

DIGITAL TRANSFORMATION OF MENTAL HEALTH SERVICES

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ABSTRACT

The digital revolution has fundamentally transformed the delivery of mental health services, altering how these services are sought and experienced. As global rates of mental illness rise, digital solutions, such as mobile apps, AI diagnostics, telepsychiatry, and virtual therapy, are emerging as potential game changers in both developed and developing countries. This study examines the development of digital mental health services globally, with a focus on innovative Western approaches that could be adapted for use in Africa. Important topics about technology, ethics, accessibility, and equity are also covered. Drawing from scholarly literature and global case studies, this article critically examines the promises, challenges, and future directions of the digital transformation of mental health services.

Keywords: Digital Transformation, Mental Health Services

1. Introduction

The mental health crisis is a significant and ongoing concern worldwide. The World Health Organisation (2023) reports that over 970 million people globally suffer from some form of mental disorder, and access to quality mental health care, particularly in low- and middle-income countries, is often uneven. Conventional approaches to mental health care, which mostly entail face-to-face interactions, centralised services, and facility-based treatments, have come under fire for being time-consuming, inaccessible, and insufficient to meet the growing demand for mental health services.

In response to these issues, digital health technologies have become strong substitutes that offer more affordable and flexible access to mental health services. Among these technologies are wearable technology, AI chatbots, remote counselling platforms, virtual reality therapies, and mobile applications that track mood (Torous *et al.*, 2021). The coronavirus pandemic further accelerated the integration of digital mental health tools in both public and private sectors.

However, this transition is not without its challenges. Concerns regarding data privacy, ethical considerations about algorithmic biases, digital literacy, cultural relevance, and the need for transparency and explainability in these technologies remain unresolved (Naslund *et al.*, 2022). Therefore, it is essential to examine the issues surrounding the digital transformation of mental health services from social, cultural, and ethical perspectives, in addition to the technological aspects.

This article aims to explore the overall landscape of mental health care and its current transformation into digital formats. It will highlight the opportunities that have arisen, evaluate the successes and failures, and consider what lies ahead. The conversation will cover both global and regional viewpoints, referencing recent developments in low-resource contexts like Nigeria and other African nations, as well as high-income, resource-rich environments like the United States and the United Kingdom.

2.1 Theoretical Background

To understand the digital transformation of services for mental health, it is essential to ground this shift in key psychological, technological, and health-related frameworks. Two major theories that provide context for this transformation are the Technology Acceptance Model (TAM) and the Health Belief Model (HBM).

The Technology Acceptance Model (TAM), introduced by Davis in 1989, posits that technology acceptance is influenced by two main factors: the perceived usefulness of the technology and its perceived ease of use. This framework is commonly used in mental health informatics to explain why some consumer groups may be reluctant to use telepsychiatry platforms or mobile health apps, especially older adults and underserved populations (Kamal *et al.*, 2020). When users believe that a digital intervention can help them manage their mental health with minimal effort, they are more likely to accept it.

In contrast, the Health Belief Model (HBM) is a psychological framework that explains health behaviour based on individuals' perceptions of the threat posed by an illness, along with its potential benefits and barriers. Within the context of digital mental health applications, this model sheds light on the reasons why people might choose to use or avoid mental health apps or online therapies. People are more likely to use digital solutions if they believe they are at risk for mental distress and think they are safe and beneficial (Champion & Skinner, 2008).

Both theoretical models emphasise the importance of user-centric design, trust-building, and targeted messaging when developing digital health interventions. For any solution to be effective, it must not only function technologically but also be psychologically and socially acceptable to its users.

2.2 The Evolution of Digital Mental Health

Significant changes have occurred in mental health care, including a shift from institutional treatment to community-based methods and, more recently, to digital solutions. The earliest digital mental health tools emerged in the form of self-help websites during the 1990s, primarily in Western countries (Christensen *et al.*, 2004). With the increasing availability of internet access, cognitive behavioural therapy (CBT) programmes like MoodGYM from Australia became pioneers in online mental health interventions.

By the 2010s, the rise of smartphones led to a rapid expansion of mobile health applications. Users of these programmes can monitor their moods, access resources for therapy, and even get crisis

intervention in real time. The COVID-19 pandemic further accelerated this digital transformation; according to NHS Digital (2022), there was an increase of over 80% in NHS mental health app usage between 2020 and 2021.

Today, digital transformation in mental health is no longer limited to self-help tools. It includes AI-integrated screening tools like Tess and Woebot, government-backed mental health chatbots like Wysa (UK and India), and teletherapy platforms like Talkspace and BetterHelp (USA) (Fulmer *et al.*, 2022). The practice and experience of mental healthcare are changing globally as a result of these innovations.

2.3 Current Global Applications

Western Contexts

In most Western countries, the trend is shifting towards the use of digital solutions to complement and enhance traditional mental health therapy methods. For instance, virtual therapy can be conducted through text, video, and voice, significantly reducing location barriers. Platforms like Talkspace in the US exemplify this movement (Andersson & Titov, 2014). Similarly, in the UK, the National Health Service (NHS) is integrating digital cognitive behavioural therapy (CBT) programmes and triaging bots into its core care pathways (Mind UK, 2021).

Moreover, AI-based programmes and applications are proving effective for symptom monitoring and care prevention. For example, an algorithm developed by researchers at Stanford University can detect symptoms of depression based on individuals' social media activity (Guntuku *et al.*, 2017). In Sweden and Canada, research is being conducted on wearable devices and predictive analytics to identify early intervention opportunities for patients at risk of relapse in bipolar disorder or schizophrenia (Mohr *et al.*, 2018).

Global South and African Contexts

In contrast, digital mental health is an emerging field in Africa that is rapidly gaining momentum. In Nigeria, programmes like the Mentally Aware Nigeria Initiative use web platforms, Instagram, and WhatsApp to offer youth support (Ogunwale&Olutayo, 2020). In Kenya, government-led pilots for mental health screening via SMS are being implemented in rural areas, showing promising results (WHO, 2021).

However, challenges such as limited internet access and bandwidth, linguistic diversity, low mental health literacy, and cultural stigma still hinder broader access to these services. Despite these obstacles, the success of mobile platforms like Shezlong in Egypt and PsyndUp in South Africa suggests a growing demand for culturally relevant digital solutions (Ifeagwaziet *et al.*, 2022).

2.4 Technological Innovations in Mental Health

As digital technologies intersect with mental health care, various innovations are emerging to improve diagnosis, prevention, treatment, and follow-up care. These innovations can be categorised into areas such as telemedicine, mobile applications, artificial intelligence, wearable

devices, virtual reality, and chatbots, each establishing its unique role in the evolving landscape of mental health service delivery.

Telepsychiatry and Telepsychology

Telepsychiatry has become one of the most widely accepted innovations in mental health services, particularly during the COVID-19 pandemic, when it emerged as a crucial tool for continuing care. In the United States, policies that allow reimbursement for telehealth services have significantly supported platforms such as Doxy.me, Zoom for Healthcare, and VSee (Shore *et al.*, 2020).

Telepsychology, which encompasses a broader range of services, has also gained popularity as an effective alternative for clinical psychologists and counsellors to provide therapy to clients through secure video calls. To assist populations that find it difficult to access services because of things like distance or mobility concerns, national mental health strategists in nations like Canada and Australia have formally integrated virtual therapy systems (Smith *et al.*, 2021). By eliminating geographical barriers, this approach ensures access to licensed practitioners, particularly in rural areas with inadequate mental health resources.

Despite its advantages, critics point out some limitations of telepsychiatry, such as the lack of physical cues for diagnosis, challenges in building rapport, and concerns regarding the privacy of information. Nonetheless, new regulations and improvements in video technology are making telepsychiatry more credible and promoting its use (Langarizadeh *et al.*, 2017).

Mobile Mental Health Applications (mHealth)

Mobile mHealth applications represent one of the most accessible forms of digital mental health support, offering a wide range of services from mood tracking and guided meditation to digital cognitive behavioural therapy, psychoeducation, and crisis support.

Popular applications like Headspace, Calm, and Moodpath have amassed millions of users due to their user-friendly interfaces and evidence-based interventions. For example, studies have shown that Headspace can reduce stress and anxiety (Howells *et al.*, 2016). Furthermore, early clinical trials have shown encouraging outcomes for Woebot, an AI-powered application that provides cognitive behavioural therapy (CBT) (Fitzpatrick *et al.*, 2017).

In low-resource environments, mobile health apps using SMS have gained traction. In countries like Uganda and Nigeria, mental health campaigns are increasingly delivered through SMS platforms, providing psychometric assessments and self-care tips translated into local dialects (Abasiubong *et al.*, 2020). Given their affordability and scalability, mobile apps hold significant potential for mental health campaigning, especially in areas where traditional therapy is under-resourced or stigmatised.

Artificial Intelligence (AI) and Machine Learning

Artificial intelligence is playing an increasingly important role in early diagnosis and the development of personalised treatment plans in mental health care. By utilising machine-learning algorithms, researchers can analyse speech, text, and social media activity that may indicate a

mental health condition. A study by Guntuku *et al.* (2017) found that language used on Facebook can accurately predict depression levels, sometimes even before a clinical diagnosis.

AI is also being employed in the triaging of mental health applications, where users undergo an initial automated assessment to classify their symptoms and direct them to the appropriate referrals or interventions. In countries like the UK and the Netherlands, AI-based platforms are being integrated into primary care to facilitate mental health screenings and reduce delays in diagnosis (Vaidyam *et al.*, 2019).

However, the incorporation of AI in mental health raises ethical concerns. Unresolved issues include algorithmic bias, a lack of transparency, and the accountability question. Furthermore, an overreliance on non-human systems in therapeutic relationships could undermine the human element, which is essential for effective mental health care (Topol, 2019).

Wearable Technologies

Wearable technologies such as smartwatches, fitness bands, and biosensors are increasingly being used to monitor mental well-being in real time. Devices like Fitbit, Apple Watch, and Garmin collect biometric data, including heart rate, sleep patterns, and physical activity, all of which are closely associated with mental health (Smuck *et al.*, 2021). These advanced devices also integrate electrodermal activity sensors to detect emotional arousal and stress.

In the context of mental health, wearables serve both self-monitoring and clinical monitoring purposes. For instance, researchers at the University of Cambridge have developed a wearable system that alerts clinicians to early warning signs of relapse in patients with bipolar disorder, based on subtle physiological changes (Barnett *et al.*, 2020).

These devices offer opportunities for proactive mental health management and early intervention. However, they also raise concerns regarding user adherence, data overload, and data privacy.

Virtual Reality and Augmented Reality

Virtual reality (VR) and augmented reality (AR) technologies are revolutionary tools for trauma treatment, phobia reduction, and social skills training. Virtual reality exposure therapy (VRET) allows individuals to confront trauma memories or fears in a safe environment. Clinical trials have demonstrated that VR is an effective treatment for post-traumatic stress disorder (PTSD), particularly among military veterans (Maples-Keller *et al.*, 2017).

VR-based treatments for social anxiety provide practice in public speaking or social interactions within simulated environments. AR enhances therapy by integrating digital prompts into the client's real-world context to support mindfulness and emotion regulation. However, these tools' full integration into mainstream mental health services is still largely unexplored, particularly in less developed nations, and their accessibility is currently limited by their high costs and technical expertise.

Chatbots for Mental Health

Chatbots are rapidly evolving innovations that combine artificial intelligence (AI) with psychotherapy principles to offer conversational support. Platforms such as Wysa, Tess, and Woebot facilitate mental health conversations and incorporate elements of cognitive-behavioural therapy (CBT) or mindfulness-based stress reduction.

These chatbots provide support around the clock, maintain user anonymity, and are cost-effective. These features make them particularly appealing to adolescents and young adults who may be reluctant to seek help in traditional settings. Studies have shown that well-designed chatbots can offer promising short-term relief for symptoms of depression and anxiety (Inkster *et al.*, 2018).

While chatbots cannot fully replace human clinicians, they can serve as valuable adjuncts. However, concerns related to misdiagnosis, data misuse, and the handling of emotionally charged conversations are ongoing subjects of research and regulatory scrutiny.

2.5 Benefits and Opportunities in Digital Mental Health Services

The digitisation of mental health care represents a significant shift in how an individual accesses and benefits from psychological services. This shift offers significant therapeutic and structural improvements in addition to convenience, many of which remove long-standing obstacles in conventional mental health systems. This section explores the major benefits of digital mental health solutions worldwide.

Improved Accessibility and Reach

One of the most significant advantages of digital interventions in mental health is their increased accessibility. Historically, mental health services have been centralised in urban hospitals or private clinics, making it challenging for individuals in rural, remote, or under-resourced areas to access care. With mobile phones and internet connectivity becoming more widespread globally, individuals can now receive support from anywhere (Naslund *et al.*, 2017).

For instance, Indigenous communities in the remote northern territories of Canada have turned to virtual therapy sessions to compensate for the lack of mental health services caused by geographic isolation (Moroz *et al.*, 2020). In a similar vein, community mental health workers in India are using SMS and low-data applications to provide services in underdeveloped villages (Singla *et al.*, 2017). In Nigeria, mobile counselling services such as MANI are crucial for engaging young people who often avoid mental health clinics due to the stigma surrounding these services (Ogunwale&Olutayo, 2020).

Reduced Cost of Mental Health Services

Digital platforms significantly lower the cost of mental health interventions for both service providers and clients. The logistical difficulties involved in scheduling therapy sessions in a

physical office space are reduced when teletherapy eliminates the need for travel (Donker *et al.*, 2013). Furthermore, many digital mental health applications are either free or very affordable, making them accessible to those who might otherwise be unable to afford traditional therapy.

For example, the National Health Service in the United Kingdom provides free access to government-approved cognitive behavioural therapy (CBT) programmes for anxiety and depression. For low-income communities in Kenya, Safaricom and the Ministry of Health have established a toll-free mental health messaging service (World Health Organisation, 2021). These initiatives illustrate how digital platforms can create a more equitable approach to mental health care.

Anonymity and Reduced Stigma

Stigma remains one of the most significant barriers to seeking mental health care worldwide. Many individuals feel intimidated by the prospect of visiting mental health clinics due to fears of social judgement and concerns about confidentiality. Digital mental health tools, such as chatbots, self-help apps, and anonymous hotlines, allow users to seek help discreetly.

According to Kim and Lee (2021), the use of anonymous mobile therapy apps has increased engagement in South Korea and Japan, where mental health is stigmatised in culture. This is especially true for young men, who are typically less forthcoming about mental health issues. The ability to engage with therapeutic services digitally can help mitigate anxiety and encourage individuals to seek intervention earlier.

Real-Time Monitoring and Personalisation

Digital technologies, such as wearables and mobile tracking apps, facilitate the real-time collection of data on mood, activity, sleep, and physiological responses. This allows for more precise and dynamic assessments of mental health, as opposed to relying solely on retrospective self-reports during therapy.

Personalised digital interventions, guided by algorithms, adapt to users' engagement patterns. According to Arevianet *et al.* (2020), the MindStrong Health app, for instance, continuously examines users' smartphone behaviours to identify cognitive changes and enable early interventions. In therapeutic contexts, real-time symptom tracking supports more accurate interventions and timely care. Some Veterans Affairs hospitals in the U.S. are now incorporating real-time symptom tracking into their mental health programmes for patients with PTSD and depression (McInnes *et al.*, 2021).

Scalable Interventions for Public Health Impact

Digital solutions have vast-scale deployment potential, allowing them to reach thousands or even millions of users simultaneously. This is particularly important for community psychoeducation,

crisis intervention, or mental health screening, especially during disasters or pandemics when in-person services may be overwhelmed or suspended.

For instance, during the COVID-19 pandemic, the CDC launched an interactive chatbot named Clara to provide emotional support and health guidance. In its initial months, Clara received millions of queries (Centres for Disease Control and Prevention, 2020).

In summary, digital mental health solutions not only enhance accessibility and reduce costs but also play a crucial role in addressing stigma, personalising care, and providing scalable interventions that can make a significant impact on public health.

2.6 Challenges and Ethical Issues in Digital Mental Health Services

As promising as digital mental health innovations are, transitioning mental health care into a technology-mediated framework comes with significant challenges. Clinical constraints, systemic injustices, ethical issues, and cultural quirks are some of the problems that impede the best possible implementation and fair access to digital mental health services. This section will critically reflect on these challenges from a global perspective, considering both high-income and low-income country contexts.

The Digital Divide and Inequality of Access

One of the most pressing issues is the digital divide, the uneven access to technology based on geography, socioeconomic status, education, and infrastructure development. While digital mental health solutions are intended to enhance access, they can inadvertently exclude individuals lacking stable internet access, digital literacy, or smart devices.

For example, internet penetration remains below 50 per cent in sub-Saharan Africa, with only about 24 per cent of people in rural areas owning a smartphone (Statista, 2023). Similarly to this, low-income and Indigenous communities in underserved areas of the US and Canada have been found to have limited broadband coverage, which makes it difficult for them to access virtual mental health care (Fang, McKay, & Park, 2021).

This disparity results in a two-tiered system where those who are digitally connected benefit from innovations in mental health services, while marginalised groups are left behind. Bridging this gap necessitates inclusive ICT planning, government investments in necessary infrastructure, and the development of user-friendly digital interfaces.

Privacy, Confidentiality, and Data Security

Mental health data is among the most sensitive types of health information, and its digitisation raises serious concerns about confidentiality and data security. Several studies have found that many commercial mental health applications violate privacy laws or disregard them, often without adequately informing users about how their data is stored or shared (Huckvale, Torous, & Larsen, 2019).

The European Union's General Data Protection Regulation (GDPR) enforces stringent data collection policies, requiring fully informed consent and transparency regarding data use by

collectors. However, applications created outside of Europe often do not comply with these regulations, and users are typically required to agree to vague privacy policies that they do not read or fully understand.

In many lower-middle-income nations, where data protection regulations are lax or poorly implemented, the situation is especially complex. For instance, while the Nigerian Data Protection Regulation (NDPR) is designed to provide some level of protection, its enforcement has been minimal. This creates ethical dilemmas for transcontinental digital mental health platforms operating in African countries, where there are often unclear compliance mechanisms (Okoye & Okenwa, 2022).

Clinical Validity and Oversight

Many digital mental health solutions, especially self-help apps, lack proof of clinical validity and are not assessed by regulatory bodies like traditional therapy provided by a licensed therapist. A meta-analysis conducted by Larsen *et al.* in 2022 determined that very few mental health apps available in app stores had undergone peer-reviewed trials or scientific evaluation.

The lack of clinical governance means users may receive interventions that are ineffective, contextually inappropriate, or potentially harmful. Issues could include diagnostic errors from AI tools, overly simplified cognitive behavioural therapy prompts, or unmoderated peer-support forums. All of these risks stem from poor design and a lack of expert oversight (Grist, Porter, & Stallard, 2017).

To address this gap, the United Kingdom has established regulatory bodies such as NICE (National Institute for Health and Care Excellence), which evaluate, endorse, and approve digital mental health interventions for public use. Similar standards are needed on a global scale to ensure that digital tools meet the same quality criteria as traditional health services.

Ethical Implications of AI and Automation

Artificial intelligence (AI) holds great promise for mental health data management and independent delivery of services. However, it also raises complex ethical issues related to autonomy, accountability, and bias.

For instance, if an AI chatbot like Woebot provides mental health advice that leads to a crisis or self-harm, who should be held responsible? The developers, the platform, or the user? Algorithmic bias can result in certain populations being misdiagnosed or underserved. Research has shown that some AI models perform poorly when applied to minority or non-Western users due to limitations in the training data (Obermeyer, Powers, Vogeli, & Mullainathan, 2019).

To address these concerns, transparency in algorithmic design, ethical audits, and the inclusion of diverse datasets are essential to ensure that AI systems enhance care without reinforcing existing inequities.

Cultural Sensitivity and Appropriateness

Mental health is deeply influenced by culture, encompassing beliefs, values, and language. A one-size-fits-all digital initiative rarely accounts for the intricate sociocultural dimensions of mental illness. For example, Western-based CBT apps may not resonate with users from Asia, Africa, or Latin America, where spiritual, communal, or traditional healing practices are more prevalent (Summerfield, 2008).

Simply translating a programme into a local language is insufficient. Genuine adaptation requires input from local stakeholders, consideration of linguistic nuances, and respect for community norms. For instance, in Ethiopia, a digital mental health intervention for postnatal depression was unsuccessful until local elders and religious leaders were involved in designing and messaging the intervention (Alem *et al.*, 2021).

Without cultural sensitivity, digital products risk alienating users and delivering experiences that lack value, ultimately damaging public confidence in mental health systems.

Disconnection from Human Interaction and the Therapeutic Relationship

While digital platforms and tools offer certain conveniences, they can undermine crucial aspects of human connection that are vital for effective therapy. Non-verbal cues, eye contact, and physical presence contribute significantly to the therapeutic alliance, which is a key predictor of positive therapy outcomes (Norcross & Lambert, 2019). Digital solutions may not provide the depth of understanding needed for emotional processing or trust-building, especially in the case of AI chatbots and asynchronous text-based therapies.

Many users report feelings of isolation or a mechanical experience when solely relying on digital mental health tools. While technology can be beneficial, it should complement rather than replace human interaction. A hybrid approach that combines digital tools with face-to-face care or live therapist interaction may offer a more effective solution.

2.7 Context of Digital Mental Health in Africa and Nigeria

While digital mental health initiatives are gaining momentum in the Global North, they face unique challenges in Africa, particularly in Nigeria. In the majority of the continent's countries, there are fewer than two mental health professionals per 100,000 people, contributing to the high rate of untreated mental illnesses (World Health Organisation, 2022). This systemic shortage, combined with changing attitudes toward mental illnesses and a fragile healthcare system, has led to the rise of digital interventions.

The Burden of Mental Illness in Africa and Nigeria

Mental health issues in Africa often arise from a complex interplay of socio-economic and political factors, including poverty, conflict, unemployment, and displacement. It is estimated that nearly 60 million Nigerians suffer from some form of mental illness, yet only 10% have access to care

(Gureje *et al.*, 2015). Furthermore, seven of Nigeria's eight neuropsychiatric hospitals are located in urban areas, limiting access for those in rural regions.

In the absence of conventional healthcare infrastructure, digital mental health interventions can represent a leapfrog development, bypassing existing constraints and targeting individuals through mobile platforms. However, these interventions must be designed with respect for cultural, technological, and linguistic diversity in Africa.

Innovations and Localised Platforms

A significant number of Nigerian and African startups are developing culturally relevant digital mental health tools. The Mental Aware Nigeria Initiative (MANI), which offers a thorough crisis counselling and mental health education programme via WhatsApp, Instagram, and its website, is one well-known example. By focusing on youth mental health and leveraging social media, MANI has achieved substantial reach among university students and young professionals (Ogunwale & Olutayo, 2020).

Another promising initiative is MindNest Health, which offers therapy scheduling, psychoeducation, and online mental health screening tailored for urban professionals in Nigeria. Additionally, Shezlong provides therapy in Arabic, while PsyndUp operates teletherapy services in South Africa, representing other regionally focused and culturally attuned digital ventures (Ifeagwazi, Chukwuorji, & Ofole, 2022).

Generally, these platforms collaborate with NGOs, faith-based organisations, and schools to coordinate community awareness campaigns and anti-stigma efforts.

Culture, Sensitivities, and Perceptions of Mental Health

In Nigeria and many parts of the African continent, discussions surrounding mental illness are often filled with misconceptions and stigma. Having a mental disorder is frequently equated with being possessed by spirits, cursed, or viewed as morally weak (Ebigbo, 2021). Due to these beliefs, many individuals prefer to seek help from traditional healers or spiritual leaders rather than clinical psychologists. Such attitudes complicate the adoption of digital mental health services, especially when those services are not appropriately contextualised.

Some programmes involve traditional and religious leaders as advocates for digital mental health, which helps build trust within communities. For example, a hybrid care model in Ghana trains Pentecostal pastors to use mental health apps to identify and refer individuals with depression (Amoah, 2020). These hybrid forms of care lend legitimacy to the use of digital tools within culturally sensitive frameworks.

2.8 Barriers to Digital Mental Health Adoption

Some structural barriers stand in the way of the mass adoption of digital mental health services in Nigeria, despite the popularity gained over time.

- Low digital literacy: many potential users are alien to app use or using platforms for online consultations.
- Poor Internet connectivity: bandwidth limitations and data costs make real-time video therapy difficult, especially outside urban areas.
- Language diversity: Nigeria has over 500 spoken languages, making it difficult to design one-size-fits-all digital content.
- Distrust of digital systems: Scepticism about data privacy and the efficacy of "online therapy" remains a major hurdle, especially among older adults.

These barriers open very fertile ground for interventions that will serve the purpose of being mobile, adaptive, low-tech, and community-driven.

2.9 Policy and Governmental Efforts

The Mental Health Act of Nigeria, signed into law in 2023, introduced several provisions aimed at promoting the use of technology in mental health service delivery. These provisions should encourage the development of an end-to-end digital interface for mental health strategies.

The Digital Transformation Strategy of the African Union (2020-2030) has also recognised the potential of e-health, including mental health apps, to address continent-wide disparities in healthcare. However, without adequate funding, coordination between policies, and inter-sectoral cooperation, these strategies may fail to come to fruition.

3.1 Recommendations and Future Directions

As digital transformation becomes the new focal point for the future of mental health care, a set of medical and technical strategies must be adopted to ensure that emerging technologies are inclusive, ethical, and effective. Although digital tools promise significant benefits, their success relies on intentional design, robust policy frameworks, cultural competence, and careful clinical governance. The following recommendations concern policymakers, clinicians, researchers, and developers to help nurture the global digital mental health ecosystem:

Forge Inclusive Digital Health Policies

Governments should establish national digital health policies that explicitly incorporate mental health within broader digital health strategies. These policies should include:

- Funding and subsidising programs in digital mental health,
- Oversight of app development and AI deployment,
- Ensuring equitable access to the internet and digital tools,
- Protecting users' data from unauthorised access.

Countries like the UK and Australia have successfully implemented national strategies for digital mental health, creating a regulatory and financial framework that fosters public-private innovation and builds user trust. Low- and middle-income countries must develop context-specific policies and ensure their implementation aligns with public health priorities and access to technology.

Co-Create Culturally Responsive Tools

Digital mental health interventions should reflect the culture, language, and mental health narratives of the communities they aim to serve. This can be achieved by:

- Engaging local stakeholders, including community leaders, patients, and traditional healers, in co-designing the tools,
- Translating content into local languages and using culturally relevant metaphors or visuals,
- Tailoring therapeutic methods to align with local interpretations of mental illness, resilience, and well-being.

Culturally tailored designs not only enhance efficacy but also foster community trust and engagement with the interventions. For example, the ‘Friendship Bench’ approach in East Africa has successfully translated local idioms and therapeutic narratives into digital platforms operated by lay health workers.

Improve Clinical Verification and Standards

All apps and platforms, as well as other innovations in mental health services, should undergo clinical verification and adhere to established professional standards for marketing approval. This may involve:

- Requiring certification from medical or psychological boards,
- Publishing efficacy studies that undergo peer review,
- Establishing ethical review boards for AI-based solutions,
- Creating global or regional repositories of approved mental health apps (e.g., NHS Apps Library).

International collaborations, such as the **WHO Digital Health Technical Advisory Group**, can help develop international standards that can be adapted to regional contexts.

Enhance Digital Mental Health Literacy

For digital mental health tools to be successful, users must understand their functions, benefits, and limitations. A new wave of digital mental health literacy initiatives should be launched, including:

- Educating users on navigating apps and teletherapy platforms,
- Dispel myths related to online therapy and AI,
- Providing guidelines on protecting personal mental health data.

In Nigeria, these programmes could be integrated into youth-targeted outreach through schools, social media, and mobile radio broadcasts, strategies that have been effective in public health campaigns related to HIV and COVID-19.

Encourage Public-Private Partnerships

The digital mental health ecosystem thrives through partnerships between public health agencies, private tech companies, universities, and civil society organisations. These collaborations can unlock new funding opportunities and ensure that diverse mental health needs are effectively addressed.

A notable example is the partnership between the United States Department of Veterans Affairs and tech firms in Silicon Valley, which developed mental health chatbots specifically designed for veterans. Similarly, non-governmental organisations (NGOs) are collaborating with mobile network operators in Kenya to subsidise mental health SMS programmes, reaching thousands of users in remote areas (Mental Health Innovation Network, 2022).

Governments and donors should promote these cross-sector collaborations through innovation hubs, seed grants, and procurement contracts.

Establish Ethical Use of AI

As the use of AI in diagnosing and treating mental health conditions increases, it is essential to ensure its ethical application. Therefore, AI tools should have the following characteristics:

1. Training datasets that represent a broad spectrum of human demographics.
2. Transparency and auditability regarding how decisions are made.
3. Human oversight, ensuring that humans can intervene in decision-making processes when necessary.
4. The assurance that AI will never replace human therapists when empathy and human expertise are crucial.

International instruments, such as UNESCO's Recommendation on the Ethics of Artificial Intelligence (2021), can shape the ethical deployment of AI within global health systems.

Encourage Longitudinal Research and Impact Evaluation

In addition, more longitudinal research is needed to examine the long-term effects of digital mental health solutions on engagement patterns and social change. Many existing studies focus on short-term relief from symptoms but do not assess the long-term outcomes of interventions across various cultural contexts and vulnerable populations, such as the elderly, adolescents, or refugees. Universities, research institutes, and international health organisations should fund and conduct large-scale evaluations using mixed-method approaches. This evidence base will not only improve technology but also inform policy, attract funding, and build public trust.

3.2 Conclusion

The digital transformation of mental health services presents a significant opportunity to create a more inclusive, accessible, and scalable global mental healthcare system. As this paper illustrates, technology offers immense benefits, such as delivering care to underserved communities, reducing stigma, enhancing personalisation, and enabling early interventions through AI-powered chatbots in the U.S., WhatsApp counselling in Nigeria, and SMS screening tools in Kenya. Digital innovation in mental health care is making strides toward closing the global treatment gap.

However, this transformation brings complex challenges, including the digital divide, data privacy concerns, clinical oversight, and cultural mismatches, particularly in low- and middle-income

countries (LMICs). A one-size-fits-all solution is not viable; instead, the future of digital mental health should emphasise ethical innovation, regulation, cultural considerations, and continuous feedback loops.

To further democratise mental healthcare, global stakeholders must build partnerships across social and economic divides, ensuring that no population is left behind in this technological evolution. With the right intentions, digital mental health can move from being merely a novelty to becoming a cornerstone of mental healthcare in the twenty-first century, promoting equity, alleviating suffering, and enhancing the psychological well-being of all individuals involved.

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