may be important in Internet treatment, for example, knowledge acquisition and viewing psychological treatment as patient education. However, whether this way forward is feasible remains to be seen.

FUTURE DIRECTIONS

The first and foremost future challenge for clinical psychology is to consider using the Internet and modern information technology (such as smartphones) in regular clinical services and to complement and blend technology with usual clinical practice. This use of technology concerns not only treatment but also assessment procedures and potentially ways to boost face-to-face treatment by focusing more on knowledge retention in psychological treatments and transfer of knowledge into the lives of the clients.

The second challenge for the future is to start doing research on more severe problems that have so far not been addressed with Internet-delivered therapy. For example, it is possible that Internet services could be used as adjuncts to other treatments for psychosis, suicidality, and personality disorders. Work in these areas is under way but will require that Internet treatment be regarded as part of other services and not as something separate. Thus, the blending of Internet and face-to-face therapies is likely to become more common. This blending may also cut costs

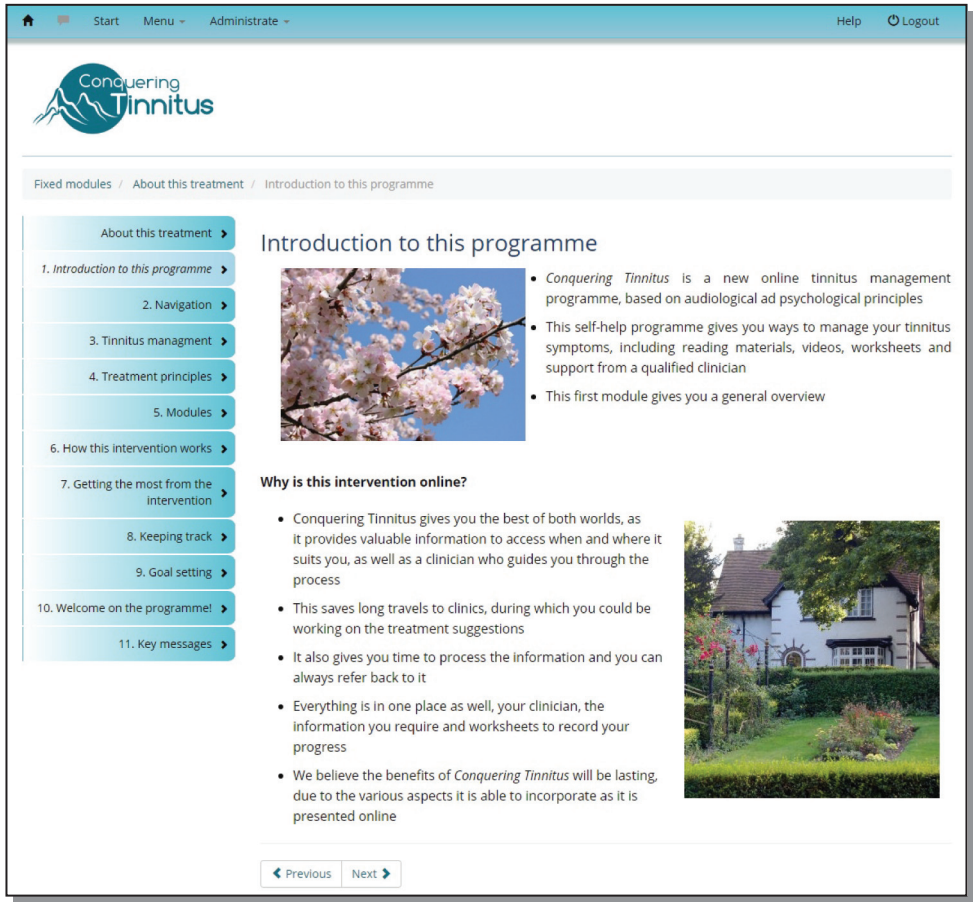

Figure 1

A screenshot from an Internet-delivered psychological treatment program for tinnitus (translated and adapted from Swedish into English).

while still maintaining effects; for example, in one trial, a smartphone app was used as a way to reduce the number of face-to-face sessions in the treatment of depression (Ly et al. 2015).

The third challenge is to take on the task of disseminating evidence-based psychological treatment beyond the Western world. Internet treatments can be culturally adapted and translated into other languages, and an increasing number of studies show that this can be feasible (for example, Internet treatment in Arabic language; Wagner et al. 2012). Such dissemination would not be competing against existing services but rather reaching out to clients with no other treatment services available. However, it is yet not clear how well Internet treatments can be tailored because to date they involve at least some standardization, and face-to-face treatments (for example, with an interpreter) may be more flexible when it comes to handling large variations in client characteristics. An example of a translated program (for tinnitus) is presented in **Figure 1**.

CONCLUDING COMMENTS

This review covers a large and rapidly growing literature on Internet-delivered therapy that has implications for clinical psychology and the practice of psychological treatment. Although much is known and a substantial evidence base already exists in terms of controlled Internet treatment trials, many questions remain for future research. Internet-delivered psychological treatment may be as effective as face-to-face treatment for some clients, but for others, Internet treatment may not be suitable. The problem is to identify who will and who will not benefit from Internet treatment. It is possible that some clients may be better helped by Internet treatment from a distance than from seeing a therapist in session. Finally, the most likely scenario for the future will be a blending of Internet and face-to-face services to decrease costs and help more clients.

DISCLOSURE STATEMENT

The author has published books related to the topic but has no other conflicts of interest.

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