

Virtual Reality for Addressing Depression and Anxiety

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Virtual reality is an emerging field in mental health and has gained widespread acceptance due to its potential to treat various disorders, such as anxiety and depression.

Keywords: virtual reality ; anxiety ; depression

1. Introduction

The use of virtual reality technology for addressing anxiety and depression has been widely studied as a promising tool for preventing and treating anxiety and depression, as well as promoting mental well-being. In recent years, with the advancements in mobile and commercial VR capabilities, the implementation of virtual reality in anxiety and depression interventions has become more feasible and affordable. The emergence of the COVID-19 virus and the subsequent restrictions enacted by over 180 countries ^[1] have led to an increase in mental health conditions such as anxiety and depression ^{[2][3][4][5][6]}, and many countries do not have adequate mental health resources and services ^[7]. As people were compelled to rely on technology to address restrictions, the pandemic has accelerated the use of technology-based interventions, including VR, for mental health treatment. The use of VR in addressing anxiety and depression has gained widespread acceptance due to its potential to provide remote tailored, immersive, and engaging experiences.

Several virtual reality (VR) interventions have recently been aimed at addressing mental health conditions and increasing the accessibility of mental health services to society ^{[8][9][10][11][12][13]}. VR can provide various opportunities to promote mental well-being, especially considering COVID-19 restrictions and the need for more accessible mental health services. VR is a technology that allows users to experience a completely different world by transporting them to a virtual world ^{[8][10][14]}. Through a combination of various technologies, such as a head-mounted display, headphones, and a joystick or hand-held controller, users can experience a fully immersive experience ^{[8][13]}. In VR, users can create responses that resemble real-world events as they interact with the world ^[10]. Due to VR's potential to treat various mental health illnesses, VR has been widely used to treat a wide range of mental health conditions ^{[8][13]}. These mental health disorders include nervousness, anxiety, post-traumatic stress disorder, autistic spectrum disorders, paranoia, and phobia ^{[8][9][10][11][12][13]}. In addition, VR allows users to explore various coping exercises and techniques to help people with anxiety or depression overcome their problems by giving them a safe space to explore different scenarios without fear of consequences ^{[9][15]}. Despite the abundance of the literature on VR for anxiety and depression, the scholarly community has not taken advantage of the opportunity to assess its general knowledge objectively.

2. Types of VR-AD

VR encompasses a broad range of technologies and applications, each with unique advantages and limitations. These VR types can be broadly divided into two categories: immersive VR and non-immersive VR. According to the study's results, immersive virtual reality is the most frequently used type of VR in VR-AD research, with its keyword appearing 36 times. Immersive VR completely immerses users in a virtual environment, blocking out the view of the real world ^[16]. Typically, an HMD and other motion-tracking devices are used to create an immersive experience ^[8]. It is found that the keyword "head-mounted display" appeared 15 times, emphasising the popularity of immersive VR experience.

Non-immersive VR, on the other hand, uses a computer screen, mobile phone, or projection to display the virtual environment rather than an HMD ^[17]. Although it is less immersive than immersive VR, non-immersive VR still provides a sense of presence in the virtual world. A 360-degree video is an example of non-immersive VR, with its keyword appearing 13 times in the study's results. In 360-degree video, users can look around in any direction as if they were actually in the environment ^[18].

Augmented reality (AR) is closely associated with virtual reality, with its keyword appearing 26 times. AR is a technology that allows users to see and interact with the real environment ^[19]. By combining the virtual and real worlds, AR provides

users with an enhanced sensory experience that allows them to see and interact with digital content more naturally and intuitively. AR can be classified as either AR or mixed reality (MR), both of which allow for the simultaneous display of virtual and real-world images, enabling users to interact with both simultaneously. Mixed reality is a type of technology that combines AR and VR elements to create a new type of experience. MR keywords appear 5 times in the study's findings.

Each type of VR has its strengths and limitations. Immersive VR provides a highly immersive and interactive experience, but it requires expensive equipment. Non-immersive VR is more accessible and affordable, but it may not provide the same level of immersion as immersive VR.

3. Therapeutic Methods in VR-AD

The findings reveal that VR-AD research uses a diverse range of therapeutic methods for treating anxiety and depression. Exposure therapy, which involves gradually exposing patients to anxiety-provoking stimuli, is the most frequently used therapeutic method in VR-AD research, with 142 appearances. The high frequency of exposure therapy suggests that it is the most widely used therapeutic method for addressing anxiety and depression in VR-based interventions. Cognitive-behavioural therapy, which focuses on changing negative thought patterns and behaviours, is the second most commonly used therapeutic method in VR-AD research, with 77 appearances. This indicates that cognitive-behavioural therapy is also a widely used therapeutic method for addressing anxiety and depression in VR-based interventions.

Furthermore, the study reveals that other therapeutic methods, such as mindfulness-based therapy, biofeedback therapy, relaxation techniques, and eye movement desensitization and reprocessing (EMDR), are frequently used in VR-AD research. These findings suggest that various therapeutic methods can be used in VR-based interventions for anxiety and depression. In addition, the prominence of exposure therapy and cognitive-behavioural therapy in VR-AD research highlights their potential effectiveness in addressing anxiety and depression in this context.

4. Diseases Influenced by VR-AD

The diseases most influenced by VR are predominantly those that relate to anxiety; hence, there is a high frequency of terms such as fear and phobia, which sometimes are used to mean anxiety. According to the results, phobia, pain, fear, anxiety, depression, dementia, schizophrenia, and COVID-19 are some diseases and situations where VR-AD research is predominantly applied. Anxiety is the most researched topic, followed by phobia, pain, and fear. Depression, dementia, schizophrenia, and COVID-19 are other significant diseases utilising VR technology. The high research focus on the use of VR technology on anxiety-related disorders suggests that it may be more effective in treating anxiety-related disorders than depression.

The COVID-19 pandemic in 2020 has intensified the research focus on anxiety and depression-related disorders. The pandemic has had a profound impact on the mental health of individuals worldwide. Therefore, VR technology has become crucial to mitigate anxiety- and depression-related conditions.

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