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OPINION REVIEW

Mental health in the virtual world: Challenges and opportunities in the metaverse era

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Abstract

Current rates of mental illness are worrisome. Mental illness mainly affects females and younger age groups. The use of the internet to deliver mental health care has been growing since 2020 and includes the implementation of novel mental health treatments using virtual reality, augmented reality, and artificial intelligence. A new three dimensional digital environment, known as the metaverse, has emerged as the next version of the Internet. Artificial intelligence, augmented reality, and virtual reality will create fully immersive, experiential, and interactive online environments in the metaverse. People will use a unique avatar to do anything they do in their "real" lives, including seeking and receiving mental health care. In this opinion review, we reflect on how the metaverse could reshape how we deliver mental health treatment, its opportunities, and its challenges.

Key Words: Metaverse; Virtual world; Artificial intelligence; Mental health; Virtual reality; Augmented reality; Technology

Core Tip: The metaverse is a new three-dimensional environment where technologies like artificial intelligence, augmented reality, and virtual reality converge. In this opinion review, we discussed its transformative potential for mental health.

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INTRODUCTION

As the prevalence of mental health problems continues to rise worldwide[1], efforts need to be placed on strengthening our capacity to effectively detect, prevent, and treat mental illness. Mental disorders are the leading causes of the global health-related burden. The World Health Organization estimates that around 5% of adults globally suffer from a depressive disorder, which together with other frequent mental health problems, such as anxiety disorders, addictions, and stress-related disorders, account for a substantial burden on quality of life and societal costs[2]. Post-pandemic data is even more problematic, showing that females and younger age groups were the most affected by major depressive disorder and anxiety disorders, especially in locations where the pandemic hit hardest[3].

In a large-scale meta-analysis of epidemiological studies, it was reported that 35% of global mental disorders occur before 14 years, 48% before 18 years, and 63% before 25 years[3]. Despite its high prevalence, mental health disorders in children and young adults remain undertreated. Several reasons have accounted for this, including stigma around help-seeking, embarrassment, inability to trust an unknown person (the therapist), and financial costs[4].

Evidence-based psychosocial interventions have shown promising results, either alone or as adjunctive treatment[5]. However, these treatments are far from flawless, as evidenced by moderate effect sizes, dropout rates of around 30%, and difficulties in maintaining long-term positive outcomes[6-8]. Considering these, efforts to increase the effectiveness of these treatments or develop new approaches are still needed.

The outbreak of the coronavirus disease 2019 (COVID-19), in addition to an increased burden of mental health problems worldwide, has encouraged a digital transformation of the way health care is delivered. The digital era generates opportunities and challenges for public and individual health. During the COVID-19 pandemic, the internet facilitated access to mental health services with positive outcomes and reasonable user acceptance rates[9,10]. However, the internet is not restricted to delivering care at a distance; it also allows using different technologies, including remote monitoring, health apps, virtual reality (VR), augmented reality (AR), and artificial intelligence (AI).

The metaverse, a network of persistent, real-time, rendered three-dimensional worlds and simulations that people can experience synchronously with the sense of "being there," is likely to become part of the daily life of many individuals in the upcoming years. A recent meta-synthesis study defined the metaverse as an interconnected web of virtual worlds partly overlapping with and enhancing the physical world[11,12]. The metaverse has been presented as the next version of the internet, in which AI, AR, and VR will be used to create fully immersive, experiential, and interactive online environments.

Avatars represent metaverse users to connect and interact with each other and experience and consume user-generated content in an immersive, scalable, synchronous, and persistent environment[11]. People could interact with each other, gather, socialize, work, play, eat, learn, and essentially do anything that we do in our "real" lives[11], potentially seeking and receiving mental health care.

Different industries, companies, academic institutions, health providers, researchers, scholars, and clinicians are enthusiastic about the opportunities the metaverse might provide. Interestingly, the scientific community mirrors this interest, as suggested by the rising number of publications dedicated to this theme.

Could the metaverse provide the context in which mental health issues will be treated in the future? Which opportunities and challenges could we expect? In this opinion review, we reflected on how the metaverse could help prevent mental health issues and reshape how we deliver mental health treatment and its potential impact.

PROJECTED OPPORTUNITIES

Preventing mental health-related disorders and reducing mental health stigma

Mainstream primary prevention of mental health conditions should be prioritized to reduce the impact of mental disorders in the next few years[13]. In this context, the metaverse emerges as one promising scenario to offer universal strategies targeting the whole population to prevent mental illness and promote good mental health.

On the one side, the metaverse could provide the environment to reduce mental-health-related stigma. VR facilitates body swap[14], allowing the experience of the world through the eyes and body of another person, potentially a person experiencing specific mental health issues. In the metaverse, people could understand what it is and how it feels to hear voices, have depression, or relate with other people for someone with autism. This could result not only in fostering empathic concern but in recognizing early signs of mental health deterioration, potentially leading to early treatment-seeking.

Different stakeholders can benefit significantly from this. Parents and relatives of young people with mental health conditions can be sensitized regarding what their loved one is experiencing, and this could be transferred to friends and professors interacting with children and adolescents who struggle with mental health problems. The benefits of this could be extended if other stakeholders, including mental health professionals and health professionals in general. Moreover,

politicians and decision-makers could experience what it is like to have a mental disorder, perhaps allowing the generation of more emphatic and humanized treatment across the health care system and targeted policies.

Similarly, the metaverse could provide the environment for actions that reduce the stigma frequently related to mental health issues and a secure and trusted environment for people to seek help[15]. The metaverse could help overcome some of the most frequent barriers[16] providing a non-judgmental, anonymized context free from cultural and peer stigma. Moreover, the metaverse could be a safe space for people to exchange experiences with others experiencing similar mental health problems.

Treating mental health problems

There are no reports of mental health treatments delivered in the metaverse. The lack of evidence is undoubtedly a significant limitation. However, as academics and clinicians are increasingly interested in the metaverse, clinical trials would take only a short time to appear.

Recently published data from a randomized, double-masked, crossover study by Tu *et al*[17] is encouraging, demonstrating that an AI system performs better than primary care physicians on many axes, including empathy. In this context, it could be reasonable to think that the metaverse could help treat mental disorders that have proven to benefit from VR and AR. VR-based interventions have several advantages over conventional treatments, making cost-effective interventions available for a wider group of patients. VR and AR are based on similar principles to traditional cognitive-behavioral therapy, and unlike conventional, face-to-face cognitive-behavioral therapy provides a unique environment to transfer the session's learning into everyday life.

VR interventions have been developed for many psychiatric disorders, particularly those requiring exposure techniques (*i.e.* anxiety-related disorders, specific phobias, panic disorder, social anxiety, and trauma-related disorders), for developmental disorders (*i.e.* autism spectrum disorders), and neurocognitive conditions including mild cognitive impairments, dementia, and Parkinson's[18]. Data suggests that VR and AR can be applied to effective treatments with positive outcomes. For example, VR-based mindfulness training is more effective than conventional mindfulness[19], and it has been shown to potentiate reductions in negative emotional states in the context of dialectical behavioral therapy skills training[20].

A meta-review of meta-analyses showed that VR-based interventions for anxiety disorders appeared to have medium-to-large effects. However, no significant differences were found compared to standard evidence-based approaches[18]. The authors concluded that VR-based interventions were not superior to traditional approaches. However, this should not discourage the use of VR. The value of VR-based interventions might not rely on their superiority but on their potential to reach groups of individuals who otherwise would not seek treatment or for whom treatment is not readily available. In any case, a broader adoption of virtual therapies should consider the perspectives of relevant stakeholders, including mental health professionals, patients, and regulatory bodies, that could discuss ethical, cultural, and social implications. Agreements achieved in multidisciplinary forums should be gathered in guidelines and recommendations that could provide the framework to reduce risks and improve the benefits of technology used in therapy.

The characteristics of digital environments, such as the metaverse, would provide a valuable opportunity to reach a particularly vulnerable population of young people, known as "Generation Z" (or Gen Z), which is believed to be the primary target group of the metaverse[21]. Individuals in this generation were born between the mid to late 1990s through the early 2010s and are the first social generation of digital natives. This generation has been described as more educated, concerned about academic performance, stressed, and depressed than previous generations[22]. On the other hand, the potential benefits of the metaverse for the aging population have also been stressed, as the metaverse could increase interconnectedness, reduce social isolation, and optimize chronic disease management[23].

Of course, it is essential to recognize that one size does not fit all. For many years, research in psychotherapy was focused on determining "what works for who." Accumulated evidence shows that certain psychotherapeutic approaches match better with specific disorders (*e.g.*, cognitive behavioral therapy has demonstrated efficacy for anxiety disorders, while dialectical behavioral therapy has shown effectiveness for borderline personality disorder). However, individual differences in personality, cultural background, or personal preferences should not be dismissed. Treatments delivered through the metaverse should effectively account for cultural factors and diverse backgrounds. Virtual environments for psychotherapeutic work should reflect cultural diversity through symbols, use of space, and furniture, potentially allowing users to customize their virtual spaces to feel safe and at ease. In addition, metaverse-based treatments should support multiple languages, offering treatments in the user's native language. Having cultural consultation teams with professionals with expertise in cultural backgrounds could help deliver culturally sensitive treatments.

Among nonspecific factors, the therapeutic relationship should receive special attention. Since the COVID-19 pandemic and the subsequent increase in hybrid treatments, how to establish and maintain therapeutic alliances in virtual environments has been a matter of concern[24]. Although virtual environments can simulate many nonspecific relation elements of face-to-face therapy[25], the alliance towards the virtual therapist should be explored. Non-verbal language, voice tone, and facial emotional expressions are essential to human interactions and should be explored in virtual relationships. Some studies addressing the impact of AR or VR on the therapeutic alliance showed good outcomes[25,26], with evidence indicating that the alliance towards the virtual therapist is a significant predictor of the treatment outcome [25]. As mentioned, data obtained by Tu *et al*[17] is promising, showing better performance for the AI system in the empathy domain than human physicians. However, specific studies conducted within the metaverse should confirm these encouraging data.

Changing behaviors requires skills acquisition, strengthening (rehearsal), and generalization[27]. Immersive by nature, the metaverse provides the perfect scenario to practice the skills acquired during treatment repeatedly. The therapist's availability in the virtual world would facilitate generalization and speed learning. Individuals could experience more effective behavior, leading to perspective-taking and facilitating the learning of new, more efficient behavioral skills.

While VR and AR have been used in mental health for several years, the use of AI to treat mental illness is still very recent. The metaverse could be used as a virtual environment for novel AI technology applied to psychological treatments. For example, deepfakes, a technology developed by using deep learning and enabling the generation and manipulation of fake faces that look almost identical to real people, seems promising as a treatment tool and could be used within the metaverse[28]. To date, only one study reported using deepfakes as an add-on treatment to allow confrontation with the perpetrator in victims of sexual violence[29]. The objective of this deepfake intervention was to overcome negative moral emotions and cognitions, decrease post-traumatic stress disorder symptoms, and increase the victims' self-empowerment. Although this paper only described the experiences of two individuals, results showed that the intervention was well-accepted and tolerated. Unlike real-life confrontations with a perpetrator, deepfake technology allows the therapist to act like the perpetrator, ensuring that the interaction is safe and tailored to the patient. The authors concluded that deep fakes are a promising add-on treatment for patients who have experienced trauma.

Implications for clinical research

Finally, the metaverse could significantly change how we conduct scientific research and, most importantly, the speed at which relevant research is transferred to society. As Baldwin *et al*[30] concluded in a systematic review, psychiatry faces several challenges in implementing precision psychiatry into real-world practices. An environment that could overcome geographic and discipline barriers could facilitate global collaborations. Virtual laboratories could benefit from more extensive access to research participants, lack of dedicated physical spaces, and expensive equipment. In the metaverse, virtual environments could mimic the conditions of traditional clinical trials, reducing the complexity of their logistics; the recruitment process will benefit significantly from patients not having to be at the physical study site.

On the contrary, participants could engage in study-related activities from their homes, allowing more diverse and real-world treatment conditions. Moreover, this would enable people from diverse backgrounds and characteristics to participate in clinical research, fostering research on the efficacy of metaverse-delivered treatments across various cultural groups. In addition, participants' responses could be monitored in real-time.

PROJECTED CHALLENGES

The potential dark side of the metaverse has also been discussed. In a recent article by leading academics and experts from diverse backgrounds, the authors commented on several aspects of mental health, ethics, privacy, and user information, among others[31].

Lack of evidence

Regarding mental health treatment, VR and AR-based interventions have proliferated in the last few years to increase the effectiveness of traditional approaches and provide effective strategies for a broader population. However, as the field is relatively new, methodologically sound studies exploring the efficacy of these interventions are still needed. Only a few randomized clinical trials have been conducted, with small samples and various interventions. Therefore, these need to be further investigated. Perhaps the most crucial question to address is whether the skills acquired in the metaverse can be transferred to "real" life and if so how can we measure this?

Concerns about addiction-like behaviors have also been raised[32,33]. Would the use of the metaverse foster avoidance of offline challenges? Would using the metaverse be related to less real-world social connectedness and disturbance of relevant behavior such as sleep or eating? Evidence showing that VR leads to depersonalization and derealization should also be considered[34]. Interestingly, a recent systematic review on the adverse effects of VR and AR interventions in psychiatry showed that of 73 studies, 7 reported worsening clinical symptoms or an increased fall risk[35]. Reported adverse events included dropouts due to cybersickness, worsening of symptoms (post-traumatic stress disorder, anxiety, and cravings), tiredness, dizziness, back pain, and carelessness. The authors expressed their concern about the need for systematic reports on adverse events, as 45 out of 73 studies did not mention adverse events. Future protocols should address this shortcoming to accurately elucidate the therapeutic effects of these interventions.

Accessibility

Arguments favoring online treatment approaches include increased access to effective interventions regardless of participant location, availability and flexibility, and anonymity[36]. While the metaverse holds promise for more extensive accessibility to mental health services, its economic advantages remain unclear. The affordability and widespread availability of VR headsets emerge as crucial factors, introducing a potential challenge to the envisioned inclusivity. Notably, the cost of VR headsets could perpetuate existing health disparities, particularly in regions where mental health inclusivity and equity are already diminished. As we delve further into the economic dimensions of metaverse-based treatments, it becomes imperative to critically assess their impact on global mental health disparities and formulate strategies to mitigate potential inequalities in access. Balancing the promise of extended reach with the economic realities of technology access will be integral to optimizing the metaverse's contribution to mental health care on a global scale.

Educating relevant stakeholders on the potential risks and benefits of the metaverse seems appropriate to ensure well-being in a broader sense. It is reasonable to think that, as with any other treatment tool, some will benefit significantly from the metaverse, and some will not. Having data and resources to identify correctly who pertains to the first group or the second would be essential.

Table 1 Overview of the main opportunities and challenges of the metaverse in the field of mental health

Opportunities	Challenges
Prevention	Lack of evidence
Reduction of stigma	Accessibility
Treatment	Ethical concerns
Clinical research	

Ethical concerns

Finally, the metaverse is expected to challenge many of the problems of today's digital age, such as data rights security misinformation and radicalization[37]. From an ethical point of view, several arguments have also been stated against this treatment modality. Privacy, confidentiality, and security have been raised as the primary concerns. In addition, therapist competence and research gaps have also been posited as significant challenges for the field. How to proceed if an emergency arises is also a matter of concern. Situations involving a threat to the individual or others can be challenging to resolve online. Educating users to be aware of these potential risks and discussing "warning signs" and when to approach "real-world" emergency services would be especially relevant for people struggling with mental health issues. Refining AI tools to appropriately diagnose and provide recommendations based on the case's severity would help to reduce risks (Table 1).

CONCLUSION

The internet, as we know it, was built over several years and decades, and its penetration in our daily lives has gradually increased. The exponential development of telehealth during the pandemic is a good example of how technology constantly changes and reshapes our lives and behaviors. Therefore, the extent to which the metaverse will impact our lives is, to date, still being determined. Will the metaverse change the way we deliver mental health care? What data must be captured to determine if a treatment provided within the metaverse is effective? This would take years to develop, and like the "normal" internet, new developments will be presented over several years. It is not easy to project exactly what the metaverse will be like and how it will impact our daily lives. It seems reasonable to think that it would influence how we deliver mental health care, with both positive aspects and obstacles to overcome. As mental health professionals and academics, our role in the metaverse is still unknown. However, it seems that the metaverse would be a space where research labs, academics, and therapists could gather efforts to develop new ways to deliver mental health care safely and effectively to specific groups of people who might be especially vulnerable. Considering all the above on our research agendas, using the metaverse to support mental well-being would be crucial.

FOOTNOTES

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