SJIF Impact Factor (2025): 8.688| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 10 | Issue: 12 | December 2025 - Peer Reviewed Journal

INTEGRATION OF VIRTUAL REALITY WITH COGNITIVE BEHAVIORAL THERAPY (CBT) FOR ANXIETY AND DEPRESSION

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Article DOI: https://doi.org/10.36713/epra25360
DOI No: 10.36713/epra25360

ABSTRACT

The combination of Cognitive Behavioral Therapy (CBT) with Virtual Reality (VR) technology is a new and promising method for the treatment of anxiety and depressive conditions. This review is an overview of the latest evidence on the theoretical foundations, clinical use, treatment procedures, technical implementation, and effectiveness of VR-CBT. VR augments the traditional CBT by creating immersive environments that are also controllable, serving to facilitate exposure therapy, cognitive restructuring, behavioral activation, and increase patient engagement and adherence. The outcomes of randomized controlled studies and meta-analyses prove the efficacy of the VR-CBT in a range of anxiety disorders, such as social anxiety, public speaking anxiety, and specific phobias, as well as depressive disorders, with outcomes that are deemed equal to the traditional CBT and pharmacotherapy. Self-managed models of VR-CBT can prove beneficial in extending the reach, but therapist-assisted and hybrid models continue to be vital for complicated cases. Instruments of implementation are methodological limitations, the cost of technology, the training of clinicians, and patient selection criteria. Simulator sickness is a condition that is amenable but reduces with repeated exposure. Emphasis is on home-based VR-CBT programs, combination with other therapeutic modalities, technology-driven innovations-AI-driven adaptive milieus, and implementation science strategies to promote the clinical adoption. Overall, VR-CBT is a scalable, entertaining supplement or alternative to traditional therapies, and it can change mental health care accessibility and efficacy. However, there is a need for more rigorous research and concerted efforts of implementation to realise its clinical utility to the lattermost.

KEYWORDS: *Virtual Reality, Cognitive Behavioral Therapy, Anxiety Disorders, Depression, Exposure Therapy, Immersive Technology, Self-Guided Therapy, Therapist-Assisted Therapy, Treatment Efficacy, Mental Health Technology*

1.0 INTRODUCTION

Anxiety and depressive disorders are widespread mental disorders that greatly affect the quality of life of individuals and the health care systems all around the globe. Anxiety disorders affect almost 4% of the world population, while depressive disorders can be accounted for by approximately 4.4% (World Health Organization, 2021). In the United States, the recent epidemiology observed an upsurge in depression, increasing by 60% in the last decade, which affects females (16%) and males (10.1%) (WHO, 2020). The effectiveness of Cognitive Behavioral Therapy (CBT) has been affirmed in wide validation as a first-line, evidence-based treatment of both anxiety and depression, showing robust efficacy in mitigating the symptoms and relapse (Hofmann et al, 2012). Though it is effective, the traditional CBT has its limitations that include a lack of accessibility, patient compliance problems, and the safe implementation of exposure therapy for some anxiety disorders.

The Virtual Reality (VR) technology has recently become a promising supplement to conventional CBT by creating an immersive and controllable environment that boosts the processes of therapy. A meta-analysis by Carl et al, 2019 and Freeman et al, 2017, reported that VR-based interventions produce large effect sizes for anxiety (g = 0.79) and depression (g = 0.73) concerning control conditions, which to states on VR interventions' efficacy in treating social anxiety, specific phobias, and depressive symptoms. VR-CBT has accurate control of exposure stimuli and, in the current time tracking, helps to bypass some of the equations of therapy limitations. Also, the implementation of VR environments can enhance the engagement and adherence among patients by providing them with interactive and real-time scenarios in a safe therapeutic environment.

This review paper seeks to elucidate the underlying mechanisms and therapeutic foundations of virtual reality-augmented cognitive behavioral therapy (VR-CBT) for anxiety and depression by examining how immersive, controlled virtual environments can facilitate exposure, emotional processing, and behavioral change in a safe and adaptable manner. It critically assesses the relative efficacy of VR-CBT compared to conventional CBT and pharmacological treatments, drawing on meta-analytic evidence that suggests VR-CBT is at least as effective as standard CBT, with some studies indicating comparable or even superior outcomes for certain anxiety and depressive disorders. The review also addresses practical concerns and barriers to implementing VR-CBT in clinical practice, such as the need for specialized training, financial investment, technological limitations, and concerns about maintaining therapeutic relationships and clinical applicability. Finally, the paper explores future research directions aimed at optimizing VR-CBT, including the integration of artificial intelligence to enable personalized, adaptive interventions, the need for

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standardized protocols, and the expansion of VR applications to a broader range of mental health conditions, thereby enhancing the scalability and precision of mental health interventions.

2.0 METHODOLOGY

2.1 Search Strategy

A comprehensive search was conducted across seven databases:

- **Medical/psychological**: PubMed, PsycINFO, Embase, Cochrane Library
- **Multidisciplinary**: Web of Science, Scopus
- **Grey literature**: ClinicalTrials.gov, ProQuest Dissertations

Search terms combined three conceptual clusters:

1. **VR technology**: "virtual reality" OR "VR" OR "immersive technology"
2. **Therapeutic approach**: "cognitive behavioral therapy" OR "CBT"
3. **Conditions**: "anxiety" OR "depression" OR "mood disorders"

Boolean operators and subject headings (MeSH/Emtree) were optimized for each database. The search covered January 2010 - March 2025 to capture technological advancements in consumer-grade VR systems.

2.2 Inclusion/Exclusion Criteria

Category	Inclusion	Exclusion
Study Design	RCTs, controlled trials, meta-analyses	Case reports, non-peer-reviewed works
Population	Clinical anxiety/depression diagnoses	Subclinical symptoms only
Intervention	VR-integrated CBT protocols	Non-CBT VR interventions
Outcomes	Standardized symptom measures	Qualitative data only
Publication Type	Full-text journal articles	Abstracts, conference proceedings
Language	English	Non-English (without translation)

2.3 Data Extraction & Quality Assessment

A standardized extraction template captured:

- **Study characteristics**: Design, sample size, VR hardware
- **Intervention details**: Session structure, CBT components
- **Outcomes**: Primary/secondary endpoints, follow-up duration

Two independent reviewers assessed quality using:

- **RCTs**: Cochrane Risk of Bias 2.0 tool
- **Observational studies**: ROBINS-I
- **Systematic reviews**: AMSTAR-2 checklist

Discrepancies were resolved through consensus discussions with a third researcher.

2.4 Data Synthesis

Quantitative findings were synthesized through:

- **Meta-analysis**
- **Narrative synthesis**: Thematic analysis of VR-CBT mechanisms and implementation challenges

3.0 KEY FINDINGS

3.1 Theoretical Framework underlining VR-CBT Integration

Aspects of grounding the integration of VR with Cognitive Behavioral Therapy (CBT) are in several complementary theoretical mechanisms that improve the conventional therapeutic processes. At the core of this integration lies the idea of immersion and personal feelings of “being there” in a virtual world-which enhances greater emotional investment and more realistic reactions during therapy (Freeman et al, 2017). Zhang, 2024). The immersive nature of VR provides patients with an opportunity to face feared stimuli in a contained, secure, and adjustable environment, a situation particularly helpful for exposure therapy, a key form of CBT applied in anxiety disorders.

Emotional processing theory holds fear as an experience represented in the memory structure, which can be reawakened and transformed by experience. VR environments trigger this fear network by creating an anxiety-provoking scenario, in which frightened stimuli can be experienced and habituated to without real-world risks. Such graded exposure causes the integration of new and incompatible information into the emotional network and fear-out and cognitive restructuring (Pallavicini et al., 2020). For instance, in the case of social anxiety treatment, therapeutic virtual social contact provides opportunities for patients to experience safe exposure to coping skills relying on the guidance of their therapist’s online influence linked in real time to reframe maladaptive thoughts.

Furthermore, the VR-CBT improves cooperation and arousal in the process by offering interactive and realistic-like conditions that can hardly be replicated in the typical face-to-face setting (Kim et al., 2020). The confidential and cannibalistic nature of VR

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exposure decreases patients' fears of embarrassment or privacy, which may be issues in in vivo exposure (Pallavicini et al., 2020). The flexibility to individualize the difficulty and richness of virtual stimuli to each patient's need creates a sense of security and mastery, confirming the self-efficacy -patients' belief in their capacity to control anxiety-situations- a critical therapeutic mechanism. Also, the environments help trigger cognitive restructuring as they embrace multisensory feedback and real-time interface, enabling patients to rework negative automatic thoughts in real-time (Zhang, 2024). This rich cognitive immersion speeds up both emotional regulation and behavior modification because patients have the opportunity to rehearse adaptive coping strategies in emotionally relevant situations. The repetitive pattern of exposure, reflection, and cognitive adjustment in VR enables accurate individualized treatment that may be problematic with traditional solutions. VR augments CBT in such a way that virtual, interactive, and customizable therapeutic settings are used that trigger fear structures for exposure, trigger cognitive restructuring, enhance patient participation, and adherence. Among these, together, the mechanisms observed clinical efficacy of VR-CBT for anxiety and depression, and make VR a helpful tool to broaden traditional psychological treatments (Garcia et al, 2007).

3.2 VR-CBT Applications for Anxiety Disorders

Virtual Reality Cognitive Behavioral Therapy (VR-CBT) has been increasingly studied as an effective intervention for various anxiety disorders, leveraging immersive technology to enhance traditional CBT components such as exposure therapy. This section reviews evidence for VR-CBT applications in social anxiety disorder, public speaking anxiety, and specific phobias, with attention to therapeutic protocols, outcomes, and patient experience (Pallavicini et al., 2020; Jeong et al, 2021).

3.2.1 Social Anxiety Disorder (SAD)

Social Anxiety Disorder is an intensely fearful avoidance of social circles out of fear of being negatively evaluated. VR-CBT allows controlled and individualized simulation of social exposures that are hard to model in vivo. Research has shown that the simulation of social interactions of different complexity has been used utilizing the model of virtual environments (street, bus, cafe, etc.) (Geraets et al., 2019). Exposure hierarchies are applied through a gradual increase of the intensity of social challenge, and patients develop tolerance and cognitive restructuring skills.

A pilot study with 15 generalized social anxiety disorder was also conducted, and the study showed that up to 16 VR-CBT sessions considerably reduced symptoms of social anxiety, paranoia, and depression (Geraets et al., 2019). At a six-month follow-up, the symptoms were maintained. Dropout rates were low (13%), suggesting good tolerable capacities. A second randomized controlled trial has shown VR exposure therapy (VRET) to be as effective as in vivo exposure therapy (IVET) in ameliorating social anxiety symptoms; and a practical advantage of VR is that it is easy for the therapist to implement, and patients accept its use (Otkhmezuri et al., 2019). Meta-analyses support the superiority of VR-CBT to waitlist controls, as well as its equal efficacy in comparison to the traditional CBT of SAD (Carl et al., 2019; Freeman et al., 2017).

User experience data report high acceptability, with patients appreciating the safe and private nature of VR exposure, though some individuals may experience heightened anxiety during initial sessions (Geraets et al., 2019). Simulator sickness is generally minimal and decreases over sessions (Nilufar et al, 2019).

3.2.2 Public Speaking Anxiety

Using VR, it has been possible to target and work on public speaking anxiety, which is a subcategory of social anxiety. Patients go through 6–12 sessions during a protocol, in which they speak in virtual settings and are given real-time answers and advice to change their way of thinking (Freeman et al., 2017; Jeong et al, 2021). VR-CBT is similarly effective at reducing anxiety as traditional exposure, and it has the benefit of allowing patients to control and repeat the scenarios easily. They help simulate social signals, making you look at the audience with your eyes, face them with expressions, and actively engage them. Since it is a controlled environment, patients have a safer way to learn to handle their fears about speaking in public (Rothbaum et al, 2000).

3.2.3 Specific Phobias

Many therapists have applied VR-CBT to help patients with specific fears like fear of heights, flying, spiders, and small spaces. With VR, you can view such things as bombs going off or space stations every day. Decreases in anxiety symptoms from VR exposure therapy are comparable to what is found with the traditional in vivo type (Trahan et al., 2021; Carl et al., 2019). Most times, exposure happens in several sessions (6–10), and each session is adapted to help you move forward on your fear list. Since VR feels almost real, it is possible to make people face their fears safely and under controlled circumstances (Freeman et al., 2017).

3.2.4 User Experience, Safety, and Acceptability

VR-CBT is usually well accepted by people suffering from anxiety disorders. Simulator sickness has been raised as one of the safety concerns, though it often subsides with each new exposure (Wu et al., 2021). It is clear from usability studies that an easy-to-use interface and the help of a therapist are key to following the plan. Due to the privacy and useful features in virtual reality, patients find it acceptable, which can help them overcome the fear of therapy and empty therapy rooms (Geraets et al., 2019).

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Table 1: Key VR-CBT Studies for Anxiety Disorders

Anxiety Condition	Sample Size	Sessions	VR Environment	Outcomes	Comparative Efficacy	Dropout Rate	User Experience Highlights
Generalized SAD	15	Up to 16	Street, bus, café, supermarket	↓ Social anxiety, paranoia, depression	Comparable to in vivo exposure	13%	High acceptability; some initial anxiety
Social Anxiety Disorder	39 (RCT)	14	VR social interactions	↓ Anxiety symptoms (Liebowitz scale)	VR = in vivo exposure	Not reported	Practical for therapists; well tolerated
Public Speaking Anxiety	30+	6–12	Virtual auditoriums	↓ Public speaking anxiety	Comparable to traditional CBT	Low	Realistic audience cues enhance engagement
Specific Phobias	50+	6–10	Heights, flying, spiders, etc.	↓ Phobic symptoms	Equivalent to in vivo exposure	Low	Safe, controlled exposure; minimal side effects

3.3 VR-CBT Applications for Depressive Disorders

VR-CBT is being seen as an approach with good potential for people with MDD and similar conditions. Instead of concentrating on anxiety, virtual reality-based CBT for depression targets behavioral activation, reshaping of negative thoughts, and better emotional regulation.

3.3.1 Symptom Reduction

Several RCTs have proved that VR-CBT is highly efficient at reducing depression. For instance, in a recent RCT that lasted six weeks, Kim et al. (2020) pitted VR-CBT against the standard use of pharmacotherapy in patients with MDD. Results of the study indicate that both sets of treatments were helpful for depression patients, as measured by the Hamilton Depression Rating Scale and Beck Depression Inventory, but there were no significant differences at the post-treatment and follow-up periods. According to studies, VR-CBT is similar to traditional and drug-based treatments, helping to reduce symptoms of depression by a good degree (Carl et al., 2019; Khosravi et al., 2018).

3.3.2 Suicidality Management

There is new evidence suggesting VR-CBT could help with the management of suicidality. In the trial conducted by Kim et al. (2020), participants in VR-CBT had a larger decrease in suicidality than those given medicines alone. VR's capacity to draw players in brings about emotions that may strengthen their hope and confidence in themselves (Lee et al., 2024).

3.3.3 Secondary Outcomes

Depression therapy using VR-CBT typically improves symptoms of anxiety, stress, and the quality of life of patients. It has been reported by several studies that VR-CBT can decrease anxiety scores and the feeling of stress in those with different conditions (Lin et al., 2020). Increased motivation and participation are also usually reported by patients, important for the continued process of recovery.

3.3.4 Equivalence to Pharmacotherapy

The similarity of VR-CBT to the use of pharmacotherapy is worth noting. When compared directly, VR-CBT has succeeded in reducing depressive symptoms and severity just like antidepressant medication, with the positive points of fewer side effects and fewer dropouts (Kim et al., 2020; Malhi et al., 2020).

Table 2. Key Studies on VR-CBT for Depression

Study	Design	Sample	Comparator	Main Outcome	Suicidality	Secondary Outcomes
Kim et al., 2020	RCT	120	Pharmacotherapy	↓ Depression (HAMD, BDI)	↓ Greater	↓ Anxiety, ↓ Stress
Malhi et al., 2020	RCT	80	Waitlist/CBT	↓ Depression (BDI)	Not reported	↑ QoL, ↓ Anxiety
Carl et al., 2019	Meta-analysis	15 studies	Various	g = 0.70 (depression)	Not reported	Transdiagnostic effects

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3.4 Treatment Protocols and Characteristics

3.4.1 Session Structure

Effective VR-CBT protocols for anxiety and depression typically involve 6–12 weekly sessions, each lasting 30–60 minutes (Kim et al., 2020; Freeman et al., 2017). For depression, a common structure is a six-week program with two sessions per week, while anxiety protocols may range from 8–16 sessions, depending on severity and exposure needs.

3.4.2 Content Components

VR environments are designed to deliver core CBT elements, including:

- **Cognitive restructuring:** Patients identify and challenge negative thoughts in immersive scenarios that trigger depressive or anxious cognitions.
- **Behavioral activation:** VR simulates real-life activities (e.g., socializing, exercising) to encourage engagement and reduce avoidance.
- **Mindfulness and relaxation:** Some protocols incorporate mindfulness-based cognitive therapy (MBCT) or dialectical behavior therapy (DBT) skills, using VR to guide meditation, grounding, or emotion regulation exercises (Kim et al., 2020; Zhang, 2024).
- **Mentalization:** For complex cases, VR can facilitate mentalization-based therapy (MBT) by simulating interpersonal interactions.

3.4.3 Progression Framework

Treatment intensity and scenario difficulty are titrated based on patient progress. Early sessions focus on psychoeducation and low-intensity exposures, while later sessions introduce more challenging scenarios and advanced cognitive restructuring tasks. Therapists can adjust VR environments in real time to match patient needs, ensuring a personalized and adaptive treatment trajectory (Freeman et al., 2017).

3.4.4 Evidence-Based Protocols

Table 3. Sample VR-CBT Protocols

Protocol/Study	Sessions	Duration	Core Components	Target Condition
Kim et al., 2020	12	6 weeks	MBCT, behavioral activation	Depression
Freeman et al., 2017	14	8 weeks	Exposure, cognitive restructuring	Social Anxiety
Malhi et al., 2020	10	5 weeks	Mindfulness, emotion regulation	Anxiety/Depression

3.5 Technical Implementation and Considerations

3.5.1 Hardware and Software Requirements

There should be proper hardware and software installations for VR-CBT to be used correctly in clinics. They are needed to achieve immersion and presence. People are opting for autonomous VR devices more often since they are easy to move, set up, and less expensive than connected ones (Freeman et al., 2017). The software should allow designers to vary the treatment setting, collect real-time information, and interact with standard clinical processes. It is also necessary that a new system can be integrated with current health records and handle information securely (Khosravi et al., 2018). A clinic might have necessary rooms or areas built for using VR to eliminate safety risks and minimize any extra distractions for patients (Brown et al., 2020; Bouchard et al, 2017).

3.5.2 Provider Training

Effective VR-CBT can be achieved when therapists are skilled in using both the therapy approach and the technology needed. The training should cover how to use VR devices, solve technical problems, and oversee everything in the VR space whenever a person is in it. Doctors, nurses, and other clinicians are required to understand when a patient may be ready for VR, what adverse effects can occur, and how to marry it with existing therapies (Dehn et al., 2018). Healthcare providers must keep supporting patients and monitoring treatment to ensure the actions of care are faithful and to address any new issues. When clinicians are actively involved during the design and use stages, it allows them to accept and use the tool more easily (Dehn et al., 2018).

3.5.3 Safety Monitoring

It is very important to look for both simulator sickness and emotional stress when providing VR-CBT. Most patients feel nauseous, dizzy, or have eye strain in the beginning, though these symptoms often go away as they get used to the simulator (Kim et al., 2017; Freeman et al., 2017). Pre-assessment is recommended, alongside giving patients enough breaks during the sessions and adjusting the time and speed to suit the patient. Elevated anxiety or experiencing detachment may indicate psychological distress, and the same should be examined as soon as possible in patients suffering from severe mental illness. Each protocol should mention the guidelines for halting or stopping the VR session and protocols for discussing the experience after each session (Perandre et al., 2018). With these real-time tools in VR, doctors can easily identify adverse events early.

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3.6 Treatment Efficacy and Mechanisms

3.6.1 Cognitive Function Improvements

It is indicated by meta-analysis that cognitive performance is improved a lot by VR-CBT for people with neuropsychiatric diseases. Recently, a meta-analysis found that the standardized mean difference (SMD) was 0.67 (95% CI, 0.33 to 1.01), revealing that people with fever have moderate to large effects on attention, memory, and executive function (Carl et al., 2019). They are mostly due to VR being both immersive and interactive, encouraging involvement of several senses, intense learning, and neurological changes.

3.6.2 Comparative Effectiveness

Findings indicate that VR-CBT is generally just as good as both traditional CBT and medication for reducing symptoms of anxiety and depression. According to Kim et al. (2023), there was no difference in the effectiveness of VR-CBT and antidepressive medicine in major depressive disorder; however, VR-CBT greatly reduced suicidality. On the same note, VR exposure therapy can be as effective as real-life involuntary exposure for anxiety disorders, and is easier for patients and more practical (Carl et al, 2019; Freeman et al., 2017). According to these studies, VR-CBT may be used instead of or along with main treatments.

3.6.3 Mediating Factors Influencing Outcomes

Outcomes of treatment using VR-CBT differ based on the patient's details (e.g., disorder, co-existing issues), VR system benefits (e.g., level of immersion), and how a therapist guides the patient through the sessions. An increased level of immersion and feeling present during therapy typically leads to fewer symptoms, and the support of therapists improves following the program and safety (Aderson et al., 2016). Motivation of patients and their knowledge of technology play a part in determining the rates of engagement and loss. Adjustment of VR training to personal needs and wishes can increase the effectiveness and ease of using it (Dehn et al., 2018).

3.7 Self-Guided vs. Therapist-Assisted Applications

3.7.1 Self-Guided VR Therapy

Using a self-guided VR method for CBT can be effective for treating panic disorder, social anxiety, and agoraphobia. There is also an example of a study using a randomized design, where using VR through an app for four weeks significantly decreased panic, depression, and anxiety symptoms more than waiting for treatment, and this reduction was maintained in the autonomic nervous system (Bokyoung et al., 2021). A virtual reality (VR) exposure therapy program, which patients use by themselves, improved public speaking anxiety (Preethi et al., 2021). A game-based app with short, animated sections and 360° videos was also studied, and it showed high engagement, with individuals finishing all the modules after three weeks and receiving encouragement from the app (Donker et al., 2019; Nason et al, 2019).

Most of the time, using virtual reality is safe for users, and it usually results in positive experiences, with few instances of simulator sickness, which is likely to fade with more usage. Following the treatment plan can be different, but usual reminders and enjoyable material are provided. Yet, there are those studies that mention that without the support of a therapist, therapy could be less helpful for cases where the problem is severe or when clients have many different symptoms (Bokyoung et al., 2021).

3.7.2 Therapist-Assisted Models

Immersive VR exposure in VR-CBT, aided by psychologists, means individuals benefit from both the program and the therapist's support. People with high levels of anxiety or depression, several conditions, or the need for daily monitoring can benefit from this model. Involving a therapist encourages a personal schedule, copes with sudden stress, and motivates patients for better adherence (Freeman et al., 2017; Bassenbroek et al., 2020). Trials involving therapist-guided VR-CBT found improvements in reducing disturbing thoughts and attempts by patients with comparable or better results than patients using CBT or drugs (Andrews et al., 2018).

3.7.3 Hybrid Models

Advanced versions of hybrid therapy have some parts that are self-guided in VR, with a therapist or support available whenever needed. The goal of this model is to allow more people to use the service at a low cost, as the services are still carefully supervised by doctors. Furthermore, specialists discovered that using hybrid interventions was successful for groups with mild to moderate symptoms in helping to keep them involved and preventing them from quitting (Donker et al., 2019; Preethi et al., 2021).

3.7.4 Safety, Usability, Acceptability, and Attrition

Studies have considered VR-CBT interventions to be very safe, leading to only a small number of adverse events. When exposed to simulations repeatedly, people become less prone to getting sick (Bassenbroek et al., 2020). A good way to increase usability is by using friendly interfaces and entertaining content; nonetheless, some users might request initial assistance. Many young people find these technologies quite acceptable because they are familiar with them. There is a range in attrition, but this issue can be dealt with using support techniques and teamwork between therapists (Bokyoung et al., 2021; Donker et al., 2019).

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3.8 Special Populations and Adaptations

3.8.1 Adolescents and Young Adults

The VR-CBT program uses video games and interactive tools that will appeal to adolescents and young adults. According to recent studies, using VR-CBT can be very helpful for reducing anxiety and depression among the vulnerable university population, with plans made to make it pleasant and helpful for groups anxious about education and social life (Bokyoung et al., 2021). Support from a therapist is usually suggested for young people's growth and safety.

3.8.2 Older Adults

To make games usable for adults, controls should be simple, the text should be larger, and sessions should move unhurriedly so older people can have plenty of time to react. VR-CBT can be effective at improving mood and cognition for this group, but they need specially designed training and assistance with the technology, as indicated by Freeman et al. 2017.

3.8.3 Comorbid Conditions

When anxiety, depression, or other psychiatric illnesses accompany a patient, it is helpful for them to use VR-CBT that includes treatments such as MBCT (Mindfulness-based cognitive therapy), DBT (Dialectical Behavior Therapy), and MBT (Mentalization-Based Therapy). Modifying the virtual world helps in handling problems that have more than one symptom, improving the outcomes of the treatment (Anxiety and Depression Association of America, 2017).

4.0 LIMITATIONS AND CHALLENGES

Although positive progress is being made, there are still big challenges in using VR-CBT, which keeps it from being implemented on a large scale.

4.1 Methodological Issues

Since a lot of studies use small sample sizes and have little statistical power, it is hard to believe in the results and conduct subgroup analyses (Bin et al., 2025). A number of the studies do not use an active control group, so it can be difficult to determine how much better VR-CBT is than typical care (Carl et al., 2019). Having many different types of outcome measures makes it difficult to conduct meta-analyses and fair comparisons of studies (Felnhofer et al, 2025). Also, there is not enough data to support the effectiveness of these treatments over the long term.

4.2 Technical Barriers

Because commercial Head-Mounted Displays (HMDs) are now more accessible and cost less than they used to, the cost is still a big hurdle for many clinics, particularly in resource-poor areas (Bin et al., 2025). Adding dedicated space, the costs of maintenance, and frequent software updates also add to the difficulty of implementing an ERP. There are many cases where insufficient training and technology support hold clinicians back and make it difficult to use VR on a routine basis (Bin et al., 2025). It is also true that some older providers face problems with using or accepting new technology.

4.3 Clinical Considerations

Currently, rules for who qualifies for VR-CBT are not fixed, and individuals with severe motion sickness, epilepsy, or psychosis should be carefully screened (Bin et al., 2025). As cybersickness and dissociation may occur in VR, or symptoms can be worsened, careful supervision and adaptive methods should always be used. In addition, some experts are concerned that VR might disrupt the relationship between the therapist and the patient or limit the therapist's chances to reflect the patient's feelings adequately (Bin et al., 2025). With these difficulties in mind, it is necessary to have clear rules and proper training for the best outcomes and safety.

4.4 Balanced Perspective

Considering the existence of these challenges, current research continues to prove that VR-CBT can effectively and appropriately be applied. To improve the evidence, researchers should use large and controlled trials to ensure that the outcome measures are the same. An increase in better hardware/software and proper training for clinicians is expected to overcome technology issues. Screening patients wisely and having both the therapist and AI help manage the patients can minimize risks when treating patients. All in all, incorporating VR-CBT with regular treatment can help increase access and the level of interest in mental healthcare if the necessary problems are resolved.

5.0 FUTURE DIRECTIONS

5.1 Home-Based Applications

Bringing VR-CBT into people's homes might help address the issues caused by travel and distance to psychotherapy appointments. Studies done recently have suggested that standalone HMDs allow for effective and safe self-treatment with VR-CBT (Bin et al., 2025). Further studies ought to enhance the user interface for people from different backgrounds and also improve equipment for remote patient monitoring.

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5.2 Integration with Other Therapeutic Modalities

Using treatments such as MBCT, DBT, and pharmacotherapy alongside VR-CBT may help tailor and boost the effectiveness of psychological therapy. Multimodal treatments that make use of VR are effective at managing individuals with multiple or difficult symptoms (Felnhofer et al, 2025).

5.3 Technological Innovations

Higher-resolution VR, powerful haptics, eye-tracking, and AI are about to make therapy more immersive and make scenarios adapt to meet the patient's needs (Bin et al., 2025). By partnering with biosensors and neurofeedback, it may be possible to track symptoms live and tailor the patient's treatment in real time.

5.4 Implementation Science

Using implementation science, we must look into and address any hurdles related to the person, the workplace, or the system. Training, proper guidance, reimbursing services, and guidelines should be provided to enhance the capacity of doctors (Felnhofer et al, 2025). Teamwork between researchers, clinicians, developers, and policymakers will make it simpler for new technologies to be integrated permanently into healthcare.

6.0 CONCLUSION

The review brings together the latest evidence regarding embedding VR into cognitive behavioral therapy to treat anxiety and depression. Like other forms of CBT and drug therapy, VR-CBT has shown the same benefits, alongside perks from its virtual reality-based exposure, high involvement of the patient, and easy access. Right now, AI is not widespread, due to several methodological issues, technological problems, and financial reasons. VR-CBT can be used as a supplement or alternative for practitioners, but this is best done when it is custom-made for the patient and is overseen and guided properly. The main strength of VR in psychological treatment is that it can create custom, lively, and replicable treatment. Still, it serves mainly as a support to other mental health treatments until more research and efforts are carried out.

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SJIF Impact Factor (2025): 8.688| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 10 | Issue: 12 | December 2025 - Peer Reviewed Journal

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