Psychometric Properties of the 15-Item Geriatric Depression Scale in Functionally Impaired, Cognitively Intact, Community-Dwelling Elderly Primary Care Patients

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OBJECTIVES: To examine the psychometric properties of the 15-item Geriatric Depression Scale (GDS-15), a brief depression screening measure.

DESIGN: Cross-sectional.

SETTING: Nineteen counties in western New York, West Virginia, and Ohio.

PARTICIPANTS: Nine hundred sixty functionally impaired, cognitively intact, community-dwelling primary care patients aged 65 and older.

MEASUREMENTS: The GDS-15, major depression as measured using the Mini-International Neuropsychiatric Interview, depressed mood, life satisfaction, suicidal ideation, and reported suicide attempts.

RESULTS: Exploratory factor analyses suggested a two-factor structure for the GDS-15 in this category of patients, with component subscales assessing depression and positive affect. Cronbach alpha coefficients provide evidence for moderate, although acceptable, internal consistency reliability. Significant associations between the GDS-15 and measures of depressed mood, life satisfaction, and suicidal ideation demonstrated construct validity, whereas acceptable sensitivity and specificity to discriminate between depressed and nondepressed patients demonstrated criterion validity. Internal consistency reliability and construct validity did not differ significantly between patients with low and high functional impairment. A significant weakness of the scale is its low correlation with suicide attempt status.

CONCLUSION: In general, this study provides evidence of impressive psychometric properties of the GDS-15 when administered to a sample of functionally impaired, cognitively intact, community-dwelling primary care patients. **J Am Geriatr Soc 53:1570–1576, 2005.**

Key words: geriatric; depression; screening; psychometrics; factor structure

Depression is a severe public health problem affecting between 8% and 20% of community-residing elderly Americans.[1] The 15-item Geriatric Depression Scale (GDS-15)[2] is often recommended as a screening instrument for depression in older persons, but its psychometric properties have not been examined for functionally impaired, cognitively intact older primary care patients who are living independently in the community (not in a nursing home or other institution). Here the results of a study of the factor structure, internal consistency reliability, and construct and criterion validity of the GDS-15 in such a population are presented.

Late-life depression is associated with functional and cognitive impairment, increases in risk for suicide and all-cause mortality, and greater healthcare use and costs. Identification of depression can help maintain and potentially improve health and functioning of older adults. Recent studies have demonstrated the utility of depression screenings in identifying depressed older adults in inpatient, assisted living, communal living, and primary care practices.

The original 30-item version of the GDS[3] was designed specifically for older adults and excludes somatic symptoms of depression, which can confound depression diagnosis with physical illnesses common in older adults. The 15-item version was developed in recognition of the fact that the initial 30-item GDS might be prohibitively lengthy for busy clinical settings and with more-impaired older adults.[2] The GDS-15 is scored dichotomously (yes/no) and inquires into subjective depression experienced during the prior week. A small validation study (35 elderly subjects) found a correlation of 0.84 between the 15- and 30-item versions.[2]

The GDS-15 has been widely recommended as a brief screening instrument for late-life depression[4,5] and has been found to be useful in detecting late-life major depression in primary care settings.[5] Although many studies have examined the validity[4,6–18] and internal consistency

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reliability[9,12,15,17,19–21] of the GDS-15, and its factor structure has been investigated in predominantly healthy community-dwelling older adults[19] and hospitalized geriatric patients,[21] these psychometric properties have yet to be examined in functionally impaired, community-dwelling elderly primary care patients. This information is especially important because 41.9% (13,978,118) of Americans aged 65 and older are disabled, of whom 28.6% (9,545,680) have a physical disability and 9.5% (3,183,840) are disabled in self-care.[22]

METHODS

Sample

The sample consisted of 960 cognitively intact adults aged 65 and older who participated in the Medicare Primary and Consumer-Directed Care Demonstration (N = 1,605), a randomized, controlled trial of innovative healthcare delivery approaches for primary care patients. Patients enrolled in the demonstration between July 1998 and June 2000 in 19 counties: eight in western New York state, six in West Virginia, and five in southeastern Ohio. All demonstration participants were required to have a high level of functional impairment (need or receive help for at least two activities of daily living (ADLs) or three instrumental activities of daily living (IADLs)) and to have had recent significant health services use (had been a hospital or nursing home inpatient or received Medicare home health care during the previous year or had had at least two emergency room visits during the previous 6 months).

Procedures

Patients were recruited by mail from the practices of the 307 primary care physicians who agreed to participate in the demonstration. In-home informed consent presentations and baseline data collection interviews were completed for 2,281 Medicare patients. Of these, 495 were excluded, most because the enrollment period ended. A total of 1,786 (78.3%) were randomly assigned to one of four intervention groups. The 1,786 prospective subjects were then required to complete a practice health services journal for 2 to 3 weeks before enrollment. Those who were unable or unwilling to do so were withdrawn or voluntarily withdrew from the demonstration. Of the 1,786 patients who were randomized, 1,605 (89.9%) entered the intervention phase of the demonstration.

The data presented in this article were collected in patients' homes before randomization. A nurse or other trained research staff interviewed patients. A cognitive screen administered at the beginning of the interview assessed the patient's ability to repeat three words (book, watch, table), respond to three questions about self-rated health, and remember the three words about 5 minutes after being asked to repeat them initially. Two hundred twenty-seven of the 1,605 patients did not pass the screen. The interviewer judged another 124 patients later, often with input from a caregiver, as not being cognitively able to answer the questionnaire accurately. The GDS-15 was administered only to patients who passed the initial screen and continued to be classified during the interview as being able to provide accurate data. Several studies have found that the GDS is not particularly accurate in identifying depression in cognitively impaired persons.[23,24]

Part of the questionnaire was the Cognitive Performance Scale (CPS),[25] an interviewer-administered measure of cognitive functioning that is highly associated with scores on the Test for Severe Impairment and the Mini-Mental State Examination.[25] An additional 130 patients received a score of 2 or more on the CPS, evidence of likely cognitive impairment, so their data were not included in the study reported here. In addition, the 164 patients younger than 65 were not included. Thus, the study reported here had 960 patients.

Psychometric Analyses

Analyses included calculation of descriptive statistics (mean, standard deviation (SD), range, skewness, and kurtosis) for the GDS-15 and validation measures, examination of the factor structure of the GDS-15, and examination of its internal consistency reliability and validity. Analyses were conducted using the SAS version 8.2 (SAS Institute, Inc., Cary, NC), Stata 8.0 (Stata Corp., College Station, TX), and SPSS 12.0 (SPSS Corp., Chicago, IL) statistical packages.

Exploratory Factor Analysis

GDS-15 items were submitted to exploratory factor analyses to ascertain the factorial structure of this measure. Initial analyses used principle components analyses with orthogonal (Varimax) rotation. Results of this procedure were compared with analyses using oblique (Promax) rotation because of the possibility of intercorrelated factors. Finally, these findings were compared with those using tetrachoric correlations, given the position that standard factor analysis using Pearson correlations is inappropriate for dichotomously scored items because of the potential for artificially inflated factor loadings.[26]

Internal Consistency Reliability

Internal consistency reliability of the GDS-15 was assessed using Cronbach alpha coefficient and corrected item-total correlation coefficients.

Validity

Construct validity for the GDS-15 was explored using Spearman correlations with measures of depression, life satisfaction, suicidal ideation, and suicide attempts. Depressed mood was assessed using a global item: "In the past year, have you felt depressed or sad much of the time?" (yes/no) and with two questions from the SF-36 Health Survey: In the past 4 weeks "Have you felt downhearted and blue?" and "Have you felt so down in the dumps that nothing could cheer you up?" (scored from 1 (all of the time) to 5 (none of the time)). Life satisfaction was assessed using a single item used in the Nun Study: "How would you rate your satisfaction with your current life?" (scored on a 5-point response from 1 = excellent to 5 = poor).[27] Two yes/no questions on suicidal ideation devised previously[28] were included, "Has there been a time in the last year that you thought of taking your own life, even if you would not really do it?" and "Has there been a time in the last year when you reached the point where you seriously considered taking your life or perhaps made plans how you would go

about doing it?" Finally, two yes/no questions on suicide attempts were included: "In the last year have you made an attempt on your life?"[28] and "Throughout your whole life, have you ever made an attempt on your life?" Criterion validity for the GDS-15 was explored with major depression (depressed vs nondepressed) treated as the criterion, exploring sensitivity and specificity of different cutscores using receiver operating characteristic (ROC) curve analysis.[29] Presence and absence of depression was determined using patient responses to the Mini-International Neuropsychiatric Interview Major Depressive Episode module (MINI-MDE),[30] an interview-based measure assessing the presence of *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV) symptoms of depression. Significant concordance has been demonstrated between the MINI-MDE, the Composite International Diagnostic Interview, and the Structured Clinical Interview for DSM, Third Edition, Revised.[30]

Functional Impairment

Several analyses were performed to compare how the GDS-15 performs in patients with less functional impairment (dependence in 0–2 ADLs) with how it performs in those with more impairment (3–6 ADLs). These included descriptive data (mean, median, SD, and range of the GDS-15), construct validity (Spearman correlations between the GDS-15 and measures of depression, life satisfaction, suicidal ideation, and suicide attempts), and internal consistency reliability (Cronbach alpha).

RESULTS

Patient Characteristics

The mean age of the study sample was almost 80 (Table 1), and 26% of the patients were aged 85 and older. Seventy-five percent were female, 3% were minorities, and 30% had not graduated from high school. Thirty-four percent had an annual household income of less than $10,000. Fifty-one percent of the patients were widowed, 46% lived alone, and many reported having few close friends or relatives. Fifty-five percent of the study sample rated their health as fair or poor. The mean SF-36 physical component summary score was low—30.4. Because of the demonstration project's eligibility criteria, the sample exhibited high functional impairment, indicating dependence in an average of 1.84 ADLs and 2.83 IADLs.

Study Measures

GDS-15 scores ranged from 0 to 14, with a mean ± SD of 4.34 ± 2.98. Using conventional GDS-15 cutpoints, 28% were mildly to moderately depressed (a score of 6–10), and 4% were severely depressed (a score of 11–15). Nearly 13% met DSM-IV criteria for a major depressive episode according to MINI-MDE scores. A total of 5.4% reported suicidal ideation in the last year, 0.4% a suicide attempt in the last year, and 3.3% a lifetime suicide attempt. Nearly 40% reported fair or poor life satisfaction.

Exploratory Factor Analysis

The initial principle components analysis of the GDS-15 revealed five factors with eigenvalues of 1 or greater (Kaiser-Meyer-Olkin measure of sampling adequacy = 0.83), accounting for 54.0% of the variance of GDS-15 scores. The first factor accounted for 23.7% of the variance. Scree test findings similarly indicated a strong first factor for the GDS-15, and possible two-, three-, four-, or five-factor solutions, each of which was explored. It was found that a two-factor solution seemed most clinically and theoretically reasonable, accounting for 33% of the total variance, comprising depression (e.g., worthlessness, hopelessness, and boredom items) and positive affect (e.g., happiness, good spirits, and life satisfaction items) factors (Table 2). Two items (emptiness and fear of negative future events) that had nearly equivalent loadings on both factors were included in both factors. Forcing a third factor again yielded factors for depression and positive affects as well as a three-item factor reflecting a restriction of novelty seeking, memory complaints, and anergia. These items were not included in a separate factor because they did not appear to be theoretically or clinically coherent. Factorial solutions were functionally identical whether using orthogonal or oblique rotations. When tetrachoric correlations were computed in place of standard Pearson correlation coefficients, the anergia item loaded more highly on positive affect than on depression.

Internal Consistency Reliability

Evidence of moderate although acceptable internal consistency reliability was found for the GDS-15. Cronbach alpha coefficient for the total scale was 0.749, and alpha coefficients with item deleted ranged from 0.720 to 0.755. Corrected item-total correlations were variable, ranging from 0.147 to 0.501, with an average corrected item-total correlation of 0.351. Item-level analyses indicated that GDS-15 items assessing feelings of emptiness (correlation coefficient (r) = 0.501) and worthlessness (r = 0.498) were more highly correlated with total scores than were those assessing problems with memory (r = 0.147) and energy (r = 0.221).

Validity

Statistically significant Spearman correlations between GDS-15 total score and presence of major depression as indicated by the MINI-MDE and items assessing depressed mood (feeling depressed or sad, downhearted and blue, and down in the dumps) (Table 3) demonstrated construct validity. GDS-15 total score was also significantly associated with life satisfaction and suicidal ideation but was not associated with suicide attempt status over the previous year or lifetime.

ROC analyses support the criterion validity of the GDS-15 in successfully differentiating between depressed and nondepressed patients (area under the curve = 0.858, standard error = 0.018, 95% confidence interval = 0.823–0.892). A cutscore of 6 is conventionally used for differentiating depressed from nondepressed older adults. In this sample, this cutscore maximized the sensitivity (81.45%) and specificity (75.36%) in differentiating between these patient groups. A previous study[4] recommended using a cutscore of 5 for identifying patients with major depression. Employing a cutscore of 5 improved the sensitivity of the GDS-15 to 89.5% but reduced the specificity to 65.3%. Increasing the cutscore to 7 decreased the sensitivity to 70.2% and increased the specificity to 84.2%.

Table 1. Patient Characteristics (N = 960)

Characteristic	Value
Sociodemographic, n (%)	
Age, mean ± SD (range 65–100)	79.3 ± 7.4
65–74, n (%)	268 (27.9)
75–84, n (%)	441 (45.9)
≥85, n (%)	251 (26.2)
Sex, n (%)	
Male	244 (25.4)
Female	716 (74.6)
Ethnicity, n (%)	
Nonwhite	29 (3.0)
White	931 (97.0)
Education, n (%)	
High school graduate or less	668 (69.6)
Some college and more	292 (30.4)
Annual household income, n (%)	
<$10,000	325 (33.9)
$10,000–19,999	362 (37.7)
≥$20,000	273 (28.4)
Site, n (%)	
New York	660 (68.8)
West Virginia and Ohio	300 (31.3)
Rural/urban, n (%)	
Rural	278 (29.0)
Urban	682 (71.0)
Social support, n (%)	
Marital status	
Married	371 (38.7)
Divorced or separated	67 (7.0)
Widowed	486 (50.6)
Never married	36 (3.8)
Living arrangement	
Alone	443 (46.2)
With spouse	310 (32.3)
With spouse and others	39 (4.1)
With relative	148 (15.4)
With nonrelative	20 (2.1)
Number of close friends, n (%)	
0	148 (15.4)
1	110 (11.5)
2–5	479 (50.0)
6–9	97 (10.1)
≥10	125 (13.0)
Number of close relatives, n (%)	
0	68 (7.1)
1	104 (10.8)
2–5	461 (48.1)
6–9	144 (15.0)
≥10	182 (19.0)
Health insurance, n (%)	
Medicaid	
Yes	82 (8.5)
No	878 (91.5)
Medigap	
Yes	705 (73.4)
No	255 (26.6)
Health maintenance organization	
Yes	111 (11.6)
No	849 (88.4)
Health status	
Self-rated health, n (%)	
Excellent/very good	122 (12.7)
Good	306 (31.9)
Fair	375 (39.1)
Poor	157 (16.4)
SF-36 Physical Component Summary score, mean ± SD (range 11.1–59.3)	30.4 ± 8.9
Number of chronic conditions, mean ± SD (range 0–12)	4.6 ± 2.1
Number of activities of daily living dependent in, mean ± SD (range 0–6)	1.8 ± 1.5
Number of instrumental activities of daily living dependent in, mean ± SD (range 0–6)	2.8 ± 1.6
Body mass index, n (%)	
≤18.5 (underweight)	81 (8.7)
18.6–24.9 (normal)	351 (37.9)
25.0–29.9 (overweight)	245 (26.4)
≥30.0 (obese)	250 (27.0)
Bodily pain in the previous 4 weeks, n (%)	
None/mild	339 (35.3)
Moderate	347 (36.2)
Severe/very severe	274 (28.5)
Mental health	
15-item Geriatric Depression Scale score, mean ± SD (range 0–14)	4.3 ± 3.0
0–5 (none/low), n (%)	653 (68.0)
6–10 (mild/moderate), n (%)	269 (28.0)
11–15 (severe), n (%)	38 (4.0)
Major depressive episode, n (%)	
Yes	124 (12.9)
No	836 (87.1)
Suicidal ideation, n (%)	
Yes	52 (5.4)
No	908 (94.6)
Previous year suicide attempt, n (%)	
Yes	4 (0.4)
No	956 (99.6)
Suicide attempt in lifetime, n (%)	
Yes	33 (3.4)
No	927 (96.6)
Life satisfaction, n (%)	
Excellent/very good	239 (24.9)
Good	351 (36.6)
Fair	273 (28.4)
Poor	97 (10.1)

SD = standard deviation.

Functional Impairment

Patients with less functional impairment (dependence in 0–2 ADLs; n = 645) reported significantly lower mean GDS-15 scores (3.99 ± 2.84, range 0–13.6) than those with more functional impairment (3–6 ADLs; n = 315) (5.03 ± 3.13, range 0–14) (*t* test for difference in means = −4.97; $P < .001$). Internal consistency reliability was moderate and similar for patients with less and more functional impairment (Cronbach alpha = 0.734 and 0.759,

Table 2. Factor Structure: Factor Patterns for Two Factor Solutions

Question	Oblique (Promax) Rotation	
	Depression	Positive Affect
1. Are you basically satisfied with your life?	0.058	0.666*
2. Have you dropped many of your activities and interests?	0.367*	0.148
3. Do you feel that your life is empty?	0.426*	0.354*
4. Do you often get bored?	0.478*	0.182
5. Are you in good spirits most of the time?	−0.154	0.804*
6. Are you afraid that something bad is going to happen to you?	0.299*	0.255*
7. Do you feel happy most of the time?	−0.056	0.831*
8. Do you often feel helpless?	0.615*	0.109
9. Do you prefer to stay at home, rather than going out and doing new things?	0.336*	−0.114
10. Do you feel you have more problems with memory than most?	0.437*	−0.220
11. Do you think it is wonderful to be alive now?	−0.008	0.428*
12. Do you feel pretty worthless the way you are now?	0.696*	0.043
13. Do you feel full of energy?	0.222*	0.139
14. Do you feel that your situation is hopeless?	0.525*	0.102
15. Do you think that most people are better off than you are?	0.557*	−0.113

* Items loading highly on that factor.

respectively). As was the case for the entire study sample, statistically significant Spearman correlations between GDS-15 total score and major depression, three items assessing depressed mood, and life satisfaction demonstrated construct validity for patients with less and more functional impairment (Table 3). The correlations were similar for both levels of functional impairment. Suicidal ideation had a stronger correlation between patients with less impairment ($r = 0.173$; $P < .001$) than between those with more impairment ($r = 0.107$; $P = .059$), but these correlations were not significantly different from one another ($Z = 0.98$; ns). Finally, GDS-15 score was not associated with reported suicide attempts for either group.

DISCUSSION

This is the first study, to the authors' knowledge, to examine the psychometric properties of the GDS-15 in functionally impaired, cognitively intact, community-dwelling older primary care patients in the United States. The study provides evidence for impressive psychometric properties for the GDS-15 when administered to a sample of these patients.

Table 3. Construct Validity: Spearman Correlations Between 15-Item Geriatric Depression Scale (GDS-15) and Measures of Depression, Life Satisfaction, Suicidal Ideation, and Suicide Attempts for Entire Scale, Two Factor Solutions, and Levels of Functional Impairment (the *P* values are presented as the second line for each measure)

Measure of Depression	GDS-15	Oblique (Promax) Rotation		GDS-15	
		Depression	Positive Affect	0–2 ADLs	3–6 ADLs
Major depressive episode (yes/no)	0.417	0.404	0.382	0.389	0.466
	<.001	<.001	<.001	.001	.001
In the past year, have you felt depressed or sad much of the time?	0.415	0.370	0.398	0.450	0.352
	<.001	<.001	<.001	.001	.001
Have you felt downhearted and blue?*	0.522	0.474	0.466	0.546	0.505
	<.001	<.001	<.001	.001	.001
Have you felt so down in the dumps that nothing could cheer you up?*	0.474	0.440	0.430	0.467	0.509
	<.001	<.001	<.001	.001	.001
How would you rate your satisfaction with your current life?	0.430	0.370	0.427	0.436	0.380
	<.001	<.001	<.001	.001	.001
Suicidal ideation (yes/no)	0.155	0.144	0.156	0.173	0.107
	<.001	<.001	<.001	.001	0.059
In the last year have you made an attempt on your life?	−0.001	−0.005	0.020	0.006	−0.017
	0.988	0.876	0.161	0.871	0.758
Throughout your whole life, have you ever made an attempt on your life?	0.053	0.034	0.077	0.059	0.035
	0.099	0.295	0.110	0.134	0.537

* Responses recoded in reverse order to obtain positive rather than negative correlations.
ADL = activity of daily living.

Exploratory factor analyses in this category of patients, with component subscales assessing depression and positive affect, supports a two-factor structure. Cronbach alpha coefficients provide evidence for moderate, although acceptable, internal consistency reliability. Significant associations between the GDS-15 and measures of depression, life satisfaction, and suicidal ideation demonstrated construct validity, whereas acceptable sensitivity and specificity to discriminate depressed from nondepressed patients demonstrated criterion validity. It was also found that internal consistency reliability and construct validity did not significantly differ between patients with low and high functional impairment. Finally, a significant weakness of the scale is its low correlation with suicide attempt status.

Limitations

Limitations of the study included exclusion of cognitively impaired patients, thus potentially limiting the generalizability of the study findings, but as noted, cognitively impaired older adults were excluded, given concerns that persons with cognitive impairment may not be able to appropriately complete the GDS-15.[23,24] Another limitation relates to the use of the MINI-MDE to identify the presence of major depression rather than the employment of a semistructured or structured diagnostic interview such as the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID) that results in a diagnosis of major depression. Because of concerns about potential fatigue effects and questionnaire burden associated with use of the longer SCID in a functionally impaired, socioeconomically disadvantaged sample of older adults, the MINI-MDE, a brief measure, was employed.

Factor Structure

These findings were consistent with those of the two previous factor analyses of the GDS-15. One[19] identified a similar factor structure in its study of older adults in Florida, with factors assessing "sad mood/pessimistic outlook" and "positive mood." It further described a third factor, "staying at home," and did not include a fourth factor in its model because "it contains such incongruent items as boredom, memory problem and feeling of energy." These findings were quite similar to those of the current study; indeed, had it been decided to adopt a three-factor model, the third factor would have comprised items reflecting these same themes. The authors of the previous study further noted that the item assessing emptiness, which loaded nearly equivalently on both factors in the model in the current study, loaded on the positive mood factor in theirs. Another study's[21] findings with older patients in Italy were also quite similar to those of the current study; its three-factor model assessed "positive attitude toward life," "distressing thoughts/negative judgment," and "inactivity/reduced self-esteem." It concluded that the apparent multidimensionality of the GDS-15 does not support use of global GDS scores.

Internal Consistency Reliability

The present study provides evidence of moderate, although acceptable, internal consistency reliability for the GDS-15 ($\alpha = 0.75$). This finding is generally consistent with those found in studies of older hospital patients ($\alpha = 0.72$),[20] older British rehabilitation inpatients and outpatients ($\alpha = 0.74$),[17] elderly Dutch primary care patients ($\alpha = 0.76$),[12] generally healthy older adults aged 60 to 85 in Florida ($\alpha = 0.77$),[19] and elderly British general practitioner patients ($\alpha = 0.80$)[9] and slightly lower than that in a study of veterans attending a Department of Veterans Affairs geriatric outpatient clinic ($\alpha = 0.86$).[15] Another study[21] reported unacceptable internal consistency ($\alpha = 0.46$) for the GDS-15 in older Italian medical inpatients, possibly reflecting sampling differences or problems with the scale's translation.

Construct Validity

Findings of significant associations between GDS-15 score and measures of major depression, depressed mood, low life satisfaction, and suicidal ideation attest to the measure's construct validity. The lack of significant association between the GDS-15 and patient-reported previous-year and lifetime suicide attempts is likely due to the low base rate of suicidal behavior in community-residing older adults (in this sample, 0.4% and 5.4% for the respective time periods). Because suicide attempts are patient-reported, they may also reflect a stigma among older persons—a lack of willingness to admit to the interviewer that they have attempted suicide. In addition, the absence of an association with suicide attempts offers evidence that the GDS-15 does not assess the depressive content domain associated with suicidal thoughts and behavior, a clear limitation for a depression measure. Clinicians screening for late-life depression using the GDS-15 are thus advised to employ an additional measure of late-life suicide risk.

Criterion Validity

The GDS-15 demonstrated criterion validity in the present study, significantly differentiating depressed from nondepressed patients, with evidence of acceptable sensitivity (0.814) and specificity (0.754) at a cutscore of 6. A number of published studies of the GDS-15 have reported similar sensitivity[9–11,13] and specificity[8,9,13,14,16,18] to that of this cutscore, whereas several others have reported poorer sensitivity[6–8,14,16] and specificity.[6,7,10,11] To the authors' knowledge, only one study, a study of Italian patients, reported appreciably higher sensitivity (0.92).[18] The area under the ROC curve in the current study (0.858), is at the higher end of the range of the other seven studies that calculated this (0.73–0.91).[4,7,10,12,15,17,18]

Functional Impairment

Although the patients with less functional impairment (0–2 ADLs) reported significantly lower mean GDS-15 scores than those with greater functional impairment (3–6 ADLs), internal consistency reliability was similar for both groups, as was construct validity using most measures. As was the case for the entire scale, GDS-15 score was not associated with reported suicide attempts for either group.

Clinical Relevance

Most primary care physicians will see a substantial number of functionally impaired older patients, many of whom will be suffering from depression. Depression is difficult to detect in patients with multiple chronic medical illnesses.

Thus, there is a special need for a psychometrically sound depression screening instrument. These findings provide evidence that the GDS-15 has good validity and internal consistency reliability as a brief screening measure for late-life depression in primary care patients with significant functional impairment.

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Author Contributions: Dr. Friedman conceptualized the study and was responsible for, and participated in, all of its aspects, including study concept and design, acquisition of data, analysis and interpretation of data, and preparation of the manuscript. Dr. Heisel participated in determining which psychometric analyses to use, data analysis, interpretation of the analyses, and preparation of the manuscript. Ms. Delavan performed the data analysis under the direction of Dr. Friedman and Dr. Heisel.

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