

Virtual Environments for Patients with Obsessive Compulsive Disorder in Outpatient Care

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Abstract

This paper describes an RCT study examining VR-based exposure and response prevention (VR-ERP) therapy as an addition to standard care for outpatients with obsessive-compulsive disorder (OCD). A within-subject waitlist-controlled design is used; a 5-week waitlist followed by five weekly VR-ERP sessions. Symptom severity was measured using the Subjective Yale-Brown Obsessive-Compulsive Scale (YBOCS-SR) at study intake, after the waitlist period, after the VR-ERP period, and at a 2-month follow-up. Results show a significant reduction in OCD symptoms following VR-ERP ($p < .001$), maintained at follow-up ($p = .001$). Participants reported engagement in between-session exposures and rated the VR-ERP as useful.

1. Introduction

Obsessive-compulsive disorder (OCD) is a severe psychiatric condition characterized by obsessions (unwanted intrusive thoughts, urges, or images) and compulsions (repetitive, ritualized behaviors or mental acts) (American Psychiatric Association, 2022). Cognitive-behavioral therapy (CBT) with exposure and response prevention (ERP) is the gold-standard treatment for OCD; however, access remains limited, and dropout rates are high, partly because in-session exposure to feared stimuli can be difficult to arrange and emotionally demanding for both patient and therapist (Ong et al., 2016). Virtual reality (VR) offers a controllable, gradable, and ecologically valid alternative for delivering exposure, enabling patients to confront personally relevant triggers in a safe, repeatable environment (Fajnerová et al., 2023). VR-based exposure therapy has demonstrated promise in anxiety-related disorders, including specific phobias, social anxiety, and PTSD (Freeman et al., 2017). Evidence specific to OCD is emerging but limited, with early studies suggesting that VR environments can provoke clinically relevant anxiety and facilitate habituation (Bouchard et al., 2019; Fajnerová et al., 2023). The present study reports pilot data from an ongoing outpatient trial investigating the feasibility, acceptability, and preliminary efficacy of weekly therapeutic sessions with VR-based exposure and response prevention (VR-ERP) technique in adults with OCD.

2. Methods

2.1. Study Design and Participants

The study employed a within-subject waitlist-controlled design. Following screening and baseline assessment, participants were placed on a 5-week waitlist (no changes to ongoing treatment) before beginning VR-ERP. Assessments were administered at four time points: study intake (Intake), after the waitlist period (5W WL), immediately after the final VR-ERP session (5W VR-ERP), and at a 2-month follow-up (2M FU).

Eligible participants were adults aged 18–55 with a primary diagnosis of OCD (ICD-10: F42) and no severe psychiatric or neurological comorbidity. Participants were permitted to continue their pre-existing pharmacotherapy or psychotherapy without changes 2 months before study intake and throughout the study. Exclusion criteria included substance use disorders; psychotropic medications other than antidepressants, antipsychotics, or hypnotics, and medical contraindications to VR use (e.g., epilepsy, severe vestibular or neurological disorders).

2.2. Procedure

At intake, participants signed an Informed consent and completed a clinical interview, questionnaire battery, and a brief psychoeducation session covering the cognitive-behavioral model of OCD and the explanation of exposure with response prevention technique. The VR-ERP program comprises five individual sessions delivered once per week. It takes place in an immersive VR environment ("OCD house") with stimuli tailored to each participant's symptom profile, as described in Fajnerová et al. (2023) (see Figure 1 and project website <https://ocddum.cz/en> for more details).

2.3. Measures

Primary outcome: OCD symptom severity was assessed using the self-report version of the Yale-Brown Obsessive-Compulsive Scale (YBOCS-SR). Secondary measures included the Beck Anxiety Inventory (BAI), the Beck Depression Inventory (BDI), and the Trait subscale of the State-Trait Anxiety Inventory (STAI-T). Participants also completed a personalised fear hierarchy and, at each VR-ERP session, rated (a) the number of between-session self-directed real-life exposures completed in the preceding week, (b) the proportion of exposures in which they successfully resisted compulsions, and (c) the perceived usefulness of the VR session for managing exposure-related anxiety in daily life.



Figure 1: Illustration of the VR-based “OCD house” stimuli for exposure and response prevention therapy.

3. Results

3.1. Sample

Forty-two participants were enrolled (23 men, 19 women, mean age: 34.69 ± 10.471). To date, 22 participants (52%) have completed all four assessment time points and are included in the prima-

ry analyses. 19 participants discontinued the study for the following reasons: overall deterioration of mental health ($N = 2$), did not show up/the distance to care was too long ($N = 2$), high-risk pregnancy ($N = 2$), change of treatment in the waiting list period ($N = 3$), financial reasons ($N = 1$), did not profit from the treatment ($N = 1$). The remaining participants are either still in the study ($N = 1$) or the reasons for not completing it are unknown ($N = 7$).

3.2. OCD Symptom Severity

A Friedman test revealed a significant change in YBOCS-SR scores across the four time points ($\chi^2(3) = 11.17, p < .001$). Post hoc pairwise comparisons showed no significant change during the waitlist period. Following VR-ERP, symptom severity was significantly lower than at intake ($p < .001$) and lower than at the end of the waitlist period ($p = .048$). At 2-month follow-up, scores remained significantly below both the intake level ($p = .001$) and the pre-VR-ERP level ($p = .017$), indicating maintenance of therapeutic gains. Figure 2 illustrates YBOCS-SR trajectories across all four time points.

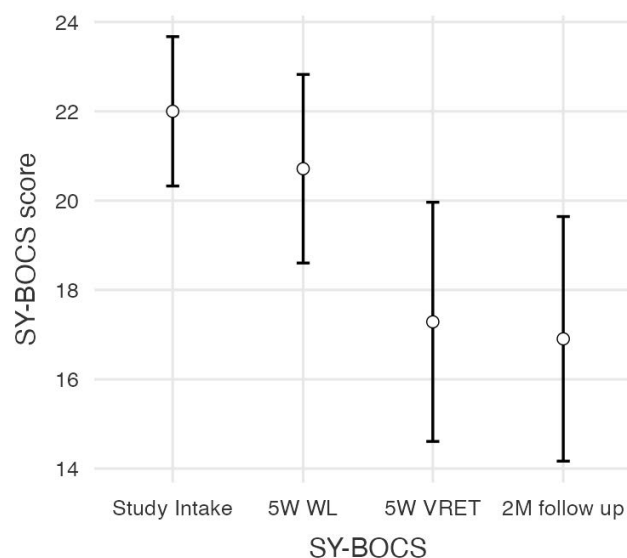


Figure 2 Changes in YBOCS-SR scores (Subjective Yale-Brown Obsessive-Compulsive Scale) across four time points: study intake (Intake), after the 5-week waitlist (5W WL), after 5 weeks of VR exposure and response prevention therapy (5W VR-ERP), and at the 2-month follow-up (2M FU).

3.3. Adherence and Perceived Usefulness

Participants assessed their adherence to exposure sessions and the usefulness of VR-ERP for managing exposure and more challenging situations in everyday life. The assessment revealed that they actively engaged in exposure sessions outside virtual reality, most frequently performing 2–5 per week. They were able to prevent compulsions in at least **one-third of cases** and considered the virtual reality exposures **useful** for managing further exposures throughout the week (see Figure 3).

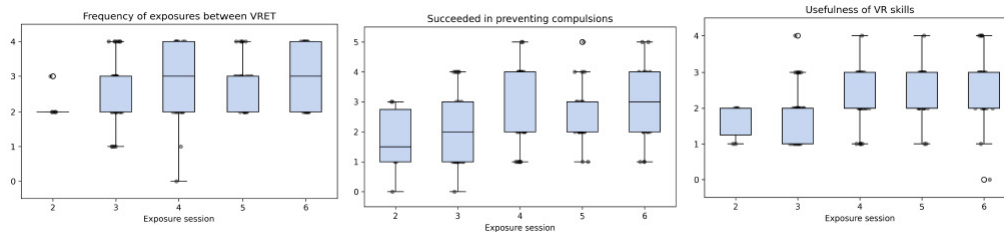


Figure 3 Self-reported adherence where: 4 = more than 10 exposures, 3 = 6–10 exposures, 2 = 2–5 exposures, 1 = less than 2 exposures, 0 = no exposure (on the left), succession in preventing compulsions where: 5 = always, 4 = most of the times, 3 = in half of the cases, 2 = in third of the cases, 1 = rarely, 0 = never (in the middle) and perceived usefulness of VR-ERP, where: 4 = extremely useful, 3 = very useful, 2 = **quite useful**, 1 = a little useful, 0 = not at all useful (on the right) across sessions. Values in bold indicate the mean rating across all sessions.

4. Discussion

The present data suggest that VR-ERP is an effective and well-tolerated intervention for outpatients with OCD. Participants showed a statistically significant reduction in Y-BOCS scores following five weekly VR sessions, and this effect persisted for 2 months after treatment ended. These findings are consistent with the broader literature demonstrating VR's capacity to elicit clinically meaningful anxiety responses and support habituation in exposure-based protocols (Fajnerová et al., 2023; Freeman et al., 2017).

A notable feature of the results is the transfer of skills from the VR environment to real-life settings: participants engaged in frequent between-session exposures and rated the VR training as useful for managing anxiety-provoking situations in daily life. As this is an ongoing study, we present the data as a preliminary report and hope to see more participants complete all four stages of the protocol. Taken together, the pilot results provide promising preliminary support for the feasibility and efficacy of weekly VR-ERP as an adjunct outpatient intervention for OCD.

Acknowledgments

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