TELE-TREATMENT AND TELE-CONSULTATION WITH CHILDREN AND ADOLESCENTS: BUILDING A GLOBAL NETWORK

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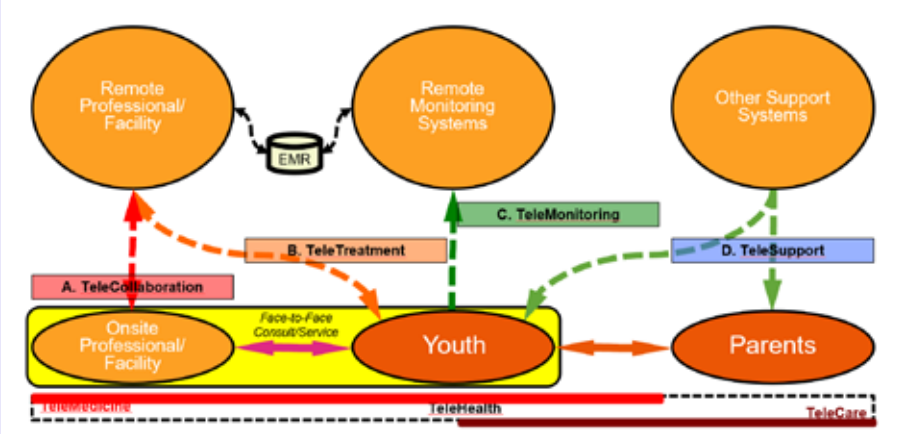
OVERVIEW

Information and communication technologies (ICTs) offer great opportunities to improve the healthcare challenges faced by low and middle-income countries (LMICs). ICTs could help to provide accessible, cost-effective, high-quality healthcare that often is not readily available to large segments of the population in LMICs. Telemedicine is one form of ICT that is especially poised to meet this challenge given its established and growing evidence-base and its widespread, successful implementation during the COVID-19 pandemic. There is no one accepted definition of telemedicine. The World Health Organization (WHO, 2009) has adopted a broad description: "The delivery of healthcare services, where distance is a critical factor, by all healthcare professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for `the continuing education of healthcare providers, all in the interests of advancing the health of individuals and their communities" (WHO, 2009). This definition is captured, and expanded, in Figure 1 that depicts the relationships among entities involved in both synchronous and asynchronous modalities. Synchronous telemedicine refers to a real-time interaction using both video and audio components (videoconferencing) between a patient at the originating site, i.e., the site of the patient during service delivery, and a health care professional at the remote site, i.e., site of the healthcare professional who is providing services. TeleTreatment is the prime example of synchronous telemedicine. Synchronous telemedicine may also include a videoconferencing session between the primary care professional at the originating site and a remote specialist without the patient present, termed TeleConsultation. Asynchronous telemedicine refers to the transmission of a patient's health information from the originating site to the remote site to be interpreted by a healthcare professional at a later time without direct interaction with the patient or primary care professional. TeleMonitoring is the prime example of asynchronous telemedicine, such as store-and-forward modalities that are common in cardiac monitoring and radiology but emerging in psychiatry with activities such as mood monitoring. TeleSupport is another asynchronous application that includes the vast array of services that an individual professional or a facility may make available to patients, e.g., for psychoeducation. Note that Figure 1 further clusters these specific applications as Telemedicine, Telehealth, and TeleCare, terms that are used throughout this chapter to organize the presentation on the telemedicine specialty of TeleMental Health (TMH). When TMH specifically involves psychiatric services, the term Telepsychiatry is used (Turvey, Coleman Dennison, 2013). Although this chapter is intended for all child and adolescent mental healthcare professionals, psychiatry is the most likely mental health discipline to be integrated into telemedicine in LMICs given its medical specialty. Therefore, we use the term child and adolescent psychiatrist, or psychiatrist, to refer to this overall group of child and adolescent mental health professionals. Most of this chapter relates to TMH TeleTreatment and TMH TeleCollaboration which have the strongest evidence-base. The broader modalities of TMH TeleHealth and TMH TeleCare comprise the last part of this chapter.

Figure 1 TeleMedicine, TeleHealth, and TeleCare



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DEVELOPMENT OF CHILD AND ADOLESCENT TMH TELETREATMENT AND TELECONSULTATION

The Case for TMH TeleTreatment and TMH TeleConsultation

The WHO identifies children's and adolescents' (youth) mental health needs as a leading cause of disability worldwide (WHO, 2009). The past few decades have brought considerable insights into the early onset of psychopathology and the early identification of developmental and psychiatric disorders. New approaches to pharmacologic treatment and evidence-based psychotherapies have produced interventions with improved prognoses for youth with chronic disorders. However, most youth with developmental and psychiatric disorders living in HICs are not identified in a timely manner, often are never identified during development, and do not receive these available interventions (Myers, Nelson, Rabinowitz et al., 2017). This situation is even more poignant for youth living in LMICs who comprise up to 50% of the population. They face social stigma for having a developmental or psychiatric disorder and cannot find needed care due to the dearth of child and adolescent psychiatrists (Patel, Flisher, Nikapota et al., 2008). Further, their plight may be worsening. In many LMICs, rapid urbanization and social change are producing an increase in urban poverty and unemployment which are risk factors for poor youths' mental health. The widening of the already vast gap between youths' needs and the availability of mental health care resources will increase rates of disability and add to the burden of disease for these youth, as well as for their countries' evolving social and economic progress.

LMICs need more child and adolescent psychiatrists. They will need to adapt available evidence-based treatments to their language and culture. However, it is unlikely that the recruitment of these child and adolescent psychiatrists will ever be able to keep pace with the increasing rate of youths' needs, not even in HICs (Satiani, Niedermier, Satiani, et al., 2018). Therefore, a mechanism is needed to deliver these services to youth living in under-served areas. The advances of technological innovations make TMH TeleTreatment and TMH TeleConsultation a viable service delivery model to help meet these youths' needs, while remaining

in their own communities.

Each country's healthcare system has its own set of challenges; hence, there is no universal formula that can be used to develop TMH TeleTreatment and TMH TeleConsultation services in different countries. Financial factors, including the cost of building and maintaining the infrastructure, pose one of the biggest hurdles in many countries' implementation of telemedicine-related services. Successful programs consider each country's geography, culture, religion, existing healthcare system, and insights of dedicated psychiatrists. For example, smaller middle-income countries with homogeneous populations, consistent geographic terrains, and an established national healthcare system may readily incorporate TMH TeleTreatment and TMH TeleConsultation into their services. By contrast, lower-income countries with high levels of racial and ethnic diversity, a variable geographic terrain, and a developing healthcare system may find numerous impediments to implementing these modalities, such as installing the needed infrastructure, differences between the culture and language of the urban psychiatrists and rural populations, interpretations of mental illness, as well as access to and trust in technology.

The Expansion of TMH TeleTreatment and TeleConsultation

The practice of TMH TeleTreatment has expanded beyond the intended goal of rectifying disparities in access to timely evidence-based care for rural and other under-served communities (Duncan, Valasquez, Nelson, 2014; Myers, Sulzbacher, Melzer, 2004; Myers, Valentine, Melzer, 2008). In HICs, TMH TeleTreatment services are increasingly offered in varied settings, including small towns, inner-cities, mental health centers, correctional settings (Kaliebe, Heneghan, Kim, 2011; Myers, Valentine, Morganthaler, et al., 2006), and other child-serving facilities (Cain, Spaulding, 2006; Myers, Valentine, Melzer, 2007), and, most recently, the home (Comer, Furr, Cooper-Vince, 2014; Comer, Furr JM, Miguel E, et al., 2017) which has increased greatly since the COVID-19 pandemic. Offering services to the home can be convenient for families that are busy with other obligations. TeleTreatment also allows family members to join the intervention session from different sites during the day, e.g., the child and mother at the school with the counselor and father at work.

In most LMICs, the availability and use of TMH TeleTreatment and TeleConsultation was very limited before the COVID 19 pandemic. For many countries that changed with onset of the pandemic. For example due to the inability to provide in-person mental health services during the lockdown, many Arab countries started to accept the concept of telemedicine-related services (EL Havek, Nofal, Abdelrahman, et al., 2020). In Egypt, TeleConsultation services have been used to cover the private sector and non-governmental organizations, such as the Egyptian Red Crescent.

The TMH Tele-Consultation model has its greatest potential for supporting primary care physicians in rural areas who are front-line health care professionals and provide basic mental health care. In September 2020 due to the COVID-19 pandemic, the Vietnamese Ministry of Health launched a remote healthcare consultation and support (TeleConsultation) network that connects 27 central or end-line hospitals in Hà Nội and Ho Chi Minh City with a thousand community medical examination and treatment facilities, including those in mountainous

areas and on islands (Tuoi Tre News, 2020). There is potential to utilize this TeleConsultation service to support these thousand community sites with psychiatric consultation. Such TeleConsultation can provide needed psychiatric care during stressful times, such as the pandemic, and can help to build community physicians' skills in providing mental health care. These efforts demonstrate how quickly a country can mobilize and utilize existing infrastructure and personnel when motivated. A strong centralized government, as in Vietnam, may be especially efficient in mandating these efforts.

Schools are a naturalistic site for services given that youth are there during the day and their educational impact is only minimally disrupted when services are offered on campus. Further, many schools in LMICs have school health officers or counselors who could assist with mental health care if given appropriate support (Grady, Lever, Cunningham, et al., 2011; Stephan, Lever, Bernstein, et al., 2016). With the onset of the global COVID-19 pandemic, the TMH TeleConsultation model was implemented in Singapore. Consultations of school counsellors with child and adolescent psychiatrists went online rapidly. This approach demonstrated how the limited workforce of child and adolescent psychiatrists could extend support to community mental healthcare professionals who work as front-line providers with youth (Renjan and Fung, 2020).

THE EVIDENCE-BASE SUPPORTING TMH TELE-TREATMENT AND TELE-CONSULTATION

The evidence-base supporting TMH TeleTreatment and TMH TeleConsultation as effective service-delivery models is well established for the adult population and is emerging gradually for youth. Several studies have established the feasibility and acceptability of TeleTreatment and TeleConsultation with youth, as briefly summarized below.

Multiple studies have demonstrated the feasibility of implementing TMH TeleTreatment with youth across diverse settings (Boydell, Volpe, Kertes et al., 2007; Duncan, Velasquez, Nelson, 2014; Gibson, Coulson, Miles, et al., 2011; Jacob, Larson, Craighead, 2012; Jones, Shealy, Reid-Quinones, et al., 2014; Myers, Valentine Melzer, 2007; Nelson, Bui, 2010; Wood, Stathis, Smith, et al., 2012). Youth 2-21 years old with a broad range of psychiatric diagnoses and developmental disorders have been evaluated and treated through videoconferencing (Elford, White, Bowering, et al., 2000; Reese, Jamison, Wendland, et al., 2013; Myers, Sulzbacher, Melzer, 2004). School-aged children comprise the modal age group, and attention-deficit/hyperactivity disorder (ADHD) and depression are the most commonly treated disorders, consistent with in-person care (Nelson, Barnard, Cain, 2003; Myers, Vander Stoep, Zhou, et al., 2015). Children who are uncooperative pose challenges, but can be treated with assistance by staff at the patient site if services are provided at a mental health or primary care clinic. Additional problem-solving is needed if services are provided in the home. Child and adolescent psychiatrists determine the appropriateness of youth for care via TMH TeleTreatment based on developmental considerations, parents' preferences, support at the patient site, as well as the psychiatrist's resourcefulness.

Some authors have suggested that TMH TeleTreatment may especially

suit adolescents as they are comfortable with technology and may feel more in control of their personal space during videoconferencing (Pakyurek, Yellowlees, Hilty, 2010). Adolescents may also have decreased concerns about confidentiality as the child and adolescent psychiatrist is outside of their local community. While these theories are interesting, there are no data regarding adolescents' preference for TMH TeleTreatment.

Diagnostic assessments for disruptive behavior disorders (Myers, Vander Stoep, Zhou et al., 2015), autism and other developmental disorders (Reese, Jamison, Wendland, et al., 2013; Szeftel, Frederico, Hakak, et al., 2012) and psychotic disorders (Stain, Payne, Thienel, et al., 2011), as well as other disorders treated in usual outpatient clinics have been reliably conducted through videoconferencing (Elford, White, Bowering, et al., 2000; Myers, Vander Stoep, McCarty, et al., 2010). Several studies have demonstrated the acceptability to referring primary care physicians (Myers, Valentine, Melzer, 2007), parents (Greenberg, Boydell, Volpe, 2006; Myers, Valentine, Melzer, 2008), and youth (Boydell, Volpe, Pignatiello, 2010) of delivering services through videoconferencing. Satisfaction studies are important as they demonstrate the ability to develop a therapeutic alliance with youth and families during a virtual visit (Glueck, 2013).

The delivery of pharmacotherapy through TMH TeleTreatment has been described with youth in schools (Kriechman, Bonham, 2013), mental health centers and daycare (Spaulding, Cain, Sonnenschein, 2011), outpatient settings (Myers, Valentine, Melzer, 2008; Myers, Vander Stoep, McCarty, et al., 2010) and juvenile justice facilities (Myers, Valentine, Morganthaler, et al., 2006). One recent large community-based randomized trial provides solid evidence of the effectiveness of short-term pharmacotherapy for ADHD delivered by child and adolescent psychiatrists through videoconferencing compared to TeleConsultation to primary care (Myers, Vander Stoep, Zhou, et al., 2015). Further, psychiatrists demonstrated good adherence to guideline-based pharmacotherapy (Rockhill, Tse, Fesinmeyer, et al., 2016).

There is a robust literature supporting the feasibility of conducting TeleTherapy with adults (Backhaus, Agha, Maglione, et al., 2012; Hilty, Ferrer, Parish, et al., 2013; Osenbach, O'Brien, Mishkind, et al., 2013) and a developing literature supporting feasibility with youth (Nelson, Patton, 2016). Most studies of TeleTherapy conducted with youth have been descriptive (Duncan, Velasquez, Nelson, 2014; Nelson, Patton, 2016; Slone, Reese, McClellan, 2012). Intervention approaches have varied regarding their focus on the youth or on parenting strategies and ranged from feasibility trials to pre-post intervention designs. Findings have been positive related to feasibility and satisfaction of families. A few reports note the use of TMH TeleTreatment to address the mental health needs of youth with medical conditions (Davis, Sampilo, Gallagher, et al., 2013).

Several randomized trials of psychotherapy with youth are noteworthy. Comer and colleagues demonstrated that Parent-Child Interaction Therapy (PCIT) delivered through TeleTreatment into the home was comparable to traditional PCIT delivered in-clinic (Comer, Furr, Miguel, et al., 2017). Nelson and colleagues (2003) found comparable reductions for childhood depressive symptoms treated with eight sessions of cognitive-behavioral therapy (CBT) delivered through TeleTreatment versus in-person. The behavioral TeleTreatment

of obsessive-compulsive disorder (OCD; Storch, Caporino, Morgan, et al., 2011) and tics (Himle, Freitag, Walther, et al., 2012) has been shown to be comparable to in-person treatment. Five small randomized controlled trials have demonstrated the effectiveness of providing family interventions (Anderson, Byrne, Goodyear, et al., 2015; Gluekauf, Fritz, Ecklund-Johnson et al., 2002; Reese, Slone, Soares et al, 2012; Tse, McCarty, Vander Stoep, et al., 2015; Xie, Dixon, Yee et al., 2013). Although the evidence-base for TeleTreatment with youth is emerging slowly, the available data support its feasibility, acceptability to participants, and effectiveness.

Crises often produce opportunities. Due to the COVID-19 pandemic, a group of general psychiatrists in Addis Adaba, Ethiopia transitioned to TeleHealth, including TeleTreatment, for both existing and new patients (Tilahun, Andebirhan, Eyasu, et al., 2020). These enterprising psychiatrists also rapidly updated their website to remotely manage the administration of their practice. They reported that patients were satisfied with the TeleTreatment services given the protection from exposure to the virus; however, only 15% of patients continued to use the TeleTreatment service when in-person appointments resumed. Patients cited difficulties focused on interrupted transmissions, costs associated with the technology, and a preference for in-person appointments. The psychiatrists noted that the interrupted transmissions interfered with clinical assessments and increased their burden of home responsibilities. Their valuable experience led these authors to call for a national health policy that integrates technology into the mental health care system to best serve patients during crises.

Even prior to the pandemic, the WHO started to examine digital interventions for depression. The Step-by-Step intervention uses various techniques with emphasis on behavioral activation (Carswell, Harper-Shehadeh, Watts, et al., 2018; Harper-Shehadeh, Ramia, Cuipers, et al., 2020). Step-by-Step has been designed so that it can be adapted for use in settings with different cultural contexts and resource availability and to be meaningful in communities affected by adversity. While these efforts are in the early stages of testing, they emphasize the global look to digital interventions, including TeleTreatment, to help address the evolving crisis in mental health care for under-served populations.

LEGAL, REGULATORY AND ETHICAL ISSUES

Legal considerations can be a significant obstacle to the uptake of digital technologies. These include an absence of an international legal framework to allow physicians, including psychiatrists, to deliver services in different jurisdictions and countries; a lack of policies that govern patient privacy and confidentiality vis à-vis data transfer, storage, and sharing between physicians and jurisdictions; physician/psychiatrist authentication; and the liability risk for psychiatrists offering TeleTreatment and TeleConsultation services. A few of these issues are reviewed here.

Licensure is a complex issue. In the United States and Canada, there is no national licensure. Rather, individual states and provinces are responsible for licensure (Kramer, Mishkind, Luxton, et al., 2013). If a psychiatrist seeks to provide services in more than one state or province, licensure must be obtained in each of those jurisdictions. The site of service is considered to be the patient's location (originating site) at the time of service and not the patient's official residence. As an

example, if a student officially still resides with his parents in one state but moves to another state where he receives TeleTreatment, that state is considered the site of service. Therefore, the psychiatrist must be licensed in both his own state and the student's state.

In many LMICs, especially smaller countries, such rigid state or provincial boundaries may not exist. For example, in Qatar, a small MIC with organized policies for TeleTreatment and TeleConsulation, licensure applies to the entire country. One of the challenges facing TeleTreatment in Egypt is the unavailability of regulatory bodies for training, certifying TeleTreatment systems and physicians, and addressing best practice guidelines. Therefore, there is no legalization of TeleTreatment in Egypt. However, during the COVID-19 pandemic, the "Doctors Syndicate," with the help of universities, began studying the use of TeleTreatment including establishing the foundations and precautions for its use in patient care (Samir, 2020).

Many LMICs faced considerable challenges to psychiatric care prior to the pandemic, including stigma regarding mental health conditions, a paucity of resources, access to any existing services, limited child and adolescent psychiatrists, and availability of psychopharmacology (De Sousa, Mohandas, and Javed, 2020). Some LMICs had started to utilize telemedicine (including TMH TeleTreatment and Teleconsultation) prior to the pandemic and were well poised to pivot to TeleTreatment. Viet Nam had established a registration process for physicians providing telemedicine services and required evidence that they met requirements for using the relevant technology especially related to information security (Ministry of Health, 2017). Other LMICs shifted to TeleTreatment during the pandemic, but without stringent regulatory authority to monitor the quality and ethical standards of TeleTreatment services. There is now a call for TeleTreatment regulation in Southeast Asia (Sabrina and Defi, 2021) and some individual countries are moving toward such legislation, such as Singapore (Ministry of Health, Singapore, 2022). Many other LMICs are developing relevant legislation regulating the use and practice of TeleTreatment and TeleConsultation. Although there will not be a single standard that can apply across all LMIC jurisdictions given each unique geographical, cultural, and economic status, a few core issues must be considered. These include accurate patient identification, data ownership, cybersecurity and means of overcoming the limitations of virtual interactions. A universal human factor will be the initial reluctance of patients, and psychiatrists, to utilize TeleTreatment.

Payment for TeleTreatment Services varies significantly by country, possibly by regions within a country, depending on the funding of its healthcare system and particularly of its mental healthcare system. The WHO's survey found that almost 70% of countries surveyed indicated the need for more information on the cost and cost-effectiveness of telemedicine applications. Middle income countries with a national healthcare system may easily incorporate TeleTreatment into their services, but low income countries with few psychiatrists and populations that are skeptical about mental illness may struggle with such technology-mediated services.

Some middle income countries have addressed payment for TeleTreatment. For example, Singapore's healthcare system is subsidized by the government and incorporates telemedicine costs with physicians, including psychiatrists, and subsidizes its use in the same way that it covers in-person services. There are issues related to the additional operational costs of the technology. These costs could be passed onto the patient in a fee-for-service model (Sabrina, Defi, 2021). Obviously, this approach would exclude some families from the advantages of TeleTreatment. Qatar has both a public and private healthcare system. There is no uniformly established model of reimbursement of TeleTreatment services distinct from traditional in-person services. The Ministry of Public Health regulates healthcare. Services to Qatari nationals is free of charge, while Qatari residents can obtain a Health Card for a minimal fee, giving them access to essential healthcare services. Most private practices serve patients via out-of-pocket charges or through private insurances. TeleTreatment in both the public and private sectors are funded the same as for in-person services.

Lower income countries may be more challenged in developing financial models for TeleTreatment. For example, Egypt has a dual system for mental health services, a public system managed by the Ministry of Health and a private sector financed by out-of-pocket payments. Although the public system provides basic universal coverage, reportedly it is burdened by chronic underfunding, low service quality, and high out-of-pocket payments, in part due to the low expenditure for healthcare services compared to other LMICs (Gericke, Britain, Elmahdawy, et al., 2018). Further, Egypt typifies the scenario presented by WHO regarding the mental health needs of young people in LMICs. Its population is very young, and youth unemployment has become a major societal issue. It is difficult to conceptualize how the system could expand its TMH TeleTreatment services to meet these needs given the current funding approach. Nonetheless, at the onset of the COVID-19 pandemic, payment for TMH TeleTreatment services was the same as for in-person service. Going forward, it will be informative to see how Egypt addresses TMH TeleTreatment. These challenges may be experienced by many other LMICs. Pakistan also has publicly funded hospitals, but private healthcare and therapies are expensive and not affordable by the majority of patients. Affordability concerns regarding TeleTreatment and TeleConsultation are significant as the country does not have a health insurance system.

Authentication of the parties involved in a TeleTreatment encounter ensures accuracy of service delivery and protects against fraud. During the initial encounter with a patient, the psychiatrist collects identifying information about the patient, including location, such as a clinic, school or home, or other sites (American Telemedicine Association, 2013). If the patient site is a healthcare facility, the staff may verify the patient's identity. Typically, psychiatrists begin the initial session by stating their name, credentials, and location (i.e., city). Countries may vary as to whether they must include this information in the documentation. For example, in Singapore, guidelines for telemedicine use and its ethical practice are laid out specifically for adoption (Ooi, Koh, Tan, et al., 2015; Singapore Medical Council, 2002; Singapore Medical Council, 2016). In Vietnam, physicians are required to state their name, specialized, hospital, site, working years, educational achievement, and license.

Privacy and Security of TeleTreatment services are a significant concern,

mainly if services are provided in non-clinical settings, for example, in a school or the home. Youth and their parents deserve privacy, particularly regarding psychiatric and developmental conditions for which the parents may be blamed and the youth stigmatized. Therefore, the site at which the youth receives services should have visual and auditory privacy. Maintaining this privacy can be difficult to establish in home settings. If a private space cannot be found, it may be necessary to ask other family members to leave the home during the session.

Countries may have specific regulations regarding the protection of healthcare information, and TeleTreatment psychiatrists must comply with such regulations. For example, in the United States, these protections are outlined in the Health Insurance Portability and Accountability Act of 1996 (HIPAA;104th Congress,1996). These regulations may indicate that popular video programs, such as Face Time™ and Skype,ộ are not appropriate for clinical work despite their acceptable encryption. Software vendors enter into a Business Associate Agreement with federal regulators attesting their due diligence to protect patient privacy and data and agree to an audit of patient health information if a security breach occurs.

The Western concepts of confidentiality and privacy also apply to numerous middle-eastern countries. For example, Qatar's Law No. 2, Article 20, prohibits medical professionals from disclosing confidential information of a patient, and in case of violations imposes strict disciplinary measures. In 2015, the Ministry of Public Health published a National Health, e-Health, and Data Management Strategy (QNeDP) which provides a comprehensive vision for e-healthcare developments to improve healthcare delivery in the State of Qatar. This strategy included a framework for digitalizing healthcare and personal health information while maintaining robust privacy and security standards. In 2017, Qatar became the first country among its neighboring seven countries to introduce a comprehensive data protection law, Personal Information Privacy Protection Law (PIPPL), to safeguard personal information.

In Vietnam in 2014, the Ministry of Health addressed the use of digital healthcare noting measures to ensure confidentiality of information (Ministry of Health, 2014). Regulations for telemedicine include requirements for an organization or individual to satisfy certain guidelines including technical factors such as adequate storage capacity and qualified operators that affect clinical work as well as security (Ministry of Health, 2017).

Due to the evolving nature of telemedicine generally, some LMICs do not yet have regulations to ensure privacy, but are addressing this issue, directly or indirectly. A cross-sectional study among Egyptian psychiatrists suggested high level of acceptability for TeleTreatment and TeleConsulation noting that it would be beneficial for patient care. They supported integrating it into the current health care system, but had a concern about the privacy, confidentiality and security of the patient's data (Kamel, Westenberg, Choi, 2020). Egypt's Mental Health Act of 2009 ensured the confidentiality of information of psychiatric patients (Loza, El Nawawi, 2012) and internet security is covered under Law no. 175 of 2018 for cybersecurity (Chawki, 2020; International Labour Organization, 2018). Thus, LMICs may have components of patient privacy and data security that can be referenced while awaiting development of formal guidelines.

Overall, child and adolescent psychiatrists interested in including

TeleTreatment in their practice should check their country's regulations, as well as commercial vendors' compliance with the country's regulations for TeleTreatment. Even if no such regulations exist, good clinical judgment always applies.

Informed Consent also involves a process that varies by state and country regarding the need for specific consent to receive services through videoconferencing (Shore, Yellowlees. Caudill et al., 2018; Yellowlees, Shore, Roberts, 2010). Some sites may require a separate form for TeleTreatment services, while others may presume that consent for any outpatient care also covers TeleTreatment. Some elements for consent include confidentiality and the limits to confidentiality when using electronic communications; potential for technical failure, emergency plans; documentation, recording, and storage of information; protocols for coordination of care with other physicians and contact between sessions; and conditions under which services may be terminated and a referral made for in-person services (Kramer, Luxton, 2016).

Qatar provides an example of this issue. Qatar has no specific laws requiring informed consent for routine follow-up care via telemedicine; however, it is universally considered a best practice to seek the consent and discuss the limitation before the tele-encounter. Also, as most healthcare professionals in Qatar are Western-trained, they continue to follow the processes and procedures of the systems in which they are trained, including obtaining consent before any patient encounter. Other countries will likely address this issue specific to their workforce, culture, and population as their TMH TeleTreatment services evolve.

Emergency Care is a highly desired service, especially for under-served communities. Local civil commitment laws due to violence to self or others, duty to warn and protect the citizenry requirements, and mandated reporting of child endangerment vary across sites. Psychiatrists and staff should prepare a crisis plan with the family and share those parts of the plan relevant to other members of the patient's system of care, such as other caregivers, primary care physicians, or schools. These crisis procedures are discussed as part of the informed consent process and are worth repeating, at least in part, during the initial encounter (Shore, Hilty, Yellowlees, 2007).

Ethical and Cultural Issues in TeleTreatment parallel issues encountered during in-person services but complicated by the inclusion of technology (American Academy of Child and Adolescent Psychiatry, 2012; Turvey, Coleman, Dennison, 2013). In all countries, issues about confidentiality, dignity, and privacy are of primary concern. TeleTreatment must be implemented equitably with the highest ethical standards to maintain the dignity of all individuals and ensure that differences in education, language, geographic location, physical and mental ability, age, and sex will not lead to the marginalization of care. As LMICs develop TeleTreatment and TeleConsultation services they will need to adapt currently available approaches to their own religion and values as culture affects the acceptance of TeleTreatment (Alajlani, Clarke, 2013).

Singapore has already addressed many of these issues in their establishment of ethical codes and guidelines (Singapore Medical Council, 2002; 2016). But, other countries are just starting to consider all of the factors.

Qatar provides an excellent example of the unique complexities each

physician/psychiatrist must consider in deciding whether to include TeleTreatment in their practice. Qatar is a cosmopolitan Muslim country with an affluent expatriate population from different faiths. On Hofstede's model of five cultural dimensions (Hofstede, 2011; The Hofstede Insights Network, 2022) Qatar is low on individualism, high on masculinity, and high in power distance (Rathod, Pinninti, Irfan et al., 2017). Individualism defines a culture in which more emphasis is placed on individual identity than on a family's or a tribe's identity. Family values and traditions are held high, and parents and elders are given rights to make decisions for the family, including influencing the patient's willingness to receive or reject the offered services. Qatar is also a hierarchical society in which people accept the power-holders including allowing doctors to make treatment decisions on their behalf. High masculinity indicates a culture with a high degree of gender differentiation. Qatar is also a religiously liberal country in which people maintain conservative values. Although Islam does not prevent Muslims from seeking necessary medical care, patients generally prefer to interact in a socially and religiously appropriate way. Home is considered a very personal space and not everyone is welcome to visit all parts of the house. This aspect of the culture presents unique challenges in managing young children, especially those with ADHD or developmental disabilities via TeleTreatment as most of the children do not tend to sit and engage with the psychiatrist. The majority of females also like to cover themselves while interacting with anyone other than their immediate family members, which may interfere with conducting a traditional mental status examination during TeleTreatment. As a result of the above, bringing psychiatrists into homes via videoconferencing can feel very aversive to the families who are not accustomed to this model of care.

Psychiatrists interested in TeleTreatment will need to conduct a needs assessment focused on whether their services are needed, the communities' willingness to engage in TeleTreatment, and, if willing, the conditions under which TeleTreatment may be feasible. For example, TeleTreatment may only be possible for clinic-to-clinic services, i.e., from the psychiatrist's clinic to the community's clinic; disruptive children may not be included in the entire session; women and their families will need to decide whether TeleTreatment is an option for them. The ethical and cultural aspects of TMH TeleTreatment is probably the most important area in which the approaches developed by HICs may not be directly translated to LMICs. Culturally appropriate flexibility and creativity are needed.

TECHNICAL ASPECTS OF TMH TELETREATMENT AND TELECONSULATION

Telecommunications technology refers to the technical methods or protocols used to establish an asynchronous connection (Health Resources and Services Administration, 2022a; 2022b). The WHO found that over 50% of surveyed countries wanted more information on the infrastructure necessary to implement telemedicine solutions (WHO, 2009). HICs mostly considered barriers to telemedicine implementation to include issues related to legal implications surrounding patient privacy and confidentiality, competing health system priorities, and a perceived lack of demand. LMICs were more likely to consider barriers related to resource issues such as high costs, underdeveloped infrastructure, and lack of technical expertise. Cost-effectiveness is a vital issue

for both HICs and LMICs when considering optimal ways to reach their underserved populations, e.g., whether the cost of the technology and its maintenance are feasible and sustainable. Mobile technologies are increasing around the globe and will likely be the means for making TeleTreatment and TeleConsultation possible for many rural communities in both HICs and LMICs,

Overview

Selecting the best technology can be a daunting process because the technology is rapidly changing, and many vendors offer a wide range of commercial plans. The technology chosen should provide the best clinical experience, or an "authentic doctor-patient experience."

General Review

Videoconferencing equipment varies in expense and should be selected to meet the clinical need, space considerations, and cost. Across all devices, high-quality cameras and microphones optimize the clinical experience. Both the psychiatrist's and patient's sites should have access to 1) modern, well-functioning equipment, including camera, monitor, microphone, and speakers; 2) encrypted software; 3) secure clinical space for the equipment; and 4) consistent high-speed connectivity. Consideration should be given to initial and ongoing technical support and costs.

Start the selection process by prioritizing the features and functions needed to deliver mental health services. Second, consider the budget, staffing resources, and startup timetable. Thirdly, decide whether the program needs to connect to an existing videoconferencing network that may determine the choice of technology. The clinical goals of the program should influence the selection of technology, as specific clinical services and populations may require different technologies. For example, diagnosing neurodevelopmental and movement disorders may require higher resolution video to observe the physical abnormalities, while group therapy may require multiple microphones, capability for breakout groups, and chat functions. Financial factors related to software subscriptions, hardware purchases, Internet service provider (ISP) contracts, space, and staffing play an essential role in selecting telecommunication technology. The psychiatrist and remote site staff must realistically consider their technical and financial ability to operate and maintain the technology. Ongoing, easily accessed consumer-friendly technical support is often noted as a critical factor in program success and sustainability. Lastly, deciding to extend an existing videoconferencing system or replace it with a cloud-based system will restrict the decision to a smaller number of vendors and technology options. Psychiatrists should discuss options with various commercial vendors that advertise online.

Standards-based Systems

If the program will build upon an older system at a major medical center or university, it is likely a standards-based application/platform, sometimes referred to as "legacy hardware." These proprietary systems offer the highest quality of audio and video, as well as the most stable data connection, giving participants the most life-like or "telepresence" experience. They transmit data over digital subscriber lines (DSL). This telephone company-based end-user connection transmits secure, point-to-point, high-bandwidth (≥ 1.5 Mbps), high-definition video and audio

signals over fiberoptic systems. Typical DSL broadband capacities are 1.5, 3, 5, 10, 12 Mbps, which seem small compared to residential ISP plans that offer 300 Mbps, but because these systems use a static Internet Protocol (IP), they are guaranteed this speed at all times, and the connection is more stable than the dynamic IPs used in residential connections. These systems also offer many sophisticated features, including the ability to zoom and pan/tilt cameras at both sites, connect to medical devices like stethoscopes, and connect to multiple microphones and large (and multiple) monitor systems. The advantage of such features is that they enable psychiatrists to closely examine patients and control how they view the participants in multipoint conferencing. These systems require technical support to operate with other legacy systems. Despite their superior functioning, standards-based systems are predominantly used in large organizations because they require a considerable initial investment and high costs for maintenance, technical staff, and related IT infrastructure.

Consumer-based Systems

Standards-based systems are not feasible for individual healthcare providers or small group practices. Consumer-based software platforms, or applications ("apps)," are now available at reasonable prices with the need for minimal technical skills. These systems transmit data over the internet and the consumer interface software runs on personal computers, tablets, and smartphones. Subscriptions to these cloud-based services are sold based on the number of users or accounts, ranging from free single account packages to enterprise-level subscriptions with hundreds of accounts. Enterprise-level contracts often include an option to purchase the software to allow consumers to host the service on their server. Local hosting can significantly improve the telepresence quality of the videoconference. In the United States, software vendors who advertise telemedicine solutions must provide appropriate software encryption and sign Business Associate Agreements to comply with HIPAA regulations. Such agreements are also standard in Canada and many European countries. LMICs may have other approaches to regulations regarding clinical applications of these platforms.

Recent advances in hardware and software signal compression have enabled these internet-based systems to deliver the high-quality video and audio signals necessary for clinical work. They are highly flexible, adaptable, and consumer-friendly, enabling rapid deployment to various settings with minimal training, startup costs, and fixed costs. The flexibility and portability of these systems give psychiatrists options to choose a hardware and software combination that meets their financial, clinical, and logistical needs and limitations. The COVID-19 pandemic has demonstrated how easily medical centers, private practices, and families can integrate consumer-grade systems into daily life if the appropriate infrastructure is available. Relevant information regarding consumer-grade systems for health care professionals seeking to establish TeleTreatment services is summarized in an online toolkit (National Telehealth Technology Assessment Resource Center, 2022). Interested purchasers should review systems offered by commercial vendors advertised online.

There are disadvantages to conducting clinical sessions over consumer cloud-based applications that utilize the internet. The foremost is the highly variable quality and speed of the connection, which impacts the quality of streaming audio

and video. The connection quality and speed can be affected by many factors, including nearby internet traffic (for cable-modem connections), inclement weather, network failures, local electrical device interference to WiFi signals, and intranet network traffic origination and destination sites. Other disadvantages to these cloud-based platforms include variable customer support from the vendor, a greater chance that end users will inadvertently alter the hardware or software, limited ability to connect peripheral devices such as a stethoscope, and usually no ability to control the camera at the patient's site. They usually do not connect to legacy video conferencing devices installed in many healthcare centers, schools, and other organizations. In LMICs, and in some HICs including rural areas in the United States, one of the major challenges to implementing consumer-based equipment is the cost of extending broadband and cellular devices infrastructure. Finally, initially, consumer cloud-based systems have been considered less secure than standards-based, legacy systems. Over the past two decades, technological improvements have decreased this concern.

Countries vary in their current status of technology development. In Qatar, access to the internet and technology was never considered an obstacle, as almost 100% of the population has access to ultra-high-speed internet and communication devices. Due to onset of the COVID-19 pandemic in 2020, the State of Qatar imposed strict restrictions to limit the spread of coronavirus. The healthcare facilities were directed to use virtual audio consultations from hospital networks to provide care to the population in need. Because of the confidentiality concerns, the use of commercial applications, including Zoom, Skype, and WhatsApp, was strictly prohibited. Because of the need to have video capabilities, the Ministry of Public Health later introduced a proprietary HIPPA-compliant audio/video software across Qatar's healthcare system. At the beginning of 2020, an Information Technology helpdesk across the nation's hospitals started installing the software on the hospital desktops, and workflows in the electronic medical records systems were built. Clinical informatics made physicians' and patients' workflows to follow. Health care professionals across different specialties were later trained on its use.

Egypt is, perhaps, showing the way forward for many LMICs. Over the past five years there has been a rapid increase in the rate of internet usage, predominantly through smart phone accessibility, now estimated as almost 50% penetration and increasing. Usage has focused on personal and social interests. Its use for telemedicine applications still faces many difficulties like the unavailability of an efficient infrastructure such as high bandwidth and the relevant equipment in the rural areas. However, President Abdel Fatah al-Sisi's "Egypt Produces Technology" initiative aims to revolutionize internet connection between cities (Reda, 2018). The Egyptian Information Society tries to improve the accessibility of telemedicine by developing ICT human capacities and providing socio-economic applications for healthcare systems (Hussein, Khalifa, 2012). It seems only a matter of time until the population's use of mobile technology, the government's vision, and societal pressures converge to bring Egypt into the "digital health community" and make TMH TeleTreatment and TeleConsultation an option for selected families.

In summary, choosing the best videoconferencing platform is a complicated decision. Health care professionals must consider their budget for initial and ongoing costs, the available bandwidth at all sites, the technical sophistication of

users, access to technical support, and the need to control the remote equipment. Other helpful resources are available from the National Telehealth Technology Assessment Resource Center, 2022).

Smart Phones and Other m-Health Devices

Mobile technology has spread rapidly around the globe. However, the growth in mobile technology has not been equally distributed, either across nations or within them (Pew Research Center, 2019). For example, among HICs with advanced economies ownership of mobile devices ranged from 100% in South Korea to 90% in Greece, while in LMICs with emerging economies ownership ranged from 93% in South Africa to 64% in India. Ownership of mobile devices predominantly means smart phones. Their ownership ranges from a median of 76% of advanced economies to 45% in emerging economies. Whether in advanced or emerging economies, younger people, those with higher levels of education and those with higher incomes, are more likely to be digitally connected, predominantly through smart phones. By the end of 2020, 46.45 percent of the world's population owned a smartphone. With many people using more than one smartphone, the actual number of smartphone subscriptions is much higher. As of 2021, smartphone users are using an estimated 6.4 billion smartphone subscriptions, a figure that is expected to climb to 7.5 billion by 2026 (O'Dea, 2021). As the population of young people is growing across the globe, it is anticipated that ownership of smart phones will continue to grow (Pew Research Center, 2019). The global availability of smart phones, and other digital devices, with their embedded video components has greatly expanded the potential for TeleTreatment and TeleConsultation in LMICs.

In summary, choosing the best videoconferencing platform is a complicated decision. Child and adolescent psychiatrists must consider their budget for initial and ongoing costs, the available bandwidth at all sites, the technical sophistication of users, access to technical support, and the need to control the remote equipment. Most important in LMICs is the access to videoconferencing equipment of their medical colleagues in distant communities, and individual families who may seek services on their own rather than through their community health clinic. Some helpful resources are available from the National Telehealth Technology Assessment Resource Center (2022) and the National Consortium of Telehealth Resource Centers (2022).

ESTABLISHING A TELETREATMENT AND TELECONSULTATION PRACTICE

The following is a brief overview of issues for child and adolescent psychiatrists in LMICs to consider in determining the relevance and capability of TeleTreatment and TeleConsultation for their clinical practice, whether at university and major medical centers or in private practice. The information has been gleaned from established practices in HICs as well as from new practices developed during the COVID-19 pandemic. More information can be found through several practical and free online sources in the United States, including: the National Telehealth Technology Assessment Resource Center (2022); the National Consortium of Telehealth Resource Centers (2022); Health and Human Resources (2022), andTelehealth.HHS.Gov (2022). The last source provides

information specific to services delivered from the home. LMICs will likely need to modify the guidance from these centers to address their country's regulations and resources. For example, these centers do not emphasize services provided through smart phones which may be the most prominent devices used in LMICs.

Feasibility and Sustainability of a TeleTreatment and TeleConsultation Practice

The WHO has noted that among surveyed countries, one of the most requested areas of information was the clinical uses of telemedicine, requested by almost 60% of countries surveyed (WHO, 2009). The WHO also noted that TMH TeleTreatment appears poised to play an increasingly important role within healthcare systems to address mental health disorders which comprise one of the most disabling conditions of youth in LMICs, similar to its impact on youth in HICs. The successful pivot from in-person care to TMH TeleTreatment due to the COVID-19 pandemic catapulted TeleTreatment into mainline practice in many HICs (Sharma, Sasser, Schoenfelder Gonzalez, et al., 2020). The availability and use of telemedicine services in most LMIC countries was limited before COVID 19. However with deficiency of in-person mental health services during the lockdown many countries started to accept the concept of TeleTreatment. It will be interesting to see the feasibility and sustainability of TeleTreamtent and TeleConsulation services in MICs as the pandemic resolves.

Implementing a TMH TeleTreatment in LMICs will likely evolve similarly to most HICs. TeleTreatment services will likely first be tested at academic and major medical centers in a "hub-and-spoke" model. Then, once feasibility is demonstrated and the infrastructure emplaced, other sites and individual psychiatrists can integrate TeleTreatment into their practices. This "top-down" approach does not preclude individual child and adolescent psychiatrists in LMICs with an established middle class patient populations and sustainable financial models from incorporating TeleTreatment into their practices ahead of demonstrated feasibility by major centers (Personal communications, Patricio Fischman MD, Santiago, Chile; Ahsan Nazeer MD, Doha, Qatar, 2022). In the absence of demonstrated feasibility and national regulations, innovative psychiatrists may forge their own TeleTreatment model of care.

Indeed, the COVID-19 pandemic forced most psychiatrists to be innovative. During the pandemic, individual psychiatrists and clinics developed their own TeleTreatment services and bypassed the "top-down" "hub-and-spoke" approach. They already have the components of a "bottom-up" developmental model. Going forward, it will be exciting to watch the development of TeleTreatment in LMICs.

TMH TeleConsultation services to primary care settings in rural communities from psychiatrists at academic and major medical centers are anticipated to be the most efficient use of the very scarce child and adolescent psychiatry workforce in LMICs. TeleConsultation has the added potential to increase primary care physicians' skills in caring for youths' mental health problems without the burden of traveling to distant sites for training. Financial models will be important to determining whether TeleConsultation is feasible and sustainable.

Determining the feasibility of TMH TeleTreatment and TeleConsultation services is based on an accurate needs assessment that identifies the mental health

needs of the patient site and determines whether the proposed service is likely to meet those needs and complement existing services. It is helpful to visit the patient site for collaborative problem solving with local stakeholders, such as physicians, educators, and parents. Child and adolescent psychiatrists may approach this topic by identifying a problem of most significant concern to parents. For example, autism spectrum disorders are increasingly identified in LMICs, but these children may be excluded from educational opportunities. They are at risk to not meet their innate potential, and parents are left with few resources in caring for their children. Child and adolescent psychiatrists may render TeleTreatment to children and their parents and TeleConsultation to the community to explore educational options, including behavioral management within the classroom. TeleConsultation to the primary care physician may also help to conduct medication trials to address disruptive behaviors or mood and anxiety disorders.

The sustainability of TeleTreatment services is usually thought to relate to sources of revenue and reimbursement. It may be more helpful to consider sustainability within the context of the community's needs. For example, a medical center may not benefit directly from these services, but there could be a financial benefit to the institution if emergency room services decrease. The community may also benefit from lower expenses related to correctional or educational services for youth. Families may benefit from direct or indirect services to their children if demands on the family are decreased and parents are able to continue working. With technology costs lowering, more infrastructure being built, and families increasingly purchasing mobile devices, the main issues for sustainability will be developing financial models that balance community needs with sources of reimbursement. Countries will vary depending on their resources and plans for moving forward. Two examples follow.

In Qatar, COVID-19 induced a paradigm shift, and the public health system started providing primary and urgent medical services via telemedicine. These consultations are of no charge to the patient and are covered by the Ministry of Health. In un-published surveys, most recipients have recommended that telemedicine services remain in place even after the end of the COVID-19 pandemic. In the private sector, however, telemedicine services, including TeleTreatment, are provided on an out-of-pocket charge basis to the patients, and the feasibility in that sector depends upon the continued financial health of the population and their preference for an in-person vs. telemedicine appointment. It is too early to predict the course that telemedicine applications will take in the insurance and private reimbursement model.

Vietnam is at the other end of the spectrum in terms of population, government, and financial models. Physicians are less interested in telemedicine applications for many reasons. One of these reasons is the impact on their revenue stream. In Vietnam, the cost of medical examination and treatment is usually very low compared to the cost of medicines. With the telemedicine system, doctors only advise without selling medications. There is no financial incentive to consider telemedicine applications. However, Vietnam is a country with great potential to develop a telemedicine system, including TMH TeleTreatment and TeleConsultation, because the internet system is very popular. The proportion of people with smartphones has increased by 150% the past few years and 70-80% of the population can connect to the internet at very low cost. Especially, after the

COVID-19 pandemic, millions of Vietnamese pupils and students have become accustomed to virtual group studying or meeting. The growth of this young population of "digital natives" is converging with the government's increasing efforts to develop policies and processes to increase the country's mental health system. The country is moving toward a hybrid health care system with traditional in-person and TMH services.

Patient Population and Models of Care

The patient site should identify the patients to be served but child and adolescent psychiatrists make the final determination regarding inclusion and exclusion criteria based upon their judgment and ability of the patient site to attend to acutely suicidal or agitated patients with the psychiatrist's collaboration. Exclusion criteria may include youth without accompanying guardians, patients without a primary care physician, or patients whose physician is uncomfortable in collaborating in the treatment of youth with psychiatric disorders. Different healthcare organizations may have different exclusion criteria for services. For example, in a tertiary care pediatric hospital in Qatar, patients are excluded from telemedicine applications, and instead are scheduled for an in-person session when the patient's condition is considered high-risk; when a patient is likely to need a physical examination; when the patient has a condition that affects his/her ability to use the technology; when a patient or parent prefers an in-person appointment or when communicating with children and young people is difficult. Child and adolescent psychiatrists using TeleTreatment in their private practices may set their own inclusion and exclusion criteria.

Several models of care have been used to provide TMH services in HICs including consultation to the local physician who continues to manage the patient, collaboration with the local physician or another clinician to share treatment of youth, and direct services to youth (Goldstein, Myers, 2014; Hilty, Yellowlees, Cobb, et al., 2006). Child and adolescent psychiatrists may move flexibly between these models depending on their and local physicians' decisions regarding the youth's status. One concern is that in LMICs, non-physician mental health clinicians are generally not available, thus placing the burden on the community physician to provide care when the psychiatrist is unavailable, and to continue care when the patient becomes stable.

Administrative Issues

Establishing a TeleTreatment program requires several administrative steps. Protocols are helpful, including a business plan with startup and sustainability considerations and information describing the sharing of services with potential sites and patients. The workflow must be considered, including procedures related to patient scheduling, support staff, and responsibilities during the encounter. Creating a position for a telepresenter is helpful in medical centers, as he/she brings the patient to the sessions, obtains vital signs, assists with obtaining medication consent and rating scales to document treatment progress, provides psychoeducational materials, fields patient calls between sessions, submits and retrieves laboratory testing, and coordinates the response to safety concerns (American Telemedicine Association, 2022). Often, the telepresenter joins the sessions to facilitate these tasks. The psychiatrist must directly train the telepresenter.

A telepresenter is not usually an option in private practice of TeleTreatment, and the psychiatrist must make arrangements to obtain supportive information. For example, youths' vital signs may be obtained from primary care physicians or schools if a nurse or health officer is available. Rating scales may be provided through email or a patient portal. The child and adolescent psychiatrist will need to establish a collaboration with community laboratories. These professionals often are innovative in determining how to ensure that their care complies with clinical practice parameters and professional standards of care.

In the United States, TeleTreatment involves some unique issues in documentation and billing. The documentation must indicate that the clinical visit is conducted through videoconferencing and the location of the patient and psychiatrist during the session. Billing is usually based on the duration of the session with a modifier added to usual billing codes to specify delivery through videoconferencing. For example, a 40-minute in-person pharmacotherapy session is designated 99215, while the corresponding videoconferencing session code is 99215GT. Child and adolescent psychiatrists in other countries must determine the appropriate approach to billing to optimize revenue and to avoid fraud in the financial aspects of their practice. A national healthcare system may simplify this process.

OVERCOMING THE CHALLENGES INHERENT IN CREATING AN AUTHENTIC PSYCHIATRIST-PATIENT RELATIONSHIPS DURING TELE-TREATMENT

Non-Verbal Interactions Engage the Patient

In-person care at medical centers prepares patients for their clinical session through anticipatory activities such as walking through a lobby, registration, and check-in, encountering other patients, viewing various clinical staff, completing paperwork. Even in-person care at a private office involves a few anticipatory steps. TeleTreatment obviates these steps, especially if the session occurs in the home. The patient sits down in front of the camera, and the session starts. Psychiatrists must immediately engage patients' attention and convince the patient of their ability to build a trustworthy, competent, empathic, and responsive relationship (Riggio, Feldman, 2014). Psychiatrists who naturally create good rapport are instinctually communicating non-verbally as well as verbally. Spoken language alone does not effectively communicate ideas and feelings to other people. It is often not what is said, but how it is said, that matters most to patients (Burgoon, Guerrero, Floyd, 2016; Riess, Kraft-Todd, 2014). Over two-thirds of communicated meaning can be attributed to nonverbal messages (Leathers, Eaves, 2016). A speaker's intentions, priorities and emotions are more effectively communicated when using non-verbal forms of communication to reinforce and clarify spoken words. During videoconferencing sessions, cameras, microphones, and speakers alter voice and appearance and flatten emotional expressions and patients' ability to detect the psychiatrist's non-verbal communication is diminished. The psychiatrist must compensate for this limitation. Therefore, most experienced psychiatrists providing services through videoconferencing slightly modify their communication style to establish a therapeutic relationship. The intent is to replicate good bedside manner over the camera, forge a strong engagement and sustain good rapport with the

patient, while appearing attentive and genuinely interested in the patient. In this chapter, nonverbal communication is defined as everything that occurs during the session except for the contextual meaning of the spoken words, including the nature, location, and decoration of the room, the psychiatrist's physical appearance, the distance between participants, body movements, posture, gestures, facial expressions, eye contact, touch, and the tone, pacing, and volume and intonation of the psychiatrist's voice. These interactions develop spontaneously during in-person sessions but require active attention. Many of these modifications are summarized in Table 1.

Table 1. Non-Verbal Communication in TeleTreatment

Nonverbal communication to consider during TeleTreatment includes:

- The nature, location, and decoration of the room
- Physical appearance
- Individuals' distance from one another
- Body movements, posture, and gestures
- Facial expressions
- Touching the other person
- The tone, rate, and volume of the psychiatrist's voice

The first non-verbal communication is patients' view of the psychiatrist as the camera frame limits patients' ability to see the psychiatrist and his or her non-verbal communications. They have less access to environmental information to shape their perception of the psychiatrist as trustworthy, competent, and empathic. For example, a restrictive view that only shows the psychiatrist's head and neck does not convey a real person. The psychiatrist's physical appearance, grooming, uniform/dress, and interactions become a more significant part of how patients make a first impression (Glueck, 2013). Hygiene and attire should be the same as presented during in-person sessions. If the psychiatrist's non-verbal communication does not support verbal communication, the psychiatrist seems odd or insincere (Knapp, Hill, Horgan, 2014). For example, if providing medication information in an overly casual manner may alarm the patient regarding the psychiatrist's caring about the patient's safety. This weakens the doctor-patient relationship (Henry, Fuhrel-Forbis, Rogers, et al., 2012).

Erect and open body posture that directly faces the camera and monitor communicates to patients that the psychiatrist is a confident, non-judgmental, and trustworthy authority figure who pays attention to their needs (Brugel, Postma-Nilsenova, Tates, 2015). Looking away from the camera and monitor with crossed arms indicates that the psychiatrist is closed to the patient. Moving towards or away from the camera approximates the effect of interpersonal space during in-person sessions. For example, moving slightly closer to the camera communicates

more interest or attention. If the patient seems defensive, moving slightly away from the camera conveys the perception of giving the patient more distance. The picture-in-picture function on the computer screen helps psychiatrists to monitor how their image is projected and to stay within the frame, as noted on the lower right-hand corner of Figure 2.

Figure 2
Monitoring On-Screen Presence

As patients can only see facial expressions, gestures, movements, and activities that fall within the camera frame, psychiatrists must replace large gestures with smaller ones that are more easily seen. Common gestures like outstretched arms can be replaced with hand gestures or emotionally congruent facial expressions. Hand gestures like waving and the thumbs-up sign can also replace culturally relevant handshakes and "fist-bumps" that are lost in videoconferencing.

The technology interferes with the psychiatrist's and patient's ability to interact as they would during an in-person visit, as summarized in Table 2. The psychiatrist's tone of voice can also affect the relationship (McHenry, Parker, Baile, et al., 2012). The psychiatrist must sound honest, compassionate, and intelligent while speaking slowly, loudly, and clearly enough to be easily heard and understood through the microphone, without sounding robotic. Many psychiatrists who are new to TeleTreament speak robotically due to performance anxiety or distractions by the electronics (e.g., a medical record that is simultaneously projected onto a monitor during the session). Psychiatrists may modulate the pitch of their voice slightly to avoid sounding anxious or robotic, but the challenge then is to avoid seeming theatric. Smiling while speaking makes the psychiatrist sound warm and approachable. Placing a smiley face sticker next to the camera is a good reminder for those who often look or sound too serious.

Table 2. Establishing Rapport during TelepTreatment

TeleTreatment technology affects the ability to:

- See the patient
- Be seen by the patient
- Be heard and understood
- Make gestures
- Maintain eye contact
- Touch
- Smell
- Demonstrate usual good bedside manner

Encouraging patients to speak more is associated with feeling that their needs are fulfilled (Dijkstra, Albada, Klockner Cronauer, 2013). However, the slight audio transmission delay during videoconferencing affects communication. Therefore, pauses and turn-taking are essential for the psychiatrist to manage the communication. Giving the patient an extra moment to reply in conversation may seem like a long pause but will replicate a usual pause during an in-person

conversation. During multi-center sessions, as shown in Figure 3 of several clinicians coordinating care, the psychiatrists may need to allow for even longer pauses.

Figure 3
Multi-Site Videoconferencing

The slight audio transmission delay also makes the use of verbal encouragements, such as "yes, tell me more;" or "go on," more challenging. If the patient has already resumed speaking, and hears the psychiatrist's encouraging statements, he/she stops speaking to listen to the psychiatrist, thereby interfering with communication. Therefore, experienced psychiatrists frequently use gestures, such as the thumbs-up gesture, to facilitate the reciprocal exchange of information while maintaining engagement and without interrupting the patient. The other non-verbal rapport-building strategy is to nod and smile periodically while the patient is talking, thereby indicating that the psychiatrist is listening and encouraging the patient to continue. Consider placing another sticky note that says, "Nod and smile!" on the monitor until this becomes natural. Overall, the psychiatrist must tend to turn-taking during the session to ensure that everyone has the chance to participate and that the session is not dominated by the most talkative participants. It is helpful to address individual participants by their names so that they know when it is their turn or when the psychiatrist is specifically speaking to that participant.

Optimizing the Telepsychiatry Experience

Room Selection

Optimizing the TeleTreatment experience begins with appropriate room selection, as noted in Table 3. In TeleTreatment, as soon as the camera is turned on, the psychiatrist suddenly finds him/herself in front of the patient. As the patient can be at any site, including home, school, or another clinician's office, it is up to the psychiatrist to make the session an authentic clinical experience. To start, attention is given to selecting, arranging, and appointing the rooms at both the patient's and psychiatrist's sites. Psychiatrists often work with a wide range of rooms and, with proper arrangements, sessions can be successfully conducted in classrooms, conference rooms, treatment rooms, offices, living rooms, and even bedrooms. After the room at the patient's site is selected, the setting should be reviewed to consider whether it will support videoconferences, accommodate the routine number of participants, and maximize participants' focus during the session.

Table 3. Selecting an Appropriate Space

Room selection should ensure that:

- Everyone feels comfortable
- Everyone is on camera and able to see each other
- Everyone is able to hear each other
- The room maintains visual and auditory privacy
- Room size accommodates the clinical encounter with the child or adolescent and accompanying adult(s)
- Distractions are minimized
- Décor minimizes camera distortion
- Demonstrate usual good bedside manner

Figure 4
Arranging Space For Individual Session

Note Room Size, Lighting, Framing, Uncluttered, Neutral Wall Color, Soft Surfaces, Child's Image

Figure 5
Arranging Space For Multiple Participants

Figure 6
Arranging Space in a Medical Clinic

Figure 7
Arranging Space at Home

Figure 4 shows an ideal arrangement in a clinic for an individual session in which the child appears comfortable, and the camera distance optimally allows observation of both her affect and overall body habitus and movement. Figure 5 shows another in-clinic arrangement for a child, this time accompanied by two adults. All participants are comfortably well-spaced on screen, although the child's lower body is not visible obscuring possible developmental anomalies or tremors. Figure 6 shows a session conducted in a medical clinic. The large room allows the child to move around so that the psychiatrist can observe gross motor skills and activity level. The size of the room also allows the psychiatrist to rearrange the chairs to facilitate interventions between mother and child. However, the medical equipment may distract the child and endanger equipment if the child is hyperactive oppositional, or aggressive. The child may also veer off screen, even hide from view, so that the psychiatrist cannot observe potential damage to equipment, or to the child from the equipment. Techniques are needed to maintain the child's engagement and protect the examination room. The opposite situation is shown in Figure 7. In this in-home session, the small space causes the mother to lean to the side to be fully seen, an awkward position that does not convey the usual parent-child interaction. These examples demonstrate issues in establishing a site for TeleTreatment. Choosing the optimal space should facilitate a naturalistic arrangement that allows the psychiatrist to conduct an evaluation that is comparable to a usual in-person session.

Power and Network

One of the most important considerations in room selection for sites using cloud videoconferencing is proximity to the WiFi router to maintain a strong Internet connection. If connecting through a computer, it should be plugged into the router with an Ethernet cable to provide the most robust video and auditory signal. Most software automatically downgrades the picture and sound to match the worst connection, so one slow site compromises the experience for everyone involved. Plugging the router, modem, computer, and monitor(s) into a

combination surge protector and battery backup will ensure that the connection will not drop if there is a momentary electrical surge or loss of power.

Room Setup

Selecting a room with a camera-friendly color scheme makes it easier for the camera to focus on the participant instead of the background. The camera should be focused on a wall painted a soft neutral shade to help the participant's image stand out from the wall, as shown in Figures 4 and 5. Decorations and patterns that are small, intricate, highly detailed, or cluttered may distort video images and trick the camera into focusing on the background rather than on the patient. Figures 6 and 7 show cluttered backgrounds that risk poor focus if the camera has low resolution. There should be nothing directly behind the participant's head because the camera's poor depth projection makes them appear to grow out of the participant's head. The decorations in the psychiatrist's room should be minimal and professional, reflecting the services delivered.

Cameras

Camera placement will determine the framing of the video image, including who and what is visible on the screen. It will affect the psychiatrist's ability to complete an accurate mental status examination. Cameras should be positioned at a distance from the patient that balances visualization of the child's overall presentation, including motor abilities and activities as well as facial features and expressions, as best noted in Figures 4 and 6. This is a particular challenge with smart phones that provide a restricted visual range. Psychiatrists will have to obtain various views of the youth when families are using a smart phone.

Participants naturally look at the monitor to relate to one another during videoconferencing. However, the camera is typically placed on top of the screen so that participants appear to be gazing downward. Psychiatrists' eye contact is significantly related to patients' perceptions of the psychiatrist's connectedness and empathy (Montague, Chen, Chewning, 2013). Therefore, psychiatrists' cameras should be directly in front of them, positioned at eye level, as shown in Figure 8. This positioning makes the psychiatrist gaze towards the camera when looking at the screen. Alternatively, if the psychiatrist wants to display the patient's image on the full screen, they should follow the "1/3 Rule" ----position oneself and adjust the camera so that the eyes appear to be about 1/3 down from the top of the camera on top of monitor screen. Assessing eye contact is an essential component of the developmental evaluation of children and establishing a therapeutic alliance, particularly during a videoconferencing encounter when there is decreased access to other non-verbal means of communication. The psychiatrist should determine whether apparent decreased eye contact of the child represents a technical limitation or a clinical impairment.

Figure 8
Optimizing Eye Contact

If a single participant is using a phone or tablet, it should be positioned in vertical/portrait orientation, as shown in Figure 9. This orientation adjustment improves the eye contact between participants because the participant's eyes are closer to the camera. If the device needs to capture two or more people in the frame, turning the device to a horizontal/landscape orientation will create a larger frame covering more of the room. Again, a caveat in using smartphones is that the smartphone in any orientation will capture a limited aspect of the child or

Figure 9
Establishing Eye Contact on Smart Phones

adolescent, which is not optimal for conducting a thorough evaluation or assessing medication side-effects. Nonetheless, in LMICs, many small clinics and families will only have the option of a smartphone. Thus, the psychiatrist must be creative in obtaining the desired information, such as asking the family to prop the phone in various orientations to observe the youth in different activities that will facilitate an accurate evaluation.

Psychiatrists who use an electronic medical record (EMR) during a session spend 30% of a visit gazing at the EMR (Montague, Asan, 2014). If an EMR is used during the TeleTreatment session and can be projected onto a screen, it should be placed in a vertical window above or below the monitor with the participants' images, as shown in Figure 10. This placement style causes the psychiatrist to constantly nod up and down positively and affirmatively when glancing alternately at the monitor and the EMR. By contrast, if the EMR window were placed lateral to the participants' monitor, the psychiatrist would constantly be making negative, lateral head-shaking gestures during the session. This vertical positioning of two monitors also has the "side effect" of causing the psychiatrist to make eye contact as his/her gaze passes the camera in alternating gaze between the patient's image on the bottom monitor and the EMR on the upper monitor. Psychiatrists should minimize the time spent looking at the EMR to maintain eye contact and rapport with the patient, even if this means charting very little during the session or, preferably, charting later.

Figure 10 TeleMedicine, TeleHealth, and TeleCare

Courtesy of Shabana Khan MD, NYU LangoneChild Psychiatry

Inevitably, at some point, problems arise with the video connection. If the patient cannot see the psychiatrist, a few steps may correct the problem. First check that the correct camera has been selected in the software and confirm camera selection in program settings or permissions. Close other videoconferencing apps and ensure that the camera is not covered by a sticker or other item.

Lighting

Lighting affects the quality of the videoconferencing session (Onor, Misan, 2005). Cameras need more light than human eyes to produce a clear image. An insufficiently illuminated room prevents participants from seeing each other, detecting non-verbal communication, identifying physical signs and symptoms and, therefore, detracts from the authenticity of the experience. Backlighting

should be avoided, which occurs when a bright light comes from behind the person, such as when seated in front of a bright light or window, as shown in Figure 11 which causes the person to be silhouetted. Natural light from any angle in the room can also distort images. For example, in Figure 2, if the window is facing west, the psychiatrist's image may be washed out during the afternoon sun. Figure 12 shows several variations in lighting, with optimal lighting shown in frame 2 in which artificial light is diffusely distributed over the entire site. On the left side of Figure 13, glare occurs on the hard shiny surface behind the psychiatrist, which the psychiatrist on the right avoids by covering the rear mirror with a cloth. Finally, glare-producing surfaces are not always due to vertical surfaces behind the psychiatrist. Figure 14 demonstrates the severe glare resulting from the large shiny horizontal desk surface. It is also worth noting here, that the large hard desk may interfere with the audio signal. In general, a room with a steady source of diffuse artificial light is best. Copious indirect lighting, such as floor lamps that bounce light off the ceiling, is the key to a good lighting plan. It looks natural, softer, and avoids glare or shadows. Removing or covering reflective surfaces that cause glare, such as mirrors, whiteboards, or large desks and tables also optimizes the video image. This issue should be considered early in room selection when the position of the camera is determined.

Figure 11
Backlighting Darkens the Participant's Image

Courtesy of David Roth MD, Mind-Body Clinic, Honolulu

Figure 12
Controlling Light to Optimize View

Courtesy David Roth MD, Mind-Body Clinic, Honolulu

Privacy

Problems with privacy can be managed by modulating different elements of the videoconferencing chain. This is handled at two levels. At the software level, most commercial videoconferencing vendors advertise whether they meet privacy and security standards. The second aspect of privacy is restricted access to the videoconferencing room. Enforcing this restriction may be challenging in small communities with limited room availability. Ground-level offices with windows, such as shown in Figures 2 and 15, may enable people outside to view the session. Home-based services provide major challenges as space must not be accessible to non-participating family members during the session. The living room or kitchen table may be most convenient, but these are high-traffic areas that risk intrusions of privacy. Individual sessions, and some parent-child sessions, may be conducted away from other family members, such as in a bedroom, office, or porch.

Audio privacy is a major obstacle. If the patient site is a clinical examination room, it will have been soundproofed. However, the videoconferencing equipment is often set up in a conference room, private office, or home with inadequate soundproofing. Sound privacy may be determined by asking a staff to stand outside the doors and windows during a mock session and report whether they can hear the conversation. Some psychiatrists and patients wear headphones, but this does not prevent the family from hearing children talking about their concerns. Some steps to improve audio privacy are summarized in Table 4.

Figure 13
Avoid Surfaces that Cause Glare

Courtesy of David Roth MD, Mind-Body Clinic, Honolulu

Table 4. Improving Audio Privacy

Ways to improve audio privacy include:

- Choose a room away from clinic or home traffic
- Close windows and doors
- Block gaps below doors
- Place a white noise machine outside and beside the door to the telepsychiatry room.
- Put carpet or an area rug on the floor.
- Add pillows to couches, curtains on windows, and/or tapestries on walls to absorb sound
- When remodeling, use decoupling soundproofing construction techniques.
- Consider using a headset microphone to block others from hearing patients' verbalizations

Figure 14
Shiny Horizontal Surfaces Cause Glare

Courtesy of David Roth MD, Mind-Body Clinic, Honolulu

Figure 15
Compromised Privacy

Courtesy of David Roth MD, Mind-Body Clinic, Honolulu

Audio quality: distractions and audio signal

Audio privacy and comfort also relate to the ambient noise, including printers, air conditioners, fans, intercoms, pets, lawn equipment, and outside traffic, and varies from room to room. The microphones are sensitive and can amplify these sounds, which affects the quality of the sessions, including noise from clicking of the keyboard when psychiatrists type notes during sessions. As noted in Figure 10, a quiet keyboard minimizes the noise from clicks when typing. Noise can also be minimized by using an underlayment or pad under the keyboard to soften the sounds.

Rooms should be selected to minimize these common interfering sounds. However, most rooms are not perfectly quiet, and the psychiatrist should work with staff at the patient site or at the patient's home to implement strategies to decrease background noise. Some approaches to do such are summarized in Table 5. If services are provided in the home, other household members should be forewarned to stay out of the room during the session.

Table 5. Minimizing Background Noise

Approaches to minimizing background noise include:

- Close windows and doors
- Turn down/off window and portable air conditioners, fans
- Do not to run other equipment (e.g., printers, fax machines, dishwashers)
- Turn off electronics
- Keep pets out of the room
- Encourage the patient site to only allow quiet toys without multiple parts,such as foam blocks, books, markers, action figures and dolls

Audio communication depends on the quality of the microphone and speakers. Computers, tablets, and phones often have built-in microphones and speakers that are adequate for providing clinical services. However, if psychiatrists can add a peripheral device to their system, a quality microphone can filter out background noise and improve communication. If the psychiatrist is the only person in the room, he/she could use a headset microphone that eliminates most background sounds and ensures that participants' voices are not overheard. Perhaps the most common audio problem relates to selection of the correct settings. If the psychiatrist has difficulty hearing the patient, ensure that the correct output device (speaker) is selected and if the patient has difficulty hearing the psychiatrist, ensure that the patient has selected the correct input device (microphone). If audio problems cannot be resolved, the psychiatrist can call the patient on the phone and just use the computer for video. The chat box can indicate this process to the patient. Echoes are another common problem. This may occur when a speaker systems is connected to a computer, tablet or phone. In these cases, the external speakers should be disconnected. Echoes may also occur with Bluetooth or Airplay connected speakers. Finally, feedback loops can develop making conversation impossible. The loop can be broken by having one or both sites mute their microphones when not speaking. Alternatively, participants should use headphones to eliminate the loop.

Finally, it is essential to have a backup plan in case the audio connection fails. Usually, a conference speakerphone can be used to provide an adequate audio connection while not seriously compromising synchrony with the video signal. The audio device in the videoconference software must be muted to avoid echoes and feedback due to running two microphones simultaneously. If the videoconferencing is provided by a smartphone, and another phone is not available, the videoconferencing session may have to be terminated and then reconnected by audio only to finish the session. Inevitably, at some point, bad connections occur. It may be necessary for both sites restart their software. If the connection is still poor, the internet modem and router may need to be restarted.

Summary

Psychiatrists who are effective TeleTreatment clinicians can create authentic psychiatrist-patient relationships by supplementing good bedside manner with a few media-based skills, strategies, and techniques that make TeleTreatment look easy. The resulting interactions feel authentic to both patients and psychiatrists. With sufficient practice, psychiatrists can be as effective and comfortable treating patients via videoconferencing as they are in other clinical venues. Additional resources on optimizing the telepsychiatry session are available through the National Consortium of Telehealth Resource Centers (2022) and the National Telehealth Technology Assessment Resource Center (2022).

INTERVENTIONS

Interventions provided via TeleTreatment to children and adolescents should be consistent with clinical practice guidelines established by the American Academy of Child and Adolescent Psychiatry (AACAP, 2022) or other national psychiatric organizations with child and adolescent based guidelines. They should also follow guidelines established specifically for TeleTreatment (American Academy of Child and Adolescent Psychiatry Committee on Telepsychiatry and the Committee on Quality Issues, 2017; American Telemedicine Association, 2013).

Developing rapport during videoconferencing

In addition to translating clinical practice guidelines to the videoconferencing venue, particular attention to cultural context is needed as psychiatrists located in urban/suburban areas and families in distant communities often differ in their cultural heritage and values (Brooks, Spargo, Yellowlees, 2013). Some simple research into the psychiatrist's partner communities may help in developing rapport, and trust. Further, while interventions developed in HICs may focus on the child or adolescent, interventions adapted to LMICs may focus on the family or the parents' relationship with the youth. Thus, the psychiatrist needs to adjust the approach to deliver culturally competent care.

Most youth quickly develop a rapport during TeleTreatment with just a few strategies to engage the youth. A virtual handshake, "high 5s," or "fist pumps" quickly engage youth, as shown in Figure 16. At the beginning of the session, asking about friends, favorite activities, or the school verbally engages youth. The youth often wants to understand how the session works. A simple discussion that includes the psychiatrist's location often readily engages youth. If the youth is anxious or shy, the parent may start the conversation and the psychiatrist tells the youth to offer his opinion if he does not agree with the parent's viewpoint.

School-aged children, the modal patient presenting for TeleTreatment services, are readily engaged. Younger school-aged children love to draw a picture and then share it with the psychiatrist over the camera and monitor. The psychiatrist asks the child to tell a story about the picture, allowing him/her to evaluate the child's intellect, cognitive organization, language skills, activity level, concentration, as well as the ability to enjoy interpersonal relations. Older school-aged children enjoy doing spelling or math problems that the psychiatrist assigns and then reviewing progress together. Of course, best results are obtained to start with relatively simple assignments so that the child can demonstrate proficiency.

Figure 16
Engaging Youth over the Monitor

Courtesy of David Roth MD, Mind-Body Clinic, Honolulu

Youth with Attention-deficit Hyperactivity Disorder (ADHD) need a modified approach for their own welfare and to protect items in their room. After initial engagement over the monitor, it may be most helpful to allow these children to play or roam for a while, then bring them back again for interaction. Likely they will not spend time drawing or doing a written assignment, but they may engage by talking about an issue of their choosing or showing something they enjoy, like a pet, music, a toy, etc. It may be possible to use wired ear phones so that they have to stay near the camera. Youth with Oppositional Defiant Disorder (ODD) may need extra motivation to stay in the frame for brief one to five minute intervals. Rewards may increase duration of their engagement. If youth with ODD agree to participate but off camera, just keep them talking and let them decide when to come back on camera ---- which they usually do when the parent(s) starts discussing an issue with which they disagree. Of note, if the family is using a phone for the session, they can switch to the rear-facing camera to clandestinely show the youth's behavior during the session. But beware. If youth are off camera and their parent(s) is occupied speaking with the psychiatrist, the child may cause damage in the room that is not noted until too late. It is best to keep the youth on camera if at all possible.

If youth become agitated, it may be necessary to excuse them from the session and ensure other family members' safety prior to continuing the session. Sometimes they will agree to communicate via chat of texting instead of interacting verbally. Encourage these patients to bring familiar and calming items to distract them while speaking with the parent(s), or just to use while taking a break during the session. Caution is warranted here as well. If the youth is allowed to bring electronics, it will be difficult to engage them. So one of the few "rules" is no electronics!! Of course, some psychiatrists and parents will state that this is the only way to get an opportunity to talk without interruptions from the youth. Perhaps "the rule" is electronics only at the end, but do not expect the child to re-engage and do expect a possible tantrum if the electronics are taken away which could delay ending the session.

Children with developmental disorders such as autism spectrum disorder (ASD) may be wary of interacting over the monitor. Consider allowing them to stay in the background if they want, speaking and engaging as they are able. The main issue is that the psychiatrist must be creative in keeping the child in the session while also conducting an appropriate clinical assessment.

Special assessment is also needed regarding the child's appropriateness for a traditional play session. An adult should be readily available nearby if a play session is attempted or if impaired children are engaged individually. Alternatively, the school-aged child may be observed interacting with staff in a structured or free play session, or engaged directly in play, such as developing a scenario with puppets.

Young children have other considerations. Preschoolers should be observed in developmentally appropriate interactions with their parent(s) and, if indicated, to examine separation anxiety or other clinically relevant concerns, with an unfamiliar adult, perhaps a staff member. Direct interaction with the young child is essential, such as distinguishing colors, pointing to body parts, relating a story with a special toy, or even singing their ABCs with the psychiatrist. It is helpful to

spend more time at the beginning of each session engaging the child after greeting the parent(s). The child should be allowed to play with selected toy(s) while speaking with the parent(s). This is not just to keep the child busy, but to note how the child plays, his/her attention span, imagination, and ability to entertain him/herself. It is also an opportunity to test how much the child really listens to and understands the conversation.

Adolescents may be more challenging to engage, especially if depressed. Spending some time privately with the teen, just as during in-person sessions, will best facilitate engagement. They may engage better in their room or otherwise securely away from their parents. The psychiatrist may have to go online with the teen to share a favorite electronic game, music, or website. Anxious youth are more likely to engage but they may not want to see their image in the picture-in-picture feature on the screen. So, it may need to be turned off. With anxious youth, it is best to start speaking about concrete topics, for example their interests or recent activities, then move to topics that are anxiety provoking.

Youth who are suicidal, manic or psychotic can be treated through TeleTreatment by setting up the session in collaboration with others either at the patient site or within easy access. Having a written protocol and triage process established prior to meeting with these high-risk youth will reduce the likelihood of a crisis and/or provide ease of responding if there is a crisis (Sharma, Feuer, Stuart, et al., 2022). The protocol includes steps to contact supportive and crisis services in the youth's area and the youth's consent to contact the parent(s). The protocol needs to be in place including the youth's signed consent prior to the session if the youth's high-risk status is known ahead of time. Clear communication among all relevant team members is important to safe TeleTreatment interventions.

Figure 17
Closing the Session with a Friendly Gesture

Courtesy of David Roth MD, Mind-Body Clinic, Honolulu

Closing a TeleTreatment session is as important as beginning a session. The psychiatrist prepares for the closing by verbally and non-verbally communicating that the session is ending. Verbally, the psychiatrist may summarize the session, state the plan made such as laboratory testing or the medication prescribed, note a plan for follow-up, and make a traditional closing remark, such as wishing the patient well. Non-verbally, the psychiatrist may move back from the camera, break eye contact, and raise a hand to signal good-bye, Figure 17. The closing should feel natural to the patient.

In each of these intervention scenarios the main message is that psychiatrists conducting TeleTreatment sessions must be flexible and creative in applying their clinical skills to ensure that they transcend the technology engage the youth, develop trust with both the youth and parents(s), obtain an accurate evaluation and make an appropriate treatment plan.

Figure 18
Pharmacotherapy with Youth

Pharmacotherapy during videoconferencing

Pharmacotherapy can be provided readily during TeleTreatment. Approaches to medication management depend on the model of care (Cain, Sharp, 2016; Myers, Valentine, Melzer, 2007) including direct-to-patient treatment as shown in Figure 18. All models of pharmacotherapy require maintenance of communication with the primary care physician throughout this process. In the United States, medications that are not labeled as "controlled" or "scheduled" substances and, therefore, not regulated by the Drug Enforcement

Administration (DEA), can be prescribed as during in-person practice. Controlled or scheduled medications have additional regulations, as regulated by the Ryan Haight Online Pharmacy Consumer Protection Act (110th Congress, 2008) that regulates internet prescribing. This regulation requires an existing patient-physician relationship before prescribing a controlled substance or the presence of another DEA-registered physician at the patient's site during any virtual session. Obviously, restrictions on prescribing dilute the value of TeleTreatment (Kafterian, Caudill, Kim, et al., 2019). LMICs, as well as other HICs, may also regulate the prescription of such controlled substances, although countries new to telemedicine may not. Psychiatrists should establish procedures to ensure compliance with current legislation in their countries. Of note, during the COVID-19 pandemic in the United States, this regulation was waived (https://telehealth.hhs.gov/providers/policy-changes-during-the-COVID-19-public-health-emergency/prescribing-controlled-substances-via-telehealth/) indicating that the federal legislature knows the barriers to implementing telemedicine on a nation-wide scale. Psychiatrists and policy-makers are preparing arguments to federal agencies to maintain these gains after the pandemic has resolved.

Figure 19
Evaluation of Children with Developmental Delays

Tracking vital signs, height, and weight, obtaining rating scales, assessing adverse effects, and monitoring physiologic status with laboratory monitoring are accomplished during clinic-based TeleTreatment sessions with coordination from the staff at the clinic. Such monitoring for sessions conducted at home should be coordinated with the primary care clinic or school. Abnormal movements due to antipsychotic medications can be assessed remotely by the psychiatrist using the Abnormal Involuntary Movement Scale (Amarendran, George, Gersappe, et al, 2011) or a nurse at a clinic or school can be trained to complete the scale in-person. An important aspect of medication management is providing care or assisting staff in between the sessions. Families should be given clear directions for requesting refills, asking questions and reporting adverse effects.

Figure 20
Evaluation of Children with Developmental Delays

Psychotherapy during videoconferencing

Models of psychotherapy through videoconferencing are evolving. Autism spectrum disorders and other developmental disorders are increasingly recognized across LMICs, similar to HICs. Early identification and intervention are crucial to helping these children develop their innate potential. Psychiatrists in distant can virtually provide the evaluation for early identification, as shown in Figure 19, and then join the local clinical team for intervention planning that includes the parent(s), the primary care physician, school system, and specialists from selected disciplines.

Figure 21
Parent Coaching & Child-Directed Play

Courtesy of Yaniz Padilla Dalmau PhD, Seattle Children's

As noted in the section "The Evidence-Base in Support of TeleTreatment with Children and Adolescence," the delivery of behavioral and cognitive behavioral therapies through videoconferencing is feasible, although most psychotherapy outcome studies have been small and effectiveness is not clearly established. The interventions that appear to be the most readily adaptable to TeleTreatment are those involving the parent interacting with the child, such as Parent-Child Interaction Therapy (PCIT) for pre-school-aged children (Lyon, Budd, 2010) as shown in Figure 20 and child-directed therapy as shown in Figure 21. Child-focused interventions include tics and obsessive-compulsive disorder using the parent as a local coach to translate the psychiatrist's behavioral components to the

youth.

Less has been documented for TeleTreatment with adolescents. Working with depressed teens who are often very withdrawn or irritable can be challenging (Figure 22). However, clinical work during the pandemic lends experiential validation to the feasibility of delivering cognitive-behavioral intervention to teens with anxiety and depression (personal communication, Schoenfelder Gonzales, 2021). Structured cognitive-behavioral protocols may require some flexibility to accommodate youths' ability to work through the technology.

Figure 22
TeleTreatment with Depressed Teens

The pandemic has encouraged clinicians to be creative. Groups for parents of children with attention-deficit hyperactivity disorder (ADHD) and anxiety disorders have been successfully implemented. Considerable time is needed to establish these groups. However, experience has demonstrated that these groups are feasible, and early evidence suggests that they are acceptable to clinicians and parents. However, the corresponding children's groups for ADHD and anxiety that typically accompany the parent groups have been difficult to implement as these children require ongoing adult supervision that is typically not included in these groups when delivered in-person.

Figure 23
School-Based TeleConsultation

Group therapy via videoconferencing for parents of children with ADHD and anxiety disorders is feasible, as demonstrated during the pandemic (personal communication, Schoenfelder Gonzales, 2021). TeleTreatment provides an excellent venue for youth with medical disorders that preclude their meeting in-person, such as youth with cystic fibrosis or who are immunocompromised. Group therapy via TeleTreatment appears promising for bringing evidence-based treatments to youth in distant communities who typically do not have access to group interventions as recent experience has demonstrated the feasibility and success of group TeleTreatments for youth with anxiety or depression who were transitioned from in-clinic treatment to TeleTreatment during the COVID-19 pandemic. An unanticipated benefit of these virtual groups is that they do not require clinic space that is often limited. Going forward, these successful experiences encourage psychiatrists to use their creativity and local resources to explore other applications of TeleTreatment options with youth and their parents.

Figure 24
TeleConsultation to School Counselor

TeleConsultation

TeleConsultation involves multiple venues. One of the most common TeleConsultation in child and adolescent psychiatry involves the school system. Psychiatrists consult to school nurses or health officers regarding the medical aspects of a youth's mental or behavioral disorder, Figure 23, and with school counselors and therapists, Figure 24. Note that schools usually have limited space to accommodate Tele-Consultation, or other virtual services. Thus, a classroom or office room is often used that does not have an optimal set up. This is noted in Figure 24 that shows cluttered backgrounds that can cause visual reflections and hard surfaces that can cause auditory distortions. One aspect that can be controlled is minimizing shuffling of all those papers on the TeleConsultant's desk that interfere with the microphone. Another example is shown in Figure 25. TeleConsultation from psychiatric experts to school systems are often conducted in large conference rooms with large tables. The long hard surface of conference tables may cause echoes that interfere with the audio quality, but the non-shiny, matte finish of the table surface prevents glare.

Figure 25
TeleConsultation with School Team

Courtesy, Antonio PignatielloMD, Hospital for Sick Children, Toronto, ON)

These situations represent the realities of doing TeleConsultation and TeleTreatment in the "real world." Psychiatrists must balance the benefits of providing services that would otherwise be unavailable for a community versus suboptimal conditions.

The most common, and valued, use of TeleConsultation for child and adolescent psychiatry in LMICs involves consultation from a child and adolescent psychiatrist to primary care professionals in distant communities, with or without the family present, as shown in Figure 26. These TeleConsultations are beneficial to stakeholders. Families do not need to travel to urban areas for treatment, primary care professionals increase their skills and obtain support in treating their young patients' needs, and child and adolescent psychiatrists at major medical centers provide new learning experiences for their trainees.

Figure 26
TeleConsultationto Primary Care

EVALUATING A TELETREATMENT SERVICE

In HICs, the demand for all telemedicine services has outpaced development of an optimal evidence-base supporting its efficacy. Ongoing evaluation of TeleTreatment and TeleConsultatin services will help all countries to determine the feasibility of implementing a program within their selected geographical areas, populations, and disorders. Evaluation may include process variables, such as the description of the population served, appointments kept or canceled, hospitalizations required or averted, collaboration in the community, types of services provided, and adherence to treatment plans. Routine documentation of adverse events and measurement of outcomes with standardized rating scales help to demonstrate the safety of treatment and patients' progress. Assessment may also include satisfaction ratings from the referring primary care physicians and other stakeholders, input from teachers, and parents' perceptions of treatment and progress. Psychiatrists should also consider evaluating caregivers' burden and how this is reduced by having access to TeleTreatment services (Vander Stoep, McCarty, Zhou C, et al., 2017). Exploring the virtual relationship between the patient and psychiatrist could help understand salient mediating factors when delivering care remotely. Kramer and colleagues (2012) have described a model to inform overall TeleTreatment research design, and Slone and colleagues (2012) describe additional guidance specific to pediatric research settings. Such evaluations can be published in a community's newsletters or on social media for local professional organizations, or submitted to national publications. Even simple sharing at professional meetings can help to ensure best practices-care for other child and adolescent psychiatrists seeking to incorporate TeleTreatment into their practices.

BEYOND TRADITIONAL VIDEOCONFERENCING

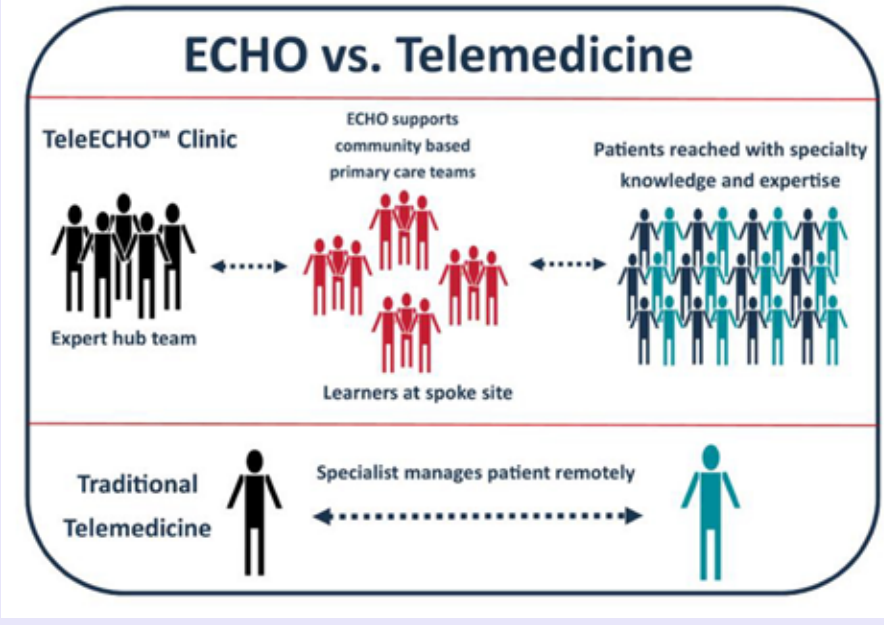
TeleTreatment, as described above, uses technology to replicate the traditional model of care, that is, one-physician-to-one-patient. While this model is important to providing direct service to under-served youth, it does not create new resources; it only redistributes the existing workforce which is sparse in LMICs. Approaches are needed to leverage the existing psychiatric workforce and the technology to reach more youth and to support their primary care physicians. Here we address WHO's broader definition of telemedicine that includes digital technologies that are used to "…deliver healthcare and improve the health of

the patient." The available and emerging technologies are particularly suited to situations in which the traditional synchronous, doctor-patient virtual office visit is impossible or inefficient. They focus on TeleConsultation to primary care physicians and direct-to-patient asynchronous models. Multiple terms have been used to refer to these technologies such as "e-health" or "connected health." We use the term "digital health."

Digital Health to Support Primary Care Professionals' Role in Mental Health Care

The Extension for Community Healthcare Outcomes model, or Project ECHOTM(https://echo.unm.edu) is a model that leverages both the psychiatric workforce and the videoconferencing technology but transcends the traditional model of one-physician-one-patient care. Project ECHOTM was founded at the University of New Mexico in 2003 by Sanjeeva Arora MD. Dr. Arora was concerned about the lack of specialists to consult to primary care physicians in managing patients' special needs. He notes that Project ECHOTM seeks to ensure that "the right knowledge exists at the right place at the right time" (About Us (unm.edu). A medical specialist at a university or other major medical center consults simultaneously to multiple primary care physicians across a broad geographical area with the aim to improve those physicians' skills in best practices-care for managing common and complex medical diseases. A schematic of Project ECHOTM is shown in Figure 27.

Figure 27 Multiple Physicians and Patients



In child and adolescent psychiatry, the psychiatrist meets on screen with a group of primary care physicians who alternate in presenting specific cases (Project ECHO (psychiatry.org). The psychiatrist also provides psychoeducation on topics chosen from the primary care physicians' feedback. Other clinicians may join the consultation, such as psychologists or dieticians (Alicata and Cheng, 2018). A sample child and adolescent Project ECHOTM psychiatry program is shown in Figure 28. Thus, Project ECHO® virtually redistributes the psychiatric workforce

Figure 28
28ECHO™ for Child & Adolescent Psychiatry

Courtesy of Daniel Alicata MD, PhD at University of Hawaii

and supports primary care physicians so that patients can obtain appropriate care in their own communities. It also allows the primary care physicians to serve as an ongoing support network for one another. In the United States, these programs are typically funded by the individual states, or grants.

This model is increasingly finding applications in the United States demonstrating its feasibility and its acceptance by physicians in diverse settings. The major limitation is finding child and adolescent psychiatrists who are interested in the model and primary care physicians who are willing to manage psychiatric conditions. Project ECHOTM has started to find applications for medical disorder in some LMICs (Partner Portal (unm.edu) but not yet for mental health disorders. These programs for medical disorders have been funded by WHO or other global organizations such as the Fogarty International Center at the National Institute of Health (Fogarty International Center (nih.gov) in the United States in conjunction with individual LMIC governments. Considering the severe paucity of psychiatrists in LMICs, the Project ECHOTM model is an ideal mechanism to disseminate the expertise of child and adolescent psychiatrists at academic and major medical centers to physicians in rural communities. Countries with nationalized healthcare systems may be especially suited to invest in training a new breed of child and adolescent psychiatrists to deliver the Project ECHOTM model.

Store-and-forward telehealth is one approach that leverages the limited workforce and the widely available m-health technology. It has been explored predominantly with adults. A clinician (various disciplines) at an originating site conducts and records a structured interview with a patient and then forwards the recording to a psychiatrist who reviews the recording and offers an opinion on diagnosis and treatment planning, which is then implemented by the consulting primary care physician. This approach has shown good feasibility with adults (Yellowlees, Parish, Gonzalez, et al., 2018). A variation has been described with youth. Parents use their smart phone to record selected, protocol-driven samples of their children's behaviors in the home setting in selected situations, such as task demand. The recording is uploaded to a secure website for review by a behavioral health expert who provides feedback to the family and primary care physician. This approach has shown good accuracy, reliability, sensitivity, and specificity (Smith, Rozga, Matthews, et al., 2017) for providing high quality information that primary care physicians used for diagnosing autism and authorizing needed interventions for children with autism spectrum disorders. Potential broader applications are evident, for example to sample a child's behavior in the classroom for later assessment by a psychiatrist at a distant site. To date, funding for this approach has been through grants.

Telephony is a low tech approach to leveraging the psychiatric workforce by supporting primary care physicians in youth mental health care. The frequency and longevity with which most youth visit a trusted primary care physician make primary care a feasible and scalable solution to address youth behavioral health care needs. Primary care physicians often serve as default mental health providers, but lack the time and training to optimally manage most behavioral health concerns and they lack realistic referral options. Most view their primary role in behavioral healthcare as limited to screening, diagnosis, education, and medication management (Stein, Storfer-Isser, Kerker, et al., 2016; Pidano, Honigfeld, Bar-

Halpern, et al., 2014) and express a desire for reassurance from specialists in this role (Pidano, Honigfeld, Bar-Halpern et al., 2014). The universally available telephone / smart phone comprises an effective and efficient approach to deliver this reassurance (Hilt, 2016; Hilt, Romaire, McDonell, et al. 2013). Telephony programs provide behavioral health consultation with several components: 1) Phone consultation on specific cases, 2) training of primary care physicians in behavioral health topics through educational venues; and 3) provision of referral information. Each program also incorporates its own site-specific components, such as a videoconference in the primary care office with patients who pose particular challenges to diagnosis and treatment planning (www.seattlechildrens.org/healthcare-professionals/access-services/partnership-access-line). In the United States there are now over 25 of these programs affiliated in the National Network of Child Psychiatry Access Programs (NNCPAP; https://nncpap.org/). The success of these programs is evidenced by their ability to modify PCPs' management of child and adolescent behavioral health conditions (Hilt, Romaire, McDonell et al., 2013; Platt, Pustilnik, Connors, et al., 2018). Such telephony programs hold considerable promise for LMIC governments that seek to support their primary care physicians and improve the mental health of their young people. Generally, these initiatives are funded by their state governments.

Egypt introduced a variant of telephony during the pandemic lockdown (EL Havek, Nofal, Abdelrahman, et al., 2020). They established a specialized national child and adolescent mental health helpline. Services including providing parenting advice and psychological support. With more challenging cases suggesting psychiatric disorders, parents are encouraged to seek available psychiatric help from the nearest mapped services. In cases of emergencies, such as abuse, a specific protocol was applied. To ensure continuity of the services to children with autism spectrum disorders, some centers provided training to mothers with weekly follow up calls.

The MH² is an early research effort that is testing a parent web-based "app" designed to optimize medication titration of Attention-Deficit Hyperactivity Disorder (ADHD) for children (Paschall, Marti, Cheung, et al., 2018). The treatment of ADHD remains suboptimal in HICs, especially in community settings. Given near-universal access to smart phones in the United States, m-health holds promise for improving treatment, and for developing family-centered care. The parents use the MH2 "app" to obtain education about ADHD, understand medication side-effects, set reminders for medication administration, document medication adherence, and enter ADHD behavior ratings for their child in response to medication titration. The MH2 program aggregates these parent-generated data and sends them to their physician. Then, during in-person visits, results are displayed on the physician's iPad to facilitate medication decision-making collaboratively between the physician and family.

Early results of process variables with several samples indicated that parents' use of the main features of the MH2 "app" was feasible and was sustained during early medication titration, although consistency of use varied widely and frequency of use decreased over three test sessions. Ratings of parent competence, treatment acceptability, medical-management self-efficacy and medication adherence rates improved moderately from baseline to end of the study and were substantially higher than those reported among parents of children served in comparable, low

income, publicly funded mental health programs. A downside of these outcome variables was that they varied so widely. Overall, the authors concluded that MH2 facilitated parent-centered medication decision-making during early stimulant medication treatment. More reports on the MH2 system should be forthcoming.

Digital Health for Direct-to-Patient Care

i-Therapies are asynchronous, self-administered, psychotherapy interventions delivered to patients at convenient times, in a non-clinical setting, on their preferred electronic device. Development of these interventions recognizes the large number of youth in need of mental health treatment, the scarcity of psychiatrists and other mental health clinicians, and the inability of many families to access services even when they are available. i-Therapies are being tested predominantly in HICs with government-supported healthcare, including Great Britain, Sweden, the Netherlands, Australia, and New Zealand (Lenhard, Andersson, Mataix-Cols, et al., 2017; Merry, Stasiak, Shepherd, et al., 2012; Stasiak, Fleming , Lucassen, et al., 2016). Generally, they have a theoretical orientation based on Cognitive-Behavioral Therapy (CBT) for depression and anxiety (Schniering, Einstein, Rapee, et al., 2017) for which they have demonstrated effectiveness, although perhaps more for anxiety than for depression (Christ, Jschouten, Blankers et al., 2020).

A strength of i-therapies is their reliable delivery of the intervention's content, whereas "real world" therapists may deviate in implementing manualized protocols. The downside is that many youth drop out after completing only a few modules, consistent with the adherence challenges common to other online self-help tools (Ebert, Zarski, Christensen, et al., 2015). In adult studies, support by a therapist or coach by phone or "chat" increases adherence. Such asynchronous support may be needed with youth. Perhaps the success of i-therapies will be in a hybrid model that alternates in-person and i-therapy sessions, thereby efficiently decreasing the number of in-person sessions needed to achieve effectiveness; or in which in-person sessions support the use of i-therapies. These approaches have some potential to turn therapy around, i.e., the delivery of the intervention is primarily through i-therapy while the therapist provides support for use of the i-therapy modality and/or additional services as indicated. While a promising approach for universal dissemination of therapies for milder behavioral and mental health disorders, funding for i-therapies has not been adequately addressed, particularly for use in private practice.

The internet and mobile health technologies (m-health) are emerging as a major asynchronous source of health information (Eysenbach, Powell, Kuss, et al., 2002). Kauer, Mangan, Sanci, 2014; Wood, Benson, LaCroix, et al., 2005), which has implications for young people who prefer online environments as their primary mode of communication (Thayer, Ray, 2006). Teens may use their mobile devices to learn about their health, including their mental health. Psychiatrists may integrate these digital technologies into their practices to appeal to teens. They may strengthen the impact of their interventions with online "homework" between in-person sessions. Digital technologies may also be used to efficiently conserve the scarce psychiatric workforce, for example by alternating in-person with online sessions. Following are some evolving digital healthcare approaches in child and adolescent psychiatry.

Recognizing this trend, digital self-help programs online and through "apps" are proliferating for youth (Thayer, Ray, 2006; Blanchard, Herrman, Frere, et al., 2012; van der Zanden, Kramer, Gerrits, et al., 2012; Price, Yuen EK, Goetter E, et al., 2014; Merry, Stasiak, Sherherd, et al., 2012). These low risk technologies have the potential to efficiently increase youths' knowledge of mental health and mental health conditions (van der Zanden, Kramer, Gerrits, et al., 2012) and increase autonomy in self-monitoring and determining their need for assistance (Bradford, Rickwood, 2015; Hetrick, Robinson, Burge, et al., 2018; Iorfino, Cross, Davenport, et al., 2019; Kauer, Reid, Crooke, et al 2012; Ospina-Pinillos, Davenport, Iorfino, et al., 2018; Ospina-Pinillos, Davenport, Ricci, et al., 2018) and finding referral resources (Kim, Coumar, Lober, et al., 2011). They may also find useful psychoeducation materials for self-administered interventions for milder problems (Hoek, Marko, Fogel, et al., 2011; Kollins, DeLoss, Canadas, et al., 2020; Tait, Christensen, 2010).

Youth can find "apps" that aim to provide self-screening, monitoring, and even treatment for selected conditions, such as insomnia, depression, and anxiety (Calear, Christensen, 2010; Hoek, Marko, Fogel, et al., 2011; Ospina-Pinillos, Davenport, Iorfino, et al., 2018; Ospina-Pinillos, Davenport, Ricci, et al., 2018; Lenhard, Andersson, Mataix-Cols, et al., 2017; Merry, Stasiak, Shepherd, et al., 2012; Stasiak , Fleming, Lucassen, et al., 2016); Tait, Christensen, 2010; Thabrew, Stasiak, Hetrick, et al., 2018). Some of these "apps" are based on solid research (Merry, Stasiak, Shepherd, et al., 2012; Whiteside, Biggs, Tiede, et al., 2019).

However, this potential to aid youths' efforts to tend to their mental health needs is offset by several factors. Most of these "apps" lack an established evidence-base regarding their validity, reliability, and effectiveness. Also, there is insufficient data regarding the potential adversities of such untested "apps" (Grist, Porter, Stallard, 2017; Leigh, Flatt, 2015). Many "apps" are proprietary and must be purchased, making them inaccessible for the 90% of youth aged10 to 24 years old who live in LMICs (Das Gupta, Engelman, Levy, et al., 2014), who, then, are at risk of experiencing not only physical and social but also technological inequalities in health. Until there is formal evidence supporting such "apps," psychiatrists can help their patients to choose an appropriate "app" by using the American Psychiatric Association's "app" evaluation model to critically assess accessibility, privacy and security, clinical foundation, engagement, and interoperability (Lagan, Sandler, Trouous, 2021); however, there is no centralized database for users to view the performance of these "apps" when assessed via this model. Another available evaluation frameworks include the Mobile App Rating Scale (MARS) (Stoyanov, Hides, Kavanagh, et al., 2015) or the Adapted MARS (Roberts, Davenport, Wong, et al., 2021).

Despite the potential benefits of m-health tools to help youths' mental health, uptake has been limited due to difficulties with engagement, adherence, and attrition (Clark, Kuosmanen, Barry, 2015; Eysenbach, 2005; Garrido, Millington, Cheers, et al., 2019). Many explanations have been proposed, most specifically the need for participatory design methodologies with youth in construction of the tools (Bjerkan, Hedlund, Hellesø, 2015; Hagen, Collin, Metcalf, et al., 2012; Ospina-Pinillos, Davenport, Ricci, et al., 2018). Multiple technological solutions have been proposed, particularly "gamification" (Burns, Davenport, Christensen, 2013). Cheng, 2020; Cheng, Piper, Ottavio, et al., 2021); Fleming, Stasiak,

Moselen, et al., 2019).

It is not yet clear whether the experience of m-health will be different in LMICs. Given the dearth of child and adolescent psychiatrists, as well as other mental health clinicians, uptake would, ideally, be better than in HICs. Ninety percent of the world population aged 10 to 24 years lives in a LMIC (Das Gupta, Engelman, Levy, et al., 2014). As m-health technologies become more widely distributed, youth and their families may access psychoeducation sites to identify their conditions and to seek clinical services, if their LMIC has a mental health workforce. Psychiatrists in these countries could incorporate m-health into their practices to augment their sessions, or to efficiently alternate in-person and self-administered sessions that would, thereby, optimize utilization of the country's psychiatric workforce and minimize youths' absences from school and parents' absences from work. Primary care providers can utilize m-health to obtain education in mental health (Patel, Saxena, Lund, et al., 2018), access guidelines regarding mental health conditions and interventions, and provide information to their patients. They may also obtain digital consults from available psychiatrists at major medical centers.

There are several concerns regarding the use of m-health as a solution to the dearth of mental health services in LMICs, beyond the concerns cited for HICs above. First, as noted for HICs, many available "apps" and other resources are not sufficiently examined to allow their recommendation. It is tempting to think that an available digital intervention is better than no intervention (Garrido, Millington, Cheers, et al., 2019). There is just not sufficient evidence to know this; and, if families must pay for an intervention, there is risk of indirect harm. Second, many m-health "apps" are not available in varied languages (Ospina-Pinillos, Davenport, Navarro-Mancilla, et al., 2020). Third, even if translated into a country's language, these "apps" may not be vetted for cultural relevance. Finally, families in LMICs may not be receptive to m-health modalities, and only trust clinical information conveyed by a physician during an in-person visit.

Going forward, we support the Lancet Commission on Global Mental Health and Sustainable Development (Patel, Saxena, Lund, et al., 2018) and the World Economic Forum (2019) that propose that the internet and other digital tools can expand equal access to care and treatment, or at least reduce the barriers to equal access. Recognizing the diversity of the global community, they also advocate for the development of regulations and policies regarding the use of health information technologies for mental health care. The response of LMICs to these recommendations will require that psychiatrists, cultural advocates, technology specialists, and governments collaborate to explore m-health approaches to improve the mental health, well-being, and future of their burgeoning young populations. Each country's approach and solution will rely on its internal strengths, values, and goals for their young citizens.

SUMMARY

In HICs, the convergence of increasing clinical needs, limited mental health resources, and advancing health technologies have made TeleTreatment and TeleConsultation an attractive approach to deliver evidence-based treatment

directly to youth and families who are not well served by traditional models of in-person care. The COVID-19 pandemic removed many barriers to these modalities. A rapidly developed evidence-base and clinical experience during the pandemic have demonstrated the feasibility and acceptability of implementing TeleTreatment services with youth and their families in their homes. Following the pandemic, in-home services are likely to be maintained in mainstream psychiatric practice, but to what extent is not yet clear. Going forward, psychiatrists must keep abreast of technical, financial, and regulatory changes in this rapidly evolving field. Establishing an authentic patient-psychiatrist relationship and a successful practice requires psychiatrists to expand their repertoire of interpersonal relatedness and online presentation to optimize patients' experience.

TeleTreatment and TeleConsultation were incorporated in some LMICs despite the lack of prior experience, demonstrating the potential to include these venues when motivation is high. Generally, TeleTreatment in LMICs takes advantage of the widespread availability of smart phones. However, the dearth of a child and adolescent psychiatric workforce makes a consultative model from psychiatrists to community primary care physicians a more feasible and efficient model of care.

There are many models of digital mental health evolving. These exciting advances should be helpful for LMICs to reach their population of young people with psychiatric conditions. However, for most of the self-administered, asynchronous technologies the lack of an evidence-base supporting their efficacy limits their recommendation. Some self-administered "apps" may be financially unfeasible for families in LMICs. Support by governments, particularly those with social healthcare systems may make some of these evolving mental health technologies options in LMICs.

We need to take advantage of the opportunity that the COVID-19 pandemic has presented to reconsider our models of mental healthcare and their relevance for LMICs. Each LMIC should consider how the available mental health technologies could help their young, and growing, population, how to support the technology that is the "best fit" for them, and move forward with implementing digital mental healthcare. It is time for our world to connect.

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