Rural Child and Adolescent Telepsychiatry: Successes and Struggles

Donald M. Hilty, MD; Peter M. Yellowlees, MD, MRCP; Priya Sonik, MD; Mikla Derlet, MD; and Robert L. Hendren, DO

Research consistently shows that as many as one in five children and adolescents have mental health problems, and primary care providers (PCPs) identify 19% of children with behavioral and emotional disorders.[1] Although these providers frequently refer children for mental health treatment, significant barriers exist to referral, including lack of available specialists, insurance restrictions, appointments delays, and stigma.[2] Approximately 25% of the population lives in rural settings, and rural departments of health report an even greater problem with access to specialists for rural residents than their urban counterparts.[3-4] In adults, and probably children and adolescents, the lack of mental health services leads to undertreatment, poor outcomes such as higher rates of suicide and homicide, as well as increased use of emergency services, hospitalizations, and placement in mental health institutions.[5-6]

Telepsychiatry conducted by videoconferencing has improved access to specialists,[5] and the American Academy of Child and Adolescent Psychiatry (AACAP) established a guideline for its use.[7] A review article described only 27 studies of child telepsychiatry services, with 24 of 27 falling into the lowest "Quality of Evidence" criteria (category III).[6] Two controlled studies on child telepsychiatry reported treatment success for depressed children over time with reasonable reliability of child telepsychiatric assessment and treatment.[8-9] Overall, the literature regarding children and telepsychiatry reveals high provider and patient satisfaction.[10]

How telepsychiatry is used depends on the model of service delivery, the technology used, the availability of specialists and cost. Psychiatric care can be provided, or consultation-liaison models may be used (eg, traditional referral, routine consultation care, and collaborative care).[4] These models may also employ mental health extenders and stepped care to use scarce psychiatric resources judiciously.[11] Quality improvement programs also improve treatment rates and outcomes for depressed patients with comorbid medical illness in primary care and are cost-effective.[12] Chronic disease management for depression via telemedicine is also effective.[13]

PRACTICAL ISSUES WITH TELEPSYCHIATRY

Working with children and adolescents and their families presents complexities beyond working with an adult patient or a PCP. First, children and adolescents are generally part of a family or home of some sort, so acceptance of the consultation and recommendations goes beyond the youth alone. Either the caregiver or the youth may feel self-conscious if he/she believes the interview is being recorded and viewed by others (not typical practice).

Donald M. Hilty, MD, is Professor of Psychiatry and Behavioral Sciences, and Director, Rural Program in Medical Education (Rural-PRIME), UC Davis School of Medicine and Medical Center. Peter M. Yellowlees, MD, MRCP, is Professor of Clinical Psychiatry and Behavioral Sciences and Director of Academic Information Systems, UC Davis School of Medicine and Medical Center. Priya Sonik, MD, is Resident of Psychiatry and Behavioral Sciences, UC Davis School of Medicine and Medical Center. Mikla Derlet, MD, is Assistant Clinical Professor of Pediatrics, UC Davis School of Medicine and Medical Center. Robert L. Hendren, DO, is Professor of Psychiatry and Behavioral Sciences, and Chief; Child and Adolescent Psychiatry; Tsakopoulos-Vismara Chair and Executive Director, M.I.N.D. Institute, UC Davis School of Medicine and Medical Center.

Address correspondence to: Donald M. Hilty, MD, Department of Psychiatry and Behavioral Sciences, University of California, Davis, 2230 Stockton Boulevard, Sacramento, CA 95817; fax: 916-734-3384; or e-mail dmhilty@ucdavis.edu.

Dr. Hilty; Dr. Yellowlees; Dr. Sonik; Dr. Derlet; and Dr. Hendren have disclosed no relevant financial relationships.

Resistance can involve one or more of the family system. Although many of these issues are the same for face-to-face psychiatric care, there have been few studies of the unique effects of teleconsultation on this complex process.

Videoconferencing procedures for the evaluation and treatment of youth should follow the same guidelines presented for adults, with modifications to consider the developmental status of youth, such as motor functioning, speech and language capabilities, and relatedness.[7] The room at the originating site (patient site) should be large enough to include the youth and a parent and one other individual, and should allow the camera to scan an area large enough to observe the child's motor skills adequately as he or she moves about the room, plays, and separates from the parents.[7] A table may provide a surface on which the child can draw or play while the parent relates the history, but it should not interfere with communication or viewing the youth's motor skills. Some simple toys should be provided both to occupy the child and to allow assessment of skills.

Consent, Confidentiality, and Parent/Guardian Involvement

Generally, children and adolescents have felt comfortable with telepsychiatry.[6] Consent for treatment by telepsychiatry should involve the parent/guardian, as with usual care. Some programs use a consent form, although telepsychiatry is now so commonplace that some believe the form is more of a formality. If the patient is anxious, this generally eases shortly after beginning an interview. Confidentiality follows clinical and legal standards, and for programs that involve a consultation model, it is important for the telepsychiatrist to be mindful of the charting, since the note is entered into the primary care clinic notes. Forensic evaluation or care involves even more complex boundaries, with the telepsychiatrist serving both the patient and the legal system.

Technology Used for Telepsychiatry

Nearly all telepsychiatric services are conducted using interactive videoconferencing. Equipment selection is based on software applications, ease of use, image and sound quality, cost, and compatibility with other units to which one will link. The specific technologic issues can be found elsewhere in this issue.[14] Generally, the key is to have that there be no delay that might affect communication.

Effect of Technology on Communication

In adults, telepsychiatry appears to have both positive and negative effects on communication, including the establishment of a "social presence".[15-16] One concern with telemedicine is that the technology may affect communication adversely and interfere with the development of a positive therapeutic alliance. A critical variable affecting communication is telemedicine's ability to simulate real-time experiences in terms of image and interaction. Transmission speed has a profound effect on audio and video quality. Transmission speed that is too low may result in delays, with words being "cancelled out" when parties speak simultaneously. Consequently, this may be perceived as interrupting, and a turn-taking conversation may occur. On the other hand,

ability to detect nonverbal cues in patient interviews also has been shown to facilitate mutual connections and understanding, which are incorporated without conscious awareness (eg, the way a patient is seen sitting or walking). Taken as a whole, videoconferencing certainly provides more cues than telephone conferencing.

Several articles have assessed telepsychiatry's effect on psychotherapy. Basic indications and contraindications have been suggested for using telephone and videoconferencing methods for psychotherapy,[17] but more rigorous evaluation is warranted before drawing conclusions. Some wonder whether it is necessary to have a preexisting relationship (that is, to see the patient first in person) to minimize telepsychiatry's possible negative effects, if any, on the specialist-patient relationship. Two studies using formal assessments revealed no difficulty developing an alliance without an in-person meeting, and no adverse events were noted.[18-19]

Telemedicine for Psychiatry: Uses, Access to Care, and Programs

Locations for service are theoretically limitless for adults, adolescents and children; they include clinics, hospital emergency rooms, patients' homes, group homes, nursing homes, homeless shelters, hospices, schools, and forensic facilities. A range of evaluation, consultation, and management services has been carried out by telemedicine, including case management; decision support; disease prevention and management; legal hearings; forensic evaluation; transplant evaluation; neuropsychological evaluation; individual, family, and group therapy; home, outpatient, nursing home, and inpatient care; and personal and social support.[5-6]

Reliability and Validity Studies

Older studies of telepsychiatry were uncontrolled trials of adults with significant limitations,[20] but, many recent studies have been completed, and they are summarized in detail elsewhere.[5,6] Furthermore, frameworks for assessing telemedicine applications in general have been made available.[21] Most studies compare telepsychiatry with in-person care, although some compare it with telephone care. Studies of children (unstructured compared with structured assessments), adult (psychotic, anxiety, cognitive, and mood disorders), and geriatric patients (psychotic, depressive, and cognitive disorders) have been conducted. Nearly all have had good results when adequate transmission speeds (bandwidths) are used. A wide range of psychiatric disorders were diagnosed reliably (for example, anxiety, cognitive decline, depression, and psychosis). Overall, interrater reliability has been high.[5,9] Again, limitations to studies thus far appear attributable to inadequate bandwidth.[5] More reliability and validity studies need to be done in children and adolescents.

Clinical Outcome Studies

The literature regarding outcomes for telepsychiatry is small, but growing, and it indicates that telepsychiatry has many improved outcomes. Child outcomes were positive. An 8-week trial of cognitive-behavioral therapy delivered by telepsychiatry to children with depression was as successful at a bandwidth of 128 KBS (kilobytes per second) as in-person care.[8] In a comparison with in-person care, adults receiving telepsychiatric care did equally well on self-report and clinical measurements over a 1-year follow-up;[8,22-24] no child or adolescent trials of this nature have been reported. Other positive outcomes of telepsychiatry discovered are reduced transfers for emergencies, reduced appointment waiting time, reduced use of the psychiatric intensive care unit and reduced hospital admissions (by 50%).[5]

If rural PCPs have adequate, customized telepsychiatric support, they appear better able to diagnose and manage mental health issues. In a study of specialty consultation including telepsychiatry, specialists changed the diagnosis in 91% of cases and recommended medication changes in 57%, resulting in clinical global improvement measures for 56% of patients at 3 to 6 months.[25]

This results in maintaining more services in the community, potentially reducing costs (eg, less inpatient referrals), less travel from home for patients and less money spent outside of the community.[5] Customized teleconsultation services, perhaps with integrated psychiatry and medical interventions, may be needed for these rural sites and for other special populations (eg, older adults, Native Americans). One such program was documented to increase the knowledge and skills of PCPs.[4]

Patient and Provider Satisfaction Studies

Overwhelmingly, telepsychiatry has been satisfying to patients and families, which in turn has increased PCP acceptance of this "new" model of mental healthcare service delivery.[26] Pediatricians appear very satisfied with telepsychiatric services.[27] Some populations (eg, incarcerated youth) expressed concern about privacy.[28] One study identified a seemingly common and potentially significant problem, that is, a concern that PCPs will not be able to comply with teleconsultant recommendations because of inadequate local mental health services (eg, cognitive-behavioral therapy for 10 weeks).[29] Satisfaction and outcomes may also depend on matching teleconsultants with ethnicity (eg, American Indian youth).[30]

The literature on adult telepsychiatry suggests that the following are important positive satisfaction outcomes: reduced time to travel, reduced absence from work, reduced waiting time, and more patient choice and control. Other predictors may include frame speed, demographic factors (for example, age, sex, or ethnicity), state- and trait-dependent factors (for example, acute depression compared with depression in remission), cost, reduced waiting time, familiarity with the local setting (that is, in a remote site), and provider qualities.[5] One prospective study allowed patients to

select either in-person or telepsychiatric care for evaluation and follow-up care, if applicable. When length of wait, insurance, demographic information, and diagnoses were controlled, satisfaction and adherence to appointments were equal for in-person and telepsychiatric care.[5]

MODELS OF SERVICE DELIVERY

Many models of service delivery have been researched and summarized elsewhere:[31-33]

- Model 1: Telepsychiatric consultation, with the PCP managing the case (eg, prescribing, taking phone calls) and occasionally calling/e-mailing the psychiatrist with a question; therapy locally, if available;
- Model 2: Telepsychiatric service with the psychiatrist managing the case as in usual practice;
- Model 3: Child and adolescent telepsychiatrist tutoring an adult psychiatrist at a distance.

Collaborative care, with telepsychiatrist and PCP comanaging care could be done as in adult face-to-face collaborative care.[11]

The model of service delivery determines the responsibility for caring for, and responding to, patient and family needs. If care is done at a distance, additional clarity and caution are needed for all parties, since suicide is remarkably high in adolescents. Emergency procedures need to be in place, too for agitated and/or suicidal patients.[34]

DEVELOPMENT AND SUSTAINABILITY ISSUES

Program Development

The literature is abundant on how to build a telemedicine program and to provide services successfully.[35-36] Keys to success generally involve patient, physician, staff and system issues (see Sidebar).[35-36] A developmental model includes a needs assessment, an infrastructure survey, a partnership organization, structure configuration, and other factors.[36] A framework for evaluating telepsychiatric systems includes opinion scan, focus groups, and individual interview.[37] Failures in telepsychiatry have involved patient no-shows and a consultant's impression that is needed to see the patient face-to-face on follow-up.[38] Successful programs need outcome and cost measures.[39]

SIDEBAR.

Guidelines for Program Viability and Delivering Quality Service

1. Do a thorough needs assessment in the region that the program is planning to serve.
2. Obtain overall and financial support of the program from senior leadership of the organization.
3. Use clinically proven technology.
4. For each consult, be certain that the technical quality equipment is appropriately matched to the service and needs of the patient and their condition.
5. Evaluate options, implementation, and maintenance of telepsychiatry with a team of clini cians, technicians, and administrators in both the hub and the spoke sites.
6. Adequately train all site coordinators in the technical and procedural aspects of the service, including referral guidelines and transfer of patient medical information to the specialist and back to the referral site.
7. Obtain a telepsychiatric champion and provide adequate training for others with regard to the technology, adapt clinical practice to fit its use, and identify its limitations.
8. Provide regular technical maintenance and prompt trouble-shooting.
9. Coordinate timing of consults (ie, patient arrives at appointed time, telepsychiatrist has ad equate time, and/or referring providers or staff stop in if desired).
10. Adequately evaluate outcomes, satisfaction, costs (patient, referring provider, and specialist), and the program (coordinator, technical staff, and administration).

Costs and Funding

The quality of cost data in the literature is suboptimal and little information has been collected in a systematic, controlled, prospective fashion. Ideally, direct and indirect costs should be collected for patients, clinics, providers, and society at large. Direct costs include equipment, installation of lines, and supplies. Fixed costs also include the rental cost of lines, salary and wages, and administrative expenses. Variable costs include data transmission costs, fees for service, and equipment maintenance and upgrades. Cost analysis is difficult for several reasons. For example, technologies continue to evolve and become outdated rapidly, and costs depend on frequency of use. In addition, the cost may seem high, since usual care often amounts to no care. Further cost-effectiveness and cost-benefit analyses are needed.[5]

Many rural patients, including pediatric patients, are indigent or depend on Medi-Cal or Medicare, which is an important consideration if telemedicine were to be used to attempt to compensate for the rural physician shortage. Rural economies are not strong, and the people in rural areas are underserved in terms of healthcare. This poses a significant financial risk for any party taking on the population without measures to improve the pool of patients or to obtain contracted rates up front.

Other streams of reimbursement exist but are not being accessed. County mental health systems theoretically are responsible for mental healthcare, at least in conjunction with their primary care systems, but these systems do not always work well together. Federal programs, like the Federally Qualified Health Centers and Rural Health Clinics, therefore have been established with high specialist reimbursement for rural patients seen face-to-face but not by telepsychiatry.

New models to overcome some financial obstacles are needed.[40] Some health

systems with fiscal responsibility over most or all services will employ telepsychiatry, even if reimbursement is poor, since it appears to be cost-effective in terms of reducing transfers and hospitalization utilization.

CONCLUSIONS

Rural populations are still underserved in terms of psychiatric services, particularly for children and adolescents. Telepsychiatry is feasible and offers benefits to children and adolescents, but issues of development and family functioning may influence acceptance and continued success. Additional research is needed on the unique aspects of using telepsychiatry in the pediatric population.

REFERENCES

1. Wallace SA, Crown JM, Cox AD, et al. *Child and Adolescent Mental Health: Health Care Needs and Assessment*. Oxford, United Kingdom: Radcliffe Medical Press; 1997:10.
2. The President's New Freedom Commission on Mental Health, Final Report, July, 2003, Washington, DC.
3. Rabinowitz HK, Diamond JJ, Markham FW, Hazelwood CE. A program to increase the number of family physicians in rural and underserved areas: impact after 22 years. *JAMA*. 1999;281(3):255-260.
4. Hilty DM, Nesbitt TS, Kuenneth CA, Cruz GM, Hales RE. Rural versus suburban primary care needs, utilization, and satisfaction with telepsychiatric consultation. *J Rural Health*. 2007;23(2):163-165.
5. Hilty DM, Marks SL, Urness D, Yellowlees PM, Nesbitt TS. Clinical and educational telepsychiatry applications: a review. *Can J Psychiatry*. 2004;49(1):12-23.
6. Pesämaa L, Ebeling H, Kuusimäki ML, Winblad I, Isohanni M, Moilanen I. Videoconferencing in child and adolescent telepsychiatry: a systematic review of the literature. *J Telemed Telecare*. 2004;10(4):187-192.
7. King RA. Practice parameters for the psychiatric assessment of children and adolescents. American Academy of Child and Adolescent Psychiatry. *J Am Acad Child Adolesc Psychiatry*. 1997;36(10 Suppl):4S-20S.
8. Nelson EL, Barnard M, Cain S. Treating childhood depression over videoconferencing.*Telemed J E Health*. 2003;9(1):49-55.
9. Elford R, White H, Bowering R, et al. A randomized, controlled trial of child psychiatric assessments conducted using videoconferencing. *J Telemed Telecare*. 2000;6(2):73-82.
10. Yellowlees PM, Hilty DM, Marks SL, Neufeld J, Bourgeois JA. A retrospective analysis of a child and adolescent eMental Health program. *J Am Acad Child Adolesc Psychiatry*. 2008;47(1):103-107.
11. Katon W, Von Korff M, Lin E, Simon G, Walker E, Bush T, Ludman E. Collaborative management to achieve depression treatment guidelines. *J Clin Psychiatry*. 1997;58(Suppl 1):20-23.
12. Schoenbaum M, Unützer J, Sherbourne C, et al. Cost-effectiveness of practice-initiated quality improvement for depression: results of a randomized controlled trial. *JAMA*. 2001;286(11):1325-330.
13. Hilty DM, Marks S, Wegeland J, et al. A randomized controlled trial of disease management modules, including telepsychiatric care, for depression in rural primary care. *Psychiatry*. 2007;4(2):58-66.
14. Marcin JP. *Pediatric Ann*. 2008;38(4): 224-226.
15. Cukor P, Baer L, Willis BS, et al. Use of videophones and low-cost standard telephone lines to provide a social presence in telepsychiatry. *Telemed J*. 1998;4(4):313-321.
16. Hilty DM, Nesbitt TS, Marks SL, et al. How telepsychiatry affects the doctor-patient relationship: communication, satisfaction, and additional clinically relevant issues. Primary Psychiatry. 2002;9(9):29-34.
17. Kaplan EH. Telepsychotherapy. Psychotherapy by telephone, videotelephone, and computer videoconferencing. *J Psychother Pract Res*. 1997;6(3):227-237.
18. Manchanda M, McLaren P. Cognitive behaviour therapy via interactive video. *J Telemed Telecare*. 1998;4(Suppl 1):53-55.
19. Stevens A, Doidge N, Goldbloom D, Voore P, Farewell J. Pilot study of televideo psychiatric assessments in an underserviced community. *Am J Psychiatry*. 1999;156(5):783-785.
20. Frueh BC, Deitsch SE, Santos AB, et al. Procedural and methodological issues in telepsychiatry research and program development. *Psychiatr Serv*. 2000;51(12):1522-7.
21. Hailey D, Jacobs P, Simpson J, Doze S. An assessment framework for telemedicine applications. *J Telemed Telecare*. 1999;5(3):162-170.
22. Kennedy C, Yellowlees P. A community-based approach to evaluation of health outcomes and costs for telepsychiatry in a rural
23. De Las Cuevas C, Arredondo MT, Cabrera MF, Sulzenbacher H, Meise U. Randomized clinical trial of telepsychiatry through videoconference versus face-to-face conventional psychiatric treatment. *Telemed J E Health*. 2006;12(3):341-350.
24. O'Reilly R, Bishop J, Maddox K, Hutchinson L, Fisman M, Takhar J. Is telepsychiatry equivalent to face-to-face psychiatry? Results from a randomized controlled equivalence trial. *Psychiatr Serv*. 2007;58(6):836-843.
25. Marcin JP, Nesbitt TS, Cole SL, Knuttel RM, Hilty DM, Prescott PT, Daschbach MM. Changes in diagnosis, treatment, and clinical improvement among patients receiving telemedicine consultations. *Telemed J E Health*. 2005;11(1):36-43.
26. Boydell KM, Volpe T, Kertes A, Greenberg N. A review of the outcomes of the recommendations made during paediatric telepsychiatry consultations. *J Telemed Telecare*. 2007;13(6):277-281.
27. Myers KM, Valentine JM, Melzer SM. Feasibility, acceptability, and sustainability of telepsychiatry for children and adolescents. *Psychiatr Serv*. 2007;58(11):1493-1496.
28. Myers KM, Valentine JM, Melzer SM. Feasibility, acceptability, and sustainability of telepsychiatry for children and adolescents. *Psychiatr Serv*. 2007;58(11):1493-1496.
29. Greenberg N, Boydell KM, Volpe T. Pediatric telepsychiatry in ontario: Caregiver and service provider perspectives. *J Behav Health Serv Res*. 2006;33(1):105-111.
30. Savin D, Garry MT, Zuccaro P, Novins D. Telepsychiatry for treating rural American Indian youth. *J Am Acad Child Adolesc Psychiatry*. 2006;45(4):484-488.
31. Hilty DM, Ingraham RL, Yang SP, Anders TF. Multispecialty telephone and e-mail consultation for patients with developmental disabilities in rural California. *Telemed J E Health*. 2004;10(4):413-421.
32. Hilty DM, Yellowlees PM, Cobb HC, Neufeld JD, Bourgeois JA. Use of secure e-mail and telephone: psychiatric consultations to accelerate rural health service delivery.*Telemed J E Health*. 2006;12(4):490-495.
33. Hilty DM, Yellowlees PM, Cobb HC, Bourgeois JA, Neufeld JD, Nesbitt TS. Models of telepsychiatric consultation--liaison service to rural primary care. *Psychosomatics*. 2006;47(2):152-157.
34. Shore JH, Hilty DM, Yellowlees P. Emergency management guidelines for telepsychiatry. *Gen Hosp Psychiatry*. 2007;29(3):199-206.
35. Nesbitt TS, Hilty DM, Kuenneth CA, Siefkin A. Development of a telemedicine program: a review of 1,000 videoconferencing consultations. *West J Med*. 2000;173(3):169-174.
36. Shore JH, Manson SM. A developmental model for rural telepsychiatry. *Psychiatr Serv*. 2005;56(8):976-980.
37. Boydell KM, Greenberg N, Volpe T. Designing a framework for the evaluation of paediatric telepsychiatry: a participatory approach. *J Telemed Telecare*. 2004;10(3):165-169.
38. Krupinski EA, Barker G, Lopez AM, Weinstein RS. An analysis of unsuccessful teleconsultations. *J Telemed Telecare*. 2004;10(1):6-10.
39. Hailey D, Bulger T, Stayberg S, Urness D. The evolution of a successful telemedicine mental health service. *J Telemed Telecare*. 2002;8 Suppl 3:S3:24-26.
40. Hilty DM, Cobb HC, Neufeld JD, Bourgeois JA, Yellowlees PM. Telepsychiatry reduces geographic physician disparity in rural settings, but is it financially feasible because of reimbursement? *Psychiatr Clin North Am*. 2008;31(1):85-94.