Use of Montessori-based activities for clients with dementia in adult day care: Effects on engagement

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Abstract

Clients with dementia in an adult day care center were observed taking part in regular activities programming or Montessori-based activities developed for persons with dementia. During the nine-month study, clients in Montessori-based activities exhibited greater amounts of constructive engagement, defined as motor or verbal behavior exhibited in response to the activity in which the client was taking part, than clients in regular programming. Montessori-based activities also elicited less passive engagement, defined as listening and/or looking behavior exhibited in response to the activity the clients were participating in, than regular programming. Implications of these results and ways to implement Montessori-based programming in settings serving persons with dementia are discussed.

Introduction

Persons with dementia exhibit a number of problematic behaviors, ranging from extreme agitation to apathy.[1] In their survey of frequency of problematic behaviors exhibited by persons with Alzheimer's disease (AD), Mega *et al*[1] found that the most frequently exhibited problem behavior was apathy, which was exhibited by 72 percent of their sample. The next most frequent problem behaviors were: agitation (60 percent), anxiety (48 percent), irritability (42 percent), dysphoria and aberrant motor behaviors (both 38 percent).

When persons with AD are presented with tasks that are beyond their level of functioning, these problem behaviors tend to increase.[2] On the other hand, lack of engagement or boredom can also lead to behavioral problems such as aggressiveness, agitation, and withdrawal.[3] Some researchers[4] report that problem behaviors such as agitation can be reduced in frequency and/or intensity when persons with dementia are engaged in stimulating and appropriate activities. It seems useful, therefore, to investigate methods for developing activities that can be used as forms of intervention for problem behaviors in AD and related disorders.[2,5-8]

The Montessori method

The use of the Montessori method, developed by Maria Montessori as a way to teach cognitive, social, and functional skills to children, has been recommended as an effective means of developing activities for persons with AD.[2,9-14] According to Vance *et al*,[2] persons with dementia need structure, activities and order in their environment, and often become upset when changes are made in their surroundings. The Montessori method supports this need for structure in that the materials are taken from the everyday environment and each lesson or task is taught at its simplest level, followed by more complex tasks if appropriate. Tasks and materials give extensive cuing and guidance in terms of what is expected, and also provide feedback regarding appropriateness of responses. Therefore, tasks are designed to be self-correcting. Increasing the complexity of a task or breaking down a

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task to a simpler level allows for success and decreases frustration that accompanies failure. Materials also provide sensory and cognitive stimulation and allow persons with dementia to express their social skills.[5,11-12] Additionally, using the Montessori approach with persons with dementia has been useful in assessing an individual's cognitive, motor, and sensory functioning as well as social skills.[5]

Based on this reasoning and evidence from pilot studies,[11,12,14] it was decided to further expand this research by implementing a variety of Montessori-based individual and group activities in an adult day care setting. We hypothesized that clients who took part in Montessori-based programming would be more engaged with their social and physical environments than persons not taking part in Montessori activities.

Method

Sample selection

Nineteen participants (11 women and eight men) completed the study. Their Mini Mental State Examination (MMSE)[15] scores ranged from 7 to 24 (Mean = 17, S.D. = 5). All participants were diagnosed by a neuropsychologist, with 14 having probable or possible AD, three having probable or possible vascular dementia, and two having mixed dementia. Age ranged from 60 to 101 years (Mean = 81, S.D. = 8.7). Seventy-six percent of the participants were Caucasian and 24 percent of the participants were African-American. Measures of functional status (the MOSES),[16] depression (CSD)[17] and agitation (CMAI)[18] indicated relatively high functional status (MOSES Mean = 54), low depression (CSD Mean = 2.4), and little agitation (CMAI Mean = 17) among these clients.

Participants were matched according to their MMSE scores and assigned to either the treatment group or the control group. There were six women and three men in the treatment group, while the control group had five men and five women. The groups were not significantly different ($p > .05$) for the MMSE, MOSES, CSD, or CMAI. Both groups had equal numbers of persons with probable or possible AD.

Materials and procedures

Engagement measures

To quantify the varying levels of engagement occurring in the regularly scheduled programming in comparison to engagement occurring in the Montessori-based intervention programming, research staff developed an engagement scale. Specifically, the amount of engagement and the types of engagement exhibited by clients participating in the two types of activities measured during 10-minute observation windows were assessed. Four main categories of engagement were observed: constructive engagement (CE), passive engagement (PE), non-engagement (NE), and self-engagement (SE).

Constructive engagement was defined as any motor or verbal behavior exhibited in response to the activity in which the client was taking part. For example, talking in a discussion group, painting in a creative arts activity, and singing or dancing to music would all be coded as constructive engagement. Passive engagement was defined as listening and/or looking behavior exhibited in response to the activity the client was participating in. For example, listening to a discussion or a speaker, watching others paint or color in an art therapy project, and listening to music would all be coded as passive engagement. Non-engagement was defined as staring off into space or another direction away from the activity, sleeping, or any motor and/or verbal behavior activity in response to an activity the client was not currently participating in. Non-engagement is comparable to disengagement and apathy, which were discussed earlier. Self-engagement was defined as motor, verbal, listening and/or looking behavior during a transition period when an activity was not currently being offered or when the client chose not to participate in the scheduled activity. Raters observed clients during 10-minute observation windows using a stopwatch to code the length of time each type of engagement was exhibited. Inter-rater agreement across 25 observation windows was over 90 percent.

Clients in both the control group and the treatment group were observed at three different periods during the study. At baseline, before Montessori-based activities were introduced, both groups were observed four times—twice in the morning and twice in the afternoon, for 10-minute segments in regularly scheduled activities offered at the adult day care center. At posttest one, four months after baseline, and at posttest two, eight months after baseline, the control group was observed in the regularly scheduled activities. As was the case during baseline, observations were taken four times, twice in the morning and twice in the afternoon, for 10-minute segments at both posttest one and posttest two. The treatment group was observed in the Montessori-based intervention programming four times for posttest one and four times for posttest two, twice in the morning and twice in the afternoon, for 10-minute segments.

For an additional comparison, participants in the treatment condition were also observed four times, twice in the morning and twice in the afternoon, during regularly scheduled activities during the posttest two observations. This provided an additional within-subjects comparison to determine the effects of Montessori-based programming for these participants.

Table 1. Means (and standard deviations) of constructive and passive engagement measures by group by time of test measured in seconds

			Time of test		
Measure	**Group**	**Pre-test**	**Posttest one**	**Posttest two**	
Constructive engagement	Treatment	118 (128)	398 (180)	394 (193)	**152 (115)**
	Control	93 (90)	98 (101)	113 (103)	
Passive engagement	Treatment	352 (117)	201 (181)	206 (193)	**264 (136)**
	Control	398 (166)	427 (138)	364 (142)	

n = 9 for treatment (Montessori-based programming) group; n = 10 for controls
SDs are shown in parentheses
600 total seconds were possible (10-minute observations)
Numbers in bold represent treatment group taking part in regular (*i.e.*, control condition) adult day care programming at Posttest two)

Treatment and control procedures

All participants in the treatment group participated in both individual and group Montessori-based programming during the entire study period after baseline measures had been obtained. Group activities consisted of Question Asking Reading (QAR) and Memory Bingo. QAR is a small-group reading activity (three to six players) in which participants read a two-page story and answer relevant questions about it. Group participation and discussion is facilitated through external memory aids, such as cue cards.[12,19-20] Memory Bingo is a small-group activity designed for participants who are able to read one word at a time.[10] Each participant receives four playing cards with answers to corresponding calling cards containing questions and/or phrases. Participants take turns reading the questions and/or phrases on the calling cards and then look to see if they have the answer on one of their playing cards. If so, they turn that card over. Once all four playing cards have been turned over, the game is finished.

Individual programming took two forms. Intergenerational Programming was designed for participants to serve as effective mentors to young children, while demonstrating how to complete a Montessori-based activity.[11,12] In general, this type of programming was used with clients exhibiting mild to moderate dementia. Montessori-based individual programming was also used directly with clients[10] (no children are involved). Here, the focus is on the clients practicing and building on their remaining skills with the aid of an assistant. These activities are generally used with clients exhibiting moderate to more advanced dementia.

Four participants took part in QAR programming, eight participants took part in Memory Bingo, three participants took part in Intergenerational Programming, and six participants took part in individualized Montessori-based activities. Some participants transferred from QAR programming into Memory Bingo due to deterioration of their reading skills during the course of the study.

Participants in the treatment group engaged in Montessori-based intervention programming as an alternative to regular Adult Day Care programming according to their attendance schedule. Intervention programming occurred twice a day, once in the morning and once in the afternoon, for approximately 45 to 60 minutes under the direct supervision of research staff. This programming occurred concurrently with the regularly scheduled adult day care programming.

Participants in the control group engaged in the regularly scheduled programming offered at the adult day care center. Many of these activities are designed for large groups of older adults. The types of programming that most frequently occurred included: art therapy, musical programs, exercise programs, watching movies, playing cards, and discussion groups.

Results

Engagement measures

We found that instances of self-engagement and non-engagement were extremely rare during those activity periods when observations were conducted. For example, only six of the 19 participants were observed on any occasion during baseline exhibiting self-engagement, and only one participant exhibited self-engagement on any occasion at either posttest one or posttest two. In a similar fashion, only seven participants ever exhibited non-engagement on any occasion during baseline observations, while only four and five participants exhibited any instances of non-engagement at posttest one and posttest two, respectively. As a result, these measures were not subjected to formal analyses. It should be noted, however, that no instances of either self-engagement or non-engagement were observed during Montessori-based programming.

Constructive and passive engagement measures were analyzed using 2 X 3 mixed-model ANOVAs representing the between-groups factor "Group" (treatment vs. control) and the within-subjects factor "Time" (baseline vs. posttest one vs. posttest two). Means associated with these measures and analyses are shown in Table 1. We had hypothesized that adult day care clients observed during Montessori-based programming would display higher levels of constructive engagement and lower levels of passive engagement than clients observed during regular programming. These hypotheses were, for the most part, supported.

With regard to constructive engagement, significant main effects were found for Group, [$F(1, 17) = 14.8$, $p < .001$] and Time, [$F(2, 34) = 15.7$, $p < .001$]. In addition, the Group x Time interaction was significant, [$F(2, 34) = 13.1$, $p < .001$]. One-tailed independent t-tests conducted between treatment and control groups at each time of measurement found that these two groups were not significantly different from each other at baseline ($p > .05$), but were significantly different at both posttest one ($p < .001$) and posttest two ($p < .001$).

With regard to passive engagement, a similar pattern was displayed. Significant main effects were found for Group, [$F(1, 17) = 4.7$, $p < .05$] and Time, [$F(2, 34) = 6.3$, $p < .005$]. In addition, the Group x Time interaction was significant, [$F(2, 34) = 6.2$, $p < .005$]. One-tailed independent t-tests conducted between treatment and control groups at each time of measurement found that these two groups were not significantly different from each other at baseline ($p > .05$), but were significantly different at both posttest one ($p < .01$) and posttest two ($p < .03$).

Treatment group at posttest two in both types of programming

As described in the Methods section, participants in the treatment group were observed taking part in both Montessori-based programming and regular adult day care activities at posttest two. This enabled us to test the effects of Montessori-based programming versus regular programming within the same individuals at the end of our study. Dependent t-tests were performed on constructive and passive engagement measures for treatment group participants in Montessori-based programming and regular adult day care programming. Means associated with these comparisons are shown in Table 1. This comparison was significant for constructive engagement, [$t(8) = 3.6$, $p < .004$], but not for passive engagement, [$p > .05$]. In addition, we compared treatment and control group participants taking part in regular programming at posttest two. Control and treatment condition participants were not significantly different [$p > .05$] in either constructive or passive engagement at posttest two when both groups of these participants were taking part in regular adult day care programming. These final results indicate that treatment group participants, when taking part in regular adult day care programming, were comparable to control group participants in observed levels of engagement.

Discussion

Persons with dementia in an adult day care setting showed significantly more constructive engagement when taking part in Montessori-based activities than in regular programming. In addition, there was a reduction in passive engagement compared to levels seen in regular programming in some circumstances. The implications of these findings are straightforward. Montessori-based activities are designed to elicit positive forms of engagement in persons with dementia, and can do so within this setting. The key issue, of course, is whether this type of programming can be implemented within real-world contexts, *i.e.*, can regular staff and volunteers conduct Montessori-based activities within existing schedules and organizational structures/constraints. This is the line of work we are currently exploring. At the adult day care center where these data were collected, regular staff and volunteers have been trained by our research staff to implement Montessori-based programming, and are doing so within existing activities' scheduling. In addition, we have trained nurse assistants to implement Montessori-based activities within a long-term care environment.[14] We are currently engaged in a pilot study training family members to use

Montessori-based programming as part of their visits with relatives living in long-term care settings. Preliminary results indicate that these efforts are likely to be successful.

Authors' notes

For additional information about the manual Montessori-Based Activities for Persons with Dementia: Volume 1*, or general questions about use of Montessori-based activities for persons with dementia, contact Cameron J. Camp, PhD, Senior Research Scientist, Myers Research Institute, 27100 Cedar Road, Beachwood, OH 44122, (e-mail ccamp@myersri.com).*

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