DIGITALIZATION AND ARTIFICIAL INTELLIGENCE: IS IT THE FUTURE OF MENTAL HEALTHCARE IN PAKISTAN?

NAZISH IMRAN[1] and IMRAN IJAZ HAIDER[2]

[1]Professor and Head, Department of Child & Family Psychiatry, King Edward Medical University/Mayo Hospital, Lahore, Pakistan
[2]Professor of Psychiatry, Fatima Memorial Hospital, Lahore, Pakistan

CORRESPONDENCE: **DR. NAZISH IMRAN**   E-mail: nazishimrandr@gmail.com

ABSTRACT

Mental health disorders are of serious public health concern globally, and it is estimated over 15 million people are suffering from mental illnesses in Pakistan. To address this mental health situation, the application of technologies like digital mental health including Artificial intelligence (AI) is to be considered. The advantage of digital platforms is they allow users self-monitoring and self-management of their mental health status and prompt sharing with mental health professionals. AI can transform the subjective diagnostic system in psychiatric clinical practice and make it more objective, and is now being used progressively by psychiatrists for clinical support. The COVID-19 pandemic led to significant applications of digital mental health interventions, and mental healthcare professionals must accept and utilise these technological advances to their advantage in the times to come.

Keywords: Digital Mental Health, Artificial intelligence, COVID-19

Mental health disorders are increasingly being recognised as a major public health concern among the leading causes of global disease burdens. A report suggests that in Pakistan, over 15 million people are suffering from some form of mental illness. Mental health services to address complex healthcare needs of this huge population are under-resourced and mostly available in big cities, while most of the country's population resides in rural areas.[1]Unfortunately, many people with mental illness have limited, if any chance of seeking treatment at all in the current situation. With the digital revolution worldwide, technological innovations and solutions like digital mental health, including Artificial Intelligence (AI) may be employed in Pakistan to address the scale of mental health crises we are witnessing. As mental health professionals, we need to equip ourselves with applications of digital mental health and AI to be better prepared to work in changing landscapes and demands of clinical practice in mental health.

"Digital mental health" is defined as any application of digital health technology for mental health assessment, support, prevention, and treatment, whereas Artificial intelligence (AI) is "the science and engineering of making intelligent machines".[2,3] The World Health Organization classifies health related digital interventions into those for clients, healthcare providers, health system managers and data services.[4] This technological cluster includes mobile health (mHealth), mental health applications, wearables, virtual reality, chatbots and other emerging online platforms and care coordination systems. The most significant effect of digital mental health is increased accessibility to mental health care, irrespective of geographical constraints and affordability. Provision of continuous and round-the-clock support and help, increase autonomy and empowerment of patients, and enhanced therapy facilitation are further benefits of using digital mental health.[2] Information sharing, making connections via social media, opportunities for peer support, anonymity and ease of access to aid in understanding one's own difficulties are additional advantages.[5]

There is growing evidence to suggest that digital mental health can improve emotional problems, e.g. depression and anxiety.[6] In particular, these interventions are more helpful in mild to moderate severity cases, which otherwise might not be evaluated or treated because of a huge burden of severe illnesses and resource limitations. Provision of easier access to information with active involvement and taking responsibility in managing their own wellbeing is likely to foster a sense of patient empowerment. Digital platforms allow self-monitoring and management to the users regarding their mental health in ways not possible through face-to-face interactions. Thus, in symptoms can be observed through digital applications and information can be shared with healthcare professionals in a timely manner. Some digital tools primarily focus on psycho-education, provision of proper information, thus helping people cope with difficult situations, whereas others increase access to mindfulness-based approaches in severe mental illnesses fluctuations.[7] Coping with Voices, HelpID, and MoodSwings-Plus are some examples of Cognitive Behavioural Therapy digital applications for Schizophrenia and Bipolar disorder,[8,9] which provide psychoeducation and self-management. A recent randomized controlled trial of three publicly available 'mood apps' observed improvement in wellbeing compared to a wait list control group.[10] There is a much higher acceptability of digital mental health among the younger population.[2] Use of the internet as a trusted source of information by young people, as well as flexibility and anonymity of the digital space in interacting with healthcare professionals allows young individuals to avoid social stigma and access therapy through a smartphone from the comfort of their home.[2]

Mental health disciplines have been slower to adopt AI compared to other fields, but AI has the power to transform the subjective diagnostic system in psychiatric clinical practice to a more objective medical discipline. Its major strength is rapid pattern analysis of large data sets, which is not humanly

possible. Machine learning is an AI approach which uses various learning styles (like supervised, unsupervised, and deep learning) as well as Natural Language Processing (NLP) for learning algorithms.[11] All these approaches of AI are now being used in mental health for better understanding of disease progression, early disease detection, formulating risk models, uncovering biological mechanisms, offering technology to assess medication adherence and to help implement personalized mental healthcare and assess novel treatments.[11] AI is progressively being used to assist psychiatrists in clinical decision making. A recent review article identified 28 studies of AI and mental health and revealed high accuracy and the excellent potential of AI in this field with proof-of-concept works. Most studies were focusing on depression, anxiety, suicidal ideation and attempts, while a few were related to schizophrenia. Data used included electronic health records, mood tracking apps, brain imaging data, social media platforms and smartphone monitoring systems.[11]

Digital innovations are no doubt needed worldwide in the mental health field, but various barriers have been identified which limit implementation. Some of these barriers include organizational factors, poor digital literacy and dearth of training opportunities to use digital technology, reliable internet access requirements and perceived loss of therapeutic relationships in the absence of face-to-face interactions, etc.[12]

Despite the advantages of digital tools, it is unwise to dismiss the potential risks and concerns regarding digital technologies and use of Artificial Intelligence in mental healthcare. Technology literacy gaps among clinicians, as well as patients need to be addressed first for adoption and implementation of current digital mental health products. The need for establishing standards and guidelines for use of digital technologies, including AI in healthcare settings is a must, as lack of technical and medical standards are one cause for suboptimal adoption of digital interventions in clinical settings. Privacy and confidentiality concerns related to digital health interventions are paramount.[13] A large proportion of apps available for mood disorders were found to be transmitting user data to third parties without disclosing it in their privacy policy. Such data sharing is a serious concern due to the intersection between commercial and public health interests. It is crucial to improve privacy settings for apps and other digital interventions being used for mental healthcare. Another important concern about many digital technologies available (like wellness apps), is lack of adequate clinical validation, and evidence supporting their safety and efficacy.[14]

Institutional review boards also have limited knowledge of vast varieties of emerging technologies, which leads to inconsistent risk assessment. Furthermore, AI algorithms develop from emerging data sources, which may not be representative of the population, and the size and quality of data also limit algorithm performance in AI applications. Digital technologies cannot and should not replace medical practice and is to be blended with clinician interventions wherever possible along with being responsive to the changing needs of patients. Human interaction during in-person sessions for assessment, rapport building, therapy and monitoring of patients cannot be replaced by AI; digital interventions are preferable as additional tools in clinical settings. Thus, one needs to exercise a careful balancing act and scrutinize the benefits that these digital technologies can bring for mental health care while minimizing their unintended risks.

In conclusion, mental health professionals need to bear in mind that digitalization and Artificial Intelligence are here to stay. The COVID-19 Pandemic led to significant surges in acceptance, endorsement, and uptake of digital mental health interventions, although not always by choice.[15] The key is to embrace these technologies and embed them in current care modalities as useful additions and an ally through research and education. Mental Healthcare workers need to play an active role by collaborating with data and computational scientists and other experts to introduce digital interventions into clinical care with a strong evidence base. Clinical expertise, informed ethical guidelines, careful risk-benefit analysis, and oversight mechanisms in this new domain are definitely needed. This will hopefully help to transform mental health practice and radically improve patient care in resource-limited settings such as ours. Keeping in mind the advances and limited experience to date there is no doubt that the future of digital technologies and Artificial Intelligence in mental health care looks extremely promising.

REFERENCES

1. Javed A, Khan MN, Nasar A, Rasheed A. Mental healthcare in Pakistan. Taiwan J Psychiatry. 2020; 34(1):6-14

2. Wies B, Landers C, Ienca M. Digital Mental Health for Young People: A Scoping Review of Ethical Promises and Challenges. Front digit health. 2021:91.

3. John McCarthy. Artificial intelligence, logic and formalizing common sense In Philosophical logic and artificial intelligence. Springer, Dordrecht. 1989; 161-190.

4. World Health Organization Classification of Digital Health Interventions. Geneva: World Health Organization. 2018.

5. Bucci S, Schwannauer M, Berry N. The digital revolution and its impact on mental health care. Psychol. Psychother: Theory Res Pract. 2019; 92(2):277-97.

6. Lattie EG, Adkins EC, Winquist N, Stiles-Shields C, Wafford QE, Graham AK. Digital mental health interventions for depression, anxiety, and enhancement of psychological well-being among college students: systematic review. J Med Internet Res. 2019; 21:e12869. doi: 10.2196/12869

7. Ben-Zeev D, Brenner CJ, Begale M, Duffecy J, Mohr DC, Mueser KT. Feasibility, acceptability, and preliminary efficacy of a smartphone intervention for schizophrenia. Schizophr Bull. 2014; 40(6):1244-53. https://doi.org/10.1093/schbul/sbu033

8. Moritz S, Schröder J, Klein JP, Lincoln TM, Andreou C, Fischer A, Arlt S. Effects of online intervention for depression on mood and positive symptoms in schizophrenia. Schizophr res. 2016;175(1-3):216-22. https://doi.org/10.1016/j.schres.2016.04.033

9. Lauder S, Cosgrove VE, Gliddon E, Grimm D, Dodd S, Berk L, et al. Progressing Mood Swings. The upgrade and evaluation of Mood Swings 2.0: an online intervention for bipolar disorder. Contemp Clin Trials. 2017; 56:18-24.

10. Bakker D, Kazantzis N, Rickwood D, Rickard N. A randomized controlled trial of three smartphone apps for enhancing public mental health. Behav Res Ther. 2018;109:75-83.
   https://doi.org/10.1016/j.brat.2018.08.003

11. Graham S, Depp C, Lee EE, Nebeker C, Tu X, Kim HC, Jeste DV. Artificial intelligence for mental health and mental illnesses: an overview. Curr Psychiatry Rep. 2019; 21(11):1-8.

12. Berry N, Bucci S, Lobban F. Use of the internet and mobile phones for self-management of severe mental health problems: qualitative study of staff views. JMIR mental health. 2017; 4(4):e8311.

13. Ienca M, Haselager P, Emanuel EJ. Brain leaks and consumer neurotechnology. Nat Biotechnol. 2018; 36:805-10. doi: 10.1038/nbt.4240

14. Ienca M, Fabrice J, Elger B, Caon M, Scoccia Pappagallo A, Kressig RW, et al. Intelligent assistive technology for Alzheimer's disease and other dementias: a systematic review. J Alzheimers Dis. 2017; 56:1301-40. doi: 10.3233/JAD-161037

15. Ratheesh A, Alvarez-Jimenez M. The future of digital mental health in the post-pandemic world: Evidence-based, blended, responsive and implementable. Aust N Z J Psychiatry. 2022; 56(2):107-9.