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ORIGINAL ARTICLE

Examining the Effectiveness of an Intensive Telemental Health Treatment for Pediatric Anxiety and OCD During the COVID-19 Pandemic and Pediatric Mental Health Crisis

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Abstract
Despite research supporting the efficacy of weekly outpatient videoconferencing-based cognitive behavioral therapy (VCBT), limited evidence exists about the benefits of leveraging VCBT for brief intensive formats. We examined the effectiveness of an intensive outpatient VCBT targeting pediatric anxiety and OCD. Quasi-experimental design was used to compare outcomes of intensive, in-person, group-based cognitive-behavioral therapy with medication management and caregiver guidance pre-pandemic, to a similar VCBT peri-pandemic ($n = 130$). Pretreatment and posttreatment assessments included patient- and caregiver-report of anxiety and functional impairment. Analyses of covariance were conducted, examining changes in anxiety and impairment between treatment groups, controlling for admission levels. No significant differences in posttreatment anxiety or impairment were observed between conditions. This study illustrates that intensive, group-based treatment for pediatric anxiety and OCD using VCBT is associated with comparable reductions in anxiety and impairment. It marks a crucial step toward providing broader access to quality care for youth in need.

Keywords Telepsychology · Telepsychiatry · Child adolescent psychology · Anxiety disorders · Obsessive–compulsive disorder

Introduction

Anxiety disorders and obsessive–compulsive disorder (OCD) are among the most common mental health conditions affecting children and adolescents [1–4]. Prevalence rates for youth anxiety disorders range from 8 to 12%, and 0.2 to 4% for those who meet criteria for OCD at any given time [5–7]. Anxiety disorders and OCD often emerge early in life [8–10], increase in prevalence across development [11–13], and tend to exhibit a chronic course [14–16]. These conditions are associated with impairments across multiple domains of development and functioning, including academic and social difficulties [17, 18], sleep problems [19], irritability [20], and the development of comorbid psychopathology in adolescence [6, 13, 21, 22]. When left untreated, anxiety and related disorders have been linked to a host of negative outcomes in adulthood, including the development of comorbid psychopathology, substance misuse, and reduced quality of life. [15, 16, 22–26] Beyond the individual, the economic costs of youth anxiety disorders and OCD to families and society are substantial [27, 28]. An estimated 10.6 billion USD per year is spent on the treatment of OCD [29], and a further 46.6 billion USD to treat anxiety disorders [28, 30]. Moreover, the cost of illness in families with a child with an anxiety disorder (i.e., costs of direct care for their children as well as associated indirect costs) is up to 21 times greater than that of families with children who do not have anxiety disorders [31]. Not surprisingly, these conditions are also associated with lower parenting satisfaction and greater family dysfunction [32]. Regrettably, rates of pediatric anxiety disorders have been rising over the past decade [33], with rates accelerating dramatically during the COVID-19 pandemic [34, 35]. Taken together, these findings underscore the critical importance of developing and disseminating effective and accessible treatments for youth impacted by anxiety disorders and OCD.

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Pre-COVID-19 Standards of Youth Anxiety and OCD Treatment

Research efforts over the past 40 years have greatly advanced the treatment of anxiety disorders and OCD in pediatric populations; cognitive behavioral therapy (CBT) approaches, in particular, have shown considerable efficacy for the treatment of youth anxiety and OCD [24, 36, 37]. Moreover, CBT for the treatment of pediatric anxiety and OCD has demonstrated efficacy when delivered through multiple intervention formats, including individual outpatient treatment [38–41], family-based treatment [42–45], group-based treatment [46, 47], and brief, intensive or condensed (BIC) formats. [48, 49]

Regarding BIC approaches, these brief, high-intensity treatments have demonstrated efficacy across a range of pediatric anxiety disorders and OCD, [48, 50] including specific phobias [51, 52], panic disorder, and agoraphobia [53], separation anxiety disorder [54], social anxiety disorders [55], selective mutism [56], school refusal [57, 58], and OCD [59–62]. Importantly, BIC treatments for pediatric anxiety disorders and OCD delivered within the clinic have demonstrated comparable efficacy to standard weekly treatments [48, 61, 63], and also result in meaningful reductions in functional impairment [64]. BIC approaches to the treatment of pediatric anxiety disorders and OCD confer a number of additional benefits which may be desirable for patients and their families. Weekly outpatient CBT for pediatric anxiety disorders and OCD typically takes place over the course of 12–20 treatment sessions. BIC approaches typically involve engagement in longer treatment session(s) occurring over a concentrated time-period, thereby reducing either the number of sessions or the overall length of time in which the intervention is delivered. Thus, they may allow for a more rapid accumulation of treatment gains, permitting youth to experience reductions in distress and functional impairments over a shorter period of time [65, 66]. CBT delivered through BIC formats also are associated with reduced attrition rates when compared to standard weekly treatment [48]. BIC treatments are typically delivered by highly trained, specialty-care professionals [50], access to whom may be limited for many youth in need of services [67–72]. Given the short-term nature of BIC treatments, some patients and their families may be able to temporarily relocate to participate, which can help mitigate geographic factors constraining care access [50, 65]. Moreover, these approaches may be beneficial for youth with moderate-to-severe and/or treatment-resistant conditions [66, 73], making BIC treatments potentially a viable alternative for patients for whom traditional CBT has historically been less effective.

Telemental Healthcare for Youth Anxiety and OCD During the COVID-19 Pandemic

The COVID-19 pandemic and associated public health measures taken to minimize its spread have had a significant impact on mental health service delivery worldwide, with many providers shifting to telemental health platforms rather than providing in-clinic care to comply with social distancing or lockdown requirements [74, 75]. Fortunately, robust and ever-growing support for the delivery of evidence-based telemental health interventions for children has emerged in recent years [76]. More specifically, a growing body of evidence supports the feasibility, efficacy, and acceptability of outpatient CBT delivered through videoconferencing formats (VCBT) to address pediatric anxiety disorders and OCD [77–80]. Importantly, weekly outpatient VCBT for anxiety disorders has demonstrated effectiveness for child and adult patients seeking care at community clinics [81–84], increasing confidence in this alternative to traditional in-clinic treatment for patients across the lifespan. Telemental health options may offer additional benefits which are likely to be attractive to patients and providers, such as improvements in attendance due to reductions in travel time, greater ease of scheduling, reduction in stigma, and broader geographic access [76, 85–87]. Taken together, advances in the science and practice of youth telemental healthcare have better positioned the field to meet the challenges posed by the COVID-19 pandemic, and the greater mental health crisis, for children struggling with anxiety and OCD.

Although research supports the efficacy of weekly outpatient VCBT to address youth anxiety, there has been limited investigation into the relative benefits of leveraging telemental health formats to deliver CBT in real time using BIC approaches for children with moderate to severe anxiety and OCD. Importantly, a recent study of intensive VCBT for OCD in an adult population indicated that similar outcomes exist between intensive outpatient and partial hospitalization programs when delivered in-person and via telemental health formats [88]. However, there remains a paucity of research examining the efficacy of VCBT for pediatric OCD and anxiety disorders. Moreover, it is yet unclear whether intensive treatments delivered through VCBT can sufficiently address the current heightened needs of youth, given the well-documented increases in childhood anxiety and OCD during the COVID-19 pandemic. [34, 35]

Current Study

To address these gaps in the literature, the following investigation examined the effectiveness of an intensive,

group-based outpatient treatment targeting anxiety disorders and OCD in youth, delivered in real-time via videoconferencing technology during the COVID-19 pandemic. Using a quasi-experimental design, we compared treatment outcomes for youth who received intensive, in-person, group-based CBT with psychopharmacology and CBT-informed caregiver guidance prior to the COVID-19 pandemic (CBT group), to outcomes for youth who received group-based VCBT with the same services delivered via videoconferencing during the pandemic (VCBT group). Given elevations in youth mental health needs during the COVID-19 pandemic [89], evidence from past research on the effectiveness of intensive CBT for pediatric anxiety and OCD [64], and the precedent established through previous investigations demonstrating the efficacy of VCBT and clinic-based approaches to child mental healthcare [77], we hypothesized that: (1) children receiving clinical care during the COVID-19 pandemic would present with higher pre-treatment scores of both symptom severity and functional impairment compared to patients treated pre-COVID-19, (2) children's symptom severity and functional impairment in both CBT and VCBT treatment conditions would improve over the course of the treatment, and (3) no significant differences in posttreatment symptom severity and functional impairment would be observed between CBT and VCBT groups after controlling for pretreatment severity and impairment.

Methods

Participants

Participants included 130 children and adolescents diagnosed with one or more anxiety disorders and/or OCD, who were enrolled in an intensive outpatient group-based treatment program for pediatric anxiety and OCD at an academic hospital in an urban city on the East Coast. The program provides treatment for children and adolescents with moderate to severe anxiety and OCD that may not be adequately treated in weekly outpatient therapy. Patients provided assent for treatment data to be used for research purposes and their caregivers provided consent. Participants ranged in age from 8–19 years ($M = 13.81$, $SD = 2.74$); 82% identified their race as White ($n = 106$), 5% Asian ($n = 7$), 5% Multiracial ($n = 7$), 0.8% Black or African American ($n = 1$), 7% chose not to disclose their race ($n = 9$); and 5% identified their ethnicity as Latino/Latina ($n = 7$). Fifty four percent (54%) of participants identified as cisgender female ($n = 70$), 35% cisgender male ($n = 45$); 5% nonbinary ($n = 7$); 2% transgender ($n = 2$); 0.7% other, questioning, or queer ($n = 1$), and 4% did not provide an answer ($n = 5$). Seventy one percent (71%) of participants presented with a primary anxiety disorder ($n = 92$) and 29% with primary OCD. Patients had, on average, 3 diagnoses at intake. See Table 1 for detailed demographic information across treatment modality groups.

Participants in the CBT group ($n = 70$) received in-person treatment between August 2018 and the start of March 2020. This timespan was selected to ensure that treatment elements between two groups were identical apart from delivery method (in-person versus telehealth). Participants in the VCBT group ($n = 60$) received treatment via videoconferencing technology following the onset of the lockdown in March 2020 through December 2021. The median length of admission was 6 weeks, which did not differ significantly between groups.

Measures

Demographic Information

Demographic Information. Caregivers and patients completed separate demographic questionnaires at admission. Patients provided information on their age, biological sex, gender, race, and ethnicity. Caregivers provided information on annual household income, education, and marital status. Marital status was coded as a bivariate categorical variable (i.e., married vs. not married).

Patient Symptom Severity

Spence Children's Anxiety Scale (SCAS; Spence 1998) [90]. The SCAS is a 44-item child-report (SCAS-C) and caregiver-report (SCAS-P) inventory that measures children's anxiety severity and was administered at admission and at discharge assessments. Respondents chose answers from a 4-point Likert scale, ranging from 0 ("Never") to 3 ("Always"). The range of possible scores on both measures is 0–132, with higher scores indicating greater symptom severity. The measure demonstrates high internal consistency (Chronbach's alpha = 0.92) [93]. In the present study, internal consistency was excellent for the SCAS-C ($\alpha = 0.91$, $\alpha = 0.96$) and SCAS-P ($\alpha = 0.88$, $\alpha = 0.92$) at admission and discharge, respectively. Of note, though the SCAS scoring algorithm can be used to produce a *T*-Score, in our study, we utilized the raw score only, as our sample does not align with the age and gender requirements necessary for producing a *T*-Score (i.e., the scoring algorithms do not allow for non-binary gender identity, and some patients were beyond the age range).

Patient Functional Impairment

Child Anxiety Impact Scale (CAIS-P & CAIS-C; Langley et al., 2004) [91]. The CAIS-P, a 27-item child-rated (CAIS-C) and caregiver-rated (CAIS-P) measure, was administered

Table 1 Sample characteristics

Characteristics	Total ($n=130$)	CBT ($n=70$)	VCBT ($n=60$)
Child age (in years), *M (SD)*	13.86 (2.77)	13.83 (2.76)	13.89 (2.81)
Child sex at birth (female), *n (%)*	79 (60.8)	46 (65.7)	33 (55%)
Child identified gender, *n (%)*			
Cisgender male	45 (34.6)	24 (34.3)	21 (35.0)
Cisgender female	70 (53.8)	40 (57.1)	30 (50.0)
Transgender male	1 (0.8)	1 (1.4)	0 (0.0)
Transgender female	1 (0.8)	0 (0.0)	1 (1.7)
Non-binary	7 (5.4)	4 (5.7)	3 (5.0)
Questioning	1 (0.8)	0 (0.0)	1 (1.7)
Undisclosed	5 (3.9)	1 (1.4)	4 (6.7)
Child race, *n (%)*[a,b]			
Asian/pacific islander	7 (5.4)	5 (7.1)	2 (3.3)
Black or African American	1 (0.8)	0 (0.0)	1 (1.7)
White	106 (81.5)	59 (84.3)	47 (78.3)
Multiracial	7 (5.4)	4 (5.7)	3 (5.0)
Undisclosed	9 (6.9)	2 (2.8)	7 (11.7)
Child ethnicity			
Latinx (white)	4 (3.1)	2 (2.8)	2 (3.3)
Latinx (non-white)	3 (2.3)	2 (2.8)	1 (1.7)
Primary diagnosis, *n (%)*			
Social anxiety disorder	43 (33.1)	24 (34.3)	19 (31.7)
Obsessive compulsive disorder	38 (29.2)	21 (30.0)	17 (28.3)
Specific phobia	17 (13.1)	9 (12.9)	8 (13.3)
Generalized anxiety disorder	15 (11.5)	7 (10)	8 (13.3)
Agoraphobia	5 (3.8)	2 (2.9)	3 (5.0)
Panic disorder	4 (3.1)	3 (4.3)	1 (1.7)
Separation anxiety disorder	3 (2.3)	2 (2.9)	1 (1.7)
Other anxiety disorder	5 (3.8)	2 (2.9)	3 (5.0)
Number of diagnoses at admission, *M (SD)*	2.8 (1.4)	2.8 (1.5)	2.7 (1.2)
Household Income, *n (%)*			
$0–$100,000	27 (20.8)	13 (18.6)	14 (23.3)
$100,001–$200,000	41 (31.5)	22 (31.4)	19 (31.7)
More than $200,000	60 (46.2)	34 (48.6)	26 (43.3)
Caregiver education, *n (%)*			
Bachelor's degree	27 (20.8)	18 (25.7)	9 (15)
Master's degree	49 (37.7)	28 (40.0)	21 (35)
Professional degree (MD, PhD, JD, etc.)	46 (35.4)	23 (32.9)	23 (38.3)
Caregivers married, *n (%)*	112 (86.2)	65 (87.8)	50 (83.3)

[a]Multiple options could be endorsed. [b]No patient endorsed identifying as American Indian/Alaskan Native. *CAIS-C* Child-rated Child Anxiety Impact Scale; *CAIS-P* Caregiver-rated Child Anxiety Impact Scale; *SCAS-C* Child-rated Spence Children's Anxiety Scale; *SCAS-P* Caregiver-rated Spence Children's Anxiety Scale

at admission and discharge assessments to evaluate the impact of anxiety symptoms on each child's overall functioning. The CAIS contains school, social, and home/family subscales, as well as a total score indicating overall functional impairment due to anxiety symptoms. Respondents chose answers along a 4-point Likert scale, ranging from 0 ("not at all") to 3 ("very much"). The range of possible scores on both caregiver and child versions is 0–81, with higher scores indicating greater functional interference. The total score and subscales for both caregiver and child versions of the CAIS demonstrate good construct validity and internal consistency (Cronbach's $\alpha=0.70$–0.90) [92]. The total score scale was utilized for the present study. Internal consistency was excellent for the CAIS-C ($\alpha=0.92$,

$\alpha = 0.93$) and CAIS-P ($\alpha = 0.90$, $\alpha = 0.94$) at admission and discharge, respectively. After data were collected, the authors learned that there was one item missing from the child- and caregiver-report of the CAIS: "Spending the night at a friend's house." All participants completed measures with the omitted question, so all change scores compared the same number of answered questions. The additional item would have potentially increased the total CAIS score at each time point by a maximum of three points.

Procedure

Families in both groups (i.e., in-person and virtual treatment) typically learned about the clinic from outpatient providers, school staff, or an Internet search. Caregivers applied directly to the program and completed an initial screening via phone to determine eligibility. Eligibility criteria remained the same for participants in both conditions. Specifically, inclusion criteria required that children be between the ages of 6 and 19 with a primary diagnosis of an anxiety disorder or OCD. Children were considered ineligible for the program if they engaged in current substance use or current self-harm behaviors, exhibited severe behavioral aggression, endorsed primary posttraumatic stress disorder symptoms that had not yet been addressed, presented with symptoms of psychosis, exhibited current eating disorder symptoms other than avoidant restrictive food intake disorder linked to symptoms of anxiety, and/or expressed current or recent intent and/or plan to commit suicide or homicide (i.e., within past 6 weeks). Final decisions about inclusion were made following the diagnostic assessment, which was conducted in-person for the CBT group and remotely via videoconferencing for the VCBT group. Caregivers' and children's informed consent and assent, respectively, were obtained during intake assessment.

Upon admission, each admitted family was assigned a clinical team, which included a psychologist, psychiatrist, and clinical or counseling psychology doctoral student. Youth participated in treatment in one of two tracks depending on age: a Child Track for children ages 6–13 and an Adolescent Track for teens and young adults ages 14–19. There were 5–6 patients enrolled at one time on the Child Track and 5–8 patients on the Adolescent Track. Each track received the same treatment components, and psychologists and doctoral students co-led treatment groups.

During the program, children attended treatment four afternoons per week for a minimum of 4 weeks and with the option of extending for any number of full weeks based on clinical recommendations. Three days per week, youth participated in 90 min exposure and response prevention (ERP) sessions, which were planned for and led by psychologists and doctoral trainees, and had an average patient to therapist ratio of 2:1. During these ERP sessions, participants engaged in individually tailored, graduated exposures delivered in a group-based format. Groups ranged in size from dyads to the entire treatment track (i.e., 5–7 children) and were determined each day based on the diagnostic makeup of the enrolled patient population. To capitalize on social learning, patients most frequently performed exposures alongside peers (either in the same room or external location), though depending on diagnostic need, individual exposures were also performed when appropriate. ERP sessions were followed by a 10 min break and then 50 min psychoeducation groups, during which youth learned about additional CBT skills to advance treatment goals, including psychoeducation about anxiety and/or OCD, mindfulness exercises, cognitive coping tools, relaxation exercises, problem-solving skills, and relapse prevention resources. At the end of each group day, a clinician communicated individually with each child's caregiver to review the exposures that were completed that day and the action plan to be completed before the next treatment day. One day each week, families individually participated in a 45 min psychologist-led family meeting, during which topics such as diagnostic impressions, how to support patient's treatment, and discharge plans, were discussed. Each family also attended a weekly session with a program's psychiatrist for medication consultation, if relevant. Medications were prescribed only when indicated and when welcomed by families. In addition to programming delivered to youth, caregivers attended twice-weekly 50-min caregiver guidance groups in which caregivers learned and practiced skills useful in supporting and optimizing their children's treatment progress. Skills discussed in the caregiver guidance group included behavioral parent training techniques, validation, self-care, accommodation reduction strategies, and independence-fostering exercises. Caregivers also were offered à la cart weekly phone coaching sessions if requested, totaling approximately 45 min per week.

Notable Differences Between In-Person and Telemental Health-Delivered Exposure Administration

Prior to the COVID-19 pandemic, all treatment sessions were held in-person. On one group day each week, participants met in a local public setting to help them increase the external validity of their exposures. Beginning in March 2020, in response to social distancing and lockdown recommendations related to COVID-19, the entire program was conducted remotely in real-time via HIPAA-compliant videoconferencing, during which clinicians and families participated from their homes or in the community. Within the virtual platform, patients in each track continued to

meet in diagnostic-specific groups. Breakout rooms were used for small-group and individual exposures, and served the same function as multiple offices during in-person care. Though groups were no longer held public settings, patients frequently traveled to relevant locations with a caregiver (e.g., parks, stores, school) to perform exposures targeting various phobic disorders, separation anxiety, social anxiety, and OCD, while communicating with clinicians and other group members via mobile devices and headphones. Social exposures that had historically been performed in-person, such as presentations and conversations, were performed via videoconferencing. Telephones were used extensively to approximate in-vivo exposures by calling various stores or individuals. Similar to in-person care, still images, audio, visual, and virtual reality media were used heavily to target various phobias. Families were guided through the preparation of exposure materials that were previously prepared in clinic (e.g., making fake vomit). Notably, exposures targeting contamination of germs were halted or altered to account for the actual risks associated with the pandemic.

Data Capture

When the participants started the program and on the last day of treatment, the child- and caregiver-report measures were completed to gather admission and discharge data. The data were collected by sending families a secure e-mail with a link to the electronic questionnaires using Research Electronic Data Capture (REDCap) tools managed by the program's overarching organization. REDCap is a secure, web-based software program that stores participants' responses [93, 94]. Clinical data were collected from all program participants for the purposes of treatment monitoring and program evaluation. If deemed eligible for the program at the diagnostic intake assessment, children and their caregivers were offered the option to have their clinical data used for research purposes. Participation in the program was not affected by the family's decision to participate in research, and families were not compensated for their research participation. Patients aged 6–13 provided informed assent, and patients aged 14–19 provided informed consent to have treatment data used for research purposes. For patients under 18, parents or legal guardians also provided informed consent to have their child's treatment data used for research purposes. Research procedures were approved by the hospital's Institutional Review Board.

Research Design and Analysis

To compare treatment outcomes of this intensive, group-based cognitive-behavioral treatment for pediatric anxiety and OCD when delivered across formats, and to compare differences in treatment formats between in-person and videoconferencing-based treatments, we utilized a quasi-experimental, or non-randomized pre-post-intervention study design. Due to the onset of the COVID-19 pandemic, patients were divided naturally into two groups: Those who received in-person intensive treatment prior to the COVID-19 pandemic (CBT group) and those who received the same intensive treatment delivered remotely in real-time via videoconferencing platforms (VCBT group). Children who received both formats were removed from the study.

Comparison of Child Anxiety Reported at Admission Pre- and During-COVID

Anxiety symptom severity and functional impairment for both CBT and VCBT groups were measured at admission using both child- and caregiver-report measures (i.e., SCAS-C, SCAS-P, CAIS-C, and CAIS-P). Multiple independent samples *t*-tests were conducted, and effect sizes were calculated to determine whether there were significant differences in admission assessments between the two groups.

Assessment of Post-treatment Symptom Improvement

Symptom improvement for participants in both groups was measured as change in child- and caregiver-reported anxiety severity and functional impairment between admission and discharge. Multiple paired samples *t*-tests were conducted, and Cohen's *d* was calculated to estimate effect size of changes in symptom severity and functional impairment (i.e., SCAS-C, SCAS-P, CAIS-C, CAIS-P).

Comparison of In-person (CBT) and Videoconferencing-based (VCBT) Treatment Outcomes

To determine whether changes in child- and caregiver-reported anxiety symptoms and functional impairment differed between groups, separate one-way analyses of covariance (ANCOVA) were run. One continuous posttreatment dependent variable was entered into each model: child-reported anxiety severity (SCAS-C Total Scale; Model (1), caregiver-reported anxiety severity (SCAS-P Total Scale; Model (2), child-reported functional impairment (CAIS-C Total Scale; Model (3), and caregiver-reported functional impairment (CAIS-P Total Scale; Model (4). Corresponding pretreatment scores were entered to the models as covariates to control for symptom severity upon admission. Treatment modality was entered into the model as a categorical independent variable consisting of two levels (0 = CBT; 1 = VCBT). All analyses were conducted using IBM® SPSS® Statistics program (version 24).

Results

Between-Group Comparison of Pretreatment Child Anxiety

Independent samples *t*-tests were run to assess for differences in symptom severity at admission between CBT and VCBT groups. Outliers were assessed by examining box plots. One outlier was found in the caregiver-reported symptom severity measure (CAIS-P); however, it was kept in the analysis as it was determined not to be measurement error and because removing it had negligible impact on model significance. Symptom severity scores and anxiety impairment scores at each treatment group were normally distributed, as assessed by Shapiro Wilks test ($p > 0.05$), with the exception of anxiety impairment scores among the VCBT group, which was positively skewed (Shapiro Wilks test, $p = 0.005$; skew/SEskew = 2.13). There was homogeneity of variances for symptom severity and anxiety impairment scores in both treatment groups, as assessed by Levene's test for equality of variance (all p's > 0.05).

Given the increases in child mental health concerns related to the COVID-19 pandemic, [34, 35] it was hypothesized that levels of symptom severity and functional impairment at admission would be greater for patients in the VCBT group. Results from the independent samples *t*-test demonstrated significant differences in child-reported anxiety symptom severity (SCAS-C Total Score) at admission between treatment groups, $M_{CBT} = 37.17$, $SD = 17.17$, $n = 69$; $M_{VCBT} = 43.28$, $SD = 18.58$, $n = 58$; $M_{difference} = 6.10$, (95% CI, -0.18 to 12.38); $t(125) = 1.921$, $p = 0.029$, $d = 0.34$, with higher levels of anxiety symptoms severity reported in the VCBT group. No significant differences were observed between groups for caregiver-reported anxiety severity or child- or caregiver-reported functional impairment.

Assessment of Within-Group Posttreatment Symptom Improvement

Multiple paired samples *t*-tests were conducted to assess for changes in child- and caregiver-rated measures of anxiety and impairment for both CBT and VCBT treatment conditions separately. Outliers were assessed by examining boxplots. Multiple outliers were found in the data; however, they were retained in the analysis as they were determined not to reflect measurement error and given that their removal had negligible impact on model significance. For the CBT group, the difference scores of pretreatment and posttreatment measures were normally distributed (Shapiro Wilks $p > 0.05$. For the VCBT group, the difference scores of child-reported symptom severity were normally distributed (Shapiro Wilks $p > 0.05$), however the distributions of caregiver-reported symptom severity and both child- and caregiver- report anxiety impact were not normally distributed (Shapiro Wilks $p < 0.05$). However, we continued with the tests as the paired-samples *t*-test is robust to deviations from normality.

Results demonstrated significant changes in all child- and caregiver-rated measures of anxiety and impairment for both CBT and VCBT treatment conditions (see Table 2). Upon discharge, the mean child-rated anxiety scores (SCAS-C Total Score) decreased by 15.18 points ($SD = 13.33$) for youth who received in-person treatment, $t(54) = 8.444$, $p < 0.001$, $d = 1.14$; and 14.80 points ($SD = 17.01$) for youth in the VCBT condition, $t(29) = 4.766$, $p < 0.000$, $d = 0.87$. Mean caregiver-rated anxiety scores (SCAS-P Total Score) decreased by 12.81 points ($SD = 10.88$) for the

Table 2 Pre-post-sample t-tests and estimated effect sizes

Outcome variable	Treatment group	*ΔM*	*SD*	*df*	*t*	*d*
Child-rated anxiety symptoms (SCAS-C)	CBT	15.18	13.33	54	8.444***	1.14
	VCBT	14.80	17.01	29	4.070***	0.87
Caregiver-rated anxiety symptoms (SCAS-P)	CBT	12.81	10.88	53	8.648***	1.17
	VCBT	16.67	13.56	42	6.041***	1.23
Child-rated functional impairment (CAIS-C)	CBT	12.06	16.03	52	5.473***	0.75
	VCBT	14.66	15.29	28	3.206**	0.96
Caregiver-rated functional impairment (CAIS-P)	CBT	12.47	11.72	52	7.742***	1.06
	VCBT	13.51	13.38	42	4.080***	1.01

Anxiety symptoms measures using the Spence Child Anxiety Scale (SCAS)

Anxiety impairment measured using the Child Anxiety Impairment Scale (CAIS)

Sample sizes differ because not all participants completed assessments at both timepoints

**$p = .004$. ***$p < .001$

N Number of patients, *ΔM* Mean pre-post change score, *SD* Standard Deviation, *df* degrees of freedom, *t* *t*-test, *d* Cohen's D

CBT group, $t(53) = 8.648$, $p < 0.001$, $d = 1.17$; and 16.67 points ($SD = 13.56$) for the VCBT group, $t(42) = 8.064$, $p < 0.000$, $d = 1.23$. Mean child-rated functional impairment scores (CASI-C Total Score) decreased by 12.06 points ($SD = 16.04$) for the CBT group, $t(52) = 5.4723$, $p < 0.001$, $d = 0.75$; and 14.66 points ($SD = 15.29$) for the VCBT group, $t(28) = 5.161$, $p < 0.000$, $d = 0.96$. Finally, mean caregiver-rated functional impairment scores (CAIS-P Total Score) decreased by 12.47 points ($SD = 11.73$) for the CBT group, $t(52) = 7.742$, $p < 0.001$, $d = 1.06$; and 13.51 points ($SD = 13.38$) for the VCBT group, $t(42) = 6.620$, $p = 0.000$, $d = 1.01$. No significant differences in outcomes were observed between treatment tracks (child and adolescent) in either treatment condition. These results indicate that youth in both treatment conditions experienced significant reductions in symptom severity and functional impairment between pre- and post-treatment, as reported by youth and their caregivers.

Between-Group Comparisons of In-Person and Videoconference-Based Treatment

Four separate ANCOVAs were conducted to compare treatment outcomes between CBT and VCBT groups while controlling for child/caregiver-reported anxiety at admission. For each model, linear relationships were observed between pre- and posttreatment scores for each intervention type, as evidenced by visual inspection of scatter plots from each model. Homogeneity of regression slopes was observed in each model, as the interaction terms between admission and discharge levels of anxiety were not significant in each model, respectively. Homogeneity of variance was observed, as Levene's test was non-significant ($p > 0.05$) for each model. For all models, the assumption of normality of distribution of standardized residuals was violated at one or more levels of the grouping variable (Shapiro Wilks $p < 0.05$). Due to the sample size and because the ANCOVA is robust to violations of normality, we proceeded with the analysis. Outliers were assessed by inspecting standardized residuals (i.e., any residual greater than ± 3). One outlier was observed in Model 1, but it was retained in the analysis as it was deemed not to reflect measurement error, and because removing it had negligible impact on model significance.

Model 1 examined differences in child-reported post-treatment anxiety (SCAS-C Total Score) between intervention groups while controlling for baseline anxiety scores upon admission (see Table 3). After adjusting for baseline scores, no statistically significant difference in anxiety was observed between intervention groups, $M_{CBT} = 23.26$, $SE = 1.95$; $M_{VCBT} = 24.50$ $SE = 2.65$; $M_{difference} = 1.12$, $SE = 3.30$; $F(1,82) = 0.140$, $p = 0.710$, $\eta_p^2 = 0.002$.

Model 2 examined differences in caregiver-reported post-treatment anxiety (SCAS-P Total Score) between intervention groups while controlling for anxiety upon admission (see Table 3). After adjusting for baseline scores, no statistically significant difference in anxiety was observed between intervention groups $M_{CBT} = 22.58$, $SE = 1.49$; $M_{VCBT} = 18.95$; $SE = 1.67$); $M_{difference} = 3.64$, $SE = 2.24$; $F(1, 94) = 2.633$, $p = 0.11$, $\eta_p^2 = 0.027$.

Model 3 examined differences in child-reported post-treatment functional impairment (CAIS-C Total Score) between intervention groups while controlling for child-reported impairment scores upon admission (see Table 3). After adjusting for baseline impairment scores, no statistically significant difference in impairment was observed between intervention groups, $M_{CBT} = 14.94$, $SE = 1.67$; $M_{VCBT} = 13.46$, $SE = 2.26$; $M_{difference} = 1.48$, $SE = 2.81$, $F(1,79) = 0.278$, $p = 0.6$, $\eta_p^2 = 0.004$.

Model 4 examined differences in caregiver-reported post-treatment functional impairment (CAIS-P Total Score) between intervention groups while controlling for impairment scores upon admission (see Table 3). After

Table 3 ANCOVA adjusted and unadjusted intervention means and variability for anxiety symptoms and functional impairment for the two intervention groups following

	Treatment Group	n	Unadjusted M (SD)	Adjusted M (SE)
Child-rated anxiety symptoms (SCAS -C)	CBT	55	22.04 (18.11)	23.26 (1.95)
	VCBT	30	26.73 (22.23)	24.50 (2.65)
Caregiver-rated anxiety symptoms (SCAS-P)	CBT	54	22.43 (13.93)	22.58 (1.49)
	VCBT	43	19.14 (13.42)	18.95 (1.67)
Child-rated functional impairment (CAIS-C)	CBT	53	14.72 (13.49)	14.94 (1.67)
	VCBT	29	13.86 (13.07)	13.46 (2.26)
Caregiver-rated functional impairment (CAIS-P)	CBT	53	18.09 (14.85)	17.70 (1.56)
	VCBT	43	15.72 (15.55)	16.04 (1.73)

N Number of patients, *M* Mean, *SD* Standard Deviation, *SE* Standard Error. Anxiety symptoms measures using the Spence Child Anxiety Scale (SCAS)

Anxiety impairment measured using the Child Anxiety Impairment Scale (CAIS)

Sample sizes differ because not all participants completed assessments at both timepoints

adjusting for baseline scores, no statistically significant difference in impairment was observed between intervention groups $M_{CBT} = 17.70$, $SE = 1.56$; $M_{VCBT} = 16.20$; $SE = 1.73$; $M_{difference} = 1.50$, $SE = 2.33$; $F(1,93) = 0.417$, $p = 0.52$, $\eta_p^2 = 0.004$. Taken together, these results confirm the hypothesis that no significant differences in symptom severity and functional interference would be observed between participants receiving treatment delivered in-person and those receiving videoconference-based treatment after controlling for scores at admission.

Discussion

A wealth of evidence supports the efficacy of CBT for pediatric anxiety disorders and OCD delivered across formats and settings, including in-person intensive CBT delivered within clinics and weekly outpatient telemental health-delivered CBT. However, there has been limited investigation into the utility of leveraging telemental health formats to deliver CBT in real time through brief, intensive, or concentrated approaches for children and adolescents with moderate to severe anxiety and OCD. Moreover, it is yet unclear whether intensive telemental health treatment formats can sufficiently address the needs of today's youth, given the well-documented increases in childhood anxiety and OCD during the COVID-19 pandemic [35]. This study examined: (1) differences in symptom severity between children admitted to treatment prior to and during the COVID-19 pandemic, (2) the effectiveness of an intensive, group-based, cognitive-behavioral treatment for childhood anxiety and OCD delivered through both in-person and telemental health formats, and (3) the relative impact of this treatment when delivered in-person compared to when delivered via a telemental health format.

As hypothesized, results indicated that youth who were admitted to treatment in our clinic during the COVID-19 pandemic reported higher levels of anxiety symptom severity at the time of intake compared to those assessed prior to the pandemic. These findings are consistent with research documenting the toll of the pandemic on youth mental health and wellbeing [95]. For example, a study examining pediatric insurance claims demonstrated significant increases in generalized anxiety, depression, and self-harm in youth during a 10 month period in 2020 [96]. Professional and federal organizations have also highlighted these concerns publicly and advocated for strategic initiatives to address this burgeoning crisis. Notably, the American Academy of Pediatrics, the American Academy of Child and Adolescent Psychiatry (AACAP) and the Children's Hospital Association (CHA), declared a national emergency related to children's mental health, [89] and the US Surgeon General issued a rare public health advisory on mental health issues in youth, citing that the prevalence of anxiety and depression in this age group has doubled in the context of the pandemic. [97] Given that factors contributing to the rise in pediatric anxiety since the onset of the pandemic–including heightened health risks, school disruptions, social isolation, economic challenges, racial injustice and social unrest–represent ongoing challenges, there is an urgent need for sustained federal and public investment to increase availability and access to mental healthcare for affected youth.

Creative modifications to evidence-based treatments that alter the setting and/or format in which interventions are delivered have proliferated in attempts to improve accessibility for youth mental healthcare [98]. These important initiatives can inform the adoption of multiple service-delivery methods as a means of disseminating needed treatments. However, as technological advances allow for treatment adaptations with broader accessibility, it is vital that the relative effectiveness of these approaches continue to be evaluated so that caregivers and clinicians may have confidence in the effectiveness and appropriateness of intervention options available. Within the context of such unprecedented need, our findings supporting the effectiveness of telemental health-delivered treatment for pediatric anxiety and OCD are particularly encouraging. Specifically, this study demonstrated that intensive group-based CBT for pediatric anxiety and OCD, delivered both in-person and via telemental health format, led to meaningful improvements in child- and caregiver-reported anxiety and functional impairment for children with moderate to severe anxiety and OCD. Importantly, no statistically significant differences in post-treatment child- and caregiver-reported symptom severity or anxiety impairment were observed between CBT and VCBT groups, even after controlling for symptom severity at admission. Taken together, these findings and observations provide compelling preliminary support for the functional equivalence of in-person and telemental health-based intensive group-based CBT in targeting youth anxiety and OCD. Such evidence is vital information for youth and families seeking quality care, as it provides more confidence that telemental health-delivered treatments can yield similar outcomes to those delivered in person. Furthermore, evidence supporting the delivery of evidence-based care across formats or settings can inform the adoption of multiple service-delivery methods, ensuring that the field is not constrained by a "one-size-fits-all" approach to children's mental healthcare, and that families have options when seeking quality treatment that circumvents pertinent barriers to care.

Lamentable limitations in the availability and accessibility of youth mental healthcare predated the COVID-19 pandemic, with few children in need of mental health treatment receiving *any* services, and even fewer receiving evidence-based treatment [99–101]. The burden of inadequate access disproportionately impacts families of color, as racial

minority youth are even less likely than their white counterparts to receive mental health treatment [102]. These limitations were further constrained by the onset of the pandemic, as options for in-person mental healthcare were reduced to comply with social distancing guidelines [103]. Broadening the availability and accessibility of youth mental healthcare remains crucial, particularly given the growing need that has arisen during the pandemic, and requires consideration of multiple factors. [104] First, several patient-level factors may impact access to care (e.g., geographic proximity to clinics, transportation availability, stigma related to seeking mental healthcare, mental-health literacy, treatment cost, access to reliable internet, overall family stressors, etc.). In addition, variations in diagnostic presentation and symptom severity may further constrain the type of care needed and its relative accessibility for a given patient. Organizational factors may also represent significant barriers for youth in need of services; for example, extensive clinic waitlists, inadequate numbers of clinicians available to provide care, and mismatch between clinician expertise and patient presenting concerns may restrict access even for those families who could otherwise participate in treatment. More recently, widespread workplace shortages related to the COVID-19 pandemic have compounded organizational barriers, as clinicians may be forced to reduce their workload in response to health concerns or childcare shortages due to the COVID pandemic [105–107]. Significant structural and systematic barriers persist that impede treatment access and uptake, even as technological advances are poised to overcome many of the patient-level and organizational barriers to care. These include inadequate reimbursement rates for services rendered, licensing restrictions across state lines, and disparities in broadband internet access between communities.

Within the context of multiple barriers to accessing quality, evidence-based treatment for pediatric anxiety and OCD, support for the utility of group-based, intensive telemental health-delivered CBT delivered remotely is highly promising, as this intervention may circumvent many pertinent barriers to accessing care. First, this treatment has the potential to overcome many relevant barriers at the patient-level. For example, receiving telemental health treatment delivered in the home reduces the burden of geographic, logistical, and transportation-related barriers to accessing treatment, and may be an attractive alternative for youth and families experiencing stigma around receiving mental healthcare.

Regarding organizational-level barriers to care, the remote delivery of intensive CBT may improve access to specialty care clinicians, thereby increasing the likelihood that youth will receive services that meet their presenting concerns, regardless of the availability of specialty care within their local community. Moreover, group-based treatment options allow for one clinician to provide care for multiple youth simultaneously, better meeting the extraordinary demand for services in the context of increasingly limited numbers of clinicians. Taken together, these results demonstrate that group-based intensive telemental health-delivered CBT may be an impactful intervention that promotes equity in treatment access.

Despite the promise of this approach in improving access to evidence-based care, many structural and systematic barriers continue to impede the broad dissemination of this treatment approach. Notably, limitations in insurance coverage compounds this equity issue by limiting access to telemental health treatment options, like this program [108]. In the context of the COVID-19 pandemic, new laws and policies have increased coverage of virtual services [95, 109, 110]. Medicare, Medicaid, and commercial insurances have removed restrictions to virtual treatment coverage, no longer limiting virtual coverage to those living in rural areas and some plans have even waived virtual visit co-pays. Although public and private insurances may continue to cover online therapy post-pandemic, it remains unclear whether they will continue to follow payment parity for virtual visits. Investigations like these, demonstrating the relative effectiveness of virtual intensive treatment, highlight the need to advocate strongly for continued payment parity for these services. Continued parity coverage of virtual evidence-based intensive treatment options would allow youth struggling with moderate to severe symptoms to gain continued access to intensive outpatient care that they need, without having to resort to more costly options like Emergency Rooms or inpatient hospitals.

Further exacerbating this issue of access are challenges related to cross-state licensure. Although restrictions have loosened in the context of the pandemic, intensive treatments like the one described in this investigation are still largely available to only those youth who live in the same state as the treatment program. Since few programs like these exist in this country, many children are thus unable to access this form of BIC treatments. Fortunately, solutions like the Psychological Interjurisdictional Compact (PSYPACT), which has been enacted in just over half of the United States, holds promise in reducing these barriers to care through rapid expansion. Additionally, despite the prevalence of smartphones and internet-connected computers, limitations in reliable internet access for many children remains a significant structural and systemic barrier to care [111, 112]. Public policy changes, like the Affordable Connectivity Program [113], are required to make reliable internet access more equitable and reduce coverage and licensure barriers to this care. Though individual, organizational, and systemic barriers were not examined in this study, our results supporting the effectiveness of telemental health-delivered therapies provides a strong rationale to study these interventions as possible methods of reducing barriers to care.

This study demonstrates that intensive VCBT is an effective treatment option for youth struggling with anxiety and OCD. More research is needed to determine the optimal dosage of this treatment, for whom it is most effective and under what circumstances.

Limitations and Future Directions

Conducting research in a naturalistic setting offers the strength of gathering realistic data and also poses some limitations. To this effect, the quasi-experimental design applied herein limits the ability to unequivocally determine whether our reported treatment outcomes were solely influenced by our intervention [114]. Additionally, our treatment approach was multi-modal (e.g., CBT, psychopharmacology, and caregiver guidance), and the lack of a control group limited the ability to assess for the relative impact of the multiple interventions offered. Furthermore, although we controlled for symptom severity upon admission, our non-randomized study design is vulnerable to threats of internal validity, including selection bias, maturation, and history (e.g., the onset of the COVID-19 pandemic). Further research should examine telehealth-delivered BIC treatments with VCBT using a randomized control trial design to better understand the impact of this type of treatment. To reduce the likelihood of falsely retaining the null hypothesis, our models were constructed to be most parsimonious and did not control for demographic and diagnostic differences. Future research should also examine the impact of VCBT by diagnostic category and control for demographic difference. Additionally, not all participants completed measures at both time points, which resulted in missing data and a reduced sample size. Improving procedures that facilitate more consistent data collection may yield additional data and increase statistical power.

Importantly, our sample predominantly included White families and families with high socioeconomic status who could afford to devote time and resources to treatment, which has a detrimental impact on the cultural validity of our results and does not account for cultural or economic factors that may impact treatment outcomes for many people. Future studies should investigate whether the benefits of this telehealth-delivered treatment would extend to a more diverse patient population and assess associated impacts on various barriers to care.

Finally, telemental health treatment may boast significant clinical utility, as engaging youth in exposure practices in their home setting is likely to improve the generalization and real-world application of treatment techniques and may also permit more caregiver involvement. Anecdotally, it was observed that certain treatment conditions were easily targeted from the home. For example, starting agoraphobia and separation anxiety exposures in and around the home, then moving to public locations, allowed for greater gradation in exposure intensity compared to starting these exposures in a hospital setting. Similarly, performing OCD exposures in the home allowed patients and clinicians to target spaces and items perceived as being contaminated, routines, and rituals that could not naturally be targeted in clinic. Future research should examine the clinical utility of performing diagnostic specific exposures in home compared to in clinic.

Conclusion

Despite the limitations, this study illustrates that an intensive, group-based treatment for pediatric anxiety and OCD using VCBT is associated with comparable reductions of child- and caregiver-report symptoms and impairment. Given the ubiquity of computing devices and telecommunication platforms, community providers may be able to replicate the intensive nature of this treatment while reducing barriers to care. Support for the intervention described herein adds to the growing body of evidence supporting creative alternatives to traditional weekly in-person individual psychotherapy and marks a crucial step on the road to broader access to quality care for youth in need of services.

Summary

Despite research supporting the efficacy of weekly outpatient videoconferencing-based cognitive behavioral therapy (VCBT), limited evidence exists about the benefits of leveraging VCBT for brief intensive formats. We examined the effectiveness of an intensive outpatient VCBT targeting pediatric anxiety and OCD. Participants included patients aged 6 to 19 years old who were diagnosed with primary anxiety and/or OCD and took part in an intensive group-based cognitive behavioral therapy with medication management and caregiver guidance. Quasi-experimental design was used to compare outcomes of this intensive treatment pre-pandemic, to a similar VCBT peri-pandemic (N = 130). Pretreatment and posttreatment assessments included patient- and caregiver-report of anxiety and functional impairment. Analyses of covariance were conducted, examining changes in anxiety and impairment between treatment groups, controlling for admission levels. Results indicate that significant reductions in posttreatment anxiety and impairment were observed in both in-person and VCBT conditions, meaning that patients in both the in-person and VCBT groups showed improvement. Results also indicate that significant differences in post-treatment symptoms and functional impairment between in-person treatment and VCBT did not exist when controlling for baseline symptom severity. Meaning that intensive, group-based treatment for

pediatric anxiety and OCD using VCBT is associated with comparable reductions in anxiety and impairment when compared to in-person treatment. These results mark a crucial step toward providing broader access to quality care for youth in need.

Author Contribution DIGS, ME, MG, KB, and JS wrote the main manuscript text. DIGS completed the statistical analyses and prepared the tables. All authors reviewed the manuscript.

Data Availability Research data are not shared.

Declarations

Conflict of interest None. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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