

## Review Article

# Behavioral Health of Dementia Patients in Long-term Care: Evaluation of a Montessori-based Program

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**Received:** March 17, 2015; **Accepted:** May 11, 2015;**Published:** May 20, 2015**Abstract**

Research regarding Montessori-based programs (MBPs) and persons with dementia is predominant with early-to-moderate stage dementia. Because of logistical reasons, a dearth of studies exists regarding said activities with late-stage dementia. The purpose of this study was to redress this gap by evaluating an MBP with long-term care facility residents in late-stage dementia using behavioral and social outcomes. Using a one-group interrupted time series design, staff at a long-term care facility in southern United States completed observation-based measures with 47 residents at three intervals over a 6-month period, including baseline. Residents met late-stage criteria via medical diagnosis and facility-based level of care. Empirical measures assessed problem behaviors, social engagement, and capacity for activities of daily living (ADLs). Paired-samples *t*-tests determined longitudinal change. The typical, sample resident was a married female in her mid-80s, diagnosed with Alzheimer's. The overall longitudinal result for each behavioral and social measure was as follows: problem behaviors diminished though not significantly ( $t=0.849, p=.403$ ); social engagement dropped significantly ( $t=2.197, p<.05$ ); and capacities for ADLs decreased significantly ( $t=2.948, p<.01$ ). Late-stage dementia patients are often deemed by the general population as too sick for meaningful life, however, social work ethics compels practitioners to consider and enhance the dignity and worth of all lives, regardless of illness or stage of such. Though results were mixed, the lowering of problem behaviors shows enough promise to consider continuation and future research of MBP.

**Keywords:** Dementia; Alzheimer's disease; Behavioral health; Social engagement; Montessori-based program

## Abbreviations

AD: Alzheimer's Disease; ADL: Activities of Daily Living; MBP: Montessori-based Program; RMBPC: Revised Memory & Behavior Problems Checklist; ISE: Index of Social Engagement; BADL: Bristol Activities of Daily Living Scale

## Introduction

Dementia describes a range of symptoms that negatively affect an individual's memory, cognitive skills, and ability to perform daily living activities [1]. In 2014, 5.2 million Americans over 65 years old were diagnosed with the most common form of dementia, Alzheimer's disease (AD) [1]. One population of concern is patients in the late stages of dementia or AD. Symptoms include memory loss, personality changes, and extreme difficulty completing daily tasks such as dressing, eating, and using the bathroom [1]. These symptoms increase dementia patients' dependency on caregivers and have been shown to contribute to worsening behavioral health outcomes [2].

To clarify, this study did not exclusively focus on clinical diagnoses of specific types of dementia (e.g., AD, vascular dementia, Parkinson's disease), but used a sample of patients experiencing symptoms of advanced or late-stage dementia. Since 60-80% of all dementia patients are diagnosed with AD [1], the method section will discuss how these rates were reflected in the current sample. In this

study, late-stage dementia patients were identified by two criteria; medical diagnoses combined with the facilities threshold for level of care. An observed score of 4 or 5 on the facility-based threshold of care assessment indicated the patient was not able to independently complete the activity (e.g., unable to feed themselves, completely dependent for mobility, needed assistance bathing). Accordingly, late-stage dementia patients in this study possessed high scores across numerous categories, indicating exceedingly poor functioning.

An expectant rise in the prevalence of dementia patients has elevated the need for theoretically based and empirically supported treatments for this population. As such, studies have pointed to three behavioral targets for intervention to improve the overall quality of life for late-stage dementia patients in long-term care facilities [3,4]. These targets include decreasing problem behaviors, and increasing both social engagement and ADL capacities.

## Literature Review

### Problem behaviors

Problem behaviors such as agitation and aggression have been identified as prevalent in approximately 40% of patients diagnosed with dementia [3]. Additional problem behaviors among late-stage dementia patients include: wandering, disruptive vocalizations, inappropriate sexual behaviors, and difficulty managing household

work (e.g., doing laundry, cooking safely, cleaning up) [5,6]. In order to decrease behavioral problems, studies found vocal disruptions or aggressive behaviors were caused by patients attempting to communicate pain or voice physiological needs [5,7]. Morgan et al. [7] found a declining relationship between caregivers and patients negatively impacted aggressive behaviors. Altogether, these findings suggest health care programs can reduce behavioral problems by decreasing physical pain, improving psychological well-being, and improving patient-caregiver relationships [8]. Not only is it important to decrease problem behaviors among dementia patients, but also to improve their social engagement.

### Social engagement

Dementia symptoms decrease the ability for older adults to engage socially with family members, peers, caregivers, and nursing home staff. Consequently, a lack of social engagement or participation in stimulating activities increased irritation, depression, and aggression among dementia patients [9]. Mega et al. [4] interviewed caregivers to assess the frequency of behavioral problems among 50 AD patients. Results showed *apathy*, a lack of concern or boredom, was the most frequent problem behavior observed among 72 percent of patients [4]. Thus, low social engagement may intensify behavioral problems for a large portion of dementia patients. Notably, interventions that increased social activity and social support through stimulating tasks improved dementia patient's overall cognitive functioning and promoted positive engagement [10,11]. These findings support the use of socially stimulating activities in long-term care facilities. Finally, low social engagement and problem behaviors are often accompanied by dementia patients' decreasing capacities for ADLs.

### Activities of daily living

For long-term care patients, the inability to autonomously use the bathroom, eat, sleep, and walk causes significant stress and an increasing dependence on caregivers [12,13]. Studies have shown that caregiver dependency is predictive of nursing home placement and mortality for dementia patients [14,15]. Furthermore, researchers found dependency for ADLs contributed to an overall decline in patient's quality of life [12,17] and increased risks for falling and fractures [16]. In a recent review, behavioral interventions that focused on skill-building, environmental guidance, and endurance activities (e.g., walking, balance, flexibility exercises) increased dementia patients' feelings of competence and self-efficacy for ADLs, resulting in improved quality of life [18]. In sum, behavioral interventions demonstrated effectiveness for improving ADL competencies. Collectively, research on the behavioral health of late-stage dementia patients reinforces the use of interventions that support the patient-caregiver relationship, provide activities for social engagement, and focus on the enhancement of individual skills [17,19]. A recent growth of research on end-of-life care has suggested Montessori-based programs (MBP) can positively influence the cognitive, motor, and social skills of dementia patients.

### Montessori-based programs

Originally designed to teach young children cognitive and social skills, the Montessori Method of education encompasses individualized instruction designed to enhance practical life skills and sensorial experiences [20]. Long-term care facilities for geriatric populations began to adopt MBP in order to provide activities that

rehabilitated patients' mental and physical capacities [21]. In short, Montessori methods present educational activities and subsequent tasks in their simplest form, while also providing the learner with immediate feedback [21]. The individualized design and intellectual stimulation associated with MBP has been found to increase social engagement [10] and decrease agitation among dementia patients in adult day care settings [22]. Further, in an adult day care setting, Montessori materials positively influenced dementia patient's attention and social behavior [23]. Together, these findings support the use of MBP for dementia patients; however, evaluations of these practices in long-term care facilities and among late-stage patients have been scarcely researched.

In order to readdress this literature gap, this study evaluated the effects an 8-month MBP among late-stage dementia patients, most of whom were diagnosed with AD, in long-term care facility in the Deep South. The name of said facility was 'Hope Village. Behavioral outcomes included the following: problem behaviors, social engagement, and capacities for ADLs. The MBP at Hope Village included various activities including: customized lesson planning, engaging puzzles and games, sorting exercises, story readings followed by group discussions, and guided completion of household activities. The following is a case example of Hope Villages' MBP activities with a dementia patient as observed by a research assistant.

'John is a 77-year-old male with late-stage dementia. He frequently struggles in environments with multiple stimuli (e.g., TV, radio, and groups of people) and benefits from calm and simplified atmospheres. During a period in which John appeared overwhelmed by chatter and movement of others, a staff member invited John to take a walk. By focusing on John's capacity to experience the comfort of personal contact and art, John and the staff member walked through the building and viewed the paintings in the hallways. This activity incorporated the MBP principle of focusing on abilities that do not diminish during the disease progress. John's behavioral disturbances such as anxiety and agitation greatly dissipated. Upon returning to common space, the residents were engaged in activities, and John appeared relaxed and interested in socially engaging with his peers.

This case example highlights the activities used in the Hope Village program. In brief, these activities targeted a range of cognitive domains for dementia patients including attention, executive functioning, learning and memory, language, and social cognitions. Importantly, few studies have specifically assessed the efficacy of MBP's among late-stage dementia patients as a result of ethical and methodological issues with data collection [24]. The inability to collect self-report data on late-stage dementia patients has led to a need for advanced observational methods to assess the effectiveness of a MBP among this population.

## Methods

### Design and sampling

Participants in the study were individuals residing in Hope Village whose primary caregivers provided written consent for inclusion in the study. Each participant was coded by Hope Village staff to maintain confidentiality. Non-identifying demographic data were obtained via chart records. All participants participated daily in MBP. All participants have a diagnosis of Alzheimer's disease or dementia.

**Table 1:** Sample characteristics (N = 47).

Variable	Valid %	n	Mean (SD)
<b>Age</b>			86.3 (7.60)
<b>Gender</b>			
Female	76.6	36	
Male	23.4	11	
<b>Ethnicity</b>			
Caucasian	97.9	46	
Hispanic/Latina(o)	2.1	1	
<b>Marital Status</b>			
Widowed	63.8	30	
Married	29.8	14	
Single	6.4	3	
<b>Relation to Primary Caregiver</b>			
Parent	70.2	33	
Spouse	19.1	9	
Aunt/Uncle	4.3	2	
Cousin	4.3	2	
Significant other	2.1	1	

The total sample (N) consists of 47 participants who completed at least two data collection intervals.

The specific research design for this study is a quasi-experimental, single group interrupted time series. The complete period of data collection was scheduled from January–September 2014. During this period, nursing staff completed surveys containing the observation-based empirical measures (see below) at three distinct intervals (every 3 months) for each participant: interval 1 during the early initiation of MBP activities (baseline) and intervals 2–3 while continuing MBP daily activities.

### Measures

Demographic data were collected relating to age, gender, ethnicity, marital status, and relationship to caregiver. The empirical, standardized scales to examine behavioral health among the participants are described below.

### Problem behaviors

The frequency of problem behaviors subscale from the 24-item *Revised Memory & Behavior Problems Checklist*, or RMBPC, was selected chosen for its brevity and specificity to problem-behaviors in individuals with dementia [25]. Examples of items on the RMBPC include destroying property and dangerous behaviors to self and others. Global scores were calculated via the sum of responses for each item. Range of possible global scores on the RMBPC scale is 0 – 24, with higher scores indicating greater frequency of problem behaviors. A satisfactory alpha of 0.78 for internal consistency has been reported of this RMBPC subscale [26].

### Social engagement

The 6-item *Index of Social Engagement*, or ISE, was selected as it is one of the only standardized, observation-based social engagement measures for use with older adults [27]. Examples of items on the ISE include *ease of interacting with others* and *pursuit of facility activities*.

Each item contained a yes/no response format, with *yes* = 1 and *no* = 0. Global scores were calculated via the mean of scored items. Range of possible global scores is 0–6, with higher scores indicating greater levels of social engagement. Reliability alphas of this measure in previous research have ranged from 0.70 – 0.88 [27].

### Activities of daily living

The 20-item *Bristol Activities of Daily Living Scale*, or BADL, was selected for its appropriateness as an activity of daily living (ADLs) instrument for individuals with dementia that can be completed via proxy assessment [28]. Global scores were calculated via the mean of scored items (to accommodate item responses of *not applicable*). The range of possible global scores on the BADL is 0 – 3, with higher scores indicating greater capacity to conduct common ADLs. As we could not find reliability statistics on the BADL in prior research, Cronbach's alpha on this measure was determined at 0.647.

### Analytic strategy

Sample characteristics were reported via frequencies/percentages for non-parametric variables (e.g., gender, ethnicity) and central tendency for the parametric variable of age. Descriptive statistics for all of the behavioral health outcome variables were reported via central tendency. Paired-samples *t*-tests were conducted to determine whether aggregate, mean scores of a given outcome variable were significantly different between data intervals. To examine the influence of each categorical demographic factor (e.g., gender) on an outcome variable, a *t*-test or ANOVA was conducted. To examine the influence of each parametric, demographic factor (e.g., age) on an outcome variable, linear regression was conducted. Missing data for a given scale item were computed via mean substitution derived from the remainder of the same scale items for the specific data collection interval. Significance threshold for this study was set at the traditional standard of 0.05.

## Results

### Sample characteristics

The average age in the sample was 86 years. The majority of the sample reported female (77%, *n* = 36) and Caucasian (98%, *n* = 46). Most individuals in the sample reported parental relationship to their respective primary caregivers (70%, *n* = 33). Table 1 illustrates complete details of sample characteristics.

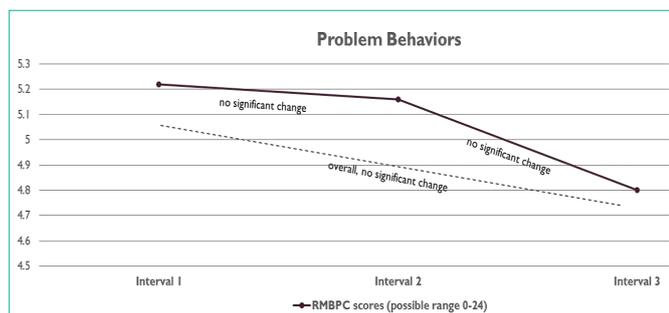
### Outcomes: Descriptive and longitudinal change

#### Problem behaviors

To iterate, the range of possible global scores on the RMBPC scale is 0–24, with higher scores indicating greater frequency of problem behaviors. The sample in reported RMBPC aggregate global scores as follows:

- interval 1 showed a mean RMBPC global score of 5.2 (SD = 3.66);
- interval 2 showed a mean RMBPC global score of 5.2 (SD = 3.78); and
- interval 3 showed a mean RMBPC global score of 4.8 (SD = 3.50).

Statistical differences between data collection intervals among



**Figure 1:** Longitudinal change in RMBPC scores (frequency of problem behaviors).

RMBPC global scores were observed as follows:

- no significant change between intervals 1 and 2 ( $t = 0.882, p = .38$ );
- no significant change between intervals 2 and 3 ( $t = 0.01, p = .99$ ); and
- overall, no significant change between intervals 1 and 3 ( $t = 0.849, p = .40$ ).

No demographic factor in this study showed significant influence on RMBPC scores. See Figure 1 for illustration of these longitudinal changes.

**Social engagement**

To iterate, the range of possible global scores on the ISE is 0–6, with higher scores indicating greater levels of social engagement. The sample in this study reported ISE aggregate global scores for each data interval as follows:

- interval 1 showed a mean ISE global score of 3.0 (SD = 2.19);
- interval 2 showed a mean ISE global score of 2.8 (SD = 1.92); and
- interval 3 showed a mean ISE global score of 2.6 (SD = 2.24).

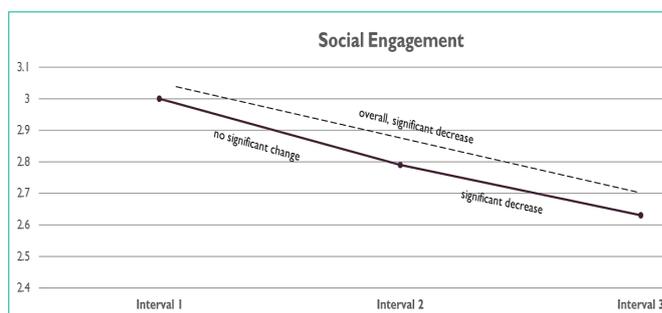
Statistical differences between data collection intervals among ISE global scores were observed as follows:

- no significant change between intervals 1 and 2 ( $t = 1.121, p = .27$ );
- significant decrease between intervals 2 and 3 ( $t = 2.065, p < .05$ ); and
- overall, significant decrease between intervals 1 and 3 ( $t = 2.197, p < .05$ ).

No demographic factor demonstrated significant influence on ISE scores. See Figure 2 for illustration of these longitudinal changes.

**Activities of daily living**

To iterate, the range of possible global scores on the BADL is 0–3, with higher scores indicating greater capacity to conduct common activities of daily living. The sample in this study reported BADL aggregate global scores as follows:



**Figure 2:** Longitudinal change in ISE scores (social engagement) scores.

- interval 1 showed a mean BADL global score of 1.2 (SD = 0.79);
- interval 2 showed a mean BADL global score of 1.1 (SD = 0.75); and
- interval 3 showed a mean BADL global score of 1.0 (SD = 0.76).

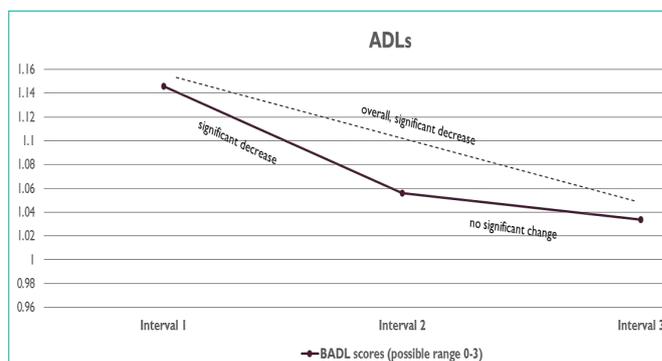
Statistical differences between data collection intervals among BADL global scores were observed as follows:

- significant increase between intervals 1 and 2 ( $t = 2.115, p < .05$ );
- no significant change between intervals 2 and 3 ( $t = 0.640, p = .53$ ); and
- overall, significant increase between intervals 1 and 3 ( $t = 2.948, p < .01$ ).

Again, no demographic factor in this study exerted significant influence on BADL scores. See Figure 3 for illustration of these longitudinal changes.

**Discussion and Conclusion**

The results of this study indicated the effects of Hope Village’s MBP moderately reduced problems behaviors, yet significantly decreased social engagement and ADL capacities for a sample of individuals diagnosed with late-stage dementia. In viewing these results, it is important to consider that a decrease in social engagement may have been influenced by the individualized design and structure of the MBP. A focus on personalized tasks and immediate feedback from



**Figure 3:** Longitudinal change in BADL scores (capacity for ADLs).

facility staff may have influenced the time patients were allotted for engagement with others. Further, since dementia symptoms worsen over time, loss of the ability to speak, hear, and memory loss, may have negatively influenced patients' competencies for socialization and ADLs. Loss of other abilities may also explain the decrease in problem behaviors (e.g., loss of physical or cognitive motor skills). Most notably, moderate changes in ADL capacities between time intervals may indicate that the MBP helped to decelerate the loss of these capacities for dementia patients. This finding may be deemed especially important as existing research points toward the importance of maintaining such capacities for improving patients' overall quality of life [18]. As such, long-term care facilities aimed at improving the overall quality of life for patients should consider the use of MBPs.

It is important to briefly note the limitations of this study and implications for future research. The use of observational methods with a small sample may have affected the reliability of the data gathered in this study. Social desirability, observer biases, and a lack of inter-rater agreement between nursing staff members should be noted. In contrast, the use of said methods were needed due to the inability to collect self-report data and for recording longitudinal changes amidst a hard to reach population. Future research, with a larger sample and greater assurances of differentiated experiences of late-stage dementia patients, is recommended to enhance our understanding of MBPs on behavioral and social outcomes. Future research should also consider using quality of life measures and multiple observers (e.g., social workers, doctors, caregivers, etc.) to augment the reliability of the data.

In conclusion, this study was needed as late-stage dementia patients warrant the same level of research attention as other medical or clinical populations. As social workers, it is our ethical obligation to research these individuals and overcome methodological challenges to redress gaps in the current literature. The results of this study have vast implications for long-term care providers as maintenance of ADL capacities may not only support a better quality of life among patients, but also alleviate demands on long-term care facilities staff and resources. Effective MBPs may also help counteract the expectant economic strain of dementia on caregivers, long-term care facilities, and the health care system as a whole. Altogether, the findings of this study support the use of MBPs for targeting behavioral outcomes among late-stage dementia patients in long-term care facilities, yet its effect on social engagement and ADLs warrants additional investigation. In viewing these results, it is important to consider that a decrease in social engagement may have been influenced by the individualized design and structure of the MBP. A focus on personalized tasks and immediate feedback from facility staff may have influenced the time patients were allotted for engagement with others. Further, since dementia symptoms worsen over time, loss of the ability to speak, hear, and memory loss, may have negatively influenced patients' competencies for socialization. Loss of other abilities may also explain the decrease in problem behaviors (e.g., loss of physical or cognitive motor skills); however, these would not appear to be consistent with significant increases found for ADLs. Most notably, a significant increase in ADLs is valuable as existing research points toward the importance of such capacities for improving patients' overall quality of life [18]. As such,

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**Footnote:** Denotes name changed for confidentiality purposes.

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