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# Internet-Delivered Cognitive Behaviour Therapy

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Additional information is available at the end of the chapter

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## Abstract

The delivery of cognitive behaviour therapy over the internet (iCBT) has developed in tandem with recent technological advancements. In this chapter, we briefly explore the background of iCBT and its ongoing evolution in the relatively short period that has been available. We summarise the empirical evidence that supports the efficacy and effectiveness of iCBT in different settings, and for different populations. We provide an overview on how an iCBT platform works for service users, and we offer some thoughts on the processes involved in repurposing an evidence-based treatment protocol into an online format. Using iCBT service, users can avail of the benefits of cognitive behaviour therapy in a flexible manner, with or without support. The case presentation provided an illustrative on some of these advantages and highlights opportunities for the individual. The service delivery examples describe the use of iCBT and its application in different contexts. Lastly, we discuss several areas of importance for the future research and practice of iCBT.

**Keywords:** internet-delivered cognitive behaviour therapy, psychological treatments, brief therapeutic interventions, depression and anxiety disorders

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## 1. Introduction

In recent decades, technological developments have significantly changed people's lives. The pervasiveness of technology has impacted almost every aspect of living in the modern world. Countless examples are illustrative of this influence, including almost complete automation of many communication tasks through e-mail, instant messaging, etc. This technological revolution has impacted how we socialise, shop, bank, learn, travel, and live our lives. The changes that these developments have delivered have been massive and have not gone unnoticed by health care professionals.

Cognitive behaviour therapy (CBT) is the most widely researched and established evidence-based treatment for psychological disorders [1]. In recent years, internet-delivered cognitive behaviour therapy (iCBT) interventions have become a method for the dissemination of evidence-based treatments for a broad range of psychological disorders including depression and anxiety. More recently, iCBT is being used to address the psychological distress associated with the management of long-term conditions in individuals with, for example, diabetes, coronary heart disease, and chronic pain.

The first complete cognitive behaviour therapy (CBT) treatment was delivered through the use of compact disc-read only memory (CD-ROM) that contained the full programme, such as *Beating the Blues*. As technology developed and the web evolved, such treatments were offered entirely online, thus heralding the dawn of internet-delivered interventions (e.g., *MoodGym*). The majority of internet-delivered interventions deliver cognitive behaviour therapy (CBT)-based treatments, as it is a structured and modular-based treatment that lends itself readily to being repurposed into an online format.

Internet-delivered treatments are named variously as online interventions, web-based interventions, e-therapy, e-health, and computerised cognitive behaviour therapy (cCBT) [2]. Some of the developments in the field have used brand names such as *Interapy* for PTSD [3], *Deprexis* for depression [4], and *SilverCloud* for depression, anxiety, and long-term conditions management [5]. Technology-delivered psychological interventions have a rich history, and it is still very much a developing field of study and clinical practice.

Results profit from many features and benefits of web development and design, where CBT protocols have been repurposed for use online. These features include the use of multimedia, open and unlimited access to the intervention, as well as delivering a secure platform, which protect the service users' confidentiality and data. Internet-delivered treatments place the pace and direction of the treatment in the hands of the service users and reduce the burden on therapists' time. The capacity to deliver evidence-based treatment protocols in this way could have enormous impact on healthcare provision into the future, some of which we have already seen today.

This chapter focuses on internet-delivered cognitive behaviour therapy (iCBT) interventions for depression and anxiety as a way of illustrating the field of internet interventions. It will describe their development, adoption, and implementation in various settings, including, for example, healthcare and employee assistance programmes. We begin by summarising the empirical evidence that supports the use of iCBT interventions for depression and anxiety disorders. After that, we will describe iCBT interventions function in practical terms. This description will illustrate using a case study example. Service delivery examples follow, which help demonstrate the flexible use of iCBT in various settings. The chapter will end by addressing future directions for both academic study and the practical implementation of iCBT.

## 2. Empirical support for internet-delivered cognitive behaviour therapy

Apart from some early research on computerised cognitive behaviour therapy [6, 7], efficacy trials began in earnest from the year 2000, and in recent years there has been a verifiable explosion

in the number of published reports that support iCBT for a broad range of psychological disorders. Most notably, clinical trials have established a sound empirical base for the treatment of the major depressive disorder and a range of anxiety disorders (social anxiety, panic disorder, and generalised anxiety disorder) and emerging evidence for others (severe health anxiety, specific phobias).

Given the high prevalence of depression and anxiety disorders and their global ubiquity, interest on iCBT has grown due to its potential to support the dissemination of evidence-based CBT. It is fair to say that internet-delivered cognitive behaviour therapy interventions find their historical roots in the treatment of depression and anxiety disorders. Several meta-analytic studies have now demonstrated the efficacy of iCBT for depression. The earliest of these studies included computerised and internet-delivered interventions, and consistently reported the same results that iCBT is effective as an intervention for the treatment of depression. Andersson and Cuijpers [8] examined a group of 12 studies and reported an overall post-treatment effect size of  $d = 0.41$  versus control groups. Their analysis showed that the effect size estimate was moderated significantly between supported ( $d = 0.61$ ) and unsupported ( $d = 0.25$ ) treatments. Another systematic review and meta-analysis conducted by Richards and Richardson [9], examined the efficacy of computer-based psychological interventions for depression and concluded that, while the outcomes of computer-assisted interventions for depression are generally positive, these results also vary depending on the type of support provided throughout the intervention. Specifically, therapist-supported studies demonstrated the highest effect size at post-treatment and follow-up ( $d = 0.78$ ), followed by administrative-supported studies ( $d = 0.58$ ); that is, the non-therapeutic support provided. Interventions that did not include a support component obtained the lowest estimated effect size ( $d = 0.36$ ). The results support the inclusion of any form of support, either a professional therapist, or a trained para-professional, or indeed a trained peer volunteer, or technician, as beneficial for optimising the efficacy of iCBT interventions [5, 10, 11]. Also, a recent individual service user data meta-analysis has shown that adherence to treatment predicts better outcomes [12].

The ability of internet-delivered interventions to maintain clinical gains at follow-up can contribute significantly towards their acceptability, adoption, and implementation in clinical practice. Many trials incorporated follow-up to 6- or 12-months post-treatment [13–15], demonstrating that iCBT has the potential to achieve and maintain significant clinical gains for service users. A smaller number have shown lasting impacts up to 3-years post-treatment [16, 17]. In one non-inferiority controlled trial of iCBT for depression that included a face-to-face control group, 3-year follow-up data demonstrated sustained improvements for both groups, with no significant differences between them [16].

Achieving outcomes that are similar to what has been offered in face-to-face treatments for depression only strengthens the validity of iCBT interventions for depression. A small number of trials have attempted this comparison, and in a review of this work, the authors [18] concluded that any differences were non-significant. In fact, they report that the effect size ( $g = 0.12$ ) favoured the supported iCBT over the face-to-face interventions. What is not clear and requires further attention is whether the mechanisms of change that facilitate the success of face-to-face interventions are equally relevant in iCBT interventions [19].

The science in this area is rapidly expanding with trials conducted in countries including Ireland [5], Switzerland [14], Germany [20], Australia [21], England [11], Canada [22], and the USA [23]. Besides, while most of the work has been with adults, there is some work with adolescents [24]. Recent avenues for research in iCBT for depression have included the cultural adaptation of interventions [25] and tailoring interventions to more appropriately meet the needs of individual users [26].

A similar picture of clinical efficacy for the anxiety disorders is established with trials for panic disorder, social anxiety disorder (SAD), generalised anxiety disorder, specific phobias, and severe health anxiety. The most recent review contributing to our understanding of the efficacy of iCBT for anxiety disorders is a Cochrane review on therapist-supported iCBT for anxiety disorders that included 30 studies [27].

The review [27] consisted of eight trials for panic disorder with or without agoraphobia and showed significant post-treatment and follow-up effects for iCBT for panic compared to waiting list controls. Some of these trials included a direct comparison with face-to-face treatment and demonstrated comparable outcomes. The evidence for panic disorder treatment delivered online is therefore good, although the diversity of trials and interventions is limited. Eleven trials of iCBT for social anxiety disorder (SAD) treatment were included in the review. Several different groups have researched treatment protocols for SAD and demonstrated large post-treatment and follow-up results, with effects being maintained up to 5-years [28]. What is also interesting is the comparison of iCBT for SAD with face-to-face treatment, and similar to panic disorder there is some good evidence to show similar outcomes [29].

Due to strict eligibility criteria, the Cochrane review included only a small proportion (four studies) of the available literature on generalised anxiety disorder (GAD). Another recent systematic review and meta-analysis of internet-delivered interventions for GAD considered a total of 17 studies and included 11 in a meta-analysis, where the treatment intervention delivered in 9 of the 11 studies was cognitive behaviour therapy [30]. Three of these studies are disorder specific, with interventions that directly addressed GAD [31–33]. The remaining six studies were transdiagnostic, treating either multiple anxiety disorders [34–36] or anxiety disorders and depression [21, 37]. The review concluded that across the studies there were significant improvements for internet-delivered interventions for GAD compared to waiting list controls.

Preliminary research has emerged that supports the use of iCBT in the treatment of severe health anxiety and specific phobias, but more studies are needed to establish this method in treating these disorders [38–41].

### **3. How does internet-delivered cognitive behaviour therapy function?**

Throughout this chapter, we use the generic term ‘service user’ to include patients, clients, or other types of users of iCBT in different settings. Likewise, we use ‘supporter’ as a category to include clinicians, para-professionals, healthcare workers, nurse practitioners, peer mentors, technicians, and volunteers who may be providing support to service users of iCBT interventions in different settings.

Service users can avail internet-delivered CBT in several ways, the two most common methods being through self-sign-up or via an invitation from a supporter. Self sign-up to iCBT occurs where the service user acquires access automatically through a website of a particular provider organisation (e.g., healthcare, employer, and educational) without the need for a formal triage or assessment. One example of this would be an employee having access to an internet-delivered stress management intervention as part of his/her employee assistance intranet. In contrast, an invitation from a supporter can be generated from the platform to a service user. In some cases, supporter sign-up involves an initial assessment of psychopathology and suitability for an iCBT intervention (e.g., in a mental health service setting or a university counselling clinic setting). For the purpose what follows, the treatment pathway within a mental health service organisation will be used to illustrate how iCBT functions.

Post clinical assessment, a service user can be identified as suitable and be requiring an iCBT intervention. They provide their e-mail address to their supporter (clinician in this setting), who then invites them through their supporter account on the platform to use the intervention. An e-mail is posted to the service user that provides them with some preliminary information about the platform and a definite URL/web link that directs them to the sign-up process. The service user will then be prompted to create a unique username and password. As with all online utilities associated with potentially sensitive information, users should be required to create a password that is composed of upper and lowercase letters, numbers and special characters. Once the service user has completed the necessary sign-up steps, they will gain access to their intervention.

In a supported mode of treatment, service users are expected to log-in to their account several times throughout the prescribed course. The supporter is supposed to review the service users' progress at regular, pre-determined intervals. These core expectations should be presented to the service user from the outset, along with other goals that may be of importance to the service providing the iCBT intervention. Support to iCBT is provided in one of two modalities:

Synchronously: where both the service user and supporter are online at the same time, and the review is conducted over video conferencing or live chat.

Asynchronously: where the service user and supporter are online at different times to engage with the programme content and providing a review, respectively. This type of contact takes the form of either e-mail or post-session review on the iCBT platform.

As with all psychological treatments, service user reported outcomes are an important aspect of iCBT. Incorporating an assessment protocol for treatment can provide a supporter with further insight into the progress of the service user. For example, a series of measures on depression, anxiety, or other related constructs could be applied at baseline, at the intervals corresponding to the date of review set by the supporter and subsequent discharge. Administering the measures through an iCBT platform would allow supporters to gauge the improvement (or deterioration) of the service user over the course of their use of the intervention, where the information is presented in an easy-to-interpret manner. Assessments conducted in this way facilitate the assessment of risk during the intervention and automated alerts can be established to inform supporters to take appropriate action.

In general, an iCBT intervention will consist of modules that reflect the active ingredients of a CBT protocol, such as behavioural activation, cognitive restructuring, problem-solving, and self-monitoring for instance. Usually, the modules are designed to be administered on a weekly basis. These modules can be presented in either a prescriptive or non-prescriptive fashion. A prescriptive intervention will require service users to go through modules in a specific order, where certain items unlock depending on the service user's progress, while a non-prescriptive intervention will allow the service user to access the modules in any order they choose. The core skills and strategies of a CBT intervention will also be incorporated through the various interactive activities that help the service user learn new concepts and skills and apply their new learning. For example, service users should be able to know about the relationship between their thoughts, feelings, and behaviours, and later apply this through an interactive activity that helps them to create their own thought-feeling-behaviour cycles. Furthermore, the pedagogy of iCBT typically includes personal stories or clinically informed vignettes of fictitious service users. These are presented with a specific symptomatology, or they may also illustrate how to apply specific CBT skills as a way of providing examples that facilitate the integration of the content. Users can return to prior modules and review specific content if they feel the need to do so. Once the user finishes with the intervention, they are assessed to determine whether the intervention has been effective or if they require further assistance.

### 3.1. The process of developing an iCBT programme

Before deployment to service users, an iCBT intervention will go through several rounds of research, development, and testing by an interdisciplinary group of psychologists, software developers, and user experience (UX) designers.

**Psychologists:**

These individuals are involved in the researching and writing of the psychoeducational/interventional content on the iCBT platform, where the content requires validation and they may lead to research trials to establish the efficacy of the intervention.

**User experience (UX) designers:**

When designing an iCBT platform, a critical component is the user experience and acceptability, where the display of content is unappealing, or a therapeutic tool is poorly designed, the service user will not interact with it. UX designers work to create a user-friendly and appealing experience for any service user.

**Software developers:**

This group takes what psychologists and UX designers create, and implement it online. Another side to this role is coding the entire platform, as well as ensuring that everything is working as intended, such as any data collection measures and the functionality of tools.

Initially, a review of the literature is conducted on the treatment protocols for the disorder the iCBT intervention intends to target. From this, a content map is developed; this document details the structure of the iCBT programme, the content of the modules, as well as the therapeutic goals and intended user objectives for service users. The preliminary content map is circulated to subject matter experts in the field for further feedback and critique. With the final

draft of the content map, a beta version of the intervention is designed online, which is then administered to users for acceptability and usability testing. This will provide an insight into the needs and experiences of the target populations. Once all feedback has been gathered and applied, the intervention can then be implemented into service provider settings and research can be conducted to establish its efficacy and effectiveness.

Key points in developing an iCBT intervention:

1. Include evidence-based and empirically supported content.
2. Incorporate subject matter experts' (SMEs) clinical expertise.
3. Deliver the intervention on robust, engaging, secure, and responsive technologies.
4. Be service user-centric and involve users in the development and testing.
5. Undergo research and evaluation to support its efficacy and effectiveness.
6. Deliver effective clinical outcomes for service users [42].

#### 4. Case presentation

Karen is a 35-year-old divorcee with two children in shared custody with her ex-husband. She has a degree in chemistry, and she works in a ceramic company as a full-time laboratory assistant. She lives in a small village with her two children.

Two years ago, Karen suffered a sudden panic attack for the first time when she was in a shopping centre with a friend. She went to the emergency room because she thought she was about to suffer a heart attack. The doctor told her that it was anxiety and that her heart was fine, so she was prescribed anxiolytics by the doctor on duty. Medication resulted in a reduction of her symptoms, and she got better quite quickly. However, she developed a fear of suffering more panic attacks, so she started to avoid specific activities such as taking public transport or attending school meetings, as she was worried about the possibility of suffering high levels of anxiety and not being able to escape from those situations without other people noticing. Over time, she started to develop higher levels of awareness of interoceptive symptoms, and Karen started noticing the beats of her heart while she was in bed, along with other ordinary signs that she believed were dangerous, so she decided to avoid other activities, such as drinking coffee and working out.

Despite the burden of these limitations, Karen continued with her routine, and it was not until 1 year later, when she suffered another panic attack while attending a family event, that she decided to take matters into her own hands. She went again to the emergency room, and she was given medication and seen by the psychiatrist on duty. It was explained to her that she most likely had an anxiety disorder and that she needed to receive psychological therapy. Therefore, she made an appointment with her GP, who after a brief assessment, decided to refer her to specialised care. Karen was then enrolled on a waiting list which took 1 month for the first screening with the psychologist, given that it was not a severe condition. However, during that month,



the panic attacks became more frequent and intense. Innocuous situations such as watching TV or washing the dishes could trigger an attack, and they even occurred in the middle of the night. After being screened by the psychologist, Karen was diagnosed with Panic Disorder and Agoraphobia, meeting all the criteria of the DSM-V, and she also obtained a clinically significant score on the Panic Disorder Severity Scale. She made an appointment for further face-to-face therapy; however, factors such as the distance to the service, the difficulty to fit her work schedule with the schedule of the service, and not least the care of her children, prevented her from attending regularly. Given this situation, the psychologist offered her the possibility of being enrolled in a supported iCBT programme that had proven to be effective for this disorder. Karen always enjoyed independent learning, therefore, she felt more enthusiastic about the online treatment. Furthermore, the possibility of accessing the programme at any time and in any location, allowed her to juggle taking care of her children, her work and receiving psychological treatment.

In the morning, she received an e-mail to create an account on the platform, and once she logged in, she received a message from her supporter. The treatment comprised eight modules that she could complete on a weekly basis and the supporter would give her feedback on her progress at the end of every week. In treatment, she benefitted a lot from knowing the rationale of the panic attacks and knowing the anxiety curve, since she learned through this that anxiety was not dangerous. Moreover, the personal stories included in the programme made her feel that she was not alone and she identified with the stories. Every week she was encouraged to do homework tasks, and she shared the activities with her supporter, who acknowledged her progress and encouraged her to keep going.

She found the CBT techniques very useful and practiced these when she began to negatively interpret her physical sensations, allowing her to address these negative thoughts, and to reduce her worrying. She practiced these techniques for some weeks, and she reviewed the content to ensure she was applying them correctly. For Karen, the most beneficial part of the iCBT intervention was the exposure component. She was able to identify which physical feelings produced her fear and she rated them by intensity. She developed a graded exposure hierarchy and started practicing these exercises each day. She was very pleased with herself, when, after a few weeks of treatment she looked at the mood chart and realised that her symptoms had decreased and that she was feeling much better. Once she finished the modules, she made an appointment with the psychologist for the post-treatment assessment, at which point Karen's symptoms had reduced to asymptomatic ranges. Karen was delighted that she had succeeded in facing her anxieties.

## 5. Service delivery examples

The following examples serve to illustrate the flexibility and adaptability of iCBT in various settings. The examples also show some real-world benefits of this mode of delivering interventions.

## 5.1. Workplace interventions using iCBT

Within a workplace environment, it is known that depression and anxiety are detrimental not only to individual's wellbeing and quality of life but also to employers and companies, through accumulated absenteeism (absence from work due to illness) and presenteeism (lost productivity while attending work when sick).

iCBT has already been tested in the workplace environment and produced positive results for some outcome measures, including distress, anxiety, sleep, and productivity. Employees can be made aware of the tools available to them for stress, depression, and anxiety related to their work. However, within the employee space, it can be difficult to access face-to-face counselling and therapy due to stigma, fears about confidentiality, and potential judgement from peers. Using an internet-delivered intervention helps to overcome some of the barriers for seeking and accessing treatments.

Employees can, for instance, access a unique webpage where they may complete some screening measures to establish levels of symptoms and after that directed to appropriate content. As individuals progress through the intervention, clinical staff provides support and feedback through the online reviews. Measures of symptomology and productivity can be collected to assess the overall effect.

iCBT in the workplace enjoys the same advantages as in other services including increased access, for example, in companies with several locations wherein the support could come from a central location. Anonymity when accessing the program tackles the barrier associated with stigma, and constant availability allows the worker to access the program at suitable times. Lastly, service users can also return to the information and content for months after the intervention ends.

## 5.2. ICBT in IAPT services

The UK National Health Service (NHS) Improving Access to Psychological Therapies (IAPT) programme is a five-step approach aimed to facilitate access to psychological care for individuals with depression and anxiety disorders. It endeavours to alleviate the burden and reduce the costs associated with these conditions. Specifically, IAPT follows an escalated treatment pathway depending on the severity of service users. Step 1 includes watchful waiting by general practitioners; step 2 offers low-intensity interventions (i.e., iCBT, bibliotherapy) for service users with mild to moderate conditions; step 3 includes high-intensity treatment (i.e., face-to-face); step 4 offers specialist mental health care; and step 5 provides in-patient procedures.

As mentioned, iCBT recommended as a low-intensity intervention for service users with mild to moderate symptoms (step 2). These interventions are aimed to provide evidence-based treatments that reduce therapist time [43]. They are supported by Psychological Wellbeing Practitioners, who are graduate psychologists with training in delivering low-intensity interventions, and support is offered through electronic communication means or by telephone. However, at step 3, some IAPT providers may struggle with waiting lists, given the high levels

of demand and the lack of trained clinicians. Therefore, iCBT is considered as a supportive tool implemented as a prequel to high-intensity therapy at step 3, for individuals with depression and anxiety disorders. In this particular case, a therapeutic package is offered to those eligible for step 3 that includes iCBT before commencing face-to-face or group treatment. Individuals using iCBT are informed that they can withdraw from the treatment at any point and still avail of other services. Service users are monitored weekly, and any deterioration in their symptoms is attended to. If an appointment for face-to-face therapy becomes available, they are then offered to begin this high-intensity treatment.

Service users are given immediate access to the platform so that they can start their treatment while being supported by their clinician. Each week throughout the intervention, service users complete a minimum data set, as per the national requirements regarding IAPT services, which includes the care provided to each service user and his/her clinical progress. The clinician reviews these assessments and the progress of the service user on a weekly basis. In this sense, the clinicians are not only expected to review the progress of the service users, but also to keep service users adhered to the intervention by acknowledging the efforts that the service users are taking, and by encouraging them to log on to the platform and practice the exercises. Once the service user finishes with the interventions, they can follow some potential trajectories in the treatment pathway. Firstly, the service user may recover and therefore get discharged from the service. Secondly, the service user might continue needing high-intensity therapy and consequently, would take up face-to-face or group therapy. Finally, it may be the case that the service user would prefer to continue with other low-intensity treatments (i.e., bibliotherapy). In sum, iCBT at stage 3 is expected to reduce the burden of the waiting lists by providing a treatment at the time the service users are waiting to start with the high-intensity therapy.

### 5.3. Primary care using iCBT in US health systems

In the US, healthcare systems are service bodies that provide physical and mental healthcare to large populations with diverse and changing needs of some primary, secondary and tertiary settings. They are also known as accountable care organisations (ACOs), which consists of one or several care providers uniting to provide mapped-out models of care under a pre-defined and limited budget.

Healthcare commission solutions are innovative, cost-effective, and evidence-based with proven clinical outcomes. Where users of healthcare services enter a treatment pathway principally through primary care, iCBT can be an efficient first step for those that present with mild to moderate mental health difficulties. Service users frequently present with depression and anxiety to primary care clinics, and physicians generally refer service users to face-to-face treatment services, which often have long waiting lists. Deploying an iCBT intervention into primary care can address these difficulties without the need for a referral to higher intensity face-to-face services, allowing for a form of treatment which is more efficient in its use of resources.

In considering the successful implementation of an iCBT intervention in primary care, the service user pathway is important. When service users present for routine assessment, they can be administered either the 9 or 4 item version of the Patient Health Questionnaire to assess symptom severity. If the service user is within a clinical range of symptoms, they can

be signed up for the iCBT intervention in a supported or unsupported modality. Primary Care Physicians (PCP) could create a referral in the patient management system and this could be managed by care advocates in the system, to onboard the service user to the iCBT platform. The platform content can be explored independently by the service user on either a smart-phone or computer and their progress can be reviewed at pre-determined intervals set by the healthcare provider. Where technology allows, service user risk is routinely monitored, and alerts can be generated when a specific risk is flagged, which can then be escalated appropriately within service frameworks.

#### **5.4. Blended delivery using of iCBT**

In many US and UK behavioural health services, CBT is the treatment of choice and is typically delivered face-to-face for a period of between 12 and 16 sessions, depending on the presenting problem. Many of these health services face the continuous challenge of meeting the demands with a lack of trained resources to see people face-to-face. Recently, such services are investigating the utility of incorporating iCBT in innovative ways. In some cases, an implementation is a blended approach, where services now deliver a model of care that includes both face-to-face and internet-delivered CBT. This can be achieved in many different formats, for instance where service users are assessed and after that complete their first face-to-face session with their CBT therapist. After that, the service user has access to the iCBT platform where they are encouraged to access the intervention in the time between the sessions. In this model, the sessions are spaced at intervals of every two or even 3 weeks. The intention is that the service user receives both face-to-face support, but also has access to content and tools between sessions that enable and support their trajectory through their therapy.

This model of implementing a blended service has the advantage of increasing throughput of service users, embracing the benefits of early intervention to treatment, and preventing drop-out from long waiting lists. In these ways, successfully implementing a blended care model could have significant implications for service development and delivery.

### **6. Future directions**

The efficacy of iCBT in addressing the symptoms of depression and anxiety disorders has been presented. However, more effectiveness studies conducted in various settings are needed to examine the potential barriers and find appropriate solutions for successfully implementing iCBT. It would seem reasonable to understand that achieving solutions for implementation will be critical to support large-scale adoption of iCBT in practice.

Another issue which merits further study is the effect of mechanisms of change, that is, the underlying factors that aid the efficacy of the interventions. Understanding these mechanisms further will allow for the adaptation of the content to the specific needs of each service user, improving the provision of these treatments in a more efficient way (determining precisely what works and for whom). Indeed, to date, little has been achieved in understanding the relative contribution of mechanisms of change to specific outcomes in iCBT [19]. Further, studies with

large sample sizes or individual data meta-analyses are needed to be able to detect any effects of different variables, such as sociodemographic factors or personality traits (i.e., neuroticism).

Lastly, different modes of implementation of iCBT interventions need also to be explored further. Recent reviews suggest that mobile interventions are also a feasible tool for delivering interventions as a standalone treatment or as an adjunct to face-to-face therapy [44]. Furthermore, innovative devices, such as apps or wearables, could facilitate the inclusion of ecological momentary assessments that allow a more accurate data collection. Hence, more research is needed to explore possibilities for integrating these devices with iCBT. The potential for blended treatments, in which internet interventions act as a supportive tool for the face-to-face therapy, should not go unnoticed. However, this field still needs more research to explore the best ways to integrate both forms of treatment [45].

## 7. Conclusions

To conclude, iCBT is an evidence-based intervention that can address the symptoms of depression and anxiety disorders. Technological advancements have allowed for the development of robust platforms and interactive content. Research has focused on the efficacy and effectiveness of these, and outcomes have been positive and encouraging. The intervention has cemented itself as a valid alternative to face-to-face or group therapy in a wide range of settings. In contexts such as primary care where, apart from pharmacological treatments, no specific psychological therapy may be offered, it can create simple service user pathways that allow for the treatment of depression and anxiety presentations. In psychological services, it can be administered to service users on waiting lists to manage their symptoms while they wait for face-to-face therapy to become available. As part of employee assistance programmes, iCBT can play a role in reaching workers and equipping them with skills that they can use to manage stressful life events. While future research should attempt to focus on the role of the supporter in the iCBT process, the science of implementing iCBT, alternative methods of delivery (applications, wearables), and mechanisms of change, the scope of the literature to date, summarised in this chapter, shows the undeniable advantages of iCBT. Its use will only increase as further research in this young field truly taps into the potential of iCBT to improve the management and quality of life of service users along the way.

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## References

- [1] Nathan PE, Gorman JM, editors. *A Guide to Treatments that Work*. New York: Oxford University Press; 2015
- [2] Barak A, Klein B, Proudfoot J. Defining internet-supported therapeutic interventions. *Annals of Behavioral Medicine*. 2009;**38**:4-17
- [3] Lange A, Van den Ven JP, Schrieken B. Interapy: Treatment of post-traumatic stress via the internet. *Cognitive Behaviour Therapy*. 2003;**32**:110-124
- [4] Meyer B, Berger T, Caspar F, Beevers GC, Andersson G, Weiss M. Effectiveness of a novel integrative online treatment for depression (Deprexis): Randomized controlled trial. *Journal of Medical Internet Research*. 2009;**11**:e15
- [5] Richards D, Timulak L, O'Brien E, Hayes C, Vigano N, Sharry J, et al. A randomized controlled trial of an internet-delivered treatment: Its potential as a low-intensity community intervention for adults with symptoms of depression. *Behaviour Research and Therapy*. 2015;**75**:20-31
- [6] Selmi PM, Klein MH, Greist JH, Sorrell SP, Erdman HP. Computer-administered cognitive-behavioral therapy for depression. *American Journal of Psychiatry*. 1990;**147**:51-56
- [7] Colby KM, Colby PM. *Overcoming depression*. Malibu, CA: Artificial Intelligence Works. 1990
- [8] Andersson G, Cuijpers P. Internet-based and other computerized psychological treatments for adult depression: A meta-analysis. *Cognitive Behaviour Therapy*. 2009; **38**(4):196-205
- [9] Richards D, Richardson T. Computer-based psychological treatments for depression: A systematic review and meta-analysis. *Clinical Psychology Review*. 2012;**32**:329-342
- [10] Titov N, Andrews G, Davies M, McIntyre K, Robinson E, Solley K. Internet treatment for depression: A randomized controlled trial comparing clinician vs. technician assistance. *PLoS One*. 2010;**5**:e10939
- [11] Gilbody S, Brabyn S, Lovell K, Kessler D, Devlin T, Smith L, et al. Telephone-supported computerised cognitive-behavioural therapy: REEACT-2 large-scale pragmatic randomised controlled trial. *British Journal of Psychiatry*. 2017;**210**:362-367
- [12] Karyotaki E, Riper H, Twisk J, Hoogendoorn A, Kleiboer A, Mira A, et al. Efficacy of self-guided internet-based cognitive behavioral therapy in the treatment of depressive symptoms: A meta-analysis of individual participant data. *JAMA Psychiatry*. 2017;**74**:351-359
- [13] Andersson G, Bergstorm J, Holländare F, Varlbring P, Kaldö V, Ekselius L. Internet-based self-help for depression: Randomised controlled trial. *British Journal of Psychiatry*. 2005;**187**:456-461

- [14] Berger T, Hämmerli K, Gubser N, Andersson G, Caspar F. Internet-based treatment of depression: A randomized controlled trial comparing guided with unguided self-help. *Cognitive Behaviour Therapy*. 2011;**40**:251-266
- [15] Montero-Marin J, Araya R, Perez-Yus MC, Mayoral F, Gili M, Botella C, et al. An internet-based intervention for depression in primary care in Spain: A randomized controlled trial. *Journal of Medical Internet Research*. 2016;**18**:e231
- [16] Andersson G, Hesser H, Veilord A, Svedling L, Andersson F, Sleman O, et al. Randomised controlled non-inferiority trial with 3-year follow-up of internet-delivered versus face-to-face group cognitive behavioural therapy for depression. *Journal of Affective Disorders*. 2013;**151**:986-994
- [17] Ruwaard J, Schrieken B, Schrijver M, Broeksteeg J, Dekker J, Vermeulen H, et al. Standardized web-based CBT of mild to moderate depression: A randomized controlled trial with a long-term follow-up. *Cognitive Behaviour Therapy*. 2009;**38**:1-19
- [18] Andersson G, Cuijpers P, Carlbring P, Riper H, Hedman E. Internet-based vs. face-to-face cognitive behaviour therapy for psychiatric and somatic disorders: A systematic review and meta-analysis. *World Psychiatry*. 2014;**13**:288-295
- [19] Mogoase C, Cobeanu O, David O, Giosan C, Szentagotai A. Internet-based psychotherapy for adult depression: What about the mechanisms of change? *Journal of Clinical Psychology*. 2017;**73**:5-64
- [20] Wagner B, Horn AB, Maercker A. Internet-based versus face-to-face cognitive-behavioral intervention for depression: A randomized controlled non-inferiority trial. *Journal of Affective Disorders*. 2014;**152**:113-121
- [21] Titov N, Dear BF, Schwencke G, Andrews G, Johnston L, Craske MG, et al. Transdiagnostic internet treatment for anxiety and depression: A randomised controlled trial. *Behaviour Research and Therapy*. 2011;**49**:441-452
- [22] Hadjistavropoulos HD, Nugent MM, Alberts NM, Staples L, Dear BF, Titov N. Transdiagnostic internet-delivered cognitive behaviour therapy in Canada: An open trial comparing results of a specialized online clinic and nonspecialized community clinics. *Journal of Anxiety Disorders*. 2016;**42**:19-29
- [23] Clarke G, Reid E, Eubanks D, O'Connor E, DeBar LL, Kelleher C, et al. Overcoming depression on the internet (ODIN-2): A randomized trial of a self-help depression skills program with reminders. *Journal of Medical Internet Research*. 2005;**7**:e16
- [24] Richardson T, Stallard P, Velleman S. Computerised cognitive behavioural therapy for the prevention and treatment of depression and anxiety in children and adolescents: A systematic review. *Clinical Child and Family Psychology Review*. 2010;**13**:275-290
- [25] Harper Shehadeh M, Heim E, Chowdhary N, Maercker A, Albanese E. Cultural adaptation of minimally guided interventions for common mental disorders: A systematic review and meta-analysis. *JMIR Mental Health*. 2016;**3**:e44

- [26] Pasarelu CR, Andersson G, Bergman Nordgren L, Dobrean A. Internet-delivered transdiagnostic and tailored cognitive behavioral therapy for anxiety and depression: A systematic review and meta-analysis of randomized controlled trials. *Cognitive Behaviour Therapy*. 2017;**46**:1-28
- [27] Olthuis JV, Watt MC, Bailey K, Hayden JA, Stewart SH. Therapist-supported internet cognitive behavioural therapy for anxiety disorders in adults. *Cochrane Database of Systematic Reviews*. 2016;(3. Art. No.: CD011565). DOI: 10.1002/14651858.CD011565.pub2
- [28] Hedman E, Furmark T, Carlbring P, Ljotsson B, Ruck C, Lindefors N, et al. A 5-year follow-up of internet-based cognitive behavior therapy for social anxiety disorder. *Journal of Medical Internet Research*. 2011;**13**:e39
- [29] Hedman E, Andersson G, Ljotsson B, Andersson E, Ruck C, Mortberg E, et al. Internet-based cognitive behavior therapy vs. cognitive behavioral group therapy for social anxiety disorder: A randomized controlled non-inferiority trial. *PLoS One*. 2011;**6**:e18001
- [30] Richards D, Richardson T, Timulak L, McElvaney J. The efficacy of internet-delivered treatment for generalized anxiety disorder: A systematic review and meta-analysis. *Internet Interventions*. 2015;**2**:272-282
- [31] Paxling B, Almlöv J, Dahlin M, Carlbring P, Breitholtz E, Eriksson T, et al. Guided internet-delivered cognitive behavior therapy for generalized anxiety disorder: A randomized controlled trial. *Cognitive Behaviour Therapy*. 2011;**40**:159-173
- [32] Robinson E, Titov N, Andrews G, McIntyre K, Schwencke G, Solley K. Internet treatment for generalized anxiety disorder: A randomized controlled trial comparing clinician vs. technician assistance. *PLoS One*. 2010;**5**:e10942
- [33] Titov N, Andrews G, Robinson E, Schwencke G, Johnston L, Solley K, et al. Clinician-assisted internet-based treatment is effective for generalized anxiety disorder: Randomised controlled trial. *Australian and New Zealand Journal of Psychiatry*. 2009;**43**:905-912
- [34] Berger T, Boettcher J, Caspar F. Internet-based guided self-help for several anxiety disorders: A randomized controlled trial comparing a tailored with a standardized disorder-specific approach. *Psychotherapy*. 2013;**51**:207-219
- [35] Johnston L, Titov N, Andrews G, Dear BF, Spence J. Comorbidity and internet-delivered transdiagnostic cognitive behavioural therapy for anxiety disorders. *Cognitive Behaviour Therapy*. 2013;**42**:1-13
- [36] Titov N, Andrews G, Johnston L, Robinson E, Spence J. Transdiagnostic internet treatment for anxiety disorders: A randomized controlled trial. *Behaviour Research and Therapy*. 2010;**48**(9):890
- [37] Newby JM, Mackenzie A, Williams AD, McIntyre K, Watts S, Wong N, et al. Internet cognitive behavioural therapy for mixed anxiety and depression: A randomized



- controlled trial and evidence of effectiveness in primary care. *Psychological Medicine*. 2013;**43**:2635-2648
- [38] Hedman E, Andersson G, Andersson E, Ljotsson B, Ruck C, Asmundson GJ, et al. Internet-based cognitive-behavioural therapy for severe health anxiety: Randomised controlled trial. *British Journal of Psychiatry*. 2011;**198**:230-236
- [39] Hedman E, Axelsson E, Gorling A, Ritzman C, Ronnheden M, El Alaoui S, et al. Internet-delivered exposure-based cognitive-behavioural therapy and behavioural stress management for severe health anxiety: Randomised controlled trial. *British Journal of Psychiatry*. 2014;**205**:307-314
- [40] Andersson G, Waara J, Jonsson U, Malmaeus F, Carlbring P, Öst L-G. Internet-based exposure treatment versus one-session exposure treatment of snake phobia: A randomized controlled trial. *Cognitive Behaviour Therapy*. 2013;**42**:284-291
- [41] Andersson G, Waara J, Jonsson U, Malmaeus F, Carlbring P, Ost LG. Internet-based self-help versus one-session exposure in the treatment of spider phobia: A randomized controlled trial. *Cognitive Behaviour Therapy*. 2009;**38**:114-120
- [42] Richards D, O'Brien E, Vigano N, Mooney J, Bonner C, O'Callaghan D. The new gold standard in online delivered behavioral health programs. In: *Connected Health*. Boston, MA; Oct 20, 2015
- [43] Bennett-Levy J, Richards DA, Farrand P, Christensen H, Griffiths KM, Kavanagh DJ, et al. *Low Intensity CBT Interventions*. Oxford: Oxford University Press; 2010
- [44] Cuijpers P, Kleiboer A, Karyotaki E, Riper H. Internet and mobile interventions for depression: Opportunities and challenges. *Depression and Anxiety*. 2017;**34**:596-602
- [45] Erbe D, Eichert HC, Riper H, Ebert DD. Blending face-to-face and internet-based interventions for the treatment of mental disorders in adults: Systematic review. *Journal of Medical Internet Research*. 2017;**19**:e306

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