bWell-D: novel Virtual Reality cognitive remediation program for depression – Preliminary usability, tolerability, and engagement results

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Background

Major Depressive Disorder (MDD) is a leading global cause of disability (1). It has been shown to be associated with cognitive deficits which often persist even after mood-related symptoms have diminished. While these deficits are a primary contributor to psychosocial impairment in MDD, traditional assessments of cognitive function may not provide a comprehensive evaluation of these deficits as they manifest in real life. Furthermore, existing cognitive remediation programs for MDD have shown mixed results in improving real-world functioning (2, 3). To address this, the University of British Columbia and the National Research Council Canada collaboratively developed the bWell Cognitive Care Platform for Depression (bWell-D), a novel, comprehensive, and immersive Virtual Reality cognitive remediation program targeting cognitive deficits seen in MDD. bWell-D combines cognitive assessment and remediation in a single platform and simulates real-world environments to maximize ecological validity (4, 5). bWell-D was designed using an agile development process utilizing iterative design from expert inputs. Moreover, bWell-D went through a co-design process with targeted patient and clinician end-users to enhance feasibility and real-world applicability (6).

Objective

Following the co-design process, bWell-D underwent pilot feasibility testing with healthy volunteers focusing on usability, tolerability, engagement, and construct validity.

Methods

To assess the feasibility, acceptability and tolerability of bWell-D, healthy participants with no psychiatric history were recruited from the community. After obtaining consent, 17 participants were enrolled in the study; participants completed a 40-minute bWell-D cognitive assessment as well as a battery of validated computerized neuropsychological tests using CNS Vital Signs (CNSVS) with repeat tests after 4 weeks. bWell-D tolerability, engagement and enjoyability were assessed with the Simulator Sickness Questionnaire (SSQ), User Engagement Scale (UES) and Game User Experience Satisfaction Scale (GUES S) respectively. Correlations between bWell-D cognitive tasks and CNSVS scores were assessed using the Pearson correlation coefficient. See Figure 1 below for an outline on the study protocol.

Results

bWell-D demonstrated high engagement and enjoyability, as evidenced by high scores on the UES (mean and SD: 15.1 ± 1.45, total possible on scale: 20) [Figure 2] and GUES S (mean ± SD across applicable factors: 5.19 ± 0.98, total possible on scale: 7) [Figure 3]. It was also well tolerated, as evidenced by a low SSQ score after the session (mean total score ± SD: 2.75 ± 3.49, total possible on scale: 81) and no significant change of SSQ score during the session. Cognitive assessment scores derived from bWell-D regarding reaction time correlated well with corresponding tests on the CNS- VS (Pearson Correlation Coefficient r(14) = -0.672; p= 0.008)

Conclusions

bWell-D, a novel VR cognitive assessment and remediation program for MDD, demonstrates good tolerability and engagement in pilot testing. There is also preliminary evidence for construct validity of certain cognitive domains assessed by bWell-D. The insights gained from this study will inform further refinements to the platform for its implementation in a randomized clinical trial involving people with MDD.

References