Poonam Shodh Rachna (ISSN 2456-5563)
(A multidisciplinary, peer reviewed and refereed Journal)
Vol.3, Issue.VIII, August 2024, Pc : PSR-2408010
http://doi.org/10.56642/psr.v03i08.003

Efficacy Of Vr Therapy In The Treatment Of Eating Disorders- A Review Study

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Abstract

This paper reviews the efficacy of virtual therapy in treating eating disorders, focusing on its effectiveness compared to traditional in-person therapy. With the rise of digital health platforms, particularly during the COVID-19 pandemic, virtual therapy has become an essential tool for mental health treatment. This review synthesizes current research on various virtual therapy modalities, including teletherapy, online cognitive behavioural therapy (CBT), and digital apps, highlighting both their benefits and limitations. It concludes with recommendations for future research and integration into broader treatment plans.

Introduction

Eating Disorder is a set of serious mental illnesses which is marked by dysfunctional eating behaviours and disturbances in body image. These disorders can often lead to various serious psychological and physiological dysfunctions which require mental and medical interventions.

The diagnostic criteria have identified seven types of Eating Disorders which are anorexia nervosa, bulimia nervosa, binge eating disorder, and three other disorders: rumination disorder, pica, and avoidant food intake disorder. Some otherwise specified feeding or eating disorders are listed in another category.

Eating disorders encompass a range of conditions characterised by abnormal eating behavioursand severe distress about body weight or shape which has a negative influence on mental and physical health.

Anorexia Nervosa: A type of eating disorder which involves severe restriction of food intake, an intense fear of gaining weight, and a distorted body image.

Bulimia Nervosa:A type of eating disorder which involves recurrent episodes of binge eating followed by compensatory behaviours such as vomiting, excessive exercise, or laxative use.

Binge Eating Disorder:A type of eating disorder which involves recurrent episodes of binge eating without compensatory behaviours, leading to distress and potential weight gain.

Other Specified Feeding or Eating Disorders (OSFED): A category that includes eating disorders that do not meet the strict criteria for anorexia, bulimia, or binge eating disorder but still pose significant health risks. These include rumination disorder, pica, and avoidant food intake disorder.

These are the most frequently seen eating disorders in humans around the globe. Among the population, young women in Western countries are the most affected suggesting the prevalence of sex-related problems in the development of Eating Disorders.

Virtual Therapy Modalities

Unprecedented technological breakthroughs in the 21st century have changed almost every area of existence. Social media platforms have changed interpersonal interactions, while the internet, cell phones, and cloud computing have revolutionised communication and information access. Across all industries, artificial intelligence and machine learning are improving decision-making and automating processes. The main objective of each technology advancement is to make various activities more effective and efficient to enhance the outcome.

Various technological advancements are being integrated into psychology and psychotherapy in the form of - Teletherapy, VR therapy, Artificial intelligence, Chatbots, Electroencephalography (EEG) and various imaging technologies. These methods reduce the required efforts and time and enhance the outcomes.

Virtual therapy for eating disorders can be delivered through various formats, each with its own set of tools and techniques:

Teletherapy (Video, Audio): Direct communication between the patient and therapist via video conferencing or phone calls. This method maintains a sense of personal connection while offering flexibility in treatment.

Online CBT (Cognitive Behavioral Therapy): CBT programs adapted for online delivery, allowing patients to work through modules and exercises remotely. These can be guided by a therapist or self-directed.

Apps and Digital Platforms: Mobile apps and platforms that offer structured therapy programs, self-monitoring tools, and support communities. These tools can be used as a supplement to professional therapy.

Group Therapy Sessions: Virtual group therapy allows patients to connect with others facing similar challenges, providing social support in a structured online environment.

Hybrid Approaches: Combining virtual therapy with periodic in-person sessions, offering the benefits of both modalities.

One such technology used for therapy is the Virtual Reality (VR). It is a contemporary technology which has the potential to improve treatment outcomes in virtual reality (VR), which can significantly improve current therapy. Patients benefit from a medically controlled environment while interacting normally with stimuli that replicate real-life settings through the production of immersive computerised 3D experiences.

For patients, particularly those who are experiencing cognitive decline or disability, VR-based therapy provides a realistic, secure, entertaining, and engaging medium. The advantage of virtual reality (VR)--based rehabilitation is its capacity to provide lifelike, immersive experiences in multimodally enhanced environments, which can be used to compensate for the traditional rehabilitation paradigm's inability to effectively implement training outcomes in everyday situations. Furthermore, some research revealed that VR-based rehabilitation produced longer-lasting training results, and that integrating physical and cognitive training components with VR improved efficacy even further.

Recently, interactive virtual reality (VR) environments which use three-dimensional images displayed on a head-mounted display have gained popularity as a professional tool for treating Eating Disorder patients. Virtual reality is making its way into medicine, and it looks like this instrument will become more and more important.

Objective of the Study:

The objective of this paper is to review the current literature on the efficacy of virtual therapy in treating eating disorders and explore various virtual therapy modalities and their effectiveness.

Methodology:

Search Engines: The various electronic databases were utilized for the literature search such as PubMed, PsycINFO, Scopus and Web of Science

Time Frame: The review considered studies published from 2017 to 2024 to capture the recent developments in virtual therapy.

Studies were included from various published peer-reviewed articles, systematic reviews, or meta-analyses, with a focus on the use of virtual therapy for diagnosed eating disorders. The study included quantitative or qualitative data regarding patient outcomes. A narrative synthesis was employed for studies that are heterogeneous in terms of design or outcomes and findings were summarized.

Limitations: A potential lack of generalizability due to the diversity of virtual therapy interventions and eating disorder presentations.

Review Studies:

De Carvalho et al. (2017) conducted a comprehensive literature review to examine the effectiveness of Virtual Reality Therapy (VRT) in the treatment of Bulimia Nervosa (BN) and Binge-Eating Disorder (BED). The researchers initially identified 420 relevant articles but narrowed their focus to 19 studies that met specific inclusion criteria. These selected studies explored how VRT could influence patients' experiences related to body image and how environmental factors or specific foods might trigger their binge-purging cycles. The analysis revealed that the integration of VRT with traditional cognitive-behavioural therapy (CBT) techniques led to increased motivation for change, improved body image disturbances, enhanced self-esteem, and a notable reduction in purging and binge-eating behaviours among participants. The study underscored the potential of VRT as a valuable addition to existing therapeutic strategies for eating disorders.

Clus and colleagues (2018) conducted a systematic literature review to investigate the role of VR in both the evaluation and management of eating disorders. The research process involved screening 311 publications sourced from databases like PubMed, ScienceDirect, and Scopus. Ultimately, 26 studies were selected based on predefined inclusion criteria. The selected studies were categorized into two main areas of interest: (1) virtual interventions targeting body image concerns (27%) and (2) exposure to virtual food stimuli (38%). The majority of these studies (73%) utilized case-control designs and focused predominantly on clinical populations with diagnosed eating disorders. Additionally, 62% of the studies employed visual immersion equipment, such as head-mounted displays, to enhance the realism of the virtual experiences. The findings suggested that VR therapy is a promising and acceptable treatment modality for individuals with eating disorders, offering new possibilities for both assessment and intervention.

In 2020, Porras-Garcia et al. conducted a study aimed at evaluating the emotional and cognitive responses of patients with Anorexia Nervosa (AN) when exposed to virtual reality-based body exposure software. The study's sample size consisted of 30 female patients diagnosed with AN. The participants were exposed to virtual bodies that closely resembled their own, allowing researchers to assess their reactions. The study's findings revealed that patients with AN reported increased levels of fear of gaining weight (FGW) and heightened body anxiety during the VR sessions. These results suggest that VR-based body exposure could be an effective tool for reducing the emotional distress associated with body image and potentially aiding in weight recovery for individuals with AN.

In a separate but related study, Porras-Garcia et al. (2020) further explored the effectiveness of VR body exposure therapy in treating patients with Anorexia Nervosa. This study

specifically assessed various psychological and behavioural outcomes, including Fear of Gaining Weight, anxiety levels, the drive for thinness, body image disturbances, and attentional bias, before and after the VR intervention. The results demonstrated that VR body exposure therapy significantly reduced AN-related symptoms, improved body mass index (BMI), and decreased attentional bias towards body-related stimuli. Notably, some of these positive effects persisted for up to five months after the intervention, highlighting the potential long-term benefits of VR therapy for AN patients.

Matsangidou and colleagues (2020) conducted an innovative study to explore the feasibility and effectiveness of remote psychotherapy using Multi-User Virtual Reality (MUVR) technology. The study involved a sample of undergraduate females aged 18-25 years who were recruited to participate in virtual therapy sessions. The research demonstrated that MUVR could effectively enhance traditional therapeutic practices, such as Acceptance and Commitment Therapy (ACT), Play Therapy, and Exposure Therapy, particularly for individuals with concerns related to body shape and weight. The study also addressed the technical and logistical challenges associated with implementing MUVR in a therapeutic context. Despite these challenges, the results showed that both therapists and participants experienced positive outcomes from the MUVR-based therapy, suggesting its potential as a viable remote psychotherapy option.

Riva et al. (2021) conducted a study to delve into the applications of virtual reality in treating eating disorders, focusing on several innovative VR techniques. The study examined VR's role in reference frameshifting, cue exposure, and correcting attentional biases and body distortions. The findings highlighted VR's capability to enhance multisensory integration processes, which are often impaired in individuals with eating disorders. Additionally, VR-Cue Exposure Therapy (VR-CET) was found to be effective in reducing anxiety responses and food cravings, offering a novel approach to managing the psychological and physiological symptoms associated with eating disorders. The study concluded that VR could be a powerful tool in modifying patients' body experiences and reducing maladaptive behaviours.

Magrini et al. (2021) undertook a systematic review to explore the evolution and application of virtual reality as a therapeutic tool for treating eating disorders, with a particular focus on body image-related issues. Following the PRISMA guidelines, the review included 25 studies sourced from databases such as PubMed, EMBASE, Scopus, and Web of Science. The studies reviewed spanned approximately 20 years, during which VR technology advanced from complex, bulky systems requiring powerful computers to more agile and accessible devices, including low-cost VR systems. The review emphasised the potential of biofeedback techniques to enhance the efficacy of VR interventions, particularly in adolescent patients with Anorexia Nervosa. The findings suggest that as VR technology continues to evolve, its application in eating disorder treatment could become increasingly effective and widespread.

Ciążyńska and colleagues (2022) conducted a qualitative study to examine the efficacy of different types of Virtual Reality environments in treating various eating disorders, including Anorexia Nervosa, Bulimia Nervosa, and Binge-Eating Disorder. The study focused specifically on VR environments that utilized head-mounted displays (HMDs) with three-dimensional graphics. The analysis included 15 articles published between 2015 and 2021, with a diverse sample population in terms of age, gender, and ethnicity. The study concluded that the latest forms of VR therapy, which incorporate technologies such as 360-degree cameras, remote therapy, and eye-tracking, combined with established therapeutic approaches, hold significant promise in treating eating disorders. The research highlighted the need for further exploration of these advanced VR technologies in clinical settings.

B.P.-H and colleagues (2022) conducted a comprehensive review of 172 articles to summarize the most recent developments in VR-based immersive rehabilitation treatments for eating disorders, with a focus on behavioural and cognitive interventions. The review covered a

range of VR-based therapies, including Experimental Cognitive Behavior Therapy (ECT), Cue Exposure Therapy (CET), and Body Exposure Therapy (BET), as applied to conditions such as Anorexia Nervosa, Binge Eating Disorder, and Bulimia Nervosa. The findings suggested that VR technology may offer long-lasting therapeutic effects, with some studies reporting that VR-based treatments were either superior to or on par with traditional therapeutic approaches. The review also noted that while VR therapy has shown considerable promise, the study also discusses the need for further research is needed to fully understand its long-term efficacy and potential limitations.

Wang and Yang (2023) conducted a study to understand the feasibility and usability of virtual reality applications in treating eating disorders. The study involved nine female participants diagnosed with Anorexia Nervosa, Bulimia Nervosa, and Binge Eating Disorder. The VR application was designed to assist in selecting appropriate therapy types for each individual. The study's findings revealed that most participants with Bulimia Nervosa and Binge Eating Disorder preferred group therapy sessions over individual therapy, citing feelings of increased security and privacy during VR sessions. The results suggest that VR therapy could be a valuable tool in providing personalised treatment options for eating disorder patients.

Helen Bould and her team (2024) conducted a qualitative study to explore the perspectives of individuals with eating disorders and the healthcare professionals who treat them regarding the potential application of virtual reality in eating disorder treatment. The study included three focus groups, comprising individuals with a current or past history of eating disorders and clinicians who have treated these conditions. The discussions covered various topics, such as how to accurately represent the body in virtual reality, potential therapeutic applications of VR (e.g., retraining attention, psychoeducation), and the perceived benefits and drawbacks of using VR in a clinical setting. The study highlighted the potential of VR to serve as a valuable adjunct to traditional therapies, while also identifying areas where further research and development are needed to optimize its use in treating eating disorders.

Results on Effectiveness of Virtual Therapy

From the above reviews the following conclusions are drawn.

Table: shows the distribution of focus areas in the reviewed studies.

Focus Area	Number of Studies	Percentage
Body Image	7	**27%**
Food Stimuli	10	**38%**
Multisensory Integration	3	11%
Anxiety and Craving Reduction	4	15%
Group vs. Individual Therapy	2	8%

From the above table, it is evident that the most focused area in reviewed studies is Food stimuli followed by Body image. Thus, body image is considered one of the most contributing factors in most of the studies, where virtual therapy is adopted These are the main domains in eating disorders. However, anxiety and Craving reduction are also equally studied.

Pie Chart: Display the percentages of studies focusing on each area.

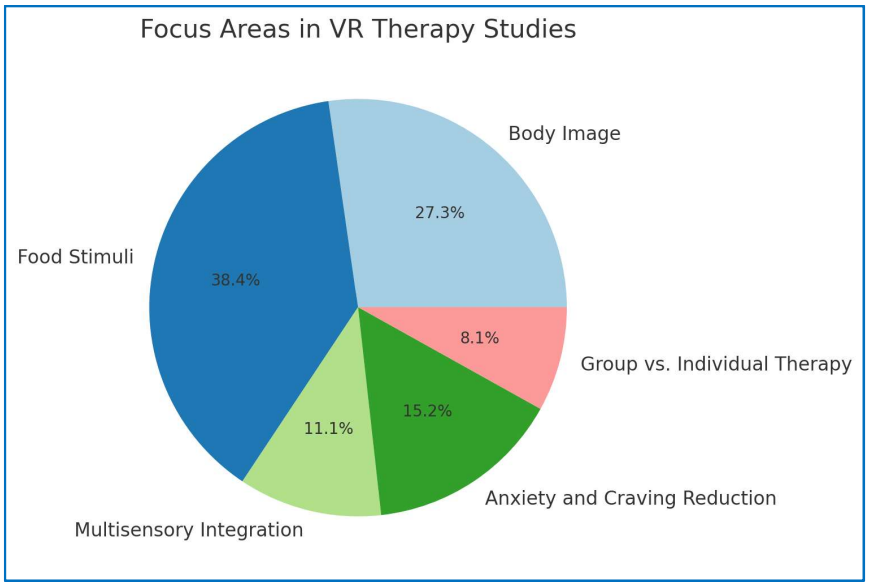


Table 2 Shows the effectiveness of VR therapy across different study outcomes (e.g., symptom reduction, and body image improvement).

Outcome	Number of Studies Reporting Positive Results
Symptom Reduction (AN, BN, BED)	**7**
Body Image Improvement	**6**
Anxiety Reduction	5
Improved BMI	3
Positive Therapeutic Outcomes	4

Looking into the review studies for the efficacy of Virtual therapy for the treatment of Eating disorders, it is evident that, VR therapy is effective in symptom reduction of eating disorders and body image improvement. VR therapy also shows positive results in reducing anxiety and improvement of BMI.

Anorexia nervosa, bulimia nervosa, and bingeeating disorderare serious mental health conditions that require effective treatment. Traditionally, these disorders have been treated through in-person therapy, often involving a combination of psychological counselling, medical intervention, and nutritional guidance. However, with the development of new technologies, particularly during the COVID-19 pandemic, virtual therapy has emerged as a viable alternative or complement to traditional treatment methods.

Bar Graph: Illustrates the number of studies reporting positive results for each outcome.

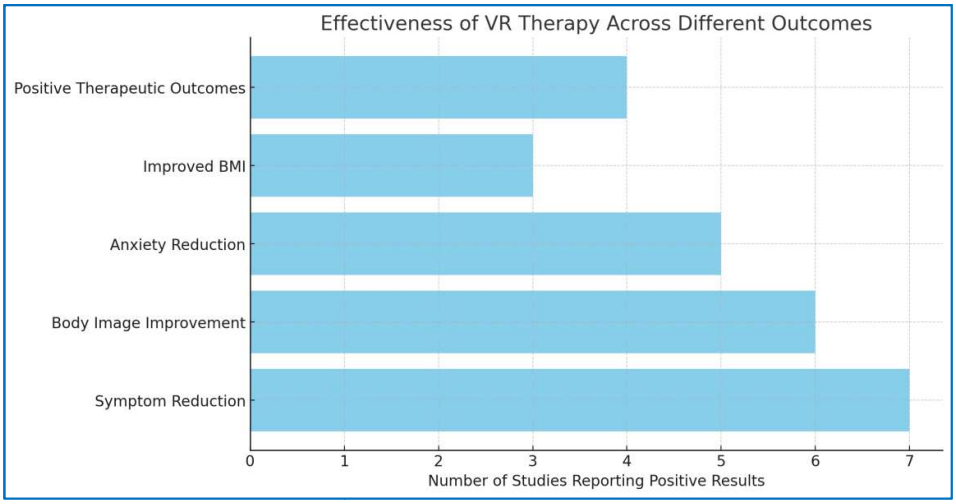
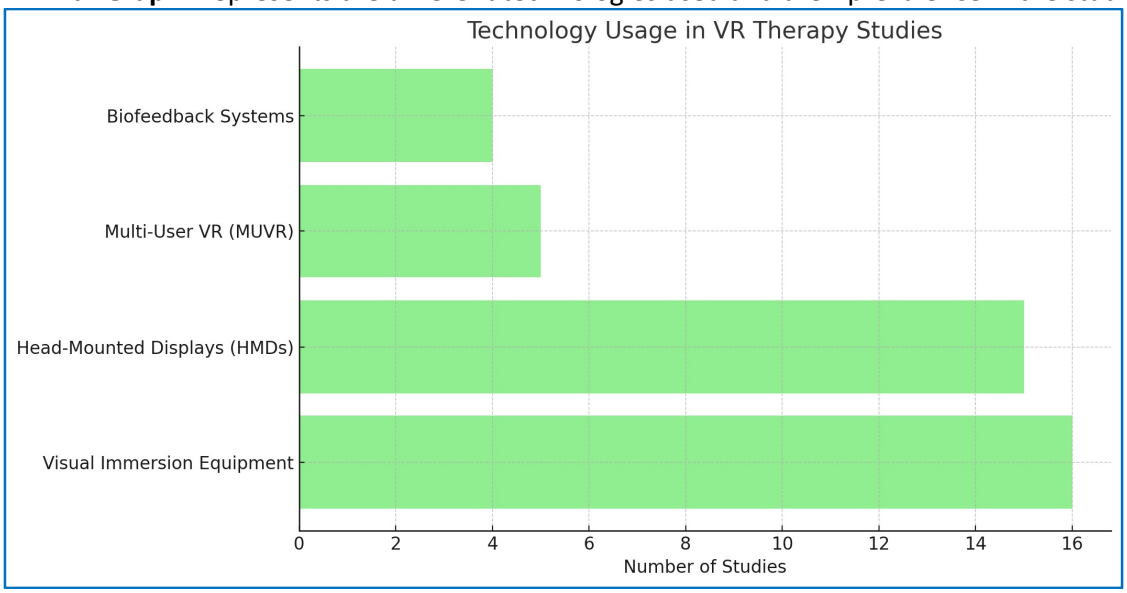


Table 3 Depicts the types of VR technology used in the studies.

Technology	Number of Studies	Percentage
Visual Immersion Equipment	16	**62%**
Head-Mounted Displays (HMDs)	15	**60%**
Multi-User Virtual Reality (MUVR)	5	20%
Biofeedback Systems	4	15%

Table 3 depicts the various VR methods used for the treatment of Eating disorders. The most common techniques used are Visual immersion equipment andHead-mounted displays. These techniques also show positive outcomes in reducing the symptoms related to eating disorders.

Bar Graph: Represents the different technologies used and their prevalence in the studies.



Conclusions:

1. Majority of studies are concentrating on food stimuli and body image worry, as thefocus areas in VR Therapy studies

2. Most of the studies show the effectiveness of VR therapy reported positive results in various outcomes such as symptom reduction, body image improvement, and anxiety reduction.

3. Among the types of VR technologies used across the studies, visual immersion equipment and head-mounted displays are the most commonly used VR technology.

The review study suggests that virtual therapy can be effective in treating eating disorders. When compared to in-person therapy, virtual therapy has shown comparable results, with patient engagement and outcomes largely dependent on the individual's comfort with technology and the quality of the therapeutic relationship. However, while virtual therapy can be effective, it is not a one-size-fits-all solution. The success of virtual treatment often hinges on factors such as the severity of the disorder, the patient's access to reliable technology, and their preference for this mode of treatment. Thus, it is concluded that Virtual therapy is an effective method for the treatment of Eating disorders, however, the efficacy of the treatment would be enhanced if it is balanced with the other therapy methods.

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