



## AOTA Critically Appraised Papers Series

# Evidence Exchange

*\*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 improved daily activity performance over time for disabled older adults with environmental barriers as a result of home modification interventions for aging in place?**

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Stark, S., Landsbaum, A., Palmer, J., Somerville, E., & Morris, J. (2009). Client-centered home modifications improve daily activity performance of older adults. *Canadian Journal of Occupational Therapy*, 76, 235–245. PMID:PMC2857667

#### **CLINICAL BOTTOM LINE:**

The results of this quasi-experimental Level III design adds to the evidence suggesting that home modifications may improve functional performance of daily activities in older adults aging in place in a naturally occurring retirement community (NORC). Strengths of the study include the use of a client-centered approach for the home modification intervention and follow-up after 2 years (longitudinal element). Weaknesses of the study were a small sample size, no control group, and the use of a single non-blinded rater who was also the treating occupational therapist.

The study supports the importance of client-centered interventions in occupational therapy practice that address the clients' needs. As occupational therapists conduct home evaluations, it is important to know which home modification options were selected by the client and if they increased occupational performance for those aging in place. The findings of this study may also be used to educate occupational therapists in client-centered interventions regarding home modifications that improve occupational performance.

Implications for occupational therapy research are the need to evaluate the frequency, duration, and intensity of home modification treatment that is beneficial to older adults that are aging in place.

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

The objective of this study was to describe a client-centered occupational therapy home modification intervention program and examine the impact of the intervention on daily activity performance over 2 years.

#### **DESIGN TYPE AND LEVEL OF EVIDENCE:**

Level III nonrandomized pretest–posttest design

Limitations (appropriateness of study design):

Was the study design type appropriate for the knowledge level about this topic? *Circle yes or no, and if no, explain.*

YES  NO

**SAMPLE SELECTION**

How were subjects selected to participate?

The study was conducted in a suburban NORC in the St. Louis metropolitan area. A convenience sample of 317 older adults was recruited through neighborhood meetings, flyers, community newsletters, and word of mouth. When participants, responding about needs for health and social services, indicated they had difficulty completing their daily activities, they were contacted by phone. Participants were screened for exclusion and inclusion criteria, and those who reported difficulty performing daily activities as measured by scores of 6 or less on 2 or more activities on the telephone version of the Functional Impairment Measure (The FIM™) were invited to participate in the home modification study. Eighty volunteers agreed to participate.

**Inclusion Criteria**

Participants were included if they were ages 60 or older, scored 6 or less on 2 or more activities on the telephone version of The FIM, and lived within the geographic boundaries of the NORC.

**Exclusion Criteria**

Exclusion criteria included a score of 10 or greater on the telephone version of the Short Blessed Memory Orientation and Concentration Test, as these individuals were considered unable to provide informed consent.

**SAMPLE CHARACTERISTICS**

N = 80.

% Dropouts	Pretest, 3.75%. Reason for dropout was the decision to move out of the NORC. Post-intervention assessment, 16.25%. Reasons for dropout included moving, severe mental health issues, death, family crisis, decreased cognition, and 1 participant who was 57 years old. Two-year follow-up, 53.75%. Reasons for dropout included moving, death, and lost to follow up.
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#/ (%) Male 12% (n = 8)

#/ (%) Female 88% (n = 59)

Ethnicity

90.7% White  
6.7% Black  
1.3% Asian  
1.3% Russian

Disease/disability diagnosis

90% reported using a mobility device such as a cane, walker, or wheelchair.

Check appropriate group:

<20/study group	20–50/study group	51–100/study group ✓	101–149/study group	150–200/study group
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### INTERVENTION(S) AND CONTROL GROUPS

Add groups if necessary

Group 1

Brief Description	The intervention included a range of typical home modification strategies, such as adaptive equipment, architectural modifications, major home renovations, and training in using the compensatory supports and strategies during daily activities. First, the barrier was identified and discussed with the participant. Next, a plan for removing the barrier was developed in consultation with the participant and team members. For each barrier identified, up to 3 home modification solutions were presented and discussed using drawings or photos. The client then chose the solution. After the home modifications were installed, the occupational therapist worked with the participant on each activity until the client was satisfied and deemed safe by the therapist.
Setting	The study was conducted in a NORC in each participant’s home in a suburb of St. Louis.
Who Delivered?	The intervention was implemented by a team that included a construction company, family members (if requested by participant), and the occupational therapist.
Frequency?	Occupational therapy visits ranged from 3 to 10 ( $M = 5$ ).
Duration?	The average time for the modifications installation and training was 39 days. There was a follow-up visit from the occupational therapist for the 3-month posttest and the 2-year posttest.

Intervention Biases: Circle yes or no and explain, if needed.

Contamination

YES  NO

Co-intervention

YES  NO

Timing

YES  NO

Site

YES  NO

Use of different therapists to provide intervention

YES  NO

## MEASURES AND OUTCOMES

The FIM--This measured motor and cognitive function.

Reliable and valid--It was reported as reliable and valid, but no statistics were provided.

Frequency of use--Pretest, 3 months posttest, and 2-year follow-up.

Investigator-Developed Measure--The investigators developed a unique set of 38 photographs depicting activities performed in the home. The photographs served as cues to assist older adults to recall their activity performance. The activities were derived from a previously conducted survey, a review of clinical records of a home modification treatment program, and the pilot study.

The first step was a card sort, which measured activity performance and was used only for developing the treatment plan. The participants identified their current activity patterns based on 4 categories indicating whether or not they performed the activity; if they did not, whether or not they wanted to; and if they performed the activity, what the level of difficulty was.

Frequency of use--Pretest.

The subset measured the performance and satisfaction of the activity by having the subjects rank the problematic activities least important to most important then rating the performance and satisfaction of those activities.

Frequency of use--Pretest, 3 months posttest, and 2-year follow-up.

The last step measured the severity of environmental barriers. An occupational therapist observed the participant performing the activity. Based on this observation, the therapist identified and rated the influence of the barrier on the performance on a scale of 1–5.

Frequency of use--Pretest, 3 months posttest, and 2-year follow-up.

Reliability and validity of the investigator-developed measure was not reported.

Lighthouse Near Visual Acuity--This measured visual acuity.

Reliable and valid--It was reported as reliable and valid, but no statistics were provided.

Frequency of use--Pretest and 3 months posttest.

Get up and Go--This measured mobility as the ability to rise from a chair, walk 15 feet, and return to the chair.

Reliable and valid--It was reported as reliable and valid, but no statistics were provided.

Frequency of use--Pretest and 3 months posttest.

Short Blessed Test--This measured memory.

Reliable and valid--It was reported as reliable and valid, but no statistics were provided.

Frequency of use--Pretest and 3 months posttest.

Manual Muscle Testing--This measured strength.

Reliable and valid--It was reported as reliable and valid, but no statistics were provided.

Frequency of use--Pretest and 3 months posttest.

Goniometry--This measured range of motion.

Reliable and valid--It was reported as reliable and valid, but no statistics were provided.

Frequency of use--Pretest and 3 months posttest.

Hearing--This measured sound repetition by using a combination of high- and low-pitched sounds. Persons were asked to repeat the sounds while the examiner blocked the view of her lips.

Reliable and valid--It was reported as reliable and valid, but no statistics were provided.

Frequency of use--Pretest and 3 months posttest.

### Measurement Biases

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

YES  NO

The study used a single unblinded rater who was also the treating therapist, which may have introduced bias.

Recall or memory bias. *Circle yes or no, and if yes, explain.*

YES  NO

Others (list and explain):

### **RESULTS**

The participants ( $N = 67$ ) identified 719 activities they had difficulty completing and 100 activities they had given up. There were 257 identified problems addressed as part of the study. An average of 3.9 problems were addressed per participant. Approximately 80% of the modifications recommended by the therapist were adopted.

Client satisfaction with activity performance increased significantly from baseline to 3-month posttest ( $p < .0001$ ), with 61% of the effect size accounting for variability in scores. Satisfaction decreased significantly from 3-month posttest to 2-year posttest ( $p < .017$ ).

For activity performance, there was a significant increase in scores from baseline to 3-month posttest ( $p < .0001$ ), with 50% of the effect size accounting for variability in scores. There was no change from 3-month posttest to 2-year posttest.

For The FIM, there was a significant increase in scores from baseline to 3-month posttest ( $p < .0001$ ), with 50% of the effect size accounting for variability in scores. There was no change from 3-month posttest to 2-year posttest.

For the magnitude of the influence of the environment or person–environment fit, there was a significant decrease in scores from baseline to 3-month posttest ( $p < .0001$ ), indicating fewer barriers). A further decline in scores occurred from the 3-month posttest to the 2-year posttest ( $p < .0001$ ).

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

YES  NO

There was a relatively small sample size; however, significant results were found.

Were appropriate analytic methods used? *Circle yes or no, and if no, explain.*

YES  NO

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

YES  NO

## CONCLUSIONS

Study findings showed that older adults who have functional ability loss can improve performance of daily activities as a result of home modifications. With the increase in older adults aging in place and the impending burden on the health care system, a possible solution may be to compensate for functional loss by providing environmental supports through home modifications. Reducing disability by improving person—environment fit in the home is a significant intervention approach that deserves further study.

This work is based on critical appraisal of the article completed by Allyson M. Roller, MSOT student at the University of South Alabama, under the direction of and as part of an evidence-based literature review conducted by Rebecca I. Estes, PhD, OTR/L, CAPS, Nova Southeastern University, [REstes@Nova.edu](mailto:REstes@Nova.edu).

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