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# The Future of Telepsychiatry in India

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## ABSTRACT

Technology is bringing about a revolution in every field and mental health care is no exception. The ongoing COVID-19 pandemic has provided us with both a need and an opportunity to use technology as means to improve access to mental health care. Hence, it is imperative to expand and

harness the tremendous potential of telepsychiatry by expanding the scope of its applications and the future possibilities. In this article, we explore the different avenues in digital innovation that is revolutionizing the practice in psychiatry like mental health applications, artificial intelligence, e-portals, and technology leveraging for building capacity. Also,

we have also visualized what the future has in store for our practice of psychiatry, considering how rapid technological advances can occur and how these advances will impact us. There will be challenges on the road ahead, especially for a country like India for instance; the digital divide, lack of knowledge to utilize the available technology and the need for a quality

control and regulation. However, it is safe to presume that telepsychiatry will evolve and progress beyond these roadblocks and will fulfill its role in transforming health care. Telepsychiatry will improve the health care capacity to interact with patients and family. The blurring of national and international borders will also open international opportunities to psychiatrist in India, heralding a new wave of virtual health tourism.

**Keywords:** Telepsychiatry, telemedicine, guidelines

This is the era of digital revolution. Over the last two decades technology has grown by leaps and bounds reaching all walks of life. This revolution has reached the field of medicine too and is changing the psychiatry clinical practice.<sup>1</sup> Telepsychiatry is the provision of psychiatric care remotely using different forms of telecommunication. Drago et al. defined telepsychiatry as the “the use of electronic communication and information technologies to provide or support clinical psychiatric care at a distance.”<sup>2</sup> Importance of telepsychiatry as a vehicle for delivering mental health services is becoming increasingly relevant as the burden of psychiatric illnesses is increasing<sup>3</sup> and human resources are consistently inadequate to handle the same.<sup>4</sup> This development is motored along by efforts and need to improve access to mental health services, quality of care, increase community-based care and integration of psychiatric services into primary care.

In the ongoing coronavirus disease (COVID) pandemic, travel restrictions and reduced in-person interactions has provided a huge impetus to telepsychiatry. Patients and caregivers face hardship to access and avail appropriate consultations and medications. Recent advancements in technology may be used to build and maintain resilience, improve clinical care, facilitate recovery, and also to expand opportunities for education, administration, and research in mental health. The silver lining is that the pandemic has provided us both a need and opportunity to use technology as a means to reach such individuals. It is the need of the hour to expand and utilize the tremendous potential that telepsychiatry possesses by expanding the currently explored applications and newer promising future possibilities. In this

article, the authors discuss the future of psychiatry practice in conjunction with the advances in digital health.

## Health Education/Capacity Building: Leveraging Digital Technology

The Mental Healthcare Act, 2017 (MHCA 2017), aims to protect, promote, and fulfill the rights of persons with mental illness (PMI), and places the responsibility on the state to ensure mental health care to all its citizens. The MHCA, 2017, seeks to overhaul the existing system and its implementation can cost around 94,073 crore rupees approximately, for the government. Also, the government would incur a loss for noninvestment in mental health care, which is calculated to be 6.5 times more per year than the investment needed to implement MHCA, 2017.<sup>4</sup> According to the World Mental Health Atlas (2014),<sup>5</sup> the number of psychiatrist per lakh of population in India was 0.75, with even lesser number of psychologists and psychiatric social workers. Even the median number of psychiatrists is only 0.2/100,000 in India as opposed to a global median of 3/100,000 population. The numbers are equally dismal for other mental health professionals (MHPs) also. Median number of psychologist, social workers, and nurses are 0.03, 0.03, and 0.05/100,000, respectively.<sup>5</sup> Assuming India would need three human resources per lakh population in each category, we would need 42 more years to fulfill the demand for psychiatrists, 74 more years for nurses, and 76 more years for clinical psychologists and psychiatric social workers. This arbitrary calculation holds good if we assume the population remains constant.

One critical area where telepsychiatry can bring about a revolution is in capacity building by leveraging digital technology. Traditional training programs involving didactic lectures, video demonstrations, power point presentations in classroom and group format often fail to translate into clinical skills required for early diagnosis and treatment of psychiatric disorders. Training experiences through telepsychiatry is advantageous since it incorporates a didactic curriculum, flexibility to adopt between a pedagogical or andragogical approach depending on the profession-

al undergoing training, undertaking a bottom-up approach, offering the opportunity to obtain service-based learning while also providing the students the flexibility to attend training classes at their convenience. Further, technology enabled learning can help them attend simulated telepsychiatry consultations, teleconference journal clubs, satellite broadcasts, and web-based modules, etc.<sup>6</sup> Even though a psychiatry trainee may be familiar with the use of technology for communication, they might need to be imparted specific skills to understand the context of telepsychiatry practice like understanding the health systems involved, developing the clinical skills required to decrease the interpersonal distance and incorporate interpersonal communication and collaborative skills. One such example in the use of technology in psychiatry training is the Initiative for Academics and Nurturing Skills (INDIANS) for up scaling post-graduate students in psychiatry along with early career psychiatrists.<sup>7</sup> Telepsychiatry can also introduce the concept of observership in psychiatry. A trainee can observe the process of evaluating, diagnosing, and monitoring the progress of a patient through online modules. This can completely overhaul postgraduation training by creating chances for more exposures into difficult clinical scenarios along with improving chances for liaison. This might result in producing more competent professionals.

Further owing to the lack of mental health care human resources across the world, especially in low- and middle-income countries (LAMI) countries; technology can be harnessed to impart education and training to not only medical students but also primary care doctors, nurses, social workers, psychologists, and other paramedical staff. This will help in not only capacity building but also reaching the unreached and serving the underserved population; eventually addressing the huge treatment gap in psychiatric disorders and reducing its morbidity. Considering the dearth of human resources, the NIMHANS Digital Academy was started to empower existing human resources. Digital certification courses like Diploma in Community Mental Health<sup>8</sup> and Diploma in Primary Care Psychiatry<sup>9,10</sup> were started. These programs are currently underway in different states like Chhattisgarh, Bi-

har, and Uttarakhand to empower primary care doctors in psychiatry. Also, the Board of Governors (BoG) in supersession to the Medical Council of India (MCI) and NIMHANS, Bengaluru, are in the process of developing an online module/curriculum for the practice of telemedicine. Registered medical practitioners (RMPs) would be mandated to complete the module within three years of its release to practice telemedicine.

## Mental Health Apps: Role in Telepsychiatry Practice

One important area where telepsychiatry has tremendous potential is in personalizing telehealth. Recent advances in telecommunication have made smartphones ubiquitous and can be harvested to provide personalized care for PMI. Mobile phone applications specific for individual mental illness can offer a dynamic two-way connectivity to a multidisciplinary team. A PMI may register self in the application that is specific to his/her diagnosis. This application may become a safe house for all the clinical details like duration of illness, clinical features, course of the illness, medication status, allergies, comorbid conditions, a checklist to monitor adherence and side effects, and an e-prescription. This application might also allow the specialist to monitor and manage the patient remotely, which is akin to running a mental health clinic albeit digitally. One such application that has the potential to harness all such endeavors is the learn, assess, manage, and prevent (LAMP) platform developed by Torous et al.<sup>11</sup> With a help of a digital navigator who monitors all the patient related data like sleep patterns, physical activity, and stressors, the LAMP platform can formulate a relapse risk algorithm and helps in developing a personalized care plan.<sup>11</sup> These applications also offer a real time behavioral data and can provide information on how the symptoms differ across various dimensions. These apps eschew the need for any customized hardware while at the same time offering real-time data.<sup>12</sup>

Recently the U.S. Food and Drug Administration (FDA) has approved an innovative application for substance use disorder to be used along with routine outpatient management—reSET (Pearl Pharmaceuticals). re-SET is a part of a comprehensive care plan for patients with

substance use disorders.<sup>13</sup> In the future there can be different applications dedicated for different purposes like an application that can help in diagnosis, which can further be disease specific, applications to monitor adherence and serve as reminder for medications or applications to collect and store individual health records. These applications when combined with artificial intelligence (AI) create the possibility of tailored treatment, which is discussed later. One essential challenge in the currently available applications is that they are developed unilaterally by engineers with no inputs from medical professionals. Data privacy and security issues remain pertinent but with technology growing leaps and bounds those concerns could also be addressed easily and applications can be tailored to suit each patient.

## Virtual Reality and Artificial Intelligence: Changing the Future Course of Telepsychiatry Practice

AI in psychiatry encompasses the use of techniques such as automated language processing and machine learning algorithms to assess a patient's mental state. The application of AI extends across multiple domains ranging from diagnosis, prediction to management of psychiatric illness. There are currently applications that monitor through AI the pattern of smartphone usage and detect individuals at risk for developing mental health problems.<sup>14</sup> AI-based techniques have also become useful in predicting psychiatric symptoms including psychosis, which present as manifestations of disorders of thought, disorganization in behavior, or catatonia as well as predicting treatment response.<sup>15</sup> Machine learning algorithms have also aided in reducing the false-negative and false-positive diagnoses by supplementing human clinical ratings. Virtual reality (VR) is a computer-generated simulation, like images and sounds that a person can interact with by wearing special equipment. There are overwhelming evidences that prove that VR as an interaction and distraction tool is useful in psychiatric illnesses, such as PTSD, anxiety, specific phobia, schizophrenia, autism, dementia, etc.<sup>16</sup> VR technology can augment in vitro therapy particularly when in vivo

exposure is difficult. Further in PTSD and specific phobias, with VR the exposure can be personalized for specific situations and stimuli that can evoke the patient's most troubling symptoms. Soon machine learning will benefit patients by increasing the likelihood of them receiving a personalized treatment regime and will help them in receiving psychological treatment through computerized conversational bots. AI can even change the face of psychiatric classification by identifying association between symptoms, neurobiological status, and functioning across diagnosis.<sup>17</sup>

In the future, the AI could aid a clinician in diagnosing a patient, can work in tandem with designated applications—analyze a host of data like past history, risk factors, side effects, existing treatment guidelines, etc., and arrive at the best possible treatment plan for any given patient—bringing in the possibility of providing “tailored treatment.” Further, the AI may analyze and notify demands of drugs, take account of the existing stock and automatically place an order for the drugs to be delivered to designated places. It is possible, along with medications, a doctor may also prescribe usage of a specific application for each disorder, which will serve different purposes like monitoring the patients symptoms, generating e-prescriptions, psychoeducation tools, monitoring adherence, and alerting both the stakeholders if any warning signs arise. Thus, ensuring a comprehensive care is delivered at the fingertips. Chat bots are an interesting addition in the field of AI. They are conversational agents and can play an important role in screening, diagnosis, and treatment of mental illnesses. In addition to this, they can also prove to be useful in suicide prevention and management.

## Online Therapy

Over the past few years, there has been an increase in online support groups probably in response to diminishing health care resources. A Cochrane review had even reported that group therapy is more advantageous than self-help for tobacco cessation.<sup>18</sup> These groups cater to individuals suffering from problems like depression, suicidal tendencies, substance abuse, malignancy, and eating disorders. The popularity that social media has gained has resulted in an opportunity for the online



peer networks to aid in mental health recovery and to reduce stigma. This becomes even more important in LAMI countries in reaching the unreached. These peer support groups are creating a paradigm shift by increasing access to health information and providing support to PMI. However, further research needs to expand upon these advantages and specifically address the question of whether the skills learned from peers through an online platform translates into a sustained improvement in social and occupational functioning in the real world. In addition, methodological challenges do remain, specifically in the form of how to evaluate such interventions and collect objective outcome measures.

## Mental Health Care Management System: An Innovative Solution from NIMHANS

The MHCA 2017 has provided a legally binding right to mental health care for over 1.3 billion people. The Department of Health, Government of Karnataka, India, initiated a digital innovation titled “Mental Health Management System” (e-Manas; the term “manas” in vernacular language means “mind”) in collaboration with Telemedicine Centre, NIMHANS, Bengaluru, India, and Electronic Health Research Centre, International Institute of Information Technology, Bengaluru (EHRC-IIIT-B), India. e-Manas is a state-wide digital registry of Mental Health Establishments (MHEs), MHPs, PMIs, and their treatment records in compliance with the MHCA, 2017. This platform brings together all the stake holders in the mental health field, that is, regulatory authorities, district review boards, MHEs, MHPs, PMIs, and their caregivers. e-Manas is the first step in integrating information technology and the mental health system. It is the first initiative in the country, completely free of cost, funded by the Government of Karnataka, and may play a crucial role during the times of emergencies. The plethora of data that can be made available through the portal may help in analyzing epidemiological trends, which might lead to tailoring improved service delivery. All the data available can be collated and can be used to monitor the mental health programs, availability of

medicines in all centers by corresponding mental health authorities. This will provide seamless services to the people in need and assist the right-based approach as directed by the law. On similar lines, Telemedicine Centre, NIMHANS, Bangalore, and IIITB, Bangalore, have initiated a development of comprehensive portal for prevention of suicide across India titled—“NIMHANS Centre for Suicide Prevention,” with the aim of creating awareness on mental illness and stress, prevention of suicide, promotion of well-being and development of human resources (gatekeeper training program) to curtail the incidence of suicide.<sup>19</sup>

## Electronic Health/Medical Records

Electronic health records (EHRs) portals are provider-tethered applications that allow patients to electronically access health information that is documented and managed by a health care institution.<sup>20,21</sup> These are very important for patients with mental illness because the psychiatrists are mandated by the MHCA 2017 to maintain a basic medical record. These portals are owned and managed by health care institutions (such as hospitals). Under these portals, institutions provide patients with web-based limited access to their clinical data recorded in patients’ health records. Patients can then access this information, read, and print it, or integrate it into any (electronic or paper-based) type of patient-owned record. Apart from this, electronic patient portals also offer provisions for requesting prescriptions for medication refill, appointment viewing and scheduling, access to general medical information, such as guidelines, or secure messaging between a patient and an institution; and maintaining clinical logs like blood pressure, pulse rate, behavior and mood charts by patients. According to a study conducted by Kipping et al., there is evidence to suggest that access to EHRs by patients may have positive effects on activation and recovery in patients with severe mental illnesses (SMI) with increase in appointment adherence; and also simultaneously improve organizational efficiencies in a tertiary level mental health care facility.<sup>22</sup> The e-Manas portal mentioned earlier is one such portal that aims to create an easily accessible patient health record not only to the patients but also across different establishments within the state. The

EHRs can be the cause of an apprehension also. With the increase in the practice of telepsychiatry and with the usage of digital records, there is an increase in the concern about storing data in cloud, particularly with respect to fear of loss of data and the requirement to have a physical server in India to store details of Indian Citizens. Perhaps in the future, the data might be condensed into the form of a smartcard that a patient can carry around and the data can be retrieved by any health professional probably through a pin provided by the patient. There are reports of implants being used in by citizens of Sweden to ease their daily routine by storing unique ID, emergency contact details, health records, financial transactions, and other details for providing services.<sup>23</sup> Perhaps there might come a day in which every citizens can store his entire clinical data in an implanted chip, which will be a game changer in health care. Further, there may be a national regulation of implanting this chip to every citizen immediately after the birth with unique ID and storing the health status from birth till death.

## Future Opportunities and Challenges of Telepsychiatry

*A proposed one stop center:* Telepsychiatry soon can bring everyone together under one roof. “One stop center” is one such possibility. Currently woman or child victims of abuse must visit multiple places to consult different professionals like a psychiatrist, gynecologist, pediatrician, a legal counsel, etc. With advances in telehealth all such services can be provided under one roof. One stop center can be a virtual center, which will remove the need for a woman or a child who has suffered from abuse to go from one place to another or perhaps even a court. They can attend all such visits from their home or woman/child friendly center and can obtain all these services through video conferencing. These centers can also serve as a place to provide mental health and psychosocial support and even long-term psychological support for such victims. One stop center can also help patient support groups like alcoholic anonymous, narcotic anonymous, etc. Patients can get psychiatric consultation and psychosocial support under one roof through such one stop centers.

*Mental Health Review Boards (MHRB):* Telepsychiatry has the potential to transform the functioning of the MHRB, which are a mandate as per the MHCA, 2017. Integrated online portals like MHMS along with EHRs could drastically ease the review process for admission and discharge of patients by the MHRB. It can also aid in inspection and audit of MHEs owing to the ease of availability of records due to the usage of an integrated portal.

*Tele-evidence:* Further such a setup can be also useful for providing Tele-evidencing in a court of law, especially for doctors to provide their expert witness. This will eschew the need for the doctor to travel to different places to provide evidence. Providing evidence online is going to change the way doctors perceive the court and giving evidence in the court of law.

*Telepsychiatry in community settings:* One other setup where telepsychiatry can be indispensable in the future is the rehabilitation centers like halfway homes, long-stay homes, custodial care homes, prisons, juvenile homes, reception centers, elderly care home, orphanages, etc., where psychiatric morbidities are high. Considering the already existing dearth of human resources, telepsychiatry is the best possible solution to cater to the mental health needs of such unreached population. The same can also be applicable to religious centers like the “Dawa and Dua Program,”<sup>24</sup> which can result in providing psychiatric services to many patients visiting such places.

*Wellness app “Gurukool”:* Apart from helping patients with mental illness, certain wellness applications would come into the picture soon. Telemedicine center, NIMHANS in association with stakeholders such as Centre for Development of Advanced Computing (CDAC), Pune, and Armed Forces Medical College (AFMC), Pune, is developing an app called “Gurukool.” This application will be used to impart life skills, to impart sex education, life style modifications, sensitize an individual toward mental illness, teach them to cope with stress, and in promoting positive mental health, targeting predominantly the healthy population or population at risk.

*Registry of mental disorders:* National Level Registry of Mental Health is an advanced form of electronic record/portal can also be available soon. This may

be indispensable to monitor high risk individuals like at risk children, persons prone to develop mental illnesses, victim of abuse, survivors of disasters, etc. This can help in tracking such individuals and help to deliver effective early intervention.

*Wearable devices:* One other area that is rapidly coming to the spotlight is the use of wearable devices in telemedicine. These devices might be used to digitally transmit patient data at real time to the psychiatrists, which might be useful in the future to monitor side effects and drug levels through body fluids, electroencephalography or electrocardiography changes, to ensure adherence by setting up automated reminders to the patient, etc. Owing to the limitations of physical examination during teleconsultations, Telemedicine Centre, NIMHANS has recently proposed a novel concept of “virtual (video-based) physical examination” (VPE).<sup>25</sup> Physicians can conduct inspection part of systemic physical examination during teleconsultations. At rest inspection for pallor, icterus, cyanosis, skin lesions, abnormal movements, etc., can be conducted. Apart from this, inspection after providing instructions can be done to examine tremors, deglutition, and gait can also be conducted. Certain scales to grade symptoms like Abnormal Involuntary Movement Scale (AIMS), Unified Parkinson’s Disease Rating Scale (UPDRS) may also be applied virtually. This concept needs further evaluation, expansion, and validation but will be greatly benefited when used concomitantly with a wearable device.

*Cost effectiveness:* All these advances can result in a decrease in the costs incurred on the patient. Considering the need for only a minimum infrastructure to practice telepsychiatry, decreasing the need to travel the consultation charges can come down significantly along with decrease in the out of pocket expenditure. The cost-effectiveness, ability to get expert consultation with minimal effort and costs will eventually result in improving the quality of life for the patients.

With all the recent advances, technology will transform how psychiatry will be practiced. It may even result in the development of bed less hospitals, where telepsychiatry will be the predominant mode of service delivery. However as with all revolution the road ahead must address some problems. The main challenge that

can arise in a country like India is the “digital divide” existing in the country and across the world, with certain rural areas yet to have proper internet connectivity. To compound this using all these applications and devices will require some skill and knowledge. All these advances will pose a challenge to people from lesser educational background, which might hinder them from using such services. In next two decades, the telepsychiatry practice is going to cut across many boundaries both nationally and internationally. Telepsychiatry consultation and online therapy will be available for international clients. India may play a global leader role in providing health services using digital technology.

Further, there is a need to have quality control for all such applications and AI. A quality control and regulation are essential to ensure all the services to be bug free, safety of health data and to prevent from data loss or theft. Further third-party vendors need to be regulated strictly to prevent exploitation. In order to prevent exploitation of patients and professionals in the future guidelines needs to be developed and adherence to the guidelines should be strictly monitored. Finally, the absence of an objective standardized measurement like other medical fields and the available structure tools are used majorly in research settings rather than in routine clinical practice. Fortney et al. have suggested that measurement-based care can improve the quality of mental health care.<sup>26</sup>

## Conclusion

Information technology advances including applications and AI do not readily answer all these problems but they are already bringing out innovations in assessment, novelties in data collection, increasing access to mental health care, and changing the very face of service delivery. The future will keep on changing the clinical processes especially with VR, synchronous and asynchronous video conferences and newer technologies that we are yet to utilize may help in reaching the deserved populations. Telepsychiatry will evolve with developments across the dimensions of technology, clinical applications, and care models. This can be further promoted by incentivizing telepsychiatry. With this evolution, telepsychiatry will fulfil its role in transforming health care

by increasing the capacity to interact with patients and family. The blurring of national and international borders will open international opportunities to psychiatrist in India. Indian psychiatrist will be providing services to international clients in real time. This will herald a new wave of regulating and monitoring of virtual health tourism across the world.

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