A Review of Pediatric Telemental Health

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KEYWORDS

• Telemedicine • Telemental health • Behavioral health

KEY POINTS

- Because of the widening gap between need for child mental health services and availability of child specialists, secure videoconferencing options are more needed than ever.
- Based on a comprehensive review of real-time videoconferencing evidence to date, videoconferencing is an effective approach to improving access to behavioral health interventions for children and adolescents.
- Overall, telemental health is feasible and well accepted by families, and shows promise for disseminating evidence-based treatments to underserved communities.

INTRODUCTION

Because of chronic and worsening specialist shortages across pediatrics specialties as well as limited access to empirically supported interventions, telemedicine is becoming more widely adopted with children and adolescents, with telemental health among the most active pediatric specialties.[1–3] Telemedicine is defined as "the use of medical information exchanged from one site to another via electronic communications to improve patients' health status."[4] Telemental health, also called telebehavioral health, is an umbrella term to refer to all of the names and types of behavioral and mental health services that are provided via synchronous telecommunications technologies.[5,6] About 20% of US children and adolescents aged 9 to 17 years have diagnosable psychiatric disorders.[7] In addition, approximately 31% of children are affected by chronic conditions.[8] Many other youth show subthreshold symptoms and stress and grief reactions that benefit from intervention. Younger children are at risk for developmental and behavioral disorders. However, there are a growing number of evidence-based psychotherapy approaches to support children and their

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families in coping with the range of psychiatric presentations,[9–11] as well as pediatric psychology approaches for supporting children with acute and chronic medical conditions and their families.[12]

However, the supply of child behavioral health specialists trained in the latest clinical advances is very small, with demand far outpacing supply across child and adolescent psychiatrists,[13–15] child and adolescent therapists and other specialists,[16–19] and developmental medicine. Thus, most children with behavioral health concerns do not receive any therapy, let alone evidence-based treatments delivered by behavioral health specialists.[20] The rationale for telemental health is to bridge the gap between supply and demand, particularly in rural and other underserved communities that face declining economies, poor access to mental health insurance, and limited transportation options.[21,22] Telemental health helps increase regular attendance by diminishing the financial and temporal barriers of travel and time from work as well as offering access to therapists outside the community via health clinics and schools, which may be less stigmatizing than traditional mental health settings.

Telemental health services build on a long history of moving mental health care for youth from the mental health clinic to the community in order to increase access to care; decrease stigma; increase adherence to treatment planning; and, it is hoped, enhance effectiveness and care coordination in naturalistic settings. These community settings provide advantages in gathering information from multiple informants/supporters about the broad range of contextual factors influencing children's behaviors and mental health needs. In particular, telemental health offers a powerful opportunity for collaboration with pediatricians to help them address the increasing expectations to improve their skills in diagnosing and managing pediatric behavioral conditions.[3,23]

Although telemental health services initially focused on rural settings,[24] they are increasingly offered in diverse settings, including underserved parts of urban communities.[25] Mental health centers and other child-serving facilities may provide infrastructure that facilitates the implementation of telemental health services. Many schools are seeking to understand their students' mental health needs and are willing to use their videoconferencing systems to access telemental health services.[26] Most behavioral health diagnoses across the developmental spectrum have been evaluated through videoconferencing consistent with patients in usual outpatient practice.[5] Telemental health allows youth to be evaluated in their own communities accompanied by family or community members who may provide context and perspective that is not available if services are provided in distant health centers.[27] Primary care practices are often key partners in telemental health services.[3]

This article first summarizes the pediatric research to date across telemental health specialties.[5,28] Underscoring ethical considerations, it then presents a case study emphasizing ethical considerations in best practice.

SUMMARY OF TELEMENTAL HEALTH EVIDENCE WITH CHILDREN AND ADOLESCENTS

Studies were included if they (1) consisted of videoconferencing applications across the pediatric age range; (2) included psychiatry/pharmacotherapy, psychotherapy and/or a pediatric psychology intervention, and/or developmental medicine intervention; and (3) included videoconferencing as the method of intervention across assessment or treatment. Studies were excluded if they (1) were conducted using telephone or mobile interactions without video, (2) used Web-based or e-health interventions as a primary method for service delivery (ie, predominantly asynchronous Web-delivered content), and/or (3) focused solely on education/training or population description. These criteria were established in a previous review.[29] As presented in **Table 1**, the

Table 1
Telemental health intervention using videoconferencing

Study	Population	Sample Description and Sample Size	Study Design	Summary of Findings
Child Psychiatry Intervention Using Videoconferencing				
Elford et al,[30] 2000	Various diagnoses	n = 25 youth Age: 4–16 y	RCT, VC vs F2F	96% concordance between VC and F2F diagnostic evaluations, no difference in patient or parent satisfaction between VC and F2F, 91% of parents reported preference for VC to long-distance travel
Elford et al,[31] 2001	Various diagnoses	n = 23 youth	Descriptive, VC	Diagnosis and treatment recommendation were equal to usual, in-person care
Greenberg et al,[32] 2006	Various diagnoses	No children, 35 PCPs, 12 caregivers	Descriptive, focus groups with PCPs and caregivers	PCP and caregivers satisfied with VC and frustrated with limitations of local supports. Family caretakers and service providers frustrated with limitations of VC
Lau et al,[33] 2011	Various diagnoses	n = 45 youth Age: 3–17 y	Descriptive, VC	Use of VC showed a large variation in patient characteristics, such as age, current living situation, and psychological symptoms. The most common reason for VC referral was for diagnostic clarification (67%). Telepsychiatrists recommended a change in medication for most (80.8%) who were already on medication and to begin medications for those not on medication at time of consult (63.2%)
Myers et al,[34] 2006	Incarcerated adolescents	n = 115 youth Age: 14–18 y	Descriptive, VC satisfaction	80% successfully prescribed medications and expressed confidence in the psychiatrist by video, and youth expressed concerns about privacy
Myers et al,[35] 2007	Various diagnoses	n = 172 patients Age: 2–21 y 387 clinic visits	Descriptive, VC satisfaction	High satisfaction with services, more so with pediatricians vs family physicians
Myers et al,[36] 2010	Various diagnoses	n = 701 patients referred by 190 PCPs	Descriptive, use of VC	Pediatricians referred to VC services more frequently than family providers, reported VC as feasible, acceptable, and increasing access to mental health services

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Study	Population	Sample Description and Sample Size	Study Design	Summary of Findings
Myers et al,[37] 2013	ADHD	n = 223 youths Age: 5.5–12.9 y	RCT, feasibility of VC	Demonstrated feasibility of conducting RCT with the use of VC with children living in underserved communities, clinicians showed high fidelity to treatment protocols, minor technical difficulties did not interfere with providing care
Myers et al,[38] 2015	ADHD, ODD, anxiety	n = 223 youth	RCT, VC vs F2F	Caregivers reported significantly greater improvement for inattention, hyperactivity, combined ADHD, ODD, and role performance for VC compared with those treated in primary care, teachers also reported significantly greater improvement in ODD and for performance for VC
Pakyurek et al,[39] 2010	Various diagnoses	n = 12 youth	Descriptive, VC vs F2F	VC may be superior to F2F for routine clinical consultation in primary care
Rockhill et al,[40] 2013	ADHD, ODD, anxiety	n = 223 children Telepsychiatrists and PCPs of these children	RCT	Telepsychiatrists adhered to guideline-based care, used higher medication doses than PCPs, and their patients reached target of 50% reduction in ADHD symptoms more often than with PCPs
Szeftel et al,[41] 2012	Developmental disability	n = 45 youth	Descriptive	VC led to changed psychiatric diagnosis for 70%; changed medication in 82% of patients initially, 41% at 1 y, and 46% at 3 y; VC helped PCPs with recommendations for developmental disabilities
Yellowlees,[42] 2008	Various diagnoses	n = 41 youth	VC pre-post	At 3 mo following psychiatric diagnostic evaluation, improvements in the Affect and Oppositional domains of the Child Behavior Checklist were observed
Myers et al,[43] 2004	Various diagnoses	n = 159 youth Age: 3–18 y	Comparison of patients evaluated using VC vs F2F	Demographically, clinically, and by reimbursement, patients look similar between VC and F2F, VC had greater adverse case mix

Myers et al,[44] 2008	Various diagnoses	n = parents of 172 youths	Descriptive, VC satisfaction	Satisfaction was higher in parents of school-aged children vs those with adolescents, high adherence for return appointments
Child Clinical Psychology Intervention Using Videoconferencing				
Fox et al,[45] 2008	Juvenile offenders	n = 190 youth Age: 12–19 y	VC pre-post	Youth increased goal achievement in areas of health, family, and social skills
Heitzman Powell et al,[46] 2014	Autism	n = 7 parents Youth age not reported	VC pre-post	Parents increased their knowledge and self-reported implementation of behavioral strategies
Himle et al,[47] 2012	Tic disorders	n = 18 youth Age: 8–17 y	RCT, VC vs F2F	Across groups, significant improvements in tic behaviors and strong ratings for acceptability and therapist/client alliance. No differences between treatment groups
Tse et al,[48] 2015	ADHD	n = 37 youth M (Teletherapy) = 9.15 y M (F2F) = 9.39 y	Substudy of larger clinical trial, VC vs F2F	Families in the 2 caregiver training 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
Nelson et al,[49] 2006	Depression	n = 28 youth M = 10.3 y	RCT, VC vs F2F	Treatment yielded significant improvement for depression in both conditions, with no between-group differences
Nelson et al,[50] 2012	ADHD	n = 22 youth M = 9.3 y	VC feasibility	No factor inherent to the VC delivery mechanism impeded adherence to national ADHD guidelines
Reese et al,[51] 2012	ADHD	n = 8 youth M = 7.6 y	VC pre-post	Using group Triple P Positive Parenting Program instead of VC, families reported improved child behavior and decreased parent distress
Reese et al,[52] 2013	Autism	n = 21 youth	RCT, VC vs F2F	No difference in reliability of diagnostic accuracy, ADOS observations, ratings for ADI-R parent report or symptoms, and parent satisfaction

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Study	Population	Sample Description and Sample Size	Study Design	Summary of Findings
Reese et al,[53] 2015	Autism	Autism Diagnostic Teams	VC feasibility	Using VC provided families in rural and underserved areas improved access to diagnostic services, parents equally satisfied with services received through VC and through university-based medical team
Stain et al,[54] 2011	Psychosis	n = 11 youth Age: 14–30 y	VC feasibility	Differences between VC and F2F modes of neuropsychological assessment were close to zero, VC produced higher ratings for general cognitive functioning (WTAR) compared with F2F assessments, strong acceptability of VC assessment from participants
Storch et al,[55] 2011	OCD	n = 31 youth Age: 7–16 y M = 11.1 y	Waitlist control, VC vs F2F	VC was superior to F2F on all primary outcome measures, with a significantly higher percentage of individuals in the VC group meeting remission criteria than in the F2F group
Xie et al,[56] 2013	ADHD	n = 22 parents Child M = 10.4 y	RCT, VC vs F2F	Parent training via VC showed same degree of improvement in disciplinary practices, ADHD symptoms, and overall functioning as F2F
Pediatric Psychology Intervention Using Videoconferencing				
Bensink et al,[57] 2008	Pediatric cancer	n = 8 youth Not reported	VC feasibility	Using VC rather than videophone to families with children diagnosed with cancer, the study noted technical feasibility and high parental satisfaction
Clawson et al,[58] 2008	Pediatric feeding disorders	n = 15 youth Age: 8 mo to 10 y old	VC feasibility	VC was feasible with the pediatric feeding disorder population and resulted in cost savings
Davis et al,[59] 2013	Pediatric obesity	n = 58 youth Age: 5–11 y M = 8.6 y	RCT, VC vs F2F physician visits	Both groups showed improvements in BMIz, nutrition, and physical activity, and the groups did not differ significantly on primary outcomes
Davis et al,[60] 2016	Pediatric obesity	n = 103 youth	RCT, VC vs telephone	Participants highly satisfied with both intervention methods, completion rates higher compared with other pediatric obesity interventions, both methods highly feasible

Freeman et al,[61] 2013	Diabetes adherence	n = 71 youth VC M = 15.2 y F2F M = 14.9 y	RCT, VC vs F2F	No differences in therapeutic alliance between the groups
Glueckauf et al,[62] 2002	Pediatric epilepsy	n = 22 (Youth) M = 15.4 y	RCT, VC, F2F, and telephone	All groups improved in psychosocial problem severity and frequency and child prosocial behavior, with no significant differences across groups. No differences in adherence between the groups were noted
Hommel et al,[63] 2013	IBD, adherence	n = 9 youth M = 13.7 y	VC pre-post	The VC approach resulted in improved adherence and cost savings across patients
Lipana et al,[64] 2013	Pediatric obesity	n = 243 youth M = 11 y	Pre-post, VC, and F2F	Using a nonrandomized design, the VC group showed more improvement than the F2F group in enhancing nutrition, increasing activity, and decreasing screen time
Morgan et al,[65] 2008	Congenital heart disease	n = 27 parents Child age: 0–25 mo	RCT, VC, and telephone	The VC approach decreased parent anxiety significantly more than phone, and resulted in significantly greater clinical information
Mulgrew et al,[66] 2011	Pediatric obesity	n = 25 youth Age: 4–11 y	VC feasibility	No significant difference in parent satisfaction between consultations for weight management delivered by VC or F2F
Shaikh et al,[67] 2008	Pediatric obesity	n = 99 youth Age: 1–17 y	VC pre-post	VC consultations resulted in substantial changes/additions to diagnoses. For a subset of patients, repeated VC consultations led to improved health behaviors, weight maintenance, and/or weight loss
Wilkinson et al,[68] 2008	Cystic fibrosis	n = 16 youth Not reported	RCT, videophone vs F2F	No significant differences in quality of life, anxiety levels, depression levels, admissions to hospital or clinic attendances, general practitioner calls, or intravenous antibiotic use between the 2 groups
Witmans et al,[69] 2008	Sleep disorders	n = 89 Age: 1–18 y	VC feasibility	Patients were very satisfied with the delivery of multidisciplinary pediatric sleep medicine services rather than VC

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; ADI-R, Autism Diagnostic Interview, Revised; ADOS, Autism Diagnostic Observation Schedule; F2F, face to face; IBD, inflammatory bowel disorder; M, mean; OCD, Obsessive Compulsive Disorder; ODD, oppositional defiant disorder; PCPs, primary care providers; RCT, randomized controlled trial; VC, videoconferencing; WTAR, Wechsler Test of Adult Reading.

telemental health evidence is presented in 3 sections: child psychiatry, child clinical psychology, and pediatric psychology.

Child Psychiatry Intervention Using Videoconferencing

The literature specifically addressing telepharmacotherapy with children and adolescents is still emerging (see **Table 1**). Two retrospective chart reviews describe the results of telepsychiatry consultation. One study reviewed the charts of 223 patients and found that consultation resulted in changes in diagnosis (48%), treatment (81.6%), and clinical improvement (60.1%).[70] In the second study, 100 patient charts were reviewed after consultation. The results showed that consultation was associated with changes in diagnosis and treatment. Twenty-seven percent of those recommendations involved starting or managing medication. The medication classes included stimulants, antidepressants, and antipsychotics.[71]

There is only 1 pharmacologic treatment study reported.[38] Myers and colleagues[38] randomized 233 children diagnosed with attention-deficit/hyperactivity disorder (ADHD) to receive 22 weeks of treatment in one of 2 groups. The active control group received a single telepsychiatry consultation, with recommendations made to primary care providers (PCPs) to implement at their discretion during the trial. The intervention group received 6 sessions of pharmacotherapy via videoconferencing during the 22-week trial, complemented by caregiver behavior training delivered in person by a community therapist who was trained and supervised remotely. Findings suggest that the telepsychiatrists showed high fidelity to consensus-based pharmacotherapy algorithms. Participants in both the intervention and consultation groups improved, and those who received the 6-session intervention showed significantly better ADHD outcomes per caregivers' reports than did the consultation group. This study provides high-quality evidence for the ability to provide guideline-based care through videoconferencing and the added value that a short-term telepsychiatric intervention provides compared with a single teleconsultation to primary care. In addition, over the 8 weeks following participation in the trial, the treatment group had more follow-up sessions and active medication management by their PCPs, suggesting that a short-term intervention may also help PCPs improve their care for children with ADHD.

Child Clinical Interventions Using Videoconferencing

Table 1 summarizes the few studies that have addressed child clinical interventions using videoconferencing (see also Nelson and Patton,[72] 2016). Most studies are interventions for ADHD but also include a variety of single-study examples. Innovative research is emerging concerning home-based telemedicine for pediatric OCD.[73] Intervention approaches varied from focus on the youth to focus on the parent and ranged from feasibility trials to pre-post designs, and a handful of randomized controlled trials. Consistent with the more robust adult individual therapy literature, findings were overall positive related to feasibility, satisfaction, and outcome.[74,75] A recent study showed that the American Academy of Pediatrics' practice guidelines for the treatment of ADHD[76] can be reliably implemented in the school setting through videoconferencing.[50]

Pediatric Psychology Intervention Using Videoconferencing

As presented in **Table 1**, 13 studies spanned a wide range of chronic and acute childhood illnesses and used multiple pediatric psychology interventions, such as cognitive-behavioral strategies to promote coping and strategies to enhance treatment adherence. As with individual therapies, findings were overall positive for feasibility, satisfaction, and outcome, although definitive statements are difficult in light of the limited number of studies, small sample sizes, and limited replication.

Evidence Table Summary

Overall, there is a growing consensus that telemental health is a reasonable alternative to in-person behavioral health management of youth who do not have regular access to expert care.[72,77] It offers a new approach to collaborate with PCPs in meeting the increasing expectation that they manage common psychiatric disorders of childhood and adolescence in their practices[3,5] and intervene early. Some providers have suggested that telemental health may be especially suited for youth who are accustomed to the technology, especially adolescents who may respond to the personal space and feeling of control allowed by videoconferencing.[28,78] There is some preliminary evidence that videoconferencing offers advantages, including less self-consciousness, increased personal space, and decreased confidentiality concerns because the provider is outside the local community.[47]

BEST PRACTICES USING VIDEOCONFERENCING

Most individual therapy and pediatric psychology interventions using videoconferencing are intended to approximate the same high-quality services that are offered in the face-to-face setting. However, ethical considerations are magnified in the telemedicine setting because of its focus on reaching underserved and vulnerable populations. Thus, just as in on-site clinical settings, therapists must look to their professional ethics codes for guidance and the core ethical concern to protect the patient remains paramount.[6,79] Guidelines are emerging to inform reasonable steps for videoconferencing-based practice across clinical, administrative, and technical considerations. These guidelines include those from the American Academy of Child and Adolescent Psychiatry,[9] the American Psychological Association,[80] and the American Telemedicine Association.[5,78,81] Pediatrics guidelines are also helpful in informing child telemental health best practices and collaborative opportunities.[1]

Behavioral health providers are encouraged to seek ongoing training and mentorship to develop and maintain telemental health competencies, with careful consideration of clinical, technical, community engagement, and cultural competencies.[6,82] Resources are available both through the federally funded telehealth resource centers (www.telehealthresourcecenter.org) and other programs (eg, www.tmhguide.org, www.americantelemed.org). In order to maximize adherence and outcomes, the same attention to rapport and relationship building should be given in the telemental health setting as in the traditional clinic experience.[83] In addition, the telemental health service should carefully consider patient inclusion and exclusion criteria based on the needs of the referring clinicians, judgment of the teleprovider, and resources at the patient site, including the site's ability to attend to acutely suicidal or agitated patients.[5]

To better describe best practices, this article incorporates ethical approaches within the following case study that spans telemental health teams.

CASE EXAMPLE

The case example includes presentation, technology and setting, initial session, abbreviated history and case formulation, assessment, and treatments. Each telemedicine service seeing the patient and family is described: child psychiatry, child psychology, autism diagnostic clinic, and pediatric weight management.

Presentation

Jay is a 5-year-old boy referred to the telemental health specialists by his rural school, supported by his primary care physician. He presented to the rural special

education center cooperative with his mother Karen and his stepfather Sean. Presenting concerns included oppositional behaviors at home and at school, symptoms of ADHD, and broader behavioral/developmental concerns based on the family history.

The family was given options for behavioral health services: to be seen through the local mental health center, although there were no child-trained psychiatrists or psychologists within their region; to see specialists in person at the academic health center; or to use videoconferencing. The telemental health option was appealing because of convenience and decreased family costs related to travel. In addition, the family had sought services through the community mental health center, which focused on individual play therapy with Jay; the family had not found this effective in addressing the presenting oppositional concerns. The availability of services at the hospital through telemental health was particularly appealing because it had less of the stigma or concern of being identified by other community members compared with visiting the mental health center. With his parent's consent, the teleproviders have collaborated with Jay's PCP across treatment.

The telemedicine nurse coordinator is the site champion at the special education cooperative, serving 15 different school districts. As such, she is competent in the telemedicine technology, the administrative expectations around confidentiality, and child behavioral health. She completed training around both the telemedicine and the mental health components of the clinic.[84] Before the appointment, she explained to Jay and his family what to expect in the telemental health visit and helped the family complete the paperwork, including consent to treatment, registration form, insurance information, Health Information Portability and Accountability Act–related Notice of Privacy, history intake form, behavioral questionnaires, records of medical care and prior medication trials, and laboratory values. The coordinator is available to assist the family throughout the telemental health encounters, particularly if there are any technical difficulties or emergent clinical concerns such as suicidal intent. She assists with supervising Jay outside the telemedicine room to allow his parents to talk with the teleproviders privately for part of the sessions.

Technology and Setting

Jay is seen over secure videoconferencing, connecting the child psychiatrist, child psychologist, developmental medicine team, and weight management team at the academic health center with the school in a small rural community. Coordination across patient/family, rural site, and provider schedules across different time zones is accomplished through the telemedicine office's scheduler. In this setting, standards-based videoconferencing systems were used on both sides using H.323 protocols. The hub/provider site uses a large room–based videoconferencing system using high-speed fiber connections and the spoke/rural site uses a room-based videoconferencing system over a cable modem, with connection speed limited by this lower bandwidth. Although technical difficulties have been minor and solved by rebooting the system, the provider and the rural sites benefited from having a readily accessible, consumer-focused technician to support sessions.

The teleprovider can zoom in on the patient to understand his speech and note motor functioning and affect. The quiet, private clinic space is large enough to accommodate both Jay and family members. A fax machine is close to the therapy room in order to exchange questionnaires, handouts, and therapy activities. The camera is placed strategically to see Jay seated at a small table in the room and the lighting allows the therapist to easily observe facial expressions.

Initial Sessions

Lessons are drawn from the initial sessions with both the child psychiatrist and child psychologist (or the teleproviders). Following well-established protocols tailored to each local site, the teleprovider socialized Jay and his guardian to the videoconferencing system, noting that it may take time to acclimate to the technology and not talk over each other. She informed the family that no one else could access the videoconferencing encounter and that the session was not being recorded. With the help of the site coordinator, the therapist explained how the components of the technology worked. The teleprovider reviewed informed consent components (ie, confidentiality and its limits around safety and abuse), risks and limitations associated with videoconferencing services, documentation procedures, and patient responsibilities around attendance and payment. As established ahead of time, the telephone was used as a backup in the rare event that the videoconferencing did not connect. Attention was given to rapport building, including Jay showing his recent drawing to the telemedicine team.

Abbreviated History

Karen described Jay as overall a smart, healthy, active boy. She reported a normal pregnancy and delivery. Developmental milestones were overall on time with the exception of speech/language. Jay had multiple ear infections with tubes placed and adenoids removed at age 2 years. Additional medical history was unremarkable with the exception of a febrile seizure at 3 years old. He has seasonal allergies and asthma, with medications including steroids and albuterol.

Jay receives speech and language services through his Individualized Education Plan. No concerns were noted with gross or fine motor skills. He has difficulty playing with other children because, if he does not get his way, he screams at other children or falls down on the ground. He is advanced in general intelligence and academic skills. He has a short attention span and often does not follow simple instructions. Karen described that Jay shows ADHD symptoms, including difficulty sitting still, fidgetiness, impulsiveness, forgetfulness, and disorganization. He has low frustration tolerance and has daily outbursts at home and school in which he swings his arms and yell. He does not destroy property and does not become aggressive. Tantrums last from a few minutes up to hours.

He argues with his teacher and other school personnel constantly, and is difficult to redirect. Jay readily answered questions over the videoconferencing system and describes himself as happy overall despite having few friends. He blames others for things he does and often lies. He is described as moody, but does not make negative self-comments or show suicidal ideation/planning. He is described as eating constantly and his body mass index places him as overweight. He has difficulty transitioning at bedtime but little trouble falling or staying asleep once in bed.

Jay had no contributing past medical or psychiatric history. No concerns were noted in relation to anxiety, psychosis, or mania. With regard to possible autism spectrum disorder, there is history of language delay, but he is noted to have empathy, social reciprocity, and no restricted interests or repetitive behaviors. He resides with his parents and 2-year-old brother. Family history was positive for ADHD and Asperger disorder in his maternal uncle. His mother had anxiety in the past, and depression on her side of the family.

Assessment and Case Formulation

Jay scored in the clinical range on the Vanderbilt Parent and Teacher Assessment Scales for ADHD and for oppositional defiant disorder (ODD),[85] which was also consistent with parent and school report

He also scored in these clinical ranges on the Swanson, Nolan and Pelham Teacher and Parent Rating Scale–Fourth Version (SNAP-IV) parent and teacher scales.[86] These results are similar to the narrative descriptions completed by his parents and teachers.

Interventions

The telemedicine treatment approaches across child psychiatry, child clinical psychology, autism assessment, and weight management are described here.

Child psychiatry

The child psychiatrist worked with the telemedicine coordinator to implement best practices around medication management, including tracking vital signs and weight, obtaining rating scales, checking metabolic laboratory work, and monitoring for adverse effects at each session.[87] After establishing the relationship, the telepsychiatrist effectively gathered all key elements of the psychiatric evaluation. On mental status, Jay was hyper and impulsive. He appeared distractible during the interview, but with bright affect and happy mood. There were no hallucinations or suicidal or homicidal ideations. Based on history, rating scales, and presentation, he was diagnosed with ADHD and ODD. After discussing risks, benefits, and potential side effects, he was prescribed Adderall XR 5 mg and his family agreed to a trial of this medicine. The family was given ways to reach his psychiatrist between appointments in case of need for interim care.

Educating his family has been an important part of treatment, including discussion of the diagnoses, prognosis, and treatment options. For example, the family was directed to CHADD.org and parentsmedguide.org as useful Web sites that address frequently asked questions and give resources to parents to help in the management of ADHD and other illnesses. Prescriptions for the schedule II medications were mailed to the patient's home. The child psychiatrist provided clear direction and her office contact number for interim needs such as requesting refills, asking questions, and reporting adverse effects.

At each follow-up appointment, it is helpful to have teacher and parent forms to quantify whether there is improvement. He was seen a month later and appeared to have improvement on the medicine, including improved ability to sit still and focus at school, and decreased number of outbursts. At 2-month follow-up, the parent reported that he had become more hyper and impulsive, and that outbursts had increased in frequency. The dose of Adderall XR was increased to 10 mg to better manage his symptoms. His parent called 3 months later to report that the increased dose again helped at first, but effects wear off over time. At the next appointment, Jay's medicine was switched to Concerta 18 mg and the family reported continued improvement at the follow-up, including better focus and decreased arguing. Jay will continue to follow in telemedicine as long as his family and clinician think it is helpful and practical. Once stabilized, some families elect to transition care back to their PCPs with consultation between the PCP and psychiatrist as needed.

Child clinical psychology

Treatment followed best practices for ADHD and ODD management.[88] Psychotherapy focused on evidence-based behavioral interventions, including sharing resources from *Parenting the Strong-Willed Child*[89] with the family. Initial discussion reinforced close supervision of Jay in order to catch him being good, redirect him quickly, and keep him on routine. The family increased special time with Jay and were encouraged to target key behaviors and "pick battles," with an emphasis on decreasing lecture/verbal attention for negative behaviors. Sessions included review/practice of time-out as well as

use of a behavioral chart system to reinforce contingencies. Jay responded well to the sticker chart and worked to earn time on his iPad. A system of tracking behaviors and matching with rewards/consequences was established between home and school, with target behaviors including (1) making good choices with classmates (eg, no hitting, name calling), (2) following instructions, and (3) using an indoor voice (eg, no yelling). As in face-to-face settings, individual time with Jay focused on anger management strategies and social skills training. He was very engaged in role playing scenarios, more so than videoconferencing, particularly practicing steps on how to make friends and how to think through walking away when he is angry.

Autism diagnostic team

Because of Jay's family history of autism spectrum disorder and his poor social skills, his parents elected to have him tested through a special telemedicine program through his school. An innovative integrated services model is used to connect families and local school teams with the interdisciplinary team at the academic health center.[53] In the integrated model, trained autism diagnostic teams complete the autism measures on site at the school in order to examine characteristics of autism, including observation, play-based assessments, and parent interview. The local team then presents findings to the parents and developmental medicine team, who make the final diagnostic determination via telemedicine. Although Jay has some peer problems and behavioral rigidity and is reported to have some lack of empathy, Jay did not meet the criteria for autism spectrum disorder. The team reinforced the medication management and behavioral health strategies in order to control ADHD and oppositional behaviors.

Pediatric psychology

As Jay's initial behavioral health concerns have improved, his family expressed interest in additional supports related to managing his weight because he is in the overweight category. He completed an initial session via telemedicine with the Healthy Hawks team, including a psychologist, physician, and dietician. The focus is on holistic healthy lifestyle activities across the family.[60] The school team participation has helped integrate the healthy lifestyle approaches at home and school and reinforce healthy choices. In addition to one-on-one telemedicine visits, his family also plans to participate in an upcoming telemedicine group opportunity through Jay's school, which connects families at several schools to the intervention team at the academic health center.

Case Study Summary

The case study shows how telemental health services can reduce barriers to treatment. This case is noteworthy in the availability to see a specialist at a young age and the anticipated decreased in morbidity associated with poorly controlled behavioral health concerns. Although most elements of a visit are the same as in-person care, videoconferencing offers both unique advantages and challenges compared with in-person care. The teleproviders were able to ascertain adequate information at the initial visit to assist with a diagnosis and treatment plan. The patient and family quickly acclimated to the technology-supported environment and good rapport was established. From the teleproviders' perspectives, a major advantage of the videoconferencing system was the increased communication with a range of team participants, including extended family, primary care personnel, and school personnel, and the opportunity for input during assessment, treatment, and treatment maintenance. Adherence to regular follow-up visits was likely enhanced by the convenience of videoconferencing. However, creativity and planning ahead were required in order to share materials and to modify patient education strategies for videoconferencing.

Another advantage was health care trainee participation at the academic health center. A graduate psychology student assisted throughout the assessment and treatment and residents from both child psychiatry and pediatrics were able to observe a telemedicine session. The trainees had no prior exposure to working with rural populations or with telemedicine and it is hoped that the experience will increase interest in working with underserved families in the future.[90] In addition, the telemedicine site uses the videoconferencing setup not only to provide therapy services but also to support staff education around child behavioral health topics. Lunch-and-learn programs and other brief distance education offerings have helped the videoconferencing services grow quickly by helping personnel identify behavioral concerns and develop a positive professional relationship with the teleproviders.

SUMMARY

Because of the widening access gap to child behavioral health services, telemental health options are more needed than ever. Although the limited studies to date are encouraging, research is needed to better understand the unique advantages and disadvantages of services using videoconferencing. Research is especially needed in assessing adult models of care for children, including telemental health services in unsupervised settings such as the home.[91] Emerging guidelines inform ethical best practices in providing therapy using videoconferencing, with continued emphasis on care based on patient and parents' preferences, developmental and diagnostic considerations, personnel and other resources at the remote site, and therapist comfort.[44] As shown by the case example, telemental health has great potential to increase access to evidence-based assessment and treatment across behavioral health services for youth living in underserved communities.

New telemedicine approaches to meeting this demand are also needed, as well as meeting expectations for enhanced care coordination among primary care and behavioral health providers as part of medical home initiatives. The Patient Protection and Affordable Care Act has called for the meaningful use of telehealth technologies to improve health care and population health for all citizens.[92] Collaborative care models in which the behavioral health professional, most often a psychiatrist, and PCP jointly manage a population of patients with a care manager have been descried with adults,[93,94] and have potential for incorporation into the pediatric medical home.[2,95] In addition, telementoring models such as Project ECHO (Extension for Community Healthcare Outcomes) use telemedicine technology to support collaboration between specialist teams and PCPs in providing high-quality interventions for child behavioral health concerns.[96]

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