

# INDIAN PSYCHIATRIC UPDATE

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## Digital Psychiatry



Editors  
**Anil Kakunje**  
**K Nagi Reddy**



**Indian Psychiatric Society**  
**South Zonal Branch**

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## **INDIAN PSYCHIATRIC UPDATE**

Founder: Dr. K. Ramakrishnan, President - IPS SZB 2021

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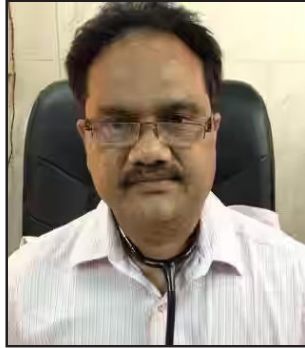
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## MESSAGE FROM PRESIDENT IPS-SZ



Digital Psychiatry is an emerging field where traditional treatment and diagnostic methods are replaced by or go hand in hand with technology. These innovations are like various apps and software which have proved beneficial as they help anybody access healthcare from anywhere at any time. The most important digital mental health research questions are balancing with face to face treatment, the safety of data obtained, accessibility and engagement with technology.

I am very happy with the awesome work done by both duo chairpersons Dr Vikas Menon and Dr Anil Kakunje with their team to tease out the most difficult and upcoming subject of Digital Psychiatry into readable and knowledgeable pieces like Telepsychiatry, Tele-Manas program, Telephone helplines, Apps, Artificial intelligence in mental health, Challenges and future of digital psychiatry. A wonderful attempt is made to make this book very useful to all mental health professionals.

I congratulate all the devine authors and the wonderful team of Publication committee members who have made this Indian Psychiatric Update book one of the treasures of the entire IPS.

**Dr Uday Kumar Kadiveti**  
President, IPS-SZ

## Message from the Chairman, Publication committee (2022-23)



Digital psychiatry is an exciting and rapidly growing branch of psychiatry that seeks to harness the power of digital health technology to augment service delivery and boost mental health outcomes. These approaches have gained global relevance in the wake of the COVID-19 pandemic and may have particular relevance to India given the considerable treatment gap and shortage of mental health resources.

In this context, this book is very relevant. Apart from compiling and discussing local and major international digital psychiatry initiatives that have made impactful contributions to mental health, the other important objective of this book is to offer a deep understanding of the potential and challenges involved in implementing Digital Psychiatry interventions within the Indian context.

I am deeply appreciative of the contributions of the invited authors, all of whom have considerable expertise in the field, which have enriched the pages of this book with their invaluable insights, diverse perspectives, and innovative ideas to advancing the cause of Digital Psychiatry in India.

I would like to extend my heartfelt commendations to Dr. Anil Kakunje, whose dedication and expertise have brought this unique resource to life. Regardless of your experience or skill in the field, I am confident that the pages that follow will offer something of value to every reader. In my capacity as the chair of the publication committee, I take immense pride in the realization of this endeavor during our tenure and thank the office bearers of Indian Psychiatric Society South Zone for this opportunity bestowed on our committee.

**Dr Vikas Menon**

Chairman, Publication Committee (2022-23)

On Behalf of, The Publication Committee (2022-23)

The Indian Psychiatric Society, South Zone

# PREFACE



Pen is mightier than the sword! It has the power to reach a larger number of people. Same is the power of the Digital world. The practice of mental health is also changing in this era. We thought DIGITAL PSYCHIATRY is an apt topic for the Vol 9 of Indian Psychiatric Update. It was overwhelmingly appreciated by all the publication committee members and the executive committee members.

Most of the authors of this book have firsthand experience on the topics involved and their expertise and experience would definitely benefit the readers.

We thank the Presidents - Dr Ramakrishnan, Dr Ramanan Eerat, Dr Uday Kumar and Dr Abhay Matkar under whose leadership this series has taken shape and grown. We appreciate the support of IPS-SZ office bearers, publication committee members and all the authors. Our thanks to Chetana Printers Mangalore for the design and editing work.

Happy reading

**Dr Anil Kakunje**  
**Dr K Nagi Reddy**

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# CHAPTERS IN BRIEF

## **Chapter 1 - Navigating Telepsychiatry: Unveiling Practices and Regulations in the Indian Context**

As telepsychiatry transforms the landscape of mental healthcare, it is imperative that the legal framework governing its practice evolves in tandem. The need for reforms is evident in the intricate interplay of technology, ethics, patient safety, and effective healthcare delivery. Telepsychiatry law reforms can unlock this transformative practice's full potential by addressing emerging challenges, ensuring ethical practice, and facilitating seamless integration with existing healthcare systems. As societies recognize the importance of mental health and the role of telepsychiatry in addressing it, these reforms will play a pivotal role in shaping a more accessible, equitable, and effective mental healthcare landscape for generations to come.

## **Chapter 2 - National Tele Mental Health Programme (Tele MANAS) of India 2022: Frameworks and Initial Progress**

Tele MANAS is the first technology-enabled helpline service dedicated to providing mental health care in India, initiated by the Government of India. Its unique feature of involving a multidisciplinary team of specialists available in a single call will help to reduce the shortage of mental health care providers in remote areas, and the maximum number of populations can access the services. It is expected to address the treatment gap and deficiencies in care and support the existing mental health care system. Future studies on the effectiveness of this programme in reducing the burden of care will guide us in policy-making and further interventional programmes.

## **Chapter 3 - Telepsychiatry Practice: Our Experience**

Amidst existing models of telepsychiatry across the globe, the Manipal Model of Telepsychiatry stands out uniquely as it has not only addressed the mental healthcare needs of the community but also a unique way of training JRs and PSW trainees in aspects of community psychiatry, organization skills, interview skills, liaison skills, public speaking skills. The model took shape in a phased manner with clear objectives and policies formed at the beginning. There were hurdles encountered at different stages and the model was self-sufficient to overcome those with ease. Manipal model of telepsychiatry can be an interesting model for replication by teaching hospitals where Psychiatry departments can reach the unreached and simultaneously train the JRs and PSW trainees in community psychiatry. This will also equip them with experience of telepsychiatry.

## **Chapter 4 – Psychiatry Helpline**

Helplines are channels set up to acknowledge and fulfil a specific need or request, or to provide help and information on various issues and concerns. They have been employed primarily in medical and health services, and are also used by businesses, governments, law enforcement agencies, protection services, consumer services and so on. Most of the calls to helplines are mostly due to crises faced by the callers and their desire to access social support. Helpline services has proven to be the closest alternative to direct interpersonal services across a multitude of circumstances.

Since its establishment in 1953 by the Samaritans and the growing trend of individuals across the globe owing a personal telephone/mobile service, there has been increasing number of services that is made available with the help of telecommunication and the internet. Helplines aim to help callers develop strategies to manage the situations causing their crisis and, when suitable, recommend services that provide more specialized, professional support.

## **Chapter 5 – Apps In Digital Mental Health Practice**

Digital Therapeutics is experiencing a revolutionary shift, rapidly transforming mental health care delivery. Mobile applications (apps) lead this tectonic transformation, providing personalized support and treatment regimens and making mental health care more accessible and effective. This chapter presents a contemporary and cutting-edge overview of using apps in digital mental health practice.

We will begin by exploring the interconnected components that make apps functional and useful in Digital Mental Health (DMH) interventions. Delving deeper into the world of DMH apps, we will uncover the latest research insights, shedding light on their significant benefits to clinical practice. Considering the sensitive nature of mental health care, we must pay close attention to critical regulatory, legal, and ethical considerations when utilizing these apps. A dedicated section will address these vital aspects, ensuring mental health professionals prioritize their patient's needs and privacy while seamlessly integrating apps into their practice. Several frameworks for assessing mental health apps that can aid in this process, guiding professionals in selecting apps that meet high effectiveness, safety, and ethical compliance standards, have been briefly looked into. Despite numerous advantages, these apps also present challenges and potential risks. We'll thoroughly examine these challenges from both the clinician's and patient's perspectives, understanding the implications and discussing strategies to mitigate any adverse effects.

## **Chapter 6- Artificial Intelligence in Mental Health Practice**

Artificial intelligence (AI) attempts to automate intellectual tasks usually performed by humans. In machine learning, especially deep learning, the computer is supplied with input data plus answers and is expected to “learn”; the rules and give outputs. Potential applications to mental health practice are automated documentation and intelligent-assistants with reasoning power to engage in clinical discussions.

Mental health professionals must have sufficient competence to evaluate critically: (i) studies on AI in mental health, such as diagnostic and prognostic predictors and clinical decision support systems; (ii) patient-facing applications advertising the use of AI for various mental health interventions, in terms of data safety and transparency of such systems. This chapter gives a superficial understanding of technical aspects of AI, an overview of recent research on AI in mental health practice, and the field’s challenges and expected trajectory using a hypothetical example of a model that chooses an antipsychotic for a patient.

## **Chapter 7 - Transcultural Telepsychiatry**

Psychiatrists should have multi-factor awareness of linguistic and cultural factors in influencing telepsychiatry encounters with their patients. There can be various sociocultural disparities in the use of ICT and digital literacy that can be a hindrance to the applicability and usefulness of telepsychiatry by patients. Psychiatrists should consider these factors when using telepsychiatry to provide mental health care, as it might not be generalizable to all of the Indian population due to sociocultural differences. Social, linguistic, and cultural context should also be considered during planning and implementing telepsychiatry encounters to provide culturally appropriate mental health care.

## **Chapter 8 - Digital Interventions in Substance Use Disorder (SUD) Treatment: Current Landscape and Future Directions**

Addiction/Substance Use Disorder (SUD) is a chronic relapsing disorder characterized by a continued engagement in behaviours despite the negative consequences. Treatment-seeking and retention for substance use disorders are generally low. Recent advances in digital technology in various fields have prompted the application of digital technology in the field of addictive disorders as well. The application of digital technology can potentially be useful in addressing treatment-seeking and retention. There is growing evidence for digital intervention in Substance Use Disorders.

## **Chapter 9 - Mental Health Problems of the Digital World**

This chapter gives a bird's eye view of various mental health problems that appeared with increased availability and access to digital technology. The evolution of the concepts and the controversies related to these problems are discussed in the beginning. Internet-related conditions have been a hot topic for researchers for the last two decades, and there needs to be more consensus and conceptual clarity. Most of the conditions are not included in the official diagnostic classifications, and most are far from the status of a separate psychiatric disorder. The following four headings describe various disorders and problematic behaviours related to digital technology. 1) Disorders that have already found a place in the classification. 2) online behavioural disorders in search of identity (conditions that can fit into already existing diagnoses and putative disorders that are yet to be included), 3) other problematic behaviours of digital space, and 4) newly introduced terms related to digital mental health.

Since there is no consensus on diagnostic criteria and the nature of most of these conditions, discussions on aetiology, epidemiology, and treatment can be exhaustive and so not included here, as it is beyond the scope of this short chapter. Problems related to online relationships are not included in this chapter as they are mainly expressions of real-life issues and cannot be considered pathological.

## **Chapter 10 - Newer diagnostic categories for the digital world**

Digital psychiatry has been proposed as a solution to existing deficits in the availability and accessibility of mental health care. Digital psychiatry refers to the use of digital health technologies (DHT) for the diagnosis and management of mental disorders. This term encompasses a wide range of methods, including telepsychiatry, smartphone-based mental health applications (“apps”), simulations based on virtual or augmented reality, conversational software based on natural language processing (“chatbots”), and social media.

The growth of digital psychiatry was catalysed by the global COVID-19 pandemic, which led to widespread restrictions on in-person consultations, and necessitated the growth of alternate forms of mental health care delivery. This led to a significant increase in virtual consultations, online psychological interventions, and the use of mental health-related apps. Though these restrictions have now been lifted in most parts of the world, the lessons learned during this period suggest that digital psychiatry is an effective, acceptable, and accessible treatment approach even in settings with relatively few resources.

## **Chapter 11- Challenges In Digital Psychiatry**

Digital Psychiatry, the integration of technology into psychiatric illness care. Its adoption into psychiatric care increases accessibility and eases delivery mechanisms. However, its implementation is associated with a range of dynamic challenges that need to be addressed from time to time for its successful incorporation into clinical practice. This chapter explores the multifaceted challenges in the realm of Digital Psychiatry including privacy, data security, accuracy, reliability and validity of diagnostic systems, difficulties in accessibility, human therapeutic relationships, regulations, ethical considerations and technological limitations. Drawing from recent evidence-based research findings in psychiatric literature, an overview of the key challenges in Digital Psychiatry and potential strategies to overcome them are discussed.



# CHAPTER - 1

## NAVIGATING TELEPSYCHIATRY: UNVEILING PRACTICES AND REGULATIONS IN THE INDIAN CONTEXT

### 1. INTRODUCTION

Telepsychiatry, which refers to providing mental health services via digital communication platforms, has garnered significant attention and recognition due to its role as an invaluable instrument in furnishing accessible and convenient mental healthcare, especially in a post-pandemic world<sup>1</sup>. Telepsychiatry's evolution stems from the broader telemedicine movement, which seeks to leverage technology to bridge the gap between healthcare providers and patients, promoting equitable healthcare, including underserved or remote areas<sup>2</sup>. With mental health issues on the rise globally, telepsychiatry offers an innovative solution to address the scarcity of mental health professionals. By facilitating virtual consultations, telepsychiatry enhances accessibility, reduces geographical barriers, and accommodates individuals with physical disabilities or transportation limitations<sup>3</sup>. This emerging prominence can be attributed to the contemporary landscape characterized by remarkable technological strides and a burgeoning need for accessible mental health services. Against this backdrop, telepsychiatry has surfaced as an indispensable pathway for extending the horizons of psychiatric care, enabling its penetration into previously underserved or geographically remote areas<sup>4</sup>.

Every psychiatrist practicing in India is mandated to adhere to our country's legal statutes to regulate telepsychiatry practice and is prohibited from aiding any efforts to circumvent such legal provisions. Furthermore, every psychiatrist is expected to display a spirit of cooperation in adhering to and enforcing the laws and regulations of the country. Integral to these responsibilities is the psychiatrist's observance of the stipulations outlined in

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legislative enactments such as the Mental Healthcare Act of 2017<sup>5</sup>, the Rights to Persons with Disabilities Act of 2016<sup>6</sup>, the Drugs and Cosmetics Act of 1940 and its accompanying Rule of 1945, the Narcotic Drugs and Psychotropic Substances Act of 1985, the Pharmacy Act of 1948, the Medical Termination of Pregnancy Act of 1971, the Transplantation of Human Organs Act of 1994 (and subsequent amendments), the Environmental Protection Act of 1986, the Pre-natal Sex Determination Test Act of 1994, and the Drugs and Magic Remedies (Objectionable Advertisement) Act of 1954. In addition, any other pertinent Acts, Rules, and Regulations promulgated by the Central or State Governments, local Administrative Bodies, or any relevant entities regarding safeguarding and fostering public health must be duly adhered to.

The duty falls squarely upon the Registered Medical Practitioner to not only adhere comprehensively to the regulations stipulated in the Indian Medical Council (Professional Conduct, Etiquette, and Ethics) Regulations of 2002 [and the subsequent The Registered Medical Practitioner (Professional Conduct) Regulations, 2023] but also to harmonize their professional conduct with the relevant provisions outlined in the Information Technology Act of 2000, as amended in 2008. This obligation extends to ensuring compliance with the Information Technology (Intermediaries Guidelines) Rules of 2011, the Information Technology (Reasonable Security Practices and Procedures and Sensitive Personal Data or Information) Rules of 2011, as well as the recently enacted Digital Personal Data Protection Act, 2023, in addition to any subsequent regulations that may be promulgated in the future. These commitments are fundamentally rooted in safeguarding the privacy and confidentiality of patients, encompassing the responsible handling and secure transmission of personal patient information. It is crucial to underscore that meeting these obligations represents a legally binding imperative that demands unwavering consistency and diligent implementation in the daily practice of medical professionals.

## **2. INDIAN LAWS AND GUIDELINES GOVERNING TELEPSYCHIATRY PRACTICE**

Ipsa facto it is crucial to remember that all the laws governing the in-person provision of medical care are also valid for teleconsultations. Telemedicine in India is governed by a comprehensive set of guidelines and legal provisions that aim to ensure the ethical, secure, and effective implementation of telehealth care services. These regulations have been established to address the unique challenges and opportunities presented by the digital delivery of medical services.

**Key guidelines and legal provisions governing the practice of telepsychiatry in India include:**

### **2.1. Mental Healthcare Act 2017**

The mental healthcare act of came into force in 2017<sup>5</sup>. It governs the delivery of mental healthcare in India. It provides the list of rights that a person with mental illness is entitled to in India. The Mental Healthcare Act (MHCA) of 2017 is a landmark legislation in India aimed at reforming and improving the mental healthcare system in the country. While it primarily focuses on the rights of individuals with mental illness and the responsibilities of mental healthcare providers, it has significant implications for various aspects of healthcare delivery, including telepsychiatry. In this comprehensive exploration, we will discuss how the MHCA 2017 impacts telepsychiatry practice.

- 2.1.1. **Recognizing Mental Health as a Fundamental Right:** One of the most fundamental impacts of the MHCA 2017 is its recognition of mental healthcare as a fundamental right for all individuals. This includes the right to access mental healthcare services, which extends to telepsychiatry. By acknowledging this right, the Act establishes the legal framework that supports the expansion of telepsychiatry services to reach underserved and remote populations.
- 2.1.2. **Informed Consent:** In telepsychiatry, obtaining informed consent is crucial<sup>7</sup>. The MHCA 2017 emphasizes the importance of obtaining informed consent from patients before starting any treatment or intervention. This requirement holds true for telepsychiatry practitioners, who must ensure that patients are fully aware of the nature of telepsychiatry services, potential risks, benefits, and alternatives. This ensures that patients actively participate in their care, which is essential for ethical and effective telepsychiatry practice.
- 2.1.3. **Confidentiality and Privacy:** Maintaining the confidentiality and privacy of patient information is a cornerstone of the MHCA 2017. Telepsychiatry providers must adhere to strict guidelines for data security and privacy, especially when delivering services remotely. This involves using secure communication platforms, encryption, and secure storage of patient records. Failure to do so can result in legal consequences and breaches of patient trust.
- 2.1.4. **Medical records:** Telepsychiatry operates at the intersection of healthcare and technology, introducing unique challenges that require modern legal considerations. These challenges encompass issues such as data security, encryption, and platform selection. Reforms can establish minimum technology standards that telepsychiatrists must adhere to, ensuring the secure transmission and storage of patient data. The integration of electronic health records (EHRs) in telepsychiatry also necessitates reforms to ensure seamless data exchange while maintaining patient privacy. When considering the integration of Electronic Health Records (EHR) or Electronic Medical Records (EMR) with telepsychiatry, psychiatrists are presented with various options that warrant careful assessment. A telemedicine platform that seamlessly incorporates an EHR offers a structured framework for encoding, storage, and retrieval of medical records in an online environment. It is important to note that psychiatrists may alternatively opt for a standalone telemedicine solution devoid of EHR, allowing them to directly input consultation notes into physical patient files, akin to traditional in-person documentation. However, EHRs should be viewed as a supplementary tool rather than the focal point of telepsychiatry care, in alignment with the augmentation provided by the consultation. It is essential, though, to comply with the provisions of the Mental Healthcare Act of 2017, particularly Section 25, which underscores the importance of maintaining basic medical records.

For the comprehensive documentation of telepsychiatry consultations, psychiatrists must adhere to a two-fold set of guidelines, encompassing the Mental Healthcare Act of 2017 (Basic Medical Records) and the Telemedicine Practice Guidelines of 2020, 2023. The Mental Healthcare Act, Section 25, grants individuals with mental illness the right to access their medical records (basic). In accordance with the telemedicine practice guidelines, meticulous records must be maintained for the treatment period, including a log or record of telemedicine interactions such as phone

logs, email records, chat or text transcripts, and video interaction logs. Psychiatrists are obliged to retain records, reports, documents, images, diagnostics, and any other pertinent data used in telemedicine consultations, irrespective of its digital or non-digital form. The prescription record maintenance is particularly notable, which mirrors the requirements for in-person consultations.

The prospect of audio or video recording during telepsychiatry consultations necessitates explicit consent from all parties involved (highlighting the illegality of covert recordings without prior authorization). Devices used for telepsychiatry services must be securely managed by authorized individuals, and precautions must be taken to prevent unauthorized access to sensitive information. In the event of device loss or theft, psychiatrists must possess the means to secure or remotely disable the device. Requests for access to basic medical records must be accompanied by written authorization from the patient, as stipulated by the Mental Healthcare Act of 2017, Section 25. Furthermore, the release of audio/visual data from telepsychiatry consultations requires specific patient authorization. Psychiatrists must operate within the bounds of their specialization and jurisdiction, as stated in Mental Healthcare Act, Section 106, to ensure patient safety and appropriate care. Geographical jurisdiction extends to telepsychiatry consultations across India, yet potential requirements for registration under specific state laws remain subject to future debate. This underscores the relevance of adhering to state-specific laws and policies, given the decentralized nature of health governance in India's federal structure.

- 2.1.5. **Mental Healthcare Advance Directives:**The MHCA 2017 introduces the concept of Mental Healthcare Advance Directives, allowing individuals to specify their preferences for treatment and nominate a representative in case they are unable to make decisions about their mental healthcare. Telepsychiatry providers must be aware of these directives and incorporate them into their practice, ensuring that they respect the autonomy and choices of their patients.
- 2.1.6. **Establishment of Mental Health Review Boards:**The MHCA 2017 establishes Mental Health Review Boards to protect the rights of individuals with mental illness. These boards have the authority to review cases related to involuntary admission and treatment. Telepsychiatry practitioners may be involved in these processes, and they must ensure that they follow the legal procedures outlined in the Act when recommending involuntary treatment through telepsychiatry.

In conclusion, the MHCA 2017 has a definitive impact on telepsychiatry practice in India. It sets a legal and ethical framework for the delivery of mental healthcare services through telemedicine, emphasizing the rights of individuals with mental illness, the regulation of professionals, informed consent, confidentiality, and other critical aspects of telepsychiatry. Compliance with the Act's provisions is essential to provide high-quality, ethical, and legally sound telepsychiatry services in India. Therefore, when it comes to the practice of telepsychiatry, every psychiatrist must be aware that all the laws outlined in MHCA hold true for telepsychiatry practice as well.

## 2.2. Information Technology Act 2000

The Information Technology Act of India, 2000<sup>8</sup>, commonly referred to as the IT Act, has significant implications for the practice of telemedicine in the country. Telemedicine is the remote provision of healthcare services using information and communication technologies, and the IT Act has played a crucial role in shaping the regulatory framework for this burgeoning field. Here is a detailed summary of the implications of the IT Act of India 2000 on the practice of telemedicine:

- 2.2.1. **Legal Recognition:** The IT Act recognizes electronic records and digital signatures as legally valid, which is a foundational element for telemedicine. Patient records and prescriptions in electronic form are considered legally acceptable, enabling healthcare practitioners to provide remote consultations and issue digital prescriptions.
- 2.2.2. **Data Protection and Privacy:** The Information Technology Act encompasses provisions that pertain to the critical domains of data protection and privacy. Specifically, Section 43A, coupled with the concomitant Information Technology (Reasonable Security Practices and Procedures and Sensitive Personal Data or Information) Rules of 2011, establish a comprehensive framework for the appropriate management of sensitive patient data, with a paramount focus on ensuring its utmost confidentiality and security. It is incumbent upon telemedicine providers to rigorously adhere to these regulatory directives, as they constitute the bedrock upon which the safeguarding of patient information rests. Compliance with these guidelines is imperative to uphold the sanctity and inviolability of patient data in the realm of telemedicine.
- 2.2.3. **Cybersecurity:** Telemedicine platforms and providers must adhere to cybersecurity standards outlined in the IT Act to protect against data breaches, unauthorized access, and other cyber threats. Compliance with these standards is essential to maintain trust among patients and ensure the integrity of telemedicine services.
- 2.2.4. **Telemedicine Platforms:** The IT Act indirectly impacts telemedicine platforms by regulating intermediaries' liability. Section 79 of the IT Act grants certain legal protections to intermediaries, including telemedicine platforms, provided they follow due diligence procedures. This encourages the development of secure and reliable telemedicine platforms.
- 2.2.5. **Telemedicine Business Models:** The IT Act's provisions on e-commerce and electronic contracts have implications for the business models of telemedicine service providers. Telemedicine companies must ensure compliance with these regulations, especially when offering paid services or entering into contracts with patients.
- 2.2.6. **Consumer Protection:** The IT Act empowers consumers by providing a legal framework for addressing issues related to fraudulent telemedicine services or data breaches. Patients have the right to seek legal remedies under the Act if they face any harm or malpractice during a telemedicine consultation.

In conclusion, the IT Act of India 2000 has had a profound impact on the practice of telemedicine in the country. It has provided the legal foundation for the use of electronic records and signatures, data protection, cybersecurity, and consumer protection in telemedicine. As the field of telemedicine continues to evolve, it is essential for healthcare

practitioners and telemedicine providers to stay compliant with the IT Act and other relevant regulations to ensure the safe and effective delivery of healthcare services through digital means.

### **2.3. The National Medical Commission Registered Medical Practitioner (Professional Conduct) Regulations, 2023 and Telemedicine Practice Guidelines, 2023**

The National Medical Commission Registered Medical Practitioner (Professional Conduct) Regulations, 2023, constitute a comprehensive framework that outlines the ethical and professional standards expected from healthcare providers registered under the National Medical Commission (NMC). These regulations serve as a vital tool in upholding the integrity and accountability of medical practitioners, ensuring patient safety and quality care. The regulations encompass a wide range of aspects, including telemedicine practices, drug prescription guidelines, patient management, health education, counseling, and medication. By setting clear guidelines for professional conduct, these regulations play a pivotal role in maintaining the highest standards of medical practice, fostering trust between medical professionals and patients, and contributing to the overall enhancement of healthcare services in the country. Some salient features of the regulations pertaining to telepsychiatry are as follows.

Chapter 2, clause 29 states that telemedicine practice is permissible as per the telemedicine practice guidelines. It also gives the ethics and medical registration board the power to revise the telemedicine practice guidelines per chapter 4, clause 36. It specifies that in case of professional misconduct, the respective state medical council where the registered medical practitioner has delivered the care [time of the cause of action]. This is an explicit entry of telemedicine also into misconduct regulation. [For the purposes of simplicity, the word RMP will be replaced by Psychiatrist for rest of the section as this chapter deals with the same] In Guideline 6, point 2 it explicitly states that when patients contact the Psychiatrist via social media, the decision to choose between an in-person consultation and a teleconsultation is as per the Psychiatrist's discretion. It also permits the Psychiatrist to provide teleconsultation to anyone in India using any medium, including chat and social media platforms. Although it explicitly states that telemedicine should be avoided for emergencies, it permits the use of the same in case no alternative is available. It permits for psychiatrists to liaise with other psychiatrists, medical professionals, and health workers. The onus of establishing identities lies with the Psychiatrist and the patient (through appropriate means of identification). This statement implies that anonymous consultations may not be legal, unless it is an emergency. In patient-initiated consultations, consent is implied, and in all other cases, explicit consent is recommended. Minors (<18 years) are not permitted to avail teleconsultations without an adult caregiver/ relative/ legal guardian. The onus of not proceeding further with the teleconsultation lies with the psychiatrist in case the psychiatrist believes that the physical examination is necessary for the appropriate delivery of healthcare. The act explicitly calls it as a misconduct if - there is an insistence of the psychiatrist to persist with telemedicine, when the patients themselves express desire for an in-person consultation; prescribing without a provisional diagnosis at least; prescribing prohibited and habit-forming drugs. The telemedicine guideline published under these regulations is in principle similar to Telemedicine Practice Guidelines 2020. There are minor changes, which are basically added clarification to the 2020 guidelines.

## 2.4. The Digital Personal Data Protection Act, 2023:

The Digital Personal Data Protection Act of 2023, having received presidential assent on August 11, 2023, through parliamentary approval, carries substantial implications for the realm of telepsychiatry. This pivotal legislation elucidates its core objective in its preamble, which articulates its commitment to overseeing the processing of digital personal data in a manner that duly acknowledges both the rights of individuals to safeguard their personal data and the imperative to process such data for legitimate purposes, along with related or incidental matters.

This Act establishes an intricate framework designed to fortify the protection and regulation of personal data. Consequently, telepsychiatrists and telemedicine platforms that provide remote mental health services are confronted with the necessity to navigate novel requirements aimed at safeguarding the privacy and security of patients' sensitive information.

Applying to the processing of personal data within the boundaries of India, including data in digital formats or those digitized from offline sources, this legislation extends its reach even to data processing conducted beyond India's borders, specifically when it pertains to the provision of goods or services within India. Section 6 of the Act emphatically prescribes that personal data may only be processed for explicitly defined purposes and only after securing the unequivocal consent of the concerned individual, in this context, the patient. This consent must be characterized by being free, specific, informed, unconditional, and unambiguous, substantiated by a clear affirmative action. The Act's insistence on the acquisition of verifiable consent, the assurance of data accuracy, and the facilitation of individuals to access, rectify, or delete their data significantly influences how patient information is gathered, stored, and managed during telepsychiatry sessions. It is noteworthy that individuals retain the right to withdraw their consent at any point in time, a key consideration for data processing in telemedicine, where data acquired by telemedicine platforms must align with this legislative framework.

Additionally, the Act introduces provisions concerning cross-border data transfers and imposes restrictions on data sharing with external entities. These provisions necessitate meticulous scrutiny when engaging in collaborations with international partners or utilizing third-party tools. While the Act undoubtedly bolsters data protection for patients, telepsychiatrists are compelled to revise their practices, bolster their technological infrastructure, and refine their consent mechanisms to harmonize with these stringent regulations, ultimately fostering a more secure and accountable telepsychiatry landscape.

It is pertinent to mention that the Act carves out exemptions for consent, as articulated in Section 7, particularly in cases of responding to medical emergencies, delivering treatment, or providing health services. Furthermore, the Schedule to the Act outlines the magnitude of penalties to be imposed for various violations and breaches committed under its purview, with data holders, referred to as fiduciaries, being subject to substantial penalties ranging up to 250 crores. This underscores the gravity with which data protection and compliance are regarded within the framework of the Digital Personal Data Protection Act of 2023.

## 3. UNANSWERED QUESTIONS, CHALLENGES, AND GREY AREAS

### 3.1. The problem with Schedule C drugs

These substances possess the propensity to induce habitual usage, thereby necessitating

the procurement of requisite permission, license, or registration as per the variable State Rules and Regulations in accordance with the Narcotic Drugs and Psychotropic Substances Act of 1985. This requirement may exhibit variations contingent upon the specific regulations of different states.

Moreover, the Telemedicine Practice Guidelines of 2020 and 2023 have unequivocally proscribed the engagement with substances listed under List C (with minor exceptions). This prescription is a manifestation of the guidelines' stance against the involvement of healthcare practitioners in any form of telemedicine practice related to List-C substances, thereby reinforcing the commitment to ethical and responsible telemedicine conduct.

The argument for keeping these medicines out of the ambit of telepsychiatry is strong, despite emerging evidence to the contrary<sup>10</sup>. Allowing the prescription of List-C drugs through telemedicine entails a myriad of perils that warrant careful consideration. List-C drugs, classified under the Narcotic Drugs and Psychotropic Substances Act of 1985, are substances with a propensity for abuse and addiction. This practice introduces significant risks, including potential misuse, diversion, and illicit trade of these substances. Telemedicine consultations often lack the comprehensive physical examination and diagnostic precision necessary for List-C drug prescription, leading to inaccurate diagnoses and inadequate monitoring. Patient safety is compromised as the potential for drug interactions, inadequate follow-up, and inappropriate polypharmacy increases. Ethical and legal concerns arise regarding proper patient evaluation, compliance with regulations, and healthcare provider responsibilities. To maintain patient well-being and uphold ethical and regulatory standards, a cautious and well-regulated approach is essential when considering the telemedicine prescription of List-C drugs. However, telepsychiatry practice will be constrained if this recommendation stays.

Psychiatrists must ensure rational prescription and use of drugs, while also respecting patient confidentiality and rights. Consent from the patient is mandatory before transmitting prescriptions to pharmacies or directly to patients. The prescription can be transmitted through various means, including email or messaging platforms.

### **3.2. Telepsychotherapy**

In the domain of teletherapy, psychiatrists are granted the authority to extend therapeutic interventions to patients across India, employing various communication mediums such as text, audio, or video. However, the fundamental principles of teletherapy, tele-psychotherapy, or tele-counseling remain tightly tethered to those governing conventional in-person therapy. This translates into consistently applying professional responsibilities, ethical benchmarks, and legal considerations, regardless of the technological mode used. Despite these overarching similarities, the unique nature of teletherapy necessitates adherence to a comprehensive set of guidelines:

Prior to embarking on teletherapy, a thorough in-person psychiatric assessment is obligatory to establish a robust foundation for subsequent interventions. Teletherapy can be seamlessly integrated with psychiatric consultations for medication prescription, either concurrently or sequentially, based on the discretion of the treating psychiatrist. However, it is imperative that teletherapy is not extended without a well-defined or provisional diagnosis.

A patient's suitability for online therapeutic engagement should be diligently evaluated before initiating teletherapy, and this assessment should be an ongoing consideration throughout the therapeutic journey. Furthermore, each teletherapy session should commence with a



swift evaluation of the patient's need for emergency care services, with a clear directive for in-person interaction with a psychiatrist or registered medical practitioner in instances necessitating crisis-related therapy.

In view of the patient's unique psychiatric and mental state, the decision of whether to involve family members in teletherapy sessions should be made judiciously. Professionalism in appointment scheduling, attire, session duration, timings, and maintaining the confidentiality of teletherapy sessions is paramount.

Furthermore, meticulous documentation of all therapeutic or otherwise communication between psychiatrist and patient is crucial. These records, encompassing electronic and non-electronic exchanges, synchronous and asynchronous interactions, must align with established record-keeping protocols. Additionally, the psychiatrist is tasked with documenting basic medical record therapy notes in accordance with the guidelines set forth in the Mental Healthcare Act, 2017, Section 2<sup>5</sup>. Ultimately, the psychiatrist can terminate teletherapy consultations at any point, exercising their judgment to uphold the patient's best interests. Reciprocally, patients can discontinue teletherapy consultations as they see fit. To ensure transparency and compliance with ethical standards, informed consent from patients should be secured, whether through in-person discussions or teletherapy sessions.

Nevertheless, while telepsychiatry offers various advantages and opportunities<sup>11</sup>, its implementation is not devoid of formidable challenges. Synchronous communication difficulties, potential breaches of data privacy, technological barriers, and issues pertaining to establishing therapeutic rapport in a virtual setting are among the intricate complexities warrant comprehensive consideration. Regulatory authorities and mental health organizations have proactively endeavoured to establish a robust framework of guidelines and legal stipulations to safeguard telepsychiatry's integrity, effectiveness, and ethical underpinnings.

Furthermore, patient safety during emergencies is of paramount importance. Telepsychiatry laws should address protocols for handling crisis situations remotely, ensuring that patients receive timely intervention and appropriate referrals when needed. Reforms can also define the responsibilities of telepsychiatrists in coordinating with local emergency services and caregivers to ensure comprehensive care.

### **3.3. Cross-Jurisdictional and International Practice:**

The digital nature of telepsychiatry blurs geographical boundaries, enabling patients to seek treatment from providers located in different states or even countries. While this opens doors to a global network of mental health experts<sup>12</sup>, it raises legal complexities related to licensure, jurisdiction, and cross-border practice. Concerning the landscape of medical practice in India, the Telemedicine Practice Guidelines of 2023, embedded within the ambit of the National Medical Commission (NMC) and the Registered Medical Practitioner (RMP) Professional Conduct Regulations, offer a clear and definitive framework. These guidelines unequivocally delineate that a Registered Medical Practitioner (RMP) possesses the eligibility to engage in telemedicine consultations with patients located in any corner of India. This progressive stance underscores the evolving nature of healthcare delivery, emphasizing accessibility and convenience for patients across the nation.

However, it is imperative to note that alongside this expanded reach, mechanisms for accountability and addressing potential complaints of misconduct are also established. In the event of any grievances or allegations of misconduct arising from telemedicine

consultations, the prescribed course of action involves lodging a complaint with the State Medical Council of the particular state where the RMP is physically situated at the time of providing the tele-consultation. This approach ensures that oversight and resolution mechanisms are in place, fostering transparency, accountability, and the assurance of ethical medical practice within the realm of telemedicine. However, regarding the international practice the same guidelines dictates that these guidelines do not apply for the RMPs (although they may have registered in India and have license to practice) outside the jurisdiction of India. Yet at the same time, ambiguously it maybe permissive to an opportunity for the RMPs to consult their old patients even if they are abroad.

### **3.4. Insurance and Reimbursement:**

As telemedicine gains traction, some insurance companies and government health schemes have started recognizing and reimbursing telemedicine consultations. These policies aim to ensure that patients have equitable access to medical services regardless of whether they are delivered in-person or through telehealth channels. In India, mental health insurance is now receiving momentum and voice. Ensuring that telepsychiatry is treated on par with in-person care in terms of insurance coverage encourages wider adoption and accessibility going ahead<sup>13</sup>.

### **3.5. Liability, and Malpractice:**

Although the rates of malpractice and litigations with respect to telemedicine may be lower than in-person consultations<sup>14</sup>, as with any form of medical practice, telepsychiatrists will be held professionally accountable for their actions. Reforms in telepsychiatry laws should outline principles of liability and malpractice in virtual consultations. Establishing a legal framework for resolving disputes and determining the appropriate jurisdiction for legal proceedings is vital to instil trust and ensure patient protection. To practice telepsychiatry safely, it is worthwhile to follow the tele-operational guidelines released by NIMHANS, Bangalore<sup>15,16</sup>

### **3.6. Navigating self-promotion in telepsychiatry through social media used for teleconsultations:**

Doctors have very little formal training in navigation of social media for patientcare and research<sup>15</sup>. The utilization of social media for patient care and research presents a noteworthy challenge within the medical profession due to the limited training doctors typically receive in this domain. Notably, the Indian Medical Council (Professional Conduct, Etiquette, and Ethics) Regulations of 2002, particularly in section 6.1 addressing "Code Advertising," delineate the ethical standards that govern physician-patient interactions within the context of advertising and publicity. These regulations establish a foundational framework to ensure that healthcare professionals maintain ethical standards when engaging with patients and the public through various communication channels, including social media.

Furthermore, the National Medical Commission (NMC) Registered Medical Practitioner Professional Conduct Regulations of 2023 offer additional guidance in this regard. These regulations explicitly prohibit RMPs from directly or indirectly soliciting patients. The prohibition extends to group practices involving RMPs, healthcare institutions, hospitals, nursing homes, corporate hospitals established or operated by government bodies, local authorities, trusts (whether private or public), corporations, cooperative societies, organizations, or individuals. This prohibition clearly underscores that telemedicine platforms should refrain from engaging

in the advertisement of RMPs who practice on their platforms.

Moreover, the regulations stipulate that RMPs should abstain from participating in telemedicine platforms that provide patient or third-party ratings, reviews, advertisements, or promotions of RMPs through any means, including the manipulation of algorithms and search engines. The overarching principle here is to maintain the integrity and professionalism of medical practice by preventing undue commercialization and marketing in healthcare. The regulations emphasize that advertising of RMPs is strictly prohibited under any pretext.

In essence, these regulations set forth a comprehensive and unambiguous framework that guides the behavior and conduct of healthcare professionals in the digital age, particularly with respect to the use of social media and telemedicine platforms. They underscore the importance of upholding ethical standards and prioritizing patient well-being and trust over commercial interests in the realm of healthcare communication and promotion.

The potential risks associated with social media are also addressed, highlighting the blurred boundaries between public and private life that can lead to professional boundary violations. Psychiatrists are advised to maintain a clear distinction between personal and professional relationships on social media, opting for separate accounts when necessary. Sharing patient data, images, videos, or case notes on social media platforms is strictly cautioned against unless explicit and irrevocable informed consent has been obtained, as published content can quickly spread and become uncontrollable. Publicly identifying oneself as a psychiatrist on accessible social media platforms is seen as an endorsement of professional responsibility, necessitating the accurate representation of one's views and maintaining a respectful approach when commenting on colleagues. In essence, adherence to these guidelines ensures the responsible and ethical use of social media platforms while upholding the dignity and professionalism of the psychiatric practice.

#### **4. CONCLUSION:**

Telepsychiatry practice and its regulation by law play a vital role in shaping the responsible and effective implementation of remote mental health services. These legal provisions highlighted above provide a blueprint for ethical conduct, patient safety, and quality care, while simultaneously establishing the framework for enforcement and accountability. As telepsychiatry gains prominence and continues to evolve, the flexible adaptive interplay between guidelines and legal frameworks will remain crucial to ensuring that mental healthcare remains accessible, secure, and of the highest standard.

As telepsychiatry transforms the landscape of mental healthcare, it is imperative that the legal framework governing its practice evolves in tandem. The need for reforms is evident in the intricate interplay of technology, ethics, patient safety, and effective healthcare delivery. Telepsychiatry law reforms can unlock this transformative practice's full potential by addressing emerging challenges, ensuring ethical practice, and facilitating seamless integration with existing healthcare systems. As societies recognize the importance of mental health and the role of telepsychiatry in addressing it, these reforms will play a pivotal role in shaping a more accessible, equitable, and effective mental healthcare landscape for generations to come.

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## CHAPTER - 2

# NATIONAL TELE MENTAL HEALTH PROGRAMME (TELE MANAS) OF INDIA 2022: FRAMEWORKS AND INITIAL PROGRESS

### INTRODUCTION

Mental health is an integral part of our general health and well-being. Years lived with disability (YLDs) are mainly caused by mental disorders, which account for one in every six YLDs globally [1]. A paradigm shift has occurred in understanding mental health and its policies globally. The Covid 19 pandemic has created a global crisis for mental health and highlighted its importance further as many studies reported an increase in the cases of mental disorders during the pandemic and post-pandemic[2]. Telepsychiatry is a promising approach to reducing the treatment gap and improving the accessibility and quality of mental health services [3]. Recognising the mental health crisis following COVID-19 and the urgent need to create a digital mental health network to support the existing mental health system, the Hon'ble Union Finance Minister, the Government of India in the Union Budget 2022 announced on 1 February 2022 India's first National Tele Mental Health Programme (NTMHP) (<https://health.economicstimes.indiatimes.com/news/industry/union-budget-2022-23-national-tele-mental-health-programme-will-effectively-counter-indias-mental-health-epidemic/89271908> ). Establishing a new milestone in the field of mental health on the occasion of World Mental Health Day, Tele Mental Health Assistance and Networking Across States (Tele-MANAS) initiative of Union Ministry of Health & Family Welfare was launched on 10th October 2022 (<https://pib.gov.in/PressReleasePage.aspx?PRID=1866498> ). To provide people with better access to high-quality mental health counselling and care services, the Government of India announced that a network of 23 tele-mental health centres of excellence will be set up under the NTMHP[4]. The Tele Mental Health Assistance and Networking Across States (popularly called Tele MANAS) initiative was subsequently launched under the NTMHP to offer free 24/7 tele-mental health services nationwide, emphasising those residing in remote or underserved areas. The current National Mental Health Programme (NMHP) and the District Mental Health Programme (DMHP) have encountered significant difficulties in implementing successfully in primary care settings due to a lack of adequate local administrative bodies, human resources, and effective central monitoring body to supervise and modify its activities based on the timely feedback [4]. To offer a feasible solution for many of the issues impeding the proper implementation of NMHP and DMHP in India, the Tele MANAS initiative was planned and is a digital arm of NMHP. This chapter discusses the background, aims and objectives, and framework of Tele MANAS.

### BACKGROUND

#### Burden of Mental Illness in India

According to National Mental Health Survey (NHMS) 2016, the prevalence rate of any psychiatric disorder in India is 10.6% among the general population[5]. Globally the treatment

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gap for mental illness exceeds 50%; however, in India, it is even higher, accounting for 83% according to NMHS 2016, due to a lack of adequate resources [5]. Besides mental illness, a population of "mental distress" with subthreshold symptoms does not fulfil the diagnostic criteria of any psychiatric disorder. The "care gap" for mental distress is unknown but likely high. A state of mental well-being enables people to cope with the stresses of life, realise their abilities, learn well and work well and contribute to their communities. It is not mere absence of mental disorder [1] which fluctuates in response to changing situations and stressors [1]. Mental illnesses refer to clinically significant disturbances in cognition, emotion regulation, or behaviour that result in distress or impairment in functioning.

### **IMPACT OF COVID-19 ON MENTAL HEALTH**

The COVID-19 pandemic had a significant impact on mental health globally. Several studies estimated a 35% increase in the prevalence of anxiety and depressive disorders in 2020 [6], post-traumatic stress symptoms, and psychological distress related to COVID-19 symptoms [7]. The pandemic has significantly impacted the delivery of mental health services. Several mental health initiatives were undertaken in India to combat the challenges posed by the pandemic. The National Institute of Mental Health and Neurosciences (NIMHANS) launched a national helpline called Samaashraya in March 2020 to provide psychosocial support [8]. The toll-free helpline (080-46110007) was accessible 24/7 in twelve local languages and English, which received a significant number of calls [9, 10]. Based on its response, Tele MANAS is the most recent initiative by the Government of India.

### **TELE MANAS**

Tele MANAS envisions working as a comprehensive, integrated, and inclusive 24x7 tele-mental health facility in each State and Union Territory (UT) in India with the following aim and objectives [13]:

AIM - To provide universal access to equitable, accessible, affordable, and quality mental health care through 24x7 tele-mental health counselling services as a digital component of the NMHP across India with assured linkages.

### **OBJECTIVES**

1. To exponentially scale up the reach of mental health services to anybody who reaches out across India, any time, by setting up a 24x7 tele-mental health facility in each of the States and UTs of the country.
2. To implement a fully-fledged mental health service network that, in addition to counselling, provides integrated medical and psychosocial interventions, including video consultations with mental health specialists, e-prescriptions, follow-up services and linkages to in-person services.
3. To extend services to vulnerable groups of the population and difficult-to-reach populations.

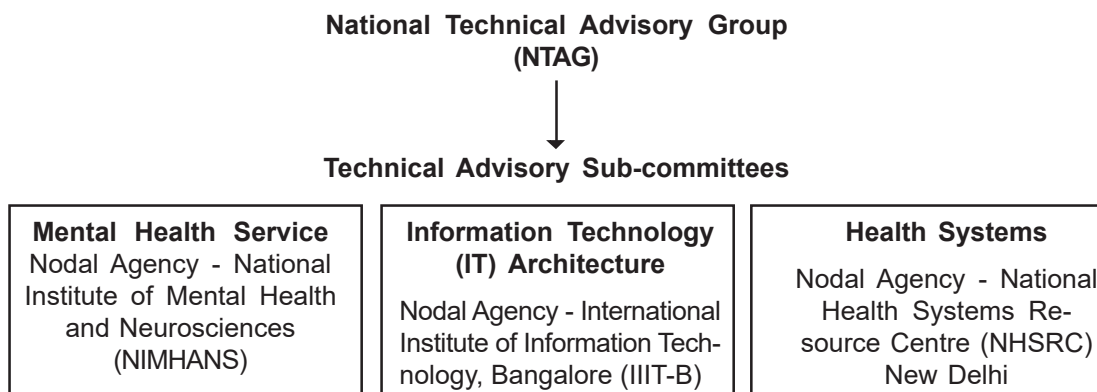
### **NATIONAL IMPLEMENTATION FRAMEWORK OF THE TELE MANAS**

The Government of India launched the Tele MANAS programme on World Mental Health Day, 10 October 2022. The Ministry of Health and Family Welfare (MoHFW) oversees its implementation.

A National Technical Advisory Group (NTAG) and three technical advisory sub-committees were formed. These sub-committees collaborate to ensure that the deliverables of various arms of the programme are harmonized[13].

**1. Structural framework:**

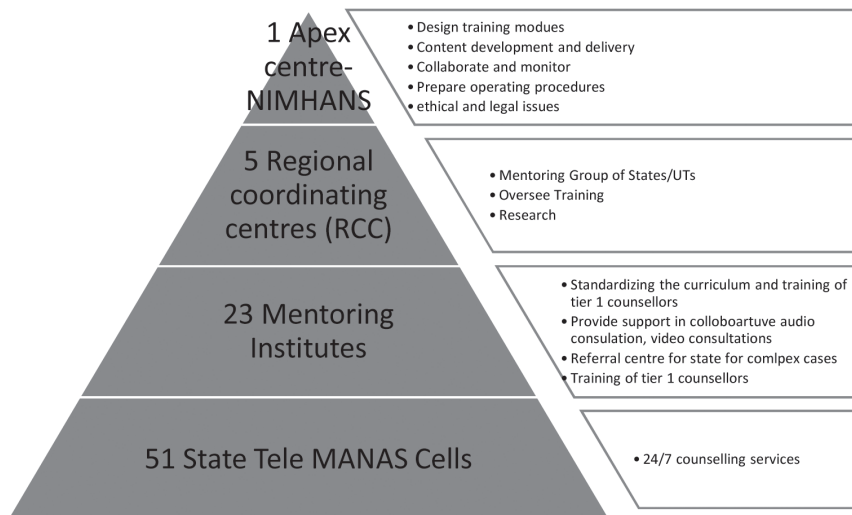
Figure 1 Organizational Framework



**2. FUNCTIONAL FRAMEWORK**

The Tele MANAS programme operates within a hierarchical framework. The National Institute of Mental Health and Neurosciences (NIMHANS) Bengaluru is the Apex co-ordinating centre for the Tele MANAS activities nationwide. The system also includes regional Coordinating centres[Lokopriya Gopinath Bordoloi Regional Institute of Mental Health (LGBRIMH)- Tezpur, Postgraduate Institute of Medical Education and Research (PGIMER)- Chandigarh, Institute of Human Behaviour & Allied Sciences (IHBAS)- Delhi, Central Institute of Psychiatry-Ranchi, NIMHANS - Bengaluru], mentoring institutes, and the Tele MANAS cells[13].

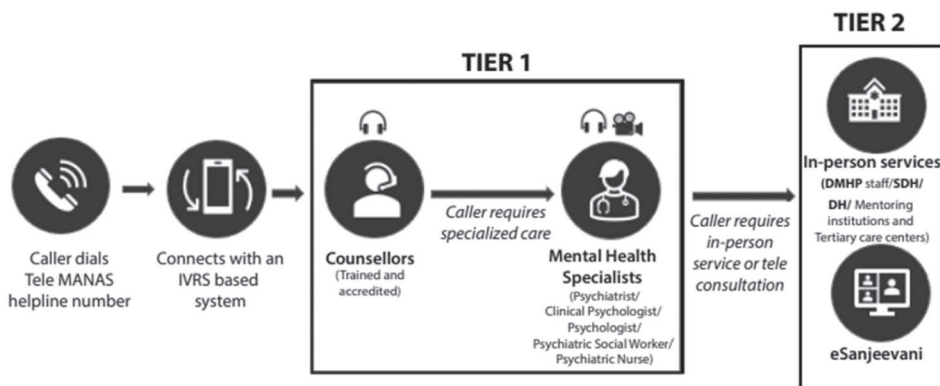
Figure 2- Functional Framework



### 3. SERVICE DELIVERY FRAMEWORK

- It operates through a two-tier system. Tier 1 comprises Tele MANAS cells, including trained tele-counsellors, and Tier 2 consists of Mental Health Professionals (Psychiatric nurse, Clinical Psychologist, Psychiatric Social worker, and Psychiatrist)[11].
- The Tele MANAS cell is the functional unit responsible for service delivery.
- The service is provided through an Interactive Voice Response System (IVRS) based on the toll-free number 14416, and tele-counsellors are the first point of contact for care.

Figure 3- Mechanism of Calling



Soon Tele MANAS shall provide video consultations with integrating e-Sanjeevani and plans to integrate with DMHP nationwide[11].

### COMPONENTS OF TELE MANAS

1. Training and Accreditation of Tele MANAS counsellors will be conducted by NIMHANS with specially designed curriculum of mental health exclusively for them to maintain the higher quality of care [14]
2. Telephone counselling involves providing psychosocial support or addressing the caller's concerns through the telephone with or without internet connectivity. Counselling involves offering help to individuals seeking help directly or through collaboration with their family members or community health workers like ASHA workers. The counselling is provided by the Tier 1 workforce involving trained counsellors 24 hours a day. Based on the level of care required, the counsellor will either provide the care within their capabilities or refer to a specialist (Psychiatrist/psychiatric nurse/Clinical Psychologist/Psychiatric social worker).
3. Online counselling/consultation - The specialists at the Tele MANAS cell provide real-time audio or video consultation. Suppose an in-person or detailed evaluation is needed. In that case, the caller will be referred to the nearest health care centre, DMHP, or an audio/video consultation will be arranged through e-Sanjeevani, a national telemedicine platform.

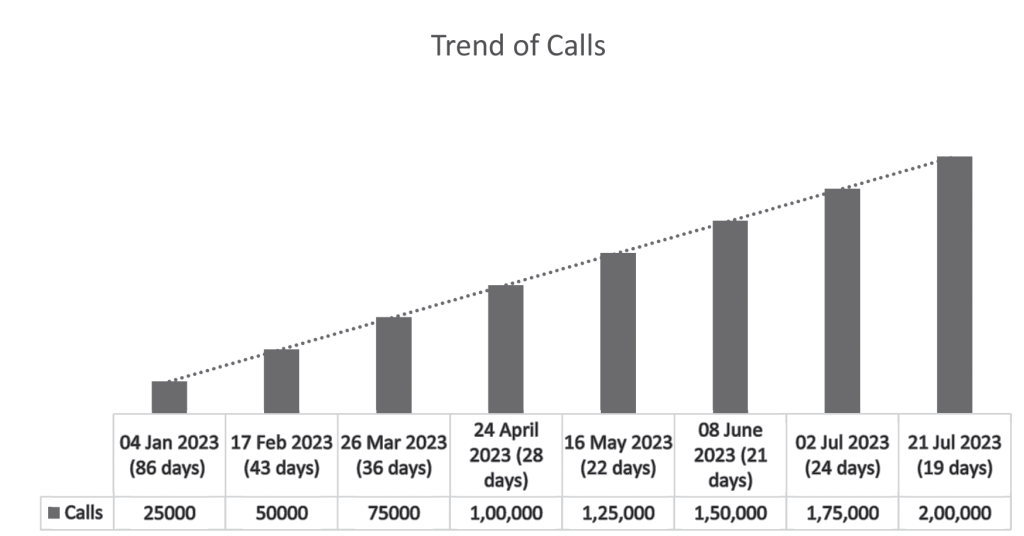
### BENEFICIARIES

Individuals with mental health problems can access the Tele MANAS helpline service 24/7 across India by dialling the toll-free number 14416.



## PROGRESS OF TELE MANAS: A TEN MONTHS ACHIEVEMENTS

After the launch of the Tele MANAS programme, incremental growth was observed in the number of calls received. Currently, 42 functional Tele MANAS cells are running in 31 states and union territories, providing mental health services in 20 languages. The initial 25,000 calls were received within 86 days after launch. However, the time taken to achieve successive 25,000 calls decreased over time. Tele MANAS achieved the milestone of the first 1 lakh calls within the first 193 days (on 24 April 2023) and reached the second one lakh, i.e., a total of 2 lakh calls within its next 86 days (on 21 July 2023) with rapid growth in the number of calls and good response from the callers [13].



Source - [13]

The profile of the first 2 lakh calls: Of the two lakh calls, 59.6% were male callers, and 40% were female callers. 75% of the callers were between 18-45 years of age, 12.5% were in the 46-64 years age group, and 8% were below 18 years of age. The majority of calls, around 28.8%, were related to general feelings of sadness, 27.6% of the calls were about sleep-related problems, 20.4% calls had anxiety concerns, 10% of the calls regarded relationship issues, 9.2% of the calls pertained to aggression, and 9.7% calls related to low interest in activities [15].

## AN INITIAL EXPERIENCE OF A TELE MANAS CELL OF JAMMU & KASHMIR, A UNION TERRITORY

Tele MANAS was launched in Jammu and Kashmir on 4 November 2022. Setting up telepsychiatry services is essential in areas like Jammu and Kashmir that have seen conflicts over politics, natural calamities, and the effects of the COVID-19 pandemic. Within the first 100 days since its launch, the state cell has received around 4000 calls from mental illness seeking professional help and the numbers are expected to rise over time [16]. These figures demonstrate the substantial need for affordable and effective mental health services. It also conveys that Tele MANAS is acceptable to individuals at a union territory as many initiate

contact with mental health professionals. The current action is anticipated to ensure timely, cost-effective, and comprehensive mental health care for the remote and underserved population in the area, enhancing mental health.

### **FUNDING AND IMPLEMENTATION RESPONSIBILITY**

In the initial three years, support will be provided to state as 100% grant for human resources, infrastructure, and equipment. Thereafter, it is envisioned that the human resources and other recurring costs would merge with the existing mechanisms of National Health Mission (NHM). States/UTs shall bear the cost as per prevailing NHM norms and budget for the same in the Program Implementation Plans [17]. However, the responsibility of implementation lies with the respective governments of each state and union territories.

### **STRENGTHS OF TELE MANAS**

1. Single national number 14416
2. Free of cost
3. Any time service available 24/7 through telephone catering to people from remote areas across the country.
4. Tele MANAS cell is a primary operational unit and the first point of contact to provide mental health care services.
5. The service is provided by trained tele-counsellors, Mental health professionals (Psychiatrist/psychiatric nurse/Clinical Psychologist/Psychiatric social worker).
6. Multi-linguistic services
7. Provides linking, referral and monitoring services to mental health care establishments, including District Mental Health Programme.
8. Comprehensive mental health care package in a single call ranging from tele counselling to video consultation by specialists.
9. Addresses the population reporting "mental distress" who do not fulfil the diagnostic criteria of any mental disorder.
10. Maintains confidentiality and anonymity of caller.

### **CHALLENGES**

1. Given that the call is IVRS-based, technical difficulties are unavoidable, occasionally making it challenging to provide the service per the caller's need.
2. There is some difficulty in establishing rapport compared to face-to-face counselling when related to sensitive issues.
3. The problematic scenarios listed below present a challenge for the tele counsellors in handling calls.
  - a. Prolonged silence
  - b. Extreme emotional reactions - Aggression, prolonged crying, etc
  - c. Excessive interference from outside
  - d. Individuals with active suicidal ideas or death wishes
  - e. Individuals reporting sexual abuse, domestic violence
  - f. Transference and countertransference
  - g. Counsellor not knowing what is to be done in a counselling session
4. In emergency cases, such as when a caller expresses suicidal thoughts, linking the caller to a referral service is challenging if the caller cannot be reached again.

5. Prank calls or calls where the caller's authenticity is questionable may be encountered.
6. The constant handling of calls with distress can negatively impact the mental health of tele-counsellors, especially burnout. Hence their mental well-being becomes extremely important.

### **ETHICAL AND LEGAL ASPECTS**

Tele MANAS will adhere to provisions of the Mental Healthcare Act 2017, National Mental Health Policy 2014, Telemedicine Practice Guidelines of India 2020, Professional Practice Guidelines related to telepsychiatry, Tele Clinical Psychology, Tele Social Work and Tele Nursing. It will also adhere to policies and laws related to Data Protection and Provisions of IT Act 2000[18].

### **CONCLUSIONS**

Tele MANAS is the first technology-enabled helpline service dedicated to providing mental health care in India, initiated by the Government of India. Its unique feature of involving a multidisciplinary team of specialists available in a single call will help to reduce the shortage of mental health care providers in remote areas, and the maximum number of populations can access the services. It is expected to address the treatment gap and deficiencies in care and support the existing mental health care system. Future studies on the effectiveness of this programme in reducing the burden of care will guide us in policy-making and further interventional programmes.

### **TAKE HOME MESSAGE BOX.**

- In India, mental health is a significant issue with many challenges and a huge treatment gap of 83% for mental disorders.
- Telepsychiatry is a promising approach to bridge the gap in the existing mental health services.
- Tele MANAS is the first and the largest government-initiated programme exclusively for providing 24 x 7 comprehensive mental health care.
- Tele MANAS is the digital arm of NMHP.
- Tele MANAS involves a multidisciplinary team of mental health professionals with referral services beyond just a helpline.
- Incremental growth was seen in the number of calls received, achieving the first 2 lakh calls in 10 months since the launch.
- The initiative has its challenges and limitations in providing care.
- Tele MANAS is expected to address the deficiencies in care and support the existing mental health care system

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# TELEPSYCHIATRY PRACTICE: OUR EXPERIENCE

## INTRODUCTION

It was in 1973 when Dwyer described the interactive mental health services via television as telepsychiatry[1] (Dwyer TF, 1973). Since then the umbrella term includes clinical services in terms of diagnosis, interventions, psychoeducation, therapies and research. With the advent of technological revolution in recent decades and the penetration of internet services in all handheld devices, the video calling facility is emerging as the preferred mode of communication across all age groups.

## TELEPSYCHIATRY IN INDIA

Telepsychiatry in India is nearly two decades old and different models of telepsychiatry services were used in the two decades. Most of the models focused on delivering mental healthcare and few tried to train the other specialists to deliver services for basic mental health ailments. Schizophrenia research foundation (SCARF), Chennai had two models: mobile telepsychiatry model[2] (Thara&Sujit, 2013) and specialist-doctor-patient model[3] (Thara, et al, 2008). There was synchronous mode of telepsychiatry in Jan SwasthyaSahyog community health program which catered out-patient and emergency mental health services in Bilaspur and adjacent areas of Chhattisgarh[4] (Pandya SK, 2014). Asynchronous model of telepsychiatry was explored in Maharashtra, where e-mail was used to send patient's details to the specialist[5] (Balasinorwala et al, 2014). For the benefit of non-specialist doctors, Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh developed and validated Clinical Decision Support System/Virtual Psychiatrist Model[6,7,8] (Malhotra et al, 2014, 2015, 2017). A giant leap in telepsychiatry was by National Institute of Mental Health And Neuro Sciences, Extension for Community Healthcare Outcomes (NIMHANS - ECHO) Project which delivered various services: case based discussions, didactic lectures, teleconsultations, Tele-mentoring and Tele E-Learning through Virtual Knowledge Network - National Institute of Mental Health And Neuro Sciences[9] (Gowda et al, 2018).

## MODELS OF TELEPSYCHIATRY

There are two modes of communication described in various models of telepsychiatry,

### 1. SYNCHRONOUS

This mode is synonymous with interactive communication. This comprises of live, two-way communication between the doctor and the patient. Various modalities under this will include

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consultations via telephone/mobile phone, communication/consultation via online mode in through the chat forums/chat boxes, and live videoconferencing. The advantages in this mode are live interaction and immediate responses/clarifications, which are possibly the closest to "face to face" doctor-patient interaction. However, this has limitations in terms of dependency on the quality of the technology which is available or accessible at both ends - patient and doctor.

## **2. ASYNCHRONOUS**

This mode can be understood as a communication wherein information is collected and stored at one point of time and forwarded to the recipient. Here, both patient and doctor are not present at the same time. Information in the form of audio, video, documents or questionnaires are collected and forwarded to the doctor via e-modalities. The doctor in turn reviews this forwarded information and replies about the management plan. This model has advantages in terms of being relatively inexpensive, simpler, easily accessible, with lesser time constraints, option to capture/edit data in of multiple forms and requires lesser technical expertise [10]. (Malhotra et al., 2013).

### **OUR EXPERIENCE: THE MANIPAL MODEL OF TELEPSYCHIATRY**

The Department of Psychiatry at Kasturba Medical College at Manipal (Maipal Academy of Higher Education, Manipal) in Udupi district of Karnataka has post graduate courses in Psychiatry and Psychiatric Social work. The department has been conducting community camps in Udupi and neighbouring districts since four decades and all these services are in the form of in person mode. However, there was a need to reach out to unreached areas. With the evolution of technology, the department made plans and initiated telepsychiatry services in 2016. Later, this was expanded to four centres namely: Primary Healthcare Centre (PHC), Kandluru; Community Health Care Centre (CHC), Byndooru; Community Health Care Centre (CHC), Hebri and a private hospital in Basavakalyan.

Udupi district of Karnataka is known for its beaches and belt of Western Ghats in addition to pilgrimage. The terrain varies from beaches to hills with some naxal affected areas. Certain areas are deprived of health care facilities due to various reasons like accessibility, terrain, prolonged monsoon, naxal activities to name a few. To address these issues Department of Psychiatry of Kasturba Medical College, Manipal has planned telepsychiatry services. Implementation of this model was in following manner.

### **STEP 1: ASSESSING LOGISTICS**

For this venture, initially SCARF team member was contacted and the satellite based communication technology was planned. However, operating cost and modification in vehicle were not feasible and financial viability was questionable. Then video conferencing applications Skype and Google talk (Hangout name in the past) were considered. It required two laptops, two webcams and internet connection. Manipal University responded positively to this new initiative and provided required laptops, webcams and all necessary logistics - vehicle for travel. Hospital internet connection has good enough speed for video-conferencing. At the other end PHC/CHC, offered their Internet services. Trial run was done in April 2016 and both Skype and Google Talk services were found to be of optimal use for the venture.

## STEP 2: SPECIFYING THE POPULATION IN NEED

Second step was to identify the population which needed mental health services. Initial step was to seek opinion from the patients who availed services at Kasturba Hospital, Manipal. Patients coming from the remote areas, areas from where commuting was difficult, areas which lacked services despite having more number of patients and with poor financial status suggested the need in certain areas. Then practicing psychiatrists in Udupi districts were approached who also gave inputs about which areas needed the mental health services. With these inputs the following areas were identified:

**Kandlur village:** This site was chosen in view of the location and the number of Psychiatry patients in and around this area. Patients from surrounding places could commute to this area easily.

**Hebri village:** This was a Naxal affected area and located in the foothills of western ghats. Agriculture being the main profession, monsoon rains played a significant role in their lives.

**Shirooru/ Byndooru taluka:** Despite being a taluka, mental healthcare services in this area were inadequate.

**Basavakalyan taluka, Bidar:** This is located 800km from Manipal. This site was chosen due to various factors: it is considered as one of the backward districts of India, lack of awareness, stigma, lack of mental health services (whole district had only one psychiatrist) and poor socio-economic status of people.

## STEP 3: POLICY ISSUES

Next step was to have defined service delivery policies of implementation. Memorandum of understandings (MoU) outlining services offered, financial and legal liability were prepared. These MOUs were between all involved agencies, namely: Department of Psychiatry, Kasturba Medical College, Manipal and office of the District Health Office of Udupi district. The validity of the MoUs was one year and based on the progress they were reviewed and renewed annually. Following points were part of the policy:

**Finances:** The services offered were part of department's extension of community mental health services. No financial incentives were offered to the service providers by the college or by the Government. No additional fee was charged for the patients who availed the services.

**Technical requirements:** laptops, webcams were provided by the Manipal Academy of Higher Education, Manipal; vans to travel to centres were provided by the University, Internet services were freely provided by the University and respective centres.

**Investigations:** Government centres had basic laboratory services. The investigations which were required as standard of care, were recommended.

**Medications:** Pharmacies in the Government Hospitals had psychotropics. Additional required medications were supplied by the District Mental Health Program (DMHP) in 3 centres. In the Basavakalyan centre, Chittsanjeevini Charitable Trust<sup>[11]</sup> provided medications for free. Further, local panchayats, Non-Governmental Organizations (NGOs) had donated medicines which were not part of the Government supply.



#### STEP 4: INTEGRATOR

The "integrator" can be considered as an entity/person who is responsible for the delivery of services for a specified set of population in a defined geographic area. After discussions, roles were defined for the integrator:

- 1) The integrator has to act as a 'link' between the healthcare providers and the healthcare recipients. The healthcare providers here mean: PHC/CHC/Hospital, mental health professionals, doctor at the centres. The healthcare recipients mean: patients, their caregivers/family members, society and the village. The mission of the integrator should be standard mental healthcare delivery.
- 2) The integrator has to recognize the mental health service requirements of the population in general and of the patients visiting the health care centre.
- 3) The integrator should provide details about the resources available at the centre and in the community which can be used to deliver standard mental health care.

The role of integrators in the centres was taken over by the doctor at centre or the hospital on total. The Psychiatry junior resident and the doctor at the centre worked in collaboration to redesign the service delivery at the centre. One exclusive predefined day in the month was kept for mental health services and all patients streamlined to this day. The integrator, in addition, went a step ahead and managed resources at their centres to suit the needs of the population: segmentation of resources, redistribution of available finances for effective implementation, coordination at the macro level with DMHP/Government.

With all the background work, the following models of telepsychiatry were implemented.

#### 1. COLLABORATIVE CARE CONSULTATION MODEL

Collaborative care consultation model consists of delivering healthcare by healthcare workers who work in collaboration at different sites. Three centres were following this model. First centre of the Manipal Model was the Primary Healthcare Centre (PHC) of Kandlur village in Kundapura taluka of Udupi district in April/May 2016. After the smooth run in first centre, this model was replicated in two more places: Community Health Centre (CHC) of Hebri taluka in April 2017 and Community Health Centre (CHC) of Byndooru taluka in September 2017.

#### WORK PATTERN IN THIS MODEL

**Manpower:** The manpower in this collaborative care model in these three centres consisted of a team of three professionals (Psychiatry junior resident (JR), Psychiatric Social Work (PSW) trainee and PSW faculty). This team would visit the centre on a designated day (different for each centre) of each month.

**Pattern of work:** The JR and PSW trainee had to arrange the visit, would coordinate with the doctor at the centre on monthly basis. PSW faculty would supervise this process.

**Process:** At each centre, a designated room with good internet connection was kept for telepsychiatry. In the room, JR and PSW trainee would interview the patients and this interview would happen in front of a laptop which would be viewed in real-time/live by the consultant psychiatrist in Kasturba Hospital, Manipal. Consultant psychiatrist, as and when needed, would clarify further and would interview the patients. JRs and PSW trainees would discuss

with the consultant and a diagnosis would be made and medications would be prescribed by the JR. The hospital pharmacy would dispense medications. PSW trainees would carry out required psycho-social evaluations and interventions. Prior to the beginning of consultation, a consent is taken from the patients/family members to be interviewed which would be supervised by the consultant via video and the consultant would clarify further.

**Reaching out:** In addition to routine care, the PSW trainee would deliver a talk on mental health/illness/treatment options/available, etc for all patients in the general waiting area. This was aimed to spread awareness among all people who are visiting hospitals for various ailments. Further, PSW faculty would conduct sessions on various topics for anganawadi and accredited social health activist (ASHA) workers periodically to identify mental health issues in the population that they cover and refer them to the centre. In these 3 centres, hospitals and Government doctors acted as integrators for this Collaborative Care Model.

## 2. DIRECT TO PATIENT CONSULTATION MODEL

The fourth centre was in Basavakalyan in Bidar district of Karnataka. The author used to visit the centre in person on monthly basis since January 2014 for delivering mental health services. Due to distance of travel involved, this was converted to direct to patient model of telepsychiatry in September 2016. In addition to this, the author would visit the centre once in couple of months also. For this centre, a memorandum of understanding(MOU) was made between the author, one Non-Governmental Organization (NGO) by name Nesara mainly for the coordination, and with one more NGO by name Chittasanjeevini Charitable Trust@[11], Bengaluru, mainly for the monthly supply of medicines. To deliver mental healthcare services in this centre, a private hospital, which had 2 Paediatricians, was approached. The hospital was liaised for delivery of services and the hospital pharmacy helped in dispensing medicines free of cost. In addition, the private hospital paediatricians would assist in physical examination and other clinical needs.

### WORK PATTERN IN THIS MODEL

**Manpower:** Volunteers from the NGO, Nesara, paediatricians at the centre and the psychiatrist at Kasturba Hospital, Manipal.

**Pattern of work:** Here, the NGO volunteers would act as contact point and the patients would call the designated volunteer who would confirm the date and time and patient reached on the specified date of the month.

**Process:** At the centre, a designated room with good internet connection was kept for telepsychiatry. Patient with family member would be sent inside the telepsychiatry room. In the telepsychiatry room, one laptop would be there and patients were interviewed online. Then, paediatrician in the next room would do necessary physical examination. Paediatrician would provide details and based on findings the prescription would be suggested by the psychiatrist which would be written by the paediatrician or emailed by the psychiatrist. The hospital pharmacy would dispense psychotropics for free of cost. Here, the volunteers of NGO and paediatrician acted as integrator and looked after the service.

### PROGRESS OF THE MODEL

This was a new way of seeking/delivering mental healthcare for the patients/family members and for the mental healthcare professionals. There was apprehension about: internet

connectivity, ability to communicate with patients/family members, empathetic interviewing, managing any acute situations, managing any adverse effects after the consultation, to name a few. However, as the time progressed all these issues were addressed satisfactorily and all stakeholders were comfortable in using this mode. Any newer challenges which emerged had been addressed satisfactorily and services were fine tuned to suit the need.

In Byndooru centre, network issues were there and the time needed for evaluation was increasing with each visit. So, it was decided to convert this centre to in person visit centre only. From 2021, this centre ceased to be a telepsychiatry centre.

The number of patient visits (old and new) in each centre till December 2022: Basavaklayan 2897 patient visits, Kandluru 2652 patient visits, Byndooru 1303 patient visits and in kHebri 681 patient visits. There was gradual increase in the number of patients over the years. New patients in total in each centre were: 478 in Kandluru, 326 Byndooru, 256 in Basavakalyan and 191 Hebri.

In all the centres the following disorders were commonly seen: mood disorders, schizophrenia, epilepsy, anxiety disorders, somatoform disorders, substance use disorders and somatoform disorders. Three post graduate theses were conducted in these centres, which are yet to be published. In one of the qualitative study in three centres, common themes in discussion were: stigma, finance, distance, time, convenience, quality care, doctor-patient relationship.

### **SERVICES DURING COVID 19 PANDEMIC**

The Covid 19[12] pandemic had disrupted the clinical services not only in the tertiary care centre but also in the periphery also. Most of the hospitals were converted as covid care centres and patients were not able to travel due to lockdown in addition to their own difficulties. During this period, the doctors at respective health centres were contacted and they ensured that patients would visit the health centres and they supplied the medicines as per the last prescriptions. Despite this few patients could not reach to the centres. In the Basavakalyan centre, another method was adopted. The NGO volunteer was the contact person for the patients. Volunteers of NGO would receive the medications from the private hospital pharmacy and he delivered the medicines to patients as per the last prescriptions. Some of the family members also visited the hospital to refill the prescriptions. However, few patients who could not cross the state border were instructed to visit the possible mental healthcare services in their states viz. Maharashtra and Telangana. The number of patients in post-covid period declined in the Basavakalyan centre.

### **BENEFITS NOTICED**

1. Increase in number of patients at each centre. There was gradual increase in number of patients.
2. Many patients who were visiting the tertiary care centre, resumed their care at the primary healthcare centre; so, this was like a demand driven supply. They expressed benefits of no cost of traveling, no absenteeism from the work, free medications to name a few.
3. Training of JRs and PSW trainees: JRs and PSW trainees were trained in telepsychiatry mode of healthcare delivery. This was like hands on experience for them. At the end of their course they were confident of organizing these independently.
4. Training to work in liaison: JRs and PSW trainees had to work in liaison with public and private bodies for conducting these. This provided an opportunity enhance their skills

- in collaborating at workplace.
5. Public talks: PSW trainees had conducted mental health education sessions in the community.
  6. PSW faculty trained the anganawadi and ASHA workers to identify the mental health problems in the community.
  7. Supervised clinical work: JRs and PSW trainees interviewed patients under the supervision of consultants; this provided an opportunity to fine tune their interview skills and management plans.

### CONCERNS EXPRESSED

The health professionals expressed that quality of service provided by this mode might not match the face to face interaction. Further, few expressed lack of satisfaction in the care provided. Other concerns expressed were: discomfort with using the AV mode for interaction, lack of adequate time for interviewing, inadequate physical evaluation clues which usually supplement the understanding of the illness, quality of doctor-patient relationship, non-availability of the all investigations/medications. However, when compared with non-availability of services to the availability of some services, it was accepted as a satisfactory model. Patients expressed concerns about non-familiarity with this mode of interaction, however the presence of JRs for interview eased the concern.

### HURDLES AND SOLUTIONS

In this model, various problems were encountered at different time frames.

1. Internet related issues were common as the quality of video calls were not consistently satisfactory in initial period. However, this was resolved with upgrading of the internet speed, scheduling the visit in the first week of month (because internet at the centre was used by all hospital employees and the data would be over at the month end).
2. Limitations in prescribing psychotropics. There were limited medicines in terms of variety and quantity were available at Government centres. This restricted the option of using required medications. This issue was addressed by donations obtained from the local panchayat, volunteers and NGOs. Few purchased the medications from janaushadhi centres.
3. Limitations of investigations: At Government centres not all investigations were available. Eg. serum lithium or valproic acid assay. Patients were advised to get those one at nearest laboratory services.
4. Documentation process: Unlike in a tertiary care setting, elaborate documentation was not possible. This issue was addressed by collecting necessary additional information periodically.
5. Rotation of JRs/PSW trainees: As part of the training program JRs and PSW trainees had to move to different units and the continuity was not maintained.
6. Language barriers and cultural differences: JRs and trainees were from different parts of the country. Despite knowing the Kannada language at times there were difficulties the language because of the variations in the dialect and different terms used to expressed different symptoms. This was addressed by the fact that most consultants knew the local languages and dialects.
7. Legal issues: Since there was a doctor at the site in all centres, no legal hurdles were encountered in this model. The telepsychiatry practice guidelines came in at a later date. However, regulatory requirements of the guidelines were not an issue: all documentation

was in hard copy, no video sessions were recorded, no identity was revealed in any place, prescriptions were given by the qualified person, mediations were dispensed at the licensed pharmacy.

### **MANAGING ADVERSE EFFECTS**

Possible adverse effects were explained to the patients. For any emergencies, they were advised to contact the doctor at the centre who in turn would contact the consultant psychiatrist at Kasturba Hospital in Manipal. There was an instance of drug induced dystonia in Basavakalyan centre and the patient reached the centre immediately and sought further treatment.

### **PATIENTS REQUIRING ADMISSIONS:**

Few patients visiting these centres needed in-patient care. For such patients, admission as free bed patient was offered at Kasturba Hospital, Manipal. This covered the in-patient expenses up to 5-7 days. After that the patients were followed up at respective centres.

### **CONCLUSION**

Amidst existing models of telepsychiatry across the globe, the Manipal Model of Telepsychiatry stands out uniquely as it has not only addressed the mental healthcare needs of the community but also a unique way of training JRs and PSW trainees in aspects of community psychiatry, organization skills, interview skills, liaison skills, public speaking skills. The model took shape in a phased manner with clear objectives and policies formed at the beginning. There were hurdles encountered at different stages and the model was self-sufficient to overcome those with ease. Manipal model of telepsychiatry can be an interesting model for replication by teaching hospitals where Psychiatry departments can reach the unreached and simultaneously train the JRs and PSW trainees in community psychiatry. This will also equip them with experience of telepsychiatry.

### **TAKE HOME MESSAGE**

Telepsychiatry is an add on effective tool to reach the unreached.

Training of the trainees during their post-graduation is an effective way of preparing a generation of mental health professionals who will be well versed with all aspects of telepsychiatry.

Effective implementation is possible if all aspects are planned in prior: policy issues, role stake holders, logistics, liaison with Government and NGOs.

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## CHAPTER - 4

### PSYCHIATRY HELPLINE

#### INTRODUCTION TO HELPLINE SERVICES

Helplines are channels set up to acknowledge and fulfil a specific need or request, or to provide help and information on various issues and concerns. They have been employed primarily in medical and health services, and are also used by businesses, governments, law enforcement agencies, protection services, consumer services and so on. Most of the calls to helplines are mostly due to crises faced by the callers and their desire to access social support (1,2).

Helpline services has proven to be the closest alternative to direct interpersonal services across a multitude of circumstances. Since its establishment in 1953 by the Samaritans and the growing trend of individuals across the globe owing a personal telephone/mobile service, there has been increasing number of services that is made available with the help of telecommunication and the internet (3). Helplines aim to help callers develop strategies to manage the situations causing their crisis and, when suitable, recommend services that provide more specialized, professional support (4).

#### PSYCHIATRIC HELPLINE SERVICES

Mental health helpline services support people with mental health issues, including anxieties, suicidality or depression, by providing immediate support and facilitating access to services (5). These services were the key in dealing with the sudden uptick in anxiety, depression, decreased life satisfaction and suicidal behaviour at the population-levels (6,7). Owing to the disparities in personal, social, economic and access to care modalities, mental health services remain inaccessible to majority of the populations, this gap became more apart during the COVID-19 pandemic. Teleservices has proved to be an efficient cost-effective platform bridging these inequalities by connecting those in need to mental health professionals, but these services are yet to made use of by the populations at large (8-12). Studies show an approximate of 50% treatment gap across psychiatric disorders(13). In India majority of the patients with diagnoses are not seeking treatment due to inaccessibility, financial constraints and other social factors (14,15). According to a WHO-ICMR project on Urban Mental Health

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Services, there is a significant shortage of psychiatrists in three major Indian cities. Chennai has a 60% shortage, Delhi has a 36% shortage, and Lucknow has a 22% shortage. The overall gap in mental health services is also large: 96% in Chennai, 92% in Delhi, and 82% in Lucknow. These figures highlight a critical lack of mental health resources in these cities, citing the need for accessible, cost-effective and flexible services like psychiatric helplines (16).

Owing to the inadequacy of mental health facilities across large populations with unequal distribution of resources and access, telehealth services enable the professionals to reach wider populations, to those who direly require assistance and also provide a platform for those in need to access help and care in a sustainable manner. Telephone helplines are promising for connecting patients to treatment. They offer several advantages: they reduce stigma compared to visiting a mental health facility, are cost-effective, save time, and maintain caller confidentiality. They are especially helpful for individuals in crisis, such as those contemplating suicide or needing immediate brief counselling as some helplines are accessible 24-hours a day (17).

Stigma is a major obstacle to accessing quality mental health care and appears in various forms across the globe, especially in the developing countries. To help people connect with Mental Health Professionals (MHPs), mental health centres are introducing strategies like 24-hour helpline services(17,18). Psychiatric services are mostly available in cities and large towns, yet there persists an astounding shortage of mental health professionals and services, as pointed out by Pirkis et al. (2016). Telephone helplines can serve as the initial contact point and facilitate the process of accessing mental health assistance at their privacy and discretion. Telephone helplines aim to quickly connect people to information and care making them a simple and widespread mental health support system from a variety of concerns like suicidality, alcohol or drug abuse, domestic abuse, child harassment, etc. According to Chavan et al. (2012), interactions with the first point of contact for care can affect an individual's future engagement with healthcare, break down the social stigma, it also proved helpful for care takers or family members of individuals have pressing mental health distress and requires immediate attention or care.

## **STUDIES ON PSYCHIATRIC HELPLINES**

A systematic review found that research on frequent callers to crisis helplines is limited and mostly of insufficient quality. Frequent callers are more likely to be male and unmarried, with no differences in age, employment, ethnicity, mental health conditions, or suicidality compared to other callers. The impact on helpline staff is understudied. Responses to frequent callers, such as limiting call duration or assigning specific counsellors, reaching out to caller rather than waiting for them to call have been effective in reducing call frequency. The review highlights the need for an improved definition of frequent callers that goes beyond call frequency to include call length, nature, and appropriateness. This knowledge will help crisis helplines respond more effectively to frequent callers(5).

A scoping review by Assing Hvidt et al. (2016) shed light on the need for both quantitative and qualitative studies with rigorous methodologies to assess the efficacy of telephone crisis intervention on alleviating suicidality. Studies showed positive impact on immediate and intermediate levels of suicidality, ideation and depressive states, but it is unclear if the service can mitigate long term risks among the individuals who avail telephonic help. Hence there



is a need for long term follow-ups and encouragements to avail in-person interventions for best results. The review also highlighted the importance of training and equipping counsellors, alongside measures to ensure their wellbeing.

Even though mental health services are provided and made accessible to populations, there are significant dropout rates in teleservices as well. Chavan et al., (2012) posits that the dropout rates or lack of follow up may be due to patients in India prefer seeing their family physicians and might have received treatment after contacting the helpline, others might have consulted psychiatrists or physicians at community health centres and hospitals instead of following up on the helpline. Belief in alternative medicine like Ayurveda and homeopathy, stigma surrounding psychiatric illness, myths about psychiatric treatment, lack of time, and mild disorders not necessitating a doctor's visit might have also contributed to patients not seeking further professional services after calling the helpline.

During the COVID-19 phase, a slightly higher percentage of females used the mental health helpline. Studies suggest that women were more vulnerable to psychological distress during the pandemic and may feel more comfortable discussing their vulnerabilities than men. Men might be less willing to seek help and might cope by abusing alcohol. According to Scerri et al. (2021) consistent with previous studies, females have reported psychological distress, anxiety, and depression slightly more than males. It is crucial to investigate whether men are experiencing less distress or if it is going unnoticed, and to ensure that mental health services are socially acceptable to men. The study shows that despite the rise in deaths and cases during the second COVID-19 wave, people increasingly sought information as a coping mechanism and to avoid mental health struggles faced earlier. Coordination between authorities is essential to ensure information is timely, accurate, and evidence-based. Additionally, this information should address needs and concerns gathered from various sources, including helplines. Alongside providing the best services to the community, aspects such as training, support and the enjoyment of helpline volunteering had a good correlation with positive attitude and engagement from the helpline volunteers side (20).

Indian studies mostly focus on people currently receiving professional help or on the general population, with fewer examining those in the community who need help but aren't getting it. The studies that do look at treatment seekers often focus on severe mental illnesses. There's a lack of research on ways to encourage seeking help in India. Help-seeking is a complex process influenced by many factors like education, income, beliefs about treatment, and a preference for informal help. Simply knowing about mental health services isn't enough to reduce delays in seeking professional help, and hence helplines systems need a research based initiative to account for its short comings and become efficacious (21). An extensive team from NIMHANS stated that helplines play a crucial role in reducing distress and preventing long-term mental health effects of the pandemic. Many NGOs and mental health experts have established helplines tailored to address individual needs. Evidence supports telephonic helplines as the initial step in breaking down barriers for people seeking help, transitioning from planning to action. However, helplines are just the start of mental health readiness, and we should prepare for a surge in mental health issues among the public in the near future(22).

#### **ADVANTAGES OF PSYCHIATRIC HELPLINES**

**1. Accessibility:** Helplines provide round-the-clock accessibility, allowing individuals to seek assistance anytime, anywhere, overcoming barriers such as geographical distance and

mobility constraints.

2. **Cost effective:** Availing intake session and follow-up consultations online can prove to be hassle free and cost effective for patients who may have to travel far for prescription or dosage changes.
3. **Anonymity and Confidentiality:** Offering anonymity, helplines facilitate open communication without fear of judgment or stigma, fostering a safe environment for individuals to disclose their concerns. Confidentiality protocols ensure privacy and trust, encouraging honest expression.
4. **Immediate Support:** Helplines offer immediate emotional support and crisis intervention, mitigating distress and preventing escalation of mental health crises. Timely intervention can significantly reduce the risk of self-harm or harm to others.
5. **Psychoeducation and Coping Strategies:** Helplines offer psychoeducational resources and teach coping strategies to manage stress, anxiety, and other mental health challenges. This empowers individuals to develop resilience and self-management skills.

#### DISADVANTAGES OF PSYCHIATRIC HELPLINES

1. Lack of one-on-one connect, which is essential for long-term therapeutic relationship and recovery. This also causes inability to observe the body language, expressions and nonverbal cues to arrive at apt risk assessment and diagnoses.
2. The inconsistency in helpline professionals handling the calls can put off some clients. The changes or shifts in professionals handling the helpline proves a challenge for the clients who has built comfort and rapport with a specific professional, who may not be available at the times they avail the helpline services.
3. Landline numbers pose a physical limitation for the helpline professionals to provide constant and continued support. To address the portability issue and ensure 24hours access, it is pertinent to switch helpline systems to mobile networks.
4. Limited Continuity of Care: Helplines often provide short-term support, lacking the capacity for ongoing therapeutic relationships. This limitation may hinder long-term recovery and comprehensive treatment planning.
5. Overload and Accessibility Issues: High call volumes can lead to long wait times or difficulty accessing the service during peak hours, potentially impeding individuals in crisis from receiving timely support.
6. Language and Cultural Barriers: Helplines may face challenges in catering to diverse linguistic and cultural needs, limiting accessibility and effectiveness for certain populations.

#### HOW PSYCHIATRIC HELPLINES CAN HELP POPULATIONS

1. Reducing Stigma and Increasing Help-Seeking Behaviour: Helplines play a crucial role in reducing the stigma associated with mental illness by providing non-judgmental support and promoting help-seeking behaviour.
2. Addressing Mental Health Disparities: Helplines bridge gaps in mental health services, particularly in underserved or remote areas, thereby addressing disparities in access to care.
3. Preventing Crisis Escalation: Early intervention through helplines can prevent crises from escalating, reducing the burden on emergency services and preventing hospitalizations.

4. Supporting Vulnerable Populations: Helplines offer specialized support for vulnerable populations such as LGBTQ+ individuals, survivors of trauma, and those experiencing domestic violence, addressing their unique mental health needs.

### **CITING USEFUL INDIAN HELPLINES**

In the area of mental health, many helplines have been set up in the country like:

- National Tele MANAS helpline (Bangalore): 1800-89-14416
- SAHAI (Bangalore): +91 7942697007
- AASRA (Navi Mumbai): +91 7942699505
- SNEHA (Chennai): +91 7947128225
- Maitreyi (Pondicherry): +91 7947430134
- Roshni (Secunderabad): +91 7947429548
- Saath (Ahmedabad): +91 7947430545
- Sumaitri (New Delhi): +91 7947431031
- Maithri (Cochin): +91 7947428226
- The Samaritans Sahara (Mumbai): +91 7947433488
- KIRAN (Govt): 1800-500-0019
- IMA stress helpline: +91 9717776514
- Yenepoya Psychiatry Helpline (Mangaluru): +91 9108919025

### **CONCLUSION**

The importance of mental health helplines and telemedicine has increased during the pandemic and is expected to grow with the digital world. However, challenges include difficulty gauging body language, responding to acute psychiatric emergencies over the phone, accessibility for all population segments, public acceptance, and resource availability. Future research should address client satisfaction and the effectiveness of the nuanced telephonic interventions like conversational analysis emotional freedom techniques(2,10). Mental health professionals on helplines can support by understanding needs, listening empathetically, providing psychological support, promoting health recommendations, teaching coping mechanisms, managing their own stress, and supporting other frontliners.

In conclusion, psychiatric helplines serve as indispensable resources in addressing mental health challenges by offering accessible, immediate, and confidential support. While they offer numerous advantages such as anonymity, immediate assistance, and resource referral, challenges such as continuity of care and risk assessment limitations must be acknowledged and addressed. With ongoing research and innovation, psychiatric helplines have the potential to play an increasingly significant role in promoting mental well-being and preventing crises within diverse populations.

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# APPS IN DIGITAL MENTAL HEALTH PRACTICE

## INTRODUCTION

Digital Therapeutics is experiencing a revolutionary shift, rapidly transforming mental health care delivery. Mobile applications (apps) lead this tectonic transformation, providing personalized support and treatment regimens and making mental health care more accessible and effective [1].

This chapter presents a contemporary and cutting-edge overview of using apps in digital mental health practice. We will begin by exploring the interconnected components that make apps functional and useful in Digital Mental Health (DMH) interventions. Delving deeper into the world of DMH apps, we will uncover the latest research insights, shedding light on their significant benefits to clinical practice.

Considering the sensitive nature of mental health care, we must pay close attention to critical regulatory, legal, and ethical considerations when utilizing these apps. A dedicated section will address these vital aspects, ensuring mental health professionals prioritize their patient's needs and privacy while seamlessly integrating apps into their practice. Several frameworks for assessing mental health apps that can aid in this process, guiding professionals in selecting apps that meet high effectiveness, safety, and ethical compliance standards, have been briefly looked into.

Despite numerous advantages, these apps also present challenges and potential risks. We'll thoroughly examine these challenges from both the clinician's and patient's perspectives, understanding the implications and discussing strategies to mitigate any adverse effects.

Moving forward, we'll explore the exciting emerging trends in mental health apps, unveiling the latest developments and their limitless possibilities. As we wrap up this chapter, we provide readers with a scannable barcode that grants access to various valuable resources. These include a case study of a clinician prescribing a mobile app to manage anxiety, a collection of mental health apps with download links, frameworks for assessing mental health apps, links to chapter references, and a designated platform to ask any specific queries to the authors.

Our ultimate goal is to empower digital mental health professionals and researchers with practical knowledge, equipping them to utilize mobile application technology effectively in their practice. By the end of this exploration, the reader will have gained valuable insights into how these apps significantly enhance and complement clinical mental health care in this tectonic transformation.

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## OVERVIEW OF THE APP ECOSYSTEM

Mobile applications enable mental health professionals to improve patient outcomes. Understanding apps and their integration within the mobile technology ecosystem empowers practitioners to recommend, guide effectively, and use mental health apps, ultimately enhancing patient care and well-being [2, 3, 4]. The technology ecosystem that comprises interconnected components making these apps functional and useful includes -

1. **Mobile Devices:** Smartphones, tablets, and watches used to access various apps
2. **Operating Systems (OS):** Software that powers the devices; the brain of the device that makes apps work. E.g., iOS, Android, KaiOS, HarmonyOS, Sailfish OS, Tizen
3. **App Stores:** Digital marketplaces where users can find, download, and update mobile apps that meet their preferences and needs
4. **Mobile Applications:** Software programs for mobile devices that give people access to a wide range of features and services
5. **Application Programming Interfaces (APIs):** Interfaces that let apps access device functions, connect with other software, and engage with external services
6. **Cloud Services:** Remote servers that store, process, and provide other resources for mobile apps
7. **Connectivity:** Mobile networks (4G and 5G), Wi-Fi, and Bluetooth allow access to the internet and contact between devices
8. **Sensors and Hardware Integration:** GPS, accelerometers, and device cameras boost app capabilities and user experiences
9. **User Interface (UI) and User Experience (UX):** Apps' design and interaction elements influence how users see and use them
10. **Mobile Analytics:** Tools and technologies developers use to monitor how users use an app and how well it performs to improve its features and user experience
11. **Mobile Security:** Measures implemented to protect user data, prevent unauthorized access, and ensure the overall safety of users and their devices
12. **Push Notifications:** Messages sent directly to users' devices to provide updates, reminders, or alerts from apps
13. **Mobile Advertising:** Including advertisements within certain apps to monetize
14. **Mobile Payment Systems:** Secure solutions that enable users to make transactions and purchases within mobile applications
15. **Mobile App Distribution:** The developer determines the pricing strategy. The deciding factors are the app's features, intended users, and revenue targets. Free and paid versions are available [6]. Mobile app distribution happens as follows -
  - **Free Apps (Freemium):** Offer basic functionality for free with in-app purchases or ads for revenue.
  - **Paid Apps:** Require a one-time payment for full, ad-free access.
  - **Subscription Apps:** Provide features/content through recurring fees (monthly/yearly).

Some apps may provide a hybrid of the three models, with a free version with some limitations and a premium version that adds more capabilities for a fee. Ultimately, it's up to the user to decide whether to use a free app or one with paid upgrades. By grasping the nuances

of the mobile technology ecosystem and the fundamentals of mobile applications, mental health practitioners can confidently embrace technology as a valuable tool in their practice.

### **UNDERSTANDING DIGITAL MENTAL HEALTH APPS**

Digital Mental Health (DMH) Interventions refer to the use of digital technology (Mobile applications, websites, wearables, or virtual platforms) in assessment, diagnosis, treatment, prevention, rehabilitation, education, self-management and support [5]. By leveraging the ubiquitous prevalence of smartphones and the internet, DMH interventions aim to increase the availability, accessibility, and affordability of mental health treatments. They play a vital role in modern mental health care by complementing traditional therapeutic approaches. Mental Health Practitioners (MHPs) recommend specific apps to enhance therapeutic benefits, create a continuous support system, and facilitate real-time data sharing between patients and MHPs [6].

What sets DMH apps apart, particularly concerning emotional well-being, is their ability to utilize the device's hardware and software to offer personalized assistance. These apps create innovative and interactive experiences tailored to individual needs and preferences through access to smartphone sensors like GPS, cameras, and microphones [7]. For example, they can use GPS data to provide location-specific resources, linking users with nearby support groups, counseling centres, or crisis helplines. The app's accelerometer and gyroscope can also aid with meditation and mindfulness exercises, guiding users through movements that promote relaxation.

Real-time mood tracking becomes possible through integration with smartphone sensors, yielding valuable insights and identifying patterns or triggers that aid in treatment or self-reflection [8]. Data on users' behavioural patterns, habits, and activities can be collected to personalize treatment interventions. The app might recognize triggers and suggest coping strategies or relaxation techniques tailored to each individual. Moreover, Mental Health Professionals (MHPs) can utilize the apps with access to the device's camera and microphone to offer telehealth services and online counselling, extending access to treatment for individuals with limited mobility or living in remote areas [9]. In critical situations, these apps can use location-based data to promptly connect users with emergency services or crisis helplines, proving crucial during distress or mental health crises [10].

The power of mobile technology enhances mental health support and interventions, making them more personalized and relevant to individuals facing unique challenges in their daily lives. Integrating mobile apps with other technologies, such as wearable devices, sensors, artificial intelligence, and telehealth, makes mental health care more comprehensive and responsive to patients' needs [11].

### **CLASSIFICATION OF DIGITAL MENTAL HEALTH APPS**

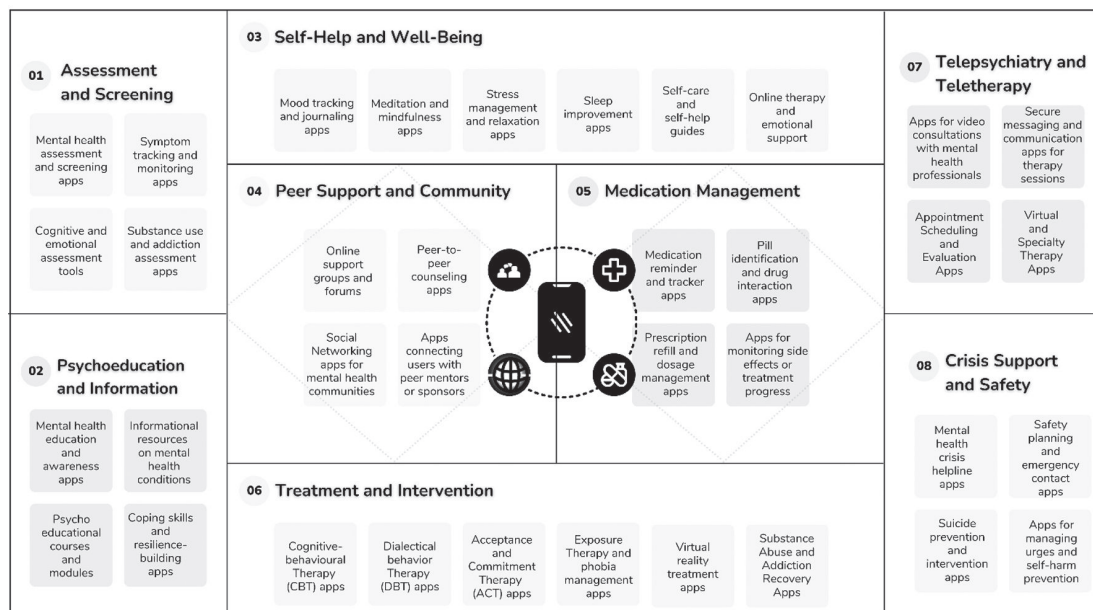
One simple way to classify DMH apps is to evaluate and categorize them based on their purpose, features, and target audience. The classification of apps in Figure 1 can help potential users make more informed choices and find apps that align with their specific needs and goals.

It's important to note that these apps are not a replacement for professional therapeutic intervention but tools to complement the process and empower individuals to help themselves. Familiarity and comfort with using smartphones can make the integration process smoother.



Moreover, researchers are actively working on developing and evaluating evidence-based mental health apps [12].

Figure 1: Classification of apps in digital mental health practice



As the landscape of mental health apps continues to evolve, some apps may have features that span multiple categories, and new functionalities may emerge over time. Regularly reviewing and updating the categorization is essential to accommodate these changes and ensure the apps remain relevant and effective in supporting mental health needs.

## RESEARCH ON DIGITAL MENTAL HEALTH APPS

Research in digital mental health provides valuable insights and evidence supporting the use of apps in digital mental health practice. Several studies have investigated the efficacy of mobile mental health applications for various mental health conditions [13]. The findings indicate the potential benefits of these interventions, but some challenges must be addressed [14].

Several scoping reviews and systematic studies have shed light on the state of mobile mental health apps. While most apps focus on development and evaluation, future research is needed to establish their quality and safety [15]. Some studies have highlighted the promising effects of cognitive-behavioural therapy [16], but evidence for other approaches remains limited. Nevertheless, research has shown that mobile apps can be equally effective in Hispanic and Latino populations, indicating their potential for underserved communities.

Additionally, digital technology, including apps, has shown promise in enhancing the treatment of psychosis and reducing depressive symptoms. Smartphone-based interventions have positively affected motivation and quality of life for certain populations. However, the lack of scientific evidence for many mental health apps is concerning, and there have been

instances of harmful content [17], emphasizing the need for rigorous evaluation and regulation [18].

Addressing the challenges of digital mental health is crucial for its successful implementation. Low engagement, privacy concerns [19], ethical issues, and the digital divide [20] are among the key obstacles that must be overcome. Integrating diverse data sources, personalizing interventions, and improving research methods are essential to enhancing the potential of mobile and connected health technology [21].

Developing evidence-based apps with personalized features and evaluations is essential to guarantee the safety and effectiveness of digital mental health interventions [22]. Research and collaboration are needed to improve mobile mental health applications' quality and safety [23]. While digital mental health can benefit underserved populations, further research and development are necessary to cater to diverse demographics effectively [24].

However, a cautious approach is required to address challenges like low engagement, a lack of evidence, and ethics [25]. The need of the hour is for collaborative, customized, scalable, and clinically sound digital interventions to bridge the enigmatical mental health treatment gap [26].

## **BUILDING ENGAGING DIGITAL MENTAL HEALTH APPS**

The world has seen exponential growth in mental health challenges in the fast-paced digital age [27]. Creating mental health apps has garnered great traction to address these challenges and provide accessible support. The apps provide a promising chance to reach a larger audience by giving access to resources, guidance, and assistance to people seeking help with their mental and emotional well-being. On the other hand, creating a truly successful and interesting mental health app is not without hurdles [28]. In this section, we first explore the challenges developers might encounter in the development process and the essential design strategies required to build engaging mental health apps that can effectively surmount these challenges [29].

### **CHALLENGES**

Mental health apps have emerged as a beacon of hope for coping. However, beneath the glossy user interfaces and flossy features lie a myriad of challenges developers face in designing an engaging mental health app. Listed are some hurdles innovators and developers must overcome to forge a compelling and meaningful mental health app experience for users and recommenders [30].

- 1. Ensuring Accuracy and Effectiveness:** Incorporating evidence-based interventions and measuring positive outcomes can be challenging to ensure the app's efficacy in improving users' mental well-being.
- 2. Privacy and Data Security:** Safeguarding personal details and sensitive mental health data requires implementing robust security measures, encryption techniques, and strict data access controls, which can be complex and demanding.
- 3. Regulation and Compliance:** Navigating general healthcare guidelines and data privacy regulations, especially in some countries' absence of specific regulations for mental health apps, pose compliance challenges.
- 4. User Engagement and Adherence:** Many apps suffer from low user retention rates

and a lack of sustained usage. Researchers are investigating strategies to improve user engagement through gamification, personalized experiences, and behavioural nudges.

5. **Access and Equity:** Addressing barriers like limited internet connectivity, language differences, smartphone affordability, and disparities in healthcare access can be an uphill task, affecting the app's reach and impact on diverse user groups.
6. **Integration with Traditional Care:** Overcoming challenges in integrating the app with existing healthcare systems to facilitate smooth communication and collaboration between app users and healthcare professionals requires thoughtful planning and coordination.

## KEY CONSIDERATIONS

Designing mental health apps that effectively support users' mental health journeys requires a user-centred approach. Thorough research, collaboration with mental health professionals, and a clear purpose are essential for tailoring interventions to meet users' needs - a user-friendly interface and navigation enhanced engagement, adherence to treatment, and overall effectiveness. To achieve this, mental health apps can incorporate principles of gamification, personalization, and interactive interfaces. Data privacy, seamless integration with traditional care, and regular evaluation are crucial for creating holistic and impactful mental health apps. [31- 41]. Here are five design strategies for creating a compelling and impactful mental health app.

### 1: Emphasizing the Significance of User Experience (UX) Design

User Experience (UX) design is essential for several reasons -

- i. **Reducing Stigma and Encouraging Help-Seeking:** A user-friendly interface and intuitive navigation create a non-intimidating environment, reducing stigma and encouraging users to seek help without feeling judged.
- ii. **Enhancing Engagement through Gamification:** Incorporating gamification elements like rewards and achievements makes the app more enjoyable, motivating users to stay consistent with treatment.
- iii. **Personalization for Tailored Support:** Personalized content and interventions align with users' unique needs, making the app's therapeutic experience more relevant and effective.
- iv. **Boosting Adherence to Treatment:** A well-designed UX with features like reminders and goal-setting helps users stay on track with their treatment plans.
- v. **Creating Emotional Connection and Empathy:** Interactive and empathetic design fosters a sense of companionship and trust, especially in mental health apps where emotional support is crucial.
- vi. **Providing Immediate Feedback and Encouragement:** Real-time feedback reinforces positive behaviours, enhances self-esteem, and boosts user motivation.
- vii. **Empowering Users with Self-Management Tools:** Interactive elements like mood trackers and coping strategy tools empower users to take an active role in their well-being.
- viii. **Enhancing Data Privacy and Security:** Establishing open communication regarding data practices and obtaining user consent fosters trust and assurance in the application.
- ix. **Seamless Communication and Support:** Smooth communication channels with mental health professionals strengthen the therapeutic alliance and promote ongoing engagement.

## 2: Integrating Wearable Devices for Enhanced User Experience

Integrating wearable devices for an enhanced user experience is important for several compelling reasons:

- i. **Comprehensive Data Collection:** Wearables monitor physiological parameters to provide a more holistic view of users' well-being.
- ii. **Objective Assessment:** Real-time data reduces reliance on subjective self-reports, improving assessment accuracy.
- iii. **Identifying Patterns and Triggers:** Continuous data helps identify patterns contributing to mental health issues.
- iv. **Personalized Interventions:** Data-driven app suggestions tailor interventions to individual needs.
- v. **Real-Time Feedback and Support:** Wearables trigger coping strategies or connect users to crisis professionals.
- vi. **Longitudinal Tracking:** Tracking changes over time helps evaluate intervention effectiveness.
- vii. **Encouraging Self-Reflection:** Access to data empowers users to understand their mental health patterns.
- viii. **Early Warning System:** Wearables can alert professionals to sudden changes in well-being.
- ix. **Remote Monitoring and Telehealth:** Integration enables remote tracking and intervention.
- x. **Research and Data Analytics:** Aggregated data aids mental health research and insights.

## 3: Creating a Supportive Virtual Community with Social Networking Features

Creating a supportive virtual community with social networking features can benefit its members. Here's why it's important:

- i. **Peer Support and Empathy:** Users connect, share experiences, and feel understood and validated.
- ii. **Safe and Non-Judgmental Environment:** Anonymity allows open discussions without fear of judgment.
- iii. **Community Building and Sense of Belonging:** Users form connections based on shared experiences.
- iv. **Accessibility and Reach:** Virtual support groups offer access regardless of location.
- v. **24/7 Support and Immediate Feedback:** Users receive instant help and support.
- vi. **Diverse Perspectives and Coping Strategies:** Community members learn from each other.
- vii. **Empowerment and Mentorship:** Users can become mentors, empowering themselves and others.
- viii. **Community-Driven Content:** Valuable resources circulate within the app.
- ix. **Event Hosting and Live Chats:** Real-time interactions enrich the community experience.
- x. **Long-Term Engagement:** A sense of belonging leads to sustained app usage.

## 4. Designing Culturally Sensitive and Inclusive Mental Health Apps

Designing culturally sensitive and inclusive mental health apps is crucial to ensuring that mental health support is accessible and available for individuals from diverse cultural backgrounds. Here are some key reasons why it is important:

- i. **Reducing Stigma and Promoting Help-Seeking:** Culturally sensitive apps encourage diverse users to seek help. They consider their target users' diverse cultural beliefs, norms, and practices.
- ii. **Language Accessibility:** Multiple language options facilitate access for non-native speakers.
- iii. **Culturally Relevant Resources:** Inclusion of traditional practices and values improves relevance. By incorporating culturally relevant content and examples, the app can feel more relatable and resonate with users from different cultural backgrounds.
- iv. **Customizable User Experience:** Personalization reflects users' cultural preferences.
- v. **Accounting for Diverse Mental Health Experiences:** App content addresses cultural variations.
- vi. **Culturally Sensitive Language and Imagery:** Avoiding stereotypes promotes inclusivity.
- vii. **Cultural Competency of Support:** Apps may offer support from mental health professionals who have cultural competence training or belong to the same cultural background as the users. It can create a safer and more understanding environment for seeking help.
- viii. **Culturally Informed Assessment Tools:** Assessment tools within the app should consider cultural variations in mental health symptoms and manifestations to provide accurate and culturally informed results.
- ix. **Respecting Privacy and Confidentiality:** Adherence to cultural norms fosters user trust.
- x. **Inclusive User Testing:** Testing with diverse users identifies barriers and improvements.

## 5. Strategies for Long-Term Engagement

Long-term engagement is critical for the success and sustainability of the app. Keeping users engaged over an extended period is a continuous effort. Here are some strategies to foster long-term engagement:

- i. **Personalized Notifications:** Tailored reminders keep users engaged.
- ii. **Rewards and Incentives:** Gamification elements motivate continued usage.
- iii. **Progress Tracking and Visualisation:** Visual representations boost motivation.
- iv. **Virtual Coaching and Support:** Virtual coaches offer personalized guidance.
- v. **Community and Peer Support:** Interaction with peers fosters engagement.
- vi. **Daily Routines Integration:** Seamless integration encourages app usage.
- vii. **Challenges and Goal Setting:** Goal-oriented features maintain motivation.
- viii. **Customizable Content and Pathways:** User control enhances the relevance.
- ix. **Feedback and Iterative Improvement:** User input drives continuous improvement.
- x. **Empowering Users Through Co-Creation:** Involving users fosters app ownership.

Creating effective mental health apps involves a multi-faceted approach that places user experience at the forefront, integrates wearable devices, fosters virtual communities, ensures

cultural sensitivity, and implements strategies for long-term engagement. By embracing these fundamental principles and actively involving users throughout the development process, mental health apps can be powerful tools to empower individuals on their mental health journey.

Relying solely on user experience to predict long-term engagement with mental health apps is unreliable. Consequently, mental health app developers and evaluators must delve deeper into understanding and engagement. It necessitates defining sustained engagement, identifying the factors that influence it, and devising strategies to create products that facilitate such long-lasting involvement. It is crucial to foster enhanced collaboration between industry and academic teams to gain this profound understanding, as this synergy can advance the science of engagement [42].

## ASSESSING DIGITAL MENTAL HEALTH APPS

### General Regulations

A mental health practitioner's understanding of healthcare regulations for mobile applications is crucial for ensuring compliance with legal and ethical standards, protecting patient privacy, data security, and overall patient safety [43]. It enables one to confidently use and recommend mobile applications that comply with industry regulations, allowing them to provide high-quality care while minimizing potential legal and ethical implications. Many nations follow some common principles and guidelines to ensure the safety, efficacy, and privacy of healthcare-related apps. Key aspects of these regulations include:

- 1. Medical Device Regulations:** Healthcare-related mobile apps may be classified as medical devices, subject to specific regulations to ensure safety and effectiveness.
- 2. Data Privacy and Security:** Healthcare apps are subject to strict privacy and security regulations due to sensitive patient data.
- 3. Health Data Interoperability:** Some regulations aim to promote health data exchange between healthcare apps and systems for better patient care.
- 4. Informed Consent:** Users must provide informed consent before collecting or using their personal health information.
- 5. Clinical Validation and Evidence:** Apps claiming to diagnose or treat medical conditions may require clinical validation or evidence of safety and effectiveness.
- 6. Telemedicine Regulations:** Apps that provide telemedicine services must adhere to particular regulations to ensure quality and safety.
- 7. Pharmaceutical Regulations:** Apps providing information or services related to pharmaceuticals may need to adhere to pharmaceutical regulations.
- 8. Advertising and Promotion:** Regulations govern how healthcare apps can advertise their services to ensure accuracy and transparency.
- 9. App Store Policies:** Healthcare apps must adhere to app store guidelines set by platforms.

It is essential to comprehend that regulations can vary significantly between countries, and developers must be familiar with the regulations in each target market. The regulatory landscape for healthcare apps is continuously evolving, so staying informed about the latest regulations is crucial to ensure compliance and delivering safe and reliable healthcare apps.

## Regulations for Digital Mental Health Apps in India

While no specific regulations exist exclusively for mental health apps in India, adherence to existing laws and standards is crucial to ensuring reliable and secure services [44]. Some applicable regulations include:

1. The Drugs and Cosmetics Act, 1940: If a mental health app provides pharmaceutical-related services, it must comply with relevant provisions.
2. The Information Technology Act, 2000: Compliance with data security and privacy provisions is essential for handling user information.
3. The Telemedicine Practice Guidelines, 2020: Relevant for Mental Health Apps Offering Remote Consultations or Therapy
4. The Personal Data Protection Bill, 2019: Addresses regulating the processing and protection of personal data, including data collected by mental health apps.
5. EHR and Health Record IT Standards: Adherence to Standards for Handling Health Records and e-prescriptions.
6. Medical and IT Hardware Standards: Ensuring the Quality and Safety of the Equipment Used.
7. Software Standards: Ensuring data integrity and safety in the software used for healthcare records

## FRAMEWORKS

Assessing the effectiveness and suitability of mental health apps is crucial to ensuring they provide meaningful support and adhere to ethical standards. Several frameworks have been proposed to evaluate mental health apps [45]. These frameworks typically consider the evidence base, usability, privacy, and clinical relevance. Here are some well-known frameworks for assessing mental health apps [46].

### 1. Mobile App Rating Scale (MARS)

The Mobile App Rating Scale (MARS) is a widely adopted framework for assessing the quality of mobile health apps, including those related to mental health. It assesses apps on four dimensions: engagement, functionality, aesthetics, and information quality. Each dimension is divided into sub-dimensions and rated on a 5-point scale [47].

### 2. National Health Service (NHS) Apps Library Assessment Criteria

The NHS Apps Library Assessment Criteria is a set of standards developed by the UK's National Health Service to evaluate health apps, including mental health apps. It considers clinical safety, data protection, and accessibility to ensure apps meet quality and safety standards [48].

### 3. APA App Evaluation Mode

The American Psychiatry Association (APA) developed an evaluation framework to assess mobile health apps for psychological interventions. It focuses on evidence-based content, user experience, and data security [49].

#### 4. IDEAL Framework

The IDEAL framework is designed to evaluate the impact of digital interventions, including mental health apps. It assesses the intervention's development, feasibility, acceptability, effectiveness, and implementation [50].

#### 5. Consensus Standards for App-Based Digital Mental Health

Experts created this framework to offer a set of common standards for assessing app-based digital mental health interventions. It covers data privacy, security, evidencebase, and user engagement [51].

#### 6. PsyberGuide

PsyberGuide is an independent online platform that evaluates mental health apps and digital tools based on scientific evidence, usability, data security, and user experience. The primary aim is to assist users, mental health practitioners, and healthcare providers make informed decisions when selecting effective and secure mental health apps. The platform's expert team of clinical psychologists, researchers, and app developers conducts objective assessments and considers user feedback to promote transparency and accountability in the mental health app industry. PsyberGuide's support for high-quality digital mental health interventions helps users identify apps that align with their needs and preferences while adhering to established standards [53, 54, 55].

When evaluating mental health apps, it's essential to use multiple frameworks or criteria to understand their strengths, weaknesses, and appropriateness for different user groups [56]. Given the rapid evolution of technology and mental health interventions, continuous updates to these frameworks may be necessary to incorporate the latest developments and insights.

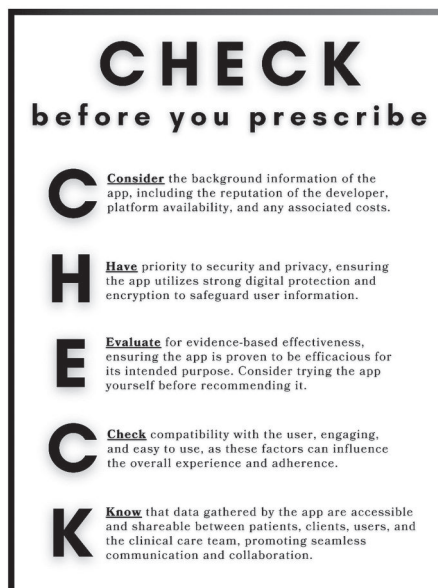
Though there is limited evidence supporting the effectiveness of mental health apps in clinical practice, clinicians must be informed about their usage, particularly when a patient inquires about them. Relying solely on online reviews and ratings for an app may not suffice.

Consequently, using the frameworks for app evaluation combined with clinical judgment can assist in identifying a suitable app for a specific client/patient. Presented in Figure 2 is the model in the convenient form of an acronym, CHECK

#### CHALLENGES IN THE USE OF DIGITAL MENTAL HEALTH APPS

While using apps in digital mental health care, patients and professionals have valid concerns that must be addressed to ensure these technologies are effective and ethical. Tackling concerns and managing risks is crucial to building patient trust,

Figure 2: CHECK Acronym





addressing professional reservations, and upholding ethical standards. By doing so, apps can enhance credibility, promote responsible usage, and improve mental health outcomes [57].

### PATIENTS' CONCERNS

Present-day mental health policies emphasize involving service users in care delivery. Ensuring a mental health app's effectiveness, user-friendliness, and ethical standards requires a deep understanding of the service user's concerns to support mental well-being. [58]

1. **Data Security:** Patients worry about data security in mental health apps, fearing their personal information could be vulnerable to discrimination at work or in healthcare services.
2. **Lack of Human Interaction:** Patients value the empathy and understanding therapists provide in face-to-face interactions, leading them to prefer traditional therapeutic methods over app-based approaches, which may lack the human connection they desire.
3. **Appropriate Assessment and Diagnosis:** Patients are concerned about the accuracy and reliability of self-reported assessments without the input of trained professionals, fearing potential misdiagnoses or misinterpretations of results.
4. **Accessibility and Inclusivity:** Language barriers, technological literacy, and internet connectivity can limit access to mental health apps, exacerbating disparities in mental healthcare accessibility for certain populations [59].

### PROFESSIONALS' CONCERNS

Understanding professionals' concerns when developing a mental health app is vital because it ensures clinical validity, ethical compliance, data security, and seamless integration with existing care practices, leading to a more effective and reliable tool for mental health support. Some commonly cited professionals' concerns include -

1. **Overdiagnosis and Overtreatment:** Mental health professionals worry that the self-service nature of apps may lead to overdiagnosis and overtreatment of mental health issues, potentially exacerbating concerns or creating unnecessary anxiety in users [60].
2. **Influence of Content:** Professionals are concerned that app content may lead people to believe they have a mental health issue when it could be a typical stress reaction, potentially impacting treatment decisions.
3. **Efficacy and Evidence-Based Interventions:** Concerns arise about whether app activities are evidence-based and align with established therapeutic approaches for effective treatment.
4. **Lack of Personalization:** Mental health apps may not fully address the unique needs of patients, limiting the individualized approach that traditional treatment can offer.
5. **Therapeutic Relationship and Human Connection:** Relying solely on apps may hinder the establishment of trust and rapport between therapists and patients, impacting the therapeutic relationship.
6. **Data Security and Confidentiality:** Mental health professionals express concerns about data security and privacy measures implemented by mental health apps, especially when handling sensitive patient information.

## ETHICAL CONSIDERATIONS

Addressing ethical considerations related to using apps in digital mental health practice is crucial to ensuring the well-being and privacy of patients. Mental health professionals must be mindful of these considerations to use technology effectively and responsibly. [61] Here are some key points to consider:

- 1. Informed Consent:** Before using the app, ensure patients are fully informed about its purpose, features, data collection, and potential risks. Obtain explicit patient consent regarding its use in their treatment, and discuss any potential limitations or drawbacks.
- 2. Privacy and Security:** Choose apps prioritizing data privacy and security. Data stored in the app must be protected from unauthorized access or breaches. Consider the risks associated with cloud storage and transmitting sensitive patient information. "Federated learning" introduces a groundbreaking machine learning technique wherein data remains stored on users' devices rather than on a central server. This innovative approach effectively preserves user privacy and bolsters the security of digital mental health interventions.
- 3. Data Ownership and Control:** Clarify with patients who own the data generated and collected through the app. Patients should have control over their data and know how it will be utilized and shared.
- 4. Appropriate Use:** Ensure the app's functionalities align with each patient's therapeutic goals and specific needs. When face-to-face sessions or other forms of treatment may be more appropriate, avoid relying solely on app-based interventions.
- 5. Competence and Training:** Mental health professionals using apps in their practice should be competent and understand the technology's limitations. Training should be provided to enhance their skills in integrating apps into treatment effectively.
- 6. App Selection and Evaluation:** Thoroughly research and review apps before integrating them into clinical practice. Choose evidence-based and clinically validated apps, and be cautious of those making unfounded claims or providing misleading information.
- 7. Termination and Data Deletion:** Establish a clear plan for terminating the use of the app when treatment ends. Ensure all patient data is securely deleted from the app and associated systems.
- 8. Boundaries and Communication:** Communicate with patients about appropriate app use, response times, and emergency procedures. Set boundaries to avoid blurring the lines between therapeutic interactions and personal communication.
- 9. Cultural Sensitivity and Diversity:** Be aware of potential cultural biases embedded in apps and how they might impact patients from diverse backgrounds. Choose apps that are sensitive to cultural differences and inclusive in their approach.
- 10. Monitoring and Supervision:** Regularly monitor the app's effectiveness and patient feedback. Engage in ongoing supervision or consultation with colleagues to ensure ethical use and address emerging issues.
- 11. Patient Empowerment:** Use apps to empower patients in their mental health journey rather than replacing professional guidance. Promote patient proactivity in their care by involving them in app usage decisions.
- 12. Emergency Response:** Establish protocols for handling emergencies or crises that may arise through app-based interactions. Ensure patients have alternative means to reach you in urgent situations.

## RISKS AND CHALLENGES

Integrating technology in digital mental health practice offers various benefits, yet it entails addressing numerous risks and challenges. [62]:

1. **Digital Divide:** In mental health care, it can lead to disparities in treatment outcomes, as not all patients have access to or feel comfortable using technology.
2. **Ethical Use of Data:** By collecting and analyzing large datasets, mental health apps may raise questions about how this information is used and whether it could be used for things other than the well-being of the patients.
3. **Appropriate Diagnosis and Treatment:** Technology may not always accurately diagnose complex mental health conditions or determine appropriate treatment, potentially overlooking critical nuances in a patient's condition.
4. **Overreliance on Technology:** There is a likelihood that mental health professionals will rely too much on technology, which could mean less time spent with people and less personalized care. Technology should complement, not replace, traditional therapeutic approaches.
5. **Regulation and Standards:** The rapidly evolving nature of technology often outpaces regulatory frameworks and standards, leading to the proliferation of apps without sufficient scrutiny for safety and efficacy [63].
6. **Unintended Harm:** Poorly designed apps or interventions could cause harm to patients psychologically and emotionally. Unforeseen adverse effects may arise due to a lack of rigorous testing or understanding of individual differences.
7. **Boundary Issues:** Apps used for patient communication may blur professional and personal boundaries, raising ethical concerns and potential dual relationships.
8. **Disengagement and Non-Adherence:** Some patients may lose interest or motivation to regularly engage with mental health apps, leading to decreased treatment adherence and limited progress.
9. **Algorithmic Bias:** Artificial intelligence and machine learning algorithms used in some mental health apps may inherit biases from the data they were trained on, leading to potential inaccuracies or discriminatory outcomes.
10. **Lack of Human Connection:** Technology-mediated interactions may lack the warmth and empathy that in-person therapeutic relationships provide, potentially impacting the therapeutic alliance.

To deal with these challenges and risks, mental health professionals must stay alert, keep learning about best practices, and put the health and safety of their patients first. Integrating technology thoughtfully into clinical practice while maintaining ethical standards can maximize the benefits of technology while minimizing potential harm.

## DESIGNING TOMORROW'S DIGITAL MENTAL HEALTH APPS

As technology advances and the demand for accessible mental health services grows, the landscape of apps in digital mental health practice constantly evolves. The future of mental health apps appears bright, with various emerging trends and potential advancements that will significantly influence the field. The key lies in developing future-proof mental health apps that can maintain relevance and effectiveness as technology and mental health needs

progress. These apps must withstand technological advancements, changes in circumstances, and evolving needs without quickly becoming outdated. The focus is on building apps with foresight and anticipating potential advances to ensure they can adapt and consistently provide valuable support to users in the long run [64, 65]

### **1. AI and Personalized Interventions**

Artificial intelligence (AI) is expected to play a significant role in mental health apps. AI algorithms personalize solutions by analyzing extensive data. These apps may adapt their real-time content and features to address patients' challenges.

### **2. Virtual Reality (VR) treatment**

VR technology is being explored as a potential tool for exposure treatment, relaxation techniques, and immersive therapeutic experiences. VR can create controlled and safe environments to help patients confront and manage their fears and anxieties.

### **3. Neurofeedback Apps**

Neurofeedback apps are becoming more accessible, allowing individuals to regulate their brain activity in real-time to improve attention, emotional regulation, and overall brain function.

### **4. Digital Therapeutics (DTx)**

DTx refers to evidence-based therapeutic interventions delivered through technology. In mental health, DTx apps are being developed to complement traditional treatments and may even be prescribed as standalone treatments.

### **5. Teletherapy and Telepsychiatry**

Owing to their convenience and accessibility, Telehealth services, including therapeutic and psychiatric consultations, have gained popularity. Mental health apps facilitating secure and confidential telehealth sessions will likely become more prevalent.

### **6. Chatbots and Virtual Assistants**

AI-powered chatbots and virtual assistants are being integrated into mental health apps to provide support, psychoeducation, and real-time responses to users. The chatbot-human handoff approach is emerging as an effective strategy to optimize the user experience.

### **7. Biometric Feedback Integration**

Apps may incorporate biometric sensors to track physiological responses and emotions, providing valuable data to therapists for assessment and treatment planning.

### **8. Peer Support Networks**

Apps facilitate online peer support networks where individuals with similar mental health challenges can connect, share experiences, and offer mutual support.

### **9. Gamification of Interventions**

Mental health apps incorporate gaming elements, reward systems, and interactive features to enhance engagement and motivation to make the therapeutic process more enjoyable.

### **10. Data Analytics for Treatment Insights**

As more individuals use mental health apps, the data generated can be analyzed on a

large scale to gain insights into treatment effectiveness, common mental health trends, and individual progress.

### **11. Multicultural and Inclusive Apps**

Future apps will likely emphasize inclusivity and cultural sensitivity to cater to diverse populations and address unique cultural needs.

### **12. Ethical AI and Algorithm Transparency**

The use of AI algorithms in mental health apps raises important ethical considerations that must be addressed to ensure responsible and effective use. Algorithmic bias, privacy concerns, informed consent, transparency, and human oversight are essential considerations.

As mental health professionals, researchers, and app developers continue to collaborate and conduct rigorous studies, integrating emerging technologies thoughtfully and responsibly can lead to more accessible, personalized, and efficient mental health interventions for individuals worldwide.

## **CONCLUSION**

As we step into the future of mental health care, the world of "Apps in Digital Mental Health Practice" beckons us with boundless possibilities. These cutting-edge technologies and personalized interventions promise to revolutionize patient care by offering location-based support, real-time mood tracking, telehealth services, and virtual peer communities. However, we must be cautious not to succumb to a 'Gold Rush Mentality', where enthusiasm for AI and other technological advancements overshadows crucial considerations.

Amidst this promise, we must acknowledge the importance of regulatory, legal, and ethical measures to safeguard patient safety, privacy, and effective treatment. Compliance, data security, and clinical validation are paramount for secure app-based interventions, while concerns about human connection, accurate diagnosis, and trust-building must be addressed to ensure meaningful engagement.

To harness the true potential of mental health apps, we should prioritize user experience, integrate wearable devices, foster virtual communities, and ensure cultural sensitivity. By embracing technology with ethics at its core, mental health professionals can empower patients and improve treatment outcomes while navigating the challenges and risks of these advancements.

The horizon of mental health apps holds even greater excitement with advancements in AI, virtual reality, digital therapeutics, and telehealth. Personalized interventions, data analytics, and inclusive apps catering to diverse populations await us. However, in our pursuit of progress, collaboration among professionals, researchers, and developers becomes vital for responsible and impactful app integration, guarding against potential pitfalls that a gold rush mentality might bring. By embracing technology with a keen focus on ethics, mental health professionals can usher in a brighter tomorrow where these apps elevate well-being, illuminating a path to a profoundly healthy society.

In conclusion, it is important to remember that the successful integration of DMH apps into mental health practice necessitates a balanced approach that appreciates the significance of technology and touch. Continuously gather patient feedback, revise strategies, and remain

open to embracing new technologies as they emerge. Let us shape a future where compassion and technology merge to create a truly transformative era of mental health care.

### ADDITIONAL RESOURCES

Tap into the power of mental health apps using these valuable resources!

Just scan the barcode to access a case study of a clinician prescribing a mobile app to manage anxiety, a collection of mental health apps with download links, frameworks for assessing mental health apps, links to chapter references, and a designated platform to ask any specific queries to the authors.



#### Take Home Message

The acronym "**CHAPTER APPS**" summarises the key points of integrating apps into Digital Mental Health Practice.

**Consider** prescribing apps for optimal therapeutic outcomes in digital mental health practice.

**Harness** apps to complement conventional mental health care for comprehensive support.

**Adhere** to legal, ethical, and regulatory requirements in implementing DMH apps.

**Promote** evidence-based, culturally sensitive interventions in DMH apps.

**Take care** to recommend apps with patient safety and well-being in mind.

**Engage** using frameworks to assess mental health apps.

**Rely** on data from wearable devices for objective assessments in clinical practice.

**Amplify** the user experience with the app's interactive interfaces and gamification.

**Prioritise** data security, accuracy, and personalization in app usage.

**Provide** real-time tracking and crisis support through DMH apps.

**Stay** future-proof by learning about new features that make the apps relevant and effective.

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# CHAPTER - 6

## ARTIFICIAL INTELLIGENCE IN MENTAL HEALTH PRACTICE

### 1 INTRODUCTION

What follows in Box 1 is fictional but all **within the reach of current technologies**.

We repeat that everything described in Box 1 is possible today (1). Artificial Intelligence (AI) in medicine is an expanding field. We argue that mental health practitioners should engage with the technicalities of AI and take an informed view of this matter. We have inquisitiveness and background information to judge claims regarding new treatments or diagnostics. We must have similar competence to evaluate claims such as "an AI-based chatbot is four times more empathetic than clinicians" (3).

This chapter is arranged in three parts. In the first part, we equip the reader with a shallow but comprehensive understanding of the technical aspects of AI. In the second part, we review recent research on AI in mental health practice. Finally, in the third part, we discuss the field's challenges, pitfalls and expected trajectory. We use a toy example of a model that chooses an antipsychotic for a patient; we hope this will ground the discussion.

### 2 A GENTLE INTRODUCTION TO ARTIFICIAL INTELLIGENCE

#### 2.1 Artificial Intelligence, Machine Learning and Deep Learning

**Artificial Intelligence (AI) is a broad field of engineering that attempts to automate intellectual tasks usually performed by humans.**

AI can be classified into - symbolic AI and Machine Learning (ML).

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#### Declaration by Dr Lekhansh:

The manuscript has been checked with Grammarly Plagiarism Checker and has less than 10% similarity.

There were consultant rounds in the morning and a journal club in the afternoon for Aditi. She was frequently questioned by consultants as a final-year MD psychiatric resident. She fretted most about the latest admission during pre-round preparations. Mr Sunil, 32, has received four antipsychotics with little improvement. Aditi struggled to choose an antipsychotic for this case. In 30 minutes, she must evaluate Sunil's five discharge summaries, three years of outpatient records, and recent investigations.

She uses the experimental 'PsychAssist' website in the duty room, peering over her shoulder to avoid detection. She submits discharge summaries, OP records, and investigation results as PDFs. Waiting, she eagerly watches the screen display "patient identifiers eliminated from 5 out of 20 documents". She finally gets the message "corpus generated and fed to GPT-4; what is your query?". She requests her unseen pal to email her an antipsychotic trial summary including dose and duration. Her phone rings with an email with the summary table, which will be printed for rounds.

**"Suggest an antipsychotic for this Schizophrenia patient; provide a reason and PubMed or Maudsley's Guidelines sources"**. Watching the progress bar, she knows clozapine is the answer. To her amazement, the answer is, "Olanzapine has not been tried at a sufficient dose; it can be tried. Depot preparation is much better". When challenged, the system shows Maudsley's recommendation for an olanzapine trial before clozapine and a meta-analysis of long-acting antipsychotics' efficacy. As she is ready to note these resources, the necessary disclaimer appears: "I am only a language model which has not acquired any medical training; I do, however, have access to Maudsley and PubMed updated up to December 2022, which is when my fine-tuning ended." She closes the alert and wonders what "fine-tuning" is.

Next, she uploads today's journal club article and waits for the question box. **"Find methodological or statistical faults in this research and give a clear account of your critique"** she asks. She learns why not adjusting multiple hypothesis testing p values casts doubt on the results. She now has one smart critique when pulled up in the afternoon.

Box 1: Illustration of AI's Impact on Mental Health Practice

### 2.1.1 Symbolic AI (Classical Programming/Expert Systems)

The classical programming paradigm has been that humans program machines to perform tasks on data. With arbitrarily complex rules, we can solve seemingly tricky problems with hardcoding actions for all possibilities. For example, see Box 2 for a pseudocode example (hypothetical) to choose an antipsychotic.

```
def suggest_option(BMI, tried_options):
    """
    Suggests an option based on the value of BMI & tried_options.
    Args:
        BMI: Body Mass Index.
        tried_options: List of failed antipsychotics
    Returns:
        The suggested option from Olanzapine (OLZ), Clozapine (CLZ), Aripiprazole (ARP),
        Lurasidone (LRS), Risperidone (RSP)
    """
    # Check if any options have been tried yet.
    if tried_options:
        # Check if the two failed options include OLZ.
        if "OLZ" in tried_options[-2:]:
            return "CLZ"
        else:
            return "OLZ"
    else:
        # Check the value of BMI.
        if BMI > 23:
            return "ARP/LRS"
        else:
            return "RSP/OLZ"
```

Box 2: Hypothetical example of a symbolic AI program to suggest antipsychotics

## 2.1.2 Machine Learning

ML turns the paradigm of symbolic AI on its head. Instead of providing input data plus rules and expecting the answer, the computer is supplied with the input data plus answers and is expected to 'learn' the rules. In effect, the computer is not programmed but trained. For the example of antipsychotic choice, we would provide case summaries and the expected output, i.e., which antipsychotic is ideal for this case and the computer is expected to learn the rules by itself.

ML techniques can be further classified into Deep Learning (DL)-based and others. This chapter mainly focuses on DL-based solutions.

### 2.1.2.1 Deep Learning

Deep Learning (DL) is a specific type of machine learning with surprising abilities. In DL, the computer extracts increasingly meaningful transformations of input data layer by layer

(4). Each layer consists of computational units (called artificial neurons), and the whole system is called an artificial neural network. In effect, these layers are chained computations; each layer does some computation on the input data and passes the output to the next layer.

In the previous example, the learning will progress thus. We will create a training dataset of input variables like BMI, past antipsychotic trials, and other clinical data. For each case in the training dataset, experts will choose the best antipsychotic, which will be the ground truth, i.e., this is what a perfect model should predict. The input dataset will pass through the neural network, which will output a prediction. The difference between the ground truth and prediction will be used to calculate a loss score. Finally, an optimiser will use this loss score to change the specifics of computations in each layer to minimise the loss score. The computations that each layer does to the input are called weights or parameters. In essence, the learning is stored in the model weights. Figure 1 shows this schematic.

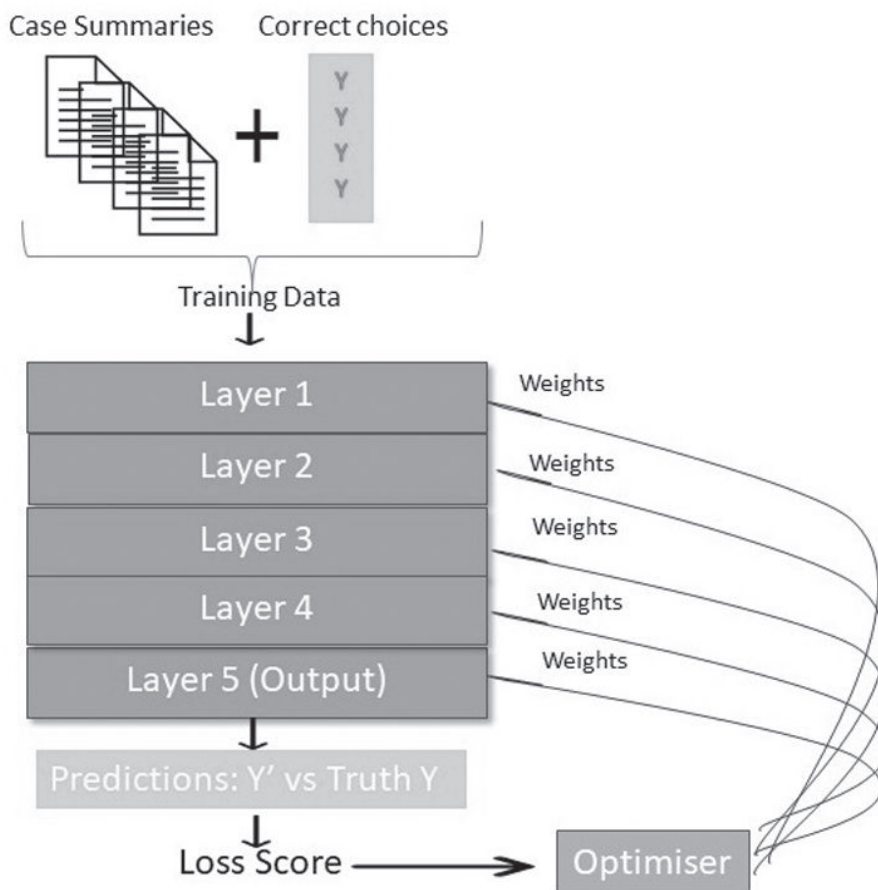


Figure 1: Schematic Representation of Deep Learning

## 2.2 Classification of ML Models

### 2.2.1 Based on the supervision

#### 2.2.1.1 Unsupervised Learning

ML techniques that do not involve training with labelled datasets are called unsupervised learning. These models do not need human intervention except to provide clean input data. A classic and commonly used example of unsupervised learning is clustering. Clustering is a computational technique in which each instance of the input dataset is assigned to a cluster based on similarity measures. For example, we can recast the example of choosing an antipsychotic to a clustering problem if we have a large dataset of baseline characteristics, antipsychotic received, and adverse effects shown in Figure 2.

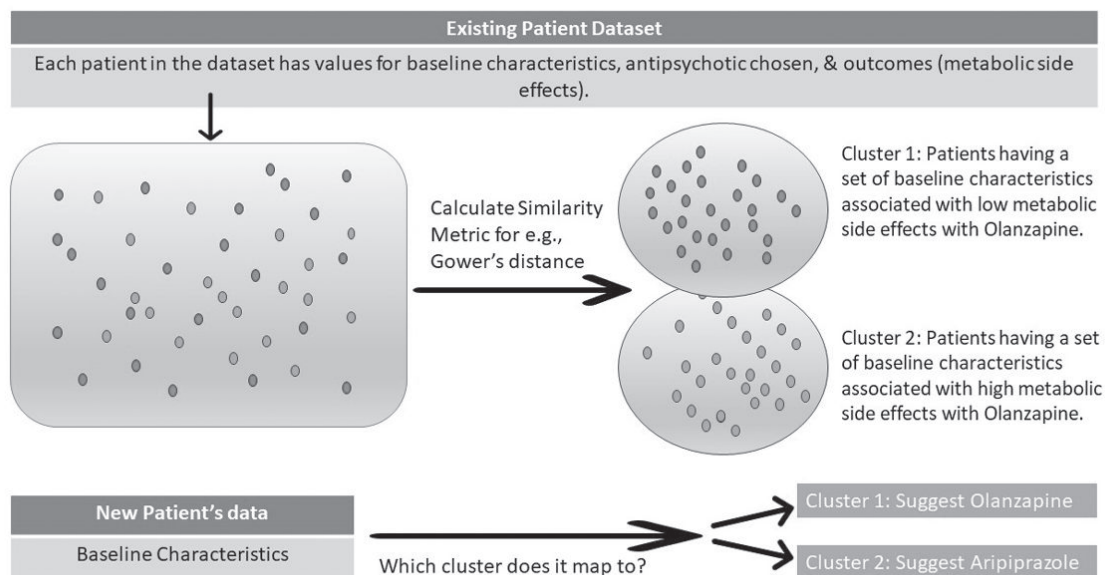


Figure 2: Unsupervised Learning (clustering) applied to the problem of choosing an antipsychotic

#### 2.2.1.2 Supervised Learning

ML techniques that require labelled datasets are called supervised learning.

#### 2.2.1.3 Self-supervised Learning

As we can imagine, creating labelled datasets is a time-consuming process. For example, imagine having clinicians check records of thousands of cases and generating consensus decisions about the best antipsychotic. A possible solution to this problem is self-supervised learning, which intelligently uses the inherent continuity in some data types to design a learning task. A typical example is the masked language task, which consists of feeding in a text corpus, and the computer randomly masks some words and sets up a task to predict the masked word using the context of the text.



Table 1: Types of Machine Learning Models

Type of Model	Expected Output	Task
<b>Predictive Models</b>		
<b>Binary classifier</b>	Chosen drug (only one)	Choose between two antipsychotic drugs.
<b>Multiclass classifier</b>	Chosen drug (only one)	Choose an antipsychotic drug from a set of seven.
<b>Multilabel classifier</b>	Chosen combination (two or more drugs)	Choose a combination of antipsychotic drugs from a set of seven.
<b>Scalar regression</b>	Kgs of weight change expected.	Predict the change in weight during the first 6 months of treatment with an antipsychotic for a given patient.
<b>Vector regression</b>	Kgs of weight change and cms. Of waist circumference expected	Predict weight and waist circumference change during the first 6 months of treatment with an antipsychotic for a given patient.
<b>Generative Models</b>		
<b>Language models (transformer based)</b>	Text Paragraph	Give a personalised treatment regimen consisting of medicines, when to take them and lifestyle advice.
<b>Image models (diffusion or variable encoder based)</b>	Images	Generate images and figures to be used in patient educational material.

## 2.2.2 Based on the expected output

### 2.2.2.1 Predictive Models

Most models used in the medical field are predictive models. The nature of the predictions yields further subtypes, as shown in Table 1.

### 2.2.2.2 Generative Models

Models expected to give complex output, like a paragraph of text or an image, are called generative models. Unlike predictive models, the output of generative models is not constrained to a set of labels. The vignette in Box 1 is an example of a generative model.

## 2.3 Data - Fuel for the AI Engine

There are two reasons why transformative AI is possible now. Computers have become powerful enough to ingest large amounts of data, and large datasets are available. The availability of large datasets is the result of multiple unrelated changes:

1. Widespread adoption of Electronic Health Record (EHR) systems.
2. Policy decisions that have allowed linkage, retention and use of large-scale medical data like the UK Biobank.
3. Availability of passively collected data from smart devices like fitness trackers and mobile phones.
4. Social media as a source of narrative medical queries and responses.
5. Most importantly, the inventiveness of researchers to leverage disparate data sources.

In this section, we first discuss the technical aspects of data for AI models and then give an overview of data types used for AI models in psychiatry.

### 2.3.1 All Data must be numeric.

Data that can be represented by numbers and thus arranged in tables is called structured data. Text, images and audio data, on the other hand, are examples of unstructured data. However, for the data to be used for computation, it must be in the numeric format. Table 2 lists some data types and how they can be understood numerically. An important data type - text is detailed in the next section.

Table 2: Numerical representation of unstructured data (excluding text)

Type of Data	Description	Use cases
<b>Audio</b>	Three characteristics are all inherently numerical. Time, frequency and amplitude.	Speech recognition, speech to text.
<b>Images</b>	Three characteristics – location, colour channel and pixel intensity. For example, we can describe a value as follows: pixel intensity (numeric) of colour channel number 1 (red) at the left bottom corner (location: $x=0, y=0$ )	Analysis of radiological images.
<b>Video</b>	It can be decomposed into audio, images, and timestamps.	Analysis of taped interviews.

### 2.3.2 Text - A special case of unstructured data

Unlike audio and video, text cannot be easily understood as numeric data. We must contend with two challenges. First, there is no natural numbering scheme for words. Therefore, we must create a numbering scheme by arranging all words in a text (say alphabetically) and giving them an index. Still, the number has no inherent meaning, i.e., words starting with the letter 'x' are no more important than words beginning with the letter 'a'. Second, the meaning of a word depends on the context, i.e., words that came before and after it.

Due to these complexities, Natural Language Processing (NLP) and language modelling have developed into a separate field of AI. In this section, we present some basic concepts related to these fields.

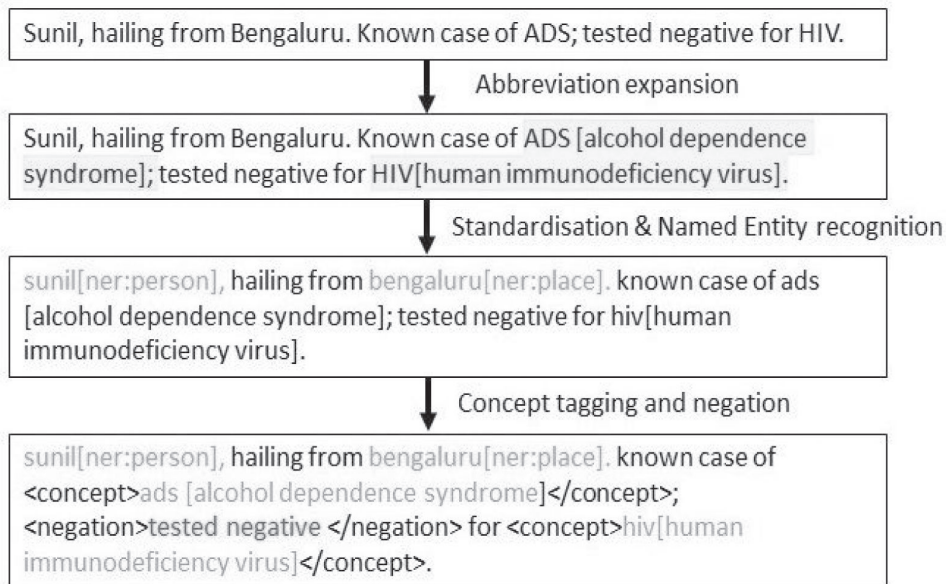
Box 3 explains some NLP tasks for preprocessing text data.

#### 2.3.2.1 Tokenisation & Indexing

The text has to be split into chunks before it can be used in the model. There are two

## Box 3: Natural language processing tasks

1. Standardisation: Conversion of all text to lowercase and removal of punctuations. To a computer 'Alcohol' and 'alcohol' are not the same words. We must be careful as medical notes usually contain abbreviations.
2. Named Entity Recognition: An information extraction method that extracts entities and categorises them into person, location, date etc. This is useful for removing patient identifiers from clinical notes.
3. Abbreviation Expansion: Standard abbreviations (for example as listed in Unified Medical Language System [UMLS]) are expanded.
4. Concept extraction: Spans of text are mapped to medical concepts listed in UMLS.
5. Negation detection: Linking negation phrases to the concept they refer to. The figure below shows all these steps at work. These steps can be automated using NLP packages for medical text(2).



approaches -those that care about word order, called sequential models, and those that do not, called 'bag of words' models. For sequential models, text is usually split into words, i.e. split on white space or punctuation. Text is split into pairs or triplets of words for a bag of word models. We must note that bag-of-words models lose all the sentence structure and are shallow models.

Following tokenisation, a vocabulary is created for the whole dataset. The index of this vocabulary provides the numerical representation of a word. Finally, each word is encoded into a vector. Vector can be understood as a table with one column and as many rows

as unique words exist in a document. To encode a word, we put 0s in all rows except the row that has the same index as the word. Figure 3 shows this process.

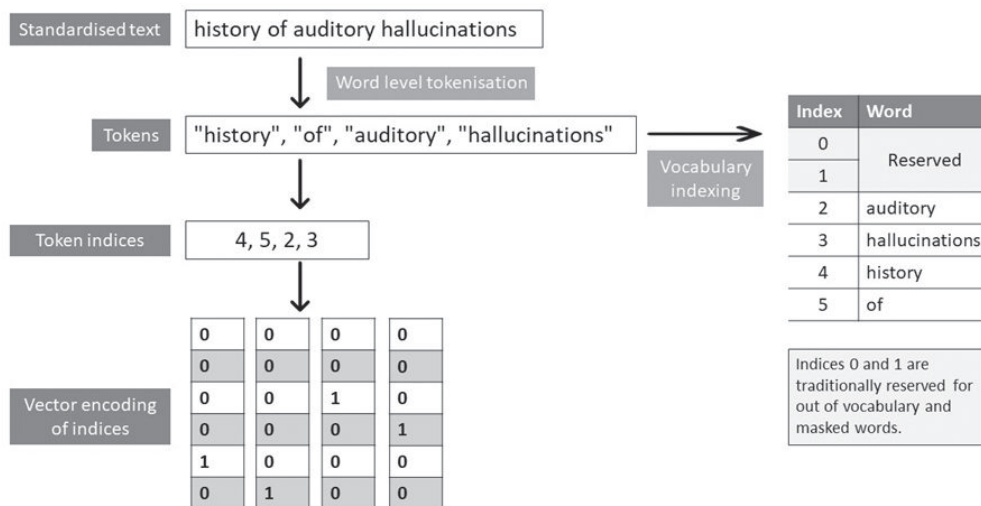


Figure 3: Example of tokenisation and encoding of text

### 2.3.2.2 Contextual Embedding

As shown in Figure 3, we can derive a numerical representation of words by using indexing and encoding. However, this method makes a strong assumption that words are independent of each other. We know this is a false assumption; words are related to each other when used in meaningful sentences.

For example, consider these two pairs of words - 'urge and craving' and 'disgust and revulsion'. We know that the words in each pair are used interchangeably when a doctor notes psychiatric symptoms. The reader must have guessed that the first pair will primarily occur in the summary of a patient with an addictive disorder and the second in a patient with obsessive-compulsive disorder. But, the encoding scheme will give us four orthogonal vectors for these words. More concretely, the vector representation of the word 'urge' will differ equally from the vectors for 'craving' and 'disgust'. This peculiarity compromises the meaning of sentences and undermines model performance.

A solution to this problem is using contextual embeddings. Contextual embedding generates vectors that preserve semantic relationships. It is difficult to visualise how this is done. At a higher level, it is adequate to know that vectors of similar words (like 'urge' and 'craving') will be geometrically closer to each other and distant from opposite-meaning words (like 'disgust' and 'revulsion').

Computers cannot truly 'understand' the meaning of a word, so how do they generate embeddings? Embeddings are also learnt from the data, for example, using frequency of co-occurrence of words.

### 2.3.3 Data Sources for Mental Health Models

AI models are 'data hungry', and the availability of big data in mental health has allowed AI model training. Big data is characterised by - Velocity (passive, high-speed capture), Variety (heterogeneous sources and purposes) and Volume (amount) (5). Traditionally, countries have instituted linkage between EHR, genetic, neuroimaging and blood investigations to constitute biobanks. Table 3 describes some unorthodox sources of data.

**Table 3: Unconventional sources of data for machine learning models in psychiatry**

Data Source	Current uses	Limitations
Non-clinical textual data from social media.	Predictive models for detection of mental illness (depression, anxiety and self-harm).	Concerns about construct validity (what is being predicted?) and annotation quality(6).
Self-reported (active), high-frequency data collected via smartphones.	Predictive models for detection of illness, relapse, and improvement.	Low and selective engagement by participants. The discrepancy between self-reported and objective measures of mood, activity, and sleep (7).
Passive, high-frequency data from smartphone sensors – location, activity, sleep, socialisation, light exposure, and phone usage.		Requires extensive preprocessing to extract useful features. Lack of collection and analysis standards.
Passive, high-frequency data from commercial wearable technology – heart rate variability, activity, sleep.		Variability in fidelity due to different devices.(8)
Locality level measures of socio-exposome (9). These include remote sensing data like green cover, population density, and urbanicity. Also consists of the neighbourhood deprivation index air and water pollution.	Predictive models for calculating the risk of psychiatric illness.(10)	Rarely available at sufficient spatial (location) resolution in developing countries.

For illustration, the DL model for choosing antipsychotics may benefit from patient-reported and passively collected data regarding physical activity, weight gain and food intake. These data can be used to calculate the risk of metabolic adverse effects.

## 2.4 Large Language Models

Large Language Models (LLMs) are DL models designed to understand and generate human-like text. They are called 'large' because they typically have billions of parameters (several hundreds of billions). Psychiatrists must know the basics of LLM for three reasons.

First, these models have attracted much public attention (think 'Chat-GPT'), and patients use them for medical queries. In short, 'Dr Google' will soon be replaced by 'Dr Chatbot' as the two leading search engines - Bing and Google- have integrated output from LLMs in their results. Second, at present, LLMs are the most promising AI-based tools for integration in clinical practice - they have impressive performance on clinical tasks(11) and outcome predictions(12). Finally, psychiatric practice depends heavily on language. Of course, most human activities depend on language. Psychiatric diagnosis and one form of treatment (psychotherapy) are entirely language-based. Thus, LLMs are likely to have most applications in psychiatry.

### **2.4.1 Why are Large Language Models Special?**

At their heart, LLMs are generative models that predict the next word in a text output. They have been called 'stochastic parrots' to highlight that they cannot really 'understand' text. While we do not wish to engage in a philosophical discussion about the possibility of computers ever understanding language or if understanding is necessary, we must note what makes LLM unique.

Many of the abilities of LLMs are called 'emergent abilities', i.e. they are not seen in smaller language models but emerge as the model size increases(13). This reminds one of 'consciousness' being an emergent phenomenon. Some of these abilities are as follows:

#### **2.4.1.1 In-context-learning**

In-context-learning refers to the phenomenon where an LLM can be taught to solve a problem by giving instructions in natural language and a few examples. This is so striking because, generally, learning requires many examples and changes in model weights. But, in-context-learning doesn't change model weights.

#### **2.4.1.2 Instruction Following**

A step further to in-context-learning, an LLM trained on instructions learns to follow instructions for tasks it has never seen. This is an example of generalisation. Unlike in-context-learning, no examples are needed for the model to solve a problem if adequate instructions are given.

#### **2.4.1.3 Step-by-step reasoning**

LLMs can be made to solve complex problems by following multiple reasoning steps. The steps can be elicited by prompts that make the model consider intermediate steps.

#### **2.4.1.4 Human-like conversations**

LLMs (especially GPT-4) show three characteristics, making their conversations human-like and less jarring or rehearsed. First, LLMs can hold the context of discussion while replying. This is traditionally called 'state management' and makes the conversation free-flowing and non-repetitive. Second, LLMs have shown an impressive ability to empathise. We realise the consternation in the reader's mind, but current research suggests LLMs understand the emotional state of others and give emotionally rich, appropriate responses(14). Third, LLMs can look at their own output and identify errors. This self-reflectiveness, however, is superficial in that we must feed Chat-GPT its own output in a separate session for it to identify its errors.

### 2.4.1.5 Confabulations

LLMs are liable to give completely fabricated responses without any indication of being unsure about the answer. This phenomenon is variably called fabrication, hallucination and confabulation. We prefer the word confabulation because such responses occur when the appropriate response would have been 'I do not know'. The most worrisome aspect of these confabulations is that they fit the context and superficially seem plausible. We do not know at present what causes confabulations.

Till we know the source and solution for these confabulations, the output of LLMs cannot be used in medical or psychiatric contexts without human supervision.

### 2.4.2 LLM Ecosystem

Creating an LLM is a multistep and resource-intensive process. Most medical teams are unlikely to have the resources to train a language model from scratch.

#### 2.4.2.1 Pretrained Language Models

The first step in creating an LLM is to train it on massive amounts of data. For an idea of scale, the T5 model from Google is small (in the world of LLMs) with 11 billion parameters and was trained with 1 trillion words (tokens). This chapter has approximately 8000 words. These are foundation models, as they can be used for various purposes without training them from scratch. While no group declares the sources of data, scraping text data from the World Wide Web is a primary source of training data.

Fortunately, many pretrained models are open-source and can be adapted for specific tasks. Some of the available models are:

1. Generative Pretrained Transformer 3 (GPT3).
2. Pathways Language Model (PaLM) family.
3. Large Language Model Meta AI (LLaMA) family.

Furthermore, LLMs that have received pretraining on biomedical literature are also open source. The table below lists some of these models with a description of biomedical data they have been trained on.

#### 2.4.2.2 Adaptation of pretrained language models

A pretrained language model has substantial abilities in processing language tasks like summarisation, concept extraction and question-answering. We can impart domain-specific abilities to these models by exposing them to domain-specific data. Adaptation requires less data and computation in comparison to pretraining.

Fine-tuning refers to a supervised learning set-up where a pretrained model is exposed to domain-specific data. For example, to create a chatbot that helps clinicians generate an antipsychotic prescription, we will fine-tune a pretrained model on a dataset of patient summaries and prescriptions (these prescriptions will be created by doctors and represent the ideal choice).

Instruction tuning refers to exposing a pretrained model to formatted instances of tasks that it is supposed to do. For example, to create a chatbot as described above, we will create formatted instances of patient summaries. A detailed task description - "Choose an antipsychotic from A,B,C,D, keeping in mind which of them have already failed," and some examples make a formatted instance.

Table 4: Pretrained Large Language Models for Biomedical Applications

Model	Base Model	Additional Pretraining dataset
BioBERT	Bidirectional Encoder Representations from Transformers (BERT)	PubMed Abstracts (4.5 Billion tokens) Freely available PubMed Articles (13.5 Billion tokens) (15)
ClinicalBERT		Medical Information Mart for Intensive Care (MIMIC) version 3.(16)
BERT (P+M)		PubMed Abstracts and articles and clinical notes available in Medical Information Mart for Intensive Care (MIMIC) version 3.(17)
PsychBERT		PubMed Abstracts and articles in psychiatry, psychology, mental health and social media conversations around mental health (18).
Bio-GPT	Generative Pretrained transformers version 2 (GPT-2)	PubMed Abstracts.
medPaLM-M	Pathways Language Model (PaLM)	Not open source. The only multimodal model, i.e., can take input in text, images, etc. (19). Pretrained on multiple medical datasets including MIMIC, USMLE Question papers, etc.

## 2.5 PRACTICAL ISSUES IN DEVELOPING AI-BASED SOLUTIONS

### 2.5.1 Domain Expertise

Developing an AI-based solution requires a multidisciplinary team. Experts from clinical fields are needed to formulate a problem, evaluate solutions'feasibility and provide training data. Experts from computer science are required to build and deploy the model. Furthermore, ethics, data safety and implementation research experts are needed at various development and deployment stages.

### 2.5.2 Hardware

There are two phases of modelling - training and inference. During the inference phase, the model generates output for new input data; this is a less expensive operation and can be done on usual computers (except for large generative models) with some techniques.

Training DL models, particularly those with many parameters, is computationally intensive and time-consuming. A Graphical Processor Unit (GPU) based server can significantly accelerate this process by performing parallel computations. These servers cost several lakhs, and this is a significant entry barrier for new teams.



### 2.5.3 Data

Supervised ML (especially DL) is very 'data hungry'. This creates two problems. First, domain experts must give substantial time and effort to generate the labels. For example, we will require a team of clinicians to choose the best antipsychotic after reading a case summary. This step cannot be automated. Second, small centres rarely have access to large enough datasets (several thousand). This has been described as a 'parasitic relationship between humans and AI'. We must first feed the model with vast amounts of clean, annotated data in the hope that it will benefit us later(20).

### 2.5.4 Guidelines and Compliance

Established guidelines exist for developing, testing and scientific reporting of AI-based solutions in the biomedical field. These guidelines ensure ethical compliance and increase the scientific validity of outcome research. Table 5 mentions some of these guidelines.

**Table 5: Guidelines and Standards for Machine Learning models in the biomedical field**

Guideline/ Standard	Description
Transparent Reporting of a Multivariable Prediction Model of Individual Prognosis or Diagnosis (TRIPOD)	TRIPOD and PROBAST are well-established standards by the EQUATOR network for research that predicts individual-level outcomes using multiple variables. These are being adapted for use in AI studies (21).
Prediction model Risk Of Bias ASessment Tool (PROBAST)	
Consolidated Standards of Reporting Trials (CONSORT-AI)	Adaptations of existing standards are to be used when any aspect of intervention includes AI (22).
Standard Protocol Items Recommendations for Intervention Trials (SPIRIT-AI)	
Minimum information about clinical artificial intelligence modelling (MI-CLAIM checklist)	Focuses on enabling a direct assessment of clinical impact and facilitating rapid replication of the technical aspects of the study. Since the original data cannot be shared due to ethical and regulatory issues, this ensures that at least the modelling pipeline is reported with adequate details.(23)
Findable, Accessible, Interoperable and Reusable (FAIR) principles	Not specific to the medical field. Conceptualises big data and AI models as a 'common good' which should remain accessible. This promotes the creation of open-source datasets and the reusing of models (24).

Nevertheless, this field is rapidly growing, and the guidelines may not cover some areas.

## 3 APPLICATIONS OF AI IN MENTAL HEALTH PRACTICE

### 3.1 Predictive Models in Psychiatry

Prediction models can be of two types - regression-based and ML-based. Regression-based models have been studied for a long time in the field of precision psychiatry(25). However, in this section, we only discuss ML-based models.

Table 6 lists the types of predictive models in psychiatry.

**Table 6: Overview of Predictive Machine Learning Models in Psychiatry**

Predictive Model	Clinical Questions	Use Cases
Diagnosis prediction: Calculate an individual's current probability of a (or many) psychiatric diagnoses based on extant diagnostic criteria.	Separation from normal: Illness vs. no illness.	Task shifting: diagnosis of mental illness by non-specialists. Assistance and supervision of specialists.
	Separation from other illnesses: Illness A or B.	
	Comorbidity: Illness A & B.	
Prognostic prediction: Calculate an individual's future probability of onset or course of psychiatric illness.	In a group of high-risk individuals who will develop a diagnosable illness. For example, cohorts at high risk of psychosis.	Targeted prevention. Prognostication and support planning.
	Given the illness course till now, what will be the course in future?	
Response prediction: Calculate an individual's response probability to a given course of treatment.	Given the illness course and past response, what set of choices will maximise benefit and minimise harm?	Personalised treatment plans.

Amongst the prediction models, diagnostic models are the most studied. The research output is so prolific that we now have an umbrella review (review study of review studies) on the topic(26). We do not aim to provide an exhaustive review of studies but to highlight some salient trends.

### 3.1.1 Severe mental illnesses are the most studied.

Most studies have studied major depressive disorder, bipolar disorder, schizophrenia, dementia, and obsessive-compulsive disorder(25-27). Furthermore, neurodegenerative illnesses like Mild Cognitive Impairment (MCI) and Alzheimer's dementia (AD) have been studied most methodically (26). This trend is counterintuitive to the aim of predictive models (primarily diagnostic models) - task shifting. Common mental disorders like mild depressive disorder, anxiety disorders and addictive behaviours are more likely to be managed by non-specialists.

### 3.1.2 Shift in data sources

Traditionally, neuroimaging, electroencephalography and genetic data have been used to develop diagnostic and prognostic models (27). We must note that this data is rarely available when a patient is seen in non-research settings. Therefore, reliance on these advanced investigations limits the utility of these models in routine care.

Recently, DL has allowed the use of noisy data sources like EHR (27). This development is exciting because it has immense translational potential, and EHR contain longitudinal data. For example, Tran et al. used 'history of presenting illness' to diagnose 11 mental illnesses with impressive accuracy(28). With sophisticated artificial neural network architecture that can capture longitudinal histories, Pham et al. modelled trajectories of mental illnesses(29).

Furthermore, there is promising research that audio and video data (for example, during a clinical interview) can be directly used in diagnosis prediction(30, 31). We also note using social media data to model non-diagnosable mental health conditions like stress.

In summary, there is a shift from specialised data sources to more noisy but easily obtainable ones.

### 3.1.3 Lack of replication

While the trends are exciting, we must note that these are still early days for ML models in psychiatric practice. The methodology of studies evaluating ML-based predictive models is highly heterogeneous. Even for a well-defined outcome like the diagnosis of Alzheimer's dementia, no two studies are directly comparable. As a result, we have numerous systematic reviews but no meta-analysis (26).

Different groups have used different input data to model the same outcome. The general philosophy is to use as many data points as possible. Furthermore, there is rarely an attempt to quantify the contribution of individual predictors. As a result, the next group studying the same outcome cannot pick from where the earlier group stopped. Every effort is a new effort preventing incremental progress in the field.

Another barrier to replication is the lack of sufficiently detailed study procedures. For example, most studies do not report preprocessing steps and missing data management(32). This is especially striking as most of the groups working on these projects are 'code-savvy' teams who should be able to share their code.

Finally, this field has low adherence to standard reporting and quality guidelines(32).

## 3.2 Generative Models in Psychiatry

The current discourse of generative AI is dominated by LLM. We must note that the line between generative and predictive AI is not set in stone. For example, an LLM can be fine-tuned on case summaries to output the most probable diagnosis. Nevertheless, psychiatric and medical experts hold LLMs as the most promising candidate for integration into clinical workflow(33, 34). We look at some of these applications in this section.

### 3.2.1 Clinical Assessments

There is early evidence that LLMs trained on medical datasets and fine-tuned on psychiatric case histories achieve acceptable discriminative capabilities to assign diagnoses and estimate the severity of illness(35). We must note that the out-of-the-box performance of LLMs (especially GPT 3) on many psychiatric tasks is sub-optimal(36, 37).

Finally, ongoing research compares standardised rating scales (consisting of closed-ended questions) with LLMs to quantify the intensity of a psychological phenomenon. This line of investigation addresses the core dilemma of psychology - how to quantify self-reported psychological states(38).

### 3.2.2 Chatbots in Psychiatry

Chatbots are conversational agents that can be text-based, voice-based or have some embodiment like an avatar. Multiple chatbots have been studied in mental health, and we note some important trends(39).

1. Most studies are in non-clinical populations like college students. To be clear, these studies

show effectiveness in decreasing 'depression or anxiety symptoms' in subjects who were not clinically depressed, to begin with.

2. All studies invariably show that the chatbots work. The general trajectory is that a group conducts 1-2 studies on a chatbot, and any other group does not attempt to replicate the findings.
3. Most studies are industry-sponsored or done by groups that eventually patent and commercialise the solution.
4. Cognitive Behavioural Therapy (CBT) is the most common form of therapy offered.
5. Most chatbots are opaque because one does not know the technical details of the ML techniques used.

#### 4 Landscape of AI Applications in Psychiatry

So, where do we stand today? We can gauge the impact of AI on psychiatry by looking at how many discoveries/inventions have been patented, commercialised, and approved by regulatory bodies like the Food and Drug Administration (FDA) (Table 7).

Table 7: Selected AI-based solutions in psychiatry.

AI-based solution	Patented	Commercialised	FDA Approved
ML is applied to Single Nucleotide Polymorphisms to identify depressed patients who will respond to corticotropin-releasing hormone (CRH) modulating drugs (40).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
ML applied to voice samples to diagnose depression and minor cognitive impairment (MCI). This technology is being used in numerous self-help and mental fitness Apps (41, 42).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
ML applied to actively collected data (mood) and passively collected data (Bluetooth-based social interactions, call logs) to give personalised recommendations. Advertised as an end-to-end mental health solution in the form of an App (43).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
ML applied to location and physiological data collected through a smartwatch to calculate the risk of relapse in patients recovering from addictive behaviours (44).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Psychophysiological data, facial expressions and visual tracking are used in a DL model to calculate the risk of specific mental illnesses (45).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
ML applied to active and passively collected data from smartphones to predict recovery in severe mental illness. Learn, Assess, Manage and Prevent (LAMP platform) (46). (open source)			
DL applied to typing kinematics (speed, pauses etc), cognitive tests and self-report data to track bipolar disorder. (BiAffect) (47)			
NLP techniques to deliver CBT via a chatbot (Woebot, Tess) (48)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
DL applied to user provided data to create a digital avatar of the person with whom one can talk, explore oneself etc. (Replika) (49)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Text based delivery of CBT, mindfulness based advise to patients with chronic pain. (Wysa) (50)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Contingency management and community reinforcement interventions delivered through an App to SUD patients. No ML is involved. (reSET and reSET-O) (51)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

## 4.1 Challenges

In developing AI-enabled clinical solutions, psychiatry lags behind general medicine, radiology, oncology and ophthalmology(52). A combination of challenges inherent to psychiatry and the limitations of current AI solutions explain this gap between promising research and real-world impact.

1. Fuzzy problems: Psychiatric diagnoses are syndromal, i.e., based on the co-occurrence of specific self-reported symptoms. The current classificatory system has high utility but questionable validity(53). The zones of separation between an illness and normality and between different illnesses are not well demarcated.
2. Heterogeneity of diagnoses: For example, consider the diagnosis of borderline personality disorder in DSM 5, which requires 5 out of 9 symptoms. Mathematically, there can be 256 unique symptom combinations. While this is not an absolute problem for ML algorithms, this heterogeneity requires massive datasets to train a predictive model.
3. Concept drift: Concept drift is a phenomenon where data characteristics change over time. Concept drift affects most ML applications that depend on human language data. With time, various emotions' vocabulary, expressions, and signifiers change. For example, a model trained to diagnose depression based on patient-generated descriptions in the 90s will have poor performance in the current times.
4. Limited context window: Even the most advanced LLMs have a limit to how much data they can hold at a time. Psychiatric case histories are long, and patterns emerge longitudinally. For example, a case history starting at age 8 for hyperactivity that reveals substance use and manic symptoms at age 20 is likely to exceed the context window of LLMs.
5. Lack of open-source datasets: Unlike intensive care or radiology, there are no open-source datasets in psychiatry that can be used to train a model. This has led to the use of PubMed articles and social media posts, neither representing clinical psychiatry.

## 4.2 Pitfalls and Ethical Issues

As we step into this 'brave new world', we must note some of the pitfalls we have already stepped into and some which we must be careful of.

### 4.2.1 Cart before the Horse - Commercialisation

There is a lot of commercial interest in mental health, wellness, and self-help. The boundaries between clinical psychiatry and wellness promotion are blurred. This has allowed disingenuous advertising using buzz words - 'mental health' and 'AI-enabled'. Let us take an example of an FDA-approved chatbot. The only empirical study in a clinical population is an uncontrolled feasibility study in orthopaedic patients. The study recruited 61 patients (out of 208 eligible patients) and did not use any diagnostic instruments(54). However, the chatbot now advertises itself as a one-stop solution for many mental health care needs. This is a standard modus operandi for AI-enabled wellness solutions. First, market the product directly to customers (non-clinical population), then do a non-principled, non-controlled analysis of user engagement and retention, and finally establish yourself as an AI-enabled mental health solution provider.

### 4.2.2 Opaque Solutions

Linked to premature commercialisation is the problem of opacity. When we refer patients to a therapist, we trust their training and are reassured that we can speak to them and

develop a plan. However, most available solutions do not declare basic information about their functioning. Unfortunately, available material is invariably meant for advertisement and not for information. This is equivalent to a situation where we were to prescribe medications based on what sales representatives told us.

Without loss of generality and only for illustration, we present some questions we must ask of patient-facing AI solutions (Table 8).

**Table 8: Common claims made by commercial AI-based mental health solutions and relevant questions to ask**

Claim	Relevant Questions
“Conversational AI creates an anonymous, safe space to work through worries and stressors, preventing them from escalating in severity and towards illness.”	Is this a solution for prevention of illness? What is ‘conversational AI’? If it is a LLM, does it hallucinate? What data was used to train the AI model? How does it distinguish between ‘worries and stressors’ and symptoms of an illness?
“Our AI is clinically proven to create a therapeutic alliance equivalent to a human therapist within the first week.”	Evidence is for what illness or conditions? Extraordinary claims require extraordinary evidence – therapeutic alliance within a week? (The original study did not have any comparison with human therapists.)
“In our Clinical Programs, the AI checks in every morning and evening and can also be supplemented by a human coach or therapist. The programs are clinically validated to reduce symptoms of depression and anxiety.”	Are the checks the same for everyone or personalised? Does the course of treatment change based on the cheques? What are the qualifications of the coach/therapist? Reduce symptoms in whom – clinical or non-clinical population?
“Customised escalation pathways”	Customised for whom? Customised how? How does the system detect the need for escalation? Are there studies that report the sensitivity of this system? What proportion of interactions are reviewed by humans?
“Your data is secure with us.”	Who is “us”? Will the data be used to train future models? What is the data retention policy?

An egregious example of this opaqueness came to light in 2023. A 'peer support App' designed to connect people looking for psychological support and volunteers deceptively tested GPT 3.5 on its users. The proprietors boasted how users liked AI's responses better than those of humans. Thousands of vulnerable people participated in an experiment without their consent or knowledge (55).

#### 4.2.3 Equity

The current growth of AI in mental health practice is inequitable by all measures.

1. Almost all patents and research come from developed countries.
2. Almost all solutions of note are based on the English language.
3. While treatment-related solutions target the 'worried well' group, avoiding well-defined illnesses, predictive models have focussed on severe mental illnesses.
4. The cross-cultural validity of solutions is never investigated.

We must note that AI development is being called the fourth industrial revolution(56). Nations are competing for data (which is the oil) and hardware (the engine). Therefore, it will be unrealistic to expect importing solutions developed by other countries and at least in the short run, we will have to build our own solutions.

#### 4.2.4 Privacy & Good Practices

Data privacy acquires a new dimension in the context of AI. It is not only a question of confidentiality but also of justice and fair trade.

Imagine this: you are a senior psychiatrist finding it challenging to answer patient queries on email and WhatsApp. You search for solutions to make a 'no-code' chatbot for your website. A Google Search shows many affordable options; a standard pitch is 'AI-powered, train GPT on your own data'. You select a vendor who asks you to share patient queries and your answers. You pat yourself on the back for never deleting emails or chats; you have a ready-made dataset of standard questions and their answers.

If you share your data as is - you are violating patient confidentiality. So, you carefully remove all patient identifiers from the queries and your answers. Now, you share your data with the vendor, who gives you an attractive drag-and-drop interface to make an 'AI-powered' chatbot on your website. Is this fair trade?

When you read the fine print, you realise that the vendor reserves the right to use data for "improving their product". This implies that till yesterday, they had a model that had no exposure to what questions Indian patients ask of their psychiatrists. They have trained their model using your dataset and continue to do so while people ask queries on your website. In a few months, the provider launches a custom chatbot to handle psychiatric questions with the tagline "customised for Indian population". In effect, you have paid the vendor to improve their product using your intellectual resources! If the preceding discussion seems paranoid, consider that OpenAI's GPT-4 costs 20 USD per month and approximately 4 times that if you want to ensure your data is not used for training further iterations of the model (enterprise pricing).

Furthermore, mental health Apps have consistently been rated worse in terms of data security or transparency of disclosures (57).

#### 4.2.5 Historical Biases

ML models imbibe the prevalent societal norms, prejudices, and biases. For example, AI models used during COVID-19 were shown to have substantial negative bias towards blacks(58). Again, this is not just a theoretical concern. Imagine if we trained a model for diagnosing ADHD using a dataset from a tertiary centre; there would hardly be any female cases in the training dataset. Unless we counter this tendency to underdiagnose and undertreat ADHD in females(59), we will end up with a biased model that rarely diagnoses ADHD in girls.

### 4.2.6 Regulatory Frameworks

FDA and the European Medical Agency have evolved regulations and pathways for AI/ML-based solutions (52). Similarly, we need to develop regulatory frameworks, including direct customer advertisement.

## 4.3 OPPORTUNITIES

While the opportunities are many, in this section, we focus on some areas that are relevant to our country and have not received much attention. We show unedited outputs from GPT-4 using a hypothetical clinical case. The inputs or outputs have not been edited or improved in any manner.

### 4.3.1 Automating documentation.

Mental Health Care Act (MHCA) mandates maintenance of various medical records(60). Most practitioners use some form of EHR system today. The documentation burden is likely to increase as health insurance becomes more common. Evidence from other countries shows that documentation is a primary cause of burnout in healthcare providers and hampers forming a real connection with the patient(61). We believe LLMs are poised to help with this. For example, Box 4 shows GPT-4's performance in writing a summary based on minimal clinical notes.

Box 4: GPT4 output for summarising clinical information

***Please write a brief summary of diagnosis and treatment of the patient. Doctor's notes are pasted below:***

Anil, Male, 24

First Contact: Jan 12, 2023

Auditory hallucinations ("hears voices telling him to hurt himself"), delusions of persecution, withdrawal from family and friends, poor hygiene.

Symptoms for approximately 9 months, worsening last 3 months.

Examination:

Disorganized speech, flattened affect, eye contact minimal, appears agitated.

Oriented. Thought disorganized, impaired judgment, no insight.

Provisional Diagnosis:

Schizophrenia, first episode.

Treatment Plan:

Initiate Risperidone 3 mg Tablet, daily. Psychoeducation for patient and family. Schedule follow-up in two weeks.

Advised family to monitor for side effects and worsening symptoms.

Follow-up: Jan 26, 2023

No improvement in auditory hallucinations, increased agitation.

Tremors, stiffness, akathisia, and other extrapyramidal symptoms noted.

Examination:

Restlessness, continues to present with flattened affect and disorganized speech.

Advise:

Stop Risperidone.

Initiate Olanzapine 20 mg Tablet, daily.

Monitor weight weekly, Fasting sugars and lipids in follow-up at one month.

Follow-up: Apr 8, 2023

Auditory hallucinations and agitation are much improved.

Weight gain of 7 kgs. FBS = 210 .

Examination:



**Examination:**

Appears more stable, improved eye contact, speech more organized than previous visits.

**Advise:**

Continue same treatment. Referral to endocrinologist.

**Output:**

Summary of Diagnosis and Treatment for Patient Anil

**Diagnosis:**

Anil, a 24-year-old male, presented with a first episode of schizophrenia characterized by auditory hallucinations, delusions of persecution, social withdrawal, and poor hygiene. Symptoms had been present for around 9 months and worsened over the last 3 months. Examination revealed disorganized thought processes, flattened affect, and impaired judgment, with no insight into his condition.

**Treatment Summary:**

Anil's initial treatment with Risperidone was discontinued due to intolerable extrapyramidal side effects and lack of symptomatic improvement. Olanzapine 20 mg daily showed effectiveness in controlling psychiatric symptoms but led to significant weight gain and elevated blood sugar levels, necessitating endocrinological consultation. Overall, while the psychiatric symptoms have been managed effectively with Olanzapine, managing its metabolic side effects is the current challenge.

An even more advanced system could use speech-to-text engines to capture crucial clinical information, which can then be fed to LLMs for summarisation.

### 4.3.2 Universal Translators

LLMs are good at translation if they have received sufficient exposure to a given language. At present, Indian languages constitute a small fraction of digitised data; thus, LLMs do not perform well out of the box. However, there is another kind of translation that is useful for us. LLMs can be asked to generate educational content appropriate for various groups. An example of this ability is shown in Box 5.

#### Box 5: GPT4's output for a layman's summary of illness

Please generate a ten-line educational material regarding Anil's diagnosis, his symptoms and treatment. This must be simple enough for his mother to understand she is from a rural background and has received only primary education.

**Output:**

Certainly, here is the information in a narrative format that should be easy for Anil's mother to understand:

Anil is going through a difficult time because he has a health condition called schizophrenia. This problem affects how he thinks and feels, making him hear voices that aren't there and believe that people want to harm him. This has also made him pull away from family and friends and neglect taking care of himself.

We first gave him a medicine called Risperidone, but it didn't help him get better and also caused some troubles like shaking and stiffness. So, we changed his medicine to Olanzapine. This new medicine is working much better in calming his mind and helping him behave more like himself.

However, the new medicine has its own set of problems. Anil gained weight very quickly and his sugar levels shot up, which is a sign of a sugar disease called diabetes. We're getting advice from a specialist for this new issue so we can take care of it properly.

It's really important that Anil continues to take his medicine and also watches his weight and sugar. Balancing these will take time, but many people with schizophrenia can live meaningful lives with the right treatment.

About what to expect in the future—schizophrenia is a long-term condition, but with ongoing treatment, many people manage it well. Some even return to near-normal functioning. We'll keep adjusting Anil's medicines and treatments to find the best combination for him. We want to help him manage both his mind and body in the best way possible

### 4.3.3 Intelligent Assistants

We realise that this is a bold suggestion. However, it is imminent that models trained on psychiatric datasets will have enough reasoning power to engage in discussions regarding diagnosis and treatment, just like clinicians do. We believe these tools can be used like we use fellow clinicians - to discuss, debate, reflect and clarify.

Box6 shows the out-of-box capabilities of GPT 4, which has not received training on psychiatric datasets.

#### Box 6: GPT4's output as an example of intelligent clinical discussion

***Can you tell me three important pieces of information missed in the first contact which have a bearing on Anil's diagnosis?***

Output:

In the initial first contact note for Anil, certain potentially crucial information appeared to be missing that could have a significant bearing on his diagnosis and treatment plan:

1. **\*\*Family History:\*\*** There is no mention of any family history of mental illness. A family history of schizophrenia or other psychotic disorders could have implications for both diagnosis and prognosis. Understanding if there's a familial pattern could help in determining the most effective treatment strategy.
2. **\*\*Substance Use History:\*\*** There is no information about whether Anil has a history of substance use, such as alcohol, drugs, or medication abuse. Substance use could not only mimic symptoms of schizophrenia but also interact with prescribed medications, affecting their efficacy and potentially leading to additional health issues.
3. **\*\*Baseline Physical Health Parameters:\*\*** No baseline health data such as weight, blood pressure, or glucose levels were noted. This is particularly relevant because antipsychotic medications like Risperidone and Olanzapine can have significant metabolic side effects. Baseline information would provide a reference point for monitoring these potential side effects more accurately.

Including these elements in the initial assessment could provide a more comprehensive understanding of Anil's condition and help in crafting a more targeted and effective treatment plan.

## CONCLUSIONS

AI is such a rapidly changing field that this chapter will likely be outdated by the time the book is published. Still, we can draw some conclusions from the current research.

1. AI is a broad field, with the most exciting solutions coming from deep learning and Large Language Models.
2. Deep learning models require massive datasets and computational resources and thus remain out of reach of small teams.
3. Predictive models in psychiatry have shown great promise but depend on non-routine data and must be validated in multiple settings.
4. Chatbots for mental health require careful attention before we use them for clinical purposes.
5. Data privacy, equity and protection against historical biases are critical ethical concerns.
6. No AI-based solution has been shown convincingly (replicated studies, multiple settings) to be comparable to trained professionals.
7. Doctor-facing applications are within reach but unexplored.

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# TRANSCULTURAL TELEPSYCHIATRY

## INTRODUCTION

Information and Communication Technology (ICT) (e.g., telephone, mobile phone, computers, and video conferencing) and the internet have helped transform the delivery of telepsychiatry care across India by mitigating barriers to access to mental health care. Since the COVID-19 pandemic, telepsychiatry is increasingly being relied upon as an alternative in-person delivery of mental healthcare. However, psychiatrists should be aware of the sociocultural factors that can influence telepsychiatry and address them during their patient encounters.

## THE IMPORTANCE OF CULTURE AND PSYCHIATRY

Culture reflects the ways and norms of life in our society. It is a shared pattern of beliefs, behavior, traditions, values, and ideas that a group of members in a society have in their minds (1). It guides their conduct and activities in their daily lives. Culture can vary from different societies and is influenced by many factors, including relationships between its members, historical lineage, genetics, ethnicity, economics, religion, philosophy, politics, and technological advances (1,2). It is dynamic as it constantly changes and is passed on from generation to generation (1).

Culture provides a context for our subjective perspective of the objective world around us (3). Culture helps us in interpreting human interactions and experiences. It creates standards of our interactions with others, helps us understand the diverse possibilities of activities in a society, and uses resources including technology (3). It provides a framework for developing patterns of thinking, feeling, and behavior with our environment (3). These patterns can be concordant with cultural context or discordant, leading to abnormal patterns of thinking, feeling, and behavior (3). As cultural context helps understand the personal situation, it can shape the threshold of distress along with the range and form of expression of the distress that is acceptable for the cultural context (4). Thus, culture can influence the mental health of people in a society along with the diagnosis, presentation, course, and outcomes of mental illness (1). As every cultural group has its spectrum of behaviors that they consider normal and various levels of tolerance for abnormal behaviors for their group, it is easy to misdiagnose mental illness in a person from a cultural group by a psychiatrist who has been trained in another cultural group. For example, in relation to expression of depression, patients from Western societies verbally express their depressive symptoms, whereas patients from India present with more somatic symptoms (like headache and insomnia), anxiety, and agitation (5). In the USA, African Americans tend to be diagnosed with schizophrenia compared to other indigenous and racial groups due to racial biases in assessing psychiatric symptoms (6). Racial differences can also occur regarding responses and side effects of psychotropic medications. Asians are at higher risk of extrapyramidal side effects of antipsychotic medications and have been found to have higher levels of haloperidol and prolactin compared to Caucasians who are prescribed haloperidol (6). There can also occur racial differences

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in cytochrome P450 enzyme metabolism of psychotropic medications, leading to poor metabolizers in certain ethnic groups, making them more vulnerable to side effects of medications (6). Asian women have also been found to tend to exhibit flushing responses to alcohol due to genetic polymorphism of alcohol dehydrogenase and aldehyde dehydrogenase (6). Cultural syndromes can also occur in specific cultures characterized by symptoms and behaviors that occur in specific cultural groups, communities, or contexts (6)

As India is an amalgamation of various ethnic, multicultural, and linguistic groups, psychiatrists need to understand the cultural context, attitudes, and beliefs that can influence the presentation of mental illness and help-seeking behavior (6). A psychiatrist in India can speak a language or a dialect different from their patients and hold beliefs that are different from their patient's culture. Presentations of psychiatric symptoms can vary across regions in India as studies have found more patients from Muslim ethnic groups from South India present with somatic complaints like headache, nausea, and vomiting (1). Psychiatric patients from North India have also been found to present with predominantly gastrointestinal somatic complaints characterized by constipation and gaseous sensation in the abdomen (1). Dhat is an important cultural syndrome prevalent in Indian culture (7). It is characterized by severe anxiety and somatic symptoms of weakness and exhaustion to concerns with the discharge of semen through urine, nocturnal emission, or masturbation (7). It is related to overvalued cultural beliefs of semen as a vital human body substance (7). Patients in India can have non-medical beliefs for their distress or mental illness, including religious and spiritual, leading them to seek help from traditional and faith healers (1). Understanding patients' perspectives about their illnesses is important for acceptable and appropriate healthcare by modern medicine (1). The psychotherapy style in India is more of a traditional 'guru-chela relationship' (a wise teacher guiding a pupil) in creating a therapeutic alliance, and psychotherapy needs to be based on cultural concepts and beliefs that are acceptable to the patient (1). Stigma towards mental illness is also prevalent in India and causes barriers to access to mental health care in India. Social distance, rejection, guilt and responsibility for illness, poor knowledge, lack of recognition of symptoms of mental illness, and perception that people with mental illness are dangerous are some of the factors related to stigma and mental illness in India (1,8).

Social, linguistic, and cultural factors influence telepsychiatry encounters (9). Psychiatrists in India can face patients from diverse backgrounds and belonging to linguistic and cultural communities that are unfamiliar to them. Telepsychiatry can affect verbal and non-verbal communications occurring during telepsychiatry encounters due to various sociocultural factors (9). For a successful telepsychiatry encounter, the method of the ICT used for the telepsychiatry encounter should be applicable and acceptable to the patient (9). The various sociocultural factors affecting the applicability of telepsychiatry in India and the measures that can be taken to provide culturally appropriate mental health care via telepsychiatry will be described below.

### **THE DIGITAL DIVIDE IN INDIA**

An important aspect of understanding the successful use of telepsychiatry in the Indian context is the availability and accessibility of digital technology to the Indian population. Despite progress in the use of telecommunication and the internet by the Indian population in the past two decades, socio-economic disparities exist between those with access to ICT and internet and those without access to the same.



As per the Indian Telecom Services Performance Indicators from January-March 2023, India has a teledensity of 84.5% with 1172.34 million mobile phone users. There are 881.25 million internet users with an Internet penetration of around 63.53 per 100 population (10). However, psychiatrists should consider the urban-rural divide in the infrastructure for applying telemedicine in India as rural areas have a lower teledensity of 57.71% and 516.38 million mobile phone users compared to urban areas which have a high teledensity of 133.81% and 627.54 million mobile phone users (10). Rural areas in India have a lower internet usage, with 357.99 million internet users with an Internet penetration of around 39.84 per 100 population (10). This is much lower than urban areas in India, with 523.26 million internet users with an Internet penetration of about 107.11 per 100 population (10). Data from the National Family Health Survey of 2019-21, 57.1% of the users of the internet in India were males (11). This survey also found gender disparities in internet usage in urban and rural areas of India. The survey found that 72.5% of males and 51.8% of females have ever used the internet in urban areas, compared to 48.7% of males and 24.6% of females in rural areas (11). The Mobile Gender Gap Report of 2021 by the Global Systems for Mobile Communication also found that 79% of males and 67% of females were mobile phone owners in India (12).

As per Oxfam's India Inequality Report 2022: Digital Divide, income, religion, and caste-related disparities exist in access to digital technology in India (13). The report describes that the Indians belonging to lower levels of income were less likely to have a computer, a mobile phone, and access to the internet (13). General and other backward caste groups were more likely to have access to a computer or a mobile phone compared to scheduled caste and scheduled tribe populations, with economic disadvantage being an important reason for lack of access to technology in disadvantaged caste populations in India (13). Sikh and Christians were found to more likely to have a computer or a mobile phone, followed by Hindus and Muslims (13). In terms of the states in India, Goa has the highest internet penetration in India (70%) followed by Maharashtra (67%) and Kerala (65%) (14). In comparison, Jharkhand (41%), Uttar Pradesh (38%), and Bihar (32%) have the least internet penetration (14).

Patients who are expected to use telepsychiatry should also have acquired the ability to understand and use digital technologies meaningfully in life situations (15). This ability is known as digital literacy, and the Indian Ministry of Electronics and Information Technology considers a person who can operate information technology-related tools like a computer, smartphone, or tablet as a digital literate person (16). Digital literacy is composed of the knowledge and skills to use information technology, understand the content presented through the digital media, and have the capacity to create and share with the information technology (15). Mothkoo and Mumtaz using the 2017-18 National Sample Survey data, found that 38% of Indian households were digitally literate (8). The urban-rural divide in terms of digital literacy also exists, with urban areas of India having higher digital literacy rates (61%) compared to rural areas (25%) (17). Like access to information technology and the internet, lower digital literacy rates were found in scheduled castes and tribes (17). The states of Tripura and Jammu and Kashmir had the lowest digital literacy rates (<20%), whereas Kerala, Goa, and Lakshadweep had more 70% digital literacy rates (17). The high digital literacy rates in the latter states were attained due to the implementation of various initiatives undertaken by the states to improve digital literacy, including the Akshaya Project in Kerala (17). Most internet users in India are estimated to be 35-60 years of age, with older adults

having lower internet usage, including smartphones (18,19). Low digital literacy, traditional literacy, aging-related issues, and poor vision and cognition are some of the barriers related to ICT and internet use by older adults in India (19).

The above information shows disparities in ICT access and use in terms of geographical region, religion, caste, gender, and socio-economic status. The digital divide in India provides a cultural context on the pragmatic issues of the generalizability of applying telepsychiatry to the Indian population. Such disparities exist due to differences in cultural tastes and preferences in the use of ICT by different social groups, along with gaps in finances and resources to access ICT (13). Digital literacy and access to the internet is becoming more recognized as a social determinant of health (20). The digital divide in India raises questions of exacerbating health inequalities in access to telepsychiatry in mentally ill patients, especially those belonging to underprivileged groups and in rural areas that already lack access to mental health care. Many parts of India, especially rural areas, frequently face electricity and internet shutdowns, causing more barriers to access to telepsychiatry. The Indian market has also witnessed a steady rise in mobile phone healthcare applications (or apps) like Practo. Lack of digital literacy or access to a mobile phone will be a hinderance in using these apps. Many of these mobile phone apps are in English, which leads to exclusion by design in digitally illiterate and non-English speaking populations in India (13).

Major initiatives will be needed in India to address the divide across various sociocultural contexts in India. More projects by the State and National Governments in increasing digital literacy and digitalization of medicine, such as the Digital India Project and the Ayushman Bharat Digital Mission, expanding internet connectivity and accessibility to ICT in rural areas and underprivileged populations can help address the digital divide. This can help with the accessibility and utilization of telepsychiatry across various populations in India.

### **PROVIDING CULTURALLY APPROPRIATE TELEPSYCHIATRY CARE**

Cultural awareness and competency are needed for positive experiences by the patient and to provide high-quality patient care. Cultural competency means understanding sociocultural factors influencing the beliefs and behaviors related to a patient's health, the interaction of these factors at various levels of healthcare systems, and taking into these issues while delivering culturally appropriate and quality health care for diverse patient populations (21). In telepsychiatry, psychiatrists should be aware of the heightened potential of cultural differences that can occur during telepsychiatry encounters that can negatively impact the quality of care.

During clinical encounters, psychiatrists must consider the patient's cultural background and understanding of their behavioral symptoms and treatment, the influence of culture on doctor-patient relationships, and factors that can influence therapeutic relationships and outcomes (22). These factors can influence behaviors and interpretations of verbal and non-verbal including body language and tone of voice (22). In India, a horizontal head swing can represent "yes" which can be misunderstood as a "no" by a mental health provider unfamiliar with the Indian culture (23). Indian women often request their spouse to be present during telepsychiatry sessions and rely on them for making health-related decisions (24,25). Patients can also be uncomfortable with the digital platform and technology used for telepsychiatry encounters. The digital platform used for the telepsychiatry encounter can magnify, mute, or modify verbal and nonverbal communication (like speaking loudly, maintaining a direct

eye gaze, and maintaining the same body posture) (26). Some patients can have concerns about confidentiality during telepsychiatry encounters (27). Educating patients about patient confidentiality during the initial visit and reinforcing it in subsequent visits can often alleviate such fears (27). Some patients with a past history of trauma and stress-related disorders or autism spectrum disorders often find it difficult to express themselves during in-person clinical encounters and might find it easier to express themselves easier during telepsychiatry encounters as the psychiatrist is at a distance from the patient (27)

During clinical encounters, psychiatrists should assess the patients' reactions, comfort level, and regard for the ICT for conducting the telepsychiatry encounters (28). If the patient cannot participate in video conferencing, other telepsychiatry modalities, like phone calls for audio-only telepsychiatry visits, should be considered (29). Efforts should be taken to educate the patients about the ICT they are using to conduct the telepsychiatry encounters and discuss how it can impact the clinical encounter and communication (e.g., the need for good lighting and sound, and ability to see both the patients and psychiatrists during virtual encounters) (28). Psychiatrists should know patients from rural and economically disadvantaged backgrounds may have limited or no access to a reliable internet connection. Unreliable internet connection or power failure can cause failed relationships and delays in telepsychiatry causing a decrease in the effectiveness of telehealth visits, leading to premature ending of the telepsychiatry visits. Alternative options to cope with internet or power failures should be discussed, including contacting the patient by phone or a messaging application (29). Psychiatrists or any support staff can consider providing practice sessions or a video recording to help the patient be familiar with the digital platform used for the telepsychiatry encounter and model the telepsychiatry encounters (29). Although older adults can experience low levels of comfort in using ICT and changes in cognitive functioning, memory, hearing, vision, and mobility, they can be open to telepsychiatry services. Psychiatrists should allow older adults to participate in telepsychiatry encounters and discuss the pros and cons of it with older adult patients. Psychiatrists should assess for any medical issues, like visual or hearing impairment, that can cause hindrances in the use of telepsychiatry. If videoconferencing is pursued, psychiatrists should have a simple background to avoid visual challenges during the session (29). Large fonts, color contrast formats, captioning, headsets and volume controls in the digital platform used for telepsychiatry encounters can also help older adults engage during treatment (29). Psychiatrists should also maintain eye contact to build rapport with the older adult by watching the camera and not the screen during videoconferencing (29).

Language barriers can hinder patients' participation in telepsychiatry encounters and patient-provider communication (29). It will be ideal for patients to participate in telepsychiatry with psychiatrists who are fluent in their primary language. However, there can be a scarcity of bilingual psychiatrists and interpretation services will be needed to reduce language barriers. Language interpreters will need bilingual fluency and the ability to shift smoothly between two languages (29). They should be able to interpret the meaning and emotional tone of the language when communicating from one language to another (29). The interpreter should also be able to help with awareness of the patient's cultural nuances to help build rapport and engagement of treatment with the patient (29). When using video conferencing during telepsychiatry encounters, psychiatrists should ensure that they are visible to the patient and the interpreter on the screen so that the patient can see both (29). However, audio-only telepsychiatry services can be challenging when using an interpreter, as visual cues like facial expressions, body language, and nuances with words and phrases with visual

cues can be missed (29). Friends and families should be avoided as sensitive information about family friends (e.g., abuse) might not be conveyed by the friend or family member. However, they can be used for interpretation services if requested by the patient (29)

Care should be taken during telepsychiatry encounters when there are concerns for abuse, including intimate partner violence. In such scenarios, efforts should be taken to have telepsychiatry encounters alone with the patient so that the perpetrator cannot influence or overhear the communication during the clinical encounter (29). The psychiatrists should emphasize the importance of privacy during such sessions and develop a plan with the patient. The psychiatrist can use a safe word or a phrase that is not easily detected, such as, "Did you have tea?" can be used to check to ensure privacy so that the patient can communicate freely (29). If there are privacy concerns, psychiatrists can consider rescheduling the visit during a time when the patient can communicate freely (e.g., when the spouse leaves for work) or, if feasible, request the patient to relocate to a more private space to conduct the telepsychiatry session (29).

Psychiatrists should consider modifying their clinical workflows (e.g., accommodating an interpreter if there are language barriers, backup communication plans in the event of disruptions of internet connections) and communication technologies based on the cultural norms and preferences of the patients (28). Such modifications can also be done with the help of consultations with individuals who are familiar with the cultural norms related to the patient, including colleagues, local community leaders, administrative and local healthcare staff working at the clinical site hosting the telepsychiatry encounter or living near the patient's home (28). There should also be an understanding of the site where the patient is having their telepsychiatry encounter. The psychiatrist might not have ever been to the clinical site or home from where the telepsychiatry encounter is being hosted for the patient, have had no exposure to the environment around the patient (noise, lighting, clinical and administrative staff, etc), work flow at the site if the telepsychiatry encounter is at a site other than the patient's home, and may have minimal understanding of the cultural and local social norms of the area (26). Thus, the psychiatrist might find themselves in a telepsychiatry encounter where they are unfamiliar with the culture and do not have enough time to develop an awareness of how the hosting clinical site's organizational culture can affect patient care (26). The experiences of the patient with the organizational culture of the hosting clinic site can influence their experiences with the psychiatrist during the telepsychiatry encounter (22). Rurals areas in India can have high poverty rates and underprivileged communities including scheduled castes and tribes. Patients in rural areas are less likely to receive psychiatric treatment due to a lack of mental health resources, distance to psychiatrists for in-person visits, and stigma related to seeking psychiatric care (26). Telepsychiatry can help mitigate these challenges by allowing easier access and engagement with mental health treatment. It has been shown that valuing differences between cultures of psychiatrists and patients, being personally dedicated to delivering high-quality care, and having trained interpreters who speak patient's primary language have been important factors for providing effective psychiatric care in rural areas (30).

Psychiatrists should become familiar with the organizational cultures, environments, and resources of their patients' communities, including the clinical site at which a telepsychiatry encounter can occur if the patient doesn't conduct it at their homes (28). Efforts should also be made to understand local communication styles, cultural norms, and expectations related to patients and organizations/clinical sites hosting the telepsychiatry encounters (28).

Psychiatrists should adapt their communication patterns to the local cultural styles and expectations. This can also help build credibility and commitment by the psychiatrist to the community.

Psychiatrists should also understand their levels of competency and literacy using digital technology and how their cultural backgrounds might have influenced these levels (28). They should also be aware of their biases, assumptions, and expectations using specific ICT used for telepsychiatry encounters (28). Psychiatrists should also be familiar with the fact that patients can view their environment during virtual telepsychiatry visits. Thus, it is important to make well-informed decisions about the pictures, adornments, and background features that the patients can view in the psychiatrist's office that is presented to them virtually (29). Materials implying the psychiatrist's explicit or implicit bias that the patient can view during the virtual clinical encounter can be unwelcoming and harmful for the patient (9). Artwork and adornments in the office space that are relevant to the patients can be helpful for the patients' comfort during telepsychiatry visits (29). Psychiatrists should be mindful of religious images or adornments as they can be unwelcoming to patients who disagree with those religious displays or religion in general (29). If the psychiatrist is unsure about creating a culturally competent virtual environment, a neutral or blurred virtual background can be used, or use a view of the office that does not offer information of the psychiatrist's personal life (29).

Organizations and Institutions related to mental health care and post-graduate residency training programs should try to attain cultural awareness and competency while using telepsychiatry. Educational and training activities and outreach visits to the local clinical sites hosting telepsychiatry visits can also help psychiatrists and psychiatric training to improve their knowledge and cultural context of the patients they encounter during telepsychiatry visits. Advocacy efforts can also be undertaken with local, state, and national governments to expand telehealth access, including telepsychiatry, and broadband internet services for underprivileged communities and rural areas to address disparities in access to telepsychiatry. Engaging with local health and community leaders can help understand the mental health concerns and needs of the community along with its cultural context. They can help as the cultural liaison between the psychiatrist, the patients, and the community. It can also help with planning telepsychiatry services in the area and consider the suitability and appropriateness of it.

## CONCLUSION

Psychiatrists should have multi-factor awareness of linguistic and cultural factors in India in influencing telepsychiatry encounters with their patients. There can be various sociocultural disparities in the use of ICT and digital literacy that can be a hindrance to the applicability and usefulness of telepsychiatry by patients. Psychiatrists should consider these factors when using telepsychiatry to provide mental health care, as it might not be generalizable to all of the Indian population due to sociocultural differences. Social, linguistic, and cultural context should also be considered during planning and implementing telepsychiatry encounters to provide culturally appropriate mental health care.

**KEY POINTS:**

- In India, disparities exist due to sociocultural factors to access to information and communication technology and the internet, and digital literacy, causing hindrances in the generalizability of the use of telepsychiatry.
- Awareness is needed of cultural differences occurring with psychiatrists, patients, or clinical sites hosting telepsychiatry encounters.
- Make efforts to understand the cultural backgrounds of the patients and the context of their symptoms.
- Assess cultural factors influencing verbal and non-verbal communication of patients during telepsychiatry encounters.
- Visit the clinical site of organizations if they are hosting telepsychiatry encounters to understand the organizational culture and the cultural background of the region.
- Pursue educational activities/training to improve cultural awareness, knowledge, and competency to provide culturally appropriate telepsychiatry patient care.

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# DIGITAL INTERVENTIONS IN SUBSTANCE USE DISORDER (SUD) TREATMENT: CURRENT LANDSCAPE AND FUTURE DIRECTIONS

## 1. INTRODUCTION

Addiction/Substance Use Disorder (SUD) is a chronic relapsing disorder characterised by a continued engagement in behaviours despite the negative consequences. Treatment-seeking and retention for substance use disorders are generally low(1). Recent advances in digital technology in various fields have prompted the application of digital technology in the field of addictive disorders as well. The application of digital technology can potentially be useful in addressing treatment-seeking and retention. There is growing evidence for digital intervention in SUDs (2).

It is essential to understand the various terminologies used in the context of applying digital technology to addictive disorders. Digital technologies are electronic tools, devices, systems, and resources that help create, store, and manage data. It includes both software and hardware. Digital technologies are constantly evolving. Digital technologies can include various hardware like mobile phones, computers, smart watches, etc. and software like GPS, artificial intelligence, and ecological momentary assessment. It can also include gaming, virtual reality (V.R.), augmented reality (A.R.), and internet. The application of these fields of health is called digital health. Digital medicine is a branch of digital health that deals with the application of digital technology in the evaluation and management of various medical illnesses. Digital therapeutics are interventions that are treatments that are used for specific disorders (3).

In this chapter, we attempt to provide an overview of the classification of digital technology and the existing evidence for these conditions.

## 2. RELEVANCE OF DIGITAL TECHNOLOGY IN SUBSTANCE USE DISORDERS

Digital technology has emerged as a promising avenue for addressing addictive disorders due to its multifaceted advantages. One of its primary merits is its unparalleled accessibility and widespread reach, enabling individuals from various backgrounds to access interventions that might otherwise be inaccessible. This ubiquitous availability is particularly advantageous for the management of addictive disorders, as it offers continuous support to navigate urges and triggers whenever they arise (4,5). Anonymity and privacy offered by digital platforms are crucial in encouraging individuals to seek help without fear of judgment or stigma(6). The ability to personalise interventions according to individual's unique needs and progress

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enhances the effectiveness of treatment, ensuring that challenges are met with customised strategies (6). Real-time monitoring facilitated by digital tools provides comprehensive insights into triggers and patterns, enabling users and healthcare providers to make informed decisions. Moreover, gamified and interactive learning experiences make interventions engaging and motivating, potentially leading to higher adherence and more favorable outcomes (6). Beyond geographical constraints, digital interventions offer cost-effective alternatives to traditional therapies, thereby expanding access to a wider demographic. By acting as a bridge between in-person sessions, digital tools ensure continuity of care (6). They empower individuals with relapse prevention strategies and early intervention mechanisms, curbing setbacks and promoting long-term recovery. Integrating digital technology into addiction treatment holds promise in revolutionising how we approach and manage these disorders, but should always be coupled with professional guidance for comprehensive care.

In the Indian context, there is a significant treatment gap for substance use disorder (National Mental Health Survey, 2016). Furthermore, the growing accessibility of digital technology is evident in the increasing number of people in India, especially in rural areas, gaining high speed Internet access (8). This underscores the added significance of utilizing digital technology within the Indian population.

**Table 1: Digital technology can supplement to ongoing care for SUD.**

1. Low Treatment-Seeking and Retention: Addiction is a chronic relapsing disorder, with low treatment-seeking and retention rates despite negative consequences
2. Digital Technology's Role in Addiction: Recent advancements in digital technology have prompted its application in addressing addictive disorders, offering potential solutions for treatment-seeking and retention issues.
3. Understanding Digital Technology: Digital technologies encompass electronic tools, devices, software, and hardware, including mobile phones, A.I., and AR/VR, with their application in healthcare referred to as digital health and digital medicine
4. Advantages of Digital Interventions: Digital technology's accessibility, privacy, personalization, real-time monitoring, gamified learning, and cost-effectiveness make it a promising approach for managing addictive disorders
5. Addressing the Treatment Gap in India: India faces a significant treatment gap in substance use disorders, making the integration of digital technology even more crucial due to the increasing accessibility of digital tools, especially in rural areas
6. Comprehensive Care: While digital interventions hold promise in addiction treatment, they should be complemented with professional guidance to ensure comprehensive care

### 3. SPECTRUM OF DIGITAL INTERVENTIONS IN SUBSTANCE USE DISORDER

There are many ways digital interventions in substance use can be classified. Considering the focus is the kind of technology, in the chapter, we classify the chapters based on the type of technology used.

Raney and colleagues have categorised digital interventions in the context of integrating them

into primary healthcare into three main groups: Patient-Facing Technologies, Capacity-Building Technologies, and Virtual Visits. Patient-facing technologies are those used directly by patients for self-help, often through mobile or web-based applications. These can include various tools and resources designed to aid individuals in managing their health. Capacity-building technologies encompass interventions that aim to enhance the capabilities of healthcare providers, enabling them to deliver better and evidence based care in their practice. Virtual visits include Telepsychiatry and direct consultations that involve remote interactions between patients and healthcare professionals, expanding access to mental health and medical advice via digital platforms. This categorisation helps us understand the different roles of digital interventions in improving healthcare delivery(9).

Another way to classify interventions can be based on the stage of intervention during the illness. It can be apps to prevent substance use, screen for problematic substance use, provide intervention, and assist in follow-up and recovery (10).

The classification can also be based on devices used, such as mobile phones, computers, and wearable devices. Subtypes can also be based on the software used, including mobile applications, web applications, virtual reality, artificial intelligence, video games and approved devices.(2)

The intervention can be self-help, with minimal human interaction and complete human interaction. In the following sections, various patient-facing digital technologies are discussed. (Table 2)

**Table 2. Overview of Components of Digital Intervention**

	<b>Technology</b>	<b>Components</b>
Telephone	Interactive Voice Response System (IVRS)	Brief Intervention Relapse prevention Follow up Reminder
Smartphone	Text Message App Chatbot Ecological momentary assessment (EMA) Augmented Reality Online consultation	Motivational Interviewing (MI) Cognitive Behavioural Therapy (CBT) Brief Intervention  Just-in-time adaptive interventions (JITAI)
Desktop/ Web-based	App Chatbot Online consultation	MI CBT Brief Intervention
Wearable technology	EMA	Drug screening Contingency management Overdose monitoring
V.R.- Headset	V.R. based intervention Avatar based intervention	Cue exposed therapy Coping skills training

#### 4. PATIENT-FACING TECHNOLOGIES

Figure 1 shows the general components under patient-facing technologies. (Modified from Barak 2009)

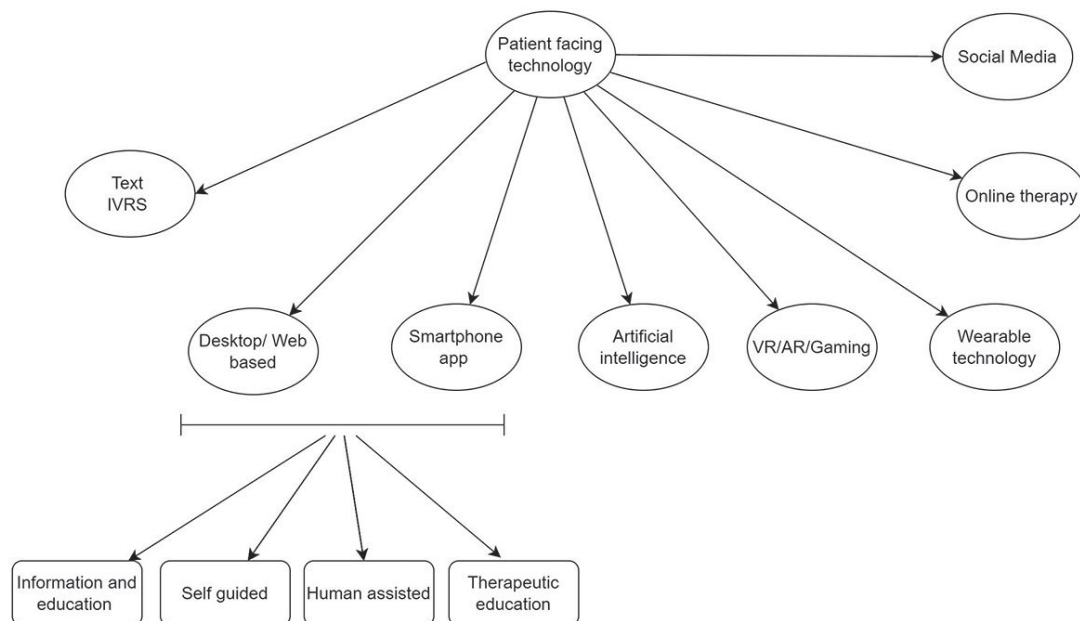


Figure 1. Patient-facing technologies in substance use disorders (11,12)

##### a. Text-based interventions in substance use disorder

Short messaging services are a simple and inexpensive intervention that attempts to improve accessibility. Interventions with text messaging have been tested for quite some time now. Its initial use was in the context of a national drug helpline which would provide substance abuse treatment and support groups via text messaging. These are commonly beneficial for the evaluation of follow-up reminders and remote monitoring. Over time, it has been used as a medium for text-based therapeutic intervention, particularly in the context of brief intervention, behavioural approaches, and relapse prevention strategies. It has also been utilised as a means of follow-up after acute treatment to improve treatment adherence (13).

A review by Keoleian et al. to summarise the 12 RCTs of text message-based interventions in addictive disorders showed that, particularly in tobacco use disorder, the study overall noted that text message-based intervention is acceptable and feasible. Overall efficacy among the users was positive in the short term. Interventions were mostly automated and personalised with the phase of quitting. The intervention period varied from 6 weeks to 6 months with initially more messages as and when the quit date was approaching which was gradually tapered off subsequently (14). Few of the studies included multimedia messages as part of the intervention. Recently, studies have moved from SMS to WhatsApp-based text intervention. (Table 3)

**Table 3: Summary of studies in SUD with intervention through text messaging.**

Authors	Substance	Intervention	Outcome focussed
Kmiec J 2019 (13)	All substances	Motivational messaging Craving management	Acceptability and usefulness
Haug, Paz Castro, Meyer (2017)(15)	Problematic alcohol use	Life skill training through personalised text message	Risky single-occasion drinking
Huang et al; 2013(16)	Tobacco use	Personalised text message and feedback	Abstinence from tobacco
Agyapong V et al; 2020 (17)	All substances	Daily supportive text messaging	Reduction in craving
Nadkarni et al; 2022(18)	Hazardous drinking	Text messages on Brief intervention	Reduction in drinking
Gopinathan et al; 2018(19)	Tobacco	mCessation: automated text messaging	Quit rate in tobacco use

### **b. IVRS-based intervention in substance use disorder**

An interactive voice response system is a technology that allows computers to interact with humans through voice and dual-tone multi frequency tones via telephone keypad inputs. Interventions were provided through a voice call to the patient, with a prior algorithm of response depending on the patient's response through keypad inputs. Most IVRS studies are conducted on alcohol and tobacco use disorders. Interventions are generally provided through this route has been Brief intervention and follow-up assessment. Some studies are also conducted to recruit relapsed patients back to Quitline (20).

Studies have reported good acceptability and satisfaction with using the IVRS system for alcohol use disorder. There are mixed results in preliminary studies that evaluate the efficacy of the intervention, one study showing no significant improvement compared to treatment as usual, and another study showed higher abstinence from alcohol (21). One study was conducted in which IVRS was used to screen and provide B.I. before consultation with a primary care physician, which showed better discussion regarding the substance with clinicians with prior B.I. through IVRS(22).(Table 4)

### **c. Web-based intervention in substance use disorder**

Web-based interventions for SUD began to gain prominence in the early 2000s. These interventions emerged as a response to the growing recognition of the potential of the Internet to provide evidence-based treatment and support to individuals with SUD. Initially, web-based interventions focused on providing information, self-assessment tools, and online support communities. Over time, they evolved to encompass more comprehensive and interactive programmes, including cognitive behavioural therapy modules and telehealth services, all of which aim to address SUD in a more accessible and scalable manner(2).

In general, web-based interventions can be categorised into self-help interventions, Internet-

**Table 4: Studies related to IVRS-based interventions in SUD**

Author	Substance	Intervention	Targeted outcome
Rose et al 2016(22)	Alcohol use disorder	Brief intervention	Discussion regarding alcohol with primary care physician
Andersson 2015(23)	Hazardous drinking	Brief intervention Single and Repeated interventions and web-based interventions	Peak blood alcohol concentration
Rittogi 2017 (24)	Tobacco	Five automated calls to the IVR over 3 months	Biochemical validation Patient Satisfaction
Carlini et al. 2012(20)	Tobacco	Screening Brief intervention	Reintroduction to treatment
Kumar et al 2018(25)	Tobacco	Brief intervention	Quit rate in tobacco

mediated therapy, social media applications, and emerging software and applications. Initially, the primary goal was to provide information and education, which later expanded to include modules for self-guided self-paced interventions, eventually incorporating human-supported therapeutic interventions. Since these interventions have existed for more than two decades, extensive studies have evaluated their utility, acceptance, and efficacy, covering a range of substances (11).

One of the early studies, developed by Bickel in 2004, focused on providing information and education to individuals with opioid use disorder regarding HIV/AIDS, demonstrating good acceptability and positive outcomes in a controlled setting(26). 'Down your drink' serves as a self-guided therapeutic intervention, offering personalized feedback based on alcohol-related harm assessments and providing specific cognitive-behavioural therapy (CBT) strategies to reduce drinking, showing reduced alcohol consumption in controlled studies(27). Additionally, some web-based interventions incorporate brief contact with peers, counsellors, or healthcare workers, as observed in CanReduce-a web-based intervention for individuals with problematic cannabis use(28).

The Therapeutic Education System (TES) for substance use disorder (SUD) represents a digitally delivered therapeutic program developed at Dartmouth Hitchcock Medical Center. It offers a structured, evidence-based approach to SUD treatment, leveraging technology to provide accessible, scalable, and effective interventions. TES integrates cognitive-behavioral therapy (CBT) principles and places significant emphasis on relapse prevention, equipping users with coping strategies and skills to identify and manage triggers, cravings, and high-risk situations. Users can progress through self-paced, interactive modules, often including multimedia elements. Some versions of TES offer real-time monitoring and feedback, while

others may integrate peer support features. The digital nature of TES allows for scalability, accessible through web-based platforms or mobile apps, and it has undergone rigorous evaluation, establishing its efficacy as an evidence-based practice in SUD treatment(29).

Web-based interventions extend beyond SUDs to address psychiatric comorbidities as well. Examples include "Self-help Alcohol and Other Drug Use and Depression" (SHADE), a web-based intervention incorporating CBT and motivational interviewing (MI) in computerized sessions, and the "Depression Alcohol Project" (DEAL)(4).

Overall, a systematic review has indicated acceptance and discussed the advantages of web-based interventions. With the emergence of smartphones and apps, interventions have recently transitioned toward app-based interventions. (Table 5)

**Table 5: Summary of web based interventions for SUD**

Web based intervention	Substance	Intervention	Targeted outcome
CBT4CBT(30)	All substances	6 modules CBT based intervention with craving management, problem solving and decision making which includes audio visual cues as well	Reduction in substance use
Snow control(31)	Cocaine	8 modules of CBT with MI for cocaine use disorder	Reduction in substance use
CanReduce(28)	Cannabis	Web based intervention with 8 modules and access to therapist for brief period with CBT focus	Reduction in substance use
Breaking the Ice(32)	Amphetamine type stimulant	Web based program with 3 modules of CBT or MI	Reduction in substance use

#### **d. App-based intervention in substance use disorder**

Smartphone app-based interventions have emerged as a transformative approach to addressing substance use disorder (SUD). Taking advantage of the ubiquity of smartphones, these interventions provide accessible and highly personalised tools to assist individuals in the management of substance use disorders. Apps have rapidly become the most popular software method for delivering health support on mobile devices.

As with computer-based interventions, app-based interventions can be self-guided or human-supported therapeutic interventions. The interventions vary from the provision of information, daily monitoring or the provision of psychosocial intervention(12). Smartphone apps provide a wide array of features and advanced software capabilities to improve the management

of relapsing illnesses like SUD. The smartphone app also forms the essential platform for application of many other digital technologies like chatbots, ecological momentary assessment, online consultation, social media-based interventions, and data collection and tracking(33).

FDA has approved two app-based interventions for substance use disorder. reSET, a 90-day programme for the treatment of substance use disorders (SUD), and reSET-O, an 84-day programme designed to address opioid use disorder (OUD), both originated from the Therapeutic Education System discussed above. Both the apps have been evaluated in large-scale multicentre trials and has shown an increase in adherence to abstinence which is statistically significant also well as treatment retention (34,35).

Smartphone-based interventions offer an alternative to conventional in-person treatment methods, enabling the delivery of ecological momentary interventions. These interventions occur in real-life settings where individuals encounter cravings, face the risk of relapse, or continue with alcohol consumption. Location-based monitoring and intervention for alcohol use (LBMI-A) is one such intervention(36).It comprises seven psychoeducation modules focussing primarily on monitoring and prevention of relapse. When interventions are provided to individuals who experience challenges in maintaining abstinence, immediate intervention is provided; these interventions are called just-in-time adaptive interventions (JITAI), which can include immediate phone or text messages to the emergency contact, craving management (34). Examples of JITAI include the Addiction-Comprehensive Health Enhancement Support System(A-CHESS) and HealthCall.

In the Indian context, a mobile phone application known as the "Quest" app was developed and pilot study was conducted. This app is specifically designed to deliver relapse prevention therapy for individuals with alcohol use disorder. The pilot investigation outcomes revealed promising acceptance and usability levels (37).

Apart from two FDA-approved applications, most other applications are heterogeneous in the type of intervention provided and are often only evaluated in studies with small sample sizes.(Table 6)

#### **e. Artificial intelligence-based interventions**

In recent years, there has been an increase in the application of artificial intelligence in health care. In particular, the machine learning component of artificial intelligence has increased application in the mental health field. Machine learning is the computer's ability to learn without being explicitly programmed. It can be supervised or unsupervised. In supervised, there are preset rules, as in the case of supervised classification, the collection of data is not preset and is clustered (39).

Application in research and clinician-facing technologies are in digital phenotyping, predictive modelling, and clinical decision support systems. In individuals with substance use disorders, interventions are often in the form of computerised adaptive testing or conversational agents/ chatbots (40).

These chatbots' functions include screening and assessment, triaging, content delivery, including CBT, and monitoring and managing high-risk situations. The interventions have come a long way from the initial chatbot ELIZA, which was programmed to provide psychotherapeutic intervention based on rule. Newer generation chatbots are more complex, including machine



Table 6: Summary of App based interventions

Mobile App	Substance	Components of intervention	Targeted Outcome
reSET(35)	All Substances	The reSET program's cognitive-behavioural therapy (CBT) content comprises a set of interactive modules accessible in audio, text, and video formats. These modules are made available to patients sequentially as they advance through the program. Contingency management (CM) techniques are incorporated to offer motivational incentives for completing lessons and maintaining abstinence. Patients are directed to complete four modules weekly, beginning with the 31 core modules, and subsequently progressing to an additional 30 supplementary modules after completing the core ones.	Reduction in substance use
HealthCall(33)	All substances in HIV positive adults	Motivation interviewing, Automated calls, Self-monitoring, personalised feedback	Reduction in substance use
A-CHESS(38)	All substances	Provide information, adhesion strategies, decision-making tools, social support with delivery of social support and targeted messages as and when needed	Reduction in substance use
LBMI-A(36)	Alcohol	CBT, Psychoeducation module, Progress tracking, EMA based intervention	Reduction in substance use
Quest(37)	Alcohol	Educational and relapse prevention components	Reduction in alcohol use after in-patient treatment

learning and natural language processing, providing better responses and modifying responses progressively based on newer learning. Chatbots are integrated into various platforms, including mobile applications, websites, virtual reality and texting(40-42).

Most of the studies evaluate the feasibility and utility of the chatbot technique. Among a few studies that have conducted trials, positive outcomes are reported in tobacco cases(41,42).(Table 7)

Table 7: Summary of Chatbots in the interventions of SUDs

Author/ Name of chatbot	Substance	Intervention	Targeted outcome
Woebot (Prochaska 2021)(43)	All substances	Cognitive behavioural therapy	Reduction in the amount of substances
Elmasri and Maeder 2016(44)	Alcohol	Risk assessment and education	Acceptability and utility
Almusharraf et al; 2020(45)	Tobacco	Motivational interviewing	Self-reported benefits
Masaki et al; 2020(46)	Tobacco	Behavioural therapy	Abstinence from substance

#### f. Wearable technology intervention in substance use disorder

A wearable sensor is a device designed to be worn on the body to continuously monitor an individual's activities without causing discomfort. It consists of a biosensor that measures specific substances in the body, converting these measurements into electrical signals through a transducer. The wearable component collects these signals and transmits the data wirelessly to a central system, which could be a cloud or mobile app(47).

The application of wearable technology in the context of substance use disorder is of a multitude. It includes monitoring of biological parameters to predict craving or stress along with the possibility of lapse or identification of drug use using body fluid-based sensors or, when used in conjunction with data from mobile phone apps with a global positioning system, could provide an ecological momentary assessment of the patient followed with an immediate relevant intervention. Drug use monitoring can also assist in interventions like contingency management(48).

With increasing overdose-related deaths, another important application has been identifying overdose based on parameter changes. Most of the preliminary studies focus on acceptability and usability with pilot studies for efficacy(48).(Table 8)

#### g. Virtual and Augmented reality-based interventions

Virtual reality is computer-generated simulation of an environment with which the user reacts and typically blocks out the physical world completely. It typically involves using a headset to block the external environment and project the digital environment. Augmented reality, in contrast, is an overlay of digital content onto the real world. The real world is enhanced using the addition of computer-generated elements (52).

Both of these have been evaluated in psychiatric disorders for some time now and have recently found their use in addictive disorders as well. In addictive disorders, it has been used both for research and therapeutic intervention (53). There are various intervention-based applications of V.R. The primary intervention done using V.R. is cue-exposed therapy. It is based on the principle that repeated confrontation with substances reduces craving and allows patients to learn alternative behaviours.

Studies have been done with alcohol and tobacco primarily. A study by Lee and colleagues was a VR-CET that utilised multisensory stimulation to reduce craving for alcohol, which

**Table 8: Wearable technologies in the SUD intervention**

Intervention	Substance	Mechanism of intervention	Targeted outcome
SCRAM (Secure continuous alcohol monitoring) system (49)	Alcohol	The transdermal alcohol sensor in the wearer's ankle monitors transdermal alcohol concentration every 30 minutes for contingency management.	Reduction in heavy drinking
Triple A(50)	Alcohol	A mobilephone-linked breath analyser which uses facial recognition software or camera recordings to confirm the identity of the user during the test and are capable of sending real-time communications between the user and the administrator	Reduction in drinking
EmpactaE4(51)	Opioid	A wearable wrist sensor to detect recurrent opioid toxicity after treatment for an opioid overdose	Reduction in episodes of overdose

showed a reduction in craving as compared to that of baseline(54). Another study evaluated predictors of improvement when supplemented with alcohol use disorder when used VR-CET, which showed it was particularly beneficial in individuals with intense alcohol cravings and prior use of illicit substances(55) Gaming interventions are also commonly used in V.R. based CET. Similarly, augmented reality also has been utilised in substance use disorder. In contrast to V.R., AR usually doesn't require headsets and can be incorporated to smartphones alone. Similar to V.R., AR has been used in CET and preliminary studies have been conducted which show high acceptability of A.R. app as an adjuvant in one of the studies for tobacco use (53) .Table below discusses a few examples of A.R./VR-based interventions.(Table 9)

#### **h. Gaming as an intervention strategy**

Over the past decade, there has been an increasing number of interventions in the gaming format to increase engagement. Gaming intervention is particularly targeted for adolescents and young adults primarily as a preventive element in the former group. Few interventions are supportive treatment modalities (59).

Games are delivered through various modalities, including mobile phone apps and personal

**Table 9: AR/VR based interventions in SUD**

Author	Substance	Intervention	Outcome measure
Kwon et al (56)	Alcohol	8 sessions of VR-CET	Craving
Lee et al (54)	Alcohol	10 sessions of VR-CET	Craving
Thomson and Lake et al(57)	Tobacco	VR-CET with object-related cues and avatar interaction	Craving
Wang et al(58)	Methamphetamine	Six sessions of V.R. counter conditioning procedure using meth-related cues and adverse consequences	Craving

computers online or offline. In games targeting prevention, the game play focuses on increasing awareness about substance abuse, identifying risky behaviours and carrying out protective behavioural techniques. In treatment-focused games, the design focussed on constructs of coping skill training and modification of cognitive bias.

With the advent of Virtual reality and motion-based interaction, the user interface has become much more attractive with features of destruction of cues and related animations also part of gameplay (60).A few latest game plays include avatars navigating through a virtual environment and destroying drugs as well as avoiding drugs as a part of intervention. The majority of studies are currently in the development and testing phase (59).Few studies with RCTs show positive results regarding acceptability, usability and efficacy. (Table 10)

**Table 10: Gaming as intervention strategy**

Game	Substance	Gameplay	Targeted intervention
Recovery Warrior Game (60)	All substances	Various types, including avatars destroying the drug, avoiding drugs by ducking, dodging and jumping to control avatars	Engagement and Adherence to Treatment
INSPIRE (61)	Alcohol	PC-based serious Game with interactive narrative experiences	Prevention – Education and practice of drink refusal
Arise)(62)	Alcohol	A first-person game in which the player experiences several settings and situations common to adolescents	Relapse prevention
Gamified CET and AET (63)	Alcohol	The patient sees multiple drinks as photos on a P.C. screen and has to push the alcoholic beverages away and pull the non-alcoholic towards himself to learn to avoid alcohol	Approach avoidance techniques and cue exposure therapy

### **i. Social media and online communities**

Online platforms, such as chat rooms and social media, offer anonymous, supportive communication for self-management and connecting with treatment for SUD. While twelve-step-based online communities are popular, and other alternatives are also emerging. The effectiveness of these forums is uncertain, but they could complement clinician-delivered SUD interventions in primary care. Many commercial online sites and social media pages provide access to therapists, peer support, and motivational content(2).

## **5.DIGITAL INNOVATION IN SUDS FROM INDIA**

The utilization of digital technology in addressing substance use disorders (SUD) in India is gaining momentum as the country witnesses an increasing prevalence of SUD alongside greater access to digital resources. India, with its vast and diverse population, faces a substantial treatment gap when it comes to SUD. Digital technology has emerged as a promising solution to bridge this gap, offering a wide array of advantages. Mobile phones, with their widespread reach even in rural areas, are being used to deliver text-based interventions, while Interactive Voice Response Systems (IVRS) provide accessible and anonymous support to individuals seeking help. (12, 37, 64)

### **a. NIMHANS ECHO: Building a High skilled addiction provider network**

NIMHANS ECHO is an innovative capacity building program that uses a HUB and SPOKE knowledge-sharing network, led by expert teams from the National Institute of Mental Health and Neurosciences (NIMHANS) in Bangalore, to provide training and tele-mentoring to healthcare professionals working in remote areas of India. The "Hub" and "Spoke" model links an inter professional specialist team at Centre for Addiction Medicine NIMHANS (Hub) with health care providers (spokes).Each NIMHANS tele-ECHO session consists of spoke-led presentations of anonymized patient cases and discussion of the cases whereby the peers as well as hub experts provide advice on the diagnosis and management. This is followed by a brief didactic on a addiction-related topic. Using a smartphone app and multipoint videoconferencing, healthcare professionals are able to access live virtual sessions on a weekly basis, where they learn through case-based learning, best-practices, and web-based monitoring for outcomes.

Through routine engagement that involves coaching and mentoring in teleECHO sessions, healthcare providers become experts and, over time, acquire the knowledge and skills to treat patients with addiction and mental health within their communities.(65-67) These programme runs as cohort and linked to a Professional developmental certificate course which is approved by NIMHANS Digital Academy board of studies.(68)

### **b. Addiction Rx app for Physicians**

On 31 May 2022, the Ministry of Health and Family welfare released Addiction Rx mobile app(69).This app is designed to assist physicians in the screening, management, and treatment of substance use disorders. The app provides up-to-date evidence-based guidelines, resources, and tools to help healthcare professionals make informed decisions when treating patients with addiction problems. The app also provides detailed information on medications used in the treatment of substance use disorders, including dosages, side effects, and contraindications. There are common screening tools like Audit, Assist, FTND, COWS as a part of this app. These tools can help physicians evaluate the severity of a patient's

addiction, withdrawal symptoms, and monitor their progress throughout treatment. Doctors can also use the online chat facility through this app to make suggestions about the treatment of their patients. This app is available free in both google play (70) and apple app store (71).

### **c. Self-study eLearning platform**

Self-module e-learning is crucial for counsellors and healthcare providers in the realm of addictive disorders, offering flexible, self-paced training to enhance their knowledge and skills, ultimately improving the quality of care for patients with addiction issues. These can be accessed at any time and any place.

- i. NDDTC AIIMS Addiction Treatment Training: To address the challenges of lack of trained human resources in the community, National Drug Deaddiction Treatment Centre, AIIMS, has come up with online training programs (OTP) on various aspects of substance use disorders. The OTPs comprise of several modules and lessons in the form of presentations with voiceover by the experts. There are also videos that demonstrate specific skills required in providing treatment, such as assessment or specific type of counselling. In addition, there are interactive quizzes in between the lessons to keep the audience engaged during the learning process. More details at <https://naat.co.in/all-courses/> (72)
- ii. Primer on Tobacco Cessation from VKN, CAM NIMHANS: Addressing the pressing need to combat tobacco addiction, the Centre for Addiction Medicine developed the "Primer on Tobacco Cessation online Certificate Module." This comprehensive eLearning module targets healthcare professionals and equips them with essential skills and knowledge on public health problems, tobacco use in India, screening, and brief intervention using the 5A/5R model. There are three lessons, and each lesson has three topics. Each topic has a brief write-up, slides, and a relevant video. The first two lessons end with an objective assignment and the last ends with a subjective one. (73)
- iii. TAPAS (Training for Augmenting Productivity and Services) This is an Online Learning Management Platform created by NISD (National Institute of Social Defence) .The online course on Substance (Drug) Abuse Prevention consists of Video lectures, supplementary learning material, discussion forum and self-assessment. (74)

### **d. Quest mobile app**

The 'Quest' app was developed at NIMHANS and tested for smartphone-based relapse prevention in alcohol dependence patients. It achieved high acceptability (65%) and usability (5.8/7).Both patient groups, with and without the app, significantly reduced drinking at 30, 60, and 90 days follow-up compared to baseline. No significant difference was observed between the groups in terms of lapses and heavy drinking days. Further validation and testing with a larger, diverse population are necessary to refine the app's effectiveness. (37)

In 2024, this app will be available for public domain in play and app store.

### **e. mCessation and National Quitline for tobacco cessation (1800112356)**

In 2016, MOHFW launched m-Cessation, a text message-based mobile health programme nationwide, to help tobacco users quit by calling the toll-free number 011-22901701. An evaluation showed a self-reported quit rate of 19% within 4-6 months. 77% of the respondents found the programme useful (19). On 1st September 2018, the national tobacco Quitline number 1800112356 was displayed prominently in all tobacco products sold in India. The National

Tobacco Quitline Service (NTQLS) achieved a remarkable 38.8% quit rate among callers in its first year. This service offers customised assistance to motivate people and assist in tobacco cessation. (25)

## 6.FUTURE DIRECTIONS

Digital interventions as an intervention are still in the initial stages. Future innovations will be focussed on personalization, leveraging A.I. and machine learning to tailor treatment plans dynamically. Integrating virtual and augmented reality technologies, wearables, and biometric data will offer immersive experiences and real-time monitoring for early relapse detection. Gamification, incentives, and predictive analytics will enhance motivation and relapse prevention, while ethical considerations surrounding data privacy and responsible A.I. use will gain prominence. There is further need for studies with larger population size as well as interventions with uniform methods

## 7. CONCLUSION

Digital interventions represent a promising area in the realm of addictive disorders. As technology advances, these interventions offer a dynamic and accessible approach to addiction treatment and support. They address key challenges, such as stigma reduction, treatment personalization, and continuous monitoring, while enhancing addiction care's reach and scalability. However, their successful integration into the healthcare landscape hinges on ongoing research, ethical considerations, and a balanced approach that recognizes their role as valuable complements to traditional treatment methods. The digital interventions discussed in this chapter underscore the potential for innovative solutions to transform the addiction treatment landscape.

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## CHAPTER - 9

# MENTAL HEALTH PROBLEMS OF THE DIGITAL WORLD

### INTRODUCTION

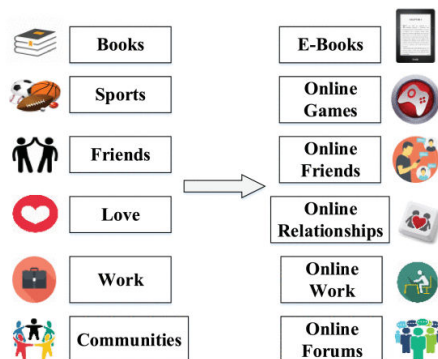
The introduction of digital technology and the internet has brought sweeping changes in human thinking, emotions, behaviour and interactions.<sup>1</sup> Its influence on human life is so profound that scientists, philosophers and politicians worldwide were excited and, at the same time, apprehensive of those sweeping changes. In 1962, long before internet was discovered, Marshall McLuhan, a Canadian media theorist, predicted that the electronic interdependence will create 'global village' closely knit with information and communication technology.<sup>2</sup> Authors like Nicholas G. Carr have expressed the concern that the internet may have detrimental effects on cognition that diminish the ability to concentrate and think deeply.<sup>3</sup> There were several other apprehensions related to dependence on technology, the digital divide it can create, the privacy of individuals and security. These discussions about the advantages and disadvantages are going on relentlessly.<sup>4,5</sup>

The rapidly changing nature of digital technology and its deepening influence on daily life results in equally rapid changes in human behaviour in real life and the digital world. Understanding those behaviours and managing the problematic ones pose several opportunities and challenges for mental health professionals.

### THE DIGITAL WORLD: A NEW DIMENSION OF THE PHYSICAL WORLD

Online social platforms, spaces, and virtual identities we create form a virtual world. Every behaviour we see in real life is creating its version online. (Fig-1). Cyberactivism, cyberlearning, cyber shopping, cyber gaming, cyber wellness, cyber security, cybercrime, cyber addiction, cyberbullying, cyber cheating, cyberstalking, cyber suicide, cyber self-harm, cyber hoarding, cyber vandalism, cyber racism, and cyber terrorism are some of the words originated from the activities in the digital world. The digital world, in turn, mirrors and transforms the physical world around us.

Figure1- Expression of real-world in the digital space.<sup>6</sup>



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Mobile phones and digital technologies are the most rapidly evolving technologies in human history.<sup>7</sup> It was back in 2003 that Philip Rosedale launched 'Second Life', a virtual world where people can live as their avatars. Though it initially attracted millions of users, it could have been more successful.<sup>8</sup> Now after two decades, the mobile technology is heading towards creation of a virtual universe; namely, metaverse, where users can interact with each other just as in the real world.<sup>9</sup> It will use all the latest and most immersive technologies like virtual reality (VR) and augmented reality (AR), enabling a sense of presence. All human interactions in the real world will be possible in the metaverse. It can transform how we work, play, and learn and that will raise more questions about privacy, security and misuse.<sup>10</sup> Adapting human behaviour to the metaverse, and its social milieu will raise new challenges before mental health professionals and researchers.<sup>11,12,13</sup>

### **Mental Health Problems of the Digital World: Everyone Has an Opinion, but No One Agrees.**

There is general agreement that there are several mental health problems specific to the digital age, and that the problem is real. However, there has yet to be a consensus on the extent of the problem and how to conceptualise and approach the same. Though thousands of research studies have been published on the various aspects of problematic internet use (PIU), research in this field faces several challenges. Experts are yet to define how to diagnose various putative disorders. They are yet to decide whether to follow medical or psychological models, how to account for the cultural and contextual factors, and the importance to be given for comorbid psychiatric conditions.<sup>14</sup> Research in this field lacks clarity because of a lack of consensus about the terms used, the lack of standardised assessment tools, rapid changes in the technology and the difficulty in distinguishing between problematic use and healthy, recreational internet use.<sup>15,16,17</sup> For any communication to be possible, we must agree upon the meaning of our words. Science needs precision, and therefore, proper definitions of the terms and key words used are necessary.<sup>18</sup>

Controversies about terminologies like 'internet addiction' and their status as repetitive or maladaptive behaviour started right from the beginning.<sup>19,20</sup> A review of the conceptual and operational questions and controversies about them is beyond the scope of this short chapter. Since there is no consensus on definitions of these entities and their underlying concepts, the prevalence, comorbidities, and complications widely vary depending upon the tools used, the population studied and the geographic region where the studies were conducted. For the same reason, they are not included in this chapter.<sup>21,22</sup> Cyber relationships and related problems are extensions of real-life problems into the cyberworld and not pathological by itself. So, they are also not included in this chapter.

Nowadays, digital technology has penetrated every aspect of life, and its influence is increasing day by day. So, clinicians must include questions about client's relationship with modern technologies in their interviews.<sup>23</sup> The lack of clarity on the topic should not prevent clinicians from addressing the symptoms or suffering based on available knowledge and skills.

### **Internet addiction; a parody turned into a head-scratcher**

The term "internet addiction" was coined by Dr. Ivan Goldberg in 1995, just four years after the internet was made publicly available.<sup>24</sup> The first ever website was created only in August 1991 and the internet was in infancy.<sup>25</sup> He proposed this disorder by borrowing the criteria

for substance dependence syndrome just to mock the Diagnostic and Statistical Manual of the American Psychiatric Association (DSM IV), released the previous year (1994).<sup>26</sup> He reportedly said, "To medicalise every behaviour by putting it into psychiatric nomenclature is ridiculous. If you expand the concept of addiction to include everything people can overdo, then you must talk about people being addicted to books, [etc.]" Though he said this, he also added that it "makes as much sense as having a support group for coughers,". He stayed on as a support group member for people with internet addiction.<sup>27</sup> Later, Dr. Kimberly Young developed a 20-item tool named Internet Addiction Test (IAT) in 1998, again depending on the criteria for substance use disorder from DSM IV.<sup>28</sup>

Looking back, it is not difficult to see that the internet use has changed beyond imagination from 1995, when these concepts and tools were developed to the present. The first smartphone with an internet connection was introduced in 2001, and the first iPhone in 2007.<sup>29</sup> Internet usage in 1995 According to the World Wide Web Consortium (W3C), the number of Internet users worldwide was 16 million in December 1995, which was 0.4% of the world population.<sup>30</sup> Internet was then used mainly by academic and research communities in developed countries. The number of users worldwide at present is 5.4 billion, 67% of the world population.<sup>31</sup> Now, nearly all human activity is dependent on or influenced by the internet and digital technology. Most people now use the Internet regularly. In the 'Internet of Things' era, all human activities are becoming hybrid of digital and physical activities. No doubt that the Internet has become an essential commodity like electricity.

In this context, existing internet addiction screening tools have been found to have specific gaps in accurately measuring addiction. Several authors have tried modifying existing tools like IAT or devising better tools, which further resulted in various other issues like introducing new criteria and non-comparability of results.<sup>32,33</sup> Another problem is that these studies define Internet Addiction with a cut-off score, which is not based on any consensus or approved diagnostic criteria. Similar research using the same or similar tools accumulates equivalent results, mistakenly which are taken as more evidence. Such studies on internet-related disorders are enthusiastically reported by the media, spreading the misconception that they are true addictions that can be diagnosed and treated along similar lines with other addictions.<sup>34</sup>

### **Internet 'addiction' and other misnomers**

The available literatures on internet related disorders are full of misnomers. The scientific terms are used in a loose and inconsistent manner in internet-related writings in lay press and even in research articles. Internet 'addiction' or social media 'addiction' are not addictions, nomophobia is not a phobia, and cyber psychosis is not a psychosis if we apply scientific standards. Use of such terminology leads to misinterpretation of scientific concepts, trivialisation of scientific fields, spread of misinformation, confusion and conflicts. Sometimes these terms were created initially as hoax news (e.g., 'selfitis') or parody (e.g., internet 'addiction'). Using these ill-defined and misleading terms also leads to spreading of misinformation about the nature and cause of internet/digital technology-related problem-behaviours.

The use of 'addiction' in terms like internet addiction, social media addiction, and game addiction is criticised on several grounds. Two decades of research on internet 'addiction' or its sub-categories could not show evidence to classify it as an addiction. It is also unclear whether problematic use of the internet PUI is an impulse control problem or a compulsive

phenomenon, or both.<sup>35,36,37,38</sup>

In literature, the term "internet addiction" is used interchangeably with terms like "problematic internet use," "pathological internet use," and "internet addictive disorder". Other terms for such behaviour include "internet overuse," "problematic computer use," "compulsive internet use," "internet abuse," "harmful use of the internet," and "internet dependency." Preferred term in recent literature is problematic use of the internet (PUI).<sup>39</sup>

### **Concepts in search of clarity:**

How to understand the phenomenon of PUI still lack clarity. The medical model alone cannot explain the problems related to the digital world. Even if we agree to follow a medical model, several questions still need to be answered. Is it a problematic behaviour described elsewhere, manifesting differently as a compensatory use? Is it an addiction? Is it an impulse control disorder?<sup>40</sup> Is it a manifestation of underlying reward deficiency syndrome? Is it a behavioural problem with faulty learning? Is it just an online manifestation of a real-life behavioural problem?<sup>41</sup> Research has revealed a relationship between excessive internet use and problematic online and offline behaviours.<sup>42</sup> These include psychological or emotional difficulties and alcohol/substance abuse. Can we consider the internet as a medium, and all these behaviours as addictions to the processes, and not the internet per se? These questions elucidate the multi-dimensional nature and complexity of the problem and remind us that we should view internet related problems in the broader context of everyday life.<sup>43,44</sup>

### **Addictive behaviour or behavioural addiction?**

One significant result in this ongoing debate on 'internet addiction' was, the development of the concept of addictive behaviours. They include online behaviours like internet gaming and use of social media and offline behaviours like excessive indulgence with eating or exercise. The discussions on addictive nature of behaviours such as shopping, gambling, and eating, started in the early 1990s.<sup>45</sup> These behaviours, which are pleasurable, at least initially, may later lead to loss of control, distress and impaired functioning, as in case of addictive substances.<sup>46</sup>

On August 11, 2011, the American Society for Addiction Medicine (ASAM) issued a public statement defining addiction (long and short definitions). The short definition is as follows:

"Addiction is a treatable, chronic medical disease involving complex interactions among brain circuits, genetics, the environment, and an individual's life experiences. People with addiction, use substances or engage in compulsive behaviours and often continue despite harmful consequences."<sup>47</sup> It was the first time ASAM agreed that behaviours can also become addictive.

The word 'addiction' was omitted from the DSM-IV diagnosis because the DSM work group in 1980 thought that it had a potentially negative connotation. Instead, they introduced the term 'substance dependence.' Then, later substituted the same with 'substance use disorder' in DSM-5 in 2013.<sup>48</sup>

The term 'addictive behaviour' was introduced in DSM-5 and ICD-11.<sup>49,50</sup> Interestingly, the term used is 'addictive behaviours' and not 'behavioural addictions'. The stress is on the problematic



behaviours, not the condition denoted by addiction.<sup>51</sup>

### **DISORDERS THAT HAVE ALREADY FOUND A PLACE IN THE CLASSIFICATION.**

Many internet-related and non-internet-related behavioural problems, collectively named 'behavioural addictions' or preferably 'addictive behaviours,' have been the subject of intense research and discussion in the last two decades. But only two of them had made their entry into the diagnostic classifications. The first was Gambling Disorder in both DSM-5 and ICD-11; the second was Gaming Disorder in ICD-11. In DSM 5, the gaming disorder not considered as a fully valid diagnosis, but as 'a condition for further study'.

Note that only the Gaming Disorder is the newly introduced diagnosis. Problematic gambling was already there in the earlier classifications as 'Pathological Gambling' under the section of 'Impulse Control Disorders.'<sup>52</sup> The online gambling can be considered as an extension of the gambling behaviour into the digital space.

Many internet-related problems can be understood as similar extensions of problem-behaviour into the digital space. E.g., Repeated checking of health-related information online, hoarding files or webpages, and developing delusions related to the internet. Similarly, an unreasonable fear of digital technology, computers and the internet causing impairment in function can be diagnosed as a Specific Phobia (Cyberphobia).

Excessive and compulsive use of online pornography can be diagnosed as a non-paraphilic form of 'Compulsive Sexual Behaviour Disorder' (CSBD) in ICD-11. Non-paraphilic compulsive sexual behaviour was not included in DSM-5.<sup>53</sup> Where to include such behaviour is debatable. In many individuals, it may be an expression of underlying Impulse Control Disorder, Obsessive-Compulsive Disorder or may be better explained by another psychiatric disorder like depression.<sup>54</sup> Similar is the case of Compulsive Buying-Shopping Disorder (CBSD). Compulsive buying can be diagnosed as a Hoarding Disorder in ICD-11 and DSM-5 along with OCD spectrum disorders. Need for a separate diagnostic entity and the position of the same in the diagnostic classification is controversial

### **Addictive Behaviours in DSM-5 and ICD-11**

Addictive behaviours or behavioural addictions have been subject to different approaches in the two diagnostic classifications. Diagnostic criteria also differ significantly. The criteria proposed in DSM 5 for gaming and gambling disorders are markedly different from the criteria in ICD-11 (discussed below). This can result non-comparability of research findings, related to epidemiology, clinical features and treatment outcomes.

#### **ICD-11**

In ICD-11, there is a new section named "Disorders Due to addictive behaviours", for so-called 'behavioural addictions.' (Table- 1) Three conditions are listed under this section, as given below

1. Gambling Disorder
2. Gaming Disorder
3. Other Specified Disorders Due to Addictive Behaviours

In a bold move, ICD-11 has potentially opened the door for the entry of internet-related and

other addictive behaviours into formal psychiatric diagnosis by introducing general diagnostic criteria for addictive disorders (Table-2) and by introducing a new diagnostic entity- 'Other Specified Disorders Due to Addictive Behaviours.' Behaviours that can be included here are not listed in ICD-11. Any problematic repetitive behaviours other than gambling and gaming which satisfy the mentioned criteria can be diagnosed here. Introduction of this diagnostic entity is supposed to improve the clinical applicability of this new section and allow addressing problematic behaviours other than gaming and gambling. Addictive behaviours related to the internet, such as 'Buying-Shopping Disorder' (BSD) and Social-Network-Use Disorder (SNUD), are some of the candidates for this new category of diagnosis.<sup>55</sup>

**Table-1**

<b>Disorders Due to Addictive Behaviours include the following:</b>	
6C50	Gambling Disorder
6C50.0	Gambling Disorder, predominantly offline
6C50.1	Gambling Disorder, predominantly online
6C51	Gaming Disorder
6C51.0	Gaming Disorder, predominantly online
6C51.1	Gaming Disorder, predominantly offline
6C7Y	Other Specified Disorders Due to Addictive Behaviours
Exclusions: Compulsive sexual behaviour disorder (6C72), Paraphilic disorders (6D30-6D3Z)	

**Table-2**

The diagnostic criteria for all addictive behaviours are same in ICD-11.

<b>Diagnostic Requirements for Disorders Due to Addictive Behaviours</b>	
<b>Essential (Required) Features:</b>	The presentation is characterized by symptoms that share primary clinical features with other Disorders Due to Addictive Behaviours, including a persistent pattern of repetitive behaviour in which the individual exhibits <b>impaired control</b> over the behaviour (e.g., onset, frequency, intensity, duration, termination, context); <b>increasing priority</b> given to the behaviour to the extent that it takes precedence over other life interests and daily activities; and continuation or escalation of the behaviour <b>despite negative consequences</b> (e.g., family conflict, poor scholastic performance, negative impact on health).
<b>1</b> Impaired control	
<b>2</b> Increased priority	
<b>3</b> Continuation or escalation despite negative consequences	
<b>Other criteria</b>	<ul style="list-style-type: none"> <li>• <b>not better accounted for by</b> another Mental, Behavioural, or Neurodevelopmental Disorder</li> <li>• <b>not a manifestation of another medical condition</b> and are <b>not due to the effects of a substance or medication</b> on the central nervous system</li> <li>• symptoms result in <b>significant distress or significant impairment</b></li> </ul>
<b>Duration</b>	<ul style="list-style-type: none"> <li>• <b>over an extended period (e.g., 12 months)</b></li> </ul>
<b>Specifiers</b>	<ul style="list-style-type: none"> <li>• <b>continuous or episodic and recurrent</b></li> </ul>
Note: <b>Impaired control</b> over substance uses or sexual behaviour is not included in this category.	

### DSM-5

In DSM-5 the chapter is titled 'substance-related and addictive disorders' and the section is titled 'non-substance related disorders.' The only diagnosis listed in this section is Gambling Disorder (GD). There is no 'online' specifier for gambling disorder.

The problematic behaviour of internet gaming is included in 'Section III under the heading "conditions for further study", which supplies the proposed diagnostic criteria. (Table-3) The editors of DSM 5 concede that there is no adequate evidence to give it the status of an independent psychiatric diagnosis. The DSM-5 defines IGD as "a pattern of excessive and prolonged Internet gaming that results in a cluster of cognitive and behavioural symptoms, including progressive loss of control over gaming, tolerance, and withdrawal symptoms, analogous to substance use disorders."

Though the criteria for diagnosis of IGD differ markedly in the two diagnostic classifications, good consistency between them was found in a recent study.<sup>56</sup> But the diagnostic stability over one year was found to be low, and there were high rates of psychiatric comorbidity.<sup>57</sup>

**Table-3**

<b>Internet Gaming Disorder Proposed Criteria</b>	
Persistent and recurrent use of the Internet to engage in games, often with other players, leading to clinically significant impairment or distress as indicated by five (or more) of the following in a 12-month period:	
1	<b>Preoccupation</b> with Internet games. (The individual thinks about previous gaming activity or anticipates playing the next game; Internet gaming becomes the dominant activity in daily life.) Note: This disorder is distinct from Internet gambling, which is included under gambling disorder.
2	<b>Withdrawal</b> symptoms when Internet gaming is taken away. (These symptoms are typically described as irritability, anxiety, or sadness, but there are no physical signs of pharmacological withdrawal.)
3	<b>Tolerance</b> -the need to spend increasing amounts of time engaged in Internet games.
4	<b>Unsuccessful</b> attempts to control the participation in Internet games.
5	<b>Loss</b> of interests in previous hobbies and entertainment as a result of, and with the exception of, Internet games.
6	Continued <b>excessive use</b> of Internet games despite knowledge of psychosocial problems.
7	Has <b>deceived</b> family members, therapists, or others regarding the amount of Internet gaming.
8	Use of Internet games to <b>escape</b> or relieve a negative mood (e.g., feelings of helplessness, guilt, anxiety).
9	Has <b>jeopardized or lost</b> a significant relationship, job, or educational or career opportunity because of participation in Internet games.
<p>Note: <b>Only nongambling</b> Internet games are included in this disorder. Use of the Internet for required activities in a business or profession is not included; nor is the disorder intended to include other recreational or social Internet use. Similarly, sexual Internet sites are excluded.</p> <p>Specify current severity: Internet gaming disorder can be <b>mild, moderate, or severe</b> depending on the degree of disruption of normal activities.</p>	

## ONLINE BEHAVIOURAL DISORDERS IN SEARCH OF IDENTITY

### Social Network Use Disorder (SNUD) or Social Media Addiction (SMA)

Most popular social media platforms worldwide are Facebook (2.9 billion), YouTube (2.5 billion), WhatsApp (2 billion) and Instagram (2 billion).<sup>58</sup> All over the world teenagers and young adults use Internet and social media more often than older adults.<sup>59</sup>

Excessive use of social media causing impairment in daily life was called "social media addiction" (SMA). Such behaviour might interfere with daily chores and cause functional impairment. Use of the term 'addiction' for excessive social media use is controversial because of several factors discussed in the beginning of this chapter. Therefore the term Social Network Use Disorder (SNUD) or Social Media Use Disorder (SMUD) were introduced.<sup>60</sup> SNUD has been found to overlap with other disorders such as online compulsive buying-shopping disorder (OCBSD).<sup>61</sup> Research has shown that SNUD is marked by characteristics of addictive behaviours, including implicit cognitions, experiences of gratification and compensation, and use expectancies<sup>62</sup>. Studies have also shown that social network support can have a positive impact on the treatment outcomes of individuals with opioid use disorder (OUD) who are receiving medication for OUD<sup>63</sup>. These findings highlight the importance of understanding and addressing SNUD and the role of social networks in the treatment of various disorders. Further research is needed to explore the commonalities and distinct features of SNUD and other related disorders.

### Problematic pornography use (PPU)

Problematic pornography use (PPU) is a clinically relevant condition, which is considered as an impulse control disorder. CSBD includes multiple specific sexual behaviours, and problematic pornography use may be considered a subtype of CSBD with parallels to addictive behaviours<sup>64</sup>. Men are more driven by sexual arousal and the desire for pleasure when accessing online pornography, which can contribute to Internet Pornography-Viewing-Disorder (IPVD).<sup>65</sup> Clinicians working with male clients should assess for problematic pornography use and body image concerns to reduce the risk of developing or worsening eating disorder symptoms<sup>66</sup>. Treatment approaches, such as cognitive behavioural therapy, have shown effectiveness in reducing symptoms of compulsive sexual behaviour disorder (CSBD) and PPU<sup>67</sup>.

### Compulsive Buying-Shopping Disorder (CBSD)

Compulsive buying is included in ICD and DSM as Hoarding disorder. It can in some cases be better explained by another psychiatric condition like mood disorder in which excessive buying is common. Compulsive online buying disorder refers to a disorder of impulse control when shopping online, characterized by uncontrollable and repetitive online shopping with many purchases that are not useful<sup>68</sup>. Treatment studies for compulsive buying-shopping disorder (CBSD) have focused on offline CBSD, with limited research on online CBSD<sup>69</sup>. The growth of e-commerce has led to the emergence of online CBSD, which is still poorly understood and requires further research on its underlying mechanisms, assessment, epidemiology, and treatment<sup>69</sup>. Studies have found overlap between online CBSD and social-networks-use disorder (SNUD) in convenience, non-clinical samples<sup>70</sup>. There is a need for more high-quality treatment research targeting online CBSD, with emphasis on the CBSD subtype and mechanisms of change<sup>71</sup>.

### **Phantom ringing or Phantom vibration**

Phantom ringing, also known as phantom vibration syndrome or ringxiety, refers to the false sensation of hearing a phone ringing or feeling the vibration of the phone when it is not.<sup>72</sup> This is a psychological phenomenon related to the constant anticipation of communication, anxiety, and excessive use of mobile phones.<sup>73</sup> A longitudinal study with medical interns found that depression and anxiety explained a portion of stress-induced phantom ringing.<sup>74</sup> It usually subsides when the person reduces mobile phone use but should be treated if it occurs repeatedly and is distressing.

### **Cyberphobia**

Cyberphobia is an unreasonable and severe fear of digital technology, computers or the internet, usually seen in adults who are in a situation, in which use of technology is needed. The depiction of internet and digital technology as a tool in the hands of evil, troubled, and dangerous characters in several popular movies is said to contribute to the feeling that the internet is complicated, elusive, and potentially hazardous<sup>75,76</sup>.

Using computers, being around computers or even thinking about computers may evoke fear in some people with this condition and they may avoid coming to locations with computers. Given the ubiquitous presence of computers in modern life and the significant role that technology plays in it, this phobia has the potential to be problematic. The fear of technology and resistance to change can manifest as behavioural opposition or passive incompetence<sup>77</sup>. This condition can be considered as a specific phobia. People with cyberphobia can manage their symptoms through therapy and technical education.

### **Cyberchondria**

Looking for information about health and illness on the internet is a common and useful practice. But excessive searching on internet for health or illness related information associated with baseless doubts or fear related to illness can be a problematic symptom or preoccupation. This repetitive behaviour can be a symptom of 'illness anxiety disorder'. Cyberchondria negatively affects well-being and increases depressive symptoms.<sup>78</sup> Management of cyberchondria involves addressing psychopathology, personality traits, and behavioural responses. Prevention of cyberchondria requires improving online health information literacy.<sup>79</sup>

### **Nomophobia**

Nomophobia is the fear of being without or not able to access a mobile phone. Nomophobia stands for "no-mobile-phone phobia", an acronym first coined by the authors of a UK Postal Office study in 2008<sup>80</sup>. However, at that time, smartphones were little known. Apple introduced the first iPhone in 2007<sup>81</sup>. Smartphones have now mostly replaced mobile phones.

According to Statista reports, 90.90 % of the world's population owns a mobile phone and 85.82% use smartphones.<sup>82</sup> That means most of the world's population depends on smartphones for their daily activities. No wonder a recent meta-analysis of studies on nomophobia found that most individuals with a smartphone have mild to moderate 'nomophobia'<sup>83</sup>. How can it be considered as a disorder when the access to mobile phones is essential for almost all daily activities?

The most used tool, the Nomophobia Questionnaire (NMP-Q), is based on criteria for diagnosis of addiction and not phobia.<sup>84</sup> The fear should be unreasonable and excessive to diagnose

a 'specific phobia.' These facts show a need to exercise caution while interpreting research data on internet-related disorders. The available research literature on nomophobia and the conceptualisation overlooks social and environmental factors contributing to this anxiety. It ignores the fact that current life situation needs the daily use of smartphones.<sup>85</sup>

## **OTHER PROBLEMATIC BEHAVIOURS OF DIGITAL SPACE.**

### **Blue whale game: much ado and moral panic about nothing**

In February 2017, sensational news spread like wildfire in social media and mass media worldwide that a suicide game named 'blue whale game' had taken the lives of hundreds of children in Russia. The news originated from a misinterpretation of another news reported in an investigative piece of writing in the Russian publication Novaya Gazeta, published in May 2016. The report was about the suicides of adolescents belonging to a social network group. But further investigations revealed that the group or a game in that group was not linked to the suicides<sup>86</sup>.

The media coverage of the game often lacks compliance with international guidelines on best practices for suicide reporting, such as supplying information on reliable and contextualized help resources<sup>87</sup>. The sensationalized news media reports on the game could unintentionally propagated suicide contagion effects<sup>88</sup>. There was misinformation in reporting, with articles attributing many suicides to the Blue Whale Challenge without sufficient evidence<sup>87,89</sup>. These violations of safe messaging guidelines in news reporting, such as normalizing suicide and discussing means of suicide, probably resulted in copycat events, particularly in youth and young adults<sup>90</sup>. The consequences of fake news about the Blue Whale Challenge game include the potential for increased suicide rates and the normalization of self-harming behaviours among youth and young adults.<sup>91</sup>

So, looking back, the real culprit was the fake news and the moral panic created by it and not the non-existent game. Instead of controlling the media, limiting the sensationalism and promoting fact-check, several countries including India took the futile policy of banning the non-existent game

### **Cyber-bullying**

Cyberbullying is using the internet to harass, threaten, defame, or trouble someone. The new possibilities of communication and anonymity offered by the internet make it easier for the doer to execute his/her plan secretly. Bullying can lead to lasting psychological damage to the victim. It is reported more among adolescents which may be a manifestation of conduct disorder. Cyberbullying is known to have a lasting effect on the individual, even leading to difficulties in relationships in adult life. It is known to cause depression, anxiety, social withdrawal and even suicide<sup>92,93</sup>.

### **Cyber-stalking**

Cyber-stalking is using electronic communication to follow someone regularly in a disturbing manner. It can take various forms, like monitoring or tracking the victim, online surveillance by continuously following public profiles, blogs, posts, etc, responding to and commenting on them, sending harassing or threatening emails or messages.

This behaviour can be part of antisocial personality or conduct disorder. It is harassment or intimidation that occurs on the internet and other digital communication platforms. It can

cause fear, insecurity, or even physical harm to the individuals. Cyber-stalking is illegal in many countries, and all social media platforms supply technological support and mechanisms to avoid the perpetrators. One can refer to the policy statements about bullying and harassment and seek support.<sup>94</sup> Cyber-stalking was found to cause depression and lower academic performance, which was more when there was lower perceived social support.<sup>95</sup> Cyberstalking was found to have serious detrimental effects on the mental health of adult victims, like depression, anxiety, suicidal ideation, and panic attacks.<sup>96</sup>

### **Cyber suicide**

Is an ill-defined term used to denote suicidal behaviour in relation to the internet. It can be attempting self-harm or suicide or committing suicide with influence or encouragement found on the internet. It can occur in relation to various life situation or can be a reaction to online events like cyber bullying or defamation or problems in an online relationship. It should be understood as an extension of problem behaviour into the cyberspace, with factors like personality, mental illnesses, body image dissatisfaction, substance abuse, other psychological problems and social stressors contributing. Since the suicidal behaviour is significantly influenced by digital media, there is a need to promote suicide prevention activates online.<sup>97</sup>

Several studies on the relationship between suicide and social media analysed the type of content with suicidal ideas created the audience engagement, and interaction on social network<sup>98</sup>. Researchers also investigated the effectiveness of using Artificial Intelligence (AI) to detect individuals susceptible to mental illness and suicidal ideation based on their social media postings. The study used a shared representation to extract features related to suicidal risk. The data from users diagnosed with multiple mental disorders improved the predictive accuracy of suicide risk detection<sup>99</sup>. A graph-based method has also been used to improve suicide risk identification on social media. Graph-based hierarchical attention network, deep learning model based on Label-Text Correlation and interactive model using chat ChatGPT are three digital technological innovations found to be useful for suicide risk detection using social media data <sup>100,101</sup>.

### **Selfitis**

The term "selfitis" was first mentioned in the media hoax news in 2014, in which it was reported that the American Psychiatric Association had classified it as a mental disorder<sup>102</sup>. Wiktionary describes it as an "obsessive need to take selfies and post them on social media."<sup>103</sup> The concept of selfitis has gained interest in recent years, leading to the development of measurement tools such as the Selfitis Disease Behaviour Scale.<sup>104</sup> It has acute and chronic form and was found to be associated with narcissism and body dysmorphic disorder.<sup>105</sup>

### **NEWLY INTRODUCED TERMS RELATED TO DIGITAL MENTAL HEALTH.**

As technology continues to evolve, mental health professionals and researchers are recognizing newer mental health issues and challenges specific to the digital world. Here are some emerging symptoms and concepts related to the digital world. These mental health issues of the digital world are not well studied.

**Cyberpsychosis:** The word cyber-psychosis is used in a different context and meaning unrelated to 'psychoses' used in psychiatry or psychology.<sup>105</sup> It is a term featured initially

in the cyberpunk genre of science fiction. The setting is a dystopian future world in which there is high-end technology. Cyber-psychosis refers to the effect of internet on an individual's behaviour, leading to cyber-attacks and manipulating attitudes and behaviours through persuasive messages on social media.

**Digital Detox Disorder:** Digital detox is a popular term for staying away from digital devices for a few days or week as a part of conscious decision. Some people face significant anxiety, irritability, and other withdrawal-like symptoms when trying to reduce their screen time and keep away from digital devices and social media for an extended period. This state is termed as Digital Detox Disorder.<sup>106</sup>

**Online Impulse Control Disorders:** A group of behaviours, like excessive online shopping, gambling, or other impulsive actions, which involve difficulty in controlling impulses, facilitated by the internet, are together termed as Online Impulse Control Disorders.<sup>107</sup>

**Cyberbullying-Related Stress Disorder:** Victims of cyber bullying may experience significant stress, anxiety, or trauma due to cyberbullying incidents. This condition is known as Cyberbullying-Related Stress Disorder. In some victims it can be severe enough to satisfy the criteria post-traumatic stress disorder.<sup>108</sup>

**Online Disinhibition Effect:** This concept relates to the phenomenon where people behave differently online than they would in face-to-face interactions.<sup>109</sup> It's not a disorder per se but an understanding of how online interactions can lead to uninhibited or aggressive behaviours.

**Tech-related sleep disorder:** Excessive screen time before bedtime can disrupt sleep patterns.<sup>110</sup> This encompasses sleep disorders and disturbances specifically caused or worsened by using digital devices.

**Digital Identity Crisis:** As people increasingly project their identities online, some may experience conflicts, confusion, or distress related to their digital self-presentation, leading to feelings of identity crisis.<sup>111</sup>

## DIGITAL WELL-BEING: THE PATH AHEAD

Besides physical and psychological well-being, digital mental health is recognised as a vital part of overall well-being.<sup>112</sup> All mobile and computer operating systems now supply digital well-being and parental control provisions. These facilities are essential in preventing internet-related mental health problems, especially in the younger generation.<sup>113</sup>

## CONCLUSION:

The digital world is a product of digital technology. It is an extension of the natural world, which mirrors and transforms mutually and almost all human interactions. Most of the mental health problems in the digital world, except a few, are extensions of real-world problems. Technology is changing rapidly. So is the expression of human adaptive and maladaptive behaviour. We are only beginning to understand the nature of mental health problems in the digital world. A better understanding of aetiology, epidemiology, and management must evolve through further research. Internet and digital technologies are now essential and indispensable parts of daily life. Research should be able to evaluate the related problems without invoking unnecessary fears and should not be influenced by media hype.



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# NEWER DIAGNOSTIC CATEGORIES FOR THE DIGITAL WORLD

## INTRODUCTION

Mental and behavioural disorders are among the leading causes of morbidity and disability worldwide. According to the most recent Global Burden of Disease study, around 970 million people suffer from at least one mental disorder (1). Most of these patients live in low- and middle-income countries (LMIC) where there is a shortage of mental health personnel and infrastructure. This leads to a substantial treatment gap which is difficult to bridge through conventional methods (2).

Digital psychiatry has been proposed as a solution to existing deficits in the availability and accessibility of mental health care. Digital psychiatry refers to the use of digital health technologies (DHT) for the diagnosis and management of mental disorders. This term encompasses a wide range of methods, including telepsychiatry, smartphone-based mental health applications ("apps"), simulations based on virtual or augmented reality, conversational software based on natural language processing ("chatbots"), and social media (3). The growth of digital psychiatry was catalysed by the global COVID-19 pandemic, which led to widespread restrictions on in-person consultations, and necessitated the growth of alternate forms of mental health care delivery. This led to a significant increase in virtual consultations, online psychological interventions, and the use of mental health-related apps. Though these restrictions have now been lifted in most parts of the world, the lessons learned during this period suggest that digital psychiatry is an effective, acceptable, and accessible treatment approach even in settings with relatively few resources (4).

All forms of psychiatric treatment, whether "conventional" or digital, are based on a particular diagnosis. One of the major problems faced by the field of psychiatry is the lack of an "effective ontology" of mental illness. In other words, we do not yet have a well-established and validated set of concepts, categories, and interrelationships between them that capture the entire range of psychiatric symptoms and presentations (5). Categorical classificatory systems such as the American Psychiatric Association's Diagnostic and Statistical Manual (DSM-5) and the World Health Organization's International Classification of Diseases (ICD-11) are widely used. Though these systems perform well in terms of reliability, they have relatively lower levels of validity and may lead to over- or under-diagnosis (6). Existing diagnostic categories are largely atheoretical, which means that they lack a firm conceptual foundation and do not lead to a better understanding of underlying causes and mechanisms, or to accurate predictions regarding outcome (7). Moreover, there is often a poor correlation between diagnosis and treatment - for example, antipsychotics are used in the treatment of schizophrenia, bipolar disorder, depression, and autism spectrum disorder (8). Different

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editions of the ICD and DSM have included surface-level changes in diagnostic categories, such as the splitting of manic-depressive psychosis into bipolar disorder and depressive disorder in ICD-10, the deletion of the subtypes of schizophrenia in DSM-5 and ICD-11, or the introduction of disruptive mood dysregulation disorder in DSM-5 (9). However, these changes have not addressed the deeper problems with these diagnostic systems (10).

The limitations of these categorical systems are largely a reflection of the shortcomings of the current methods of psychiatric assessment. Conventional diagnosis in psychiatry relies on interviews by professionals, which contains an element of subjectivity, as well as a significant time lag between symptom onset and presentation, leading to recall bias. The psychiatric clinic or hospital is an unnatural environment, which can itself crucially alter an individual's mood, cognition and behaviour and further bias a patient's responses (11). Moreover, despite a wealth of research, it has not proved possible to identify specific biomarkers that can be linked to a given syndrome and give it external validity (12, 13). Attempts have been made to address these limitations through dimensional approaches, but these are often difficult to use in clinical practice, and it is not clear if they result in improved validity and conceptual clarity (14). More recently, the Research Domain Criteria (RDoC) represent an initiative which attempts to link symptom dimensions to alterations at the genetic, molecular, cellular and neural circuit levels. Such an approach holds promises in improving the validity of psychiatric diagnoses (15). However, even within the RDoC framework, there are difficulties in collecting ecologically valid and unbiased information on the bio-behavioural changes associated with specific domains, except in strictly controlled and well-designed research protocols (16).

In recent times, it has been suggested that these limitations can be overcome through digital technologies, which can collect more fine-grained and detailed information from both subjective and objective sources, and which can be used in the individual's own environment (17). The current chapter focuses on digital psychiatry's potential to refine or discard existing diagnostic categories, to facilitate the creation of new diagnostic categories, and to improve the validity and conceptual basis of psychiatric nosology. Two concepts are central to the diagnostic aspects of digital psychiatry: the digital phenotype and machine learning. These will be explained first. Subsequently, this chapter will explore use of digital psychiatry to improve, refine or modify existing diagnostic categories in specific conditions or populations.

### **THE CONCEPT OF DIGITAL PHENOTYPING**

The term "phenotype" refers to externally observable characteristics or traits of a particular organism, which arise from the interaction between its genotype and environment (18). Current psychiatric diagnoses rely on a putative phenotype based on the observation of patients' behaviour, and their reports of their own experiences. In contrast, digital phenotyping refers to "the moment-by-moment quantification of individual-level human phenotypes in situ using data from personal digital devices" (19). Data collection for digital phenotyping can be either active or passive. Active data collection refers to smartphone-based surveys or questions that assess symptoms or other self-reported parameters at specific moments in time. This method is known as ecological momentary assessment (EMA). Passive data collection involves the collection of information such as location, activity level, voice tone, social media posts, web search histories, video recordings, and the monitoring of specific biological parameters (3, 17, 19). The contrast between these two methods of data collection is summarized in Table 1.

**Table 1: Active and passive data collection for diagnosis in digital psychiatry**

	<b>Active data collection</b>	<b>Passive data collection</b>
<b>Method</b>	Ecological momentary assessment (EMA)	Passive measurement of body or input data
<b>Technology used</b>	Smartphone-based apps	Body sensors, geolocation, keystroke data collection
<b>Role of the patient</b>	Active cooperation required to provide inputs to specific queries or surveys	Patient participation not required
<b>Types of data collected</b>	Self-reported symptoms, mood states, and other aspects of psychological or social functioning	Records of location, activity level, voice tone, facial expression, body posture, social media posts, web search history, and biological parameters – heart rate, temperature, skin conductance
<b>Usefulness</b>	To measure subjective aspects of a patient's experience	To obtain objective data on changes in activity or language use and potential biomarkers

The advantages of digital data collection for diagnostic purposes include reduced recall bias, improved ecological validity, better modelling of changes in symptoms over time, the ability to anonymously collect sensitive information, assessment of functioning, and early diagnosis of episodes or relapses (20). However, once this data is collected, it should be analysed and interpreted accurately, either in order to match it with existing diagnostic categories, or to develop new diagnostic approaches. This can be achieved through machine learning.

### **MACHINE LEARNING IN DIGITAL DIAGNOSIS**

Machine learning (ML) refers to a set of artificial intelligence (AI)-based concepts and methods that can be used to analyze and draw inferences from large data sets (21). There are various approaches to machine learning, but three of them are particularly relevant with reference

to digital psychiatric diagnosis. These are described in Table 2. At its simplest, ML can be used to train a computer to make diagnoses according to existing systems (ICD or DSM) based on active or passive patient data. At a more advanced level, unsupervised or semi-supervised ML can be used to identify new categories or subgroups, and to compare the predictive values and biological correlates of "old" and "new" diagnostic categories. For example, if data is collected from a large sample of patients with depression, supervised ML can be used to "train" a computer to diagnose DSM-5 major depression based on this data. On the other hand, unsupervised ML may identify specific categories or subgroups that do not exist in current nosological systems (such as depression with or without specific changes in heart rate or autonomic function), and semi-supervised ML can be used to compare the associations of these categories with specific biomarkers, or to see which is more accurate in predicting short- or long-term course and outcome. Most studies published to date have used various forms of supervised ML, but there is growing interest in the use of "deeper" forms of ML to achieve greater precision and personalization of psychiatric diagnosis and treatment (22).

**Table 2: Machine learning concepts and their relevance to digital diagnosis in psychiatry**

Concept	Definition	Diagnostic utility
Supervised ML	Learning from data with labels to predict existing diagnoses or categories	Use of digital data to make diagnoses according to current classificatory systems
Unsupervised ML	Learning from unlabelled data to identify latent structure and subgroups	Identification of novel diagnostic categories or sub-categories
Semi-supervised ML	Combination of supervised and unsupervised methods	Comparison of existing and novel diagnostic categories identified through ML; testing of predictive value

## DIGITAL PSYCHIATRY FOR DIAGNOSIS: SPECIFIC APPLICATIONS

### a. Mood disorders

The current nosology of mood disorders is based on the distinction between major depressive disorder (MDD) and bipolar disorders (BD), and on the use of various symptom and severity specifiers (23). Digital psychiatric approaches could augment or even supplant this approach by contributing new information on diagnostic validity, comorbidity patterns, and reliable bio-behavioural markers that could distinguish between mood disorder subtypes. In a review of 74 relevant recent studies, it was found that passive data on speech patterns, nonverbal communication, heart rate variability (HRV) and electrodermal activity (EDA) could distinguish major depression from depressive symptoms occurring as part of bipolar disorder or post-traumatic stress disorder (24). Similarly, a study of patients with depressive symptoms used a supervised machine learning analysis of self-reported symptoms, and was able to differentiate MDD from subclinical depression more reliably than an established screening instrument. It was also found that the inclusion of "non-depressive" symptoms, such as

panic attacks, generalized anxiety, and mood instability, improved the distinction between these two groups. This suggests that the "phenotype" of MDD includes dimensions that are not captured by existing criteria (25).

In BD, a review of existing studies found that analysis of passive data (such as speech, phone usage, keystroke patterns, location and social interaction) has been found to be useful in predicting mood, and in distinguishing manic, depressive and euthymic phases of the illness (26). Likewise, a review specifically focused on the analysis of data from portable sensors found that data such as EMAs of mood, measurements of activity levels, monitoring of changes in location and changes in speech and text message or social media are useful in identifying phases of the illness, in differentiating bipolar disorder from borderline personality disorder, and in identifying potential biomarkers (particularly HRV) that are correlated with manic and depressive episodes. It was also found that even in euthymic bipolar patients, analyses of activity and sleep patterns could distinguish these patients from healthy controls. Though these results are promising, many of them are preliminary and based on studies with small samples and limited generalizability (27).

### **b. Anxiety disorders**

Despite the prevalence and morbidity associated with anxiety disorders, there is relatively little literature on the use of digital techniques to aid in their diagnosis, or to improve their subtyping. A study involving patients with generalized anxiety disorder (GAD) found that passive data on movement patterns was strongly correlated with symptom severity, and could be used to predict subsequent symptoms (28). Similarly, the combined analysis of self-reported symptoms with measures of movement and social contact could predict subsequent symptom severity in social anxiety disorder (SAD) (29). Using multiple machine learning models, it was also found that analyses of biological markers (heart rate, EDA, temperature) during a naturalistic speech task could predict subclinical SAD in youth; this approach could facilitate early identification and psychological interventions, thereby preventing transition to syndromal SAD (30). Using a transdiagnostic deep machine learning approach, a combination of physiological parameters (heart rate and HRV), data on light exposure and location, and EMA of anxiety was found to predict symptom variation and future course in both GAD and SAD (31). Thus, while digital methods have not yet provided evidence of new approaches to the diagnosis of anxiety disorders, they have potential utility in early diagnosis and prognostication. This could be reflected in future course specifiers for these disorders.

### **c. Psychotic disorders**

The classification and subtyping of psychotic disorders remains a matter of some controversy, with neither categorical nor dimensional approaches being entirely satisfactory (32). There is early evidence that digital technologies could resolve some of these controversies, through the identification of systematic relationships between symptom dimensions and physiological parameters. This could open a "new window" into our understanding of the psychotic spectrum (33). For example, several studies have noted that sensor-based data (location, movement, screen time, text and call logs, sleep-wake patterns) as well as specific EMAs (cognition, social interaction) are significantly correlated with self-reported symptoms across multiple domains of psychosis, including anxiety, mood symptoms, positive symptoms. In other words, passively collected data can be a reliable marker of changes in psychotic symptoms, and can help in assessing the evolution and change of these symptoms over time more sensitively (34-36).

More interestingly, a study measuring three biological parameters (HRV, EDA and movement patterns) found that these parameters showed differential associations with symptom dimensions: parasympathetic dysfunction was correlated with positive symptoms, while changes in activity were associated with negative symptoms (37). Similarly, a study using multiple EMAs of symptoms, cognition, social functioning, and passive estimation of sleep and touch-screen data, was able to identify specific transitions between symptom dimensions in patients with schizophrenia. In this sample, mood changes were predictive of anxiety and positive symptoms, while reductions in sleep were predictive of anxiety (38). These findings highlight the potential of digital assessments in identifying novel, replicable correlates of, and interrelationships between, specific symptoms. This could lead to a better understanding of possible subtypes, causal mechanisms, and improved prediction and prevention of relapses.

#### **d. Suicidality**

It is well-known that certain mental illnesses increase the risk of suicide, and that past suicide attempts predict future attempts. Though the estimation of future suicide risk is an important aspect of clinical practice, attempts to predict future suicide risk using conventional methods have yielded unsatisfactory results, and existing typologies of suicide do not correlate well with real-world findings and outcomes. It has been suggested that the use of unsupervised or semi-supervised ML techniques could improve predictive power (39). In this context, both active and passive digitally collected data have been studied in an attempt to "forecast" suicidal ideation (SI) in naturalistic settings. It has been found that daily ratings of mood, collected through EMAs, correlate well with weekly ratings of SI (40), while analysis of the context of posts and the level of activity on a particular social media forum (Instagram) were found to predict suicidal ideation with 65-75% sensitivity and specificity (41). Both these studies were conducted in high-risk groups of adolescents with past SI or suicide attempts. The use of natural language processing (NLP) to analyze the text of messages and posts, using a tool based on a supervised ML approach, was found to achieve high levels of accuracy in identifying suicide-related content; however, this tool has not yet been tested in clinical populations (42). In a more ambitious proof-of-concept study, video-based markers of speech, emotional expression and movement were studied in relation to SI in patients hospitalized for a suicide attempt. It was found that several of these markers, including changes in speech and head movement, showed strong linear associations with the severity of SI (43). These early results are promising, and it may be possible to improve on them through digital tracking of parameters such as activity levels, sleep patterns, and vital signs (44, 45). The use of these digital methods could not only improve the prediction of suicide risk, but could lead to a more biologically and ecologically valid typology of suicidal ideation and behaviour.

#### **e. Substance use disorders**

The use of digital diagnostic methods in the field of substance use disorders (SUD), sometimes referred to as "e-addictology", is still in its early stages (46). A pilot study found that multimodal digital assessments, involving EMAs, sensor-based data and retrieval of social media posts, were acceptable to patients with opioid use disorders; about 70-80% of patients cooperated with one or more of these forms of data collection (47). A similar preliminary study in patients with various SUDs found that ML-based analysis of social media posts was superior to clinical assessment in predicting 3-month rates of drop-out from treatment

(48). These results suggest that digital phenotyping is feasible in patients with SUDs and may be useful for prognostic purpose. Its usefulness in identifying subtypes and severity gradients in SUDs remains to be established.

#### **f. Disorders of childhood and adolescence**

The conventional psychiatric interview has significant limitations in child psychiatry, particularly in very young children. Digital assessment methods provide an attractive alternative approach to diagnosis (49). Much research in this field has focused on autism spectrum disorders (ASD), where it has been found that ML-based analysis of movement, posture, facial orientation, blink rate, and speech patterns is accurate in distinguishing between toddlers or children with ASD and healthy controls (50-53). Given the importance of early intervention in ASD, digital phenotyping could prove invaluable in the timely diagnosis of this group of disorders. There is also an ongoing project that attempts to leverage digital data and ML in order to achieve early and specific diagnoses of the various subtypes of neurodevelopmental disorder (54). Other conditions in which digital data have been used to improve or refine diagnoses in children include prediction of attention-deficit hyperactivity disorder (ADHD) by observing child performance in a virtual reality game (55), and the use of EMAs in association with data on movement, sleep, and social engagement to track symptom course in depressive and anxiety disorders (56, 57). From a more novel perspective, a digital phenotyping study based on analysis of movement and voice data during play situations was found to have good predictive value in identifying internalizing disorders, suggesting that digital methods may lead to a novel way of conceptualizing this important and underdiagnosed group of childhood disorders (58).

#### **g. Other specific conditions**

There are several other psychiatric disorders for which digital technology and ML have the potential to validate, refine or modify existing diagnostic categories. These include traumatic stress-related disorders (59) and obsessive-compulsive disorders (60). The existing literature pertaining to these conditions is still at the theoretical or preliminary level, but is likely to grow substantially over the next decade. Digital phenotyping based on EMAs, sensor data and textual analysis has also been used to track sets or dimensions of symptoms that are often comorbid with each other, such as anxiety, depression, and disturbances in sleep. Such data could be used to identify the specific patterns in which these domains are interconnected, leading to a way of describing these symptoms that transcends existing categories of depressive disorder or anxiety disorder (61, 62). Finally, there is some evidence that these phenotyping methods can also be applied to larger groups. For example, textual analysis of messages or posts shared in an online forum or community can be used to track changes in the mental health status of the group, particularly when faced with a collective stressor such as the COVID-19 pandemic. This could help in identifying vulnerable populations that could benefit from targeted interventions (63).

### **FUTURE DIRECTIONS**

From the above discussion, it can be seen that much of the existing work is based on supervised ML approaches, and can be seen as complementing or supplementing existing classificatory systems such as DSM-5 and ICD-11. This work is valuable, as it suggests ways in which existing diagnostic and prognostic methods could be improved upon, such as using digital phenotyping in preference to questionnaires, or identifying digital predictors

of symptom course or outcome that could be incorporated into conventional nosology. However, through the collection of multimodal data and more advanced ML techniques, it is possible to go further, and to "transform" rather than "reform" the classification of mental disorders. There are already leads to such a transformative approach in existing work, such as the analysis of symptom transitions and markers of autonomic function to inform our understanding of psychotic disorders (37, 38), or through the identification of transdiagnostic categories that map reliably onto digital phenotypes (31, 62). Digital phenotyping could also be used to validate contemporary theoretical models of specific disorders, or to identify the subjective and objective correlates of proposed new diagnostic categories such as complex PTSD (64) and disruptive mood dysregulation disorder (9). These techniques could be extended to those considered at high risk for particular disorders, in order to identify multimodal signatures or phenotypes of a prodromal or early disorder, and could even be applied to the first-degree relatives of those with a given disorder, to identify "digital endophenotypes". Digital phenotyping and machine learning could also be combined with the RDoC approach to achieve a multimodal understanding of clinical phenomena such as anxiety symptoms (65). Finally, unsupervised or "deep" ML approaches could be used to analyse self-reported symptoms of psychological distress in general or clinic populations, and to correlate these with passive sources of digital data. This could lead to the construction of new categories whose reliability, validity and predictive power could surpass those of existing diagnoses (22).

### **LIMITATIONS AND CHALLENGES**

Despite the vast potential for digital methods to transform the landscape of psychiatric diagnosis and nosology, certain precautions should be borne in mind. First, despite the value of digital techniques in solving the "measurement problem" in psychiatry, these methods are not infallible. This may be due to problems with patient engagement and cooperation, to the low signal-to-noise ratio associated with sensor-based data, and to the effects of independent factors (such as physical health or the external environment) that influence measures of movement or vital signs (66). Second, there are significant ethical concerns, related to privacy and confidentiality, involved in the collection of digital data such as private messages, social media posts or phone call logs. Distinct ethical concerns also arise in relation to digital research in vulnerable populations, such as children, women, the elderly, and those with mental illnesses related to abuse or other forms of trauma. These necessitate the development of clear ethical guidelines for digital psychiatry research (67, 68). Third, there is a certain lack of precision in the definitions used for biomarkers or diagnostic categories in some studies, which limits their validity and the extent to which their findings can be generalized (69). Fourth, there is a possibility that certain symptoms, such as anxiety or paranoid delusions, may be exacerbated by continuous monitoring or sensor use, though the actual risk of such events is probably low (3). Fifth, it is important to note that many of the promising results discussed above require replication. Finally, issues of feasibility and acceptability, particularly in non-Western cultures and in low-income settings, should also be considered (4, 70).

### **CONCLUSION**

Digital mental health techniques, though largely investigated for therapeutic purposes, hold great promise in improving the validity of psychiatric diagnoses. Through the collection of multimodal data from both active and passive sources, and its analysis through machine



learning algorithms, the digital approach allows us to transcend the limitations of existing classificatory systems. This could happen either by bringing in a greater element of objectivity, or by identifying new diagnostic entities that could either subsume or subdivide existing categories. There is already evidence that this approach may improve or even transform our understanding of such diagnostic categories as mood disorders, anxiety disorders, psychotic disorders, and childhood behavioural disorders. Ultimately, such advances have far-reaching clinical implications in terms of early diagnosis, symptom monitoring, prognostication, and the selection of more specific forms of treatment.

### TAKE-HOME MESSAGE

- Digital technologies, such as the use of smartphone or smartwatch-based sensors, ecological momentary assessments (EMAs), and chatbots, can provide a continuous and ecologically valid stream of data on a patient's condition.
- Data collection can be either active (based on patient reports and ratings) or passive (such as analysis of vital signs, activity levels, or the linguistic content of messages and posts)
- Analysis of this data through various machine learning (ML) algorithms can lead to the construction of a multimodal phenotype associated with a specific set of symptoms, known as a "digital phenotype".
- Digital phenotyping can help in validating existing diagnoses, in identifying the correlates of specific symptom dimensions, and even in outlining new diagnostic categories.
- There is evidence that this approach may be useful for both common and severe mental disorders.
- If applied correctly, novel diagnostic categories derived through digital phenotyping and ML can enrich clinical practice by aiding in early diagnosis, relapse prevention, course prediction and the selection of personalized treatments.

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## CHAPTER - 11

# CHALLENGES IN DIGITAL PSYCHIATRY

### INTRODUCTION

Digital Psychiatry is the use of technology in psychiatric care to improve efficiency in delivery of psychiatric services and provide personalized care. WHO defines Digital Psychiatry as a broad umbrella term encompassing e-health, use of advanced computing sciences, big data, genomics and Artificial Intelligence<sup>1</sup>. Increasing awareness and the rapid advancement of technology has led to the emergence of Digital Psychiatry as a potential solution to bridge the gap between demand and supply of psychiatric illness care.

In 2019, 1 in every 8 people, or 970 million people around the world were living with a mental illness, with anxiety and depressive disorders being the most common<sup>2</sup>. More than 75% of people with psychiatric illnesses in low- and middle-income countries do not receive adequate treatment<sup>3</sup>. India is one of the countries with a high burden of psychiatric illnesses with an estimated 200 million people<sup>4</sup>.

There is a lack of trained psychiatric illness professionals, especially in rural areas. According to a 2016 report by the Indian Psychiatric Society, India has only about 9000 modern medicine qualified psychiatrists for a population of 1.3 billion people<sup>5</sup> which is far below the global average of one per 10,000<sup>6</sup>.

There is limited availability and accessibility of psychiatric illness services in India. According to the National Mental Health Survey 2015-2016, only about 10% of adults who meet the diagnostic criteria for a psychiatric illness receive any kind of treatment<sup>7</sup>. The majority of people with psychiatric illnesses do not seek treatment due to various barriers such as stigma, lack of awareness, financial constraints and geographical distance<sup>8</sup>.

There is inadequate funding and policy support for psychiatric care in India. According to the World Health Organization, India spends only about 0.06% of its health budget on psychiatric illnesses, which is one of the lowest in the world<sup>9</sup>. The Mental Health Care Act 2017, which was enacted to provide legal rights and protection to people with mental illnesses, has not been fully implemented due to various challenges such as funding, lack of infrastructure, human resources, and coordination among stakeholders<sup>10</sup>.

Some of the digital tools that are being used in Digital Psychiatry include: Wearables, Distance Monitoring software, Hardware & remote tracing diagnostic tools, Telepsychiatry and Telemedicine, Mobile Psychiatry, AI and ML - Big Data management, Digital Psychiatry Imaging, Robotic Surgery - Deep Brain Stimulation, electronic Health Records, Smartphones, Personal digital psychiatric phenotyping and genomics, personalised or precision medicine, Biomarker

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tools, E- pharmacies, Cloud Computing, Blockchain in Psychiatric Care, Augmented and Virtual Reality Solutions, E-Learning in Psychiatric illnesscare and other latest Digital Psychiatry applications and technologies<sup>11</sup>.

The utilization of various Digital Psychiatry platforms including mobile apps for ElectronicHealth Records, video consultations, online therapy programs, and virtual reality interventions, offers opportunities to improve access to psychiatricillness services and monitor patient progress remotely. Nevertheless, there are several challenges that pose obstacles to the widespread adoption of Digital Psychiatryto ensure its effectiveness, accessibility, scalability, and sustainability in clinical practice across India.

Digital Psychiatry has the potential to address the shortage of trained psychiatric professionals, inaccessibility of psychiatric care services, inadequate funding and difficulties in policy implementation. It aids in improving the quality and efficiency of psychiatric illness care delivery services in India.

## THE CHALLENGES

### 1. Section: Privacy and Data Security

One of the foremost challenges pertains to the privacy and data security concerns associated with Digital Psychiatryinterventions. The sharing of sensitive personal and intimate psychiatric illness data over digital platforms raises questions about data security and confidentiality and it must be protected complying to ethical and legal standards to sustain the patients' trust.The digital nature of psychiatric interventions and assessments introduces a range of vulnerabilities that require meticulous attention.

Researchers have emphasized the importance of stringent data protection measures to safeguard patient privacy<sup>12</sup>. Additionally, issues related to informed consent, potential data breaches, and the storage of personal information require careful consideration<sup>13</sup>. The collection and storage of sensitive personal data in Digital Psychiatry raise concerns about data privacy and security<sup>14</sup>. Striking a balance between data protection and the benefits of data-driven interventions is a complex endeavour.

**A. Privacy Concerns:** The collection, storage, and transmission of psychiatric illness data through digital platforms raise concerns about the potential for unauthorized access and breaches. Patients often disclose highly personal information during therapy sessions or assessments, and this data could be exploited for various purposes if not adequately protected. The risk of stigmatization and discrimination due to the exposure of psychiatric illness information further underscores the need for robust privacy measures<sup>15</sup>.

**B. Data Security Challenges:** Implementing robust data security measures in Digital Psychiatry is challenging due to the ever-evolving nature of cyber threats. Malicious actors constantly seek to exploit vulnerabilities in systems to gain access to sensitive information. Encryption, access controls, and secure authentication methods are crucial components of data security, yet even these can be vulnerable if not regularly updated and rigorously maintained<sup>16</sup>.

**C. Regulatory Frameworks:** The absence of standardized regulations specific to Digital Psychiatry exacerbates the challenges related to privacy and data security. While traditional healthcare settings are governed by established laws and guidelines, the rapid advancement

of digital psychiatric illness tools has outpaced regulatory efforts. This regulatory vacuum can lead to inconsistencies in how different platforms handle patient data and security, putting patients' privacy at risk<sup>17</sup>.

**D. Ethical Considerations:** Ethical concerns further complicate the privacy and data security landscape. Digital psychiatric interventions often rely on data-driven algorithms and Artificial Intelligence systems that analyse patient information to provide insights and recommendations. However, patients may be uncomfortable with the idea of their intimate thoughts and feelings being analysed by machines. Balancing the benefits of AI-driven insights with patients' right to privacy is a delicate ethical challenge<sup>17</sup>.

There is a need for comprehensive data protection strategies, standardized regulations, and ethical considerations to ensure the safe and secure use of technology in psychiatric illness care.

## 2. SECTION: ACCURACY AND RELIABILITY

The integration of digital tools into psychiatric care has promised to revolutionize diagnosis and treatment. However, a critical challenge that arises in the context of Digital Psychiatry is ensuring the accuracy and reliability of the diagnostic assessments and treatment recommendations provided by these tools. While technology offers exciting possibilities, concerns regarding misdiagnosis and the potential consequences of relying solely on automated assessments must be addressed.

The efficacy and validity of digital interventions in treating psychiatric illnesses require rigorous investigation. While numerous studies have shown promising outcomes, there is a need for more robust randomized controlled trials to establish the effectiveness of these interventions across diverse populations<sup>18</sup>. The variability in patient engagement and adherence to digital interventions also presents challenges in assessing their true impact on psychiatric illness outcomes<sup>19</sup>.

**A. Diagnostic Accuracy:** Digital psychiatric tools often use algorithms and machine learning to analyse patient data and generate diagnostic insights. While these tools can process vast amounts of information quickly, their accuracy is contingent upon the quality and diversity of the data used for training. Biases inherent in training data can lead to skewed outcomes, potentially resulting in misdiagnosis or the omission of critical diagnoses. Accurate diagnosis forms the foundation of effective psychiatric treatment<sup>20</sup>. However, digital tools often rely on self-reported data, which may be influenced by biases and misinterpretation<sup>21</sup>. Ensuring reliable assessments that accommodate cultural expressions and nuances remains a challenge.

**B. Risk of Misdiagnosis:** Misdiagnosis is a significant concern in Digital Psychiatry. Automated assessments lack the nuanced understanding that human clinicians possess, potentially leading to incorrect diagnostic conclusions. Misdiagnoses can have profound consequences, leading to inappropriate treatment plans, delays in receiving proper care, or unnecessary stress for patients<sup>22</sup>.

**C. Validation and Reliability:** Ensuring the reliability of digital psychiatric tools requires rigorous validation processes. Unlike pharmaceutical interventions, which undergo extensive clinical trials, digital tools may not receive the same level of scrutiny before being integrated into clinical practice. This lack of validation contributes to doubts about the reliability of these tools and their capacity to provide accurate insights<sup>23</sup>.



**D. Personalization Challenges:** Individuals with psychiatric illness conditions often present unique variations that may not be captured adequately by automated assessments. The challenge lies in adapting digital tools to provide personalized recommendations that account for these variations. Without a human touch, the capacity to tailor treatment to individual needs can be limited, potentially leading to suboptimal outcomes<sup>24</sup>.

The challenges of accuracy and reliability in Digital Psychiatry are complex and multifaceted. Balancing the benefits of technology with the potential risks of misdiagnosis and inaccurate treatment recommendations requires careful consideration and thorough validation processes.

### 3. SECTION: ACCESSIBILITY AND EQUITY

The rapid expansion of digital tools in psychiatric care holds the promise of increased accessibility to psychiatric illness interventions. However, challenges related to accessibility and equity remain significant barriers that must be addressed to ensure that technology benefits all individuals, regardless of their demographic background or socio-economic status.

Technological challenges play a significant role in hindering the seamless integration of Digital Psychiatry into clinical settings. Unequal access to technology, particularly among marginalized populations, may exacerbate existing health disparities<sup>25</sup>. Moreover, issues related to user interface design, software glitches, and compatibility across devices can impede user experience and engagement<sup>26</sup>.

Psychiatric care in India faces a shortage of modern medicine trained psychiatric professionals, which digital interventions alone cannot overcome. Integrating these interventions into the existing healthcare infrastructure while addressing resource constraints poses a significant challenge<sup>27</sup>.

**A. The Digital Divide:** The "digital divide" refers to the gap between those who have access to technology and the internet and those who do not. This divide is particularly pronounced in disadvantaged populations, including lower-income individuals, rural communities, and marginalized groups. The lack of access to necessary devices and reliable internet connections limits the reach of digital psychiatric interventions, perpetuating existing health inequalities. India's population is marked by stark disparities in access to digital technology. While urban areas boast better connectivity and digital literacy, rural and remote regions struggle with limited internet access and technological infrastructure. This digital divide hampers the equitable distribution of digital psychiatric services, leaving a significant portion of the population underserved<sup>28</sup>.

While smartphones have become ubiquitous, digital literacy remains a barrier for many Indians. Creating user-friendly interfaces and providing support for individuals with limited digital skills are essential to ensure inclusivity<sup>29</sup>. Many parts of India still face challenges such as poor signalling and internet connectivity, low digital literacy, limited access to technology compatible smartphones or computers, and high costs of data or devices. These factors may limit the reach and usability of digital tools for psychiatric illness. There is a need for more investment and innovation to improve the infrastructure and resources for Digital Psychiatry in India.

**B. Cultural and Linguistic Diversity:** Digital interventions in psychiatry often rely on standardized assessments and treatment approaches that may not consider cultural and linguistic differences. This can lead to a lack of relevance and effectiveness for individuals from diverse backgrounds. Ensuring that digital tools are culturally sensitive and available

in multiple languages is crucial for equitable access.

The stigma surrounding psychiatric illness issues is deeply entrenched in Indian society. Cultural beliefs and practices further complicate the provision of digital psychiatric illness interventions, necessitating culturally sensitive strategies<sup>30</sup>. Privacy concerns related to seeking help online also contribute to hesitancy among individuals from various cultural backgrounds to engage with digital psychiatric illness resources<sup>31</sup>. Lack of evidence-based and culturally appropriate digital interventions also pose greater challenges in delivery of digital psychiatric care. Most of the digital tools that are available or used in India are either adapted from Western contexts or developed without rigorous evaluation or user involvement. There is a need for more research and innovation to develop digital interventions that are tailored to the specific needs, cultural preferences, and contexts of the Indian population.

**C. Socio-Economic Barriers:** While digital interventions can potentially reduce the costs associated with traditional psychiatric illness care, there are still socio-economic barriers to consider. Affordability of devices, internet subscriptions, and data plans can hinder access to telepsychiatry or digital psychiatry services for those with limited financial resources<sup>32</sup>. Additionally, individuals from low-income backgrounds may face challenges in dedicating time and energy to digital interventions due to work and other obligations.

**D. Tailoring Interventions:** To ensure equitable access, digital interventions need to be tailored to the unique needs and preferences of different populations. One-size-fits-all approaches may not be effective for individuals with varying socio-economic, cultural, and educational backgrounds<sup>33</sup>. Customizing interventions to accommodate diverse needs can enhance engagement and outcomes.

It is important to address accessibility and equity challenges in Digital Psychiatry. The goal is to ensure that technological advancements are leveraged to bridge gaps in psychiatric illness care access, while also considering the diverse needs and circumstances of various populations.

#### 4. SECTION: THERAPEUTIC RELATIONSHIPS AND HUMAN INTERACTION

Digital Psychiatry has the potential to extend psychiatric illness care beyond traditional boundaries, but it introduces challenges related to maintaining therapeutic relationships and preserving the essential human interaction that underpins effective psychiatric interventions. The balance between technology-driven efficiency and the need for genuine human connection poses a critical challenge for the field.

The therapeutic relationship between a clinician and a patient is a cornerstone of psychiatry. The challenge lies in maintaining this essential human connection while delivering care through digital platforms. Research suggests that the absence of in-person interactions can impact rapport building and hinder the establishment of trust<sup>34</sup>.

**A. Digital Dehumanization:** The absence of face-to-face interactions in Digital Psychiatry interventions can lead to a sense of dehumanization for patients. The therapeutic alliance, which is built on empathy, trust, and rapport, may be compromised when interactions occur solely through screens and text. The nuances of nonverbal cues and interpersonal dynamics may be lost, impacting the quality of the therapeutic relationship<sup>35</sup>.

**B. Lack of Empathy and Understanding:** Human clinicians bring empathy and understand-

ing to therapeutic interactions, tailoring their approach to each patient's emotional state and needs. Digital tools, however, lack the capacity to genuinely empathize and understand the intricacies of human emotions. This can result in patients feeling misunderstood or dismissed, hindering the therapeutic process<sup>36</sup>.

**C. Loss of Emotional Connection:** The emotional connection between a patient and therapist is a cornerstone of effective psychotherapy. Digital interventions, even those offering real-time communication, may not replicate the depth of emotional connection fostered in face-to-face sessions. This could lead to reduced patient engagement and a diminished sense of safety and support. Building a therapeutic alliance between patients and clinicians is pivotal in psychiatric treatment<sup>36</sup>. The virtual nature of digital interventions challenges the establishment and maintenance of this relationship<sup>37</sup>. Adapting strategies that resonate with Indian cultural norms is crucial to foster trust and rapport.

**D. Ethical Considerations:** The use of technology in psychiatric illness care raises ethical concerns about the potential erosion of the therapeutic relationship. Digital interventions might inadvertently prioritize efficiency over patient well-being, undermining the core principles of client-centred care. Balancing the benefits of technology with ethical considerations requires careful thought and ongoing dialogue<sup>38</sup>.

There are many challenges posed by the digital shift in preserving the therapeutic relationship and human interaction in psychiatric illness care. The important to maintain empathy, understanding, and emotional connection while leveraging technology to enhance psychiatric illness interventions.

## 5. SECTION: REGULATORY AND ETHICAL CONCERNS

The rapid growth of Digital Psychiatry has brought forth a host of innovative interventions, but alongside the promise, it has also raised important regulatory and ethical concerns. The absence of comprehensive standardized guidelines and the unique and evolving nature of digital interventions pose challenges that must be carefully navigated to ensure patient safety and ethical practice.

Navigating the regulatory landscape is another obstacle faced by Digital Psychiatry practitioners. The lack of comprehensive updated standardized guidelines for evaluating and approving digital psychiatric illness tools can hinder their widespread acceptance<sup>38</sup>. Clinicians also face challenges related to licensure and liability when providing remote care across geographic boundaries<sup>39</sup>.

**A. Lack of Standardized Regulations:** Unlike traditional healthcare settings, the field of Digital Psychiatry lacks comprehensive standardized regulations that govern the development, validation, and deployment of interventions. The rapid growth of digital psychiatric illness interventions has outpaced regulatory frameworks. This raises concerns about the quality and safety of available apps and platforms<sup>40</sup>. Establishing standardized guidelines and oversight mechanisms is imperative to safeguard users' interests.

**B. Data Privacy and Informed Consent:** Digital psychiatric interventions involve the collection and analysis of sensitive patient data. Ensuring adequate data privacy and obtaining informed consent have become complex tasks, especially when considering the potential for data breaches and the need to inform patients about the implications of data usage and storage<sup>41</sup>.

**C. Transparency and Accountability:** The use of algorithms and artificial intelligence in digital interventions introduces challenges related to transparency and accountability<sup>42</sup>. Patients may have difficulty understanding how decisions are made by these algorithms, leading to a lack of trust in the recommendations provided. Ensuring transparency in algorithmic processes is essential to maintain patient trust.

**D. Duty of Care and Responsibility:** Healthcare providers have a duty of care towards their patients. In the digital realm, determining the extent of this duty and the responsibilities of different stakeholders (e.g., clinicians, developers, platform providers) can be challenging. Ethical considerations extend beyond individual patients to broader implications for public health and well-being.

The regulatory and ethical concerns arise with the integration of digital technology in psychiatric care. It emphasizes the need for clear guidelines, transparency, and accountability to ensure safe and ethical practices in the rapidly evolving field of Digital Psychiatry.

## CONCLUSION

Digital Psychiatry is an emerging and promising field that can offer new opportunities and solutions for improving psychiatric illness care in India. However, addressing the multifaceted challenges it poses is crucial for its successful integration into clinical practice. In a country characterized by cultural diversity, limited resources, and varying levels of digital literacy, the journey towards effective digital psychiatric illness care is marked by several challenges. Ethical considerations, efficacy assessment, technological improvements, regulatory frameworks, and the preservation of human connection all demand concerted efforts from researchers, clinicians, policymakers, and technology developers. A collaborative and multidisciplinary approach can make digital psychiatric illness interventions accessible, effective, and culturally relevant for the diverse population of India. The synthesis of technology and clinical expertise has the potential to reshape India's psychiatric illness landscape, offering hope for improved psychiatric well-being.

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