Telepsychiatry: Applications, Progress and New Initiatives

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Abstract

Telepsychiatry is the use of telecommunications in remote assessing and treating psychiatric patients. This paper introduces the applications and progress of telepsychiatry in clinics, hospital emergency rooms, home-based assessment and treatment, and medical services for students. The applications of computer game and virtual reality in telepsychiatry is also presented. New initiatives of implementing telepsychiatry in the Mississippi Delta, USA is proposed and discussed. The new initiatives cover telepsychiatry services in mental health clinics, hospital emergency departments, tele-monitoring at home, and junior/senior high schools.

Keywords: telepsychiatry, telemedicine, mental health, clinical practices, emergency department, computer game, virtual reality, network, telecommunications

Introduction

Telemedicine can be in the following areas [1]: general telemedicine, telemedicine consulting, telehome home health care, tele-radiology, tele-cardiology, tele-dermatology, and tele-psychiatry. Although education and gender have no impact on employees' mental health and job performance; there is a significant relationship between employees' job performance and mental health [2].

Telemental health (TMH) is feasible, acceptable, and effective service to improve the mental healthcare and outcomes for individuals who cannot access traditional mental health services. Video-teleconferencing is one of TMH approaches. Asynchronous tools include online therapies that offer an efficient first step to treatment for selected disorders such as depression and anxiety. Patients activate themselves in their care through portals that provide access to their healthcare information and Web sites that offer on-demand information and communication with a healthcare team [3]. The integrated care service delivery approach is popular presently to address medical and MH disorders/illnesses in the primary care setting (e.g., schizophrenia, bipolar disorder, recurrent major depression) [4]. TMH approaches will become more personalized. Home monitoring of physiologic functions through digital devices, such as cardiac monitoring, has contributed to greater safety and effectiveness of medical care. One intriguing development is ''smart clothing'' with embedded biosensors that are connected through mobile devices to a database that assesses emotional state. It can monitor vital signs and other physiological indicators (respirations, cardiac rhythm, galvanic skin responses) [3].

Telepsychiatry is a promising strategy to address distance barriers and improve access to care for patients living outside of an urban. Telehealth may be used to assess patient symptoms remotely and provide psychoeducation through existing open source technology that may reach a wider community (e.g., smartphones and Web-based applications) [5]. Telepsychiatry includes videoconferencing, land and cellular telephone lines, computer-based internet tools, and in-home

telehealth communication systems that can combine the phone with additional devices. This helps increase access of services to patients in remote areas, to at-risk populations, and provides opportunities to augment mental health services [6]. Telepsychiatry has increased access to care in urban, suburban and rural settings – with satisfaction very high for a wide variety of services. It is effective for assessment, diagnosis, and treatment across many populations (e.g., adult, child, geriatric and ethnic), with participant experience apparently comparable to in-person care for participants (e.g., patient-doctor communication; cognitive behavioral therapy) [4].

Although empirical evidence on the effectiveness of telepsychiatry has some methodological limitations, telepsychiatric services are comparable to those delivered face to face, and there are no data to suggest that these services are harmful to psychiatric patients, whether they are children or adults. Telepsychiatry appears to be a viable option for providing psychiatric care to groups that are currently underserved [7]. The use of telepsychiatry in partnership with an academic health center and a rural community mental health center may serve as a model for addressing huge mental health shortages in rural areas of unnecessary emergency department visits, as well as hospitalizations. Additionally, use and evaluation of telepsychiatry in other non-traditional health care settings, such as schools, churches, or fire stations, would be logical steps [8].

Limitations on access to care among patients with schizophrenia can lead to treatment nonadherence. This often increases the risk for inpatient hospitalization [6]. In addition, services for patients with schizophrenia are often only available during business hours; many patients need help outside of working hours. Telehealth communication services may improve adherence and enhance stability of treatment response [6]. Schizophrenia is a chronic mental illness which is associated with considerable morbidity and mortality. The promise of telepsychiatry for reducing barriers to care may be especially important for chronic mental illnesses such as schizophrenia. High satisfaction with the telepsychiatric approach to care has been noted in patients with schizophrenia. The use of modalities involving the telephone, internet and videoconferencing appears to be feasible in patients with schizophrenia. These modalities appear

to improve patient outcomes [6]. The successful use of telepsychiatric consultation by secure video chat to remotely assess a mariner expressing suicidal ideation. Telepsychiatry is a validated method of establishing a psychiatric diagnosis and disposition as well as assessing risk of suicidality and the potential for violent decompensation [9].

One area of study related to telemedicine, and particularly telepsychiatry, has been culturally diverse populations and implications for care. Rural sites face many challenges in terms of specific needs of Hispanics/Latinos and Asians, Native American, Eastern European and other populations (e.g., sign language). Language is a key factor and a common practice is to use 'interpreters' on-site. It is known that use of relatives or untrained interpreters miscommunicate medical complaints or de-emphasize information, leading to calls for credentialing. One remedy is adding interpreters by telephone from an academic center or private interpreter service; this is not the same as in-person service [4].

The implementation of HIPAA-compliant electronic communications between providers and families and the use of telepsychiatry for psychiatric assessment, treatment, and provider collaboration are also expected examples of expanded healthcare IT [10]. Telepsychiatry is complex. Barriers to implementation of recommendations included lack of cooperation or willingness by family members and/or youth, the one time nature of the consultation, and the lack of community resources. In addition, sceptics of telepsychiatry have pointed that technological difficulties are also a barrier to successful telepsychiatric consultations [11]. A physician conducting a telemedicine session with a patient in another state of USA must be licensed in both his or her state and the patient's state. Nurses and other allied health professionals have similar state licensing constraints. Establishing a national licensing system is suggested. Barriers such as cost and clinician resistance need to be overcome to increase telepsychiatry use. Technological solutions such as encryption can help maintain patient privacy during telepsychiatry [12].

Telepsychiatry in Clinics

The feasibility and acceptability of telepsychiatry for low-income Hispanic patients with major depression were assessed. Some adult Hispanic patients with major depression were randomly assigned to receive psychiatry services through a video Webcam (WEB) or to treatment as usual (TAU). WEB patients did not differ in the proportion of completed primary care versus telepsychiatry appointments and rated their working alliance with the psychiatrist and their visit satisfaction significantly higher than the TAU patients with their provider. Significantly more WEB than TAU patients used antidepressants. Although depression severity decreased faster among WEB than TAU patients, no differences were found in the overall depression score. Research results showed that telepsychiatry service for depression is acceptable. One of the findings is the impact of the patients' experiences with a psychiatrist and/or telepsychiatry. WEB patients were more willing to pay for telepsychiatry services than TAU patients, indicating a positive disposition toward the telepsychiatry modality [13].

Practice in four areas (patient characteristics, clinical care, symptom severity, and diagnostic outcomes) was examined to describe the care provided and the population seen in the telepsychiatry clinic. It was shown that telepsychiatry evaluations can be valuable for patients with developmental disabilities. Telepsychiatry can provide diagnostic clarity and specific recommendations that can be implemented by the primary care physician [14]. The diagnoses and the ratings of expressive communication level at the initial telepsychiatry appointment are summarized in TABLE -1 [14].

Psychoeducation in the inpatient clinic and telepsychiatric follow-up via telephone after discharge induced decrease in family burden, emotional expression and depressive symptoms for their caregivers and was a support for the family in the patient care [15]. The Internet-delivered parent–child interaction therapy (PCIT) treatment program (I-PCIT) that was being evaluated across multiple randomized clinical trials relative to waitlist comparison, and to traditional in-office PCIT was detailed. Embedded video clips of children treated with I-PCIT were used to illustrate novel aspects of the treatment [16].

**Table (1): Diagnoses of developmental disorders and ratings
of expressive communication level**

	Number	%
Intellectual disorder		
None	7	16
Mild	14	30
Moderate	10	23
Severe	9	21
Profound	5	11
Pervasive developmental disorder		
Asperger's	2	4
Autism	21	47
Childhood disintegrative disorder	1	2
Pervasive developmental disorder, not otherwise specified	1	2
Expressive communication level		
Non verbal	5	11
Vocabulary less than 50 words	27	60
Vocabulary between 50 and 250 words	9	20
Vocabulary greater than 250 words	4	9

A medical center-based forensic clinic that provides the necessary comprehensive consultation, continuing education, court testimony, and clinical services through an applied model of teleconferencing applications was addressed. Telemedicine technology and services have gained the attention of both legal and clinical practitioners. A model that has been applied

to a clinical forensic program that employs telepsychiatry services, and the ethical and malpractice liability issues confronted in using teleconferencing services was examined through a child and adolescent forensic evaluation clinic [17]. Videoconferencing is in common use in Australian forensic mental health services. It provides opportunities to link remote prisons, courts, and psychiatric clinics with distant specialist services, and enables a range of activities including assessment, treatment and feedback, expert testimony, education, and inter-service planning. In reality, videoconferencing should be approached at a government level to provide infrastructure sufficient to expand specialist service provision to those who are usually isolated from effective intervention [18].

The types and nature of distant interventions for patients with schizophrenia was assessed. In a preliminary analysis of patients with psychosis, there was a significant decrease in hospitalizations one year after enrollment in telephone-based interventions. For the Internet-based telepsychiatric patients with schizophrenia, there was significantly less perceived stress and significantly improved perceptions of social support. The assessment results also showed that hospitalized patients with schizophrenia were willing and able to participate in clinical trials via remote interviews conducted via videoconference [6].

Several key administrative lessons have been learned from some clinics and are summarized in TABLE-2 [19]. Although these clinics are based on a model of a single psychiatric provider, examinations of different models of mental health treatment delivery should be explored, including mental health team-based approaches and collaborative/consultative treatment in primary care settings [19].

Telepsychiatry in Hospital Emergency Rooms

Psychiatrists' evaluations of Emergency Department (ED) mental health patients made face-to-face or by telemedicine were compared. Patients were interviewed by a psychiatrist either face-to-face in the ED or remotely by video. There were no significant differences for disposition recommendation, strength of recommendation, and diagnosis. There was no

Table (2): Lessons learned from American Indian Veteran Telemental Health Clinics

Administrative

- Multi-organization collaborations are essential, possible, and desirable.
- The right configuration of organizational partners is critical with clear roles, responsibilities, and processes of communication.
- Overall administration structure needs to be consistent but with enough flexibility to meet the needs of individual patient sites.
- Importance of having local facilitator between the tribal-based organizations and federal and university systems.

Clinical

- Importance of formal and informal care coordination within and between medical systems of care for patients.
- Electronic medical record serves as important communication tool for care coordination.
- Attention to cultural impact on clinical process and cultural adaptation of patient site.
- Importance of one to two primary treatment relationships to build long-term treatment rapport, engagement, and trust.

significant difference for the intraclass correlation coefficients for the suicide scale. These provide support for the safe use of telepsychiatry in the ED to determine the need for admission to inpatient care, thereby adding to the confidence of psychiatrists performing remote emergency assessments that they are not missing essential information [20].

When patients present to the ED in crisis, there is often no specialist available for rapid

assessment and treatment because of the paucity of psychiatric services in many rural areas. The result can be unnecessary hospitalizations, inappropriate discharges or other inadequate treatment that is disruptive to people's lives and expensive for the healthcare system [20]. There appear to be very few Emergency Department (ED) telepsychiatry programs in the U.S. The most common diagnoses for ED telepsychiatry were: (1) major depression; (2) Bipolar disorder; (3) schizophrenia or schizoaffective [21].

Home-based telepsychiatry

The rationale and key considerations for a promising innovation in the treatment of early-onset disruptive behavior disorders was presented. That was about the development of an Internet-based format for the delivery of parent–child interaction therapy (PCIT) directly to families in their own homes. Specifically, traditional barriers to effective care were considered; how technological innovations can overcome problems of treatment availability, accessibility, and acceptability was also discussed [16].

Demographic aging of the world population leads to an increase in the number of persons diagnosed with dementia (PWD). Advanced technologies are being developed to support family caregivers of PWD in different ways including provision of information and support resources online, monitoring systems to alert caregivers to changes in the PWD and their environment, and telemedicine and e-health (e.g. telepsychiatry) services linking caregivers and PWD with health care providers, etc. Online or Internet-based technology can support PWD themselves, especially at early stages. Cognitive stimulation has been shown to have positive effects in PWD at early and mid stages. Another type of in-home caregiver support links caregivers with expert guidance for managing challenging care situations using video monitoring. Caregivers are trained to capture behaviors that are problems via computer video recording. The captured information is then wirelessly uploaded for a team of experts to review and provide feedback. Support for caregivers can also be provided via web-based video-conferencing and/or text-based chat forums [31].

Family factors play a major role in treatment outcomes; the practice of child and adolescent psychiatrist (CAPs) will increasingly emphasize family-focused care. In family-focused care, the strengths and needs of the entire family were systematically assessed and subsequently addressed through dyadic and family therapies, parent management training, referral of family members for their own mental health assessment and treatment as indicated, and referral of the family to supportive social services. CAP training programs must begin to look at their current training methods and curriculum and update them to reflect future practice settings. Establishing collaborative training with pediatric and family residency programs within training programs is one way to begin to mirror future practice [10].

Telepsychiatry for students

Risk situations encountered by youth in schools include negative relations with families and/or school personnel (e.g. negative teacher-student relations), inflexible or unsupportive school structures, school-home link, curriculum settings, passive instruction, and disregard for learning styles, etc. [22]. Clinics have provided various non-physician mental health services. However, child psychiatric services were limited [8]. The scarcity of child and adolescent psychiatry resources will persist as a critical issue in the context of the expanded demand for youth mental health services [10].

Cooperation of both child and parent, clear communication of recommendations, involvement of school personnel and local health providers, stability of the agencies and availability of services were key components in the successful implementation of recommendations. Having school personnel present meant that they are able to share information with the consulting psychiatrist and participate in the treatment planning process. Consequently, treatment recommendations were more likely to be applied consistently across relevant settings, particularly at home and at school [11]. Child telepsychiatry research is now beyond feasibility, acceptability, and sustainability to special populations (e.g., autismspectrum patients) and initial qualitative analysis of young people's perspectives [4].

Telepsychiatry can successfully deliver services to incarcerated adolescents with a wide range of psychiatric needs. A patient-centered approach that directly assesses adolescents' satisfaction is recommended to ensure youths' optimal involvement in needed services [23]. The following TABLE-3 [23] shows the telepsychiatry satisfaction of a total of 115 youth (13-19 years old) who were treated.

Table (3): Telepsychiatry satisfaction of incarcerated youth

Technical aspects or clinical experience	Very good or *Somewhat agree	Outstanding or Strongly agree
Overall self-rating of telepsychiatry visits	39.5%	40.3%
Ability to see psychiatrist on TV screen	37.0%	40.3%
Ability to understand the psychiatrist's recommendations	50.4%	34.5%
Ability to talk freely about your problems	38.7%	30.3%
Could talk comfortably with the psychiatrist	*51.3%	29.4%
Was not concerned about being overheard by others	*35.3%	30.3%
Telepsychiatry makes it easier to see a specialist	*36.1%	40.3%
Have no preference for seeing psychiatrist in person	*16.4%	17.2%
Would recommend telepsychiatry to friends	*47.9%	29.4%
Feel confident about the psychiatrist's recommendations despite that he/she was not in the same room with me	*37.5%	40.8%

Cognitive behavioral therapy (CBT) for child anxiety is efficacious. A smartphone app is feasible within CBT for child anxiety. An m-health platform entitled SmartCAT (Smartphone-enhanced Child Anxiety Treatment) was developed. SmartCAT consists of (1) a smartphone application (app) that cues youth to use the CBT skills taught in sessions, (2) an online portal that allows therapists to monitor skill use, to send cues and treatment-related materials, to engage youth in real-time via secure messages, and to manage rewards, and (3) a communication

protocol that allows real-time bidirectional exchange between the app and the portal. The SmartCAT platform offers better integration, compelling user interface, and visualization of information collected in real-time, as well as secure two-way communication between the patient and therapist. Users found SmartCAT both acceptable and easy to use [24].

Telepsychiatry has clinical efficacy with children, but questions remain about cost-effectiveness. State agencies in USA and health systems need to know if a child telepsychiatry consult system can address system concerns and improve care quality while lowering costs in USA. To assist care in a rural state with few child and adolescent psychiatrists, an academic center coordinated a consult system of (1) televideo consults for high-needs children with Medicaid and state Multidisciplinary Team (MDT)/foster care involvement, (2) remote medication reviews for beyond guidelines prescribing, and (3) elective community provider telephonebased consults. This coordinated child telepsychiatry consult system for a state Medicaid division reduced outlier pediatric psychiatric medication prescribing, supported local community-delivered treatments, and reduced unnecessary hospitalizations in a financially advantageous manner that was well received by the practice community [25].

Computer game and virtual reality in telepsychiatry

Computer games can serve as an alternative or additional form of treatment in several areas (schizophrenia, asthma or motor rehabilitation). Studies have been conducted showing the usefulness of serious video games in the treatment of some abnormal behaviors. A serious video game that was designed to remediate attitudinal, behavioral and emotional processes of patients with impulse-related disorders was developed and evaluated. The video game was created and developed within the European research project PlayMancer. PlayMancer is an initiative to develop a video game prototype for treating specific mental disorders (namely eating disorders and impulse control disorders). New interaction modes were provided by newly developed components, such as emotion recognition from speech, face and physiological reactions, while specific impulsive reactions were elicited. The video game uses biofeedback for helping patients to learn relaxation skills, acquire better self-control strategies and develop new emotional

regulation strategies [26].

A lot of research was done in virtual reality systems for anxiety treatments. Virtual environments have primarily been used in exposure therapies, where clients with specific phobias can be placed in safe. Virtual reality treatments have demonstrated specific improvements over traditional methods. The use of virtual reality exposure, in combination with physiological monitoring and feedback, can treat a number of panic and anxiety disorders. Indications and theoretical foundations of the potential of 3D computer gaming in adolescent mental health care was given [27].

The attention deficit/hyperactivity disorder (ADHD) is a neuropsychiatric disorder that is characterized essentially by lack of attention, agitation, and impulsiveness, which may lead to poor school performance as well as emotional and relationship difficulties. People with ADHD are influenced by colors. These colors affect the performance of tasks that simulate daily activities requiring attention. Studying the influence of colors used in conveying information can be an important aid to reduce the impact of this disorder and its implications on individuals affected by ADHD. Advances in computing and new display technologies enabled the development of virtual environments that provide situations similar to those experienced in "real life", enabling detection or treatment of ADHD. An interactive computer game based on virtual reality was developed to evaluate the performance of the players. The game proved to be a user-friendly tool capable to detect and quantify the influence of color on the performance of people executing tasks that require attention and showed to be attractive for people with ADHD. The developed computer game presented uses a virtual environment to quantify the effect of color on the performance in accomplishing oriented tasks. It was used to evaluate individuals with ADHD without using frustrating or repetitive tasks. The virtual environment offers increased immersion and interest for people with ADHD [28].

ADHD symptoms can be difficult to treat. A brain-computer interface (BCI) attention

training program that improved ADHD symptoms was developed. In addition, a new more intensive BCI-based attention training game system on unmedicated ADHD children with significant inattentive symptoms was developed. A computerized 3D graphic game, CogoLand was developed specifically as the training game. This new system monitored attention through a head band with dry electroencephalogram (EEG) sensors, which was used to drive a feed forward game. Following intervention, both parent-rated inattentive and hyperactive-impulsive symptoms on the ADHD Rating Scale showed significant improvement. The BCI-based attention training game system is a potential new treatment for ADHD. The BCI system consisted of a headband with mounted dry EEG sensors that transmitted EEG readings to the computer through Bluetooth-enabled protocol. The headband was worn around the forehead, with a grounding reference electrode clipped to the earlobe (see Fig. (1)) [29].

Fig. (1) A model engaged in intervention with the Brain-Computer Interface (BCI) attention training game system.

Post Traumatic Stress Disorder (PTSD) is a psychiatric disorder that can result from experiencing or viewing a traumatic event involving death, serious injury, or threat to self or

others. Flashbacks are the hallmark symptom of Posttraumatic Stress Disorder (PTSD). Although there were successful treatments for full-blown PTSD, early interventions were lacking. The utility of developing a 'cognitive vaccine' to prevent PTSD flashback development following exposure to trauma was proposed. Trauma flashbacks are sensory-perceptual, visuospatial mental images. Visuospatial cognitive tasks selectively compete for resources required to generate mental images. Thus, a visuospatial computer game (e.g. ''Tetris'') will interfere with flashbacks. Visuospatial tasks post-trauma, performed within the time window for memory consolidation, will reduce subsequent flashbacks. It was predicted that playing ''Tetris'' half an hour after viewing trauma would reduce flashback frequency over 1-week. Playing ''Tetris'' after viewing traumatic material reduces unwanted, involuntary memory flashbacks to that traumatic film, leaving deliberate memory recall of the event intact. Further research is required to examine the precise mechanisms of action by which ''Tetris'' reduces flashbacks to trauma. It was predicted that a verbal task would not have comparable effects and may even worsen flashbacks. Thus further studies should compare both a visuospatial task (e.g. ''Tetris'') with a verbal task (e.g. a verbal computer game) against a no-task control group [30].

New Initiatives in Telepsychiatry

*Plan 1***:** *Mental Health Clinics*

Community education and mental health improvement among patients served at mental health clinics in the Mississippi Delta is the primary goal for Plan 1. Mental health telepsychiatry will be provided based on a number of randomly selected mental health county clinics in the Mississippi Delta, a relatively poor region in USA to provide back-up services for psychiatric emergencies and to handle overflow. Counselors, social workers, nurses, and National Alliance on Mental Illness (NAMI) volunteers will work together to help all mental health patients with needs that may be emergent and no physician available, overloads, overbookings, or to increase census. Many mental health centers simply cannot handle the number of patients requiring services and many of these patients need more frequent services than are provided. It is the hope of this VidyoDesktop to improve the access across the board and improve the state of mental health care among patients seeking mental healthcare treatment at county or regional mental

healthcare treatment centers.

Evaluation: An indepth statistical analysis will be conducted using ANOVA and results will be tallied daily, weekly, monthly, or spot checked depending on the needs of the facilities.

Plan 2: Hospital Emergency Rooms

Community service and improving the service and access to care of psychiatric emergency patients across the Mississippi Delta will be priority. In Mississippi, there is a great need for VidyoDesktop for emergent telepsychiatric services due to the absence of psychiatrists on call in emergency rooms. Telepsychiatry access would allow emergent patients immediate access to a psychiatrist for evaluation and potential immediate placement. A number of hospital emergency rooms will be chosen from varying counties in the surrounding area who receive psychiatric patients, operate an ambulance service, receive ambulance calls, or have a bed size greater than 30. Emergent patients include: suicides, homicidal tendencies, drug overdoses, psychotic patients, and drug addicts with psychosis, delusional patients who are unstable and need a hold. Hospital emergency rooms would be equipped with portable carts and setups capable of monitoring a patient anywhere in the hospital.

Evaluation: Data will be collected on an as needed basis related to the number of available cases. Daily, weekly, monthly, or spot check monitoring may be necessary. Statistical analysis using ANOVA will be used to produce tangible data.

Plan 3: Home-Based Monitoring

Therapeutic mental health monitoring in the home is a revolutionary idea that can reduce sequel associated with mental health diseases such as: depression, bipolar disorder, suicidal tendencies, psychosis, schizophrenia, delusional disorders, addiction disorders, and all other types of major disorders. Social workers, counselors, psychiatrists, and NAMI volunteers can navigate a VidyoDesktop with the mental health patient via a laptop or desktop and conduct

personal counseling sessions without the costly necessicty of monthly, daily, or frequent trips to the clinic. Equipment will be provided to the patients in the form of laptops or tablets through government grants and VidyoDesktop secure access.

Evaluation: Data will only be collected monthly for home-based monitoring or spot-checked due to the nature of the setting. Data will be analyzed using ANOVA.

Plan 4: Junior/Senior High Schools

Telepsychiatric services will be provided to a number of randomly selected junior/senior schools in Mississippi, USA. If the schools cannot be tallied from selected counties, further counties will be selected from dangerously underserved areas close to the formerly selected areas. Telepsychiatric services will be aimed at treating teens to determine if VidyoDesktop will indeed improve academic performance. Conditions associated with teen behaviors are: teen bullying, teen suicide, teen addiction, teen oppositional defiant disorder, bipolar disorder, teen abuse (sexual, physical, emotional), and other mental illness as defined by the current DSMV II standards. Counselors, psychiatrics, social workers, NAMI volunteers, and nurses will be on hand to support staff already working with the school to promote teen behavior improvement and academic achievement. Telepsychiatry services will be provided by mobile carts provided by government grants and other charitable donations.

Evaluation: An evaluation team will make weekly, daily, monthly, and spot checks on academic and project progression. Statistical analysis using an ANOVA test will provide the basis for an understanding of the data collected over the course of a 9-month school year.

Conclusions

Telepsychiatry can be potential practices in rural and other remote environments with limited psychiatric care services. Telepsychiatric assessments in mental health emergencies have been established practices and improve access to care for patients. Telepsychiatry reduces or eliminates distance that is a barrier to traditional care. It also reduces patients' travel time and work time loss, shortens waiting periods for an appointment, and simplifies availability of expertise. There have been a lot of telepsychiatric treatments and services in clinics; limited

services in hospital emergency rooms, and very few services in schools. There is room to improve home-based telepsychiatric services. The new initiatives are expected to achieve quality medical services with advanced Internet and telecommunication tools.

References

[1] Rifai, B (2015) A Novel wireless and mobile E-Health expert system. IJCSI International Journal of Computer Science Issues. 12 (2):, 284-287.

[2] Ahmadia, P., Bakhshizadehb A and Balouchic, H (2012) Studying the impact of mental health on job performance of managers and staff. Management Science Letters. 2, 1579–1588.

[3] Myers, KM and Lieberman, D (2013) Telemental Health: Responding to Mandates for Reform in Primary Healthcare. Telemedicine and e-Health. 19 (6), 438-443.

[4] Hilty, DM, Green, J., Nasatir-Hilty, SE, Johnston, B and Bourgeois, JA (2015)
Mental Healthcare in Rural and Underserved Primary Care Settings: Benefits of Telemental Health, Integrated Care, Stepped Care and Interdisciplinary Team Models. J Nurs Care. 4 (2) http://dx.doi.org/10.4172/2167-1168.1000237

[5] Chung-Do, J., Helm, S., Fukuda, M., et al. (2012) Rural Mental Health: Implications for Telepsychiatry in Clinical Service, Workforce Development, and Organizational Capacity. Telemedicine and e-Health. 18 (3), 244-246.

[6] Kasckow, J., Felmet, K., Appelt, C., Thompson, R., Rotondi, A and Haas, G (2014) Telepsychiatry in the Assessment and Treatment of Schizophrenia. Clinical Schizophrenia & Related Psychoses, Spring. P. 21-27.

[7] Saeed, SA, Diamond, J and Bloch, RM (2011) Use of Telepsychiatry to Improve Care for People With Mental Illness in Rural North Carolina. N C Med J. 72 (3), 219-222.

[8] Ulzen, T., Williamson, L., Foster, PP and Parris-Barnes, K (2013) The Evolution of a Community-Based Telepsychiatry Program in Rural Alabama: Lessons Learned—A Brief

Report. Community Ment Health J. 49,101–105.

[9] Lee, A., Sikka, N., Connell, F., Dyer, A., Boniface, K and Betz, J (2015) Telepsychiatric assessment of a mariner expressing suicidal ideation. Int Marit Health. 66 (1), 49–51.

[10] Martini, R., Houston, M., Chenven, M., et al. (2013) ACOS & CAPS: Preparing for the impact of healthcare reform on child and adolescent psychiatry practice. Approved by AACAP Council March 2013, American Academy of Child & Adolescent Psychiatry, 1-11.

[11] Boydell, KM, Volpe, T., Kertes A. and Greenberg, N (2007) A review of the outcomes of the recommendations made during paediatric telepsychiatry consultations. Journal of Telemedicine and Telecare. 13 (6), 277-81.

[12] Saeed, SA, Bloch, RB and Diamond, JM (2012) Telepsychiatry: Overcoming barriers to implementation. Current Psychiatry. 11 (12,8-31.

[13] Chong, J. and Moreno, F (2012) Feasibility and Acceptability of Clinic-Based Telepsychiatry for Low-Income Hispanic Primary Care Patients. Telemedicine and e-Health. 18 (4), 297-304.

[14] Szeftel, R., Federico, C., Hakak, R., et al. (2012) Improved access to mental health evaluation for patients with developmental disabilities using telepsychiatry. Journal of Telemedicine and Telecare. 18, 317–321.

[15] Ozkan, B., Erdem, E., Ozsoy, SD and Zararsiz, G (2013) Effect of psychoeducation and telepsychiatric follow up given to the caregiver of the schizophrenic patient on family burden, depression and expression of emotion. Pakistan Journal of Medical Sciences. 29 (5), 1122-1127.

[16] Comer JS, Furr, JM and Cooper-Vince, C. et al. (2014) Rationale and Considerations for the Internet-Based Delivery of Parent–Child Interaction Therapy.Cognitive and Behavioral Practice, http://dx.doi.org/10.1016/j.cbpra.2014.07.003

[17] Miller, TM, Clark, J. Veltkamp, LJ et al. (2008) Teleconferencing Model for Forensic Consultation, Court Testimony, and Continuing Education. Behavioral Sciences and the Law. 26, 301–313.

[18] Sullivan, DH. Chapman, M and Mullen, PE (2008) Videoconferencing and Forensic Mental Health in Australia. Behavioral Sciences and the Law. 26, 323–331.

[19] Shore, J., Kaufmann, J., Brooks, E., et al. (2012) Review of American Indian Veteran

Telemental Health. Telemedicine and e-Health. 18 (2):, 87-94.

[20] Seidel RW and Kilgus, MD (2014) Agreement between telepsychiatry assessment and face-to-face assessment for Emergency Department psychiatry patients. Journal of Telemedicine and Telecare. 20 (2), 59–62.

[21] Williams, M. et al. (2009) Telepsychiatry in the Emergency Department: Overview and Case Studies, Prepared for California Healthcare Foundation, Dec 1, 1-43.

[22] Tilleczek, K., Ferguson, B., Edney, DR. Rummens, A., Boydell, K and Mueller, M. (2011) A Contemporary Study with Early School Leavers: Pathways and Social Processes of Leaving High School. Canadian Journal of Family and Youth. 3 (1), 1-39.

[23] Ayers, K., Valentine, J., Morganthaler, R. and Melzer, S (2006) Telepsychiatry with incarcerated youth. Journal of Adolescent Health. 38:, 643–648.

[24] Pramana, G., Parmanto, B., Kendall, PC and Silk, JS (2014) The SmartCAT: An m-Health Platform for Ecological Momentary Intervention in Child Anxiety Treatment. Telemedicine and e-Health. 20 (5), 419-427.

[25] Hilt, RJ, Barclay, RP, Bush, J., et al. (2015) A Statewide Child Telepsychiatry Consult System Yields Desired Health System Changes and Savings. Telemedicine and e-Health. 21 (7), 1-5.

[26] Fernando Fernández-Aranda, F., Jiménez-Murcia, S., Santamaría, JJ et. al. (2012) Video games as a complementary therapy tool in mental disorders: PlayMancer, a European multicentre study. Journal of Mental Health. 21 (4), 64–374.

[27] Coyle, D., Doherty G. and Sharry, J (2006) The Design of Computer Systems for Talk-Based Mental Health Care Interventions, Technical Report of Trinity College Dublin and Mater Hospital, pp. 1-37.

[28] Silva AP and Frère, AF (2011) Virtual environment to quantify the influence of colour stimuli on the performance of tasks requiring attention. BioMedical Engineering OnLine. 10:74.

[29] Lim, CG, Lee, TS, Guan, C., et al. (2012) A Brain-Computer Interface Based Attention Training Program for Treating Attention Deficit Hyperactivity Disorder, PLoS ONE, 7 (10), e46692.

[30] Holmes, EA, James, EL, Coode-Bate, T and Deeprose, C (2009) Can Playing the Computer Game ''Tetris'' Reduce the Build-Up of Flashbacks for Trauma? A Proposal from Cognitive Science. PLoS ONE,. 4 (1), e4153.

[31] Bossen, AL, Kim, H., Williams, KN, et al. (2015) Emerging roles for telemedicine and smart technologies in dementia care. Smart Homecare Technology and TeleHealth. 3, 49–57.

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