



## AOTA Critically Appraised Topics and Papers Series Alzheimer's Disease

*\*A product of the American Occupational Therapy Association's  
Evidence-Based Literature Review Project*

### CRITICALLY APPRAISED PAPER (CAP)

#### ***Focused Question***

**What is the evidence for the effect of interventions designed to modify and maintain perceptual abilities on the occupational performance of persons with dementia?**

Heyn, P. (2003). The effect of a multisensory exercise program on engagement, behavior, and selected physiological indexes in persons with dementia. *American Journal of Alzheimer's Disease and Other Dementias*, 18, 247–251.

#### **PROBLEM STATEMENT (JUSTIFICATION OF THE NEED FOR THE STUDY)**

State the problem the authors are investigating in this study.

Reduced physical activity is related to functional decline. There is a need to design and evaluate exercise programs that address problems associated with engagement in physical activities to improve the health of individuals with dementia. Multisensory stimulation activities may help to engage people with dementias in an exercise program.

#### **RESEARCH OBJECTIVE(S)**

List study objectives.

“To evaluate the outcomes of a multisensory exercise program on cognitive function (engagement), behavior (mood), and physiological indices (blood pressure, resting heart rate, and weight) in 13 nursing home residents diagnosed with moderate to severe Alzheimer's Disease” (p. 247).

Describe how the research objectives address the focused question.

The intervention is described as multi-sensory, involving an attempt to stimulate and thus maintain perceptual abilities. The outcome of engagement is an occupational performance outcome related to social participation.

**DESIGN TYPE:**

One group, pretest posttest

**Level of Evidence:**

III

Limitations (appropriateness of study design):

Was the study design type appropriate for the knowledge level about this topic? *If no, explain.*

Yes

No

**SAMPLE SELECTION**

How were subjects selected to participate? Please describe.

Participants were residents of a memory care residence for persons with Alzheimer's disease.

**Inclusion Criteria**

Convenience sample: 65 or more years of age; medical diagnosis of dementia; able to use wheelchair or ambulate with minimal assistance; Mini-Mental State Examination (MMSE) score of 21 or less; informed consent from participant or guardian.

**Exclusion Criteria**

Residents were excluded if they had acute medical conditions or contraindications for exercise.

Sample Selection Biases: *If yes, explain.*

Volunteers/Referrals

Yes

No

Attention

Yes  With only one group, responses may be related to increased attention.

No

Others (list and explain):

**SAMPLE CHARACTERISTICS**

N = 13

% Dropouts	<input type="text" value="0%"/>		
# (%) Male	<input type="text" value="1 (7%)"/>	# (%) Female	<input type="text" value="12 (93%)"/>
Ethnicity	<input type="text" value="All Caucasian"/>		
Disease/disability diagnosis	<input type="text" value="Dementia; MMSE scores ranged from 1 to 12"/>		

Check appropriate group:

<20/study group <input checked="" type="checkbox"/>	20–50/study group	51–100/study group	101–149/study group	150–200/study group
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Sample Characteristics Bias: If no, explain.

If there is more than one study group, was there a similarity between the groups?

Yes

No

Were the reasons for the dropouts reported?

Yes

No

NR= Not Reported

**INTERVENTION(S)**—Included are only those interventions relevant to answering the evidence-based question.

*Add groups if necessary*

Group 1

Brief Description	Multisensory exercise program with four components: <ol style="list-style-type: none"> <li>1. Focused attention and warm-up session (using storytelling and imagery in combination with seated warm-up exercises)</li> <li>2. Flexibility and aerobic exercises</li> <li>3. Strength training session</li> <li>4. Session closure focusing on relaxation and breathing</li> </ol>
Setting	Multi-purpose room at a residence for persons with dementia

Who Delivered?	Exercise physiologist with training in gerontology
Frequency?	3 times per week
Duration?	8 weeks

Intervention Biases: *Explain, if needed.*

Contamination

Yes

No

Co-intervention

Yes

No  Nursing staff were asked to report any significant changes in medication, diet, schedule, and activities.

Timing

Yes

No

Site

Yes

No

Use of different therapists to provide intervention

Yes

No

**MEASURES AND OUTCOMES**—Included are measures relevant to answering the focused question.

Name of measure:

Menorah Park Engagement Scale

Outcome(s) measured (what was measured?):

Participation in and reaction to activities

Is the measure reliable (as reported in article)?

Yes  Interrater reliability of 95%

No

NR

Is the measure valid (as reported in article)?

Yes

No

NR

How frequently was the measure used for each group in the study?

“Before and after the intervention” (p. 249). It is unclear if this was after each of the sessions or before and after the 8 weeks of intervention.

Name of measure:

Resting heart rate

Outcome(s) measured (what was measured?):

Heart rate

Is the measure reliable (as reported in article)?

Yes

No

NR

Is the measure valid (as reported in article)?

Yes

No

NR

How frequently was the measure used for each group in the study?

“Before and after the intervention” (p. 249). It is unclear if this was after each of the sessions or before and after the 8 weeks of intervention.

Name of measure:

Blood pressure

Outcome(s) measured (what was measured?):

Blood pressure

Is the measure reliable (as reported in article)?

Yes

No

NR

Is the measure valid (as reported in article)?

Yes

No

NR

How frequently was the measure used for each group in the study?

“Before and after the intervention” (p. 249). It is unclear if this was after each of the sessions or before and after the 8 weeks of intervention.

Name of measure:

Weight

Outcome(s) measured (what was measured?):

Weight

Is the measure reliable (as reported in article)?

Yes

No

NR

Is the measure valid (as reported in article)?

Yes

No

NR

How frequently was the measure used for each group in the study?

“Before and after the intervention” (p. 249). It is unclear if this was after each of the sessions or before and after the 8 weeks of intervention.

Name of measure:

Caregiver Mood Report

Outcome(s) measured (what was measured?):

Participants’ overall moods

Is the measure reliable (as reported in article)?

Yes

No

NR

Is the measure valid (as reported in article)?

Yes

No

NR

How frequently was the measure used for each group in the study?

“At the end of the multisensory program” (p. 249). It is unclear if this was at the end of each session or at the end of the 8 weeks of intervention.

Measurement Biases

Were the evaluators blinded to treatment status? *If no, explain.*

Yes

No  It is not clear if evaluators were blind.

Recall or memory bias *If yes, explain.*

Yes

No

Others (list and explain):

Limitations (appropriateness of outcomes and measures) *If no, explain.*

Did the measures adequately measure the outcome(s)?

Yes

No  It is not clear why the researcher chose to develop a mood questionnaire rather than using an existing one; interrater reliability of the engagement scale does not account for chance agreement.

**RESULTS**

List results of outcomes relevant to answering the focused question

Include statistical significance where appropriate ( $p < 0.05$ )

Include effect size if reported

Engagement: 9 participants engaged in more than half of the activity, and 4 engaged in up to half. It appears from one of the figures in the study that engagement improved from before to after intervention, but the change is reported as a percent change rather than scores.

Mood: 8 participants showed positive improvements in overall mood; 5 showed no significant or little improvement.

Resting heart rate: Mean heart rate improved significantly ( $p < 0.01$ )

Blood pressure: No significant change.

Weight: No significant change.

Was this study adequately powered (large enough to show a difference)? *If no, explain.*

Yes

No  Considering the sample size and number of outcome measures, the study likely was not adequately powered.

Were appropriate analytic methods used? *If no, explain.*

Yes

No

Were statistics appropriately reported (in written or table format)? *If no, explain.*

Yes

No  It is difficult to link the results on engagement and mood in Figure 1 with the results in text.

## CONCLUSIONS

State the authors' conclusions that are applicable to answering the evidence-based question.

The author suggests that “preliminary findings suggest that multisensory exercise approaches may decrease [resting heart rate], increase exercise engagement and preserve function in persons with [Alzheimer’s disease]” (p. 250).

Were the conclusions appropriate for the Study Design (Level of Evidence)? *If no, explain.*

Yes

No

Were the conclusions appropriate for the statistical results? *If no, explain.*

Yes

No  It is unclear how the authors concluded that function was potentially preserved, when it was not one of the outcome measures used.

Were the conclusions appropriate given the study limitation and biases? *If no, explain.*

Yes

No

## IMPLICATIONS FOR OCCUPATIONAL THERAPY

This section provides guidance about clinical practice, program development, and other implications of the study findings as they relate to the focused question.

With the limitations associated with this study, including lack of comparison group; a small convenience sample; and many outcome measures, some of which have questionable psychometric properties, it is difficult to make conclusions about the value of a multisensory exercise program. It would be anticipated that any exercise program for people living in institutional settings would be of benefit to their physical status (e.g., resting heart rate), so it is not surprising that this result was found in this study. However, as the authors correctly discuss, it can be challenging to engage people with dementia in physical activity programs. This program is of interest since it draws on a multisensory approach (i.e., stimulating such perceptual components as body awareness) to engage people in a physical activity program. Prior to implementing such a program, further evidence would be needed to demonstrate that a multisensory approach is a useful means to engage people in such a physical activity program, and that it results in functional gains as well.

This work is based on the evidence-based literature review completed in August 2005 by Lori Letts, PhD, OT Reg. (Ont.); Jacqueline Minezes, BSc (OT), OT Reg. (Ont.); Julie Berenyi, BHSc (OT) OT Reg. (Ont.); Mary Edwards, MHSc, OT Reg. (Ont.); Kathy Moros, BHSc (OT), OT Reg. (Ont.); Colleen O'Neill, BSc (OT), OT Reg. (Ont.); and Colleen O'Toole, MSc (OT), OT Reg. (Ont.).

CAP Worksheet adapted from: Critical Review Form – Quantitative Studies ©Law, M., Stewart, D., Pollack, N., Letts, L., Bosch, J., & Westmorland, M., 1998, McMaster University. Used with permission.

For more information about the Evidence-Based Literature Review Project, contact the American Occupational Therapy Association, 301-652-6611, x 2052.



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