Effects of Trans-Cranial Direct Current Stimulation and Game-Based Cognitive Training on Functional Capacity of Older Persons Living With HIV-Associated Neurocognitive Disorder

Jae Kim[1] and Raymond Ownby[1]

[1] Department of Psychiatry and Behavioral Medicine, Nova Southeastern University, Fort Lauderdale, FL

Background

Despite the advances in antiretroviral therapy, HIV-associated neurocognitive disorder (HAND) is still prevalent among older persons living with HIV (PLWH), commonly as mild neurocognitive disorder (MND). In response, combination of transcranial direct current stimulation (tDCS) with computerized cognitive training (CCT) has been studied to treat HAND. Our current study suggested that CCT with tDCS had a significant impact on attention, but the impact on day-to-day functioning is unclear. This study investigates the effects of video game-based cognitive training (VGBCT) and tDCS on functional status of older PLWH.

Methods

Forty-six participants with MND (mean age = 58.9) were randomly assigned to three treatment groups. The active tDCS group received six 20-minute sessions of VGBCT with tDCS over the course of 2 weeks, while the two sham groups received sham tDCS with either VGBCT or educational video training during the six sessions over 2 weeks. The participants' functional capacity was assessed pre-intervention, immediately post-intervention, and one-month post-intervention using validated functional capacity assessment tools, such as University of California San Diego Performance-based Skills Assessment (UPSA) and revised Medications Management Test. Relations among measures were analyzed using a mixed effects repeated measures random intercept analysis, controlling for age, gender, education, race, and viral load.

Results

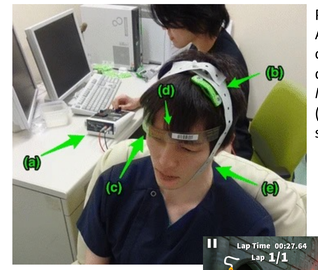
None of the analyses showed statistically significant differences in functional capacity among the three groups after the interventions. However, the active tDCS group showed larger and long-lasting improvement in financial management skills compared to the control groups as observed in UPSA Financial Skills assessment, consistent with a moderate to large effect size comparison.

Conclusion

Though VGBCT-tDCS intervention did not make a statistically significant improvement on functional capacity of the older PLWH compared to the control groups, the study showed a positive trend towards financial management skill improvement with the intervention. The small sample size served as a limitation to this study.

The finding highlights the potential benefits of VGBCT-tDCS intervention in improving at least one skill domain in functional capacity of older PLWH. As such, further studies with larger sample sizes are warranted to investigate VGBCT-tDCS intervention's effectiveness in improving functional capacity.

Video game-based training with transcranial direct current stimulation may **improve functional capacity** among older persons living with **HIV-Associated Neurocognitive Disorder**



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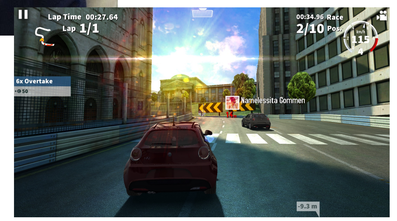

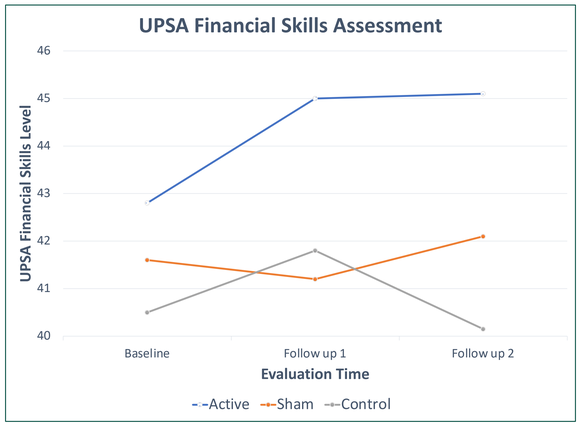

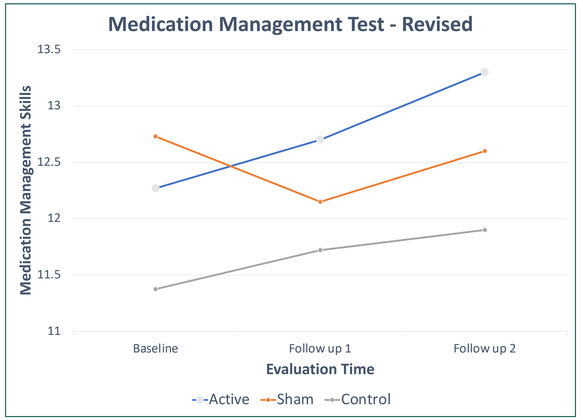

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