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## Comparing Outcomes of Online Application Therapy Versus Standard Psychotherapy in Patients Suffering from Mental Illness

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Comparing Outcomes of Online Application Therapy Versus Standard Psychotherapy in Patients  
Suffering from Mental Illness

by

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### **Abstract**

The purpose of this research was to determine the effectiveness of internet-delivered cognitive behavioral therapy (iCBT) in comparison to standard cognitive behavioral therapy in the treatment of depression and anxiety. The quality, safety, therapist-response, and cost of internet-delivered cognitive behavioral therapy was also studied. This review utilized multiple databases including PubMed, CINAHL, Clinical Key, Cochrane Library, and PsychINFO from 2015 to 2020. The literature reviewed consisted of peer-reviewed studies, randomized controlled trials, and systematic review. Sources that were excluded from the study included those prior to 2015, studies with small sample sizes, and those that involved children. Thirteen resources were selected for review. Much of the research suggested that iCBT is as effective as standard face-to-face therapy. Many authors thought it would be most useful as an adjunct to standard therapy which could ease accessibility issues. Other factors in considering the use of iCBT include therapeutic alliances, cost-effectiveness, and the varying qualities of the many different options. Internet-delivered cognitive behavioral therapy could be a viable alternative for cognitive behavioral therapy, but further research is needed.

*Keywords:* eHealth, Telemedicine, Depression, Anxiety, Cognitive behavioral therapy, mHealth, ICBT, cost, CBT, internet-delivered CBT

## Comparing Outcomes of Online Application Therapy Versus Standard Psychotherapy in Patients Suffering from Mental Illness

Mental illness is a growing problem in medicine. It is estimated that 18.7% of adults in rural America will have a mental health condition with limited access to a behavioral health professional (Addressing the Mental and Behavioral Health Needs of Underserved Populations, 2017). The stigma surrounding seeking treatment for possible mental health problems is not as prevalent as it has been historically. Mental illness is typically first noticed in primary care clinics and it has become common for primary care providers to diagnose and prescribe medications to treat diseases like depression and anxiety. These patients are then referred to a psychologist for psychotherapy. Cognitive behavioral therapy is a mainstay of treatment for depression and anxiety. It is important for patients to attend therapy to provide them with their best quality of life.

### **Statement of the Problem**

Andrilla, Patterson, Garberson, Coulthard, and Larson, published a study in 2018 that outlines the shortage of behavioral health providers across the U.S. They also divided the information into metropolitan versus non-metropolitan counties. Across the nation there is a smaller number of these providers in non-metropolitan areas (Andrilla, et al., 2018). It is unfortunate that the lack of psychologists or psychiatrists is more pronounced in rural areas because it leaves primary care providers to provide the majority of therapy for depression and anxiety. This added workload of providing more in-depth mental health treatment compounds the problem of already limited number of primary care providers in rural America. Most mental health professionals are employed exclusively in metropolitan areas. Andrilla et al. (2018) found that 65% of non-metropolitan counties do not have a psychiatrist and only 53% of these counties

have a psychologist. It can be difficult for patients to secure appointments with these providers due to long wait lists. In addition to the provider shortage, many patients are unable to attend therapy for a variety of reasons. Perhaps they cannot get time off from work to attend an appointment in the middle of the day. Some patients fear being judged for attending therapy and do not want to attend appointments where they may be recognized. Fortunately, technology is always advancing, and patients can now access therapy through the internet. There are multiple smartphone applications available for patients and they also have the option to text their therapist if needed. This advancement in technology alleviates the burden of having to take time away from jobs or families to travel to an appointment. It allows privacy compared to attending an appointment at the clinic. The concern about this new type of therapy is whether it is as effective as seeing a provider face-to-face. It is essential to research the quality of the applications, including accessibility and evaluate cost and insurance coverage before determining if this a viable option for patients.

### **Research Question**

In patients with anxiety and/or depression, is outcomes of cognitive behavioral therapy delivered through a variety of online therapies comparable to the standard approach to psychotherapy?

### **Methods**

A literature review was performed using the following electronic databases: PubMed, CINAHL, Clinical Key, Cochrane Library, and PsychINFO. Both keyword terms and MeSH terms were used to locate literature discussing outcomes of online application therapy and standard cognitive behavioral therapy. It was also searched for accessibility and quality of services. Cost and coverage were also considered in search of the literature. A time limit of five

years was placed on the research so only the most recent literature was reviewed. Many studies were excluded due to lack of participants. Thirteen studies were utilized for this review.

*Keywords:* eHealth, Telemedicine, Depression, Anxiety, Cognitive behavioral therapy, mHealth, ICBT, cost, CBT, internet-delivered CBT

### **Effectiveness of iCBT**

Internet-delivered behavioral health therapy is a relatively new option for those that suffer from depression and anxiety. Since its inception there have been numerous ways it has been implemented. It can be delivered via online applications through mobile phones or tablets. It has been used through the internet as modules on websites and it can be used via telehealth, which involves a therapist.

Ahmedani, Belville-Robertson, Hirsch, & Jurayj, (2016) published a feasibility study viewing the effectiveness, acceptability, and feasibility of a commercially available web application. This type of application instructed patients on different evidence-based interventions like cognitive behavioral therapy and other tools to monitor mood and motivation. The study noted how many times people logged in and completed modules to assess effectiveness and feasibility. Participants were also contacted to complete surveys to assess the effectiveness. These surveys included information about overall mental health and used quantitative results in the form of PHQ-9 and GAD-7 scores. (Ahmedani et al., 2016).

Participants for this study were selected from southeast Michigan from June 2015 to October 2015. There was a total of ninety-six participants, referred from seven different providers, from either primary care or behavioral health. Results showed that only 27% of participants logged in more than twice in a 30-day timespan and only 9% of participants logged in more than five times. Of the 96 participants, only 24 individuals completed baseline

assessment questions and only 20 completed the follow-up survey, however, the completed surveys gave important insight regarding the efficacy of the intervention. An improvement in symptoms would result in a decrease in the survey score. Depression scores declined by two points from baseline. And the surveys regarding anxiety showed a decline in scores from 6.8 to 6.3 and suggests this type of online intervention can be effective. (Ahmedani et al., 2016).

Providers in the study performed by Ahmedani, Belville-Robertson, Hirsch, and Jurayj, (2016) seemed to appreciate this intervention. Five of the seven considered it as an acceptable adjunct to behavioral therapy. They believed it could increase accessibility to treatment (Ahmedani et al., 2016).

Researchers in this study admitted limitations to this study. It was a feasibility trial performed to provide more information for more in-depth studies, which means there was not causal evidence of effectiveness of this intervention. The sample size was small and geographically isolated, with only seven providers involved within the study (Ahmedani, Belville-Robertson, Hirsch, & Jurayj, 2016).

Ahmedani, Belville-Robertson, Hirsch, & Jurayj (2016) provided excellent framework for future studies to follow. It proved that there was a positive relationship between online application therapy and treatment for anxiety and depression. (Ahmedani et al., 2016).

Computer-based therapy, introduced back in the 1990s as an alternative to face-to-face therapy, has been continuously studied as technology continues to advance. Andrews et al. (2018) sought to repeat a meta-analysis performed in 2010 using similar search terms in order to gather more recent information. Multiple studies were selected if they included adult patients who met criteria for depressive or anxiety disorders. Data was taken from these studies and a meta-analysis was performed. A total of 64 trials were included in the meta-analysis. After

analyzing all 64 studies, it was determined that the mean effect size showed superiority of internet cognitive behavioral therapy (iCBT) over the control group. Many of the trials included follow-up data for up to 36 months after completing therapy. This showed iCBT was effective for long-term improvement. Nine of the studies examined iCBT compared to face-to-face therapy which did not show a significant difference in results (Andrews et al., 2018).

According to the study performed by Andrews et al. (2018), iCBT was superior to the control group. It also determined there were long term positive effects of this type of therapy. It also showed similar results to face-to-face therapy, suggesting iCBT could be used as an alternative to face-to-face therapy (Andrews et al., 2018).

It is useful to know that iCBT therapy shows positive results and can be used as an option for patients waiting to see a behavioral health provider. It is also comparable to face-to-face therapy meaning iCBT could be used in its place, especially in circumstances where there is a limited availability of therapists.

A major advantage of internet-based cognitive behavioral therapy is that it can increase access to mental health services and potentially reduce cost. However, there is concern regarding the efficacy and safety of internet-based intervention. Karyotaki et al. (2017) performed an individual participant data (IPD) meta-analysis that supported the claims about self-guided iCBT providing small effects that can be clinically useful, especially in underserved areas where mental health resources are limited. To assess safety, the IPD measured the effects of iCBT in patients with depression and specifically noted clinically significant deterioration compared to controls (Karyotaki et al., 2017).

Sixteen studies were selected by finding IPD from randomized controlled trials (RCTs) that compared iCBT to a control with symptoms of depression. Researchers gathered IPD

information related to demographics, depression and anxiety scores, and the number of completed iCBT sessions. Clinical change was then evaluated through a reliable change index (Karyotaki et al., 2017).

A total of 3805 participants were examined from Australia, Germany, Spain, Switzerland, the Netherlands, and the UK. Most of the research gathered IPD information from studies that specifically used self-guided iCBT. Only 7.2% of the patients reported clinically significant deterioration. When compared to control groups only 5.8% of participants who followed iCBT displayed clinically significant deterioration while 9.1% of those in the control group experienced it. This is consistent with previous studies of web-based interventions. The deterioration is also similar to that of face-to-face treatments. The researchers gathered that iCBT was less harmful than not receiving therapy and the clinical deterioration was similar to standard therapy, suggesting it was not any more harmful than the standard approach (Karyotaki et al., 2017).

It is difficult to interpret drop-out rates with studies like this one performed by Karyotaki et al. (2017). Perhaps patients started experiencing clinically significant deterioration, so they stopped using iCBT to seek more help. Some people may also have dropped out because they started feeling better. Study adherence could also be related to the hope that patients can begin face-to-face therapy once finished with iCBT. It was also difficult for the researchers to assess patients for more serious depressive episodes (Karyotaki et al., 2017).

Self-guided iCBT could be beneficial in the setting of decreased access to a mental health provider, which includes long wait times and long travel distance to face-to-face treatment for patients. The IPD analysis performed by Karyotaki et al. (2017) found iCBT to be effective in treating depression symptoms. It could possibly be used in place of watchful waiting or starting

different medications in the primary care clinic while patients wait to secure an appointment with a behavioral health provider.

Olthuis, Watt, Bailey, Hayden, and Stewart published a Cochrane review in 2016 to evaluate whether there was enough high-quality evidence to continue to promote the use of internet delivered cognitive behavioral therapy (CBT). They researched therapist-supported internet CBT in regard to results when using it to treat anxiety disorders, comparing them to a waiting list control, face-to-face therapy, or unguided CBT (Olthuis et al., 2016).

Authors of the study searched the Cochrane Depression, Anxiety, and Neurosis Review Group Specialized Register (CCDANCTR) which includes randomized control trials from online sources like Embase PsychINFO, Central, and Medline. Studies selected were RCTs consisting of therapist supported iCBT with comparisons to a waiting list, unguided CBT or face-to-face CBT (Olthuis, Watt, Bailey, Hayden, & Stewart, 2016).

Thirty-eight studies were included which equaled 3214 participants. The studies analyzed generalized anxiety disorder (GAD), among other mental health disorders. Results were gathered from a variety of geographic locations including Sweden, Australia, Switzerland, the Netherlands and the USA. Comparing face-to-face therapy to therapist supported iCBT showed the same improvement in anxiety at post treatment analysis (Olthuis, Watt, Bailey, Hayden, & Stewart 2016).

In conclusion, therapist supported iCBT seems to be an effective alternative to face-to-face treatment for anxiety. In this study there was no significant difference in symptom improvement of anxiety after completing therapist supported iCBT (Olthuis, Watt, Bailey, Hayden, & Stewart, 2016).

Therapist supported iCBT could be an important aspect to the treatment of anxiety. This study proved that there was not a significant difference in results of iCBT compared to the results of standard treatment of face-to-face therapy. The authors suggested further research be performed to assess the role of the therapist in iCBT and to identify any possible harms associated with this intervention (Olthuis, Watt, Bailey, Hayden, & Stewart, 2016).

Forand, Feinberg, Barnett, and Strunk (2019) used individual patient data to discover whether iCBT was comparable to gold standard treatments, such as medications and cognitive behavioral therapy. They gathered their data from two randomized control trials for treating depression. The first study, referred to as the Penn-Vandy study, compared iCBT to cognitive behavioral therapy, antidepressant medication and a placebo pill. The second study, referred to as the U. Washington study, also compared iCBT to cognitive behavioral therapy, behavioral activation, antidepressant medication, and a pill placebo. A control study compared iCBT to waitlist results. These studies compared other treatments to iCBT for eight weeks. The waitlist group was offered eight weeks of iCBT after completing the waitlist. Participants in the iCBT group used a program called *Beating the Blues* and were assigned a TeleCoach in order to promote adherence (Forand et al., 2019).

A Mini-International Neuropsychiatric Diagnostic Interview 6.0.0 (MINI600) was used to diagnose any commonly seen psychiatric illnesses. It was included to provide information on comorbidities for future studies and research. The Hamilton Rating Scale for Depression (HRSD) was used to measure depression severity. PHQ-9 scores were assessed as the primary outcome while HRSD rates were used for discrepancies and as a means of comparison for wider depression treatment literature. Attrition rates of both studies were increased in the iCBT groups compared to cognitive behavioral therapy, suggesting higher rates of dropouts. However, it

appeared that the groups of iCBT had greater remission rates. The Penn-Vandy study examined a slope analysis comparing iCBT to placebo pill treatment and found that the iCBT group had a greater change in depressive symptoms but didn't appear superior to any of the other "gold standard" therapies. The University of Washington study confirmed similar analyses (Forand, Feinberg, Barnett, & Strunk, 2019).

Results of the Forand, Feinberg, Barnett, and Strunk (2019) study suggest that iCBT is not inferior to gold standard therapies offered as depression treatment. It also showed it was superior to placebo therapy. However, the rate of dropout was higher in these studies even with the TeleCoach motivation. Authors suggest implanting a tool to identify high risk individuals who may drop out, which would allow the TeleCoach to work more closely with them (Forand et al., 2019)

It is important to note that iCBT is not inferior to medication therapy and face-to-face therapy. This suggests it could be used as a more accessible alternative for some patients. It can also be used to bridge the waitlist time while awaiting an appointment with a behavioral health provider.

Another common way that online based therapeutic interventions are used is through a stepwise approach. Many times, there is a long waitlist to see a behavioral health provider. These stepwise approach models can be helpful in implanting therapeutic techniques before even seeing a therapist.

The United Kingdom created a program called "Improving Access to Psychological Therapies (IAPT)" through the National Health Service. IAPT offers a stepped care approach to treatment for people with depression and anxiety. iCBT is offered as an intervention in IAPT's second step. It consists of low-intensity psychological interventions for mild to moderate anxiety

or depression. Duffy, Enrique, Connell, Connolly, and Richards (2020) developed research questions in order to evaluate improvement of clinical symptoms of severe depression/anxiety with iCBT. Then they studied continual improvement with face-to-face visits after patients completed iCBT. They also assessed the relationship between patient and therapist and sought therapists input regarding this stepped approach (Duffy et al., 2020).

The study design aimed at gathering quantitative information including clinical outcomes, functional outcomes, wait reduction time and therapeutic alliance. It gathered qualitative information about clinician experience and acceptance of iCBT before step three of IAPT. The study took place in England over a nine-month period of time. Participants were recruited via their clinicians, then signed up for SilverCloud (iCBT provider) and completed treatment until a counselor became available for the face-to-face phase. During this time, they completed data sets that included a PHQ-9, GAD-7, Work and Social Adjustment Scale (WSAS) and a survey to assess therapeutic alliance. The referring clinicians were also able to assess patient progress via SilverCloud and monitor work and give feedback. Clinicians were also asked to complete a survey and were offered a semi-structured interview with the authors of this study (Duffy, Enrique, Connell, Connolly, & Richards, 2020).

In the study performed by Duffy, Enrique, Connell, Connolly, and Richards (2020) on IAPT, 123 clients participated and 11 clinicians. One-hundred thirteen participants completed therapy, with most of them completed questionnaires at different testing times. These questionnaires showed that 58% of participants had reliable symptom improvement. PHQ-9 and GAD-7 scores were 3 points better with iCBT. Therapeutic alliance from the patient perspective was increased by 3.9 points but remained unchanged from the clinician's perspective. When clinicians were interviewed, they spoke of appreciation of the content presented via iCBT, the

responsiveness of contacting patients, and the perceived relationship developed (Duffy et al., 2020).

Authors identified the limitations presented in this study which included the uncontrolled nature, the lack of outcome measurement between the end of iCBT and the beginning of high-intensity therapy, and, finally, the lack of responsiveness from clinicians when discussing therapeutic alliance. Future studies should include a control group that does not receive iCBT (Duffy, Enrique, Connell, Connolly, & Richards, 2020).

Blended therapy appears to be a very useful option to ease the burden of long wait times associated with behavioral therapy. According to this study, there are positive outcomes related to implementing iCBT before a patient has a face-to-face visit with a behavioral health provider.

### **Patient-Provider Relationships**

An important hurdle to implementing iCBT into practice is the variable response of the providers to using it. If providers are not willing to try this new form of therapy, it will not be used in practice. The providers involved could either be the referring provider from primary care or it could be from the mental health provider that offers support through internet-delivered services.

Duffy, Enrique, Connell, Connolly, and Richards (2020) assessed therapeutic alliance in their study of IAPT. They discovered that patients felt they had a good relationship with the clinician involved in their therapy. On the other hand, clinicians showed no improvement in score. The clinicians did believe that this type of intervention would be helpful as an adjunct therapy. It was a good transition in the IAPT step wise approach to therapy (Duffy et al., 2020).

A major limitation to the study to Duffy, Enrique, Connell, Connolly, and Richard (2020) study discussed previously, only two providers responded to the semi-structured interview

offered at the end of the trials. This did not allow for all opinions and perhaps further discussion about why the score remained unchanged for clinicians, yet relationship scores were markedly elevated from the patients' perspective, suggesting that patient (Duffy et al., 2020).

Another study performed in 2018 by Lan et al., assessed the patient provider relationship. It was composed of 20 measures to evaluate the evidence-based support of CBT mobile health (mHealth) apps and their ability to improve the patient-provider relationship. The measurements used for assessment included functions like education, recommendations, behavior tracking and many more. Fifty mHealth apps were selected from the Google play store or iTunes app store. The apps were scored on the functionality measurements using a binary scale (Lan et al., 2018).

Results reported that most of the apps scored well in areas like education, recommendations, and behavior tracking functions. The mean score of mHealth apps meeting designated function criteria was only 4.9/20. This study discovered that these apps are primarily symptom trackers or educational resources. The framework of these mHealth applications would also be difficult to integrate into a healthcare system where it would be more accessible to the provider (Lan et al., 2018).

The results of this study suggest that there is not enough evidence-based information to definitively use mHealth applications as a tool to enhance the patient-provider relationship. The major problem with the mHealth applications is that most are not integrated into a healthcare system. If it could be used by a healthcare system, providers could possibly track information and easily answer questions that patients might have (Lan et al, 2018).

Patient-provider relationships can also be affected by the patient's preference for how often they would like to be in contact or meet with their behavioral health provider. Hadjistavropoulos et al. (2019) performed a study to determine the optimal amount of time a

patient would like to spend speaking with a therapist and which type of patients are more likely to choose the optional support. The RCT study had two arms. The first arm offered standard support to include weekly contact with their therapist either by telephone or email in addition to iCBT. The second arm offered the option for participants to reach out for therapist support if they needed to, in addition to iCBT (Hadjistavropoulos et al., 2019).

A total of 546 patients from Saskatchewan, Canada were chosen. The patients completed an eight-week course designed to treat anxiety and depression. They also need to complete questionnaires, like the PHQ-9 scale and GAD-7 scale, before each weekly lesson, at the end of treatment and for 3-month follow up. Participants were also asked to address therapeutic alliance and any negative effects. Standard support patients were contacted weekly while optional support patients reached out to their therapist if they felt they needed to. Intervention use was tracked and measured. (Hadjistavropoulos et al., 2019).

Patients were able to pick whether they wanted to be in the optional group or the standard group. Only 22% of patients chose the optional therapist group. Researchers noted that patients who selected standard support had a 2.7 times greater likelihood of having GAD. The optional support group showed the same amount of symptom improvement as the standard support group. Therapists spent significantly less time counseling the optional support group. Both groups rated therapeutic alliance positively (Hadjistavropoulos et al., 2019).

iCBT is a great option for some people. Other people may appreciate speaking with a mental health provider weekly. Researchers from this study learned that every patient is different, so it is important to get their preferred level of support before beginning iCBT. With the implementation of iCBT there is hope to reduce cost and increase availability of therapists (Hadjistavropoulos et al., 2019).

### **Quality of Services**

When promoting a new type of therapy, like internet- or mobile- based cognitive behavioral therapy, it is important to address the quality of the service being offered. With iCBT as in intervention, suicide and worsening mental health risk needs to be examined. It is also necessary to address the messages sent through iCBT to see if they are comparable to the standard therapy for treatment of anxiety and depression. Some messages advertised can be harmful to people struggling from mental health disorders.

In a study performed by Parker et al. (2018) researchers recognized the recent interest in mental health apps for depression. Governments, health services, and the public are excited about the prospect of these apps to further reduce depression symptoms. They set up a content analysis of mental health messages by asking two questions: “How do prominent mental health apps frame mental health and illness?” and “What does this framing suggest about the pattern and causation of mental health problems and how problems can be managed?” (Parker et al., 2018).

Researchers performed a critical content analysis of prominent mobile health apps in the US, Canada, UK, and Australia. They collected data from the apps’ advertising materials. They coded the open-ended responses and generated a preliminary list of themes, then used a framing theory to develop the themes into interpretive memos (Parker et al., 2018).

Sixty-one mental health apps were identified. Themes among the apps included claims to reducing anxiety, panic, and stress. Researchers focused on how the apps defined the problem. They identified three different thoughts regarding the reason for mental health problems. The first stated it existed when someone had a psychological issue and/or lack of positive psychological states. The second stated the problem existed when there was a lack of mental fitness. The third identified a mental health problem as that lacking in success. Researchers

identified another theme that studied the cause and treatment for mental illness. They determined that many apps represented everyone as employed, white and in a family. Many apps did not actually address the problem in those with a diagnosed mental illness. They did not blame mental health problems on external stressors or life circumstances, instead they claimed these problems were results of abnormal neuropsychologic or poor psychological habits. Only 24 of 61 apps offered cognitive therapy, the others focused on calming and self-monitoring. Advertisement of these apps also claimed vague scientific results when few studies had even been performed. A poor response to the apps “therapy” typically blamed the participant and not any underlying issues with the treatment provided (Parker et. al, 2018).

The messages identified within these apps did not provide an accurate representation of the real problems with mental health. The first message states poor or fragile mental health is everywhere. This might help reduce the stigma of mental health problems, but it could also cause an overdiagnosis and overtreatment of certain populations, like those experiencing temporary symptoms. This could take away funding from people who truly need the resources offered for mental health treatment. The second message tells people they can easily manage their own mental health problems with only apps. This could pressure people into taking treatment into their own hands, even if they need to seek a professional. These messages also medicalize normal mental health states, which causes people to think they need to change their habits when they are coping in a healthy way. It also does not address how social determinants can affect mental health. Researchers suggested discussing app use with patients and offering alternatives to messages they are hearing from these apps. The messages from providers should address when it is important to seek professional help and offer reassurance for normal feelings (Parker et al., 2018).

Limitation of this study was limited to app advertising materials. It studied apps that consumers were most likely to encounter. Apps are ever changing so some of the information in this study may have changed already (Parker et al., 2018).

This study looked at important information that could potentially be harmful to efforts to implement iCBT. These researchers looked at app store options to improve mental health that are heavily promoted through the media. Unfortunately, the messages they send to users could have many adverse effects like those identified above. These apps also offered to “fix” people’s mental health instead of offering management interventions.

Data privacy is also necessary to study. Parker, Halter, Karliychuk, and Grundy, (2019) sought to discover if patients’ information was kept private and what happened to the data. The authors were concerned about hackers and poorly secured apps, but they also wondered if these commercial apps shared customer data. A serious consequence of data sharing could result in insights into a person’s societal pattern and behavior. Health data could be very useful in situations like determining employability and credit ratings. The purpose of this study was to identify the most important issue regarding privacy within the mental health app market. It also allowed efforts to be made to promote the quality and safety of these apps (Parker et al., 2019).

Researchers critically analyzed prominent English-speaking apps promotional marketing to determine what privacy-related information they contained. Apps had to focus on at least one mental health symptom, behavior, diagnosis, monitoring, or treatment. All apps were picked among Australia, US, Canada, and UK. They extracted data from the apps with a tool developed by a consumer advocate and privacy lawyer that observed the apps’ permissions and privacy policies on data sharing. The data gathered was then compared to relevant health app privacy in national and international policies. Sixty-one apps were identified with forty-five developing

companies responsible for them. The study reported multiple different factors considered when investigating privacy practices. It assessed the apps' request for data collection or permissions. Apps from the Google play store asked for dangerous permissions, such as allowing an app to save data to a device which enabled developers to modify or delete stored files on that device, even photos and text messages. Promoting sharing to social media was another privacy practice noted. These apps encouraged people to share their progress with social media in order to promote advertisement. Users could also join forums or groups within the app, which can give them a false sense of safety. Upon review of the apps only about half of them contained a privacy policy and none of the apps supported by governments contained a privacy policy. The policies were also judged on how easily a user could understand what was included within the privacy policy. Many of the apps had privacy policies that were either difficult to read or difficult to find and some disclosed data sharing with third parties. The privacy policies could also change at any time. Many apps did not claim responsibility for data management practices (Parker, Halter, Karliychuk, & Grundy, 2019)

The research performed by Parker, Halter, Karliychuk, and Grundy (2019) found that the apps available in an app store were not secure and most consumers were unaware of the repercussions associated with data sharing among developers. Researchers suggested stricter government regulations to offer better protection on these applications. They called for app developers to improve their privacy policies and implement better tools to combat hacking and oversharing of private information (Parker et al., 2019)

Limitations to this study included the sample of mental health apps. It was not exhaustive of all health apps. Future work should dive into the nature of data sharing practices. Apps are

also constantly evolving so they may have changed since this study (Parker, Halter, Karliychuk, & Grundy, 2019).

Privacy is a very important aspect of healthcare. It is unfortunate that commercial apps do not do a better job of protecting it. Patients share a lot of personal information when discussing their mental health and to have it so easily shared is concerning. App developers need to have stricter regulations when it comes to this sensitive information. Privacy policies should also be easier to access.

### **Cost and Coverage**

Any healthcare treatment can be costly, especially if patients do not have insurance or suffer from multiple other comorbidities. It is necessary to factor in cost when determining if internet-based therapies can be implanted into standard treatments. It is also important to assess different implementation strategies into healthcare systems so they can be billed and covered through insurance companies.

Hermes et al. (2019) published a study that sought to determine how well behavioral intervention technology (BIT) could be integrated in a large healthcare system. BITs are programs that deliver personalized interventions over the internet. These interventions are used to aid in behavioral health therapy and increase access to behavioral health. The authors chose to study the integration of BITs with the Veteran's Health Associations (VHA) as they believed this system would be able to implement this technology best. This study explored the perspectives of the organization-level determinants to provide more information for leaders, policy makers, and researchers trying to implement BITs on a wider scale within these large healthcare systems (Hermes et al., 2019).

The methods of this study included gathering perspectives from the VHA's leaders and providers to best discover the determinants of BIT dissemination and implantation. The researchers wanted providers and administrators within the VHA that had already used BITs within practice or at least had a knowledgebase about BITs. Participants held either an administrative position or leadership role, in addition to having clinical responsibilities. They were physicians, psychologists, nurses, or social workers who were recruited via email, with 20 participants selected. The participants were interviewed by a psychiatrist in the VHA who had special interest in mental health in primary care. They were asked questions about the technology regarding performance expectancy, effort expectancy, social influence, and facilitating conditions. Two themes were prominent among interviewees: availability of internet access and lack of implementation strategies. The delivery care model theme discussed the lack of accurate ways to track and bill time spent working with BITs into their workload. Some providers were also concerned that increasing the access to care using BITs will come at the expense of the quality of care. Another concern identified was the process for use at point of care. Providers need to be knowledgeable about the different BITs that are available. They also believed there needed to be a screening to implemented to determine if a patient has enough self-motivation to make use of a BIT successfully. Another determinant studied was internet infrastructure. Participants noted that even in the VHA internet could be inconsistent. Interviewees also suggested that workstations be built into facilities for patients without access to internet at home. They discussed how poor internet connection could be a problem in rural areas. Another concern was lack proper funding to support a program implementation of this scale. (Hermes et al., 2019).

There are significant barriers to consider when trying to implement internet delivered behavioral interventions into a large healthcare system. This study performed by Hermes et al. (2019) pointed out the obstacles that need to be addressed before starting a large-scale integration into a health system. Once integrated it could be a very useful tool for treating mental health, but the barriers need to be addressed.

Kolovos et al. (2019) understood that guided internet-based interventions are a promising treatment for people suffering from depression. They performed a meta-analysis using IPD from other RCTs to examine the cost-effectiveness and societal perspective of internet-based interventions. They used RCTs from Embase, PubMed, Cochrane Central Register of Controlled Trials, and PsychINFO, then collected the IPD. They investigated change in depressive symptoms using posttreatment, short-term, and long-term follow up. The scale used to assess depressive symptom severity was called the Center for Epidemiologic Studies Depression Scale (CES-D). Quality of life (QoL) was also measured. Cost was measured and valued using the Dutch standard cost. Incremental cost-effectiveness ratios (ICER) were calculated to determine the cost differences and the effects therapy had (Kolovos et al., 2019).

Five studies were used for the IPD meta-analysis with a total of 1,426 participants in either a control group or an intervention group. Researchers discovered that societal cost difference was not significantly higher in the intervention group when compared to the control. The most losses were productivity losses. When looking at the ICER for improvement in symptoms, they found that one additional improvement in CES-D scored cost 224 Euros or about 259 US dollars. Increased quality of life was also associated with an increase in cost. After comparing cost associated with symptom improvement and societal loss of productivity due to

depressive symptoms, it was found that the difference in cost was smaller than expected and favored iCBT use (Kolovos et al., 2019).

This meta-analysis found that guided internet-based interventions cannot be considered cost effective when compared to control groups. It is important to note that the control group was not receiving any type of therapy. Researchers were hopeful that the cost of iCBT would be made up in the increased societal productivity resulting from controlled depression symptoms. Further investigation should be performed to determine the cost-effectiveness of iCBT when compared to other therapy types, like face-to-face therapy or pharmacotherapy for the treatment of depression (Kolovos et al., 2019).

Depressive symptoms not only affect a person's quality of life, they also lead to an increased societal economic burden. There are direct costs, which are more obvious, including inpatient care, medications costs, and social services. Indirect costs are less visible. There is a societal loss of function due to lack of productivity or absent workdays due to depression symptoms. Internet- and mobile-based interventions (IMIs) have been shown to be most cost effective. The study published by Paganini, Teigelkötter, Buntrock, and Baumeister, (2018) sought to systematically review evidence performed on economic evaluations in previous studies. Studies needed to be randomized control trials on adults with depressive symptoms that used an online or mobile based intervention and compared it to a control group (Paganini et al, 2018).

Analysis revealed 12 eligible studies with a total of 4060 participants. Nine studies had an increased cost for IMI when compared to enhanced treatment as usual (TAU) and waitlist controls. Another three studies reported the opposite, with decreased IMI when compared to

enhanced TAU. Guided iCBT increased quality of life and lowered costs in one study (Paganini, Teigelkötter, Buntrock, & Baumeister, 2018).

Results from the study performed by Paganini, Teigelkötter, Buntrock, and Baumeister, (2018) suggest that there is potential for internet or mobile based interventions to be cost effective. The results showed a similar cost when compared to face-to-face psychotherapy and medication therapy. Authors suggest guided iCBT should be implemented in addition to standard treatment to increase accessibility of mental healthcare. There are several ongoing trials studying the cost-utility of IMIs which will have a considerable impact on the future of this type of therapy (Paganini et al., 2018).

### **Discussion**

Depression and anxiety are becoming more prevalent in healthcare, especially now that there is less stigma surrounding them. It is important for people with these disorders to receive cognitive behavioral therapy to help manage their anxiety or depression. Unfortunately, there is a significant lack of behavioral health providers available to provide therapy to these patients. Currently, there is a shortage of these providers, especially in rural and underserved communities. With technology ever-changing, internet or mobile phone delivered therapies are now available. There are a variety of options available but there is much concern over the specific outcomes of using these apps. It is also crucial to identify the quality of the resources being delivered to the patient. Finally, it is necessary to address cost and insurance coverage of these new therapeutic interventions before offering them to patients.

#### **Are Online-Based Interventions Effective?**

Computerized cognitive behavioral therapy has been around since the 1990s, meaning there has been plenty of research performed on the subject. Technology is always advancing,

which means the way therapy is delivered is continually changing too. Andrews et al. (2018) repeated a similar meta-analysis to one performed in 2010. They chose to study internet-based cognitive behavioral therapy comparing it to face-to-face therapy, bibliography therapy, and a waitlist control group. Their results showed that iCBT was superior to bibliography therapy and a waitlist. Nine of the studies compared iCBT to face-to-face therapy. Researchers found that there was not a significant difference in results between the two interventions. They also discovered that iCBT had long term effects (Andrews et al., 2018). Research like this helps to prove that iCBT is beneficial. It is superior to no intervention and it teaches patients how to manage their symptoms for effects that last long-term. This analysis also suggests that iCBT is equal to face-to-face therapy in terms of decrease in symptoms (Andrews et al., 2018). Results like this offer more support for using iCBT in places where face-to-face therapy is limited. When Forand, Feinberg, Barnett, and Strunk (2019) compared iCBT to face-to-face therapy and medication therapy they also found that iCBT is not inferior either of these therapies. This suggests it could be used as a more accessible alternative for some patients. It can also be used to bridge waitlist time before meeting a behavioral health provider.

Some applications are self-guided without intervention from a therapist. Ahmedani, Belville-Robertson, Hirsch, and Jurayi (2016) studied this type of web application. The app instructed patients on different evidence-based interventions like cognitive behavioral therapy and tools to monitor mood and motivation. Patients completed a GAD-7 and PHQ-9 and the scores were calculated to determine effectiveness. Depression scores decreased by two points from baseline and anxiety scores decreased by 0.5 from baseline (Ahmedani, 2016). Self-guided interventions are shown to be somewhat effective. Karyotaki et al. (2017) also studied self-guided interventions by performing an IPD meta-analysis. Researchers used a reliable change

index to determine the change in clinical symptoms of anxiety or depression in patients.

Different types of self-guided internet interventions were examined in this analysis. It was found that 7.2% of patients experienced clinical deterioration, whereas in the control group 9.1% of patients experienced deterioration. Authors also point out that a clinical deterioration of 7.2% is similar to face-to-face cognitive behavioral therapy (Karyotaki et al., 2017). Based upon these two studies, it appears that self-guided iCBT could be beneficial for patients who have limited access to a mental health provider.

Guided iCBT is another option available for patients with limited access to mental health providers or those on a waitlist. These types of programs have some form of therapeutic guidance with them, whether it be messaging a therapist or receiving calls from them. There is additional professional support with guided iCBT. Many studies have been performed to assess the effectiveness of this intervention. Olthuis, Watt, Bailey, Hayden and Stewart (2016) performed a Cochrane Review to determine if there was enough high-quality evidence available to continue to promote the use of internet-delivered CBT to treat anxiety disorders. The review compared iCBT to a waitlist control, face-to-face therapy, or unguided CBT. Interestingly, the results from this review suggested that there was not a significant difference between guided iCBT versus unguided iCBT. There was also no significant difference when comparing iCBT to face-to-face therapy, which has been shown in previous studies (Olthuis et al., 2016). The information provided by this study suggests equal efficacy when comparing guided to unguided iCBT. If unguided iCBT can result in similar change of symptoms, it would be the better option because it is less costly and does not take time from therapists.

The National Health Service in the UK performed a study on providing blended therapy to bridge the gap between long wait times and symptom management. This program used a form

of guided iCBT and measured outcomes using PHQ-9 and GAD-7 scales, then patients completed face-to-face therapy. Results of the study indicated that 58% of participants had reliable symptom improvement and a three point decrease in both scales when compared to patients who didn't complete iCBT modules before attending face-to-face therapy (Duffy, Enrique, Connell, Connolly, & Richards, 2020). Many studies have pointed out how blended therapy might work to ease symptoms while patients are on a waitlist. This study showed that it would be an effective way to treat patients.

Overall iCBT therapy has proven as effective as face-to-face therapy. There are so many different options available to use iCBT. From this research it appears that all types of iCBT are effective. Unguided therapy is a great option to reduce therapist strain. Guided iCBT allows patients to feel supported by a therapist but also learn the interventions on their own. Blended therapy appears to be an excellent option for patients who want to see a behavioral health provider but need to learn to control some of their symptoms before they can get an appointment.

### **Is the Patient-Provider Relationship Affected by Using Internet Interventions and Would They Recommend it?**

Without the support of therapists and other behavioral health providers, internet delivered interventions are not likely to be implemented into patient care. It is important to understand the therapist's perspective when suggesting iCBT. There have been studies performed that examine the therapeutic alliance when using iCBT.

In the NHS study by Duffy, Enrique, Connell, Connolly, and Richards (2020) the patients reported a 3.9-point increase in their satisfaction with the provider involved in their guided iCBT. The clinicians involved did not have that much satisfaction with the relationship. They were neutral with no improvement in score, however, there was no decrease in score. In the

interviews with clinicians, they felt it would be a good adjunct therapy with face-to-face therapy. They also appreciated the content presentation and responsiveness when contacting patients (Duffy et al., 2020). Ahmedani, Belville-Robertson, Hirsch, and Jurayj (2016) also examined patient-provider relationship. They agreed with the clinicians in Duffy et al.'s (2020) study. They found it to be an acceptable adjunct to cognitive behavioral therapy and could increase accessibility to treatment (Ahmedani et al., 2016).

A study of multiple mobile (mHealth) apps researched the accessibility of these interventions to providers. Lan et al. (2018) wondered if these apps provided enough information and taught enough interventions to be considered by providers. They scored the apps off 20 measures and found they were good sources of education and behavior tracking but were not necessarily credible sources for patient information, if they need cognitive behavioral therapy. The framework of these apps would also be very difficult to implement into a healthcare system. The results suggest that there is not enough evidence-based information to use mHealth applications as tools to enhance the patient-provider relationship (Lan et al., 2018).

Research regarding the therapeutic alliance is very important. Patients should be using a provider supported iCBT intervention. It appears that applications that can be found in an app store are not going to be very good sources to receive quality therapy (Lan et al., 2018). The information gathered from other the other sources suggests that clinicians are most comfortable with implanting guided iCBT adjunctive to standard face-to-face therapy.

Hadjistavropoulos et al. (2019) sought to understand the optimal amount of time a patient would like to spend speaking to a therapist when using iCBT and what type of patient appreciates having an optional support option. They learned that patients with GAD were 2.7 times more likely to want a therapist to speak with them weekly. The optional group had the

same results as the patients who chose the standard, weekly contact with a therapist. Both groups reported good therapeutic alliance (Hadjistavropoulos et al., 2019). Patient preference will vary any type of therapy. This study gave patients an option to contact their therapist when they felt they needed to. This type of therapeutic intervention would allow less therapist time to be spent counseling patients, giving them more time to take on more patients.

### **Are All iCBT Services of the Same Quality? What Problems Might Arise when Trying to Implement iCBT into Healthcare?**

If providers are going to begin offering iCBT services, it is important to assess the quality of the interventions suggested. It is crucial to identify patients that are at a high risk for suicide or other impulsive behaviors. The messages that some applications share can have adverse effects on a patients' mental health.

When studying prominent mental health apps offered around the world, Parker et al. (2018) discovered that many times these apps did not provide an accurate representation of real problems in mental health. Some blamed mental illness on poor or fragile mental health. Some messages were meant to reduce the stigma surrounding mental illness and ended up causing an overtreatment of people that were just experiencing temporary symptoms, which takes away resources from people truly experiencing a mental health crisis. Messages also made people feel like their mental illness can be easily fixed by their app. This is harmful because some people need to seek a professional to help manage their symptoms. The messages medicalized normal mental health states, allowing people to believe there was something wrong with them. Many of the apps did not address different social determinants that could affect mental illness (Parker et al., 2018). The messages offered by these apps can be obviously harmful to people struggling from mental health. This study shows that if iCBT were to be implemented, the applications

must complete a vigorous screening process to ensure anxiety and depression are being portrayed accurately and treated properly through the program. Having harmful messages sent through these apps could be detrimental to the implementation and use of iCBT.

A significant barrier will be the topic of data security. Parker, Halter, Karliychuk, and Grundy (2019) studied prominent English-speaking apps to determine if there were adequate security measures for patients to input personal information into the app. Researchers found that they are not secure and consumers are unaware of the repercussions associated with data sharing among developers. They suggested stricter government regulations and stronger penalties if patient data is shared (Parker et al., 2019). These apps need to be considered safe and secure to recommend them for patient use.

Insurance coverage for iCBT might be difficult to obtain especially if it is not part of a healthcare system. Hermes et al. studied implementation of behavioral intervention technology into a large healthcare system and interviewed providers and other behavioral health employees to identify barriers. The participants of the interviews identified numerous barriers including access to internet, lack of accurate ways to track and bill time spent working with BITs, decreased quality of care, knowing which are the best BITs to use, identifying patient ~~amount of~~ self-motivation, proper funding, and patient data safety (Hermes et al, 2019). It will be a battle to implement iCBT into healthcare systems and obtain insurance coverage for payment. Although with COVID-19 causing many new therapies to be offered online, perhaps implementation will occur faster and with less stress than previously thought.

Kolovos et al. (2019) examined the cost-effectiveness of iCBT and societal perspective through an IPD meta-analysis. Researchers were hopeful that the cost of iCBT would compensate for the loss societal productivity resulting from depression symptoms.

Unfortunately, they found that the amount of societal productivity lost from depressive symptoms did not equal the cost of providing iCBT. They suggested further studies to compare cost to face-to-face therapy and medication treatment (Kolovos et al., 2019). Fortunately, Paganini, Teigelkötter, Buntrock, and Baumeister (2018) studied RCTs to compare cost-effectiveness of iCBT to face-to-face psychotherapy and medication treatment. This study suggests that there is potential for internet or mobile based interventions to be cost effective. The results showed a similar cost when compared to face-to-face psychotherapy and medication therapy (Paganini et al., 2018). The studies above contradict one another but it is important to note the differences in the way the studies were performed. Kolovos et al.'s (2019) study did not compare cost to other treatments. It only discussed iCBT options versus no therapies at all. Paganini et al. (2018) compared the iCBT to other therapies and found it to be cost-effective compared to other therapy options. This information suggests iCBT would be useful for patients' who are seeking treatment.

### **Application to Clinical Practice**

There is an obvious need for more therapy options in regard to the treatment of depression and anxiety. It appears that internet-based cognitive behavioral therapy has promising outcomes when it has been studied and could be a viable option. Most studies suggest using it to bridge the gap while waiting to see a behavioral health provider. This could be an excellent resource for primary care providers who want to help the patient manage some of their symptoms before they are able to see a therapist. In rural areas it can take a long time before a patient is able to see behavioral health providers due to the lack of availability.

To start implementing this type of therapy, there should be some training for the providers. It will be imperative for them to recommend well studied iCBT options. As seen

above, there are some great applications and there are some that portray the wrong message. There would need to be some further training to educate providers on what types of applications or websites are available and about the different kinds of iCBT. There are opportunities for self-guided iCBT, which would be good for self-motivated patients, however, guided- iCBT would be helpful for patients who need to have contact with someone to discuss the different interventions they are learning through modules. Blended therapy could be implemented within a healthcare system. This would allow the primary care provider and behavioral health provider to work together to optimize treatment for patients.

It will be very interesting to see where these internet-delivered therapies go post-COVID. Many therapy offices are only allowing telehealth appointments at this time. Perhaps with this step towards using technology in treatment of anxiety and depression, there will be further discussion on different ways to implement iCBT. Using these interventions could potentially allow therapists to increase their volume of patients to keep up with current demand.

### Resources

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