

Virtual Reality as a Tool for Anxiety and Stress Reduction: User Perspectives

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ABSTRACT

Virtual reality (VR) is increasingly recognized for its potential in mental health interventions, yet user perspectives on its role in anxiety and stress reduction remain underexplored. This study examines experiences and perceptions of VR through a survey and in-depth qualitative responses from 35 participants (aged 20–44 years, M = 28.7, 51% male, 49% female) with diverse educational and occupational backgrounds. Participants reported high digital technology use (M = 6.9 hours/day), often linked to anxiety, stress, and sleep disruption. Among 16 VR users (46%), 13 (81%) described VR as “calming” or effective for stress relief, citing applications like meditation, gaming, and therapy (e.g., exposure therapy, pain distraction). Qualitative insights from 26 participants highlight VR’s immersive benefits, therapeutic potential, and barriers, including limited access, awareness, and concerns about over-reliance or cultural relevance. Findings suggest VR is a promising adjunct for anxiety and stress management, particularly in guided settings, but equitable adoption requires addressing access and ethical challenges. Further research should explore VR’s efficacy in diverse, underserved populations.

Keywords:- Virtual reality, anxiety reduction, stress management, mental health, user perspectives, immersive technology, therapeutic applications, exposure therapy, pain distraction, digital technology, screen time, access barriers, ethical concerns, cultural relevance, qualitative research, thematic analysis

Introduction

Mental health challenges, particularly anxiety and stress, have become increasingly prevalent in modern society, exacerbated by widespread digital technology use. Prolonged screen time, averaging several hours daily, is associated with adverse effects such as anxiety, mental fatigue, sleep disruption, and impaired emotional regulation (Twenge & Campbell, 2019; Orben & Przybylski, 2020). As individuals navigate these challenges, innovative interventions are needed to mitigate the psychological toll of digital overload while leveraging technology’s potential for mental health support. Virtual reality (VR), an immersive technology that creates simulated environments, has emerged as a promising tool for addressing anxiety and stress. Unlike traditional screen-based media, VR offers controlled,

interactive experiences that can facilitate relaxation, therapeutic interventions, and emotional regulation (Rizzo & Koenig, 2017; Freeman et al., 2017).

Research on VR’s mental health applications has demonstrated its efficacy in specific contexts, such as exposure therapy for phobias, pain distraction for chronic conditions, and mindfulness-based stress reduction (Maples-Keller et al., 2017; Won et al., 2017). For example, VR-based exposure therapy has shown significant reductions in anxiety symptoms by allowing users to confront fears in safe, virtual settings (Carl et al., 2019). Similarly, VR’s immersive qualities have been used to distract patients from pain, improving emotional well-being in clinical populations (Li et al.,

2017). However, much of the existing literature focuses on controlled clinical settings or specific disorders, with limited exploration of user perspectives across diverse populations. Understanding how individuals from varied backgrounds perceive and experience VR's mental health benefits is critical, as personal and cultural factors shape technology adoption and efficacy (Botella et al., 2018).

Despite VR's potential, barriers such as limited access, high costs, and ethical concerns (e.g., over-reliance, privacy, cultural insensitivity) may hinder its widespread use, particularly in underserved communities (Lindner et al., 2020). Moreover, the contrast between VR's structured applications and the broader mental health challenges posed by digital technologies—such as social media-induced anxiety or screen fatigue—remains underexplored. User perspectives, especially from non-clinical populations, can provide valuable insights into VR's real-world applicability, highlighting both its benefits and limitations.

This study addresses these gaps by examining user experiences and perceptions of VR as a tool for anxiety and stress reduction. Drawing on survey data and in-depth qualitative responses from 35 participants with diverse educational and occupational backgrounds, the research explores VR's role in mental health management, its perceived benefits (e.g., calming effects, therapeutic applications), and barriers to adoption (e.g., access, ethical concerns). By focusing on a sample reporting high digital technology use ($M = 6.9$ hours/day) and associated mental health challenges, the study contextualizes VR within the broader landscape of technology-related stress. The objectives are to: (1) identify how VR is used for anxiety and stress reduction, (2) explore user perceptions of its efficacy compared to other digital technologies, and (3) highlight barriers and ethical considerations for equitable implementation. Through qualitative thematic analysis and descriptive statistics, this study aims to inform the development of accessible, user-centered VR interventions for mental health.

Review of Literature

The rising prevalence of anxiety and stress in modern society has been linked to increased digital technology use, with studies reporting associations between prolonged screen time and adverse mental health

outcomes, including anxiety, depression, and sleep disruption^{1,2}. Daily screen exposure, often exceeding six hours, contributes to cognitive overload, social comparison, and emotional dysregulation, necessitating innovative interventions to mitigate these effects³. Virtual reality (VR), an immersive technology that creates interactive, simulated environments, has gained attention as a potential tool for mental health support, offering controlled experiences that differ from traditional screen-based media^{4,5}. This review examines VR's applications for anxiety and stress reduction, its therapeutic mechanisms, and the gaps in understanding user perspectives, particularly in diverse, non-clinical populations.

VR as a Mental Health Intervention

VR's unique ability to immerse users in tailored environments has positioned it as a promising intervention for mental health challenges. Unlike two-dimensional screens, VR engages multiple sensory modalities, creating a sense of presence that enhances emotional engagement and therapeutic outcomes⁶. Early research focused on VR's use in clinical settings, particularly for anxiety disorders. Exposure therapy, a cornerstone of cognitive-behavioral treatment, has been adapted to VR, allowing patients to confront phobic stimuli (e.g., heights, spiders) in safe, virtual settings⁷. Meta-analyses have demonstrated that VR exposure therapy (VRET) produces significant reductions in anxiety symptoms, with effect sizes comparable to in vivo exposure^{8,9}. For example, studies on social anxiety disorder found that VR-based role-playing scenarios improved social confidence and reduced avoidance behaviors¹⁰.

Beyond anxiety disorders, VR has shown promise in stress management. Mindfulness-based VR interventions, which guide users through virtual relaxation environments (e.g., forests, beaches), have been associated with reduced stress and improved emotional well-being¹¹. A randomized controlled trial reported that a 10-minute VR mindfulness session lowered cortisol levels and self-reported stress in healthy adults compared to a control group¹². Similarly, VR's immersive qualities have been leveraged for pain distraction, particularly in chronic conditions like cancer or sickle cell disease, where reduced pain perception is accompanied by lower stress and anxiety^{13,14}. These findings suggest VR's versatility as a tool for both clinical and general populations.

Mechanisms of VR's Efficacy

The efficacy of VR for anxiety and stress reduction is attributed to several psychological and neurological mechanisms. The sense of presence, defined as the subjective experience of being in a virtual environment, enhances engagement with therapeutic tasks, such as exposure or relaxation exercises¹⁵. Neuroimaging studies indicate that VR activates brain regions associated with emotional regulation, including the prefrontal cortex and amygdala, facilitating desensitization to anxiety-provoking stimuli¹⁶. Additionally, VR's ability to control environmental variables (e.g., intensity of stimuli, pacing) allows for personalized interventions, which is critical for addressing individual differences in anxiety and stress responses¹⁷.

VR's distraction capabilities are another key mechanism. By immersing users in engaging virtual tasks or environments, VR reduces attention to stressors or pain, a process supported by the limited capacity model of attention¹⁸. For instance, VR gaming has been shown to decrease rumination and stress by redirecting cognitive resources to interactive challenges¹⁹. These mechanisms highlight VR's potential to complement traditional therapies, offering scalable, engaging alternatives to conventional interventions.

User Perspectives and Real-World Applications

Despite VR's demonstrated efficacy in controlled settings, user perspectives on its real-world applicability remain underexplored. Studies suggest that user acceptance of VR depends on factors such as perceived ease of use, comfort, and cultural relevance²⁰. For example, qualitative research with clinical populations found that patients valued VR's immersive and non-judgmental nature but reported barriers like motion sickness and high costs²¹. In non-clinical settings, VR's use for stress relief (e.g., via meditation apps or gaming) is growing, but adoption is limited by access disparities, particularly in low-resource or rural communities²². A survey of young adults reported that while 60% were interested in VR for mental health, only 20% had access to VR devices, highlighting a significant gap between interest and availability²³.

Cultural and ethical considerations also shape user experiences. Research indicates that VR interventions designed without cultural sensitivity (e.g., ignoring

linguistic or contextual factors) may alienate users, reducing effectiveness²⁴. Ethical concerns, such as data privacy, over-reliance, and the risk of escapism, have been raised, particularly for vulnerable populations like adolescents²⁵. For instance, prolonged VR use has been linked to dissociation in some users, underscoring the need for guided, moderated applications²⁶. These findings emphasize the importance of understanding diverse user perspectives to ensure VR's equitable and safe implementation.

Gaps in the Literature

While the literature on VR's clinical efficacy is robust, several gaps remain. First, most studies focus on specific disorders or clinical populations, with limited research on VR's role in everyday stress management among non-clinical groups²⁷. Second, user perspectives, particularly from diverse educational, occupational, and cultural backgrounds, are underrepresented, limiting insights into real-world adoption and barriers²⁸. Third, the interplay between VR and other digital technologies—such as social media, which often exacerbate anxiety—remains underexplored, despite their shared role in modern lifestyles²⁹. Finally, there is a paucity of qualitative research exploring how users perceive VR's benefits and limitations in the context of high screen time and associated mental health challenges³⁰.

Current Study

The current study addresses these gaps by examining user perspectives on VR as a tool for anxiety and stress reduction in a diverse sample of 35 participants reporting high digital technology use ($M = 6.9$ hours/day). Through survey data and in-depth qualitative responses, the study explores VR's perceived efficacy, its applications (e.g., meditation, therapy, gaming), and barriers to adoption (e.g., access, ethical concerns). By situating VR within the broader context of technology-related mental health challenges, this research aims to inform the development of accessible, user-centered VR interventions.

Objectives of the study

This study aims to explore the role of virtual reality (VR) as a tool for anxiety and stress reduction through user perspectives in a diverse Indian sample. Specifically, the objectives are:

1.To identify how VR is used for anxiety and stress reduction, examining purposes such as education, entertainment, relaxation, and therapy among participants.

2.To assess user perceptions of VR's efficacy in reducing stress and anxiety, focusing on both VR users and non-users, and capturing qualitative insights into its perceived benefits (e.g., calming effects, therapeutic applications).

3.To explore barriers and ethical considerations in adopting VR for mental health, including access limitations, cultural relevance, and concerns like over-reliance, particularly in urban and semi-urban Indian contexts.

4.To provide actionable recommendations for developing equitable, user-centered VR interventions, addressing the needs of diverse populations with high digital technology use ($M = 6.9$ hours/day) and associated mental health challenges.

By addressing these objectives, the study seeks to contribute to the growing field of digital mental health, offering insights into VR's real-world applicability and potential for scalable, culturally sensitive interventions.

Methodology

Research Design

This study utilized a mixed-methods design to investigate user perspectives on virtual reality (VR) as a tool for anxiety and stress reduction. The primary focus was qualitative, leveraging open-ended survey responses and semi-structured interview-like data to explore participants' experiences with VR, its perceived mental health benefits, and barriers to adoption. Quantitative data, including descriptive statistics on demographics and VR usage, provided context and supported the qualitative findings. This approach enabled a comprehensive examination of the study's objectives: (1) to identify how VR is used for anxiety and stress reduction, (2) to assess user perceptions of its efficacy relative to other digital technologies, and (3) to identify barriers and ethical considerations for equitable implementation. The mixed-methods design was chosen to capture the depth of individual narratives while quantifying usage patterns and sample characteristics.

Participants

Participants were 35 individuals (aged 20–44 years, $M = 28.7$, $SD = 6.8$; 51% male, 49% female) recruited via purposive sampling from urban and semi-urban areas in India. The sampling strategy ensured diversity in VR experience, education, occupation, and reported mental health challenges. The sample comprised students ($n=15$), healthcare professionals ($n=6$), IT professionals ($n=3$), and others (e.g., homemaker, lawyer, community health worker), with educational levels ranging from high school (10th or 12th Pass) to advanced degrees (e.g., PhD, MD, M.Sc.). All participants reported daily digital technology use ($M = 6.9$ hours, range: 1–17 hours), often associated with anxiety, stress, or sleep disruption. For in-depth qualitative analysis, 26 participants were selected: 16 VR users (46%) with experience in education, gaming, meditation, or therapy, and 10 non-users who provided relevant insights on digital technology or mental health, ensuring a balanced representation of perspectives.

Data Collection

Data were collected through a structured survey, delivered in-person or online based on participant accessibility. The survey included closed-ended questions on demographics (age, gender, education, occupation), digital technology use (e.g., hours spent, mental health effects), and VR usage, alongside open-ended questions to elicit detailed narratives. Two key open-ended questions, offered in English and Marathi to accommodate linguistic diversity, were central to the study:

Q1. Have you used VR? If yes, what was the purpose (entertainment, education, relaxation)?

This question (F12_VR_Use) assessed whether participants had used VR and identified purposes such as education (e.g., brain modeling, workshops), entertainment (e.g., gaming), relaxation (e.g., meditation apps), or therapy (e.g., exposure therapy).

Q2. Do you think VR can help reduce stress or treat anxiety?

This question (F13_VR_MH) explored perceptions of VR's efficacy for mental health, capturing positive, cautious, or skeptical views and specific examples (e.g., calming effects, pain distraction).

Additional open-ended questions probed comparisons with other digital technologies (e.g., social media) and barriers to VR use (e.g., access, ethical concerns). The rich, narrative-like responses to these questions were treated as semi-structured interview data due to their depth, akin to qualitative interviews. For the 26 participants selected for in-depth analysis, follow-up probes (e.g., *“Can you describe a specific instance where VR reduced stress?”*) were conducted in-person or via video calls, lasting 30–45 minutes. Responses were recorded verbatim in the survey or transcribed from digital sessions. Ethical protocols included informed consent, anonymized data, and the option to skip sensitive questions. The survey was designed to be accessible, with translations and support for varying literacy levels.

Data Analysis

Quantitative Analysis: Closed-ended survey data were analyzed using descriptive statistics to summarize demographics, digital technology use, and VR usage patterns. Frequencies, means, and standard deviations were calculated for variables such as age, daily screen time ($M = 6.9$ hours), and VR use prevalence (46% users). For Question 12 (F12_VR_Use), responses were categorized by purpose (education, entertainment, relaxation, therapy), with 16 participants reporting VR use. For Question 13 (F13_VR_MH), perceptions were quantified as positive (81% of VR users), cautious/neutral (12.5%), or access-limited (6.25%). Analyses were conducted using spreadsheet software for accuracy.

Qualitative Analysis: Open-ended survey responses and follow-up probe data were analyzed using thematic analysis, following Braun and Clarke’s (2006) six-phase framework: (1) data familiarization, (2) initial coding, (3) theme identification, (4) theme review, (5) theme definition, and (6) reporting. Two researchers independently coded responses, focusing on VR’s efficacy (e.g., “calming effect,” “stress relief”), applications (e.g., therapy, meditation), and barriers (e.g., access, ethical concerns). Five themes emerged: (1) VR as a calming and immersive tool, (2) therapeutic applications and professional endorsements, (3) barriers to adoption, (4) ethical and practical concerns, and (5) contextual mental health challenges. Inter-coder reliability was established through consensus discussions, achieving approximately 90% agreement.

NVivo software facilitated code organization and theme development.

Results

Participant Characteristics

The study included 35 participants (aged 20–44 years, $M = 28.7$, $SD = 6.8$; 51% male, 49% female) from urban and semi-urban areas in India. Participants had diverse educational backgrounds, ranging from high school (10th or 12th Pass, $n=2$) to advanced degrees (e.g., PhD, MD, M.Sc., $n=22$), and occupations, including students ($n=15$), healthcare professionals ($n=6$), IT professionals ($n=3$), and others (e.g., homemaker, lawyer, accountant, community health worker; $n=11$). All participants reported daily digital technology use ($M = 6.9$ hours, range: 1–17 hours), with common mental health challenges including anxiety ($n=15$), mental fatigue ($n=10$), sleep disruption ($n=12$), and irritability or indecision ($n=18$), often attributed to screen time and stress.

VR Usage Patterns

Of the 35 participants, 16 (46%) reported using VR, while 19 (54%) had no direct VR experience or limited exposure (e.g., “saw demo,” “not aware”). Among VR users, purposes were categorized as follows:

Education: 6 participants (37.5%) used VR for academic or professional purposes, such as virtual brain modeling (Participant 6, M.Sc. Neuroscience student) or workshops for sickle cell education (Participant 19, hematologist).

Entertainment: 4 participants (25%) used VR for gaming, often citing its immersive appeal (e.g., Participant 18, B.Sc. Computer Science student: “games & meditation apps”).

Relaxation: 4 participants (25%) used VR for meditation or calming experiences (e.g., Participant 8, B.Sc. Neuroscience student: “meditation”).

Therapy: 3 participants (18.75%) used VR for therapeutic applications, such as exposure therapy (Participant 17, clinical psychologist) or pain distraction (Participant 20, biology student with sickle cell disease). Some reported multiple purposes.

Non-users frequently cited lack of access or awareness. For example, Participant 14 (accountant) stated, “*Not aware,*” while Participant 34 (community health worker) reported only seeing “*videos*” of VR. VR users were predominantly younger (21–34 years, $n=14$), with balanced gender distribution (9 male, 7 female) and higher educational attainment (e.g., M.Sc., MBBS, PhD).

Table 2: VR Usage Patterns

Category	Details
VR Users	46% ($n=16$)
Non-Users	54% ($n=19$; no direct experience or limited exposure, e.g., “ <i>saw demo</i> ”)
Purposes Among VR Users ($n=16$)	<ul style="list-style-type: none">- Education: 37.5% ($n=6$; e.g., virtual brain modeling, sickle cell education workshops)- Entertainment: 25% ($n=4$; e.g., gaming)- Relaxation: 25% ($n=4$; e.g., meditation, calming experiences)- Therapy: 18.75% ($n=3$; e.g., exposure therapy, pain distraction)
Non-User Reasons	Lack of access/awareness (e.g., “ <i>not aware,</i> ” “ <i>saw videos</i> ”)
VR User Demographics	Age: 21–34 years ($n=14$); Gender: 9 male, 7 female; Higher education (e.g., M.Sc., MBBS, PhD)

Perceived Efficacy of VR for Stress and Anxiety Reduction

Among the 16 VR users, 13 (81%) reported that VR can help reduce stress or treat anxiety, describing effects such as “*calming,*” “*stress relief,*” “*anxiety/phobia reduction,*” or “*pain distraction.*” Two users (12.5%) expressed cautious optimism, noting VR’s potential but emphasizing guidance or further research (e.g., Participant 35, data analyst: “*Potential for stress relief, but needs mindful use*”). One user (6.25%) highlighted limited access as a barrier (Participant 23, animation student: “*Yes, but access limited*”). Among the 19 non-users, 10 (53%) offered no opinion due to lack of exposure, 4 (21%) were skeptical, preferring traditional methods (e.g.,

Participant 34: “*Prefers natural remedies*”), and 5 (26%) acknowledged potential benefits without personal experience.

Table 3: Perceived Efficacy of VR for Stress and Anxiety Reduction

Group	Perceptions
VR Users ($n=16$)	<ul style="list-style-type: none">- Positive Efficacy: 81% ($n=13$; e.g., “<i>calming,</i>” “<i>stress relief,</i>” “<i>anxiety/phobia reduction</i>”)- Cautious Optimism: 12.5% ($n=2$; e.g., “<i>potential but needs guidance/research</i>”)- Access Barrier: 6.25% ($n=1$; e.g., “<i>access limited</i>”)
Non-Users ($n=19$)	<ul style="list-style-type: none">- No Opinion: 53% ($n=10$; due to lack of exposure)- Skeptical: 21% ($n=4$; e.g., “<i>prefer traditional methods like natural remedies</i>”)- Potential Acknowledgment: 26% ($n=5$; acknowledged benefits without personal experience)

Qualitative Themes

Thematic analysis of open-ended responses and follow-up probes ($n=26$ participants) identified five key themes, reflecting VR’s role in mental health and its contextual challenges.

Theme 1: VR as a Calming and Immersive Tool

VR users frequently described its immersive qualities as effective for stress and anxiety reduction. Participant 18 (24, male, student) noted, “*VR helps reduce stress via calming experiences, like meditation apps or gaming, which pull you out of overthinking.*” Participant 10 (28, male, lawyer) reported VR creating “*calming environments*” through meditation and games, contrasting it with anxiety-inducing social media. Non-users with limited exposure, such as Participant 22 (39, female, homemaker), observed VR’s potential to “*distract child pain,*” suggesting indirect stress relief for caregivers.

Theme 2: Therapeutic Applications and Professional Endorsements

Healthcare professionals and students in related fields highlighted VR's therapeutic potential. Participant 17 (36, female, clinical psychologist) stated, *"Yes, structured exposure helps,"* citing VR's use in anxiety and phobia treatment. Participant 19 (38, female, hematologist) reported, *"VR distracts kids from pain, and trials show promise for stress reduction,"* emphasizing its role in sickle cell care. Participant 6 (25, male, neuroscience student) described VR as a *"controlled therapy tool"* for stress management, reinforcing its structured applications.

Theme 3: Barriers to Adoption

Limited access and awareness were significant barriers, particularly among non-users. Participant 34 (44, female, community health worker) remarked, *"VR isn't practical here; we rely on elders and natural remedies due to language barriers and no access."* Participant 23 (20, male, animation student) noted, *"VR's stress relief is great, but access is limited for many."* Even VR users, such as Participant 8 (21, female, neuroscience student), acknowledged that access constraints restricted broader adoption.

Theme 4: Ethical and Practical Concerns

Participants expressed concerns about over-reliance, privacy, and cultural relevance. Participant 32 (44, male, bank employee) cautioned, *"Might help if guided; unsupervised, it's an addiction risk,"* reflecting on their son's VR gaming. Participant 20 (21, male, biology student) noted, *"VR can't capture emotion or culture,"* highlighting limitations in addressing diverse mental health needs. Participant 35 (27, male, data analyst) advocated for *"ethical, supportive VR,"* emphasizing privacy and mindful use.

Theme 5: Contextual Mental Health Challenges

VR's benefits were contextualized within broader digital technology-related stressors. Participants reported high screen time ($M = 6.9$ hours), linked to anxiety (e.g., Participant 24, software developer: *"Guilt, pressure"*), fatigue (e.g., Participant 6: *"Comparison-based stress"*), and sleep issues (e.g., Participant 25, medical intern: *"Disturbed sleep"*). VR users often viewed VR as a respite from these stressors,

with Participant 7 (26, male, psychology student) noting, *"VR's exposure therapy was more targeted than social media's overthinking."*

Statistical Summary

VR Usage: 46% ($n=16$) used VR, with purposes distributed as education (37.5%), entertainment (25%), relaxation (25%), and therapy (18.75%).

Efficacy Perceptions: Among VR users, 81% ($n=13$) reported positive effects, 12.5% ($n=2$) were cautious, and 6.25% ($n=1$) cited access barriers. Non-users showed 53% ($n=10$) no opinion, 21% ($n=4$) skepticism, and 26% ($n=5$) potential acknowledgment.

Demographic Trends: VR users were younger ($M = 27.1$ years vs. 30.2 for non-users) and more likely to have higher education (87.5% vs. 57.9% with bachelor's or above).

Table 1: Summary of virtual reality (VR) usage purposes and efficacy perceptions

VR usage and Efficacy Perceptions	VR Users ($n=16$)	Non-Users ($n=19$)
Education	6	0
Entertainment	4	0
Relaxation	4	0
Therapy	3	0
Positive Efficacy	13	5
Cautious Efficacy	2	0
Access Barrier	1	4

Conclusion

This study provides valuable insights into the role of virtual reality (VR) as a tool for anxiety and stress reduction, drawing on user perspectives from a diverse Indian sample ($n=35$). The research reveals that 46% of participants used VR, with purposes spanning education (37.5%), entertainment (25%), relaxation (25%), and

therapy (18.75%). Notably, 81% of VR users reported positive effects, such as calming experiences and therapeutic benefits (e.g., exposure therapy, pain distraction), supported by qualitative themes highlighting VR's immersive potential and professional endorsements. However, barriers like limited access (54% non-users) and ethical concerns (e.g., over-reliance, cultural relevance) underscore the need for equitable implementation.

The findings affirm VR's promise as a digital mental health intervention, particularly in contexts of high screen time ($M = 6.9$ hours/day) and associated stressors (e.g., anxiety, sleep disruption). By leveraging a bilingual (English/Marathi) survey, the study captures culturally nuanced insights, emphasizing VR's applicability in diverse settings. Future efforts should focus on enhancing access, ensuring ethical design, and conducting larger-scale trials to validate VR's efficacy. This research contributes to the growing field of digital mental health, advocating for user-centered VR interventions that address both the opportunities and challenges of technology-driven mental health solutions.

Ethical Considerations

Ethical approval for the study was obtained from the Institutional Ethics Committee. All participants were provided with detailed informed consent forms, assuring them of confidentiality, voluntary participation, and the right to withdraw at any time without any consequence. Identifying information was anonymized to maintain participant privacy.

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Limitations

The reliance on self-reported data may introduce recall or social desirability biases. The small sample ($n=35$) and focus on technologically familiar participants may limit generalizability to low-access populations. Open-ended responses, while rich, may lack the depth of dedicated interviews, and the bilingual survey's translation accuracy was not formally validated.

Future Directions

The findings underscore VR's potential as a tool for anxiety and stress reduction, with 81% of VR users reporting benefits like calming effects and therapeutic applications. However, several implications arise for future research and practice. First, addressing access barriers is critical, as 54% of participants lacked VR exposure, particularly in underserved communities. Developing affordable, scalable VR solutions (e.g., mobile-based apps) and community education programs could enhance adoption. Second, ethical concerns, including over-reliance and cultural insensitivity, necessitate user-centered design, incorporating privacy protections and culturally relevant content. Third, further research should explore VR's efficacy in diverse, non-clinical populations, using larger, randomized trials to validate its benefits beyond the current sample ($n=35$). Finally, integrating VR with traditional therapies and evaluating its long-term impact on mental health outcomes will strengthen its clinical utility, ensuring equitable, effective interventions for anxiety and stress management.

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