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Move and play yourself: exergame preserves cognition of older adults as much as aerobic and strength training

Mexa-se e jogue: exergame preserva a cognição de idosos tanto quanto o treinamento aeróbio e de força

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MR. EDITOR,

Simultaneous cognitive and physical stimulations can be reached by virtual reality-based exercise (exergames), which requires selective attention, decision-making, inhibitory control and cognitive flexibility¹. Due to the lack of comparative studies with others training methods, this study aimed to compare the effects of exergames, strength training, and aerobic exercise on the cognitive functions of community-dwelling older adults.

This data was retrieved from a public repository². The recruitment occurred between August 2016 and December 2019, with 19 individuals. All were in accordance with the ethical standards of the Ethical Committee of the State University of Montes Claros (1,365,041/2015). Participants were randomly allocated into three groups, featuring a quasi-experimental model: exergames (EXG), strength and balance exercises (SG), and aerobic exercise (AG).

Global cognition, short-term and working memories, semantic fluency/executive function and visuospatial attention were assessed using the Brazilian version of the Mini-Mental of State Examination (MMSE), Digit Span (DSF and DSB), animal category of verbal fluency (VF) and Trail-Making Test A (TMTA), respectively, applied before and after the intervention.

All groups performed 24 sessions, lasting 30 to 45 minutes, twice a week. EXG performed games from Nintendo Wii (Rowing Squat, In Line Lunge, Table Tilt, Sword Play Duel, Sword Play Showdown). SG performed rowing squat, anteroposterior squat, squat on the trampoline, lat pull-down, and shoulder adduction with elbow extension. AG performed a walking on a treadmill, with progressive intensity, according to the perceived subjective exertion (PSE), according ACSM³. Participants were instructed to keep the PSE between 5 and 6 points (moderate effort).

One-Way ANOVA and Kruskal-Wallis test were used with $p \leq 0.05$ significance level. The effect size values (Cohen's d) were: trivial 0-0.19, small 0.2-0.59, moderate 0.6-1.1, large 1.2-1.9, very large 2-3.9, almost perfect 4 and perfect > 4 . The same interpretation was used when the score had a negative value.

EXG, SG and AG groups were composed of 8, 6, and 5 individuals, respectively. Age, height, weight, gender and MMSE score were not different between groups ($p > 0.05$). The delta of the outcomes showed no significant difference between groups ($p > 0.05$). The effect size in the comparison between EXG versus SG and AG showed clinical improvement in the EXG group in most outcomes. Additionally, the effect size between EXG versus SG for MMSE, VF, DSF, DSB, and TMT A were 0.34, -0.01, 0.43, -0.09, and -1.17, respectively, while the comparison between EXG versus AG for the same outcomes were 0.10, 0.30, 0.55, -0.17, and -0.34. The visuospatial attention was the variable with the greatest effect in favor of EXG (Online Appendix 1).

The EXG showed a moderate effect of improvement in visuospatial attention when compared to the SG. Moreover, participants from EXG showed a small effect of improvement

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in global cognition and short-term memory compared to SG. Individuals from EXG exhibited a small improvement in semantic fluency/executive function, short-term memory and visuospatial attention compared to AG.

Finally, although this study had a small sample, which is a limitation, our findings showed a perspective of the applicability of exergames to maintain or improve cognitive functions of older adults as much as traditional methods of exercise.

AUTHOR'S CONTRIBUTIONS

EOB, ACMAR, VDR, ELP and OMN designed the study, collected and analyzed the data, and wrote the manuscript. AMBP and LLL wrote and reviewed the manuscript. RSMJ supervised all procedures across the work.

CONFLICT OF INTERESTS

Authors declare no conflict of interest.

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