

Efficacy of adaptive cognitive training through desktop virtual reality and paper-and-pencil in the treatment of mental and behavioral disorders

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ABSTRACT

In this work, we will assess and compare two content-equivalent cognitive training (CT) interventions delivered in desktop virtual reality (VR) (Reh@City v2.0) and paper-and-pencil (Task generator (TG)) formats in a sample of patients with mental and behavioral disorders. We found that both CT methodologies were associated with favorable cognitive, mood and quality of life outcomes observed in both the short (immediately after the intervention) and the long-term (two-months follow-up). We conclude that these CT methods should be viewed as complementary approaches in the treatment of mental and behavioral disorders.

1. INTRODUCTION

Cognitive deficits are a nuclear feature of mental and behavioral disorders, leading to poor treatment adherence and functionality (Rock et al., 2014). Therefore, cognitive deficits represent an essential target for intervention (Groves et al., 2018). Virtual reality (VR) methods can aid cognitive training (CT) in the context of psychiatry once they allow a more realistic training experience through the simulation of activities of daily living. VR-based interventions have several advantages over traditional paper-and-pencil methods, namely: the systematic and hierarchical presentation of stimuli and challenges; adaptation and personalization of training content to the patient's cognitive profile; immediate feedback; gaming elements to enhance motivation and engagement; increased ecological validity and, possibly, greater transfer of gains to everyday life (Faria et al., 2016; Gamito et al., 2015; Parsons 2016).

The main aims of this study are to assess and compare the impact of two-content equivalent CT interventions – the Reh@City v2.0 and the Task Generator (TG) – in a heterogeneous sample of mental and behavioral disorders recruited in a long-term care psychiatric setting.

2. METHODS

A total of 30 patients met the inclusion criteria and were randomly assigned to the Reh@City v2.0 group (n=15, two were lost to follow-up) and the TG group (n=15, one dropped out after the baseline assessment, and two were lost at follow-up). Both groups of patients underwent a time-matched 24-sessions CT intervention. Comprehensive neuropsychological assessments were conducted at baseline, post-intervention, and follow-up (2-months). We employed nonparametric tests to analyse the collected data.

3. RESULTS

A within-groups analysis revealed significant improvements in visual memory and depressive symptoms after the Reh@City v2.0 intervention, whereas the TG group improved in processing speed, verbal memory, and quality of life (social relationships and environmental domains). In the between-groups analysis, we found that the Reh@City v2.0 group showed a greater reduction in depressive symptoms, while the TG group exhibited higher improvements in social relationships aspects of quality of life. Considering the within-groups analysis at 2-months follow-up, both groups maintained the former gains, and new improvements were identified in the Reh@City v2.0 (global cognitive function, language, visuospatial and executive functions) and the TG groups (sustained and selective attention). The Reh@City v2.0 significantly reduced depressive symptoms, and the TG led to more significant improvements in processing speed, abstraction, and social relationships domain of quality of life.

4. CONCLUSIONS

Overall, patients from both groups revealed positive differential changes in primary (cognition) and secondary outcome measures (mood and quality of life) in the various assessment moments, which may suggest that the combined use of these two interventions could lead to higher short and long-term benefits in the assessed domains. The Reh@City v2.0 and the TG should be considered complementary CT methods for patients with mental and behavioral disorders living in long-term care psychiatric settings

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