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Cognitive Behavior Therapy versus Internet Cognitive Behavior Therapy in Adults with Anxiety or Depression

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Abstract

According to the American Psychiatric Association, the prevalence of anxiety and depression in adults in their lifetime are nearly 30% and 16.6% respectively. The combination of pharmacotherapy and psychotherapy interventions (including talk therapy or cognitive behavior therapy (CBT)) are considered best practice, but in recent years there has been an increase in the popularity of applications and web-based services categorized as "internet cognitive behavior therapy", or ICBT. The question proposed is, are these services as good for patient outcomes as traditional in-person CBT? A literature review was performed using electronic medical database PubMed with key word searches for cognitive behavior therapy and internet delivered cognitive behavior therapy for both anxiety and depression in adults. All searches were limited to the years between 2015 and 2022, with preference to 2018 to 2022 and filters were set to include "Clinical Trial" and "Randomized Control Trial" only. Many articles were eliminated to only include adult populations and the use of true "internet cognitive behavior therapy", not telemedicine use. Data reviewed shows evidence that participants who used ICBT had statistically significant ($p < 0.05$) improvement in anxiety or depressive symptoms similar to that of traditional CBT and both CBT and ICBT show substantial improvement from control groups. Overall, more studies are needed utilizing a focus of anxiety or depression alone in adults, for longer periods of time utilized or followed, and as more applications or ICBT options become available. The data thus far is evident, though, that ICBT provides a promising option for patients in which in-person CBT is not an option or is not desired.

Keywords: Cognitive Behavior Therapy, CBT, Internet Cognitive Behavior Therapy, ICBT, Anxiety, Depression

Introduction

Anxiety and depression are some of the most prevalent and frequently diagnosed disorders in both children and adults with the American Psychiatric Association claiming nearly 30% of adults will be affects by an anxiety disorder and one in six people will experience depression in their lifetime. And for years we have known that the best treatment is a combination of pharmacotherapy with psychotherapy, which includes cognitive behavior therapy (CBT). The role of CBT is to teach methods and tools for managing and moving beyond the issues that cause the patient's anxiety or depression. There are several known methods and theories of CBT, but the overall goal remains the same (American Psychiatric Association, 2020 and 2021). In recent years, the use of internet-based CBT (iCBT or ICBT) has gained popularity with many now using apps to reach their patients. Several have even become common household names, such as BetterHelp, TalkSpace and Cerebral. While such apps continue to grow in popularity and use, healthcare professionals often disregard these as a valid option or consider them as "second best" to in-person CBT for their patients. In areas where the waitlists to see a counselor are long, sometimes exceeding 3 months, or very rural areas where patients need to travel to have access to a counselor, are these options really second best? What about patients who have difficult work schedules or have limited transportation options?

It is important to note that telemedicine and counseling that is occasionally performed via video conference is not considered "internet cognitive behavior therapy." This is simply traditional in-person CBT that will occasionally take place by video conference. Also note, this analysis does not include self-help or meditation applications or sites, such as Calm or Headspace. ICBT is the use of a website or application that provides therapy services by pairing patients with a therapist or counselor that is usually in a different location. Some apps will give first preferences to those closest to a patient, but that can be hundreds of miles away. The patient

and counselor will never meet in the same physical location, rather they communicate via text, e-mail, phone call or video chat. Patients can select the services they need through package options or al-a-carte options, depending on the app. Some offer 24/7 services and most claim to pair a patient with a counselor within 24-48 hours. Many offer the ability to file through insurance companies. In addition, there are several apps that are tailored to specific patient populations, such as teen patients, LGBTQ+ patients, or Christian based therapy. There are also some that are specific to the type of problem they address, such as relationship therapy or family counseling.

Statement of the Problem

Traditionally we have relied on in-person talk therapy to provide the best care for our patients with depression and anxiety, but with limited resources and long waitlists to see a counselor, could on-line options be of good use? Several providers suggest using an app or online option to help their patients while they wait to see someone locally, but why is it so often treated as a lesser option? With convenience, 24/7 accessibility and a greater sense of confidentiality an online option may be more appealing to patients. This could be particularly true for younger adult patients who have been immersed and raised in technology their entire lives or for many during this post-COVID era.

Research Question

Are online counseling or therapy options as effective as in-person counseling when treating adults with anxiety or depressive symptoms?

Methods

A literature review was performed using electronic medical database PubMed and using key word searches for cognitive behavior therapy and internet delivered cognitive behavior therapy for both anxiety and depression in adults. Search entries included the phrases “CBT for

depression in adults" and "CBT for anxiety in adults". All searches were limited to the years between 2015 and 2022, with preference to 2018 to 2022 and filters were set to include "Clinical Trial" and "Randomized Control Trial" only. Many sources were found by using the "Similar Articles" section found within the article or by reviewing the "cited by" source list found at the end of the paper. Many articles were eliminated due to the specific population set studied, such as those undergoing cancer therapy or those in dialysis or they were articles that were specific to children rather than adults. And many others were also eliminated because, while they included the use of "internet cognitive behavior therapy", they were meaning face-to-face therapy sessions that were held with the counselor or therapist but were conducted via telemedicine.

Literature Review

Theme 1: Patients receiving in-person CBT for anxiety disorders

Stefan et al. (2019) conducted a randomized controlled trial to compare efficacy of three cognitive behavior therapy methodologies in the treatment of Generalized Anxiety Disorder (GAD). Cognitive behavioral therapy (CBT) is known as the gold standard for treating GAD, but there are several theories, practices, and strategies under the CBT umbrella. This study focuses on three models: Cognitive Therapy/Borkovec's treatment package (CT/BTP), Rational Emotive Behavior Therapy (REBT), and Acceptance and Commitment therapy/Acceptance-based behavioral therapy (ACT/ABBT). The most widely studied model is the Borkovec's cognitive avoidance model, which uses goals of reducing negative mental imagery, bodily sensations, and emotional experiences by cognitive restructuring these behavioral responses and dysfunctional thoughts and developing more accurate interpretations of thoughts and surroundings. The REBT model also focuses on changing the patient's dysfunctional thoughts similarly to Borkovec's model, but by using different cognitions. In the ACT model they do not try to modify a patient's dysfunctional thoughts that cause them anxiety, but instead change the patient's relationship to

the dysfunctional thoughts to reduce the distress they feel, so in a sense they defuse the emotional response tied to certain thoughts. Because of the differences between these methods, the researchers included criteria that they felt would best include measurements of success that may vary between models. So, in addition to using the measurable scales like the Generalized Anxiety Disorder Questionnaire IV (GAD-Q-IV), the Penn State Worry Questionnaire (PSWQ), and the Automatic Thoughts Questionnaire (ATQ), they also used a modified version of the ATQ that would help them measure the *believability* of the automatic thoughts, called the ATQ-Believ. The GAD-Q-IV is a 9-item self-reported screening measuring for DSM-IV criteria for a diagnosis of GAD. It is considered a reliable scale and instrument for screening ($k = 0.64$, $\alpha = 0.87$). The PSWQ is a 16-item test with questions using a 5-point scale rating of 1-5 that is designed to measure worry frequency and controllability. The ATQ is a 15-item test that also uses a 5-point scale to rank negative thoughts from 1 to 5 of frequency. The ATQ has proven good consistency ($\alpha = 0.92$) in practice. This test was then modified for the purpose of this study to measure the believability of negative thoughts. Using a 5-point scale rating 1 to 5 they developed the ATQ-Freq. Participants were volunteers with a primary diagnosis of GAD that did not also have diagnoses of severe major depression, bipolar disorder, panic disorder, substance use/abuse/dependence, psychotic disorders, suicidal or homicidal ideation, organic brain syndrome, or disabling medical conditions. Participants were also excluded if within the last three months had treatment with any psychotropic drug or other psychotherapy. The diagnosis of GAD was by standards of the Structured Clinical Interview for DSM-IV (SCID), which was given by three clinical psychologists (not the same psychologists that would be administering therapy for the purpose of the trial). The trial began with 71 participants between the ages of 20 and 51 ($m = 27.13$; $SD = 7.50$), with 60 females and 11 males, that were randomized into one of

the three therapy groups using a random number generator. The treatments included 20 separate 50-minute sessions with the first 8 sessions being held twice per week and the remaining sessions were held once per week. All sessions were held in the same outpatient clinic location. Only 39 participants completed the program through the end of the posttreatment surveys. There remained 13 patients in the CT/BTP group, 12 in the REBT group and 14 in the ACT/ABBT group. Results were calculated using the Intent to Treat (ITT) number of participants (N=71) versus completed participants of 39. Results show significant positive correlations in the pre- to post changes in all groups. Using the GAD questionnaire, the CT/BTP group correlated with the GAD-Q-IV/ATQ-Freq: $r = .625$, $p = .001$ and GAD-Q-IV/ATQ-Believ: $r = .489$, $p = .018$. For the REBT group the correlation with GAD and dysfunctional thought frequency is GAD-Q-IV/ATQ-Freq: $r = .637$, $p < .001$ and the GAD and believability was GAD-Q-IV/ATQ-Believ: $r = .669$, $p < .001$. The ACT/ABBT group the correlation with thought frequency was GAD-Q-IV/ATQ-Freq, $r = .731$, $p < 0.001$ and with believability was GAD-Q-IV/ATQ-Believ., $r = .468$, $p = .021$. Results measuring worry using the PSWQ showed similar correlations with thought frequency in the CT/BTP group at PSWQ/ATQ-Freq, $r = .562$, $p = .005$ and believability at PSWQ/ATQ-Believ, $r = .678$, $p < .001$. Similarly, in the REBT group frequency correlations were PSWQ/ATQ-Freq, $r = .703$, $p < .001$, and believability was PSWQ/ATQ-Believ., $r = .635$, $p = .001$. Lastly, in the ACT/ABBT group frequency results were PSWQ/ATQ-Freq, $r = .681$, $p < .001$ and believability was PSWQ/ATQ-Believ., $r = .441$, $p = .031$. Overall, no significant difference was found between the 3 treatment groups. In other words, between these three forms of CBT for the treatment of GAD appear to be equal in reducing GAD symptoms, worry, frequency of dysfunctional thoughts and believability of dysfunctional thoughts. This study went to great lengths to ensure that the measurements used

would account for differences in CBT models and that all processes remained equal throughout. They even held all sessions in the same location. A downfall to this study was that, while they began with 71 participants, that number dropped to only 39 at full completion. Most of those individuals that did not complete the entire study attended most or even all the sessions but did not return for the post assessment. They also did not have a control group or waitlist group as a part of this study to compare with all treatment groups to assess the degree of change versus control (Stefan et al., 2019).

Simon et al. (2021) conducted a blinded, 3-arm, controlled, parallel-group prospective study to determine the efficacy of Kundalini yoga (KY), cognitive behavior therapy (CBT) and stress education (SE) for superiority and to test for KY noninferiority to CBT. They hypothesized that "posttreatment assessment KY and CBT would each be superior to SE (hypotheses 1.1 and 1.2) and that KY would be noninferior to CBT (hypothesis 1.3) based on responder status, defined as a Clinical Global Impression of Improvement (CGI-I) score of much improved or very much improved." The study lasted nearly 6 years and involved 226 participants (mean [SD] age, 33.4 [13.5] years, 158 [69.9%] female) 18 years or older that had been diagnosed with a primary diagnosis of GAD per the DSM-5 GAD diagnosis. Only 155 participants (68.6%) completed the posttreatment assessment. Participants were excluded if they had current PTSD, substance use disorders, eating disorders, suicidal ideation, bipolar disorders, developmental disorders, or lifetime psychosis. They were also excluded if completed more than 5 CBT or 5 yoga sessions in the last 5 years or if they had had changes to any psychotropic medications in the last 6 weeks. They were randomized into one of the 3 groups (Kundalini yoga (n = 93), CBT for GAD (n = 90), or stress education (n = 43)) of about 3-6 participants and 2 instructors. Treatment entailed small group sessions of 12 120-minute sessions and daily

homework for 20 minutes. All instructors were trained, certified, and supervised for each specialty in which they lead. Data collected by a CGI-I rating was compared with post treatment twice weekly for 12 weeks and again at 6 months. Additional questionnaires utilized included the 65-item Meta Cognition Questionnaire (MCQ) and the 39-item Five Facet Mindfulness Questionnaire (FFMQ), which specifically assesses mindfulness, taken at 0-, 6- and 12-weeks posttreatment. Response rates were higher for both the KY group and the CBT group when compared to the SE (control) group. Data showed that KY group (54.2%) vs the SE group (33.0%) (odds ratio [OR], 2.46 [95% CI, 1.12-5.42] $p = .03$ and the CBT group (70.8%) vs the SE group (33.0%) (OR, 5.00 [95% CI, 2.12-11.82] $p < .001$. At 6-months the CBT group's response rate (76.7%) was higher than that of the SE group (48.0%) (OR, 3.56 [95% CI, 1.08-11.70] $p = .04$, but the KY group response rate (63.2%) was not significantly higher than that of the SE group (OR, 1.86; 95% CI, 0.52-6.69, $p = .34$). When testing for superiority between CBT and KY they were unable to detect a difference in response rate (OR, 1.91; 95% CI, 0.69-5.26, $p = .22$), but when testing for noninferiority between the CBT and the KY groups the difference was 16.6% ($p = .42$). Overall, it was found that while there is a significant difference in efficacy of CBT and KY versus SE, they were unable to support their hypothesis that KY would be noninferior to CBT (Simon et al., 2021).

Axelsson et al. (2020) conducted a randomized clinical trial in the primary care setting to compare the use of ICBT versus face-to-face CBT in patients with health anxiety. These patients enrolled by recruitment from local clinics that advertised the study. Once applicants completed online screening and provided informed consent online, they were then screened in-person with a psychiatric interview. The interview was conducted by a clinical psychologist using the Mini-International Neuropsychiatric interview, the hypochondriasis module of the Anxiety Disorders

Interview Schedule for *DSM-IV*, and the Health Preoccupation Diagnostic Interview. Patients were excluded if they answered questions that suggested they had suicidal ideations, severe depression by standard of the *DSM-5*, bipolar disorder, psychosis, a substance abuse disorder, or other personality disorders that could interfere with treatment so they could be referred for necessary care. It was also required that any patients that were taking antidepressant medication were on a stable dose for a minimum 2 months prior to the trial and that no patient had received CBT within the last year for their anxiety. The remaining 204 patients were adults, at least 18 years old, that met criteria for a "somatic symptom disorder or illness anxiety disorder" per the *DSM-5* criteria. These individuals were divided evenly into two randomly selected groups (each of 102 patients) with treatment administered for 12 weeks. There was no control group. One group would receive 12 weeks of access to an ICBT with 12 modules and were encouraged to complete 1 module per week. After completion of a module, they would receive personalized feedback online from a therapist and would have the ability to communicate with a therapist via an email-like system. The face-to-face CBT group would meet in person with a therapist and have daily homework assignments. The first week's session was 80 minutes long and the remaining week's sessions were each 50 minutes long. Data was collected using an 18-item Health Anxiety Inventory (HAI) that was completed by the patients and baseline, once weekly during treatment, post-treatment and at 6 and 12 months after treatment completion. Additionally, a wide variety of self-rated questionnaires, including those on sleep, alcohol use, illness attitude, depression, and anxiety, were completed at baseline, at treatment completion, and at 6 and 12 months after treatment completion. Lastly, they assessed cost comparison to value for outcome for ICBT versus the face-to-face CBT sessions. The mean change in HAI data was plotted over time comparing ICBT and face-to-face CBT data. Significance was determined

by $\alpha = .05$ and both models remained with the confidence interval to indicate ICBT is non-inferior when compared to face-to-face CBT treatment in this study. On comparison of cost, there was a substantial reduction of net costs for ICBT versus an in-person therapy option (mean [SD]: $454 [257] vs $2059 [595] respectively). Overall, the outcomes of this trial supported the hypothesis that ICBT is noninferior compared to in-person CBT with the added benefit of cost reduction for patients with health anxiety. While this study seemed to do a thorough job of comparing these two treatment options, and with limited variability between tested groups, there were some limitations to mention. First, there was no control group of any kind, there was no follow-up psychiatric evaluation performed at the completion of the study and the authors were also the physiatrists involved in the therapy given to these patients in both the ICBT and CBT groups. While this is good for consistency, it also means they had substantial control over the methods implemented and the success of that implementation. During the study there were repeated comments on the high level of qualifications and expertise of the therapists involved in the study (themselves). There are also multiple statements on conflicts of interest in this study that several of the authors were recipients of other grants during the study, one of which was a company that also funded the study. Some of the authors were also coauthors of a self-help book for those with anxiety that was released and published during the trial. Additionally, two of the authors are also shareholders of an online program for psychiatric symptom assessment and a company that created online cognitive behavioral therapy manuals. At no time during the study did they reveal the name or specifics on the design of the ICBT program used, so it also makes it difficult to determine its relevance to other populations or types of psychiatric conditions or if it is even available to the public or in other countries (Axelsson et al., 2020).

Theme 2: Patients receiving in-person CBT for depressive symptoms

Forand et al. (2019) compared the use of internet guided CBT with the "gold standard" CBT that has been thoroughly studied for depression in an 8-week trial. Unique to this trial, they held the 8-week trial of iCBT participants and a control group to samples from two randomized control trials (RCTs) on depression treatment – PennVandy (N=240) and U. Washington (N=241). Participants of the trial (N=89, iCBT N = 59, waitlist (control) N = 30) needed to be 18 years or older, able to give consent, had access to a computer and had a score of greater than or equal to 2 on the first two questions of the PHQ9 and greater than or equal to 8 on the remaining questions. This was highlighted as it ensures presence of cardinal depression symptoms. The program used in this trial was called *Beating the Blues* which is an interactive, internet delivered CBT for depression. There are 8 sessions that were 50 minutes each and had additional homework that participants were encouraged to do. They were also given a "coach" to improve accountability. In addition to the PHQ9, the Hamilton Rating Scale of Depression (HRSD) (a 17-item interview-based measure testing for severity) was included in the evaluation. The HRSD was compared at week 0 and week 8. Comparing to Penn-Vandy data the attrition rate with iCBT was greater than that of Cognitive Therapy (CT), odds ratio (OR) = 0.362, 95% confidence interval [CI] [0.132, 0.994], $p < 0.05$. Regression data showed a significant effect for the treatment group on remission, $\chi^2(3) = 7.89$, $p < 0.05$. Note, though, the iCBT group showed a greater rate of remission than CT, OR = 0.308, 95% CI [0.086, 1.099], $p = 0.07$. In the noninferiority data using the HRSD at week 8, the data indicated that iCBT was noninferior to CT ($t = -4.71$, $p < 0.0001$, 95% CI [−4.88, −0.24]). Comparing to the U. Washington data, once again the iCBT attrition rate was greater than the CT group, OR = 0.169, 95% CI [0.053, 0.542], $p < 0.01$. No overall differences in remission were detected between iCBT and U. Washington conditions, $\chi^2(4) = 3.30$, $p = 0.51$ and in noninferiority testing at week 8 iCBT was found to be

noninferior to CT ($t = -3.53$, $p < 0.001$, 95% CI [−3.85, 1.04]). Overall, this data supports the idea that iCBT can produce changes in symptoms that are noninferior to the traditional CBT and a greater change than placebo groups. They even have evidence that supports that iCBT is *superior* to CT in this trial, but it also had higher dropout rates than other more traditional treatments with patients falling off after the 8-week completion mark in the trial. This may be because participants were told it was an 8-week trial and did not intend to continue after the completion date. As previously mentioned, this study is unique in that they held their own study but designed their study to match criteria and demographics of two other studies to compare the data collected to these larger studies. This means that this study was not randomized and not blinded. They had ended the study at 8 weeks and compared it to data at the same 8-week mark, but the other studies continued for 16 weeks. In addition, the Penn-Vandy and U. Washington studies used for comparison were completed more than a decade before this study (Forand et al., 2019).

Nakagawa et al. (2017) conducted a 16-week study to test the effectiveness of cognitive behavior therapy (CBT) on patients with major depressive disorder (MDD) who have had difficulty or failure with pharmacotherapy alone. Participants of this study were aged 20 to 65 years old who had sought treatment for major depression at either a psychiatric hospital or a university teaching hospital in Tokyo. They were required to provide written consent, needed a baseline assessment, and needed to have a diagnosis of MDD per the DSM-IV criteria with some degree of treatment-resistance by a Maudsley Staging Method for treatment-resistant depression score greater than or equal to 3 and a 17-item GRIS-Hamilton Depression Rating Scale (GRID-HDRS) score of greater than or equal to 16. Selected participants were then randomly separated into one of two groups, either a treatment as usual (TAU) group or a CBT plus TAU group. CBT

plus TAU participants were given 16 individual 50-minute CBT sessions that were held weekly with the option of four additional sessions if the therapist deemed appropriate that the TAU group was not offered. TAU consisted of education and medication management from psychiatrists and given a 16-item Quick Inventory of Depressive Symptomology Self-Report (QIDS-SR) at each clinical visit. All participants were assessed at baseline, 8-week, 16-week, and again 3 months, 6 months and 12 months after the 16-weeks of treatment. The total enrollment for this study was 80 participants with 40 in the CBT plus TAU group (n = 40) and 40 in the TAU alone group (n = 40). The mean changes in GRID-HDRS scores showed improved depressive symptoms at 16 weeks in the CBT group than in the TAU group (−12.7 vs −7.4, respectively) and in the between-group times as well (−5.4; 95% CI, −8.1 to −2.6; P < .001). These effects of CBT were maintained to the 3- month mark (−13.2 vs −9.5; difference = −3.7; 95% CI, −6.4 to −0.9; p = .01), the 6 month mark (−14.9 vs −11.5; difference = −3.4; 95% CI, −6.2 to −0.6; p = .02), and even to the 12 month mark (−15.4 vs −11.0; difference = −4.4; 95% CI, −7.2 to −1.6; p = .002). At 8 weeks there was no significant difference in the treatment effect (p = .11). Overall, their work supported that adding CBT to the traditional pharmacotherapy was more effective in treatment of major depression, specifically that had previously been resistant to treatment. The data also tells us that the addition of CBT has a long-lasting effect for reducing depressive symptoms versus TAU alone. They report that there were no serious adverse events during the 16-week intervention period, but that during the post-treatment follow-up two participants from the TAU group had been hospitalized for depression exacerbation and one of these individuals committed suicide shortly after discharge. This happened 10 months after the completion of the 16-week intervention period (Nakagawa et al., 2017).

Theme 3: Patients receiving ICBT for anxiety disorders

Hwang et al. (2022) conducted a blinded, randomized trial on 126 individuals that were identified to have work related stress and could successfully meet study criteria. This was a prospective study conducted over a 10-week time period. The requirements for participants included the following: they needed to be aged 18-60 years, not self-employed, worked a minimum 20 hours per week, obtained a score of 14 or higher on the Perceived Stress Scale-10 (PSS) defining that the participant has a perceived increased stress, could determine the cause of their stress was mostly work-related, and could provide consent to participate in the study. Exclusion criteria included: history of alcohol abuse, drug abuse, neurological disorders, congenital brain disorders, cerebral palsy, acquired brain injury, an education level below the 9th grade, severe anxiety, severe depression, or a psychotic disorder according to the Korean Symptom Checklist–95, or the inability to provide consent to the trial. The goal of the study was to demonstrate the effectiveness of an internet based cognitive behavioral therapy (ICBT) in the reduction of work-related stress. The 126 participants were divided equally into two groups using a random generator: a test group given access to the application BetterLife to be used for 50 minutes a week for 10 weeks and a control group that was not provided any intervention. Baseline demographics and psychological scale data was collected to compare groups, without any significant variation found, and intervention outcomes were determined using self-reported psychological scale data. These scales include: the Perceived Stress Scale (PSS), the Utrecht Work Engagement Scale (UWES), World Health Organization Quality of Life Scale (WHOQOL), Beck Depression Inventory (BDI), and the Beck Anxiety Inventory (BAI). Results show statistically significant improvement in PSS (F=24.33, p<.001) and UWESK scores (F=8.32, p=.0046) for the intervention subject group versus the control group. There are seven

measured sub-groups within the WHOQOL score and six of the seven showed significant improvement (determined by a p of < 0.05), except in overall health ($p = 0.20$). This data supports the use of the app BetterLife for improvement in work related stress, work engagement, and improvement in quality of life versus control group. Due to reliance on volunteer participation, the individuals that came forward to participate were of a very similar demographic in that most were females that held at least a college degree. This provided little variation in the test subjects, so it is difficult to determine if the data is applicable to a larger, varied population. The data here also relied entirely on self-reported information over time and no true objective data was collected. Lastly, the data was collected for only the 10 weeks during which interventions were applied but did not follow up in the weeks or months after. Although this study was performed in Korea, it seems the demographic data and variety of testing scales used would imply the results would be applicable to a global demographic of similar criteria (Hwang et al., 2022).

As previously mentioned, Axelsson et al (2020) conducted a randomized clinical trial to compare ICBT to in-person CBT in the primary care setting for patients with health anxiety. Adult participants that met criteria for a "somatic symptom disorder or illness anxiety disorder" per the *DSM-5* criteria underwent 12 weeks of treatment in either an internet-based CBT, that included 12 modules with a goal to complete 1 module per week, or into a face-to-face CBT that would meet weekly in person and have daily homework assignments. The ICBT group would also have personalized communication and feedback with a counselor via e-mail. Data was collected using the 18-item Health Anxiety Inventory (HAI) data, self-rated questionnaires, and cost comparison for ICBT versus the face-to-face CBT. According to the analysis in this study ICBT is non-inferior when compared to face-to-face CBT and there was a substantial reduction

in costs for ICBT versus an in-person therapy option (mean [SD]: $454 [257] vs $2059 [595]), so outcomes supported the hypothesis that ICBT is noninferior to in-person CBT and has an added benefit of reduced cost in patients with health anxiety. This study is specific to patients with health anxiety (Axelsson et al., 2020).

Howell et al. (2019) conducted a study on graduate students at an American university that were enrolled in either the College of Medicine, College of Dental Medicine, College of Graduate Studies, College of Health Professions, College of Nursing, or the College of Pharmacy. They selected this particular demographic because of the higher risk of anxiety-related problems and a lesser probability of seeking help due to stigma and time and scheduling conflicts. They performed a randomized controlled trial of web-based cognitive behavior therapy (webCBT) versus a control group (CG) for the reduction of stress and prevention of anxiety problems. They used a web-based program called MoodGYM which is anonymous and available 24/7. Howell (2019) predicted:

> (1) individuals assigned to the webCBT group would report lower anxiety symptoms than individuals in the CG at follow-up assessment. We also hypothesized that a smaller proportion of individuals in the webCBT group, versus CG group, would: (2) meet a cutoff score suggestive of clinically elevated anxiety symptoms and/or (3) would not demonstrate a clinically significant increase in symptoms during the school year (regardless of clinical status). (p. 4)

There were 594 participants (n=594; M_{age}=27; 67% female; 80% Caucasian; webCBT: n = 266; CG: n = 328). All participants completed a baseline survey that included demographic information, such as gender and race/ethnicity, the type of academic program/college they were enrolled in and symptoms and were randomly assigned to either the webCBT group or the

control group (CG). The CG was sent an email each week to the institution's Counseling and Psychological Services' online resource center to complete a 10-minute self-assessment on mood, anxiety and substance use with immediate feedback for their scores. The webCBT group was assigned four weeks to MoodGYM to complete modules. Each lasted about 30 minutes and included exercises, scenarios, and quizzes and uses "cognitive restructuring techniques that promote the ability to identify and challenge inaccurate, unrealistic, or overly negative thinking". When comparing anxiety symptoms to follow up data the results were $t = 2.65$, $p = .008$, $d = .24$, $CI(95)_d = .06 - .42$ and the students that participated in webCBT showed less anxiety at follow-up (*marginal M*[*SD*] = 2.88[3.36]; CI[95%] = 2.42 - 3.34) than the CG students (*marginal M*[*SD*] = 3.69[3.35]; CI[95%] = 3.30 - 4.07). The results support that, for students who have mild to moderate anxiety (GAD-7 between 5 and 10), a web-based CBT can help to significantly lower anxiety symptoms. This study had a very specific demographic that may not be entirely applicable to general populations, but the sample size was larger than many other studies of similar goals. They also did not include much follow-up for longevity in this study as the students progressed through the year (Howell et al., 2019)

Theme 4: Patients receiving ICBT for depressive symptoms

Rauen et al. (2020) conducted a study to compare internet cognitive behavior therapy with the addition of face-to-face outpatient psychotherapy (ICBT+) or without (ICBT) face-to-face therapy in patients with moderate to severe depression. One hundred sixty-eight adult patients (age 18-65 years) with depressive symptoms were divided into the either the ICBT+ group (n = 96) or ICBT group (n = 72) and underwent intervention for 12 weeks. Participants were eligible if their depressive symptoms were moderate to severe with a BDI-II between 20 and 40 and lasted at least 2 weeks and they spoke German. Exclusion criteria included a BDI-II

of greater than 40, suicidal ideation, substance dependency, history of bipolar disorder or psychotic symptoms or current impatient or semi-residential treatment or care. This was a longitudinal study that measured patients at baseline (T0), postintervention at 12 weeks (T1) and at follow-up at 6 months (T2). Questionnaires used to measure Quality of Life (QoL) and depression severity included the World Health Organization Quality of Life Questionnaire (WHOQOL-BREF) and the Beck Depression Inventory (BDI-II). Participants were given access to 8 modules with one released every week and included education and exercises. There were email communications sent out to remind participants if they had not finished a module, hadn't logged in in more than 7 days and whenever a new module had been released, but there was no personal or individualized support provided. Once the 12-week intervention period ended the participants had free access to continue to use the program without restriction if they chose, but they didn't receive any new modules or emails. For QoL analysis the WHOQOL-BREF scores did not differ between groups (ICBT: n = 88/ ICBT+: n = 72) at baseline (36.4 ± 13.9/36.2 ± 11.9; $p = 0.94$) and both groups gained improved QoL scores when compared to baseline without group differences ($p = 0.87$; $\eta 2 < 0.01$). For comparison of depressive symptoms, the BDI-II scores did not differ between groups (ICBT: n = 95/ICBT+: n = 69) at baseline (27.4 ± 7.7/27.6 ± 7.1; $p = 0.97$) and BDI-II scores at T0 and T1 shows reduced depressive symptoms in both groups with $p < 0.001$. Those in the ICBT group showed a slight reduction of depressive symptoms with higher BDI-II scores versus those in the ICBT+ group at 6 months (T2) and 12 weeks (T1) ($p = 0.02$). Meaning there appeared to be a beneficial effect of additional face-to-face outpatient psychotherapy when comparing overtime. Rauen (2020) states:

> Internet cognitive behavioral therapy can help improve QoL and depressive symptoms especially for those patients having limited access to psychotherapy and/or being afraid

> of psychiatry-related stigma, thereby being supportive to overcome lack of treatment capacities or stigma of psychiatric consultations. (p. 6)

Overall, the results of this study suggest that face-to-face outpatient psychotherapy in addition to the ICBT may help with stabilization over time (Rauen et al., 2020).

The previously mentioned Forand et al. (2019) study compared iCBT with the "gold standard" CBT for depression in an 8-week trial. They held the 8-week trial of iCBT participants using *Beating the Blues* and a control group to data from two RCTs from PennVandy (N=240) and U. Washington (N=241). Data showed a significant effect for the treatment group on remission, $\chi^2(3) = 7.89$, $p < 0.05$ than CT, OR = 0.308, 95% CI [0.086, 1.099], $p = 0.07$. Noninferiority data using the HRSD at week 8 indicated that iCBT was noninferior to CT ($t = -4.71$, $p < 0.0001$, 95% CI [−4.88, −0.24]). Comparing to the U. Washington data, once again the iCBT attrition rate was greater than the CT group, OR = 0.169, 95% CI [0.053, 0.542], $p < 0.01$. There were no overall differences in remission between iCBT and U. Washington, $\chi^2(4) = 3.30$, $p = 0.51$ and in noninferiority testing at week 8 iCBT was noninferior to CT ($t = -3.53$, $p < 0.001$, 95% CI [−3.85, 1.04]). This study supports iCBT in that it can produce changes in symptoms that are noninferior to the "gold standard" traditional CBT and a greater change than placebo groups. Remembering that the data from the study even supports that iCBT is *superior* to CT in this trial The iCBT group showed higher dropout rates than other more traditional treatments, but participants were enrolled in an 8-week trial and while data was being compared at an equal 8-week point, the CT studies continued for a total 16 weeks (Forand et al., 2019).

Discussion

Anxiety and depression are fluid states that change often, are easily impacted by our environment, and become difficult to measure. There is no lab value or imaging that can quantify the degree of anxiety or depression in a given moment. Our only tools to measure both

symptoms and severity of anxiety and depression are surveys or questionnaires, almost always those that include self-reflection and analysis of one's own feelings and thoughts. The research utilizes the question of effectiveness of cognitive behavior therapy then relies heavily on self-analysis and associated survey.

For decades it has been known that the best treatment for anxiety or depression is a combined approach of pharmacotherapy and cognitive behavioral therapy. While there are numerous pharmacologic options available and used today, and several variations in the methodologies of cognitive behavioral therapy used, these varieties will not be addressed here. Discussed here is the efficacy of internet cognitive behavior therapy (ICBT) compared to traditional in-office or in-person cognitive behavioral therapy (CBT). Internet cognitive behavioral therapy has surged in popularity. This is likely due to a few factors, including the increased use in technology from very young ages, the improvements in quality of technology available and the broadening of technology into more areas of our lives. Additionally, the impacts of COVID-19 and subsequent normalization of video conferencing has introduced us to multiple types of interaction options people had not explored before. This paper does not use comparisons with telemedicine as this is not equivalent to "internet cognitive behavior therapy." Telemedicine is still traditional in person behavior therapy that may just take place via video conferencing from time to time. These sessions are still through a therapy or counseling office in the traditional sense. Internet cognitive behavior therapy (ICBT) refers to the use of a website or application (mostly used through apps) that allow for a more on demand, flexible option for therapy. Many have services available 24/7 yet still offer customized therapy to the individual and work with a consistent counselor or therapist just as you would expect from traditional services. As these modes of therapy gain popularity, more apps become available and some are

focusing their clientele or methodology, such as Christian based therapy or apps geared toward teen patients or LGBTQ+ patients. Many benefits can be considered with internet-based services, most significantly the flexibility to log in and the anonymity that comes with an app-based service. Some offer flexible financial options, such as al a carte services, but also file through insurance like traditional counseling. They also allow patients the opportunity to get help soon rather than waiting weeks or months to be seen by someone, which is a real problem patients and providers face when trying to get appropriate help needed. Small communities or rural locations often struggle to get in to see someone in their own community within 6-8 weeks and some small towns don't have any option and need to travel to see someone in person. For some this just isn't an option, nor it is financially possible. Other patient's schedules won't allow to see someone during the "typical office" hours that almost all counselors hold. One other concern expressed by patients is the stigma that they fear will affect them if they are seen getting counseling or if they may have ties to the counselor, they don't feel they can speak or share openly for there to be an optimal outcome. The apps allow for anonymity and allow for a patient to log in from wherever they want. On the other hand, many patients feel the need to be physically in front of another person to have an effective connection and prefer to have a place to go to participate in their sessions. Some have mentioned working through trauma is difficult for them and they don't want that to happen in their home, they like to have a separate safe space to go to for this. All of these individual preferences will certainly play a role in the data collected when testing the efficacy of ICBT versus CBT.

All trials used some form of questionnaire or survey to quantify the severity of the anxious or depressive symptoms and/or the impact of symptoms on daily life. They surveyed participants throughout and at the completion of the trial and compared the data. Participant

selection and disqualification criteria were very similar between trials eliminating any participant with drug or alcohol dependency, personality or psychological diagnoses such as bipolar disorder, schizophrenia, multiple personality disorder, etc., the recent initiation or adjustment of a psychotherapeutic drug, or any suicidal thoughts or actions. For obvious safety reasons, they did not want to run trials on individuals who needed urgent or emergent help and also wanted to get a sample of patients that would be a middle ground "average" or typical patient. Once data was collected from pre-treatment studies, treatment and post-treatment time frames data was compared overtime and between methods. Most studies used a control group that was a waitlist group of individuals that received no intervention at all. The analysis of the articles here have repeatedly shown statistically significant ($p < 0.05$) improvement in anxiety or depressive symptoms with the use of ICBT when compared to CBT. Both CBT and ICBT show substantial improvement from control groups throughout all studies that used control groups and when they compare initial surveys there has not been a substantial difference between the impact for those who did CBT versus ICBT.

The data was surprisingly limited considering the trend in use of these apps. Additionally, many of the studies or trials performed used a very limited type of participant, such as those undergoing cancer therapy or dialysis. More studies are needed using the apps that we see used more commonly, such as TalkSpace, Cerebral or BetterHelp. The studies found used apps or programs that are not commonly used in the United States. As an after effect of the COVID-19 pandemic it is expected to see an increase in these studies and trials. Additionally, there is a need to see more longevity out of some of these trials. Many studies followed up for months to a year after treatment to test for longevity out of the treatment, but what isn't known with this data is if there is continued use out of the app. Many patients will see a counselor for a period of time and

will continue this for months or years and make that plan together, but is lack of adherence an issue from patients that use the app since it is treated more of an on-demand service? Do patients only seem to use it when in "crisis mode" or do they stick to it as expected out of traditional CBT methods suggest or require? Do most patients need that person they meet with and regularly scheduled appointment to keep consistent or is there equal consistency between CBT and ICBT?

It is expected that as time goes on and generations pass, we will begin to see a shift in the preferences and people will chose ICBT because with each generation people become more and more comfortable with technology and want more of an on-demand and immediate service.

Conclusion

Currently, the data we have supports that ICBT is just as effective for patients as traditional in-person CBT for the treatment of anxiety or depressive symptoms in adults. The studies above present a variety of internet-based therapy systems used and a variety of systems of measurement that compared outcomes. Additionally, outcomes were compared over various periods of time and still the data supports that the use of ICBT is comparable to traditional in-person CBT. While additional research is needed in comparing these two approaches the above data is a very promising start. Much of the current research found was based upon very specific populations, but there has been little tested on general adult populations. There is also a need for research that uses some of the more commonly accessed apps. It's expected that the COVID-19 pandemic will lead to an increase in research in this area due to an increased need and popularity of these sites and apps, such as BetterHelp, TalkSpace, and Cerebral.

It is important to remember that while the data supports a comparable outcome, this does not mean a direct equal effect for every patient. Remember that the best medicine for a patient is the medicine they will take. It is necessary to approach any recommendation on therapy options

with the patient's preferences, lifestyle and needs in mind. Some patients would never consider in-office or in-person CBT, so online could provide a great opportunity. Others may live out of town, so ICBT is the only option for them. Others have trouble staying on track and would need in-person support and pre-set meetings to keep making progress. Age and financial limitations should also be considered.

Application to Clinical Practice

Regarding clinic practice and patient care it appears that suggesting the option of an app does not need to be regarded as second-best practice. The data presented here shows that patient outcomes for the use of ICBT are comparable to in-person CBT. The additional benefits that are offered by using an ICBT, such as 24/7 availability, at home privacy and confidentiality, faster time to be seen and easier availability in rural or underserved areas may appeal to some patient populations that would not otherwise consider therapy. Best practice for patients would be tailored recommendations to each patient and realize that some patients would best benefit from in-person CBT, and they may need the face-to-face connection, while others may not.

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