Oral Communication

OC-530

Telerehabilitation With Non-Immersive Virtual Reality Serious Games for Continuity of Care in People With Parkinson's Disease: Preliminary RCT Results

Topic: Telerehabilitation

Sanaz Pournajaf[1], Carrie Louise Thouant[1], Elena Sofia Cocco[1], Michela Goffredo[1], Fabrizio Stocchi[2], Maria Francesca De Pandis[3], Marco Franceschini[1]

[1]*Department of Neurosciences and Neurorehabilitation, IRCCS San Raffaele Roma, Rome, Italy*
[2]*Clinical Trials Center for Parkinson's Disease, IRCCS San Raffaele Roma, Rome, Italy*
[3]*Clinical Trials Center for Parkinson's Disease, San Raffaele Cassino, Cassino, Italy*

BACKGROUND

Regular, task-specific, and personalized physical exercise can mitigate non-motor symptoms of Parkinson's disease (PD), such as fatigue, apathy, and cognitive decline, while improving motor performance. However, limited access to rehabilitation centers remains a major barrier. Telerehabilitation (TR) has emerged as a promising alternative to ensure continuity of care, personalized interventions, and remote monitoring. This study aims to evaluate the effectiveness of non-immersive virtual reality (VR)-based serious games TR compared to conventional in-person rehabilitation, focusing on autonomy in daily activities.

METHODS

A single-blind, bicentric, national randomized controlled trial included individuals aged 30-80 years with PD (Hoehn & Yahr Stage 2-3 in the "on" phase; MoCA score ≥ 17.54). Participants were randomly assigned to an experimental group (EG) or control group (CG). The EG performed 30 sessions (3-5 days/week for 6-10 weeks) using the VRRS Tablet system (Khymeia srl, Italy) for motor, speech, and cognitive rehabilitation. The CG followed a conventional rehabilitation program without technological devices. Assessments were conducted at baseline (T0) and post-intervention (T1). The primary outcome was the Unified Parkinson's Disease Rating Scale II (UPDRS II), measuring autonomy in daily activities. Secondary outcomes included the total UPDRS, Parkinson's Disease Questionnaire-8 (PDQ-8), Montreal Cognitive Assessment (MoCA), Timed Up and Go (TUG), TUG Dual-task, mini-Balance Evaluation Systems Test (mini-BESTest), 10-Meter Walking Test (10mWT), New Freezing of Gait Questionnaire (NFOG-Q), Activities-specific Balance Confidence scale (ABC), falls, adherence, and patient satisfaction. Statistical analysis included paired-sample and Wilcoxon tests ($p < 0.05$).

RESULTS

Thirty-one participants were enrolled (EG: n = 15, 33% female, mean age 64.9 ± 1.5; CG: n = 16, 25% female, mean age 70.4 ± 3.4). Both groups had comparable baseline characteristics. At T1, TUG execution time significantly improved in the EG (5.78 ± 1.65s, $p = 0.005$) but not in the CG (9.67 ± 1.96s, $p = 0.157$). The TUG Dual-task test also improved significantly in the EG ($p = 0.028$) and less markedly in the CG ($p = 0.015$). The 10mWT showed a significant improvement in the EG ($p = 0.048$). Between-group analysis confirmed a greater TUG improvement in the EG ($p = 0.047$), suggesting superior functional mobility and balance gains in the TR group. No adverse events were reported in the EG.

CONCLUSION

Preliminary findings demonstrate that non-immersive VR-based serious games TR significantly enhance mobility and balance in people with PD compared to conventional rehabilitation. Telerehabilitation is safe and a promising alternative for continuity of care. Larger studies with longer follow-ups are needed to confirm its impact on autonomy and social participation.

Statement of Disclosures

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The authors declare no conflict of interest.

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Corresponding Author:
Sanaz Pournajaf
Department of Neurosciences and Neurorehabilitation, IRCCS San Raffaele Roma, Rome, Italy
Email: sanaz.pournajaf@uniroma1.it