

RECENT DEVELOPMENTS AND FUTURE DIRECTIONS OF VIRTUAL REALITY FOR THE TREATMENT OF PSYCHIATRIC DISORDERS

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ABSTRACT

Virtual reality (VR), sometimes known as phantomatics, is a manufactured representation of artificial reality. Utilizing information technologies, totally in three dimensions. VR allows users to see virtual environments where sensory inputs aren't present as if they were transported through a specific system to the brain. Virtual medicine is designed to reduce direct contact with and impact on the human body during therapy. The development in this field is inevitable given the expanding availability of high-quality electronic gadgets, their powerful computational capabilities, and the ever-evolving Internet infrastructure. As a result, the study's goal was to identify VR's medical applications, with a particular emphasis on the fields of rehabilitation and mental health. It also included developing guidelines for future research. Environmental factors are always present in mental health issues. Individuals can continually experience their troubling circumstances in virtual reality (VR), computer-generated interactive environments, and learn how to deal with challenges through evidence-based psychological therapy. VR is emigrating from specialized labs. There are several gaps in useful applications for mental health. Although VR exposure-based treatments for anxiety disorders have the best track record, there are many more promising research and treatment directions. It was discovered that VR is a term that is frequently overused and used to refer to noninteractive and nonimmersive technologies. We come to the conclusion that VR has the potential to revolutionize the diagnosis, comprehension, and care of mental health issues.

1. INTRODUCTION

A technological revolution in internal health care is approaching. At the van may be virtual reality (VR), a important tool for individualities to make new literacy for the benefit of their cerebral well- being. Immersive VR creates interactive computer- generated worlds, which substitute real- world sensitive comprehensions with digitally generated bones , producing the sensation of actually being in life- sized new surroundings. VR allows similar tight control over the stimulants presented that remedial strategies can be precisely enforced; VR can produce situations that can be therapeutically helpful if used in the right way but near insolvable to recreate in real life; VR allows repeated, incontinently available and lesser treatment input; and VR can reduce inconsistency of treatment delivery. The future is rapidly getting closer with the availability of high-quality VR gadgets to the consumer market. Because it is so affordable, technology can now be used in homes and cutting-edge mental health clinics as well to being used for studies in laboratories.

2. VIRTUAL REALITY

Virtual reality is a simulated 3D terrain that enables druggies to explore and interact with virtual girding in a

way that approximates reality, as it's perceived through the druggies' senses. The terrain is created with Computer

tackle and software, although druggies might also need to wear bias similar as helmets or goggles to interact with the terrain. The more deeply druggies can immerse themselves in a VR terrain-- and block out their physical surroundings-- the more they're suitable to suspend their belief and accept it as real, indeed if it is fantastical in nature.

The system's image and audio are adjusted by the device in response to changes in the observer's head, hands, eyes, language, and body motion. Viewers can examine or control virtual things with natural gestures that mimic their own speech, body language, or behavior. The goal of virtual reality is to provide living things with a space where we may engage with technology in the same way that we do in the physical world, for as by sending letters to or drawing pictures of virtual people. There are primarily three types of VR. Non-immersive VR, also known as Anon- immersive VR, is designed to operate in a computer-generated environment where the user can control effort

without having to engage in direct commerce. The final 2 are fully and semi-immersive virtual reality.

3. VR AND MENTAL HEALTH

If high levels of presence are reached for circumstances that worry people, VR offers remarkable potential to assist them overcome mental health issues. The core of mental health problems is difficulty interacting with the outside world [for example, becoming extremely anxious around spiders in arachnophobia, experiencing intense flashbacks with memories of past trauma in post-traumatic stress disorder (PTSD), fearing attack from others in persecutory delusions, and repressing the urge to drink more in alcohol abuse disorders].

Recovery therefore entails acting, responding, and thinking differently in these circumstances.

The therapies that provide people the tools to make these adjustments in their everyday lives are the most effective.

With VR, people can experience realistic simulations of challenging circumstances and receive coaching on how to react based on the best available theoretical understanding of the particular illness. The simulations can be played again with varying degrees of difficulty until the desired learning is achieved. Access to the best psychological treatments could be made easier with VR. With the couch gone, headsets might soon be the preferred way of psychological therapy. Future clinics may also be able to assess issues in real time in virtual reality. The technology may potentially make significant progress in understanding the factors that contribute to mental health illnesses, for instance, by identifying environmental factors that increase an individual's chances of experiencing unfavorable psychological reactions.



Fig.1

4. ASSESSMENT USING VIRTUAL REALITY

4.1 Assessment in Social Anxiety Disorder

The use of virtual reality (VR) to assess social anxiety and public speaking anxiety has been examined, however the findings are conflicting. The preprogrammed avatars used in dialogue could not be commanded to interact and speak with the patient in real time until recently due to limitations in technology.

4.2 Assessment in Posttraumatic Stress Disorder

It has been suggested that VR can be utilized for PTSD assessment in active duty soldiers and veterans due to the possibility that some soldiers may overreport PTSD symptoms in order to receive benefits or may underreport PTSD symptoms out of shame.

Self-reported symptoms are less illuminating than psychophysiological reactions when soldiers and veterans are exposed to realistic VR worlds. Virtual reality (VR) worlds have been studied as an analog to genuine trauma in order to investigate mechanisms behind the development of trauma symptoms. Posttraumatic stress has previously been compared to the trauma film paradigm.

4.3 Assessment in Substance Use Disorder

It is assumed that craving in response to alcohol- and drug-related cues plays a part in the persistence of SUDs. The question of whether VR may be utilized to examine whether substance-related circumstances cause craving in substance-users has received attention in a number of recent research. The majority of studies have been done on people who are addicted to nicotine. There is some evidence that peer pressure from virtual avatars is quite successful in causing need. Virtual reality cue exposure to cues (such as cigarettes, an ashtray, or smokers in a bar) almost always results in craving. This suggests that immersing people in virtual worlds connected to their particular addiction can increase the accuracy of craving assessments and that virtual cravings may potentially be employed in cue exposure therapy.

4.4 Assessment in Eating Disorders

According to numerous research, people with eating disorders exhibit increased levels of anxiety when exposed to virtual environments that feature high-calorie foods and specific social interactions (such as a kitchen or swimming pool). According to research done on anorexic and bulimic patients, exposure to virtual food cues causes the same emotional, cognitive, and behavioral responses as exposure to actual food does: In VR settings, high-calorie foods might make you feel hungry and unsatisfied with your body. The enhanced presence felt in VR circumstances is typical.

4.5 Assessment in Attention Deficit Hyperactivity Disorder

Studies have looked into whether VR can be utilized for some neuropsychological exams, such as the continuous performance test (CPT), which evaluates attention, executive function, and memory.

4.6 Assessment in Psychosis

Virtual reality (VR) worlds have been utilized in a number of studies to look into executive performance and memory

problems in schizophrenia patients. Results generally demonstrated that the VR tasks gave researchers the ability to tell individuals with schizophrenia spectrum disorders and controls apart.

5. VIRTUAL REALITY TREATMENT



Fig . 2

5.1 Anxiety Disorders

The effectiveness of virtual reality exposure therapy (VRET) in the treatment of anxiety disorders has been the subject of several randomized controlled studies (RCTs), which are summarized in this section.

5.2 Acrophobia

A within-groups design was employed in a first pilot study to assess the efficacy of low-cost VR in treating acrophobia. Acrophobic people underwent two sessions of virtual exposure to heights and then two sessions of actual exposure. On anxiety and avoidance strategies, VRET was discovered to be just as effective as exposure in vivo. 33 acrophobic individuals were randomly assigned to either VRET or in-vivo exposure to heights in a first RCT. The real world used during exposure in vivo served as inspiration for the virtual surroundings employed in treatment. On anxiety and avoidance measures as well as a behavioral avoidance test, VRET was discovered to be just as effective as exposure in vivo. At the six-month checkup, the results remained consistent.

5.3 Dental phobia

Various VR therapies have been the subject of much research in dental phobia. Generally, VR is a successful intervention technique that uses diversion to ease patients' discomfort and anxiety during various dental procedures. In a recent trial, VR was employed with 255 individuals to lessen preoperative dental anxiety. The VR relaxation training group or the treatment-as-usual (TAU) group was randomly assigned to patients. The VR intervention was a 360-degree, tranquil countryside immersion lasting around 3.5 minutes. The VR group experienced a greater reduction in overall and anticipated dental anxiety than the TAU group. VRET can be quite

helpful in helping patients with certain phobias overcome their avoidance coping mechanisms. Different strategies from exposure have also been looked into for dental fear. Techniques like distraction and relaxation are one example whose justification conflicts with the exposure therapy's presumptive theoretical foundation.

5.4 Agoraphobia and panic disorder

The first-choice treatment for panic disorder and agoraphobia is CBT, which mostly involves exposure to circumstances and physical sensations that cause anxiety. While in-person exposure to many social circumstances might be difficult, virtual reality (VR) offers a fantastic way to simulate various daily situations for panic disorder and agoraphobia. Although this possibility appears clear, there is little evidence on VR exposure therapy's effectiveness for panic disorder and agoraphobia, and its adoption into clinical practice is progressing slowly. Research suggests that VR and in-person exposure therapy are equally effective in treating panic disorder and agoraphobia.

5.5 Social anxiety disorder

An extreme fear of criticism and rejection from others, as well as a persistent worry of embarrassment or humiliation, are traits of SAD. Exposure to feared stimuli while removing safety behaviors is a key element of CBT for SAD. This teaches patients that the predicted negative consequences are unlikely to materialize. Given that there are frequently few social contexts in which to conduct CBT in real life, VRET has emerged as a crucial tool for simulating social contexts and has been demonstrated to have the potential to elicit the social discomfort that patients experience.

5.6 Generalized anxiety disorder

Generalized anxiety disorder (GAD) is known to have a chronic or recurring course and commonly begins before the age of 20. Only a small number of studies have looked into VR therapies for GAD. The focus of these applications and how VR is used in treatment vary. VRET was paired with a mobile device that provided biofeedback in one of the earliest investigations of GAD (n = 20), and this treatment was compared to a waiting-list control group. Patients participating in VRET were immersed in a tranquil virtual setting (such as a beach or park), which helped them unwind. Following a period of relaxation, participants encountered a peculiar stressor in the form of words. The findings revealed no differences between the groups, and both groups improved over baseline.

5.7 Obsessive-compulsive disorder

OCD is a severe condition that frequently progresses chronically in patients, burdening them for the rest of their lives. The recommended course of treatment is exposure and response prevention (ERP), which has remission rates as high as 50% but still has potential for improvement. However, it is believed that ERP frequently causes a great deal of suffering in patients, and fewer than 40% of patients receive enough CBT. Patients may be encouraged to take their first exposure steps using VR exposure therapy in a secure setting.

There haven't been many research with VR and OCD patients, despite the fact that VRET has a lot of potential for treating the disorder.

5.8 Addiction

According to the principles of operant learning, addictive behaviors are seen as ingrained routines that are reinforced by rewards. The stimulation of the brain's pleasure regions by addictive substances serves as reinforcement for substance misuse. However, in many instances, the easing of unfavorable emotions also serves to negatively reinforce substance misuse. Many theories of addiction presuppose that craving is essential to developing and maintaining substance dependence. Cue exposure, which involves repeatedly exposing patients to the sights or scents of substances (such as the sight and smell of a glass of beer or the sight of white powder on a mirror), is used in some CBT protocols to treat patients until the cravings triggered by these signals significantly lessen.

5.9 Smoking

A few studies have looked into whether VR cue exposure therapy is successful in treating smoking, however the outcomes of these controlled studies have been inconsistent. In a study of those who were moderately dependent, VR cue exposure was just as successful as CBT at lowering cigarette consumption. However, in an RCT, adding VR cue exposure to CBT did not make it more successful than CBT alone. The combination condition actually had a greater relapse rate one year following treatment than the stand-alone CBT condition.

5.10 Body image disturbance

VR worlds are mostly utilized in therapy to change binge eating and body image issues. In comparison to CBT with a focus on psychonutrition, it was discovered that VR exposure for body image disturbance boosted body satisfaction in females with binge eating disorders. The VR-based body image protocol stimulates changes in how people perceive their bodies. Through reliving past experiences in virtual reality while being accompanied by a psychotherapist, this therapy helps patients identify cognitive biases in their perception of particular events and learn to perceive those scenarios differently.

6 FUTURE DIRECTIONS

VR environments have been developed for the treatment of additional anxiety disorders, PTSD, substance-related disorders, eating disorders, psychosis, and ASD in addition to their original purpose of treating specific phobias. The primary method used to treat these diverse illnesses is, exposure to pertinent circumstances that set off the distinctive issues associated with the majority of these diseases. Training social and cognitive abilities with avatars in VR environments is another typical component in some diseases (such as autism spectrum disorder).

The acceptance of VR assessment and therapy by professionals and patients is a crucial component of VR research.

Many medical professionals are hesitant to employ virtual reality (VR) to treat patients; in particular, these medical

professionals are concerned that the working alliance may be harmed by VR therapy because patients wear head-mounted displays, restricting eye contact.

Clinicians are also concerned that patients in VR therapy will stop participating since the VR worlds might seem unrealistic and irrelevant to their problems, and that their problems might even get worse.

The harmful effects of VR therapy?

The rates of VR degradation were examined in a recent study.

15 published RCTs for anxiety disorders were used to retrieve data sets. This demonstrated that VR therapy's degradation rates were equivalent to those of other therapeutic modalities and Patients receiving VR therapy showed less deterioration than those in waiting-list control groups. There is a definite need for studies exploring potential deterioration in diseases other than anxiety disorders because the outcomes for deterioration after VR therapy in other mental disorders have not been comprehensively assessed.

The price of VR is one barrier preventing its widespread adoption in therapeutic settings. The use of VR applications in the field of public mental health care is now possible because to the expanding availability of VR devices and the quick advancement of VR technologies. Today, a complete VR system (one computer, one head-mounted display, and one set of motion-sensing inputs) can be purchased for less than \$1,500, which was not the case 20 years ago. However, developing new 3D VR environments comes at a significant financial expense. Virtual reality (VR) environments are commercially accessible for the majority of the illnesses included in this article, but they are expensive for usage by individual therapists.

The majority of research using VR systems and immersive headsets to diagnose and treat the mental health issues covered in this review. More studies are utilizing 3D scenes created by computers. for the technical distinctions between 3D computer-generated scenes and immersive VR. It is imperative to assess the efficacy of VRET in individuals with mental disorders employing immersive headsets with computer-generated 3D scenarios. Investigating whether the presence in the VR environment, which is the sensation of "being there," is similar between VRET utilizing headsets and VRET using 3D images is one of the issues to be addressed. Clinicians will probably utilize VRET using 3D scenes more if it is as successful as VRET utilizing headsets because it is simpler to use in an office setting.

7.SUMMARY

The use of virtual reality exposure therapy for particular phobias, social anxiety disorder, and panic disorder with agoraphobia is supported by the most research. Virtual reality exposure treatment and evidence-based cognitive behavioral interventions are rarely compared head-to-head to determine whether method is best.

Few studies have been published on the effects of virtual reality exposure on people with PTSD from other events; research on virtual reality exposure therapy and posttraumatic stress disorder (PTSD) is restricted to veterans and active duty troops with PTSD.

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