

USING TECHNOLOGY TO BRIDGE GAPS IN RURAL AND UNDERSERVED MENTAL HEALTH CARE

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Abstract : Digital technology is increasingly intertwined with everyday life and offers promising avenues to support mental health, particularly in rural and underserved communities. This qualitative study explores user experiences and perceptions of technology's role in mental well-being among 35 participants aged 20 to 44 from varied educational and occupational backgrounds, including engineers, students, and healthcare workers. Participants reported daily screen use ranging from 2 to 17 hours, with many linking extended digital engagement to anxiety, poor sleep, and reduced attention span. Breaks from digital platforms were associated with better focus and sleep quality. While virtual reality (VR) was underutilized, a few users described its calming effects and potential in education. Artificial intelligence (AI) raised concerns about emotional misinterpretation and over-dependence, although some acknowledged its informational benefits. Fast food consumption and lifestyle factors further contributed to mental health stressors. Despite limited awareness and access to advanced digital tools like VR or AI-based support systems, participants expressed interest in integrative approaches combining technology with physical wellness practices. Findings suggest that to bridge mental health gaps in underserved areas, interventions must go beyond access alone and prioritize culturally relevant, emotionally supportive, and balanced digital solutions.

Keywords: *Mental health, digital technology, virtual reality, artificial intelligence, screen time, rural health, underserved populations, lifestyle factors, qualitative research, digital wellness*

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INTRODUCTION

Mental health remains a critical component of overall well-being, yet access to mental health services is disproportionately limited in rural and underserved regions. In many low- and middle-income countries, including India, geographic isolation, lack of trained professionals, stigma, and poor infrastructure contribute to an expanding mental health care gap. With the rapid advancement of digital technology, new avenues have emerged to deliver mental health support remotely and more affordably. Tools such as mobile health apps, teleconsultation platforms, artificial intelligence (AI)-based chat systems, and virtual reality (VR) interventions offer scalable solutions that can potentially overcome traditional access barriers.

However, the success of such technologies depends not only on availability but also on awareness, acceptability, and relevance to local populations. In rural and semi-urban areas, digital literacy, trust in technology, and infrastructural limitations pose challenges to widespread adoption. Moreover, excessive or unregulated use of digital tools—especially among youth and working professionals—may paradoxically

contribute to mental health issues such as anxiety, sleep disturbances, and emotional dependency.

This study aims to explore the lived experiences, perceptions, and behavioral patterns related to digital technology use among individuals from diverse backgrounds. By examining screen time habits, awareness of AI and VR, and associated lifestyle factors, the research seeks to understand both the promise and the pitfalls of technology-based mental health solutions in underserved settings. The findings aim to inform the development of more effective, user-centered, and culturally sensitive digital interventions for mental health care.

REVIEW OF LITERATURE

Access to mental health services in rural and underserved populations remains a global challenge. According to the World Health Organization (2021), more than 75% of people with mental disorders in low-income countries receive no treatment at all. In India, rural regions often suffer from a severe shortage of mental health professionals, compounded by stigma, poor transportation, and inadequate infrastructure (Patel et al., 2018). These limitations highlight the

urgent need for scalable, cost-effective, and context-sensitive mental health delivery models.

Digital technology has emerged as a promising solution to bridge these gaps. Mobile-based mental health applications, telepsychiatry, and e-therapy platforms have been found effective in increasing access to care, especially in geographically isolated areas (Naslund et al., 2017). For instance, smartphone apps offering guided meditation, mood tracking, and cognitive behavioral therapy (CBT) modules have shown potential in reducing symptoms of anxiety and depression. A study by Mohr et al. (2019) emphasized the importance of digital interventions tailored to local languages, cultures, and user needs.

Artificial intelligence (AI) tools, such as chatbot counselors, are increasingly being integrated into mental health services. These tools offer 24/7 support and anonymity, which can be particularly useful in communities where stigma inhibits help-seeking behavior (Fulmer et al., 2021). However, critics argue that AI lacks emotional intelligence and may not replace human empathy, especially in sensitive psychological contexts.

Virtual reality (VR) has also demonstrated value in therapeutic settings. VR-based exposure therapy, relaxation training, and mindfulness experiences have been effective for anxiety, PTSD, and phobias (Freeman et al., 2017). Nevertheless, high costs, limited awareness, and accessibility issues have restricted its application in rural populations.

At the same time, digital overuse presents its own mental health risks. Excessive screen time has been linked to poor sleep quality, increased anxiety, and reduced attention span (Twenge et al., 2018). Among youth and working professionals, the compulsive use of digital devices often replaces physical activity and face-to-face interactions, which are crucial for mental well-being.

There is a growing consensus that while technology offers transformative potential, it must be implemented with caution and cultural sensitivity. Holistic approaches that combine technology with community outreach, health education, and lifestyle interventions may offer the most sustainable path forward. This study builds on these insights by exploring how digital tools are currently perceived and used among diverse individuals in underserved settings, and what barriers remain in leveraging them for mental health promotion.

METHODOLOGY

Study Design:

This study employed a qualitative, descriptive design to explore the perceptions and experiences of individuals regarding the role of digital technology in mental health, particularly in underserved and rural settings. A semi-structured questionnaire approach was used to collect in-depth insights into digital behavior, technology usage, mental well-being, and related lifestyle factors.

Study Population and Sampling:

A purposive sampling method was adopted to include a diverse range of participants representing different educational and occupational backgrounds. A total of 35 individuals aged between 20 and 44 years participated in the study. Participants included students, engineers, healthcare professionals, technicians, and rural workers, ensuring a varied demographic to capture multiple perspectives.

Data Collection Tool

Data were collected using a structured, self-administered questionnaire designed in bilingual format (English and regional language). The questionnaire consisted of open-ended and close-ended items covering themes such as daily digital screen usage, psychological impact of screen time, sleep and diet habits, awareness of artificial intelligence (AI) and virtual reality (VR), and views on technology's future in mental health care.

Data Collection Procedure

The survey was conducted both online and offline between April and May 2025. Participation was voluntary, and informed consent was obtained from all respondents. Confidentiality and anonymity were ensured throughout the data collection process.

Data Analysis

Responses were coded and analyzed thematically. Thematic analysis involved reading and categorizing responses to identify recurring patterns and sub-themes. Descriptive statistics were also used to summarize key quantitative variables such as screen time hours and frequency of fast food consumption. Microsoft Excel was used for basic data handling and visualization.

Ethical Considerations

The study received approval from the Institutional Ethics Committee. Participants were briefed about the purpose of the study, and written informed consent was obtained. No identifying personal data were collected.

RESULTS

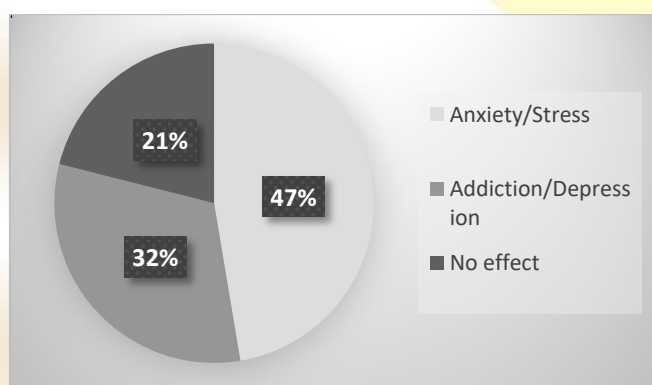
Demographic Profile

A total of 35 participants, aged between 20 and 44 years, were included in the study. The sample comprised both males and females from diverse educational backgrounds such as electrical engineering, MBA, GNM, DMLT, and MPH. Occupations included students, engineers, doctors, nurses, and technicians, offering a broad view across rural and semi-urban socioeconomic contexts.

Digital Usage and Mental Health Perceptions

Daily screen time varied significantly among participants, ranging from 2–3 hours to more than 17 hours in a 24-hour period. High digital exposure was common among professionals and students. Many respondents reported adverse mental health effects due to prolonged screen use, including anxiety, addiction, depression, negative thinking, loneliness, and reduced attention span. A few participants, however, did not perceive any psychological effects from screen usage.

Figure No.1 Reported Mental Health Effects of Digital Use



Breaks from Screen and Sleep Quality

Most participants acknowledged that taking breaks from digital screens had positive effects on their mental clarity and sleep patterns. Benefits cited included reduced eye strain, better focus, and enhanced sleep. Conversely, those who refrained from taking breaks reported difficulties such as emotional dependency on screen

interaction and disturbed sleep cycles. Factors contributing to poor sleep included rotational job shifts, excessive screen time, and mental stress.

Perceptions of Artificial Intelligence in Mental Health

Awareness of artificial intelligence (AI) and its application in mental health was limited. Some participants expressed concerns about AI's emotional disconnect and the risk of over-dependence. Comments included fears that AI systems may misinterpret emotional nuances or reinforce prior biases based on search history. A few respondents had no opinion, indicating a lack of awareness or exposure to AI-driven mental health tools.

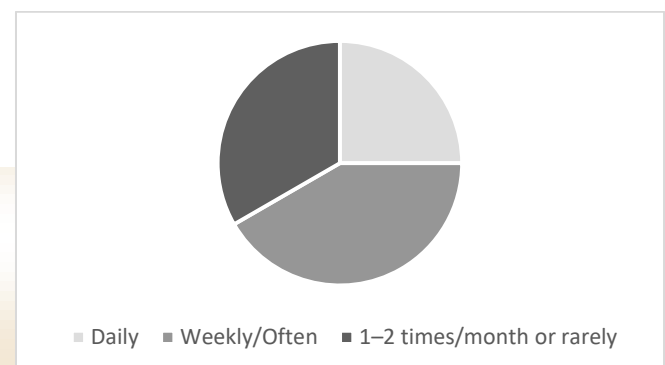
Virtual Reality (VR) Usage and Impact

VR usage among participants was minimal. Those who had used VR, primarily for films or educational purposes, reported mild calming effects. One participant mentioned hearing about its application in gaming and mental health, but hands-on experience was rare. Limited access, awareness, and cost barriers were cited as possible reasons for low adoption of VR in mental wellness strategies.

Fast Food Consumption and Its Mental-Physical Impact

Fast food was commonly consumed, with several respondents indicating daily or weekly intake. While some participants felt no strong negative impact, others reported issues such as acidity, bloating, weight gain, and sluggishness. Reducing fast food intake led to noticeable improvements, including better digestion, mood enhancement, and increased energy levels—suggesting an indirect link between diet and mental well-being.

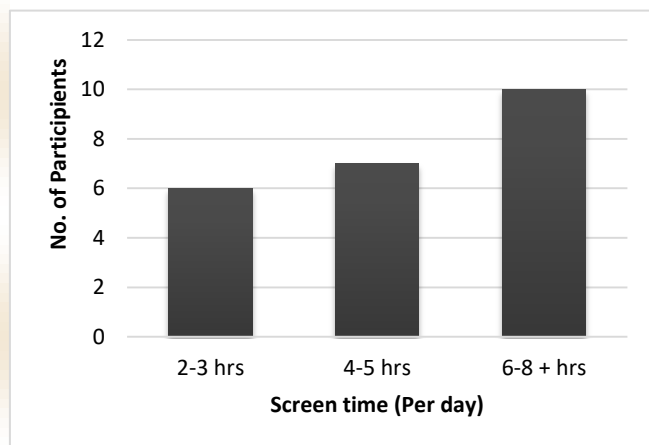
Figure 2: Fast Food Consumption and Its Mental-Physical Impact



Technology and the Future of Mental Health

Participants shared mixed feelings about technology's future role in mental health care. While many expressed concerns about tech addiction, eye strain, and increased stress, a few emphasized the importance of using technology in balance with physical and social activities. Suggestions included integrating sports, music, and limited digital use to enhance mental resilience. Overall, participants acknowledged that while technology can aid mental health care, it must be implemented with cultural sensitivity, awareness, and emotional intelligence.

Figure 3: Daily Screen Time Distribution Among Participants



DISCUSSION

This study explored the role of digital technology in influencing mental health among individuals from diverse professional and educational backgrounds in underserved and rural contexts. The findings reveal both the potential and challenges associated with integrating technology into mental health support systems in such populations.

A significant proportion of participants reported prolonged daily screen time, often exceeding 6–8 hours. This aligns with previous literature linking excessive digital use to increased anxiety, reduced attention span, and disrupted sleep patterns (Twenge et al., 2018). Participants who incorporated breaks from digital devices experienced noticeable improvements in sleep quality and focus, supporting the idea that mindful use of technology can mitigate its negative psychological effects.

Awareness and use of advanced technologies like artificial intelligence (AI) and virtual reality (VR) were limited. While a few respondents recognized the calming and educational effects of VR, its overall adoption remained low. This suggests a gap in digital exposure and access, especially in

rural and semi-urban areas, where infrastructure and digital literacy may be lacking. Similar findings have been noted in other studies that emphasize the digital divide in low-resource settings (Naslund et al., 2017).

Concerns about AI were centered on its emotional inadequacy and risk of dependency. These perceptions reflect the broader ethical and clinical debates about using AI in psychological care, where machine-led interventions may not fully replicate human empathy (Fulmer et al., 2021). Therefore, while digital tools hold promise, they must be integrated carefully and ethically into mental health strategies, especially in communities with limited awareness.

Fast food consumption emerged as a secondary but relevant lifestyle factor affecting mental well-being. Many participants reported daily or frequent intake, leading to complaints such as acidity, fatigue, and digestive discomfort. Reducing fast food improved both physical and mental states in several cases. This finding is consistent with literature connecting dietary habits to mood and cognitive function (Jacka et al., 2011).

Interestingly, most participants expressed a mixed attitude toward technology's future in mental health care. While they acknowledged its benefits for education and access, there was also fear of over-dependence, distraction, and emotional isolation. This calls for the development of digital mental health interventions that are culturally sensitive, emotionally intelligent, and balanced with offline wellness activities such as physical exercise and social interaction.

Overall, the study underscores the need for a hybrid approach that combines technological innovation with community-based education, human support systems, and lifestyle improvements. Such a model would be more effective in addressing the complex mental health needs of rural and underserved populations.

CONCLUSION

This study highlights the dual role of technology in mental health care among underserved populations. While digital tools offer valuable opportunities for education, support, and access to care, excessive or unregulated use contributes to stress, poor sleep, and emotional fatigue. Limited awareness and usage of advanced tools like AI and VR suggest that significant barriers—such as digital literacy and cultural acceptability—still exist in rural and semi-urban areas. Participants expressed a desire for more balanced, human-

centered approaches that integrate technology with physical activity, nutrition awareness, and emotional support. Bridging the mental health care gap in underserved regions will require not only improved digital infrastructure but also community engagement, health education, and ethical integration of emerging technologies. A hybrid model that values both innovation and local relevance can make mental health care more accessible, effective, and inclusive.

LIMITATIONS AND FUTURE RESEARCH

This study had a small sample size and used self-reported data, which may limit generalizability. Participant understanding of advanced technologies like AI and VR was also limited, affecting response depth. Future studies should include larger, more diverse populations and combine qualitative insights with clinical or behavioral data. Research should also assess the long-term impact and cultural suitability of digital mental health tools in underserved settings.

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