Predictors of the Impact of Nonpharmacologic Interventions for Agitation in Nursing Home Residents With Advanced Dementia

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ABSTRACT

Objective: Research is needed to determine specific factors that contribute to the success of nonpharmacologic interventions. In this study, we examined the influence of personal characteristics (demographic, medical, and functional variables) and possible barriers (eg, staff or family barriers) on the efficacy of nonpharmacological interventions in reducing agitation.

Method: Agitation was systematically observed at baseline and intervention stages using the Agitation Behavior Mapping Instrument (ABMI) in a sample of 89 residents from 6 Maryland nursing homes (mean age = 85.9 years). Each participant received interventions based on an individualized algorithm (TREA–Treatment Routes for Exploring Agitation), which identifies unmet needs and matches interventions to needs and to the participant's sensory, cognitive, and functional abilities, as well as to self-identity and preferences. The study was conducted between June 2006 and December 2011.

Results: Analyses revealed that decreased levels of agitation during intervention correlated significantly with higher levels of cognitive function ($r = 0.36$, $P < .001$), with fewer difficulties in the performance of activities of daily living ($r = 0.29$, $P < .01$), speech ($r = 0.47$, $P < .001$), communication ($r = 0.23$, $P < .05$), and responsiveness ($r = 0.28$, $P < .01$). In addition, less reduction of agitation during intervention was significantly related to the presence of staff barriers (eg, refusals, interruptions) ($r = -0.38$, $P < .001$) and the occurrence of pain ($r = -0.21$, $P \leq .05$).

Conclusions: The findings elucidate the characteristics of those who are most likely to respond to TREA intervention, and point to the need of systemic changes to reduce staff-related barriers and to improve methodologies for increasing the impact of intervention on those at the lowest levels of functioning.

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Agitation in persons with dementia has been linked to various unmet needs,[1] including loneliness,[2] boredom,[3] sensory deprivation,[4] and pain.[5] Unmet needs arise in persons with dementia because, due to impaired communication and cognitive skills, they are often no longer capable of satisfying or accommodating their needs. Often caregivers are not aware of those unmet needs, and, even when needs are recognized, caregivers do not always feel capable of fulfilling them.[6]

Many unmet needs that are manifested as agitated behaviors can be addressed by the provision of nonpharmacologic interventions.[6] Multiple nonpharmacologic interventions have been reported to reduce agitation in persons with dementia including modification of the physical or social environment,[6,7] removal of physical restraints,[8,9] sensory stimulation,[2,10,11] real or simulated human social contact,[2,12] exercise,[13] Montessori-based activities,[14] acupressure,[14] art activities,[15] hand massage,[16] and robotherapy.[17]

Individually tailored interventions have been shown to reduce agitation in persons with dementia.[18,19] These interventions are based on the principles of person-centered care[20] and involve a systematic analysis of personal variables, such as the needs underlying agitated behaviors; the person's past role identity; past and/or present preferences; and cognitive, mobility, and sensory abilities and limitations.[18] One such approach is termed Treatment Routes for Exploring Agitation (TREA).[21] TREA systematically individualizes nonpharmacologic interventions to target the unique unmet needs of agitated persons,[4] and yielded a statistically significant reduction in overall agitation and significantly increased pleasure and interest in a sample of 167 nursing home residents.[18] These findings have been recently replicated.[22]

In line with the established success of nonpharmacologic interventions in reducing agitation in persons with dementia, current guidelines recommend treating agitation with nonpharmacologic methods first, and only if these fail, then to resort to medical therapy.[23] Nonetheless, there are no data on the characteristics of persons who are most likely to benefit from such interventions. This article focuses on the impact of personal attributes of the recipient (eg, responsiveness, cognitive function) as well as on the role of system barriers[24] to intervention delivery. We hypothesize that:

1. The success of an intervention is dependent on the responsiveness of the agitated person, which, in turn, is affected by the person's ability to interact with stimuli and to communicate effectively. Specifically,
   a. Interventions will be more successful with persons who are responsive than with those who are nonresponsive.
   b. Interventions will be more successful with persons who are more communicative than with those who are less communicative.
2. The success of an intervention is affected by the ability to deliver it as planned. When interventions encounter external barriers (eg, staff unwillingness to remove physical restraints, unwillingness of the physician to prescribe pain medication), interventions will be less successful.

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Clinical Points

- Persons with dementia who have at least some ability to speak are likely to show the greatest improvements in agitation following nonpharmacologic interventions.
- Maintaining verbal communications with nursing home residents as long as possible is important to optimize their care and quality of life.
- Receptiveness of medical and nursing staff to suggestions concerning treatment of pain and amelioration of discomfort is essential to success in reducing agitation in persons with dementia.

METHOD

This research was conducted within the context of the treatment arm of a randomized, placebo-controlled, repeated-measures design of nonpharmacologic intervention for agitation in persons with dementia (ClinicalTrials.gov identifier: NCT00820859).[22]

Participants

Participants were 89 nursing home residents with dementia from 6 Maryland nursing homes (mean age = 85.9 years, SD = 8.62). Inclusion criteria were (1) residence at the facility for at least 3 weeks, ensuring accurate assessment by the nursing staff; (2) identification by nursing staff as exhibiting verbal agitation or physical nonaggressive agitation, at least several times a day; and (3) a diagnosis of dementia. The diagnosis of dementia was confirmed by a physician or nurse practitioner. Exclusion criteria included a life expectancy of less than 3 months due to obvious causes; an accompanying diagnosis of bipolar disorder or schizophrenia; and a Mini-Mental State Examination (MMSE) score of 25 or higher.

Assessments

Background. Sociodemographic factors included age, gender, ethnicity, education, and marital status and were collected from each resident's chart at the nursing home.

Function. Data regarding performance of activities of daily living (ADLs), vision, hearing, and speech were obtained via the Minimum Data Set (MDS).[25] The ADL index is a sum of 10 items that describe physical self-maintenance abilities, such as mobility, dressing, eating, personal hygiene (toileting abilities and bathing), and locomotion.

Medical status. Information obtained from medical records included a list of prescribed medications (including pain relievers and psychotropic drugs) and medical diagnoses. The medical diagnoses were summarized as a disease index, which included the number of diagnostic categories (ie, cardiovascular, respiratory, neurologic, musculoskeletal, digestive, genitourinary, blood, endocrine, major affective, other [eg, cancer, skin], dementia, other psychiatric disease) for each participant.

Cognitive function was assessed using the MMSE.[26] The MMSE score ranges 0 (severe cognitive impairment) to 30 (normal cognitive functioning).

Pain. The Pain Assessment in Noncommunicative Elderly Persons (PAINE)[27] was administered to each participant's current nursing staff caregiver. The PAINE has been found to have an interrater reliability of 0.71 for nursing assistants with varying levels of familiarity with the resident and 0.99 for trained research assistants, a test-retest reliability of 0.78, and a Cronbach α of 0.78.[27]

Ability to communicate was assessed for each participant using 2 measures: (1) *Communication difficulties* were assessed via 2 items from the Multidimensional Observation Scale for Elderly Subjects (MOSES[28]; "understanding communication" and "talking" [ratings ranged from "was coherent and logical" to "the resident did not talk in the past week"]). A mean score of the 2 items was calculated. The reliability of the MOSES has been established in studies of older persons.[29] The Pearson correlation between the 2 communication difficulties items was 0.59 (n = 193, $P < .001$); and (2) *Speech impairment* was retrieved from the nursing home charts, based on the MDS speech clarity item, which assesses how well residents make themselves understood through speech (ratings ranged from clear speech to no speech). The mean reliability of the items in this section was found to be 0.60.[30]

Responsiveness was assessed via the Functional Assessment Staging scale (FAST).[31] The FAST is a staging assessment for dementia (1 = normal adult, 2 = normal older adult, 3 = early dementia, 4 = mild dementia, 5 = moderate dementia, 6 = moderately severe dementia, 7 = severe dementia), including cognitive and functional aspects of dementia among which are several indicators of responsiveness: eg, "the ability to speak limited to approximately a half dozen different words or fewer, in the course of an average day or in the course of an intensive interview," "speech ability limited to the use of a single intelligible word in an average day," "loss of the ability to smile." In addition, nonresponsiveness was assessed by 3 items from the MOSES: "How often during the past week did the resident respond to social contacts made by other people?"; "In the past week, how often did the resident pay active attention to the things happening around him?"; "In the past week, how often did the resident seem to take any interest in events happening outside of his residence?" Since these items intercorrelated ($r = 0.39$, n = 247, $P < .001$; $r = 0.38$, n = 248, $P < .001$; and $r = 0.19$, n = 247, $P = .002$, respectively), we calculated a mean of the 3 items.

Lack of cooperation with care was assessed as the mean of the 2 items from the MOSES[28]: "On most days in the past week, when interacting with nurses and orderlies, the resident…" (rated on a scale ranging from "Actively co-operated in his own care" to "Resisted care attempts in a major way"); and, "Most of the requests or instructions made by the staff of the resident in the past week…" (rated on a scale from "Were followed without resistance or resentment" to "Were not understood by the resident"). A significant Pearson correlation was found between the 2 items ($r = 0.57$, n = 242, $P < .001$).

Barriers to Intervention Delivery Assessment (BIDA). The BIDA[24] was used to document reasons for failure or

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difficulties in intervention delivery. Barrier categories were staff-related barriers (eg, staff refusal to remove restraints), family-related barriers (eg, lack of family cooperation to provide stimuli, such as family photos, for an intervention), environmental barriers (eg, too much noise), research design and process barriers (eg, lack of money for intervention material purchase), resident barriers (eg, unwillingness to participate, and resident attributes such as unresponsiveness), and resident not available (eg, eating). In order to assess the reliability of the BIDA, barriers to interventions for 11 residents were independently rated by 3 research assistants, and the agreement rate averaged 92%.[24]

Outcome measure: observed agitation. Direct observations of agitation were recorded using the Agitation Behavior Mapping Instrument (ABMI).[32] Direct observations were chosen because they are more objective and accurate than other forms of assessment. The ABMI includes 14 items, which describe physically agitated (eg, pacing) and verbally agitated (eg, screaming, complaining) behaviors. Interrater reliabilities of behaviors averaged 96%, with an intraclass correlation (ICC) of 0.90.[22] The average agreement between direct observations of agitated behaviors and blinded observers' ABMI ratings, obtained by watching videotapes, was 95%, with an ICC of 0.97.[22]

Procedure

Informed consent was provided by the attorney in fact or the closest family member of each participant.[33] The study was approved by the Institutional Review Board (IRB) of the Charles E. Smith Life Communities. The assessments and direct observations of agitation were administered and recorded by research assistants who were trained in standardized administration and scoring procedures. Once background data were obtained, a trained research assistant recorded 3-minute baseline ABMI observations onto a Palm Pilot Zire 31 handheld computer (PalmOne, Inc, Milpitas, California). Each participant was observed once every half hour from 8:00 AM to 9:00 PM over a consecutive 3-day period. Research assistants observed 1 resident at a time, around 3 to 5 residents during every half-hour period. From these data, 4 hours of peak agitation along with the type of agitation (verbal or physical) were identified for each resident.

We used the TREA decision tree protocol[18] to uncover possible reasons for each participant's manifestations of agitated behaviors. With TREA, we were able to hypothesize an unmet need, identify a corresponding treatment category, and design the specifics of the treatment to best fit the study participant's past identity and preferences, as well as sensory, mobility, and cognitive abilities (see reference[4] for further description of the TREA decision tree protocol). Individualized interventions were administered to each participant for 10 days, during 4 hours a day. Hours were chosen based on the person's peak of agitation, as determined during baseline observations. One research assistant was responsible for conducting the interventions, and a second research assistant recorded the observations. The study was conducted between June 2006 and December 2011.

Analytic approach. All statistical analyses were performed using SPSS software (SPSS Inc, Chicago, Illinois). ABMI agitation data were examined as percentage of change from baseline to intervention; that is, for each participant, we subtracted the intervention ABMI score from the baseline ABMI score and divided this value by the baseline ABMI score. In order to understand the relationship between the impact of the intervention and background and process (barriers) variables, we then examined the Pearson correlation between percentage change scores with variables of interest, including demographics, functional variables, medication variables, and barriers to intervention delivery. In addition, we conducted a linear regression to ascertain which variables independently best predicted change.

To examine the hypotheses, the following analyses were performed:

Hypothesis 1a: We examined the Pearson correlations between the percent of change in agitation following intervention with responsiveness, as measured by the FAST score and the responsiveness measure based on the MOSES.

Hypothesis 1b: We examined the Pearson correlations between the percent of change in agitation and communication according to (1) the MDS and (2) the MOSES.

Hypothesis 2: We examined the Pearson correlation between percent of change in agitation and the presence of external barriers.

In order to determine which variables independently predicted change in agitation, a multiple regression analysis was performed using all the variables that were significant in the bivariate analyses. Both a backward elimination model and a stepwise model were run.

RESULTS

Participants' characteristics are presented in Table 1.

The Pearson correlations between percent change in agitation and demographic, functional, medical, and process variables are presented in Table 2. Demographic variables were not significantly related to the effect of the intervention as measured by percent change. Functional variables were significantly correlated with the impact of interventions. The strongest correlations, in descending order, were speech impairment (MDS, speech clarity item; $r = -0.47$, $P < .001$), cognitive function (MMSE; $r = 0.36$, $P < .001$), talking difficulties as measured by the MOSES talking item ($r = -0.36$, $P < .001$), ADL difficulties ($r = -0.29$, $P < .01$), lack of responsiveness as measured by the FAST ($r = -0.28$, $P < .01$) and the MOSES ($r = -0.28$, $P < .01$), and communication difficulties (mean of the 2 MOSES items) ($r = -0.23$, $P < .05$). These correlations indicated that those with higher functional scores (cognitive status, communication, ADL, or responsiveness) were most likely to benefit from the interventions. In terms of medical status, the only significant correlation involved pain (PAINE; $r = -0.21$,

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Table 1. Participants' Characteristics (N = 89)

Characteristic	Value
Demographic characteristic	
Age, mean (SD), y	85.9 (8.62)
Gender (female), %	73.0
Ethnicity (white), %	80.9
Marital status, %	
Widowed	60.7
Married	28.1
Separated/divorced	9.0
Never married	2.2
Education, %	
High school or lower	57.3
College/technical school	23.2
Graduate degree	19.5
Functional characteristic, mean (SD)	
Cognitive function (MMSE; range, 0 = low cognitive functioning to 30 = high cognitive functioning)	7.6 (6.33)
Responsiveness (FAST; range, 1 = normal adult to 15 = most severe dementia)	8.5 (3.37)
Communication difficulties (MOSES; range, 1 to 4)	1.9 (0.83)
Lack of cooperation (MOSES; range, 1 to 4)	2.0 (0.83)
Nonresponsiveness (MOSES; range, 1 to 4)	2.8 (0.65)
Activities of Daily Living (MDS; range, 0 = independent to 4 = dependent)	2.7 (0.84)
Vision impairment (MDS; range, 0 = adequate to 4 = severely impaired)	0.6 (1.07)
Hearing impairment (MDS; range, 0 = hears adequately to 3 = highly impaired)	0.4 (0.72)
Speech impairment (MDS; range, 0 = clear speech to 2 = no speech)	0.2 (0.41)
Pain (PAINE; range, 0.5 = less pain to 8.5 = more pain)	3.5 (1.82)
Medical status	
Diagnosis index[a]	5.3 (1.47)
Total no. of medications per person	8.8 (2.11)
% Administered	
Sedatives	9.0
Antipsychotics	60.7
Antidepressants	70.8
Antianxiety medication	42.7
Analgesics	100.0

[a]Number of diagnostic categories from the following: cardiovascular, respiratory, neurologic, musculoskeletal, digestive, genitourinary, blood, endocrine, major affective, other disease (such as cancer, skin), dementia, and other psychiatric disease.
Abbreviations: FAST = Functional Assessment Staging, MDS = Minimum Data Set, MMSE = Mini-Mental State Examination, MOSES = Multidimensional Observation Scale for Elderly Subjects, PAINE = Pain Assessment in Noncommunicative Elderly Persons.

Table 2. Pearson Correlations of Change in Agitation During Treatment With Background Variables (N = 89)

Variable	Correlation of % Change[a]
Demographic	
Age	0.052
Gender (male = 1, female = 0)	0.166
Ethnicity (white = 1, other = 0)	0.143
Marital status (married = 1, other = 0)	0.003
Education	–0.130
Function	
Speech impairment (MDS)	–0.470***
Cognitive status (MMSE)	0.363***
Talking difficulties (MOSES)[b]	–0.357***
Activities of Daily Living (MDS)	–0.289**
Nonresponsiveness (FAST)	–0.284**
Nonresponsiveness (MOSES)	–0.283**
Communication difficulties (MOSES)	–0.225*
Lack of cooperation with care (MOSES)	–0.158
Vision impairment (MSD)	–0.153
Understanding communication difficulties (MOSES)[b]	–0.131
Hearing impairment (MSD)	–0.102
Medical status	
Diagnosis index	0.043
Total no. of medications	0.121
Sedatives	–0.194
Antipsychotics	0.033
Antidepressants	0.163
Antianxiety medication	0.076
Pain	–0.209*
Types of barriers—treatment phase	
Overall staff barriers (0 = no, 1 = yes)	–0.376***
Family availability or cooperation (0 = no, 1 = yes)	0.076
Overall environmental (0 = no, 1 = yes)	–0.085
Overall research design and process (0 = no, 1 = yes)	0.029
Overall will to participate (0 = no, 1 = yes)	0.006
Overall resident attributes (0 = no, 1 = yes)	–0.034
% sessions with eating as a barrier	0.200
% sessions with being asleep as a barrier	–0.088

[a]Baseline agitation minus intervention divided by baseline agitation.
[b]Item from the communication factor of the MOSES.
*$P \leq .05$.
**$P \leq .01$.
***$P \leq .001$.
Abbreviations: FAST = Functional Assessment Staging, MDS = Minimum Data Set, MMSE = Mini-Mental State Examination, MOSES = Multidimensional Observation Scale for Elderly Subjects.

Table 3. Regression Results Describing the Independent Contribution of Predictors of Change in Agitation[a] (N = 89)

Independent Variable	β	*SE*	*P* Value
Speech impairment	–0.303	0.058	.004
Nonresponsiveness	–0.267	0.036	.008
Staff barrier	–0.347	0.072	.001
	$R^2 = 0.355$		

[a]Results of the backward elimination model. The same results were obtained using a stepwise model.

$P \leq .05$), indicating that those with more pain were less likely to benefit from the intervention. As for treatment delivery variables, the only significant correlation was found with staff barriers, showing that staff barriers were associated with less impact of the intervention ($r = –0.38$, $P < .001$) .

The results of the regression are presented in Table 3. Speech impairment, nonresponsiveness, and staff barriers independently contributed to change in agitation ($P < .01$ for all 3 variables), accounting for 35.5% of the variance.

DISCUSSION

This study examined the role of personal characteristics and system barriers in the success of nonpharmacologic interventions in a sample of 89 nursing home residents with dementia. The findings demonstrate that measures of higher functioning, quantified as comparatively higher cognitive status, greater communication ability, and higher responsiveness, are related to a greater and more effective impact of individualized nonpharmacologic interventions for persons with advanced dementia. This can be explained in 2 ways. First, the more communicative and coherent the person is, the easier it is to determine that person's unmet need(s). Second, the more responsive the person is, the more likely he/she will react to the intervention designed to fulfill his/her unmet need(s). While our findings clearly fit with our understanding of the process by which an individualized intervention plan is implemented, they also highlight the difficulty encountered when working with people at the

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latest stages of dementia; that is, when the person becomes uncommunicative, ascertaining his/her needs becomes difficult. When the person becomes nonresponsive, providing for the needs becomes even harder.

With respect to the communication variables, the strongest relationship was found with speech, or the residents' ability to communicate with others, as compared to the ability to understand communication. This was shown by the significant Pearson correlations between intervention impact and both the MDS ($P < .001$ for speech impairment and $P < .01$ for activities of daily living) and the MOSES talking measures ($P < .001$ for talking difficulties, $P < .01$ for nonresponsiveness, and $P < .05$ for communication difficulties); difficulties in understanding communication, although in the same direction, indicated only a nonsignificant trend. Our data suggest that active speech may be a more sensitive measure of cognitive abilities that affects treatment response than passive understanding. These findings raise questions about the possibility of helping residents to maintain communication capacity longer into the dementia process. Maintaining existing skills and abilities for as long as possible through continued practice is an important principle of dementia care. Many nursing home residents are limited in their opportunities to process speech, due to hearing loss, background noise, and the fact that speech is not often addressed to them.[34] Caretakers need to be aware of the importance of talking with a resident and encouraging him/her to talk by using strategies consonant with the individual's remaining capabilities (see references[35,36]). Also, when verbal communication becomes impossible, other forms of communication should be kept in mind, including tone of voice and nonverbal communications such as body language, gesture, and facial expression. Making caretakers aware of their own use of these techniques as well as that of the resident can help prolong the period of effective communication and, hence, more effective interventions.

Of all the variables concerning treatment delivery, only the item pertaining to staff cooperation regarding pain-related issues was found to be related to decreased impact of the intervention. Furthermore, the only medical variable found to significantly impact the efficacy of the intervention was pain ($P \leq .05$). These findings fit with the large body of research documenting the underdetection and undertreatment of pain in this population.[37,38] The only barriers to treatment delivery that had a statistically significant Pearson correlation with intervention effectiveness were those related to staff compliance ($P < .001$). In the intervention phase of our study, most activities were provided by research staff and therefore were not affected by nursing staff compliance. Only interventions related to physical care, such as provision of pain medication or removal of physical restraints, required staff cooperation. As previously reported,[24] physicians did not agree with the assessments' findings of pain in close to a quarter of residents, and nursing staff refused to remove restraints, refused to assist the resident, or interrupted an intervention for over 10% of the participants. Staff noncooperation in these cases may have resulted in pain and discomfort persisting for the resident, thus resulting in reduced impact of the intervention.

Our results are strengthened by the fact that some of the variables such as speech impairment and responsiveness were represented by multiple measures that provided similar results (the former by MDS and MOSES and the latter by FAST and MOSES), thus providing convergent validity. The study is limited, however, by a relatively small sample size. While a sample of 89 is sufficiently large to establish the impact of the intervention,[22] it limits the ability to examine different aspects of the intervention, such as different types of barriers to intervention delivery.

Inevitably, this study has limitations. First, we did not investigate the processes by which the included variables influence change in agitation. As mentioned above, it is likely that the influence is partially explained by the fact that persons with certain characteristics (eg, lower functioning) received different interventions. For example, we know that persons with higher cognitive levels are more likely to receive analgesics for treating pain.[39] However, there is also evidence that when presented with identical sets of stimuli, persons with dementia who have higher levels of cognitive function will demonstrate more engagement with the stimuli.[40] Therefore, we conclude that not only differences in interventions but also differences in responses to interventions may contribute to the outcome. A second limitation concerns the choice of study variables, which focused on basic background, health, function, and process variables. Future studies may include additional variables, such as psychosis or specific medical problems. Future studies may also investigate setting-related variables (eg, staff-resident ratio or staff training) and their impact on the efficacy of nonpharmacologic interventions.

In summary, the strongest factor affecting success of the nonpharmacologic intervention is one's level of functioning, represented by significant relationships with speech, cognitive function, functional status, communication, and responsiveness. Functioning factors enable caregivers to determine needs and enable the participant to respond to the intervention. The only medical factor affecting intervention success was pain. The only system factor affecting intervention success was staff cooperation. The results thus support both hypotheses. With regard to personal attributes, intervention success was independently predicted by the responsiveness and speech abilities of older persons. In terms of setting attributes, intervention success correlated negatively with staff barriers. Speech impairment, nonresponsiveness, and staff barriers accounted for over a third of the variance in change in agitation.

While these results clarify who is most likely to respond to nonpharmacologic interventions to reduce agitation, they also point to the need of decreasing staff-related system barriers and emphasize the obligation to improve the detection of needs and methodologies for increasing the impact on those at the lowest levels of functioning.

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REFERENCES

1. Cohen-Mansfield J. Agitation in the elderly: definitional and theoretical conceptualizations. In: Hay DP, Klein DT, Hay LK, et al, eds. *Agitation in Patients With Dementia: A Practical Guide to Diagnosis and Management*. Arlington, VA: American Psychiatric Publishing, Inc; 2003.
2. Cohen-Mansfield J, Werner P. Management of verbally disruptive behaviors in nursing home residents. *J Gerontol A Biol Sci Med Sci*. 1997;52(6):M369–M377.
3. Buettner L, Kolanowski A. Practice guidelines for recreation therapy in the care of people with dementia. *Geriatr Nurs*. 2003;24(1):18–23, quiz 24–25.
4. Cohen-Mansfield J. Theoretical frameworks for behavioral problems in dementia. *Alzheimer's care today*. 2000;1(4):8.
5. Cohen-Mansfield J. Relatives' assessment of pain in cognitively impaired nursing home residents. *J Pain Symptom Manage*. 2002;24(6):562–571.
6. Cohen-Mansfield J. Nonpharmacologic interventions for inappropriate behaviors in dementia: a review, summary, and critique. *Am J Geriatr Psychiatry*. 2001;9(4):361–381.
7. Fossey J, Ballard C, Juszczak E, et al. Effect of enhanced psychosocial care on antipsychotic use in nursing home residents with severe dementia: cluster randomised trial. *BMJ*. 2006;332(7544):756–761.
8. Tilly J, Reed P. Falls, wandering, and physical restraints: a review of interventions for individuals with dementia in assisted living and nursing homes. *Alzheimer's care today*. 2008;9(1):45–50.
9. Werner P, Cohen-Mansfield J. In: Braun J, Lipson S, eds. *Outcomes of Removal of Physical Restraints*. Baltimore, MD: Health Professions Press; 1993:147–156.
10. Holmes C, Ballard C. Aromatherapy in dementia. *Adv Psychiatr Treat*. 2004;10(4):296–300.
11. Hickman SE, Barrick AL, Williams CS, et al. The effect of ambient bright light therapy on depressive symptoms in persons with dementia. *J Am Geriatr Soc*. 2007;55(11):1817–1824.
12. Ballard C, Brown R, Fossey J, et al. Brief psychosocial therapy for the treatment of agitation in Alzheimer disease (the CALM-AD trial). *Am J Geriatr Psychiatry*. 2009;17(9):726–733.
13. Aman E, Thomas DR. Supervised exercise to reduce agitation in severely cognitively impaired persons. *J Am Med Dir Assoc*. 2009;10(4):271–276.
14. Lin LC, Yang MH, Kao CC, et al. Using acupressure and Montessori-based activities to decrease agitation for residents with dementia: a cross-over trial. *J Am Geriatr Soc*. 2009;57(6):1022–1029.
15. Morley TD. Recovered memories: an arts program designed for patients with dementia. In: Arrington DB, ed. *Art, Angst, and Trauma: Right Brain Interventions With Developmental Issues*. Springfield, IL: Charles C Thomas Publisher Ltd. 2007:230–243.
16. Remington R. Calming music and hand massage with agitated elderly. *Nurs Res*. 2002;51(5):317–323.
17. Libin A, Cohen-Mansfield J. Therapeutic robocat for nursing home residents with dementia: preliminary inquiry. *Am J Alzheimers Dis Other Demen*. 2004;19(2):111–116.
18. Cohen-Mansfield J, Libin A, Marx MS. Nonpharmacological treatment of agitation: a controlled trial of systematic individualized intervention. *J Gerontol A Biol Sci Med Sci*. 2007;62(8):908–916.
19. Feliciano L, Steers ME, Elite-Marcandonatou A, et al. Applications of preference assessment procedures in depression and agitation management in elders with dementia. *Clin Gerontol*. 2009;32(3):239–259.
20. Epp TD. Person-centred dementia care: a vision to be refined. *The Canadian Alzheimer Disease Review*. 2003;5(3):14–19.
21. Cohen-Mansfield J. Nonpharmacological management of behavioral problems in persons with dementia: the TREA model. *Alzheimer's care today*. 2000;1(4):22–34.
22. Cohen-Mansfield J, Thein K, Marx MS, et al. Efficacy of nonpharmacologic interventions for agitation in advanced dementia: a randomized, placebo-controlled trial. *J Clin Psychiatry*. 2012;73(9):1255–1261.
23. American Geriatrics Society; American Association for Geriatric Psychiatry. Consensus statement on improving the quality of mental health care in US nursing homes: management of depression and behavioral symptoms associated with dementia. *J Am Geriatr Soc*. 2003;51(9):1287–1298.
24. Cohen-Mansfield J, Thein K, Marx MS, et al. What are the barriers to performing nonpharmacological interventions for behavioral symptoms in the nursing home? *J Am Med Dir Assoc*. 2012;13(4):400–405.
25. Morris J, Hawes C, Murphy K, et al. *MDS Resident Assessment*. Natick, MA: Eliot Press; 1991.
26. Folstein MF, Folstein SE, McHugh PR. "Mini-mental state": a practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res*. 1975;12(3):189–198.
27. Cohen-Mansfield J. Pain Assessment in Noncommunicative Elderly Persons-PAINE. *Clin J Pain*. 2006;22(6):569–575.
28. Helmes E, Csapo KG, Short JA. Standardization and validation of the Multidimensional Observation Scale for Elderly Subjects (MOSES). *J Gerontol*. 1987;42(4):395–405.
29. Mallick MJ, Whipple TW. Validity of the nursing diagnosis of relocation stress syndrome. *Nurs Res*. 2000;49(2):97–100.
30. Sgadari A, Morris JN, Fries BE, et al. Efforts to establish the reliability of the Resident Assessment Instrument. *Age Ageing*. 1997;26(suppl 2):27–30.
31. Reisberg B. Functional Assessment Staging (FAST). *Psychopharmacol Bull*. 1988;24(4):653–659.
32. Cohen-Mansfield J, Werner P, Marx MS. An observational study of agitation in agitated nursing home residents. *Int Psychogeriatr*. 1989;1(2):153–165.
33. Cohen-Mansfield J, Kerin P, Pawlson G, et al. Informed consent for research in a nursing home: processes and issues. *Gerontologist*. 1988;28(3):355–359.
34. Cohen-Mansfield J, Creedon MA, Malone T, et al. Dressing of cognitively impaired nursing home residents: description and analysis. *Gerontologist*. 2006;46(1):89–96.
35. Wilson R, Rochon E, Mihailidis A, et al. Examining success of communication strategies used by formal caregivers assisting individuals with Alzheimer's disease during an activity of daily living. *J Speech Lang Hear Res*. 2012;55(2):328–341.
36. Jootun D, McGhee G. Effective communication with people who have dementia. *Nurs Stand*. 2011;25(25):40–46, quiz 47.
37. Corbett A, Husebo B, Malcangio M, et al. Assessment and treatment of pain in people with dementia. *Nat Rev Nephrol*. 2012;8(5):264–274
38. Cohen-Mansfield J, Lipson S. Pain in cognitively impaired nursing home residents: how well are physicians diagnosing it? *J Am Geriatr Soc*. 2002;50(6):1039–1044.
39. Allen RS, Thorn BE, Fisher SE, et al. Prescription and dosage of analgesic medication in relation to resident behaviors in the nursing home. *J Am Geriatr Soc*. 2003;51(4):534–538.
40. Cohen-Mansfield J, Marx MS, Regier NG, et al. The impact of personal characteristics on engagement in nursing home residents with dementia. *Int J Geriatr Psychiatry*. 2009;24(7):755–763.

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