
**CLINICAL BOTTOM LINE:**

This article indicates that older adults with cognitive impairments who received adapted mental aerobics (MA) training showed an improvement in ratings for interpersonal skills, emotional functioning, cognitive/memory functioning, relationships with staff, and reliance on medications to control behavior or remember things. This is relevant to occupational therapy practice because the areas being tested are components therapists frequently work on with clients with cognitive impairments. The study was limited to a dementia care facility, so further research is needed to see if this training can be generalized into the community context. Overall, though, the MA training intervention proposed in the study provides insight on how and which intervention strategies, including core occupational therapy components of client-centered and occupation-focused interventions, can be used for this population.

**RESEARCH OBJECTIVE(S)**

List study objectives.

Evaluate the impact of mental aerobics (MA) training on older adults with memory impairments.

**DESIGN TYPE AND LEVEL OF EVIDENCE:**

Level I: Randomized controlled trial

**SAMPLE SELECTION**

How were subjects recruited and selected to participate? Please describe.

The 14 residents were recruited from Silverado, a dementia care facility in Texas, by the director of patient care, the third author. However, the study did not specify the exact method of recruitment.
Inclusion Criteria

Participants had to have resided in Silverado for at least 2 months. Participants had to be diagnosed with Alzheimer’s disease or a dementia-related memory impairment.

Exclusion Criteria

NR

SAMPLE CHARACTERISTICS

<table>
<thead>
<tr>
<th>N= (Number of participants taking part in the study)</th>
<th>N = 14</th>
</tr>
</thead>
<tbody>
<tr>
<td>#/ (%) Male</td>
<td>3/21.4%</td>
</tr>
<tr>
<td>#/ (%) Female</td>
<td>11/78.6%</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>NR</td>
</tr>
<tr>
<td>Disease/disability diagnosis</td>
<td>Diagnosed with Alzheimer’s disease or dementia-related memory impairment</td>
</tr>
</tbody>
</table>

INTERVENTION(S) AND CONTROL GROUPS

Add groups if necessary

Group 1

Brief description of the intervention

The mental aerobic (MA) program’s purpose is to emphasize the creative use of one’s own skills to solve a challenging problem while in a supportive group atmosphere. In such a program, active involvement of each participant is encouraged, and the solutions to problems are both individually and collectively reached in the context of the presence of a supportive and encouraging group leader. The experience is designed to be both entertaining and interactive for participants. This cognitively oriented intervention is designed to improve older person’s perceptions of cognitive ability, as well as to improve cognition in everyday function. The programs consist of components of creativity drills, math problems, spatial puzzles, verbal exercises, and other mental games.

To accommodate the cognitively impaired residents being tested, explicit attempts were made to minimize distractions and maintain residents’ focused attention, and the revised program consisted of both oral and visual presentations, as well as highly familiar concrete problems that were thought to be more meaningful to the participants as a whole.

How many participants in the group?  

\( n = 7; \) 5 females, 2 males

Where did the intervention take place?  

Silverado, a dementia care facility in Texas; attempts were made to facilitate an environment that maintained resident’s attention.
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who delivered?</td>
<td>Co-led by the first and second authors</td>
</tr>
<tr>
<td>How often?</td>
<td>6 30-minute sessions</td>
</tr>
<tr>
<td>For how long?</td>
<td>Spread over a 3-week interval</td>
</tr>
</tbody>
</table>

**Group 2**

<table>
<thead>
<tr>
<th>Brief description of the intervention</th>
<th>No contact control group</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many participants in the group?</td>
<td>( n = 7; 6 ) females, 1 male</td>
</tr>
<tr>
<td>Where did the intervention take place?</td>
<td>Silverado, a dementia care facility in Texas</td>
</tr>
<tr>
<td>Who delivered?</td>
<td>No contact because control group did not receive any intervention.</td>
</tr>
<tr>
<td>How often?</td>
<td>No contact because control group did not receive any intervention.</td>
</tr>
<tr>
<td>For how long?</td>
<td>No contact because control group did not receive any intervention.</td>
</tr>
</tbody>
</table>

**Intervention Biases:** *Check yes, no, or NR and explain, if needed.*

**Contamination:**

- **YES ☐**
- **NO ✒**
- **NR ☐**

*Comment: NR*

**Co-intervention:**

- **YES ☐**
- **NO ☒**
- **NR ☐**

*Comment: The facility provides both interpersonal and cognitive activities on daily basis to residents, so it is possible that participants received other cognitive interventions.*

**Timing:**

- **YES ☒**
- **NO ☐**
- **NR ☐**

*Comment: The study suggests a follow-up assessment for a longer time frame.*

**Site:**

- **YES ☐**
- **NO ✒**
- **NR ☐**

*Comment: The participants live in the facility.*

**Use of different therapists to provide intervention:**

- **YES ✒**
- **NO ☐**
- **NR ☐**

*Comment: Two different therapists led the intervention, so potential varying levels of therapeutic use of self may have affected the results.*
MEASURES AND OUTCOMES

Complete for each measure relevant to occupational therapy:

Measure 1:

<table>
<thead>
<tr>
<th>Name/type of measure used:</th>
<th>5-Point Likert rating for each domain.</th>
</tr>
</thead>
<tbody>
<tr>
<td>What outcome was measured?</td>
<td>Domains of a) active involvement in everyday life; b) cognitive/memory functioning; c) interpersonal skills; d) relationship with staff; e) activity of daily living skills; f) general mental status at present; g) dependence upon medication; and h) emotional functioning.</td>
</tr>
<tr>
<td>Is the measure reliable?</td>
<td>YES ☒  NO ☐  NR ☒</td>
</tr>
<tr>
<td>Is the measure valid?</td>
<td>YES ☒  NO ☐  NR ☒</td>
</tr>
<tr>
<td>When is the measure used?</td>
<td>Ratings of each participant were made 1 week prior to the beginning of the program and 1 week after the program ended by the same staff member for respective participant.</td>
</tr>
</tbody>
</table>

Measurement Biases

Were the evaluators blind to treatment status? Check yes, no, or NR, and if no, explain.

| YES ☒  NO ☐  NR ☐ | Comment: Staff members rating the participants were blind to both the existence of the program and to the residents’ assignment to either the treatment or control group. |

Recall or memory bias. Check yes, no, or NR, and if yes, explain.

| YES ☒  NO ☐  NR ☐ | Comment: During the interview, recall questions were asked to assess the projected outcomes. |

RESULTS

List key findings based on study objectives

Include statistical significance where appropriate (p < 0.05)

Include effect size if reported

The means of the following domains showed significant improvement over time in the MA program residents’ ratings compared to the control: interpersonal skills 57% vs. 14%; emotional functioning (66% vs. 16%); active daily involvement (43% vs. 14%); cognitive/memory functioning (80% vs. 25%); relationships with staff (28% vs. 0%); and reliance on medications to functioning control behavior or remember things (14% vs. 57%). All differences were statistically significant (p < 0.05). However, the difference between proportions for active daily involvement was not significant (p = 0.10).

Based on the ANOVA analysis and nonparametric techniques (Fisher exact probability change and Mann Whitney U tests), the domains of activities of daily living, mental status, and cognitive/memory functioning were observed to have no differential effects in the MA versus
control groups. However, the effects of the domains of interpersonal functioning, emotional functioning, and relationships with staff were moderate after nonparametric analyses were run ($p > .06 < .09$). For everyday activity/involvement and reliance on medications, the effects of MA Training were the most substantial, with more participants rated everyday activity (Fisher’s exact test, $p < .05$) and fewer rated reliance on medications to control behavior and/or memory (Mann Whitney U Test, $p < .05$). It should be noted that the actual statistical values (other than $p$ values) were not reported. Even though the authors reported means and standard deviations, the values from ANOVA, Fisher, and Mann Whitney statistical tests were not reported for the reader.

Was this study adequately powered (large enough to show a difference)? Check yes, no, or NR, and if no, explain.

| YES ☐ | NO ☒ | NR ☐ | Comment: The tests were hampered by small sample sizes, and consequently low power. |

Were appropriate analytic methods used? Check yes, no, or NR, and if no, explain.

| YES ☒ | NO ☐ | NR ☐ | Comment: N/A |

Were statistics appropriately reported (in written or table format)? Check yes or no, and if no, explain.

| YES ☒ | NO ☐ | Comment: N/A |

Was the percent/number of subjects/participants who dropped out of the study reported?

| YES ☒ | NO ☐ |

Limitations:

What are the overall study limitations?

The study was conducted in an environment designed to be cognitively stimulating, therefore the pilot data reported here are perhaps even more impressive in reflecting the gains indicated in the results. In essence, the findings suggest that positive MA program effects were observed over and above any benefits linked to efforts on the part of the program staff to routinely stimulate residents mentally on a daily basis. The outcome measure tool used in the study was developed by the first author; however, the authors did not report how it was precisely developed. For instance, there is no information about how the constructs and content were formulated or the content validity of the tool. Additionally, no reliability evidence is provided for this tool. Therefore, because all findings stem from this outcome measure, this lack of evidence of validity is a significant limitation of this study and should be noted.
CONCLUSIONS
State the authors’ conclusions related to the research objectives.

These pilot findings suggest that MA training can have beneficial effects for older persons with memory impairment, though it is clear that such benefits are greater for some adults than for others and that a more intensive program of longer duration might be more effective. Future research to be conducted should include follow-up assessment; use direct assessment of residents’ cognitive skills; incorporate self-ratings of cognitive status, mood, quality of life, or relationships with others; and use multiple staff raters.

This work is based on the evidence-based literature review completed by Karlyn Dixon, OTS; Gina Rodriguez, OTS; Rebecca Yenan Wint, OTS; and Rochelle Mendonca, PhD, OTR/L, Faculty Advisor, Temple University.


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