Cognitive training with and without transcranial direct current stimulation and attention in older persons with HIV

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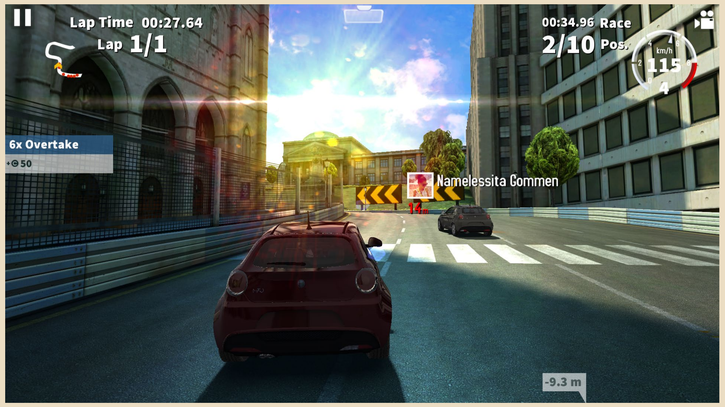
Overview

Antiretroviral therapy has resulted in reduced mortality in persons with HIV infection, however, affected individuals may experience age-related changes in cognition as well as deficits related to chronic HIV infection. To study a possible strategy to address this issue, we did a study of game-based cognitive training with and without anodal transcranial direct current stimulation (tDCS) to the left dorsolateral prefrontal cortex (F3) in 46 persons 50 years of age and older with mild neurocognitive disorder (MND by Frascati criteria). Participants completed a battery of measures, six 20-minute training sessions over two weeks, an immediate post-training assessment and a follow-up assessment 30 days later. They were assigned to (1) cognitive training + active tDCS, (2) cognitive training + sham tDCS, or (3) watching educational videos + sham tDCS (control).

We hypothesized that the cognitive training + active tDCS group would show greater improvements in attention and working memory (Digit Span Forward and Backward) compared to the other groups. Mixed effects repeated measures models showed a significant interaction of group vs time (p = 0.047) for attention. Post hoc analyses showed a significant difference between the training + active tDCS and the other groups at the first follow up visit but not 30 days later. A similar but nonsignificant effect (p = 0.11) was seen for working memory. These results suggest that cognitive training with tDCS may have positive effects on attention and working memory in older adults with HAND, but that they may not be sustained over 30 days.

Intervention



Users complete assessments of sleep, mood, and stress, and then receive individualized feedback based on norms.

Multimedia elements include photos, motion graphics, and audio narration to enhance user interest and learning

Teaches how to keep a sleep log and use it in deciding how to manage sleep using sleep restriction.

Cognitive Behavioral Content

Method

Sample

Sample characteristics reflect the stated purpose of this project, to study the impact of chronic disease self-management apps in persons with low health literacy. Inclusion criteria include participant age 40 or greater and treated for at least one chronic health condition. Persons who graduated from college are not eligible, as in an earlier study we found that no college graduates had low health literacy.

This preliminary presentation is based on the first 140 participants of a planned total of 430. The sample includes 65 men and 75 women, with 17 whites and 123 blacks with a mean age of 57.2 years (SD = 8.2) and mean education of 12.0 years.

As the study is ongoing, only part of the sample has completed all study visits. One hundred forty have completed the baseline assessment, while 121 have completed the first follow-up (immediately after completing the 2-3 week series of intervention visits), and 60 have completed the 3-month follow-up.

Procedures

Potential participants are first screened by telephone to determine whether they meet study entry criteria. Those who are potentially eligible are then scheduled for an in-person visit during which their level of health literacy is assessed, and a detailed medical history and medication review are conducted. Persons who are eligible are then scheduled for a baseline assessment, during which measures of sleep (Pittsburgh Sleep Quality Index, PSQI), mood (Center for Epidemiological Studies Depression scale, CES-D), stress (Perceived Stress Scale, PSS) and quality of life (MOS SF36) are administered.

Participants then complete three intervention visits over two to three weeks, during which they interact with the sleep app. They then return for the first follow-up visit at which time they again complete the battery of measures.

Analyses

As these data are preliminary, we did not complete statistical tests of changes in outcome variables over time. Wen complete, we will use mixed effects repeated measures models to assess change over time in sleep, as well as mood, stress, quality of life, and patient activation.

Results

Conclusions

Preliminary results suggest that the app may be helpful in reducing sleep problems in older persons with chronic health conditions who have low health literacy. The study is ongoing.

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