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Feasibility and Effectiveness of a Telehealth Service Delivery Model for Treating Childhood Posttraumatic Stress: A Community-Based, Open Pilot Trial of Trauma-Focused Cognitive–Behavioral Therapy

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Telepsychotherapy (also referred to as telehealth or telemental health), the use of videoconferencing to deliver psychotherapy services, offers an innovative way to address significant gaps in access to care and is being used to deliver a variety of treatments for youth. Although recent research has supported the effectiveness of telehealth delivery of a variety of interventions for children, the literature has focused very little on childhood posttraumatic stress disorder. This pilot study examined the feasibility and potential effectiveness of trauma-focused cognitive–behavioral therapy (TF-CBT) delivered via telepsychotherapy in community-based locations of either schools or patient homes. Telepsychotherapy treatment was delivered to 70 trauma-exposed youth in 7 underserved communities. Of these, 88.6% completed a full course of TF-CBT and 96.8% of these treatment completers no longer met diagnostic criteria for a trauma-related disorder at posttreatment. Results demonstrated clinically meaningful symptom change posttreatment, with large effect sizes evident for both youth- and caregiver-reported reduction in posttraumatic stress disorder symptoms. The results

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observed in this pilot evaluation are promising and provide preliminary evidence of the feasibility and effectiveness of this novel treatment format. The COVID-19 global pandemic has resulted in an unprecedented need to rethink how mental health services are delivered, which is particularly applicable to high base rate conditions related to posttraumatic stress. Given the existing network of nationally certified TF-CBT therapists, and many international TF-CBT therapists, these findings suggest the potential for providing effective and accessible telepsychotherapy intervention during this public health crisis (as well as those that will occur in the future).

Keywords: posttraumatic stress disorder, children and adolescents, telehealth

Exposure to potentially traumatic events (e.g., physical abuse, sexual abuse, witnessing domestic or community violence, violent or unexpected death of a loved one) is a significant public health concern with approximately half of all youth reporting experiencing at least one type of potentially traumatic event before the age of 18 (Finkelhor, Turner, Shattuck, & Hamby, 2013; Kilpatrick et al., 2003). Trauma exposure increases the risk of a number of mental health problems and disorders including posttraumatic stress disorder (PTSD), depression, anxiety disorders, externalizing problems, and substance use disorders (Kessler, 2000). Despite high rates of trauma exposure and subsequent mental health outcomes, many children in need of mental health care still do not receive it, receive an inadequate “dose” of sessions, or do not receive evidence-based care (Alegría, Vallas, & Pumariega, 2010; Comer & Barlow, 2014). Even greater health disparities are seen across geographies (e.g., rural locations) and among racial and ethnic minority youth (Merikangas et al., 2011; “New Freedom Commission,” 2007).

Telepsychotherapy Can Extend the Reach of Evidence-Based Treatment

Telepsychotherapy (also referred to as telemental health or telehealth), offers an innovative way to address significant gaps in access to care. Telepsychotherapy refers to the use of interactive, real-time (synchronous) technologies, such as videoconferencing, to deliver psychotherapy to patients (Centers for Medicare and Medicaid Services, 2019). Secure videoconferencing technology allows providers and youth/families at different locations to interact in real time. It is a relatively low-cost technology solution because mental health interventions largely rely on conversation rather than the

need for the expensive peripheral devices (e.g., electronic otoscope or stethoscope) that are used in some telemedicine applications. Additionally, youth often have extensive exposure to and comfort with technology, including videoconference software, and thus, telepsychotherapy may be a particularly good fit for this age group (Nelson, Cain, & Sharp, 2017).

Telepsychotherapy has the potential to address several barriers in the accessibility of evidence-based care. First, telepsychotherapy can overcome distance and time barriers to treatment and minimize conflicts with job and child care responsibilities (Comer, Elkins, Chan, & Jones, 2014). For example, telepsychotherapy reduces travel time and thus can decrease interference with caregiver work schedules and missed school time for patients. In addition to the distance and time barriers, patients and families also report that they utilize telepsychotherapy to decrease costs associated with traveling long distances for care and to decrease stigma by connecting to child friendly locations such as schools (Gloff, LeNoue, Novins, & Myers, 2015).

Current evidence provides some support that services delivered via telehealth are efficacious in addressing a number of disorders in youth such as attention-deficit/hyperactivity disorder (Myers, Vander Stoep, Zhou, McCarty, & Katon, 2015), obsessive-compulsive disorder (Comer, Furr, Kerns, et al., 2017), disruptive and oppositional behavior (Comer et al., 2015), depression (Nelson, Barnard, & Cain, 2003), PTSD (Stewart, Orengo-Aguayo, Cohen, Manarino, & de Arellano, 2017), and other mental health problems (see Gloff et al., 2015, for a review). Comprehensive reviews of child telehealth have found good clinical outcomes in both rural and urban settings (e.g., Cain, Nelson, & Myers, 2015; Gloff et al., 2015; Nelson

& Sharp, 2016), with high rates of diagnostic accuracy, practical feasibility of methods employed, and satisfaction across patients and caregivers (Hilty et al., 2016; Myers, Palmer, & Geyer, 2011).

Delivery of Trauma-Focused Treatment for Children and Adolescents via Telepsychotherapy

Although the published literature supporting telepsychotherapy delivery of evidence-based treatments for children is expanding, there is still a dearth of literature evaluating trauma-focused treatment for children delivered via telepsychotherapy. To our knowledge, there is only one small proof of concept feasibility study (Stewart, Orengo-Aguayo, Cohen, et al., 2017) and several case studies demonstrating feasibility and preliminary evidence of symptom reduction (Jones et al., 2014; Stewart, Orengo-Aguayo, Wallace, Metzger, & Rheingold, 2019; Stewart, Orengo-Aguayo, Gilmore, & de Arellano, 2017). Additional community-based studies are needed to establish feasibility and effectiveness of a telepsychotherapy service delivery model for childhood posttraumatic stress treatment in real world environments. This has become even more salient in the midst of the COVID-19 global pandemic of 2020, which has forced mental health providers (and many other health care professions) to transition to a telehealth service delivery modality in the interest of public safety.

Trauma-focused cognitive-behavioral therapy (TF-CBT; Cohen, Mannarino, & Deblinger, 2017) is an evidence-based treatment for trauma-exposed youth that has garnered robust empirical support. Over 21 randomized trials have demonstrated support for its efficacy in improving PTSD symptoms across a variety of service settings in both the United States and globally (Cohen et al., 2017, pp. 74–80; de Arellano et al., 2014). TF-CBT is ideal for disseminating and testing via a telehealth model of delivery as a means to reduce barriers in access to evidence-based, trauma-focused treatment.

Present Study

In 2015, our team developed the Telehealth Outreach Program (TOP) to deliver evidence-

based, trauma-focused care to children and adolescents living in seven diverse communities across South Carolina. This effort involved ongoing program evaluation data regarding TF-CBT delivered to children via telepsychotherapy sessions conducted at either their schools or homes. This included measurement of practical feasibility variables (reflected in the number of sessions attended and rates of treatment completion), as well as pre-post comparison of clinically relevant treatment outcome variables (captured via standardized, psychometrically sound self-reports and structured clinical interviews). The methods for data extraction and aggregation entailed closed chart review of patients who received services through the TOP clinic (which received institutional review board approval). This article complies with the American Psychological Association's (2020) Journal Article Reporting Standards.

Method

Participants and Context

Participants were 70 children and adolescents aged 7 to 18 who were referred to a major medical center in South Carolina. The sample had a mean age of 12.73 years ($SD = 3.34$) with the following demographic distribution: 81.4% female, 58.6% Hispanic, 30.0% African American, and 11.4% Caucasian. A total of 42.9% of youth had an index trauma of either sexual ($n = 24$) or physical ($n = 6$) abuse; 21.4% ($n = 15$) experienced the traumatic loss of a loved one; 18.6% ($n = 13$) witnessed domestic or community violence; 8.6% ($n = 6$) experienced or witnessed armed robbery; and 8.6% ($n = 6$) had other index traumas such as traumatic medical procedures, car accidents, and so forth. Fifty-six percent of youth also endorsed experiencing additional secondary traumas. All children met criteria for PTSD ($n = 60$), adjustment disorder ($n = 9$), or other specified trauma and stressor related disorder ($n = 1$) according to the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed; *DSM-5*; American Psychiatric Association, 2013) at the time of treatment initiation, assessed via a structured clinical interview and self-report assessments at intake. Patient barriers to traditional treatment access included lack of transportation, child caregiver

work schedule, lack of childcare, residence in a rural area with limited access to treatment providers, and/or need for services to be conducted in Spanish. With regard to the latter, 34.3% of children ($n = 24$) and 57.1% of parents ($n = 40$) requested Spanish-language materials and services.

To overcome these barriers, patients received remote services either at school or home, in Spanish or English, as part of an ongoing telehealth program development project. TOP was initially funded as a pilot project in 2015 through a Duke Endowment Grant and subsequently funded through the South Carolina Telehealth Alliance and a Substance Abuse and Mental Health Services Administration National Child Traumatic Stress Network grant. The program currently provides trauma-focused treatment for youth in seven underserved communities across South Carolina. The program receives referrals from schools, child advocacy centers, law enforcement agencies, mental health clinics, and other community agencies and provides assessment, TF-CBT treatment, and psychiatric medication management services as needed.

Broader inclusionary criteria for the current study were as follows: (a) patient age between 7 and 18 years; (b) at least one remembered/reported trauma on the University of California at Los Angeles PTSD Reaction Index (UCLA-PTSD-RI; [Kaplow et al., 2020](#); [Steinberg, Brymer, Decker, & Pynoos, 2004](#)); (c) significant experience of posttraumatic stress, defined by self-report of at least three current symptoms of PTSD according to *DSM-5* criteria; (d) presence of a caregiver who could participate in treatment as needed; (e) experience of at least one barrier to accessing traditional office-based treatment (e.g., rural location, caregiver work schedule, limited English proficiency); and (f) caregiver consent and child assent. Exclusionary criteria were (a) current significant suicidal ideation, (b) serious child externalizing behaviors that would endanger themselves or the telehealth equipment, or (c) under the age of 7. To expand on the latter, the therapist needed be able to view the child at all times via the web camera for safety reasons and children had to have attentional capacity sufficient to engage in a continuous 60 min of web-based interaction within this constraint. The research team colloquially found both of these criteria to be

difficult with children younger than 7 (thus the rationale for a minimum age that was somewhat older than previous randomized TF-CBT trials that included much younger children).

Measures

UCLA-PTSD-RI ([Kaplow et al., 2020](#); [Steinberg et al., 2004](#)). The UCLA-PTSD-RI assesses trauma exposure and posttraumatic stress symptoms corresponding to *DSM* criteria in youth between the ages of 7 and 18. Parent-, child-, and adolescent-report versions of the instrument are available, all of which comprise 17 items capturing respondent experience of PTSD symptoms. The instrument yields a total scale score, as well as subscale scores for reexperiencing, avoidance, and hyperarousal. Total scores range from 0 to 68, with higher scores representing more severe posttraumatic symptoms. The instrument has demonstrated good internal reliability in multiple studies, with Cronbach's alphas between 0.90 and 0.96 ([Kaplow et al., 2020](#); [Roussos et al., 2005](#); [Steinberg et al., 2013](#)). Cutoff scores of 38 (*DSM-IV* version; [Steinberg et al., 2004](#)) and 35 (*DSM-5*; [Kaplow et al., 2020](#)) have been previously established as reflective of a likely diagnosis of PTSD. The instrument can be administered as either a self-report or clinician interview, the latter of which was the format used with youth and caregivers in the current study.

Two additional notes about the use of the instrument in the current study are warranted. First, it was administered in Spanish to anyone (children or caregivers) whose stated preference was to communicate in that language. This translated version of the instrument is as yet unpublished but was obtained from the original author through a personal communication ([Steinberg, May 9, 2017](#)). As outlined in this communication, an extensive translation process was conducted that included forward translation from English to Spanish followed by back-translation and item-level refinement of any notable discrepancies. Second, two versions of the instrument were used, which corresponded to *DSM-IV* criteria for the first 50 patients and *DSM-5* criteria for the last 20. Although the content changes between versions were minimal, scores on different versions of the measure were not directly comparable and

adjustments to data analysis and presentation had to be made (see below).

Short Mood Feeling Questionnaire (SMFQ; Angold et al., 1995). The SMFQ is a 13-item instrument to measure child and adolescent depression, comprising the 13 highest-loading items from the Mood Feeling Questionnaire–Long Form (Angold et al., 1995; Costello & Angold, 1988). Previous psychometric studies have exhibited good internal consistency of the measure ($\alpha = .85$; Angold et al., 1995). Parent- and child-report versions of the instrument are available, and a score of 8 or higher on either form is indicative of likely depression. The original author was contacted to inquire about a Spanish translation of the instrument, which was reportedly developed across multiple organizations using a process very similar to that described above. As with the UCLA-PTSD-RI, the Spanish-language version of the instrument was administered to anyone with a stated preference for such (children or their parents).

Treatment

Trauma-focused cognitive–behavioral therapy. TF-CBT (Cohen et al., 2017) is an evidence-based, manualized treatment protocol used to treat posttraumatic stress symptoms in children and adolescents ages 3–18. TF-CBT is usually delivered in 12–24 weekly sessions and includes the following components: (a) psychoeducation, (b) parenting skills, (c) relaxation skills, (d) affective modulation skills, (e) cognitive processing skills, (f) trauma narration and processing, (g) in vivo mastery of trauma reminders, (h) conjoint child–parent sessions, and (i) enhancing safety or future development. Efficacy for TF-CBT has been established through numerous randomized controlled trials in a range of populations (Cohen et al., 2017).

Treatment was provided by one of the following: (a) a licensed clinical psychologist (the first author), (b) a postdoctoral fellow with a doctoral degree in clinical psychology, (c) a clinical psychology intern with a master's degree in clinical psychology, or (d) a licensed master's-level social worker. Both doctoral-level therapists and three of six interns were bilingual in English and Spanish and capable of conducting services in either language. All study personnel received initial TF-CBT training from a licensed clinical psychologist who is

a national trainer in TF-CBT, as well as weekly clinical supervision from a licensed clinical psychologist with expertise in TF-CBT.

Telepsychotherapy connections. The clinical program examined was developed and refined according to the American Telemedicine Association's and American Psychological Association's current practice guidelines for telemental health, as well as published accounts of other technological, ethical, and administrative considerations (e.g., American Psychological Association, 2013; Myers et al., 2017; Shore et al., 2018). The hardware demands for rendering services were minimal, consisting on the therapist side of a desktop computer, web-camera, external speakers or a headset, and a microphone. For participants, hardware setups differed depending upon location, but requirements were similarly minimal. Participants receiving sessions at school connected using a laptop computer and headset device provided by the research team. Those receiving sessions at home had an array of connection options that depended upon their existing resources. When and where families had computers and access to sufficiently high-speed Internet, they could participate in home-based sessions using their own equipment. When families did not have access, however, the program provided them with an iPad (with the capability for cellular data transmission if needed), headset, and white noise machine for use to facilitate treatment. Software was selected to be similarly minimal in terms of learning demands and resources necessary to connect to treatment providers. Although many options for video communication are available, the current project entailed use of Vidyo (Vidyo Inc., 2010). Vidyo is videoconferencing software that conforms to Health Insurance Portability and Accountability Act and Health Information Technology for Economic and Clinical Health requirements and allows two-way, real-time communication in a low bandwidth environment. It also enables the capability for screen-sharing, which facilitates immediate display of handouts or other written materials with patients (Comer et al., 2014).

Procedure

Assessment. Participants referred for treatment initially engaged in a comprehensive clinical evaluation that included separate clinical

interviews with child and caregiver(s), elicitation of trauma, medical, and psychiatric history, and completion of self-report instruments described above. These assessments were conducted either through telehealth or in-person meetings depending upon patient needs and logistical considerations for study-staff deployment. Preference for location of subsequent telepsychotherapy services was also discerned at this meeting, and eligible youths were scheduled to participate either at school or home. Self-report measures were repeated before beginning the trauma narration and processing component of treatment, which was an individually based and variably timed determination based on all available clinical data. The same clinical interview administered at baseline was repeated at the end of treatment, as were all self-reports. Participants did not receive compensation to complete assessments.

Treatment. Prior to the first treatment session all participants (and their schools, when relevant) received assistance from staff in setting up the Vidyo software and testing their connections. This test entailed technical assessment of bandwidth and user interface viability as well as a tutorial from the study staff about Vidyo's basic functions. Additionally, schools and/or families were given basic guidelines for the physical environment in which treatment should ideally occur, including selection of an isolated, quiet space that would ensure privacy, deactivation of cell phones or other alerts from electronic devices, and minimization of other distraction opportunities (e.g., other people; TV; using the computer/iPad for other purposes during sessions). Once treatment parameters were established, participants presented for approximately weekly telepsychotherapy TF-CBT sessions with academic medical center therapists (located between 30 and 150 miles away). Special considerations for the format of treatment included ensuring that all individuals present announced themselves, backup plans were made to conduct sessions by phone in the event of an Internet outage or technical malfunction, and specific procedures to handle potential safety issues remotely (adult present and available at all times in case of an emergency; 911 or police called if child was in imminent risk and could not be deescalated or kept safe).

Patient and caregiver engagement. Caregiver participation is an important component of TF-

CBT, but also a simultaneously challenging issue in child mental health treatment in terms of effectively engaging caregivers, particularly in a school-based environment. (Gopalan et al., 2010). Our program utilized evidence-based strategies to enhance engagement through addressing logistical, perceptual, and cultural barriers to treatment engagement (Gopalan et al., 2010; McKay & Bannon, 2004). These strategies involved using reminder phone calls and text messages, directly addressing caregiver concerns and barriers at the time of the initial appointment and throughout treatment, and addressing beliefs and attitudes related to mental health treatment (particularly those likely to present barriers to receiving services).

For the present study, 81% of youth ($n = 57$) had a caregiver who actively participated in treatment on a regular basis (i.e., attended treatment sessions weekly or biweekly). During each session, the therapist typically met individually with the child and then met conjointly with the child and caregiver or individually with child and caregiver at separate times for caregivers who were unable to attend sessions at their child's school. For home-based telepsychotherapy cases ($n = 24$), the therapist was able to meet with the caregiver in the home via telehealth at the time of the session with the youth. For school-based telepsychotherapy cases ($n = 46$), caregivers could be scheduled to meet with the therapist at the school location. Alternatively, if the caregiver was unable to attend telepsychotherapy sessions at the child's school, the child was seen at school via telepsychotherapy and the parent component was completed via computer or iPad at some other point (e.g., after the parent returned home from work or during the parent's lunch break).

Interactive electronic-format activities for delivering treatment content and promoting engagement. TF-CBT is structured to make significant use of worksheets and visual aids to facilitate therapy being more interactive and engaging for children and adolescents. To implement these same strategies via telepsychotherapy a variety of techniques were implemented, including the development of electronic versions or treatment worksheets and handouts and the use of PowerPoint presentations and digital games. For example, worksheets and handouts designed for in-person therapeutic engagement were adapted to allow the therapist to use the

“screen-share” function of the videoconferencing platform that allows real-time sharing of the therapist’s desktop view. We also created a series of interactive computer games that children play in session with their therapist to enhance the child’s understanding of treatment concepts. These programs allow both the therapist and patient to simultaneously see a working document in real-time during session; however, only the therapist was able to manipulate the documents and thus the child had to instruct the therapist which moves to make for him/her during the game. We used Microsoft PowerPoint, Word, and Excel and Adobe Acrobat to create our working documents and interactive games, thus making them portable and freely accessible to most environments (given the ubiquity of these software applications in professional settings).

The majority of activities and games used in our telepsychotherapy program were adaptations of in-person clinic-based TF-CBT treatment activities, but others were new games created specifically for the purpose of telepsychotherapy sessions. One activity adapted from in-person TF-CBT treatment activities is the “How Do We Experience Feelings in Our Bodies?” activity (Hendricks, Cohen, Mannarino, & Deblinger, n.d.), which aims to help children review physiological responses to emotions. In clinic-based, in-person care, the therapist uses a worksheet that asks the child to indicate where in his or her body he or she feels specific emotions and then collaborates with the child to color in the worksheet. For the telepsychotherapy delivery format, we developed an interactive PDF document that provides children with an image of the worksheet, which they can color in with the assistance of the therapist by continually verbally communicating to direct the therapist as to where to color.

An example of an interactive game we developed using PowerPoint (called “Feelings Memories”) reinforces emotion vocabulary in connection to real-life experiences. The child selects a tile numbered 1–12. Behind each numbered card are an emotion term and the instruction, “Tell me about a time when you felt (sad, mad, happy, scared, etc.)” The therapist and child take turns selecting a card and telling about a time when they felt the identified emotion. Other interactive games we developed are *Jeopardy*-style games presented via Power-

Point, which therapists use to review psychoeducation regarding sexual abuse, physical abuse, witnessing domestic violence, or traumatic grief, depending on the specific traumatic events each child had experienced.

Other examples of telepsychotherapy-specific strategies include the use of interactive worksheets, PowerPoint presentations with content tailored to the child’s interests, video clips, and electronic versions of children’s books. For example, we utilized PowerPoint to create an animated activity for teaching about varying levels of emotions. This animation shows a thermometer with the temperature rising as emotions intensify. Additionally, we frequently used video clips. For example, when teaching about diaphragmatic breathing with a child who liked soccer, we used a video clip of a soccer player utilizing diaphragmatic breathing before a penalty kick. We also incorporated additional strategies while completing the trauma narrative. For example, a child dictated the trauma narrative while the clinician typed verbatim what the child says into a Word document. The therapist was able to “share” the therapist’s screen with the child so that he or she could see the words that the therapist was typing in real-time. Additionally, children colored pictures with crayons and paper to illustrate specific elements of the traumatic event, which could be displayed to the camera and captured by the clinician through a screenshot (and later used in the child’s trauma narrative, if applicable). Similarly, therapists could also work collaboratively with the child to create a PowerPoint version of the trauma narrative incorporating clipart or other picture-based methods of conveying their experiences.

Results

Process Description and Qualitative Results: Feasibility

Strategies for providing TF-CBT via telepsychotherapy. A primary concern in delivering TF-CBT via telepsychotherapy was patient safety. To address this concern, pretreatment site visits to schools were used to survey the physical premises and build relationships that would later serve to facilitate good communication between the treating clinicians and the school staff (e.g., guidance counselor). Dur-

ing each session of TF-CBT, clinicians had contact information readily available for school staff. All appointments took place during regular school hours of operations; accordingly, the school staff was available in case of emergencies. Notably, there were only two instances in which school staff needed to be contacted, and no instances in which local authorities needed to be contacted due to patient safety concerns. In both instances schools were contacted due to patient suicidal ideation. Additionally, in school-based sessions there was one instance in which a teenager inappropriately disengaged from the therapeutic communication (i.e., closed the laptop during the therapy session), which was quickly reconnected with a call to the identified school contact (guidance counselor). There was also one instance of a patient leaving her chair and crouching on the floor out of view of the camera, wherein the clinician successfully requested that the patient return to the chair.

For home-based telepsychotherapy, a caregiver was always present in the home at the time of sessions. During each home-based session, clinicians had contact information available for the caregiver who was present in the home as well as additional emergency contacts for the child. Additionally, an emergency plan was discussed with each family that involved contacting local police or 911 if the clinician thought that the child or caregiver presented an imminent threat to themselves or others. No safety concerns arose during home-based TF-CBT telepsychotherapy sessions.

Technical performance of the telepsychotherapy equipment. There were few technical problems with the telepsychotherapy equipment. Occasionally, school sites and home-based patients experienced initial difficulty with logging into the videoconferencing software. This led to a delay in starting sessions; however, this issue was always easily resolved via telephone calls with the treating clinician. Additionally, the telepsychotherapy video feed occasionally became pixilated for several seconds when using a Wi-Fi-based Internet connection, but this was resolved by utilizing a direct Ethernet connection. More difficulty was encountered when utilizing cellular data-enabled iPads in rural locations. In several cases the video feed frequently became pixilated or froze and the sound and/or video were lost. These issues

were often resolved by having the patient move to a different location with a better signal (provided that location was private). In one case the cellular data connection was too poor to adequately provide home-based treatment and thus the child was transitioned to school-based sessions. In general, though, the telepsychotherapy equipment worked adequately for its intended purpose and rarely necessitated accessing backup telephone procedures. The provision of simple, standardized troubleshooting guides and step-by-step, written reminders of instructions for accessing video connections likely also helped facilitate reduction of errors.

Quantitative Results

Initial comparison of groups. Demographics, baseline symptoms levels, and number of sessions completed were investigated across the two main treatment settings (school and patient home, excluding the two participants who received services in both). As expected, Mann–Whitney tests revealed no group differences in gender ($p = .61$), race ($p = .88$), or language preference ($p = .78$ and 0.53 for child and parent, respectively). Similarly, t tests comparing baseline measures revealed no differences in patient age ($p = .55$) or baseline symptom levels on the UCLA-PTSD-RI ($p = .80$ for child; $p = .11$ for parent) and SMFQ ($p = .92$ for child; $p = .71$ for parent) comparing school and home treatment settings. Additionally, neither group differed in terms of the number of sessions completed over the course of the study ($p = .88$). Given the lack of significant differences as a function of treatment setting, all analyses that follow were conducted considering the entire sample as a whole (see Table 1 for summary data).

Service provision. School-based telepsychotherapy services were provided to 44 youth and home-based for another 24. Two additional youth began treatment in the school-based setting but later transitioned to home-based sessions after moving schools and no longer having availability of adequate resources at school. Assessment and treatment were provided in English or Spanish according to the stated preference of participants. Services were provided in English for 46 youth and Spanish for 24, whereas caregivers received Spanish-language sessions in 40 cases and English in 30.

Table 1
Outcome Scores

Time point	UCLA-PTSD-RI						Mean number of sessions attended, child
	DSM-IV		DSM-5		SMFQ		
	Child	Parent	Child	Parent	Child	Parent	
Baseline							
<i>M (SD)</i>	36.96 (14.54)	31.59 (16.36)	44.39 (11.98)	34.37 (18.00)	10.88 (6.36)	9.02 (6.31)	
<i>n</i>	50	46	18	19	68	61	
Midpoint							
<i>M (SD)</i>	26.00 (14.49)	19.84 (16.71)	32.81 (11.81)	26.17 (18.86)	7.13 (6.19)	7.00 (6.19)	
<i>n</i>	34	19	16	6	39	30	
Posttreatment							
<i>M (SD)</i>	9.29 (7.15)	9.27 (9.40)	18.56 (13.33)	13.12 (8.71)	3.83 (4.96)	2.75 (3.75)	15.34 (5.50)
<i>n</i>	42	40	18	17	59	57	70
Effect sizes (<i>d</i>) comparing pre- and posttreatment ratings							
Range	2.42	2.04	1.68	1.50	1.24	1.21	3–29

Note. UCLA-PTSD-RI = University of California at Los Angeles Posttraumatic Stress Disorder Reaction Index; DSM-IV = Diagnostic and Statistical Manual of Mental Disorders (fourth edition); DSM-5 = Diagnostic and Statistical Manual of Mental Disorders (fifth edition); SMFQ = Short Mood Feeling Questionnaire.

Clinical outcomes. At baseline, 51.4% of children ($n = 36$) scored above the relevant clinical cutoff on the UCLA-PTSD-RI (accounting for the version of the scale implemented). By the completion of treatment, however, only 4.3% scored above clinical cutoffs ($n = 3$). A similar trend was noted in parent report on the UCLA-PTSD-RI, wherein 28.5% ($n = 20$) indicated clinical elevation at baseline but none did by the end of treatment. Examination of mean scores for both versions of the instrument are given at pre-, mid-, and posttreatment in Table 1. Comparisons of pre- and posttreatment child-reported scores indicated significant differences on both the *DSM-IV*, $t(40) = 14.12$; $p < .0001$; $d = 2.42$ and *DSM-5* versions, $t(17) = 8.90$; $p < .0001$; $d = 2.04$. Findings comparing parent-reported data were similar, *DSM-IV*, $t(36) = 9.19$; $p < .0001$; $d = 1.68$; *DSM-5*, $t(16) = 6.09$; $p < .0001$; $d = 1.50$.

As can be seen in Table 1, baseline child and parent reports on the SMFQ indicated mean levels that were above the established clinical cutoff score. By the completion of treatment, however, these scores had decreased precipitously such that average symptom levels were no longer problematic. Comparing baseline to posttreatment scores for children, $t(57) = 9.27$; $p < .0001$; $d = 1.24$, and parents, $t(51) = 6.34$; $p < .0001$; $d = 1.21$, indicated that this difference was statistically significant in both cases. The aforementioned variables were also compared in a series of 2 (Group; school or home) \times 2 (Time; pre- or posttreatment) analyses of variance. These results were nonsignificant (all values between 0.37 and 0.81), indicating that within-group changes were consistent regardless of the setting in which treatment occurred.

As outlined above, all participants met criteria at baseline for a trauma- or adjustment-related disorder, with 60 of 70 participants having a primary diagnosis of PTSD. By the end of treatment 54 participants (77.1%) were diagnosis-free and another seven (10.0%) retained primary diagnoses that were not related to trauma. Only two cases continued to meet criteria for PTSD by the endpoint assessment, and both evidenced substantial changes in self-reported posttraumatic symptoms on the UCLA-PTSD-RI (decrease from 72 to 42 for one participant and 46 to 26 for the other).

Discussion

The world is currently undergoing an unprecedented global pandemic with COVID-19 that has highlighted the pressing need for evidence-based telehealth service delivery models of mental health services. Stress is increased for many caregivers and children due to things such as social isolation and economic instability. There is the potential for increase in PTSD and other stress-related disorders in children, particularly children of caregivers at elevated risk for exposure, including health care providers, first responders, grocery store and sanitation workers, and so forth. The present open pilot trial of TF-CBT offers one of the first evaluations of the use of telepsychotherapy to remotely deliver TF-CBT in community-based locations, and findings supported the preliminary feasibility and effectiveness of this novel treatment delivery format with trauma-exposed children and adolescents. The present findings add to a growing body of literature supporting telepsychotherapy for expanding the reach of evidence-based mental health treatments for youth (e.g., Comer, Furr, Kerns, et al., 2017; Comer, Furr, Miguel, et al., 2017; Cooper-Vince, Chou, Furr, Puliafico, & Comer, 2016; Doss, Feinberg, Rothman, Roddy, & Comer, 2017; Gloff et al., 2015; Nelson et al., 2003; Sibley, Comer, & Gonzalez, 2017). Although recent research has supported the efficacy of telepsychotherapy delivery of a variety of interventions for children, the literature has focused very little on childhood PTSD. The preliminary feasibility and positive treatment outcome of telepsychotherapy-delivered TF-CBT observed in this pilot evaluation are promising. Close to nine out of every 10 youth (88.6%) completed a full course of telehealth delivered TF-CBT, and 96.8% of these treatment completers no longer met diagnostic criteria for a trauma-related disorder at posttreatment. Although 2.9% (or two individuals) did not exhibit full treatment response, both youths showed substantial treatment response in the form of symptom reduction (albeit not to the extent of full diagnostic remission). Although this pilot evaluation was, by design, underpowered and not methodologically geared to test formal efficacy (see Gallo, Comer, & Barlow, 2013; Kraemer, Mintz, Noda, Tinklenberg, & Yesavage, 2006), there was nonetheless preliminary indication that TF-

CBT delivered via telepsychotherapy yielded a favorable clinical response from both youth and caregiver perspectives.

Although the present pilot study did not include a comparison condition in which youth were treated in a clinic-based setting, the findings are promising in showing treatment effects that are comparable with TF-CBT delivered in an in-person, office-based setting (Rubin, Washburn, & Schieszler, 2017). Considering that attrition from office-based TF-CBT treatment remains a significant concern (e.g., approximately 25–50%; Cohen, Mannarino, & Iyengar, 2011; Olfson et al., 2009; Scheeringa, Weems, Cohen, Amaya-Jackson, & Guthrie, 2011), the rate of 11.4% for the current study is encouraging. Reduction in barriers to accessing care that the use of telepsychotherapy technology affords (e.g., reduced need for caregivers to take time off from work; find transportation/gas money to reach our clinic; drive long distances to appointments), as well as the availability of linguistically competent clinicians, may have contributed to the high treatment completion rates and the concomitant reductions in clinical symptoms. In particular, it is important to note that our program also utilized additional engagement strategies (Gopalan et al., 2010; McKay & Bannon, 2004), such as using reminder phone calls and text messages, directly addressing caregiver concerns and barriers at the time of the initial appointment and throughout treatment, and addressing beliefs and attitudes related to mental health treatment. These engagement strategies may have decreased treatment attrition beyond what would be seen if we had used the telepsychotherapy delivery model without these additional engagement strategies. While the lack of treatment attrition in the present study is very encouraging, future controlled studies will be needed to directly compare attrition rates for the telepsychotherapy versus in-person treatment modalities.

Additionally, future studies investigating the sustainability of telepsychotherapy models are important to further development of this modality of treatment. This becomes an especially important aspect of future research given the global pandemic outbreak of COVID-19 and subsequent rapid adjustment to most mental health services now being offered through telepsychotherapy connections (whether or not providers, agencies, or service delivery systems were ready to do so).

For example, individual states are increasingly mandating coverage for telepsychotherapy (American Telemedicine Association, 2017; Centers for Medicare and Medicaid Services, 2019) and third-party payers are improving reimbursement for real-time telehealth services (American Medical Association, 2019; Centers for Medicare and Medicaid Services, 2018; Centers for Medicare and Medicaid Services, 2020b). The recent COVID-19 pandemic has also resulted in temporary federal mandates for Medicare to reimburse telepsychotherapy services offered by psychologists and other mental health providers without regard for previous restrictions regarding rural locations (Centers for Medicare and Medicaid Services, 2020b). Additionally, the U.S. Department of Health and Human Services has temporarily relaxed Health Insurance Portability and Accountability Act compliance regulations for virtual platform use in an effort to increase the reach of services during this global crisis (U.S. Department of Health & Human Services, 2020). Psychiatric services (e.g., medication management) provided via telehealth were significantly more likely to be reimbursed prior to the COVID-19 pandemic than psychotherapies (e.g., TF-CBT) delivered via telehealth, particularly by federal and state programs (American Telemedicine Association, 2017; Centers for Medicare and Medicaid Services, 2020a), partially due to their greater ease of integration into primary care or other approved originating environments previously necessary to adhere to CMS rules. The steps taken to increase reimbursement for telepsychotherapy services during the current global pandemic may be the first step in paving the way for sustainability of these services in the future. Further work to establish the effectiveness of delivering trauma-focused treatment for youth through telepsychotherapy could promote sustainability of these interventions that can help to reduce the burden of suffering for families who are underserved by typical office-based models of care (Kazdin & Blasé, 2011).

The present pilot study provides preliminary evidence of the ability to successfully deliver TF-CBT via telepsychotherapy technology, resulting in clinically meaningful symptom change post-treatment with low treatment attrition (11.4% dropout) among trauma-exposed children and adolescents ages 7–18. Additionally, the ethnic and language diversity of the sample (58.6% Hispanic, 30.0% African American; 34.3% of children and 57.1% of parents requesting Spanish-language

materials and services) provide important preliminary evidence of TF-CBT effectiveness with a more representative sample of trauma-exposed youth in the United States, which may have applicability to other global settings (e.g., Central and Latin America). Nevertheless, additional efforts are still needed to further establish the empirical base for telepsychotherapy delivery of trauma-focused treatment for youth.

Limitations of the present study include the small sample size and primarily female sample, which may reduce the generalizability of the study results. The lack of a comparison group and randomization are also problematic in terms predicting the applicability of results in other environments, which would suggest the need for noninferiority studies similar to those seen among adult veteran populations (e.g., [Acierno et al., 2016](#)). Treatment fidelity was also only informally assessed during weekly supervision, but more formal measures would have been useful. Additionally, TOP was potentially somewhat atypical in that the program was able to provide iPads and Internet access to patients who would otherwise not have been able to access these resources (thus precluding their participation in treatment). Cost-effectiveness analysis and careful attention to resource acquisition would be useful to examine the feasibility of this strategy in future work in usual care settings. Organizations will need to think creatively to address these barriers, such as obtaining grant or other funding to provide these resources for needy families, as some school districts are doing currently for schooling in the midst of national quarantine restrictions on school attendance.

Despite these limitations, program evaluation of applied service delivery environments are critical for pilot testing novel treatment formats that may be useful in supporting future randomized inquiries ([Gallo et al., 2013](#); [Kraemer et al., 2006](#)). The present findings are among the first to provide evidence in support of the preliminary feasibility, acceptability, and effectiveness of telehealth TF-CBT for youth presenting with trauma-related disorders (i.e., PTSD, adjustment disorder, other specified trauma and stressor related disorder). The COVID-19 global pandemic has resulted in an unprecedented need to rethink how mental health services are delivered, which is particularly applicable to high base rate conditions related to posttraumatic stress. In an effort to protect the public, thousands of mental health providers

and patients have been advised to transition to a telepsychotherapy delivery format. Telepsychotherapy offers many benefits over traditional face-to-face psychotherapy service delivery models including (a) reduction of barriers in access to care (e.g., distance to clinic, lack of transportation, cost of gas and parking, work schedules, childcare), (b) increased likelihood of adequate treatment dose and completion (by way of reducing the aforementioned barriers), and, more recently, (c) protecting the public amid a global crisis that requires physical distancing and potentially relative social isolation. Having started this clinic five years ago, our team was well suited to assist teams across the United States and the world in transitioning their own services to a telepsychotherapy format, which was fortuitous as the need to do so arose for essentially the entire field at once. We have now trained providers across child advocacy centers, academic medical centers, university clinics, and independent practice environments. Given the existing network of nationally certified TF-CBT therapists (<https://tfcbt.org>), and many international TF-CBT therapists, these findings suggest the potential for providing effective and accessible telepsychotherapy intervention during this public health crisis (as well as those that will occur in the future). It will be imperative to present empirical evidence for the feasibility and potential effectiveness of delivering psychotherapy for children and adolescents via telepsychotherapy to legislators and policymakers to ensure sustained reimbursement and expansion of this method. If the COVID-19 pandemic has taught us anything about health care service delivery thus far, it is that the entire American system was ill prepared to adapt to such a crisis. Future work to develop new clinical and technical infrastructures, public policies, and methods of reimbursement is imperative to ensuring that this crisis results in an opportunity to improve service delivery to those in need.

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Viabilidad y efectividad de un modelo de prestación de servicios telemedicina para tratar el estrés postraumático en la infancia: Una prueba piloto abierta, basada en la comunidad, de Terapia Cognitivo-Conductual Enfocada en Trauma

La telepsicología (también conocida como telesalud o telesalud mental), el uso de la videoconferencia para entregar servicios psicoterapeutas, ofrece una manera innovadora para abordar brechas significativas en el acceso al cuidado y ha sido usada para entregar una variedad de tratamientos para jóvenes. Aunque investigaciones recientes han apoyado la

efectividad de una variedad de intervenciones para niños entregadas por telesalud, la literatura se ha enfocado muy poco en el trastorno de estrés postraumático en la infancia. Este estudio piloto examinó la viabilidad y efectividad potencial de la Terapia Cognitivo-Conductual Enfocada en Trauma (TF-CBT) entregada a través de telepsicoterapia en lugares basados en la comunidad ya sea en escuelas o casas de los pacientes. El tratamiento telepsicoterapeuta fue proporcionado a 70 jóvenes expuestos a traumas en 7 comunidades de pocos recursos. De estos, 88.6% completaron un tratamiento completo de TF-CBT y 96.8% de los que completaron el tratamiento ya no cumplieron con los criterios de diagnóstico para un trastorno relacionado con el trauma después de recibir el tratamiento. Los resultados demostraron un cambio en síntomas clínicamente significativo después del tratamiento, con gran tamaño de efecto evidente en la reducción de síntomas de TEPT reportados por parte de los jóvenes y su proveedor de cuidado. Los resultados observados en esta evaluación piloto son prometedores y proporcionan evidencia preliminar de la viabilidad y efectividad de este nuevo formato de tratamiento. La pandemia COVID-19 mundial ha resultado en una necesidad sin precedente para reconsiderar en como los servicios de salud mental son aportados, que es particularmente pertinente a las afecciones con alta tasa de base relacionadas al estrés postraumático. En vista de la red existente de terapeutas certificados nacionalmente en TF-CBT, y numerosos terapeutas TF-CBT internacionales, estos hallazgos sugieren el potencial para proveer intervención de tele psicoterapia efectiva y accesible durante esta crisis de salud pública (y también durante aquellas que ocurrirán en el futuro).

Trastorno de Estrés Postraumático, Niños y adolescentes, telesalud

一种治疗儿童创伤后应激的远程医疗服务提供模式的可行性和有效性：一项关注创伤的认知行为疗法的基于社区、开放性试点试验

远程心理治疗（也称为远程医疗或远程心理健康），使用视频会议提供心理治疗服务，提供了一种新性的方法来应对医疗可及性的缺失，并且正在用来对青少年提供多种治疗。尽管近期研究支持使用远程医疗提供对儿童的多种干预方式的有效性，文献少有关注儿童创伤后应激障碍。本试点研究探讨了关注创伤的认知行为疗法（TF-CBT）的可行性和可能的有效性，该研究是通过远程心理治疗的方式提供服务，且基于社区地点，包括病人的家中或学校。远程心理治疗被提供给了来自7个缺少服务社区的70名有过创伤暴露的青少年。这些青少年中，88.6%完成了全程的TF-CBT，而96.8%的完成全程治疗者在治疗后不再满足创伤相关疾病的诊断要求。结果显示治疗后的症状改善有临床显著意义，并且在青少年报告和照顾者报告的PTSD症状减少上都有大的效应量。本试点评估中的观察结果很有希望，并对这种新型治疗方式的可行性和有效性提供了初步证据。COVID-19全球大流行造成了前所未有的对重新思考怎样提供心理健康服务的需求，特别是对有关创伤后应激的高基础概率疾病。鉴于已有的全国认证TF-CBT治疗师网络，以及许多国际TF-CBT治疗师，这些发现提示在这次公共健康危机中提供有效和可及远程心理治疗干预的潜力（以及在未来的潜力）。

创伤后应激障碍，儿童和青少年，远程医疗

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