

The Use of the Minimum Data Set to Identify Depression in the Elderly

Cristina C. Hendrix, DNS, CFNP, CCRN, Kenneth M. Sakauye, MD, George Karabatsos, PhD, and Deborah Daigle, BA

Objective: To determine whether depression in the elderly in institutionalized settings could be identified using the mood indicators in the Minimum Data Set (MDS) 2.0 (Section E1, Items A-P).

Design: Descriptive study.

Setting: Three nursing homes in the southeastern part of the country.

Participants: Residents aged 65 and above.

Measurements: The items in "Indicators of Depression, Anxiety and Sad Mood" on the MDS 2.0 were used to identify observable features of depression in the elderly. The Cornell Scale for Depression in Dementia (CSDD) was used to validate the MDS indicators. Consensus analysis, which controls raters' bias, raters' ability, and item difficulty, was used to analyze data.

Results: No depressive patterns were detected using the MDS indicators. On the CSDD, distinct depressive features were identified: anxiety, sadness, lack of reaction to pleasant events, irritability, agitation, multiple physical complaints, loss of interest, appetite loss, and lack of energy.

Conclusion: The incongruent findings on the MDS indicators and the CSDD may be reflective of the assessment process used with the MDS rather than its ability to identify features of elderly depression. The practice of allowing nondirect caregivers to complete the MDS may have serious implications for the accuracy of the data collected. (*J Am Med Dir Assoc* 2003; 4: 308–312)

Keywords: Depression; observable indicators; elderly; institutionalized settings

Many health care professionals do not feel knowledgeable about the features of elderly depression.^{1–5} The Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM IV) criteria are the gold standard for psychiatric diagnosis, but patients often do not complain about these symptoms,⁶ and the symptoms of depression and those of chronic illnesses frequently overlap. Even the cardinal feature of depressed mood is often attributed by the elderly to other causes.^{7–8} Many use somatization as the proxy for affective complaints (eg, "I'm just tired not depressed" or "I'd like to do more if I didn't feel so bad"). Dementia further complicates the diagnosis of depression because of the lack of awareness and introspection of these patients.⁹ Thus, accurate diagnosis of depression is often an exercise in disentangling confounds.

Observable indicators may be more useful in identifying depression in elderly residents than paper-and-pencil, self-report tools since limited verbal communication is common.^{10–11} This mode of assessment also avoids the bias of

imperfect recall and socially desirable responses. Indicators of depressed mood in the absence of admission of depression may include statements like "Nothing matters," "I'm of no use to anyone," and "I'd rather be dead," as well as symptoms such as persistent irritability with self and others, sleep disturbance, and lack of energy.⁹ Some authors have suggested that combative behavior, anxiety, and changes in socialization patterns and attendance at activities may be the most apparent symptoms of depression in the elderly.^{2,4} Providing nursing home staff a set of these observable features of elderly depression would help to prevent both underdiagnosis and false-positives.^{1,6,9,11–12}

One of the major strengths of the Minimum Data Set (MDS) is its reliance on routine, daily observations by nursing home staff.¹³ These assessments provide a more complete picture of residents' status than self-reports or one-time interviews, which are often fragmented and confounded by the negative events of the day. The latest version of the MDS, the MDS 2.0, contains 16 items under the Indicators of Depression, Anxiety, and Sad Mood (MDS indicators), that are part of assessing mood and behavior patterns (Section E1). Because all nursing homes receiving federal reimbursement have been mandated to complete the MDS on an annual basis, and on a quarterly basis if significant changes in residents' status are noted, using the MDS indicators to identify features of depression in the elderly would not place an additional burden on staff. However, whether these MDS indicators can

Duke University School of Nursing (C.C.H.); Louisiana State University Health Sciences Center School of Medicine (K.M.S.); University of Illinois at Chicago, College of Education (G.K.); Stanley S. Scott Cancer Center, Louisiana State University Health Sciences Center (D.D.).

Address correspondence to: Cristina C. Hendrix, DNS, CFNP, CCRN, Duke University School of Nursing, DUMC 3322, Durham, NC 27710. E-mail: hendr024@mc.duke.edu

Copyright ©2003 American Medical Directors Association

DOI: 10.1097/01.JAM.0000094065.05310.FB

sufficiently capture the features of depression in the elderly remains unclear.^{14,15}

The purpose of this study, therefore, was to determine whether depression in the elderly could be identified using the Indicators of Depression, Anxiety, and Sad Mood in the MDS 2.0. The study used the MDS data as they are presently collected in nursing homes. No attempt was made to introduce special training or expertise to the nursing home staff. The Cornell Scale for Depression in Dementia (CSDD), a tool that also relies on observation, was used to validate the utility of the MDS.

METHODS

Sample

The sample was drawn from nursing homes in the southeastern part of the United States. Three nursing homes participated: two were nonprofit religious homes (one Jewish and one Protestant), and one was a for-profit facility. The 321 subjects, who were 65 years and above, were all Medicare eligible.

Measures

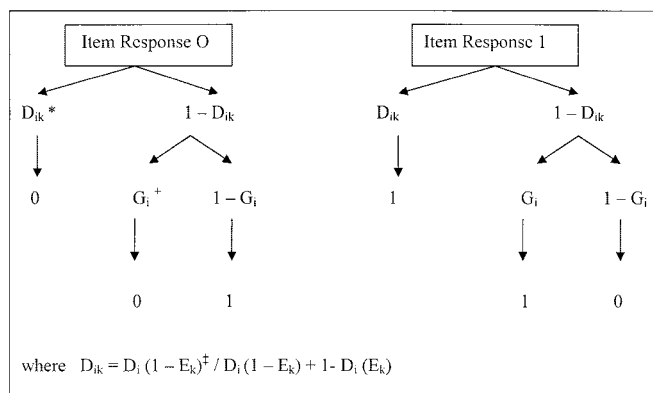
The MDS 2.0 mood indicators (Section E1: Items A to P) were used to identify the features of depression in the elderly. There are 16 of these indicators, each assessing a definite symptom. The symptoms are grouped as verbal expressions of distress; sad, apathetic, anxious appearance; and loss of interest. Scoring is based on the frequency of symptoms, with 0 denoting not being exhibited, 1 being exhibited up to 5 days a week, and 2 being exhibited daily or almost daily. The average weighted kappa reliability is reported to be 0.68.¹⁶

The CSDD was used to validate the ability of the MDS to detect depression in the elderly. The CSDD is a 19-item scale that staff complete based on interaction and conversations to screen for depression in both cognitively intact and impaired elderly.^{17,18} Scoring is based on the intensity of symptoms, with a score of 0 for absence of symptoms, 1 for mild or intermittent, and 2 for severe. Scores of 8 and above are indicative of depression. Interrater reliability coefficients have ranged from 0.60 to 0.97 and 0.82 to 0.93 for dementia and nondementia subjects, respectively. The CSDD also distinguished levels of depression in dementia subjects and correlated well with psychiatric diagnoses of depression ($r = 0.81$, $P < 0.01$).

A baseline data sheet was developed to collect demographic information and information on coexisting medical conditions of subjects, using the residents' medical records. Dementia was determined based on the comprehensive problem list indicated on the residents' medical records.

Data Collection

The latest MDS assessments were retrieved for each participating resident. Inquiry by the investigating team revealed that these assessments were completed customarily by administrative nurses, who often consulted with staff nurses in completing the assessment forms. Administrative nurses also did chart reviews when necessary. All administrative nurses



* D_{ik} = Ability of rater i for item k

+ G_i = Guessing bias of rater i

+ E_k = Item k level of difficulty

Fig. 1. Determination of an item response using the consensus theory model.

were reported to have undergone training on how to complete the MDS properly.

Staff registered nurses and licensed practical nurses in the three nursing homes administered the CSDD to residents they were caring for after receiving training by the investigating team on how to use the scale. To test interrater reliability, the CSDD was administered twice by two different raters, a staff nurse and a member of the investigating team, on 20 randomly selected residents. The time interval between the collection of data for the MDS and the administration of the CSDD was limited to 12 weeks.

Data Analysis

Data were analyzed using the consensus theory (CT) model, which identifies patterns of item responses by looking at response agreement for a particular item. The CT model does not assume a priori knowledge of the true response category for any item.¹⁹⁻²² CT assumes that neither items in a scale nor raters are equal.¹⁹ Determination of an item response (N) is influenced by the rater's ability (D_i), rater's guessing bias (G_i), and item difficulty (E_k), as shown in Figure 1. CT controls for these parameters when it determines the response mode for a particular item, an advantage it possesses over merely aggregating frequency counts of item responses by independent raters. CT estimates these parameters using the following model:

D_i = degree to which the item responses of rater i agree with the item responses of the remaining $N - 1$ raters; $0 \leq D_i \leq 1$

G_i = relative to rater's set of item responses; $0 < G_i < 1$, with 0.5 as no bias

E_k = degree of response disagreement among raters within item k ($0 \leq E_k \leq 1$), with 0 as very easy and 1 as very difficult.

The CT framework was applied to dichotomous response data. MDS scores of 1 and 2 were recoded as 1 (presence of symptomatology), and 0 was maintained as 0 (absence of symptomatology). The same procedure was applied to the

Table 1. Comparison of Sample Data and National Data on Age, Gender, and Marital Status

	Sample Data (N = 322)	National Data* (N = 1,385,400)
Gender		
Female	72% (n = 231)	75% (n = 1,042,700)
Male	28% (n = 91)	25% (n = 342,700)
Age		
65–74 years	18% (n = 58)	18% (n = 242,000)
75–84 years	37% (n = 119)	42% (n = 586,300)
>85 years and over	45% (n = 145)	40% (n = 557,100)
Marital Status		
Married	13% (n = 41)	17% (n = 229,300)
Divorced/Separated	13% (n = 42)	6% (n = 75,800)
Never married	13% (n = 43)	11% (n = 154,300)
Widowed	60% (n = 194)	66% (n = 914,800)

*National Data are from Dey, A.N. (1997). *Characteristics of elderly nursing home residents: Data from the 1995 National Nursing Home Survey* (Advance Data No. 289).: USDHHS Center for Disease Control and Prevention National Center for Health Statistics

CSDD scores. The statistical software CONSENSUS, developed by Karabatsos and Batchelder,¹⁹ was used for the analysis. Five thousand iterations were performed, discarding the first 1000 burn-in iterations. The output of the CT analysis consisted of a response mode for each particular item on the MDS indicators and the CSDD, after controlling for rater's bias and ability, and item difficulty. Also, estimates of these three parameters were calculated.

RESULTS

The demographic characteristics of the 321 residents were similar to those of respondents to the National Nursing Home survey conducted in 1995²³ (see Table 1). The majority were white (54%), with blacks comprising 43% of the sample. Seventy-seven percent (n = 249) had more than three diagnosed medical conditions; the most common was related to

cardiovascular dysfunction (24.9%), followed by mental dysfunction (22%). The most frequent mental diagnoses were dementia/Alzheimer's disease (53%) and depression (22%). However, of the 79 (25%) residents who had a total CSDD score ≥ 8 , 57 (72%) did not have a medical diagnosis of depression.

Sixty-eight (86%) of the 79 residents identified as depressed on the CSDD had responses on both the MDS and the CSDD and were included in the analyses. Using the consensus approach, no patterns of depressive features were detected on the MDS (Table 2). MDS item responses were primarily zero. However, on the CSDD, distinct patterns of depressive features were noted: anxiety, sadness, lack of reaction to pleasant events, and irritability, classified as mood-related signs; agitation, multiple physical complaints, and loss of interest, classified as behavioral disturbances; and appetite

Table 2. Item Responses on the MDS Indicators Among Depressed Residents and Consensus Item Response Mode (N = 68)

MDS Items	Item Responses*		Consensus Item Response Mode
	0	1	
1. Negative statements	61	7	0 (no)
2. Repetitive questions	62	6	0 (no)
3. Repetitive calls for help	60	8	0 (no)
4. Persistent anger/irritability	59	9	0 (no)
5. Self-deprecation	65	3	0 (no)
6. Unrealistic fears	64	4	0 (no)
7. Expressions of panic or recurrent statements that something terrible is about to happen	66	2	0 (no)
8. Repetitive health complaints	57	11	0 (no)
9. Repetitive anxious complaints (non-health related)	60	8	0 (no)
10. Diurnal mood variation	67	1	0 (no)
11. Sleep disturbance	66	2	0 (no)
12. Sad, pained, worried facial expressions	58	10	0 (no)
13. Crying, tearfulness	62	6	0 (no)
14. Repetitive physical movements	59	9	0 (no)
15. Withdrawal from activities of interest	64	4	0 (no)
16. Reduced social interaction	60	8	0 (no)

*Item response 0 = absence of symptoms; 1 = presence of symptoms

Table 3. Item Responses on CSDD Among Depressed Residents (N = 68)

CSDD	Item Responses*			Consensus Item Response Mode
	0	1	Missing	
1. Anxiety	17	47	4	1 (yes)
2. Sadness	27	37	4	1 (yes)
3. Lack of reaction to pleasant events	12	50	6	1 (yes)
4. Irritability	16	49	3	1 (yes)
5. Agitation	20	45	3	1 (yes)
6. Retardation	43	20	5	0 (no)
7. Multiple physical complaints	21	37	10	1 (yes)
8. Loss of interest	11	47	10	1 (yes)
9. Appetite loss	31	32	5	1 (yes)
10. Weight loss	35	31	2	0 (no)
11. Lack of energy	23	39	6	1 (yes)
12. Diurnal variation of mood	40	14	14	0 (no)
13. Difficulty falling asleep	33	24	11	0 (no)
14. Multiple awakenings during sleep	28	27	13	0 (no)
15. Early morning awakening	40	12	16	0 (no)
16. Suicidal feeling	46	6	16	0 (no)
17. Poor self-esteem	33	16	19	0 (no)
18. Pessimism	29	25	14	0 (no)
19. Mood congruent delusions	45	8	15	0 (no)

*Item response 0 = absence of symptoms; 1 = presence of symptoms

loss, and lack of energy, classified as physical signs (Table 3). When the nondepressed residents were analyzed (n = 239), there were no item response patterns of depressive symptomatology detected on either the MDS or the CSDD. The item response mode for all items on both measures was zero (absence of symptom).

Twenty-five percent (n = 44) of subjects who had a diagnosis of dementia were also classified as depressed by their CSDD score. Again, no observable depressive features were detected for this group using the MDS indicators. On the CSDD, item response patterns were similar to those found in the depressed group. In summary, based on these findings, the MDS indicators were unable to capture depressive features among elderly residents, whereas the CSDD was able to provide distinct features of depression in the elderly.

Comparisons of item difficulty, rater's ability and rater's guessing bias between the MDS mood indicators and the CSDD are presented in Table 4. The mean disagreements between responses on the CSDD and the MDS mood indicators within item k (mean E_k) were comparable (0.49 vs 0.50

respectively). Overall, there was a higher agreement on responses among raters for the MDS (mean $D_i = 0.65$) than for the CSDD (mean $D_i = 0.39$). However, the MDS raters were also more inclined to give item response 0 (mean $G_i = 0.44$), while no bias toward 0 was detected among the CSDD raters (mean $G_i = 0.51$). Using Kendall Tau's degree of relationship, item responses on the CSDD given by nurse caregivers and by the investigating team for 20 randomly selected residents were modestly positively correlated (Kendall's tau = 0.10 to 0.72), except for item 15 (early morning awakening) which had a correlation of -0.09 .

Discussion and Conclusions

Nursing home staff are in the best position to recognize depression because they are with residents throughout the day and over a period of time. If staff become cognizant of observable features that elderly depressed residents are likely to manifest, this may help with the problem of underdiagnosis^{6,9,11,24-26} and misidentification^{1,6,12} of depression. In this study, however, no MDS mood indicator item differentiated

Table 4. Comparison of Mean Item Difficulty, Mean Rater's Ability and Mean Rater's Guessing Bias Between the MDS Mood Indicators and the CSDD

	Item Difficulty (E_k)*		Rater's Ability [†]		Rater's Guessing Bias [‡]	
	Mean	Range	Mean	Range	Mean	Range
MDS Mood Indicators	0.50	0.44–0.57	0.65	0.45–0.69	0.44	0.40–0.61
CSDD	0.49	0.34–0.58	0.39	0.33–0.54	0.51	0.38–0.62

*Ranges from 0 to 1, with 0 as very easy and 1 as very difficult

[†]Ranges from 0 to 1, with 0 as poor and 1 as excellent

[‡]Ranges from 0 to 1, with 0.5 as no bias, < 0.5 as inclination to response 0, >0.5 as inclination to response 1

depressed from nondepressed residents. This may reflect the measurement process rather than the ability of the MDS indicators to screen for depression.^{27,28} In the nursing homes included in this study, nurse administrators completed the MDS. Although they may have been trained to complete the tool properly, their limited contact with the residents may have resulted in inability to discern manifestations of depression in these residents. In contrast, the CSDD was completed by direct caregivers, and mood-related signs (anxiety, sadness, lack of reaction to pleasant events, irritability), behavioral disturbances (agitation, multiple physical complaints, loss of interest), and physical signs (appetite loss and lack of energy) were consistently observed as indicators of depression of both cognitively intact and cognitively impaired elderly residents.

Many nursing homes appear to use administrators to complete the MDS. Others hire a compliance nurse to abstract data from charts to complete the forms rather than having direct caregivers do it.^{29,30} Delegating responsibility for completing the MDS to nurses who are not directly involved with resident care may result in MDS data that do not reflect residents' real status.^{27,28} The intent of this study was to use the MDS indicators as they are normally collected in nursing homes to gain insight into the utility of these available data in detecting features of depression in the elderly. However, before conclusions can be drawn on the utility of the MDS indicators, a further study is needed that will initially train nursing home staff who are direct caregivers in the use of the MDS and ensure that these same staff will be responsible for completing the MDS. It is crucial to set up a system that ensures that the MDS is completed by those responsible for care planning for a particular resident.

The MDS has been lauded as a foundation for excellence in long-term care. It is here to stay. The Centers for Medicare and Medicaid (formerly the Health Care Financing Administration) is committed to regular revisions to improve the quality of instrument and to ensure that it remains consonant with the standards of clinical practice in nursing homes.^{13,16} However, no matter how excellent a tool is, it is only as good as its rater. The importance of ensuring the accuracy of the data contained in the MDS cannot be overemphasized because the MDS serves as the trigger to develop responsive strategies and to prevent further declines in residents to maximize improvements.

REFERENCES

- Burrows AB, Satlin A, Salzman C, et al. Depression in a long-term care facility: Clinical features and discordance between nursing assessment and patient interviews. *J Am Geriatr Soc* 1995;43:1118-1122.
- Parmelee PA, Lawton MP, Katz IR. The structure of depression among elderly institution residents: Affective and somatic correlates of physical frailty. *J Gerontol* 1998;53A:M155-M162.
- Katona C, Livingston G, Manela M, et al. The symptomatology of depression in the elderly. *Int Clin Psychopharmacol* 1997;12:S19-S23.
- Samuels SC, Katz IB. Depression in the nursing home. *Psychiatr Ann* 1995;25:419-424.
- Teresi J, Abrams R, Holmes D, et al. Prevalence of depression and depression recognition in nursing homes. *Soc Psychiatry Psychiatr Epidemiol* 2001;36:613-320.
- Gallo JJ, Anthony JC, Muthen BO. Age differences in the symptoms of depression: A latent trait analysis. *J Gerontol* 1994;49:P251-264.
- Callahan CM, Hendrie HC, Dittus RS, et al. Depression in late life: The use of clinical characteristics to focus on screening efforts. *J Gerontol* 1994;49:M9-M14.
- Baker FM, Miller CL. Screening a skilled nursing home population for depression. *J Geriatr Psychiatry Neurol* 1991;4:218-221.
- Forsell Y, Winblad B. Major depression in a population of demented and nondemented older people: Prevalence and correlates. *J Am Geriatr Soc* 1998;46:27-30.
- Snowdon J, Donnelly N. A study of depression in nursing homes. *J Psychiatric Residency*. 1986;20:327-333.
- Kafonek S, Ettinger WH, Roca R, et al. Instruments for screening for depression and dementia in a long-term care facility. *J Am Geriatr Soc* 1989;37:29-34.
- Folstein MF. Rating scales for use in the elderly. *Curr Opin Psychiatry* 1991;4:591-595.
- Won A, Morris JN, Nonemaker S, Lipsitz LA. A foundation for excellence in long-term care: The Minimum Data Set. *Annals of Long-Term Care* 1999;7:92-97.
- Horgas AL, Margrett JA. Measuring behavioral and mood disruptions in nursing home residents using the Minimum Data Set. *Outcomes Management for Nursing Practice* 2001;5:28-35.
- Burrows AB, Morris JN, Simon SE, et al. Development of a Minimum Data Set-based depression rating scale for use in nursing homes. *Age Aging* 2001;29:165-172.
- Morris JN, Nonemaker S, Murphy K, et al. A commitment to change: Revision of HCFA's RAI. *J Am Geriatr Soc* 1997;45:1011-1016.
- Alexopoulos GS, Abrams RC, Young RC, Shamoian CA. Cornell scale for depression in dementia. *Biol Psychiatry* 1988;23:271-284.
- Alexopoulos GS, Abrams RC, Young RC, Shamoian CA. Use of the Cornell scale in nondemented patients. *J Am Geriatr Soc* 1988;36:230-236.
- Karabatsos G, Batchelder WH. Markov chain estimations method for test theory without an answer key. Institute for Mathematical behavioral Sciences. 2001;University of California, Irvine.
- Romney AK, Weller SC, Batchelder WH. Culture as consensus: A theory of culture and informant accuracy. *Am Anthropol* 1986;88:313-338.
- Romney AK, Batchelder WH, Weller SC. Recent applications of cultural consensus theory. *Am Behav Sci* 1987;31:163-177.
- Weller SC, Mann NC. Assessing rater performance without a "gold standard" using consensus theory. *Med Decis Making* 1997;17:71-79.
- Dey AN. Characteristics of elderly nursing home residents: Data from the 1995 National Nursing Home Survey (Advance Data No. 289). 1997. USDHHS Center for Disease Control and Prevention National Center for Health Statistics.
- Katz IR, Leshner E, Kleban M, et al. Clinical features of depression in the nursing home. *Int Psychogeriatr* 1989;1:5-15.
- American Medical Directors Association. Depression: Clinical Practice Guideline. Columbia, MD:1996.
- Bair BD. Diagnostic dilemmas, part II: Frequently missed diagnosis in geriatric psychiatry. *Psychiatr Clin North Am* 1998;21:941-971.
- Schnelle JF, Wood S, Schnelle ER, Simmons SF. Measurement sensitivity and the Minimum Data Set depression quality indicator. *Gerontologist* 2001;41:401-405.
- McCurren C. Assessment for depression among nursing home elders: Evaluation of the MDS mood assessment. *Geriatric Nursing* 2002;23:103-108.
- Teresi JA, Holmes D. Should MDS data be used for research? (editorials). *Gerontologist* 1992;32:148-149.
- Kane RL. Assuring quality in nursing home care. *J Am Geriatr Soc* 1998;46:232-237.