The Reality of the Use of Virtual Reality in Patients with Eating Disorders

Giuseppe Riva ¹²

¹ Applied Technology for Neuro-Psychology Lab. Istituto Auxologico Italiano, Milan, Italy
² Centro Studi e Ricerche di Psicologia della Comunicazione, Università Cattolica del Sacro Cuore, Milan, Italy

This is a letter to the Editor related to the recent JMIR paper:

Clus D, Larsen ME, Lemey C, Berrouiguet S

The Use of Virtual Reality in Patients with Eating Disorders: Systematic Review


For correspondence please write to:
Prof. Giuseppe Riva
Università Cattolica del Sacro Cuore
Largo Gemelli 1
20123 Milan, Italy
Tel. +39-02-72343734
Fax. +39-02-72342280
e-mail: giuseppe.riva@unicatt.it
The Reality of the Use of Virtual Reality in Patients with Eating Disorders

This letter is in regard to the recent publication of “The Use of Virtual Reality in Patients with Eating Disorders: Systematic Review” [1]. The authors present an interesting systematic review of the field that I think is relevant for the readers of the journal and underlines the potential of virtual reality (VR) for the field. However, in my opinion, the interpretation of the results of the review requires further discussion to better clarify the clinical value of this technology.

What are currently the best evidence-based treatments for eating disorders? According to Cochrane [2, 3], the situation differs between bulimia, binge eating and anorexia. For bulimia and binge eating, cognitive-behavioral treatment (CBT) is better than other therapies and better than no treatment [2]. In contrast, for anorexia nervosa the review suggested that none of the available treatments - including CBT, Family Therapy, the Maudsley Model for Treatment of Adults with Anorexia Nervosa (MANTRA), Cognitive Analytic Therapy, Focal Psychoanalytic Psychotherapy, Interpersonal Psychotherapy, Cognitive Orientation Therapy and Self Psychology - were consistently superior to any other specific approach [3].

Starting from these data, I want to discuss the following statements presented in the paper:

1) "The lack of controlled randomized clinical trials leads us to be cautious in interpreting these results": This statement suggests that the authors were not able to find controlled randomized clinical trials in the review. However, this is not true. As noted by another recent systematic review in this field [4] (which is strangely not cited in this paper): “Two different randomized, controlled trials have shown at one-year follow-up that VR had a higher efficacy than the gold standard in the field, i.e., cognitive behavioral therapy (CBT).” The two papers cited [5, 6] are also included in this systematic review, even if the one published in JMIR is wrongly described in the Multimedia Appendix as a case study. Moreover, at least one more RCT [7] is not included in the review. This RCT is even more interesting because, differing from the two previous that used VR to enhance CBT, it used virtual reality treatment (Virtual Reality Cue Exposure Therapy) as a second-level treatment for patients with recurrent binge eating who failed a first-level structured cognitive-behavioral treatment (CBT). The results confirm the outcomes of the previous RCTs: virtual reality cue exposure therapy produced better results than additional CBT sessions.

In this view, I think that the authors of the previous review [4] better describe the situation of the field when they state: “It is important to register that, after a first phase of immaturity (published between 1999 and 2004) with studies showing several methodological flaws the field has evolved. The more recent studies, in particular the ones published in the last five years follow the guidelines required by high level RCTs.” In particular, these three RCTs clearly suggest that, for the treatment of bulimia and binge-eating disorders, virtual reality can enhance CBT, which is the current leading evidence-based treatment for these disorders according to Cochrane [2]. I think that this is an important piece of information that should be shared with the readers of the review.

The statement that there is a lack of RCTs is true for anorexia nervosa. However, a 2016 paper that is not included in the review [8] (despite the fact that it appears in PubMed using the search strategy reported by the authors) supports a new possible use of VR for this disorder: body swapping, which I will discuss below.
2) “Two main areas of interest emerged from these studies: virtual work on patients’ body image (7/26, 27%) and exposure to virtual food stimuli (10/26, 38%)”: Even if this information is true, in my opinion two additional pieces of data are missing from the review: the way in which VR is used to achieve these goals and the clinical rationale driving these approaches.

An important finding of the Cochrane review on anorexia is that none of the available treatments were consistently superior to any other specific approach. This finding suggests the need for a better analysis of the problem, as a better understanding of the causes of anorexia would aid in developing better treatment. Unfortunately, while the American Psychiatric Association’s (APA) Diagnostic and Statistical Manual of Mental Disorders (DSM V) identifies eating problems as the clinical core of eating disorders, the exact cause of anorexia remains unknown.

To explore the role played by theoretically relevant factors – from dieting to body image - in predicting the onset and maintenance of eating disorders, my research group recently carried out two four-year longitudinal studies involving more than 5000 male and female college students [9, 10]. The results suggest that eating problems are less relevant than expected: the experience of the body, and in particular self-objectification (thinking and monitoring the body's outward appearance from a third-person perspective), emerged as the largest contributor to both the initiation and the persistence of all behavioral symptoms ($R^2 = 0.43$). Specifically, this variable explained between two and three times more the emergence and maintenance of the disturbance than both dieting and negative affectivity.

This finding, together with the emotional, proprioceptive, interoceptive, visual and tactile, deficits present in individuals with eating disorders, led me [11] and my colleagues, Dakanalis [12] and Gaudio [13], to suggest that these disorders may reflect a broader impairment in multisensory body integration that affects the individual’s abilities: (a) to identify the relevant interoceptive signals that predict potential pleasant (or aversive) consequences and (b) to modify/correct the autobiographical allocentric (observer view) memories of body-related events (self-objectified memories).

The actual use of VR in the treatment of eating disorders reflects these two hypotheses. On the one hand, VR cue exposure to critical stimuli (e.g., food or human bodies) allows both to reduce the level of anxiety elicited by them and to disrupt the reconsolidation of negative memories based on conditioned emotional responses [7, 14]. VR exposure may be further improved by the use of interoceptive exposure [15], which helps patients to process bodily sensations by repeatedly exposing them to the feared physical sensations. On the other hand, VR allows to update an inaccurate representation of the body through two different strategies. In the first – “reference frame shifting” [16, 17] – the subject re-experiences in VR a negative situation related to the body (e.g., teasing) both in first-person and in third-person (e.g., seeing and supporting her/his avatar in the VR world). In the second – “body swapping” [18, 19] – VR is used to induce the illusory feeling of ownership of a virtual body with a different shape and/or size. While the first approach works well with binge-eating individuals [5], the second may be needed for more severe body experience impairments like those experienced with anorexia [8]. In particular, it may be strengthened by the use of more advanced VR experiences that also target inner body signals (i.e., interoceptive and proprioceptive signals) [20].
In conclusion, existing studies already suggest an important role for VR in the treatment of eating disorders that, at least for bulimia and binge-eating disorders, is supported by the outcomes of three high-quality RCTs carried out independently by different European research groups. However, I agree with the authors of the review that VR still requires further basic and applied research in order to avoid interpretation biases. In particular, as suggested in the review, results have to be confirmed by a study of North American origin. To reach this goal, the Stanford Adult Eating and Weight Disorders Program at the University of Stanford, USA, was recently funded by the National Eating Disorders Association for the project “Virtual Reality Intervention Adaptation to a Real-World Clinic Setting”. This study aims to adapt and enhance the European virtual reality protocols for a U.S. population within an adult outpatient clinical setting, leveraging the increased efficacy of VR to improve outcomes and efficiency of care. Year one of the study will focus on operational adaptations of the existing European protocols, including software development, the creation of a treatment manual, and a clinician training protocol for binge-related EDs (BED/BN/OSFED). Year two of the study will test feasibility and acceptability of the protocol for both clinicians and patients.

Acknowledgments
GR was supported by the MIUR Italian research project “Unlocking the memory of the body: Virtual Reality in Anorexia Nervosa” (201597WTTM).

References
12. Riva G, Dakanalis A. Altered Processing and Integration of Multisensory Bodily Representations and Signals in Eating Disorders: A Possible Path Toward the Understanding of Their Underlying Causes. Frontiers in Human Neuroscience 2018;12.