

Assessment of Cognitive Training & Social Interaction in People with Mild to Moderate Dementia: A Pilot Study

BACKGROUND

Dementia is a neurodegenerative disorder with no cure that affects millions of adults in the United States. Common symptoms of dementia include memory loss, neuropsychiatric symptoms (NPS), and social withdrawal, all of which can negatively affect a person's quality of life (QoL). Recent research has shown that non-pharmacological interventions, such as cognitive training or social activities, may be able to combat some of these negative symptoms. Cognitive training may provide older adults with a meaningful, goal-directed activity that can potentially lead to improvements in cognition and reduce the severity of NPS. Social activities may also be able to strengthen the cognitive abilities of older adults, in addition to improving QoL. However, no research has ever examined whether a combined intervention that uses both cognitive training and social interaction can lead to better cognitive, neuropsychiatric, or QoL outcomes. Therefore, the goal of this pilot study was to examine if: (1) social interaction and computer-based cognitive training is feasible in a sample of older adults with mild to moderate dementia; and (2) there is a relationship between cognitive training and social interaction on the cognitive abilities, NPS, and/or QoL of these older adults.

STUDY METHOD

Participants. The study recruited 10 participants from an adult day health care center, however 2 participants dropped out, resulting in an analytical

sample of 8. The participants in this study all had to complete the cognitive training regimen from Posit Science, and were also randomly assigned to one of two groups based on the level of social interaction to be had (i.e., high or low).

Intervention. All the participants in this study completed twelve cognitive training sessions. There were three different training sessions that incorporated four different games that specifically targeted different aspects of cognition. This computer-based cognitive training was utilized for this study because it provides adaptive game play which results in a threshold parameter that is used to modulate difficulty and maintain optimal game play. An additional component to this intervention was the level of social interaction that was given to the participants while they completed the games. If participants were in the high social interaction (HSI) group, there was open conversation during the sessions with the researcher and the participant. However, if the participant was in the low social interaction (LSI) group, the interaction was kept exclusively to rating the games.

Measures. This study utilized both quantitative and qualitative data. The quantitative outcomes included pre- and post-test assessments that examined cognition, NPS, and QoL. Cognition was assessed with the Montreal Cognitive Assessment (MoCA) and the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). The MoCA provided results about participants overall cognitive status, where the RBANS provided in-depth analyses for overall cognitive abilities, memory, and visuospatial

abilities. The Neuropsychiatric Inventory (NPI) was used to examine the presence or absence of 12 NPS, including the frequency and severity of each NPS, as well as the levels of caregiver distress caused from each. For this study, an overall score representing the frequency and severity of all of the NPS was used, in addition to an overall caregiver distress score. Finally, the Quality of Life-Alzheimer's Disease (QoL-AD) scale was used for evaluating the QoL of the participants. Two scores were obtained from this scale, one from the participants about their own QoL and another from caregivers about the participant's QoL. The qualitative outcomes were examined using the Observational Measurement of Engagement (OME) tool, which provided a guide for field note taking during the cognitive training sessions and for analysis. The OME was used to examine the rate of refusal to begin the training, attention during the training, and attitude toward the training.

Analytic method. Means and standard deviations were calculated for all of the assessments at baseline and the completion of the study. This was done for the total group, the HSI group, and the LSI group. A mixed model analysis of variance was then used to examine the differential change from pre- to post- training for all of the participants, as well as to examine the interaction between these scores in relation to one's social interaction group. Finally, qualitative analyses were conducted using the OME, where the responses for rate of refusal, attentiveness, and range of attitudes were transformed into Likert-scaled numerical values.

FINDINGS

Results indicated a better performance on all the cognitive assessments when looking at the overall sample. In particular, there was an increase in scores on the MoCA, RBANS total, RBANS memory, and RBANS visuospatial from pre- to post-assessment. When looking at the individual groups, there was an increase in scores for the HSI

group on all four of the assessments. However, the score on the MoCA remained exactly the same, and the scores for RBANS total, memory, and visuospatial for the LSI group declined. The only cognitive assessment to see significant change from pre- to post-assessment was the RBANS memory. There were no significant interactions found for the individual groups.

Results also indicated a reduction in the frequency and severity of NPS for the entire sample. Specifically, there was a significant reduction in the NPI scores from pre- to post-assessment for the entire sample, and a reduced score for both the HSI and LSI groups, although this interaction was not significant. This translated into a reduction in caregiver distress for the entire sample, and each group, although none of these changes were significant. Finally, when the participants rated their own QoL, there was overall reduction in the scores. However, when participants' QoL was rated by their caregiver, there was an overall increase in the scores. Both of these changes were found to be statistically significant. There was also a statistically significant interaction found for the participants' QoL ratings. Specifically, the ratings in the HSI group remained the same from pre- to post-assessment, and the ratings by those in the LSI group declined. The QoL ratings by caregivers about participants in the HSI and LSI groups increased from pre- to post-assessment, but these changes were not significant.

The qualitative results found that there was an overall low rate of refusal to begin the training by participants. Additionally, participants were highly attentive and had a positive attitude during game play. This shows that the games were able to capture the attention of someone with dementia, and could be easily implemented in this population. Several frequent themes arose during these sessions. These included needing a reminder or re-explanation about the directions, reassurance because of self-doubt, and comments about the game. These show that the participants with dementia can do these games, but it is

necessary to have someone there to help them progress through the tasks at hand.

POLICY IMPLICATIONS

The findings support the idea that both computer-based cognitive training and social interaction may help with managing some of the symptoms of dementia. The first major finding in this study is that cognitive training may be a viable way to manage the NPS that typically accompany dementia. The frequency and severity of these NPS were reduced in the entire sample at the end of the study. In addition to this, caregiver distress associated with these symptoms was also reduced.

The second major finding is that HSI may positively influence the cognitive abilities of older adults with dementia. In this study, the HSI group's cognitive scores increased from baseline to the end of the study, where the LSI group's cognitive scores remained the same or declined. The third major finding in this study is that QoL may be influenced by both cognitive training and social interaction. From pre- to post-assessment, participants in the HSI group saw stability in their QoL scores, but their caregivers reported improvement. Additionally, participants in the LSI group saw a reduction in the QoL scores, but their caregivers also reported an improvement. The final major finding is that cognitive training is feasible and well-liked among older adults with dementia.

These findings are especially important as they offer alternatives to antipsychotic medications which are typically prescribed to manage NPS despite their very serious adverse effects. Further research is needed to compare longer term implementation of computer-based cognitive training paired with social interaction, with a large sample, to see if the benefits brought by both are still maintained. Policy makers should incentivize the use of non-pharmacological interventions for people with mild to moderate dementia. They should also educate the public on the different types of interventions that are available.

Original Article

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