Original Research

Teletherapy Delivery of Caregiver Behavior Training for Children with Attention-Deficit Hyperactivity Disorder

Yuet Juhn Tse, BS,¹ Carolyn A. McCarty, PhD,^{1,2}
Ann Vander Stoep, PhD,^{1,3,4} and Kathleen M. Myers, MD, MPH, MS^{1,3}

¹Seattle Children's Research Institute Center for Child Health, Behavior, and Development, Seattle, Washington.

Departments of ²Pediatrics and ³Psychiatry and Behavioral Sciences, University of Washington School of Medicine, Seattle, Washington.

⁴Department of Epidemiology, University of Washington School of Public Health, Seattle, Washington.

Abstract

Background: Preliminary studies suggest that videoteleconferencing (VTC) may be an effective means to deliver behavioral interventions to families. Subjects consisted of a subsample of children (n=37) and caregivers who participated in the Children's Attention-Deficit Hyperactivity Disorder (ADHD) Telemental Health Treatment Study (CATTS) (n=223), a randomized trial testing the effectiveness of delivering treatments for ADHD to families residing in their home communities using distant technologies. Families randomized to the CATTS intervention arm received pharmacotherapy and caregiver behavior training. **Materials and Methods:** Thirty-seven families from the CATTS intervention arm participated. All families received pharmacotherapy through VTC. Twelve families received the caregiver behavior training through VTC, or teletherapy, and 25 received the intervention in-person. We assessed children's outcomes at 25 weeks with the Vanderbilt ADHD Parent Rating Scale and the Columbia Impairment Scale. We assessed caregivers' outcomes using measures of distress in caring for a child with ADHD, including depression, stress, strain, and empowerment. We used analysis of covariance to assess outcomes from baseline to 25 weeks. **Results:** Families in the two conditions showed comparable attendance at sessions and satisfaction with their care. Caregivers in both conditions reported comparable outcomes for their children's ADHD-related behaviors and functioning, but caregivers in the teletherapy group did not report improvement in their own distress. **Conclusions:** Findings support the feasibility, acceptability, and effectiveness of treating children with ADHD through teletherapy. Future work should investigate how teletherapy may improve caregivers' distress. Teletherapy is a promising modality for delivering behavioral interventions for children with ADHD.

Key words: telemental health, telemedicine, telehealth, teletherapy, videoconferencing, attention-deficit hyperactivity disorder, parent training

Introduction

Psychiatric disorders affect 7–20% of children and adolescents ("youth") and cause impairment in multiple domains of functioning throughout the lifespan.^{1,2} Most youth with psychiatric disorders are never treated or receive inadequate care.^{3–5} Rural and underserved community mental health centers face problems in providing youth and families access to evidence-based treatments,^{6,7} in part due to the scarcity of mental health professionals trained to treat youth. Moreover, relative to therapists working in urban areas, rural providers are more likely to note barriers to learning empirically supported treatments.^{8,9}

In response to these needs, teletherapy is developing as one approach to rectify disparities in access to evidence-based care.¹⁰ In the context of this article, teletherapy refers to the use of videoteleconferencing (VTC) to deliver interactively psychosocial interventions that are usually provided in-person. Multiple studies have reported the feasibility, acceptability, and tolerability of providing teletherapy to youth,^{11–16} but few studies have examined the efficacy of teletherapy with caregivers and youth.

Reese et al.¹⁷ used a pre- to post-intervention study design to examine the efficacy of a Group Triple P Positive Parenting Program ("Group Triple P") for families with children diagnosed with attention-deficit hyperactivity disorder (ADHD) and behavioral problems. The eight families attended eight sessions and reported improvement in their children's behaviors that were comparable to improvements found in meta-analyses of Triple P programs delivered in-person.¹⁸ Caregivers also endorsed improvement in their parenting skills and decreased distress in parenting their children.

Glueckauf et al.¹⁹ examined the provision of six sessions of family therapy to 22 families with an adolescent diagnosed with epilepsy. They compared the provision of care through home-based teletherapy with home-based speakerphone counseling and with office-based counseling. Teenagers and caregivers reported significant reductions in both problem severity and frequency, as well as increases in prosocial behaviors, across all three conditions from pre- to post-intervention and at the 6-month follow-up. Therapeutic alliance was high but varied as a function of family member and treatment.

Recently, Xie et al.²⁰ examined the efficacy of teletherapy in providing a manualized parent-management training protocol to caregivers of children diagnosed with ADHD. Using a quasirandomized design, the investigators assigned 22 caregivers to receive group behavior training through teletherapy or in-person, both at the investigators' outpatient clinic. Caregivers completed ratings of change in their children's ADHD and other disruptive behaviors and global ratings of impairment and improvement, as well as multiple

measures of their own distress and parenting experience. The two groups improved comparably across all constructs.

Finally, Comer et al.²¹ are examining the delivery of treatment for early-onset obsessive-compulsive disorder through in-home videoconferencing. Early results indicate successful engagement of both the child in the behavioral interventions and the family in supportive therapy.

These few studies suggest that teletherapy may be an effective service model to deliver parenting interventions for children with disruptive behaviors. The current study contributes to the evidence base by comparing teletherapy with in-person service delivery to families in their home communities.

Materials and Methods

This study was conducted during the course of a larger clinical trial. Children and caregivers described in the current study consisted of 37 of the 223 participants in the Children's ADHD Telemental Health Treatment Study (CATTS). The methodology^{22–24} and outcomes²⁵ for the CATTS trial have been described elsewhere and are briefly summarized.

OVERVIEW OF THE CATTS TRIAL

The CATTS trial was a community-based, multimodal randomized controlled trial designed to test telemental health as an effective service-delivery model for implementing the practice parameters for ADHD.^{24,25} Participants included boys and girls, 5.5–12 years old, living with their legal guardians, attending school, and referred to the trial by their primary care providers in seven underserved communities in the Pacific Northwest. Children's primary caregivers were also participants. Exclusion criteria included children with psychiatric, developmental, or medical disorders that would warrant treatments beyond the scope of this trial, such as schizophrenia, autism, or seizures. The trial was conducted using a hub-and-spoke administrative model. All investigation-related activities were conducted at the research hub at Seattle Children's Research Institute. The seven spoke sites were community health clinics located between 60 and 280 miles from the research hub. All clinics had high-definition, standards-based VTC end points.

Diagnostic eligibility was determined in three steps. We reviewed records provided by referring primary care providers to assess basic eligibility. Then, caregivers completed online the Child Behavior Checklist 4–18^{26,27} to screen for ADHD and exclusionary comorbidities. If the T-score for the ADHD subscale on the Child Behavior Checklist was greater than 65, ADHD was probable.²⁸ The caregiver then completed the Computerized Diagnostic Interview Schedule for Children, Version IV²⁹ in-person with the local CATTS therapist to confirm an ADHD diagnosis. Children who met diagnostic criteria for ADHD (hyperactive/impulsive, inattention, or both) were then randomized to the CATTS intervention condition ($n = 111$) or to the active control condition ($n = 112$). The control condition has been described elsewhere and is not a focus of this study.^{23,25}

THE CATTS INTERVENTION: PHARMACOTHERAPY AND CAREGIVER BEHAVIOR TRAINING

The CATTS intervention consisted of six sessions with two components, delivered back-to-back, spaced 3–4 weeks apart;

both components were conducted at community clinics with existing high-definition telehealth equipment. All participants received consensus-based pharmacotherapy³⁰ with a child and adolescent telepsychiatrist. The second component was a manualized caregiver behavior training intervention for ADHD delivered to each caregiver individually by community therapists who were trained and supervised remotely by a clinical psychologist at Seattle Children's Research Institute.

Based on reviews of the evidence base for treating youth with ADHD,^{31–33} the caregiver training in the CATTS trial was developed, consisting of six sessions designed to cover the topics of psychoeducation, school advocacy, differential attention, commands and follow-through, and implementation of time out or token economy reinforcement systems.³⁴

Community therapists were trained remotely to deliver the caregiver training by a supervising psychologist at Seattle Children's Research Institute. Training involved reviewing the manualized protocols and training via telephone with the supervising psychologist, observing 12 digitized model therapy videos (six sessions for each of two families), and practicing at minimum two sessions prior to engagement with study-referred patients. The total amount of training was approximately 15 h, including telephone discussion of practice cases with the therapists. Additionally, ongoing supervision was conducted via telephone biweekly for 1 h in teams of two or three therapists, with fidelity monitoring conducted on recorded sessions. Team meetings via VTC were held weekly with all therapists at the spoke sites and the research team at the hub.

Each of the six caregiver training sessions is specified in a manual, with accompanying handouts, worksheets, and quizzes. Handouts consisted of written summaries of the educational information on the topic for the week, to be kept by the caregiver as a reminder of the material presented that week. Worksheets were designed to be tools for therapists to use to obtain information systematically from caregivers. The therapist entered worksheet information specific to the family electronically on the clinician's portal (described later), for example, documenting the caregiver's plan for using differential attention skills between sessions. Finally, brief (i.e., three or four items) multiple-choice quizzes were given at the beginning of sessions 2–6 to assess the caregiver's retention of information from the previous week. For example, at the beginning of the session following the praising and ignoring skills session, quiz items inquired as to when ignoring is NOT appropriate and to identify an example of specific praise. The therapist then initiated a dialogue with the caregivers to address any topics needing further clarification or discussion based on the quiz items.

TELETHERAPY VERSUS IN-PERSON CAREGIVER BEHAVIOR TRAINING

Thirty-seven children and one of their caregivers ($n = 37$) participated in this substudy, including the teletherapy sessions and outcome assessments. Twelve families at two of the seven sites received the caregiver behavior training via teletherapy. They were compared with 25 families at the same sites who received the training in-person

by the same two therapists who provided the teletherapy. These two therapists provided the teletherapy at each other's respective clinics to accommodate the families' scheduling needs. Restricting teletherapy to two therapists provided some degree of control over study variables. One site was a satellite medical clinic of Seattle Children's Hospital for outreach specialty care, and the other site was a community medical clinic affiliated with Seattle Children's Hospital. Both routinely provided telemedicine services.

OUTCOMES AND STUDY MEASURES

Feasibility and acceptability. The feasibility of providing teletherapy was measured as the number of telepsychiatry and teletherapy sessions attended. Acceptability to caregivers was measured with the Client Satisfaction Questionnaire³⁵ adapted for use with caregivers of children with ADHD (CSQ-ADHD).

Children's outcomes. The primary study outcome in the CATTs trial was improvement in caregiver-rated ADHD-related behaviors rated on the Vanderbilt ADHD Rating Scales (VADRS). Ratings were obtained from caregivers at five time points: baseline prior to randomization and then again at 4, 10, 19, and 25 weeks.

The VADRS includes subscales of inattention (nine items), hyperactivity/impulsivity (nine items), oppositional defiant/aggressive behaviors (eight items), and role performance related to academic, classroom, and interpersonal functioning (eight items). Items on the VADRS scales are based on the diagnostic criteria for ADHD included in the *Diagnostic and Statistical Manual*, 4th edition,³⁶ with wording simplified to slightly below a third grade reading level. In this study, symptom scales were scored by summing the severity rating for each item on a 4-point scale (from 0 = "never" to 3 = "very often"). Higher scores indicate more severe symptomatology and behaviors. The VADRS scales have solid psychometric properties and are widely used in pediatric practice.³⁷⁻⁴⁰ Caregivers completed their assessments online through a portal that transmitted data directly into the outcomes database.⁴¹

Secondary outcomes included measures of functional impairment. The Columbia Impairment Scale-Parent Version (CIS-P) is a 14-item measure scale that assesses functional impairment across domains of interpersonal relationships, psychopathology, schoolwork or job, and use of leisure time.⁴² Higher scores indicate higher impairment. Internal consistency reliability is very good, and validity is supported by high correlations with the Children's Global Assessment Scale (CGAS).⁴³ The CGAS measures functioning based on the clinician's global impression of the child's functioning.⁴³ Higher scores indicate better functioning. Scores on the CGAS range from 1 (needs constant supervision) to 100 (superior functioning in all areas), with a midpoint of 50 (moderate degree of interference in functioning). Psychometric properties of the CGAS are sound.⁴⁴ "Caseness" is best discriminated by a threshold score of 61-70. The CGAS was independently assessed by the telepsychiatrists at the beginning and at the completion of treatment. The Clinical Global Impressions of Improvement (CGI)⁴⁵ is a global measure of improvement that was

rated independently by therapists and caregivers at each follow-up session (sessions 2-6) to gauge the child's response to intervention sessions. The CGI scale ranges from 1 (very much improved) to 4 (no change) to 7 (very much worse). Higher scores indicate greater improvement. The CGI has been widely used in treatment outcome studies.⁴⁶ These measures of children's symptomatology and functioning are summarized in *Table 1*.

Caregivers' outcomes. Caregivers completed assessments regarding their own distress in four domains that reflect challenges in raising children with ADHD: depression, parenting stress, caregiver strain, and family empowerment.

The Patient Health Questionnaire (PHQ-9) measures the frequency and severity of nine depressive symptoms experienced in the past 2 weeks. Higher scores indicate greater severity of depressive symptoms. This widely used scale shows good validity, including high sensitivity and specificity for detecting clinical depression.^{47,48} Internal consistency of the PHQ-9 in the CATTs trial as measured by Cronbach's alpha was 0.82.

The Parenting Stress Index (PSI) measures the stress that caregivers experience in caring for a child with special needs. The 20 items of the PSI used here are rated on a 5-point Likert-type scale in which higher scores indicate greater stress.⁴⁹ Internal consistency of the PSI in the trial was 0.89.

The Caregiver Strain Questionnaire (CGSQ) has 21 items rated on a 5-point Likert scale that assess "demands, responsibilities, difficulties and negative psychic consequences of caring for a relative with special needs."^{50,51} Higher scores indicate greater strain. Internal consistency of the CGSQ was 0.92.

The Family Empowerment Scale (FES) consists of 34 items that indicate caregivers' understanding of their children's health problems and their ability to advocate for their needs.⁵² The five response options range from "never" to "very often." Higher scores indicate greater empowerment in advocating for children's needs. Internal consistency was 0.93.

Caregivers' acceptability of, or satisfaction with, their children's treatment was measured with the CSQ-ADHD.³⁵ The CSQ-ADHD measures clients' satisfaction with services received and not their perception of gain from treatment or outcomes, although it does elicit the clients' perspectives on the value of services received. The CSQ-ADHD consists of 10 items rated on a 4-point Likert scale. Satisfaction ratings range from 0 to 40, with higher scores indicating greater satisfaction with care. These caregiver measures are summarized in *Table 1*.

SUPPORTING TECHNOLOGIES TO ASSIST THERAPISTS IN SPOKE SITES

To support therapists' duties, we developed two portals. An asynchronous administrative portal was developed with a Web-based tool called Catalyst Common View.^{41,53} The therapists and the research hub communicated through a secure upload area for intervention materials and an embedded Google calendar for scheduled appointments. To support therapists' coordination of clinical tasks

Table 1. Description of Outcome Measures

MEASURE	ACRONYM	ASSESSMENT DOMAIN
Children's measures		
Vanderbilt ADHD Rating Scale	VADRS	Caregiver-rated measure of ADHD-related behaviors with subscales that include inattention (nine items), hyperactivity/impulsivity (nine items), oppositional defiant/aggressive behaviors (eight items), and role performance related to academic, classroom, and interpersonal functioning (eight items). Higher scores indicate more severe symptoms and behaviors.
Columbia Impairment Scale	CIS	Caregiver-rated measure of functional impairment with 14 items, including interpersonal relations, psychopathology, schoolwork or job, and use of leisure time. Higher scores indicate greater impairment.
Children's Global Assessment Scale	CGAS	Telepsychiatrist-rated global assessment of functioning scored 0–100, with higher scores indicating better functioning.
Clinical Global impression of Improvement	CGI	Clinician-rated and caregiver-rated global measure of improvement rated 1–7, with higher scores indicating greater improvement.
Caregivers' measures		
Patient Health Questionnaire-9 Items	PHQ-9	Self-reported measure of severity of nine depressive symptoms experienced in the past 2 weeks. Higher scores indicate greater severity of depressive symptoms.
Parenting Stress Index	PSI	Self-reported measure of stress experienced by caregivers in raising a child with special developmental needs such as ADHD. Higher scores indicate greater stress.
Caregiver Strain Questionnaire	CGSQ	Self-reported measure of caregivers' perception of the demands, responsibilities, difficulties, and negative psychic consequences associated with caring for a relative with special needs. Higher scores indicate greater strain.
Family Empowerment Scale	FES	Self-reported measure of caregivers' understanding of their children's mental health problems and their ability to advocate for their children's needs in dealing with community resources. Higher scores indicate greater empowerment in advocating for children's needs.
Client Satisfaction Questionnaire modified for ADHD	CSQ-ADHD	Self-reported measure of caregivers' satisfaction with services received and their perception of the clinician's understanding of their children's treatment needs. Higher scores indicate greater satisfaction and acceptability.
ADHD, attention-deficit hyperactivity disorder.		

with the telepsychiatrists, we developed a “near-real-time” Web-based registry and data management system.⁵⁴ Telepsychiatrists remotely viewed information that therapists uploaded prior to each session (e.g., vital signs, scores on rating scales). When the caregiver training was delivered through VTC, therapists obtained this information from the clinic staff, who communicated with the therapist by phone or e-mail.

STATISTICAL ANALYSES

Thirty-seven families participated in this study: 12 received the caregiver training through telemental health, and 25 received the training in-person. Results from all enrolled participants were used in the analyses. We compared baseline characteristics for the two intervention conditions regarding demographics, comorbid conditions, children's scores on the VADRS, CIS-P, and CGAS, and caregivers' scores on the PHQ-9, PSI, CGSQ, and FES. We used the two-sample *t* test for continuous variables and the chi-squared test for categorical variables. We examined whether there was a group effect across training conditions and time effects pre- to post-interventions using paired *t* tests. We used analysis of covariance to compare children's

and caregivers' outcomes across the two intervention conditions at 25 weeks, controlling for baseline scores. We tested differences at 25 weeks in caregivers' ratings of satisfaction on the CSQ-ADHD and clinicians' and caregivers' ratings of improvement on the CGI using *t* tests.

Results

The baseline demographic and clinical characteristics of the study sample are summarized in *Table 2*. There were no significant differences between the two conditions.

FEASIBILITY, ACCEPTABILITY, AND FIDELITY

Families in the two groups completed a comparable number of intervention sessions. Families in the teletherapy condition completed a mean of 5.8 (range, 5–6) telepsychiatrist sessions, and families in the in-person condition received a mean of 5.7 (range, 3–6) telepsychiatry sessions ($t=0.498$; $p=0.62$). Families in the teletherapy condition completed a mean of 5.6 (range, 4–6) caregiver training sessions, and those in the in-person condition completed a mean of 5.5 (range, 3–6) sessions ($t=0.322$; $p=0.75$). The families

Table 2. Characteristics of Participants by Delivery Modality at Baseline

	TELETHERAPY (N=12)	IN-PERSON (N=25)	P
Age (years)	9.15 (2.45)	9.39 (2.04)	0.75
Gender [n (%)]			0.74
Boys	8 (66.7%)	18 (72.0%)	
Girls	4 (33.3%)	7 (28.0%)	
Median household income	\$50,000–74,999	\$75,000–99,999	0.50
Caregiver education			0.36
≤ High school	4 (33.3%)	6 (24.0%)	
Some college	2 (16.7%)	10 (40.0%)	
≥ College degrees	6 (50.0%)	9 (36.0%)	
Race [n (%) white]	11 (91.7%)	23 (92.0%)	0.22
Comorbidity [n (%)]			0.23
ADHD alone	3 (25.0%)	2 (8.0%)	
ADHD + 1	5 (41.7%)	17 (68.0%)	
ADHD + 2	4 (33.3%)	6 (24.0%)	
CGAS [mean (SD)]	49.6 (8.0)	54.0 (7.6)	0.12

ADHD, Attention-deficit hyperactivity disorder; ADHD + 1, ADHD with either comorbid oppositional defiant disorder or anxiety disorder; ADHD + 2, ADHD with both comorbid oppositional defiant disorder and anxiety disorder; CGAS, Children's Global Assessment Scale; SD, standard deviation.

showed comparable satisfaction with the care received through the two modalities on the CSQ-ADHD (teletherapy versus in-person, 36.50 ± 3.30 versus 38.60 ± 2.06 ; $t = 1.89$, $p = 0.07$).

Independent ratings of the DVD recordings made on a randomly selected subset of therapy sessions indicated that all ther-

apists were highly faithful to the overall intervention protocol, regardless of intervention venue, with 93% adherence for teletherapy and 96% adherence for in-person sessions by the same therapist.

TREATMENT CHARACTERISTICS AND OUTCOMES

Children's outcomes. Caregiver-rated scores for ADHD, oppositional defiant disorder, and role performance on the VADRS and impairment on the CIS-P are shown in Table 3. Children in both intervention conditions improved significantly from pre- to post-treatment. There were no statistically significant differences in outcomes for the two intervention groups at 25 weeks.

Telepsychiatrists' assessment of global functioning on the CGAS for the teletherapy group increased from $49.6 (\pm 8.0)$ at baseline, indicating "moderate degree of interference in most social areas," to $69.2 (\pm 13.8)$ at 25 weeks and for the in-person group increased from $54.0 (\pm 7.6)$ at baseline, indicating "variable functioning with sporadic difficulties or symptoms in several but not all areas," to $68.2 (\pm 10.9)$ at 25 weeks. For both groups, these 25-week CGAS ratings at the end of treatment were similar and indicate "no more than slight impairment in functioning." Telepsychiatrists, therapists, and caregivers all rated children in the teletherapy and in-person intervention groups as "much improved" (telepsychiatrists, CGI = 2.00 versus 2.04, respectively; therapists, CGI = 2.08 versus 2.32, respectively; and caregivers, CGI = 2.08 versus 2.20, respectively).

Caregivers' outcomes. Caregivers' self-reported distress at baseline and at the end of treatment is shown in Table 4. Caregivers in the in-person group, but not caregivers in the teletherapy group, reported improved scores pre- to post-intervention on the PSI, CGSQ, and FES. The analysis of covariance results testing group differences from baseline to 25 weeks controlling for baseline scores supported better outcomes for caregivers in the in-person group regarding caregiver strain (CGSQ) and empowerment (FES).

Table 3. Children's Outcomes per Caregivers' Reports by Treatment Modality from Baseline to 25 Weeks

CAREGIVERS' REPORTS	TELETHERAPY (N = 12)			IN-PERSON (N = 25)			GROUP EFFECT BY ANCOVA
	BASELINE	25 WEEKS	TREATMENT EFFECT PRE- TO POST-INTERVENTION	BASELINE	25 WEEKS	TREATMENT EFFECT PRE- TO POST-INTERVENTION	
VADRS-Inattention	20.08 (2.71)	12.58 (4.76)	$t = 5.38^b$	21.80 (3.76)	12.52 (5.79)	$t = 9.58^b$	$F(1,34) = 0.64$
VADRS-Hyperactivity	15.25 (6.17)	10.08 (5.85)	$t = 6.01^b$	18.20 (6.21)	11.24 (5.48)	$t = 7.53^b$	$F(1,34) = 0.40$
VADRS-ODD	12.42 (6.04)	8.50 (4.70)	$t = 3.27^b$	12.64 (5.81)	7.84 (4.67)	$t = 5.91^b$	$F(1,34) = 0.48$
VADRS-Role Performance	26.58 (3.45)	21.58 (7.98)	$t = 2.69^a$	28.64 (4.83)	23.28 (5.10)	$t = 4.89^b$	$F(1,34) = 0.05$
CIS-P	22.17 (6.53)	12.75 (7.46)	$t = 5.47^b$	25.52 (9.40)	13.00 (7.10)	$t = 5.47^b$	$F(1,34) = 0.34$

Data are mean (standard deviation) values.

^a $p < 0.05$, ^b $p < 0.01$.

ANCOVA, analysis of covariance (for test of group conditions from baseline to 25 weeks); CIS-P, Columbia Impairment Scale—Parent Version. ODD: opposition defiant disorder; VADRS, Vanderbilt Attention-Deficit Hyperactivity Disorder Rating Scale.

Table 4. Caregivers' Outcomes by Treatment Modality from Baseline to 25 Weeks

	TELETHERAPY (N= 12)			IN-PERSON (N= 25)			GROUP EFFECT BY ANCOVA
	BASELINE	25 WEEKS	TREATMENT EFFECT	BASELINE	25 WEEKS	TREATMENT EFFECT	
PHQ-9	7.75 (4.77)	6.75 (4.37)	$t=0.54$	7.00 (4.37)	5.40 (5.62)	$t=1.27$	$F(1,34)=0.42$
PSI	96.25 (10.15)	92.50 (11.52)	$t=0.97$	104.52 (24.74)	95.08 (22.57)	$t=2.74^a$	$F(1,33)=0.25$
CGSQ	46.33 (9.05)	42.25 (10.70)	$t=1.71$	52.80 (17.70)	39.28 (12.44)	$t=6.15^b$	$F(1,34)=5.54^a$
FES	117.92 (21.86)	119.25 (23.12)	$t=-0.33$	114.44 (16.02)	128.00 (20.95)	$t=-4.95^b$	$F(1,34)=5.91^a$

Data are mean (standard deviation) values.

^a $p < 0.05$, ^b $p < 0.01$.

ANCOVA, analysis of covariance (for test of group conditions from baseline to 25 weeks); CSQ-ADHD, Client Satisfaction Questionnaire, adapted for attention-deficit hyperactivity disorder; CGSQ, Caregiver Strain Questionnaire; FES, Family Empowerment Scale; PHQ-9: Patient Health Questionnaire-9 items; PSI, Parenting Stress Index.

Discussion

The current investigation contributes to the emerging evidence base supporting the feasibility, acceptability, and effectiveness of providing teletherapy to caregivers of children with disruptive behavior disorders. Families in the two conditions attended the same number of treatment sessions and were similarly satisfied with their care. Caregivers in both conditions indicated that their children improved during the trial, and there were no significant differences at the end of treatment in children's ADHD symptoms, oppositional defiant disorder behaviors, and role performance on the VADRS, impairment on the CIS-P, global functioning on the CGAS, and overall improvement on the CGI. Telepsychiatrists and therapists also indicated comparable improvement in global functioning at the end of treatment. These findings for caregiver-rated improvements in children's ADHD symptoms and functioning are consistent with findings from the two prior studies^{17,20} and further support the potential effectiveness of teletherapy for families of children with ADHD.

Our results differ from the two prior studies^{17,20} regarding caregivers' outcomes. Compared with caregivers who received training in-person, those who received teletherapy reported significantly less improvement in caregiver strain (CGSQ) and empowerment (FES) at the end of the trial. They also did not report improvements from pre- to post-intervention. By contrast, caregivers in the study by Reese et al.¹⁷ did report decreased parenting stress, perhaps reflecting the benefits of the Triple-P Program or the advantages of providing teletherapy in a group format. Xie et al.²⁰ measured caregivers' relationship with their children and found self-reported improvements in disciplinary practices, but did not assess caregivers' subjective distress. They may have benefitted from the group format as well. These findings suggest a need for further study of the best modality to deliver teletherapy to caregivers and any mechanisms that may differentiate the two delivery venues.

The major contribution of the current study is its ecological validity, referring to the degree of which the methods, materials, and setting of the study approximate the real-world context being

investigated. Teletherapy was provided to families in their home communities at a local clinic with existing VTC capability rather than at the same medical center where the teleclinicians were located.²⁰ In this context, teletherapy was feasible, acceptable, and associated with improvements in children's ADHD and related functioning. Furthermore, in the current study, all participants received expert pharmacotherapy services through VTC so that only the modality of providing caregiver training varied. Xie et al.²⁰ allowed medication management to vary outside of the study condition, and Reese et al.¹⁷ did not specify medication status.

These findings lay the foundation for future randomized controlled trials with larger sample sizes to assess the response to teletherapy of both children's ADHD and caregivers' functioning. Further intervention development is needed to adapt teletherapy interventions to support caregivers in their child-rearing activities and well-being.

The current study has several limitations. This substudy was part of a larger randomized controlled trial, and the intervention groups were not randomly assigned. Teletherapy was provided as a convenience for families at two of the seven sites. The study sample was small, although larger than similar extant studies. Although we conducted statistical analyses to test differences in outcomes, the study should be considered descriptive and encouraging of further research with stronger design features. If outcomes of well-designed trials indicate that teletherapy performs comparably to interventions delivered in-person, we would be in a position to contribute a promising new approach for disseminating evidence-based treatment for childhood ADHD and disruptive behaviors to underserved communities.

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Disclosure Statement

No competing financial interests exist.

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Address correspondence to:

Kathleen M. Myers, MD, MPH, MS

Seattle Children's Hospital

P.O. Box 5371

4800 Sand Point Way, NE, MS:OA.5.154

Seattle, WA 98121

E-mail: kathleen.myers@seattlechildrens.org

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