Introduction

The world is in the midst of large technological expansion and innovation. Technological growth is exponential and rapid in the last few decades. It has consistently increased in reach as well as capabilities. The exponential growth in various technologies that can be useful in practice and teaching/training medical students like wearable devices, e-learning, simulated patients, virtual learning, and interaction, is immense.

The future of technology and medicine is closely intertwined. Psychiatry is one field that is likely to be largely influenced by the owing to nature of psychiatric disorders, major reliance on the clinical interview in diagnosis, and relatively lesser need for close physical interventions in several clinical situations. Technology has been claimed to help bridge the gap between traditional care models and advanced care strategies and can help reduce the treatment gap, among many other benefits.

Technology-enabled strategies are currently having a major influence and are being utilized in the medical field.

Electronic Health Record (EHR)

EHR has been able to usefully change the workplace in medicine. It has altered work habits, access to data for patients and clinicians, and better availability to administrators, policymakers, insurance agencies, and researchers. This growth in the use of EHR and technological capabilities to capture, store, retrieve, categorize, and analyze data on a much larger scale in comparison to traditional data-keeping methods is allowing the implementation of big data analysis, machine learning, and Artificial intelligence in medicine. This vast and continuously growing amount of data provides new and unique opportunities for teaching, training, research, and innovation in psychiatry. Recently, this HER has been utilized to identify phenotype subgroups and helped in developing an algorithm for longitudinal risk prediction. Psychiatric genomic research and other biological studies where sample size used to be a major rate-limiting factor are likely to be beneficial in the near future.
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Telepsychiatry

Telepsychiatry is a cost and resources effective method for clinical practice. In recent times, specifically during COVID-19 epidemic in the world, there has been exponential increase in utilization of telepsychiatry across all parts of the world. There is also evidence that it led to improved access to mental health care and improved quality of care in several instances. The clinical need and policy push for telepsychiatry have been there in India. Recently, the government of India gave a regulatory clearance to telepsychiatry by framing preliminary guidelines for its use. Further improvement in professional guidelines, regulatory provisions, and quality standards are likely in the near future. Safeguarding ethical and regulatory requirements are among one of the foremost challenges as of now.

Technology-assisted Therapies

Technology enables healthcare providers to engage more with patients in a longitudinal, integrated way and is often also called a practice extender. The role of technology-assisted therapies is consistently being acknowledged in psychiatry and it is being increasingly incorporated into various clinical conditions. These therapies include online therapist-assisted therapy, online bot based/AI-based therapy, virtual reality incorporation in various disorders like posttraumatic stress disorders, apps for therapy, and follow-up of therapy-related advice, etc.

AI-based interventions of chatbot-assisted therapy are improving and becoming easily accessible. These chatbots can provide basic CBT and emotional coping strategies and are being used as standalone or add-on supplements to the usual care. A few examples of AI-enabled chatbots are Woebot, Tess, Replika, etc. Avatar therapy for schizophrenia has also been found to be successful in the reduction of psychotic symptoms. In addition to chatbot therapy, AI has been used to provide companions to people with various illnesses. Some examples of companion robots, include Paro (a robotic seal), eBear (an expressive bear-like robot), Kasper, Nao, and Siri (Apple’s virtual voice assistant), etc., are in various stages of use in clinical practice.

The evidence base for technology-assisted therapies is encouraging. There are also models for combined therapy by the therapist and AI known as blended care. This strategy may be more cost-effective as well as better reach the clients.

Mobile Apps

Smartphone apps can allow patients to track their symptoms, mood, and medication adherence as well as monitoring, alerting, data collection, record maintenance, and detection and prevention systems, which can provide valuable information for psychiatrists in assessing the patient’s condition. App-related applications already in existence include those enabled to assist with psychiatric diagnoses, symptom tracking, disease course prediction, and psychoeducation. A study by Lu et al. (2015) found that a mobile phone app was effective in helping patients with depression to self-monitor their symptoms and improve treatment adherence. Artificial intelligence (AI) is also used in psychiatric assessment, for example, in natural language processing (NLP) to analyze patients' speech, text, and even social media posts. This can help to identify patterns and markers that might indicate a mental disorder or risk of suicide. A study by De Choudhury et al. (2013) used NLP to analyze social media posts from individuals with depression and found that the approach had high accuracy in detecting depression. In systemic reviews, Internet-based interventions are effective and cost-effective in reducing symptoms of depression and anxiety in systemic reviews.

Big Data and Machine Learning

Newer advances in technology are impacting medicine also. Big data and machine learning technologies aim to analyze a large amount of data and prove predictions related to disease models, treatment options, and prognoses with available information and evidence base. This also provides useful research material for identifying diseases, better categorization, course and outcome evaluations, response predictors, as well as newer treatment targets. Studies have used these strategies to early identify prodromal symptoms of bipolar affective disorder and ADHD with some success. Big data and machine learning can study a large amount of data, including data from HER, continuous stream-
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ing of data from wearable devices, social media uses, etc. that is not possible otherwise in the traditional clinical scenario. Hence, it is likely to enhance the quest for precision psychiatry.

Teaching and Training

Technology is being increasingly utilized in the teaching and training of medical students. Seeing the future trends in medicine. It is also recommended to incorporate more technology-enabled strategies in training as they are applied in patient care. A lot of learning platforms are available that are helpful in training extension by providing interactive and engaging learning material. Studies have shown that online learning can lead to improved knowledge retention and satisfaction among medical students. Simulation technology is also being used in medical education. This can include high-fidelity manikins or virtual patients that allow students to practice clinical skills and decision-making in a safe and controlled environment. Studies have shown that simulation-based education can lead to improved performance and confidence among medical students.

Challenges

Several challenges must be kept in focus before integrating technology into patient care and teaching/training medical students. Technology is not the panacea for several health problems the healthcare system faces. These new developments will demand a reorganization of the work of a range of clinicians in all clinical settings.

Conclusion

The future of technology and medicine holds great promise and important challenges. As we move forward, it will be important to balance the benefits and risks of technological advancements, ensure that technology is used responsibly and equitably, and address the underlying social, ethical, and legal issues that arise as technology continues to evolve.

References