

Characteristics Associated With Depression in Long-Term Care Residents With Dementia

Ann L. Gruber-Baldini, PhD,¹ Sheryl Zimmerman, PhD,^{2,3}
Malaz Boustani, MD, MPH,⁴ Lea C. Watson, MD, MPH,⁵
Christianna S. Williams, PhD,^{2,6} and Peter S. Reed, PhD, MPH⁷

We describe the prevalence, assessment, and treatment of, as well as characteristics associated with, depression in residential care/assisted living and nursing home residents with dementia. Overall, 25% of the participants were depressed. Depression was related to severe cognitive impairment, behavioral symptoms, pain, and for-profit nursing home residence.

Key Words: *Depression, Assisted living, Residential care, Nursing homes, Dementia*

Although little research has examined the prevalence and treatment of depression for those with dementia in long-term care settings, especially in residential care/

This research was supported by grants from the National Alzheimer's Association Program and Community Services Division and Medical and Scientific Division (Grant No. IIRG-00-2222). We appreciate the cooperation of the staff, residents, and families participating in the Collaborative Studies of Long-Term Care. We are also grateful to Ms. Jane Darter for expert data management and Dr. Philip D. Sloane for reviewing a preliminary draft of this article.

Address correspondence to Ann L. Gruber-Baldini, PhD, Division of Gerontology, Department of Epidemiology & Preventive Medicine, University of Maryland School of Medicine, Baltimore, MD, 21201. E-mail: abaldin@epi.umaryland.edu

¹Department of Epidemiology and Preventive Medicine, University of Maryland School of Medicine, Baltimore.

²Cecil G. Sheps Center for Health Services Research, University of North Carolina, Chapel Hill.

³School of Social Work, University of North Carolina, Chapel Hill.

⁴Regenstrief Institute and Indiana University Center for Aging Research, Indianapolis.

⁵Department of Psychiatry, University of North Carolina, Chapel Hill.

⁶Department of Epidemiology, University of North Carolina, Chapel Hill.

⁷Alzheimer's Association, National Office, Chicago, IL.

assisted living (RC/AL), existing data suggest that depressive symptoms are common in this population and associated with poor outcomes. Estimates of the prevalence of clinical depression among elderly nursing home residents range from 9% to 30% (Parmelee, Katz, & Lawton 1989; Payne et al., 2002; Rovner et al., 1991), with high levels of depressive symptomatology in over two thirds of nursing home residents (McCurren, Dowe, Rattle, & Looney, 1999; Ryden et al., 1999). Overall, depression is underdetected (Bagley, et al., 2000; Rovner et al.; Ryden et al.) and undertreated in nursing homes, especially among residents with dementia (Brown, Lapane, & Luisi, 2002).

The one large multistate study of depression in RC/AL facilities (Watson, Garrett, Sloane, Gruber-Baldini, & Zimmerman, 2003) found significant depressive symptomatology among 13% of RC/AL residents, with only 18% of these patients taking antidepressant medication. Depressive symptoms were more than twice as common among RC/AL residents with mild or moderate dementia than among those without dementia, and depressed residents were at greater risk of discharge to nursing home and death.

To our knowledge, few studies in long-term care have compared depression across RC/AL and nursing home settings, specifically for patients with dementia, and none have examined the association between depression and staff perception of depression, treatment, or adequacy of care in these settings. Given the high prevalence of dementia and depression in long-term care, and concern regarding underdetection and undertreatment, predictors of recognition and treatment are important to examine. In this article we examine the prevalence of depression in residents with

dementia in long-term care, and we describe staff and facility characteristics associated with depression and the characteristics of residents with dementia who are depressed.

Methods

Participants

Study participants were part of the Dementia Care project of the Collaborative Studies of Long-Term Care, a four-state stratified sample described elsewhere (see the introduction to this issue and Zimmerman et al., 2001). Potential participants were randomly selected from the group of residents with a diagnosis of dementia who were age 65 years or older residing in 10 nursing homes and 35 RC/AL facilities. The participation rate was 73%. These analyses are limited to the 347 participants (82.4% of the overall sample of 421) with a depression assessment completed by a supervisor. The supervisor was chosen as the informant to obtain a consistent rating from the person with the best clinical insight who was most familiar with the resident. The majority of the supervisors reported good familiarity with the residents (87%) and had known them for 6 months or more (83%). Most (76%) supervisor respondents were registered nurses or licensed practical nurses.

Measures

Depression.—A supervisory staff member rated participants for depression by using items on the Cornell Scale for Depression in Dementia (CSDD; Alexopoulos, Abrams, Young, & Shamoian, 1988). This modified administration format of the CSDD includes 19 items asking about symptoms over the prior 7 days, each rated on a 3-point scale, with higher scores indicating greater depression (range = 0–38). Scores of 7 or greater indicate symptomatology consistent with clinically significant depression (Alexopoulos et al.; Vida, Des Rosiers, Carrier, & Gauthier, 1994).

Care Provision.—For each resident, supervisory staff reported whether and how depression was formally assessed (by a mental health professional or by use of a written, standardized instrument) and treated (professional and other nonpharmacological); if detected and treated, how successful treatment was considered to be; and whether depression was perceived to be currently present (see Tables 1 and 2 for coding details). The research staff recorded antidepressant medication use (all regular prescription and nonprescription medications administered at least 4 of the past 7 days) verbatim from the residents' medication administration records and coded the information by using American Hospital Formulary Service system criteria (McEvoy, 2001). The administrator reported depression training as the percentage of supervisory and direct care staff who received formal training in depression assessment and treatment in the past year.

The staff rated perception of training regarding how well trained they felt in depression assessment and treatment. The administrator for the facility answered queries concerning the use of mental health professionals in formal care planning and perceived facility ability to treat depression.

Other Resident Data (Covariates).—Demographic data, including age, gender, and race, was collected from the supervisor. Cognition was assessed with the Mini-Mental State Examination (Folstein, Folstein, & McHugh, 1975) and the Minimum Data Set Cognition Scale (Hartmaier, Sloane, Guess, & Koch, 1994); function with the Minimum Data Set Activities of Daily Living Scale (Morris, Fries, & Morris, 1999); and comorbidity through a list of 10 conditions (excluding mental health diagnoses). The supervisor assessed behavioral symptoms by using the Cohen-Mansfield Agitation Inventory (Cohen-Mansfield, 1986) and pain by using the Philadelphia Geriatric Center Pain Intensity Scale (Parmelee, Katz, & Lawton, 1991). Activity participation was obtained from the care provider report, using the Albert Patient Activity Scale (Albert et al., 1996). Mobility information was obtained from observational data (Williams et al., 2005, this issue). Information regarding food and fluid intake was derived from the Structured Meal Observational instrument (Reed, Zimmerman, Sloane, Williams, & Boustani, 2005, this issue).

Analyses

Descriptive and regression results present bivariate analyses predicting differences in setting (RC/AL vs nursing home) and current levels of depression, using a CSDD cutpoint of ≥ 7 . Regression models we fit using generalized estimating equations (Liang & Zeger, 1986) assuming a binomial distribution and logit linking function for the dichotomous outcome of depression and other dichotomous outcomes, and a Gaussian distribution for analyses of setting (RC/AL vs nursing home) on continuous variables. An exchangeable correlation structure was specified to account for clustering within facilities. Odds ratios (ORs) are presented with 95% confidence intervals (CIs). Multivariate regressions (controlling for age, gender, race, cognition, comorbidity, and functional status) examine predictors of current depression; interactions of predictors with setting were also tested. Values of facility predictors were ascribed to all residents within that facility.

Results

The 347 participants (with dementia) in these analyses had an average age of 84.5 ($SD = 7.1$); 81.3% were female, and 10.1% were Black. Most were severely cognitively impaired (60.7%); 13.6% were mildly and 25.7% moderately cognitively impaired.

Depression and Care by Setting.—Table 1 displays

Table 1. Prevalence of Depression and Relevant Components of Care in Dementia Care Study Sample, by Setting

Depression	RC/AL (N = 238) % or M (SD)	Nursing Home (N = 109) % or M (SD)	p ^a
Prevalence			
Residents with depression	23.9	26.6	.808
Mean supervisor-rated CSDD score	4.3 (4.3)	4.7 (4.9)	.434
Assessment (in the last year)			
By a mental health professional ^b	32.2	45.3	.275
Using written or standardized assessment	26.4	37.7	.085
Perceived presence, current	14.8	22.6	.126
Treatment			
Treatment by a mental health professional ^b	15.2	26.5	.015
Antidepressant used	36.4	42.1	.344
Nonpharmacologic treatment ^c	33.0	45.1	.146
Perceived success (if perceived depressed; quite a bit or extremely)	54.8	50.8	.780
Reports of formal training attendance and perceived adequacy to detect and treat ^d			
Supervisory staff			
None in facility	23.9	12.6	.189
Some in facility	27.7	32.6	.590
Most in facility (≥ 75%)	48.3	54.7	.291
Direct care providers			
None in facility	42.9	12.6	.099
Some in facility	8.8	10.5	.421
Most in facility (≥ 75%)	48.3	76.8	.237
Facility is adequately able to treat	73.1	89.0	.241
Staff feel adequately trained to assess	78.5	97.2	.092
Staff feel adequately trained to treat	70.9	87.2	.246
Mental health professionals in formal care planning	28.4	77.1	.017

Notes: RC/AL = residential care/assisted living; CSDD = Cornell Scale for Depression in Dementia. Depression is assessed by supervisor report using a modified administration-format version of the CSDD, and refers to ≥ 7 on the 38-point scale. Except as noted for “training,” all data are resident level, are of those residents for whom outcome data (i.e., CSDD) are available, and are from supervisor report. Due to missing data, N varies from 208 to 238 (RC/AL) and 95 to 109 (nursing home), except in the case of “perceived success of treatment,” which is relevant only for those with depression recognized in the last year, and for whom there are data for 126 (53%) and 61 (56%) residential care and nursing home participants, respectively.

^aAdjusted for facility-level clustering using generalized estimating equations (GEE; exchangeable correlation matrix); p values are based on score statistics.

^bMental health professionals could include psychiatrist, psychologist, mental health social workers, physician, or anyone defined as a professional mental health provider by the supervisor.

^cNonpharmacologic treatment is any other reported nonpharmaceutical or treatment not provided by a mental health professional. The most frequently cited examples were other medical care (38%), emotional or social support (32%), and recreational activities (22%).

^dData regarding supervisory staff training and direct care provider training (“formal” training, first two sets of items), facility adequacy to treat, and mental health professional involvement are facility level, reported by administrators, and refer to the previous year. Staff feelings of training adequacy are reported by the one supervisor (or direct care provider, if supervisor data are missing) who is most involved in the resident’s care; “adequately” is quite or extremely well trained.

the depression prevalence for the 238 RC/AL residents and 109 nursing home residents and relevant components of care. Prevalence was not significantly different between RC/AL and nursing homes; 25% of the residents in these settings (24% in RC–AL, 27% in nursing homes) had CSDD scores consistent with depression. The two most frequent items listed by residents were being anxious (48%) and being easily annoyed (48%), and more than 20% of the overall sample of individuals endorsed items about being sad, not responsive, agitated, having slow movements, and waking many times at night (results not shown). Nursing home participants were more likely to be treated by a mental health professional and to reside in facilities that include mental health professionals in formal care planning than those in RC/AL. We found no other significant differences between nursing homes and RC/AL facilities.

Predictors of Depression.—Table 2 presents both the descriptive distributions by presence of depression and the results of regressions predicting current depression. Among currently depressed participants, 42% had been recognized as depressed by the staff supervisor; 54% were currently on an antidepressant medication. A substantial proportion of those not currently depressed were also on antidepressants (33%). Only 28% of participants with current depression had any formal mental health treatment.

Participants with depression were more likely to be severely or very severely cognitively impaired, display behavioral symptoms, and be in pain than those who were not depressed. In the unadjusted (but not in the adjusted) model, depressed participants were more likely to have low activity. Residents in for-profit facilities were more likely to be depressed. Treatment (professional, nonpharmacologic, and antidepressant

Table 2. Characteristics Associated With Depression, Unadjusted and Adjusted

Characteristic	Distribution of Characteristics as % or M (SD)		Relationship Between Characteristic and Presence of Depression			
	Depressed		Unadjusted		Adjusted ^a	
	No (n = 252)	Yes (n = 76)	OR	95% CI	OR	95% CI
Resident^b						
Cognitive status						
Mildly impaired	15.9	3.9	1.00	—	1.00	—
Moderately impaired	29.4	15.8	2.19	(0.73, 6.58)	1.94	(0.69, 5.42)
Severely impaired	23.4	27.6	4.68	(1.65, 13.29)	4.03	(1.45, 11.22)
Very severely impaired	31.3	52.6	6.81	(2.45, 18.91)	5.46	(1.93, 15.43)
Behavioral symptoms ^c						
Low activity	50.0	84.2	5.20	(2.73, 9.88)	4.80	(2.51, 9.19)
High pain	44.8	51.3	1.62	(1.07, 2.47)	1.39	(0.88, 2.21)
Immobile	15.7	36.8	2.68	(1.36, 5.29)	3.54	(1.59, 7.85)
Low food intake	12.4	11.5	0.93	(0.44, 1.98)	0.93	(0.42, 2.07)
Low fluid intake	53.2	50.7	0.96	(0.63, 1.44)	0.87	(0.55, 1.38)
48.6	54.9	1.40	(0.90, 2.16)	1.26	(0.79, 2.02)	
Facility^d						
Facility type						
Nursing home	31.3	36.8	1.00	—	1.00	—
RC/AL						
< 16 beds	13.1	17.1	1.01	(0.42, 2.43)	1.28	(0.46, 3.58)
Traditional	23.4	22.4	0.62	(0.21, 1.87)	1.05	(0.27, 4.12)
New-model	32.1	23.6	0.59	(0.25, 1.39)	0.71	(0.27, 1.84)
Facility size (OR per 10 beds)	87.3 (54.7)	77.0 (48.8)	0.97	(0.91, 1.03)	0.96	(0.90, 1.03)
For-profit ownership ^e	67.9	82.9	2.23	(1.19, 4.16)	2.53	(1.29, 4.98)
Assessment of depression						
Professional mental health assessment	34.3	43.8	1.62	(0.94, 2.8)	1.75	(0.97, 3.17)
Written or standardized assessment	28.0	39.7	1.68	(0.94, 3.02)	1.89	(0.99, 3.61)
Perceived presence, current	7.6	41.9	7.69	(4.42, 13.39)	7.48	(3.96, 14.14)
Treatment of depression						
Treatment by a mental health professional	16.3	28.4	1.96	(1.07, 3.58)	2.10	(1.10, 4.02)
Antidepressant used	33.3	54.3	2.23	(1.27, 3.92)	2.50	(1.33, 4.70)
Nonpharmacologic treatment	30.3	58.3	2.79	(1.66, 4.69)	3.69	(2.07, 6.56)
Perceived success (if perceived depressed)	61.7	48.3	0.58	(0.29, 1.13)	0.73	(0.37, 1.43)
Reports of formal training attendance and perceived adequacy to detect and treat depression						
% of supervisory staff trained						
None in facility	21.2	21.9	1.00	—	1.00	—
Some in facility (1–74%)	34.4	17.8	0.50	(0.15, 1.66)	0.50	(0.13, 1.94)
Most in facility (≥ 75%)	44.4	60.3	1.43	(0.72, 2.82)	1.36	(0.60, 2.61)
% of direct care providers trained						
None in facility	38.6	26.0	1.00	—	1.00	—
Some in facility (1–74%)	9.5	9.6	1.47	(0.61, 3.55)	1.25	(0.49, 3.18)
Most in facility (≥ 75%)	51.9	64.4	1.75	(0.83, 3.66)	1.58	(0.71, 3.53)
Facility is adequately able to treat	75.4	82.9	1.33	(0.63, 2.81)	1.32	(0.59, 2.96)
Staff feels adequately trained to						
Assess	82.1	88.2	1.80	(0.72, 4.47)	1.55	(0.53, 4.52)
Treat	76.1	69.7	0.75	(0.31, 1.78)	0.71	(0.29, 1.73)
Mental health professionals in care planning	46.4	36.8	0.67	(0.34, 1.31)	0.62	(0.29, 1.32)

Notes: RC/AL = residential care–assisted living. Depression was assessed by supervisor report using a modified administration-format version of the Cornell Scale for Depression in Dementia (CSDD) and refers to ≥ 7 on the 38-point scale. Except as noted for “training,” all data were resident level, were of those residents for whom outcome data (i.e., CSDD) and supervisor data (required for adjustment) were available, and were from supervisor report. Models were restricted to those participants with all the covariates used in adjusted models, only 19 participants were removed from the unadjusted analyses due to missing covariates. Due to missing data in the predicted variables, N varied from 270 to 328 in all models, except in the case of “perceived success of treatment,” which was relevant only for those where the staff detected depression (n = 86).

^aAdjusted for male gender, non-White race, age, cognitive status, number of 10 comorbidities (congestive heart failure; high blood pressure or hypertension; myocardial infarction, heart attack, angina, arrhythmias, or other heart problem; diabetes; kidney disease or renal insufficiency; arthritis, rheumatism, degenerative joint disease, lupus, erythematosis, or scleroderma; fractured bones or osteoporosis; cerebrovascular disease, stroke, TIA, or CVA; hemiplegia or paraplegia; asthma, emphysema, bronchitis, or COPD), and impairments in 7 activities of daily living (bed mobility, transfer, locomotion, dressing, eating, toilet use, hygiene).

^bCognitive status was based on Mini-Mental State Examination (MMSE) or Minimum Data Set–Congition (MDS-COGS) scores, if the MMSE is missing (n = 52). Cutpoints for mild, moderate, severe, and very severe (MMSE) are ≥ 18, 11–17, 3–10, and 0–2, respectively. MDS-COGS cutpoints are 0–1, 2–4, 5–8, and 9–10, respectively. Behavioral symptoms were any behavior exhibited weekly on the Cohen-Mansfield Agitation Inventory. Low activity was < 9 (median) on the Albert Patient Activity Scale. Pain was ≥ 2 on a modified administration-format version of the Philadelphia Geriatric Center–Pain Intensity Scale. Immobile was no change in location or position during 3 hours of observation. Low food and fluid intake was ate ≤ 3/4 of meal or drank ≤ 8 ounces on the Structured Meal Observation. Behavioral symptoms and pain were from supervisor report; activity was from care provider report; and immobility and consumption were based on direct observation.

^cThere was an effect modification for the type of long-term-care facility (nursing homes vs RC/AL) in the association between depression and behavioral symptoms and between depression and for-profit ownership. See text for details.

^dData regarding supervisory staff training and direct care provider training (first two sets of items), facility adequacy to treat, and mental health professional involvement were facility level and reported by administrators. Staff feelings of training adequacy were reported by the one supervisor (or direct care provider, if supervisor data are missing) who was most involved in the resident’s care; “adequately” is quite or extremely well trained.

medication) was more common among those with depressive symptoms, as was staff perception of current depression. Depression was lower for those whom staff perceived success in treatment.

Behavioral symptoms and for-profit ownership showed statistically significant interactions with facility type (RC/AL vs nursing home). For behavioral symptoms, the association with depression was much stronger (OR = 7.33, 95% CI = 3.04–17.68) in RC/AL than in nursing homes (OR = 2.78, 95% CI = 1.38–5.58; interaction $p = .030$). Conversely, the association of depression with for-profit status was stronger in nursing homes (OR = 9.62, 95% CI = 3.65–25.35) than in RC/AL facilities (OR = 1.22, 95% CI = 0.61–2.47; interaction $p = .001$).

Discussion

Findings of this study document the high prevalence of depressive symptomatology among those with dementia in long-term care. Overall, 24% of RC/AL and 27% of nursing home participants in this sample had CSDD scores of 7 or greater. Use of mental health professionals in treatment and formal care planning were the only significant differences in care that we observed between nursing homes and RC/AL, and professional treatment was higher among those participants with current depression. Overall, however, the involvement of mental health professionals in the assessment and treatment of depression in both nursing homes and RC/AL facilities is low (< 50%). Depression was more common among participants with severe dementia, behavioral symptoms, and those with pain. The correlation with behavioral symptoms was stronger in RC/AL facilities than in nursing homes.

Depression was more common for participants in for-profit nursing homes than for those in nonprofit homes and all RC/AL facilities. For-profit status in nursing homes has been found to be associated with more deficiencies (Harrington, Zimmerman, Karon, Robinson, & Beutel, 2000) and lower nurse staffing hours (Harrington & Swan, 2003). To our knowledge, an association between profit status and care in RC/AL has not been documented, and the meaning of for-profit status may differ across facility types.

Among six key domains of care, depression was the quality-of-life domain with the lowest perceived treatment success and staff rating of training adequacy (see introduction to this issue), although it is less common than behavioral symptoms, low activity, and low food and fluid intake. Also, the percent of participants who reside in facilities with no training provided for supervisors (21%) or care providers (35%), on depression was higher than lack of training for the other quality domains examined. However, level of training or perceived ability to assess or treat was unrelated to actual depression in these analyses and was surprisingly high. Admittedly, the percentage of staff with formal training in depression care was not validated, and the content of training was not specified. It is unclear why these staff members feel very well equipped to treat and assess depression, when de-

pression is not easily treated and staff themselves report success in only 48% of the identified cases. Other studies in nursing home settings (not limited to dementia patients) have found very low rates of training for depression (Bagley et al., 2000), and, even when training is considered mandatory, there is poor compliance and the impact of knowledge beyond 1 month is minimal (Brooks, Renvall, Bulow, & Ramsdell, 2000; Cohen-Mansfield, Werner, Culpepper, & Barkley, 1997). Furthermore, although the perceived presence of depression was related to higher prevalence, it is worth noting that over one half of the participants with depression were undetected by staff.

About 54% of depressed and 33% of nondepressed participants were taking antidepressant medications, and the use of antidepressants was more prevalent among those who were depressed than other formal mental health treatments. Dose, frequency, and indication information about the medications was not recorded, and so we cannot determine the adequacy of treatment. A large portion of the 33% (those taking medications among nondepressed individuals) may indicate treatment success, but we cannot exclude the possibility of inappropriate use of these medications.

Some caveats are in order. The CSDD is a measure of depressive symptoms, not a clinical diagnosis, and caution should be used when the results are compared with more clinical studies. However, the use of the CSDD as a screening tool for patients with dementia has been advocated in a recent practice guideline (American Geriatrics Society & American Association for Geriatric Psychiatry, 2003), and its utility in predicting nursing home discharge and death in RC/AL settings is established (Payne et al., 2002; Watson et al., 2003). Typically, the CSDD is rated by a clinician after data are gathered through observation and caregiver interview. In this study, the nursing supervisor rated the CSDD items, for a number of reasons: (a) inability of moderately or severely demented patients to respond; (b) the four-state sample of individuals that precluded sending psychiatrists to all facilities; (c) lack of family proxies for many of residents; (d) potential differences in staffing (and availability of staff) across assisted living and nursing home facilities; and (e) 87% of supervisors reported high familiarity with the resident. Using a nursing supervisor established a consistent, clinically oriented respondent across the sites, but it would have been ideal to obtain depression information from multiple respondents. Thus, the CSDD rating likely provides an underestimate of the true prevalence of depression symptoms. Further, because CSDD ratings were provided by the same staff member who rated current detection and treatment, the degree of correspondence between these measures may be higher as a result of similar biases in underrecognition of depression and depression symptoms. Finally, the sample of individuals is not representative and so generalizability is limited.

Despite these limitations, this study suggests that undetected depression among residents with dementia is high in both long-term-care settings, particularly in for-profit nursing homes. The role of improved de-

pression training and involvement of mental health professionals in long-term care should be further investigated.

References

- Albert, S. M., DelCastillo-Castaneda, C., Sano, M., Jacobs, D. M., Marder, K., Bell, K., et al. (1996). Quality of life in patients with Alzheimer's disease as reported by patient proxies. *Journal of the American Geriatrics Society, 44*, 1342-1347.
- Alexopoulos, G. S., Abrams, R. C., Young, R. C., & Shamoian, C. A. (1988). Cornell Scale for Depression in Dementia. *Biological Psychiatry, 23*, 271-284.
- American Geriatrics Society & American Association for Geriatric Psychiatry. (2003). Consensus statement on improving the quality of mental health care in U.S. nursing homes: Management of depression and behavioral symptoms associated with dementia. *Journal of the American Geriatrics Society, 51*, 1287-1298.
- Bagley, H., Cordingley, L., Burns, A., Mozley, C. G., Sutcliffe, C., Challis, D., et al. (2000). Recognition of depression by staff in nursing and residential homes. *Journal of Clinical Nursing, 9*, 445-450.
- Brooks, P. A., Renvall, M. J., Bulow, K. B., & Ramsdell, J. W. (2000). A comparison between lecture and videotape inservice for certified nursing assistants in skilled nursing facilities. *Journal of the American Medical Directors Association, 1*, 191-196.
- Brown, M. N., Lapane, K. L., & Luisi, A. F. (2002). The management of depression in older nursing home residents. *Journal of the American Geriatrics Society, 50*, 69-76.
- Cohen-Mansfield, J. (1986). Agitated behaviors in the elderly. II. Preliminary results in the cognitively deteriorated. *Journal of the American Geriatrics Society, 34*, 722-727.
- Cohen-Mansfield, J., Werner, P., Culpepper, W. J., & Barkley, D. (1997). Evaluation of an inservice training program on dementia and wandering. *Journal of Gerontological Nursing, 23*, 40-47.
- Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975). "Mini-mental state." A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research, 12*, 189-198.
- Harrington, C., & Swan, J. H. (2003) Nursing home staffing, turnover, and case mix. *Medical Care Research Review, 60*, 366-392.
- Harrington, C., Zimmerman, D., Karon, S. L., Robinson, J., & Beutel, P. (2000) Nursing home staffing and its relationship to deficiencies. *Journal of Gerontology: Social Sciences, 55B*, S278-S287.
- Hartmaier, S., Sloane, P. D., Guess, H., & Koch, G. (1994). The MDS cognition scale: A valid instrument for identifying and staging nursing home residents with dementia using the Minimum Data Set. *Journal of the American Geriatrics Society, 42*, 1173-1179.
- Liang, K. Y., & Zeger, S. L. (1986). Longitudinal data analysis using generalized linear models. *Biometrika, 73*, 13-22.
- McCurren, C., Dowe, D., Rattle, D., & Looney, S. (1999). Depression among nursing home elders: Testing an intervention strategy. *Applied Nursing Research, 12*(4), 185-195.
- McEvoy, J. K. (2001). *American Hospital Formulary Service drug information*. Bethesda, MD: American Society of Health-System Pharmacists.
- Morris, J. N., Fries, B. E., & Morris, S. A. (1999). Scaling ADLs within the MDS. *Journal of Gerontology: Medical Sciences, 54A*, M546-M553.
- Parmelee, P. A., Katz, I. R., & Lawton, M. P. (1989). Depression among institutionalized aged: Assessment and prevalence estimation. *Journal of Gerontology: Medical Sciences, 44*, M22-M29.
- Parmelee, P. A., Katz, I. R., Lawton, M. P. (1991). The relation of pain to depression among institutionalized aged. *Journal of Gerontology: Psychological Sciences, 46*, P15-P21.
- Payne, J. L., Sheppard, J. M., Steinberg, M., Warren, A., Baker, A., Steele, C., et al. (2002) Incidence, prevalence, and outcomes of depression in residents of a long-term care facility with dementia. *International Journal of Geriatric Psychiatry, 17*, 247-253.
- Reed, P. S., Zimmerman, S., Sloane, P. D., Williams, C. S., & Boustani, M. (2005). Characteristics associated with low food and fluid intake among long-term care residents with dementia. *The Gerontologist, 45*(Special Issue 1), 74-81.
- Rovner, B. W., German, P. S., Brant, L. J., Clark, R., Burton, L., & Folstein, M. F. (1991). Depression and mortality in nursing homes. *Journal of the American Medical Association, 265*, 993-996.
- Ryden, M. B., Pearson, V., Kaas, M. J., Hanscom, J., Lee, H., Krichbaum, K., et al. (1999). Nursing interventions for depression in newly admitted nursing home residents. *Journal of Gerontological Nursing, 25*, 20-29.
- Vida, S., Des Rosiers, P., Carrier, L., & Gauthier, S. (1994). Depression in Alzheimer's disease: Receiver operating characteristic analysis of the Cornell Scale for Depression in Dementia and the Hamilton Depression Scale. *Journal of Geriatric Psychiatry and Neurology, 7*, 159-162.
- Watson, L., Garrett, J., Sloane, P. S., Gruber-Baldini, A. L., & Zimmerman, S. (2003). Depression in assisted living. Results from a four-state study. *American Journal of Geriatric Psychiatry, 11*, 534-542.
- Williams, S. W., Williams, C. S., Zimmerman, S., Sloane, P. D., Preisser, J. S., Boustani, M., et al. (2005). Characteristics associated with mobility limitation in long-term care residents with dementia. *The Gerontologist, 45*(Special Issue 1), 62-67.
- Zimmerman, S., Sloane, P. D., Eckert, J. K., Buie, V. C., Walsh, J., & Hebel, J. R. (2001). An overview of the collaborative studies of long-term care. In S. Zimmerman, P. D. Sloane, & J. K. Eckert (Eds.), *Assisted living: Needs, practices, and policies in residential care for the elderly* (pp. 117-143). Baltimore: Johns Hopkins University Press.

Received June 25, 2004

Accepted February 1, 2005

Decision Editor: Richard Schulz, PhD