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published in

International Journal of Geriatric Psychiatry
2007

DOI (link to publisher)

[10.1002/gps.1748](https://doi.org/10.1002/gps.1748)

document version

Publisher's PDF, also known as Version of record

[Link to publication in VU Research Portal](#)

citation for published version (APA)

Jongenelis, K., Gerritsen, D. L., Pot, A. M., Beekman, A. T. F., Eisses, A. M., Kluiters, H., & Ribbe, M. W. (2007). Construction and validation of a patient- and user-friendly nursing home version of the Geriatric Depression Scale. *International Journal of Geriatric Psychiatry*, 22(9), 837-842. <https://doi.org/10.1002/gps.1748>

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Construction and validation of a patient- and user-friendly nursing home version of the Geriatric Depression Scale[†]

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SUMMARY

Objective To construct a patient- and user-friendly shortened version of the Geriatric Depression Scale (GDS) that is especially suitable for nursing home patients.

Methods The study was carried out on two different data bases including 23 Dutch nursing homes. Data on the GDS ($n = 410$), the Mini Mental State Examination ($n = 410$) and a diagnostic interview (SCAN; $n = 333$), were collected by trained clinicians. Firstly, the items of the GDS-15 were judged on their clinical applicability by three clinical experts. Subsequently, items that were identified as unsuitable were removed using the data of the Assess project ($n = 77$), and internal consistency was calculated. Secondly, with respect to criterion validity (sensitivity, specificity, area under ROC and positive and negative predictive values), the newly constructed shortened GDS was validated in the AGED data set ($n = 333$), using DSM-IV diagnosis for depression as measured by the SCAN as 'gold standard'.

Results The eight-item GDS that resulted from stage 1 showed good internal consistency in both the Assess data set ($\alpha = 0.86$) and the AGED dataset ($\alpha = 0.80$). In the AGED dataset, high sensitivity rates of 96.3% for major depression and 83.0% for minor depression were found, with a specificity rate of 71.7% at a cut-off point of 2/3.

Conclusion The GDS-8 has good psychometric properties. Given that the GDS-8 is less burdening for the patient, more comfortable to use and less time consuming, it may be a more feasible screening test for the frail nursing home population. Copyright © 2007 John Wiley & Sons, Ltd.

KEY WORDS — depression; screening; GDS; nursing homes

INTRODUCTION

Depression is a common and disabling disorder among nursing home patients. Its prevalence has been estimated at 15.5% for major depression and 25.7% for minor depression, with depressive symptoms present in an additional 43.9% (Jongenelis *et al.*, 2003). However, depression often goes unrecognized

in nursing homes (Rovner *et al.*, 1991). Because depression causes unnecessary suffering to those left untreated, the need for accurate detection of depressive symptoms in daily nursing home care is widely recognized (Rovner *et al.*, 1991; Heston *et al.*, 1992). Yesavage *et al.* (1983) introduced the Geriatric Depression Scale, a self-rating, 30 item questionnaire that was especially developed for the elderly, without focusing on physical complaints. This instrument has been found to be reliable and valid in multiple settings, including nursing homes (Yesavage *et al.*, 1983; Leshner, 1986; D'Ath *et al.*, 1994; Gerety *et al.*, 1994; McGivney *et al.*, 1994). On the other hand, it

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[†]There are no conflicts of interest to report.

has also been found less feasible for the nursing home setting (Wagenaar *et al.*, 2003). Generally, the GDS-30 is considered a lengthy, time-consuming instrument. Therefore, in several settings, shortened versions have been introduced, of which the GDS-15 and the GDS-10 have been found to be acceptable for the nursing home population. (Sheik and Yesavage, 1986; D'Ath *et al.*, 1994; Jongenelis *et al.*, 2005). Furthermore, the GDS-12R was specifically constructed for nursing and residential home populations (Sutcliffe *et al.*, 2000). However, these shortened versions all still include items that may be considered less appropriate for the frail elderly nursing home population. The often extremely compromised physical condition of these frail elderly, their dependent status and specific living situation imply that some questions are confusing or trivial. As a consequence, patients may not understand these questions, feel misunderstood or take offence, and therefore give inaccurate answers or refuse further cooperation. Moreover, Hammond (2004) found that doctors and nurses were not comfortable using the GDS, because they regard the questions as too negative and depressing for routine use and make patients feel worse. This may lead to invalid measurement and incorrect assessment of depressive symptoms in this population. The author concludes that a screening tool needs to be enthusiastically embraced by users to enable a systematic identification of depression.

The question that follows is whether a new tool needs to be developed to replace the GDS, or whether a patient- and user-friendly instrument can be constructed out of the GDS-15. The purpose of the present study was to create a short, patient and user-friendly version of the GDS by selecting questions appropriate for the frailty and specific living situation of the nursing home patient, without loss of reliability and validity of the scale.

METHODS

Sample and procedure

This study is based on data collected in the Assess project (Gerritsen *et al.*, 2004) and the Amsterdam Groningen Elderly Depression (AGED) study (Jongenelis *et al.*, 2004).

Ten nursing homes participated in the Assess project. Data were collected between September 1999 and July 2001, with an equal distribution of patients with mainly physical handicaps (from somatic wards) and mainly dementia syndromes (from psychogeriatric wards). There were no exclusion criteria with regard to conversational skills or cognitive status.

Patients with an MMSE < 15 were excluded for this paper as the GDS loses validity below this threshold (McGivney *et al.*, 1994).

Fourteen nursing homes participated in the AGED project. Data were collected on somatic wards between November 1999 and May 2001. To be eligible for participation in the study, patients had to be aged 55 years or over, able to communicate sufficiently in the Dutch language, and without severe cognitive impairment (MMSE \geq 15).

All instruments were administered face-to-face by especially trained interviewers, and informed consent of all participants was obtained prior to inclusion. Both the Assess and the AGED study received approval by the Medical Ethics Committee of the VU University Medical Centre.

Measurements

In both samples, depressive symptoms were measured with the 30-item Geriatric Depression Scale (GDS) (Yesavage *et al.*, 1983; Kok, 1994). The GDS-15, GDS-12R and GDS-10 were derived from the GDS-30. In the AGED study, diagnoses of depressive disorder according to DSM-IV criteria (American Psychiatric Association, 1994; major depression and minor depression) were made using the Schedule of Clinical Assessment in Neuropsychiatry (SCAN) (WHO, 1992; Giel and Nienhuis, 2001).

Cognitive status in both studies was assessed with the Mini Mental State Examination (Folstein *et al.*, 1975; Kempen *et al.*, 1995). Socio-demographic characteristics were obtained for all subjects using a standard questionnaire.

Data analysis

Analyses were carried out in two stages. In stage 1 the data of the Assess project were used to construct a scale, which was tested on the data of the AGED project in stage 2.

Stage 1. Firstly, the items of the GDS-15 were extracted from the GDS-30 in the Assess dataset. Subsequently, the items of the GDS-15 were rated on their clinical applicability in nursing home patients by three clinically experienced and trained interviewers, representing three disciplines: a nursing home physician (KJ), a psychologist (DG), and a registered staff nurse. All three interviewers observed recurrent disturbed reactions of the interviewed patients to several GDS-items. They individually rated the applicability of the GDS-15 items regarding the extent to which the items evoked confusion,

misunderstanding or irritation. Seven of the GDS-15 items were selected by all three of them. 'Are you afraid that something bad is going to happen to you?'; 'Do you feel full of energy?'; 'Have you dropped may of your activities and interests?'; and 'Do you prefer to stay at home, rather than going out and doing new things?' were considered confusing or even offensive towards highly disabled interviewees. Furthermore, many patients linked the latter two items to the living conditions in the home and reacted with irritation. The items: 'Do you feel you have more problems with memory than most?'; and 'Do you think that most people are better of than you are?' were considered confusing, as patients wondered whether they had to compare themselves to other residents or to people in general. The item 'Do you feel pretty worthless the way you are now?' was considered to be too negatively formulated by the interviewers.

Then, all items deemed less appropriate were removed from the GDS-15. Internal consistency (Cronbach's alpha) of the new scale was calculated.

Stage 2. Firstly, the shortened GDS version was extracted from the GDS-30 in the AGED dataset. This shortened version was tested with respect to its reliability (Cronbach's alpha) and criterion validity (sensitivity, specificity, area under ROC, positive and negative predictive values). In this second stage the SCAN was used as 'gold standard'.

RESULTS

Sample characteristics

The characteristics of both study samples are shown in Table 1.

In the Assess project, GDS data were available for 77 nursing home patients. Their average age was 76.0 (SD = 10.1; range 52–92) and 59 (77%) were women. The average score on the GDS-15 was 4.9 (SD = 3.7). The prevalence of depressive complaints measured with the GDS-15 using the cut-off 4/5 in this sample was found to be 47% ($n = 36$), and using the cut off 5/6 it was 42% ($n = 32$). The overall mean score on the MMSE was 22.4 (SD = 4.7), 64% had a score between 15 and 24.

In the AGED project, data on both the GDS and the SCAN were available for 333 nursing home patients. Their average age was 79.4 (SD = 8.3; range 55–99) and 229 (69%) of these were women. The average score on the GDS-15 was 4.3 (SD = 3.4). The prevalence of depressive complaints measured with the GDS-15 using the cut-off 4/5 was found to be 48%

Table 1. Demographic and clinical characteristics of study participants

Characteristics	Assess ($n = 77$)	AGED ($n = 333$)
Mean age (range)	76.0 (52–92)	79.4 (55–99)
Gender		
Male	18 (23%)	104 (31%)
Female	59 (77%)	229 (69%)
Marital status		
Married	12 (19%)	80 (24%)
Not married	53 (81%)	253 (76%)
Cognitive functioning		
MMSE 15–23	49 (64%)	206 (63%)
MMSE ≥ 24	28 (36%)	127 (37%)
GDS-15		
Cut off 4/5	36 (47%)	159 (48%)
Cut off 5/6	32 (42%)	119 (36%)
Major or minor depression		
Yes	— —	74 (22%)
No	— —	259 (78%)

MMSE = Mini-Mental State Examination.

($n = 159$) in this sample, and using the cut off 5/6 it was 36% ($n = 119$). The overall mean score on the MMSE was 22.0 (SD 3.8) and 63% of the patients scored between 15 and 24. A clinically relevant depression was found in 22% ($n = 74$).

Scale shortening: data of the Assess Project

Removing the identified inappropriate items resulted in an eight-item scale with an internal consistency of 0.86 in the Assess project. Internal consistencies of the GDS-15, the GDS-12R and the GDS-10 were 0.83, 0.85 and 0.76, respectively. See Figure 1 for an overview of the items that are applied in the various short forms.

Scale validation: data of the AGED Study

Internal consistency of the GDS-30, GDS-15, GDS-12R, GDS-10, the newly constructed GDS-8, and the performances of these scales against the SCAN are presented in Table 2. Cronbach's alpha coefficient of the GDS-8 was 0.80 in the AGED population. This is high, taking into account the number of items, and compared to the coefficients found for the GDS-12R (0.80), the GDS-15 (0.79) and the GDS-10 (0.72).

Sensitivity of the new GDS-8 was found to be 96.3% for Major Depressive Disorder (MDD) and 83.0% for Minor depressive Disorder (MinD) at a cut-off point of 2/3, with a specificity of 71.7%. In comparison, the GDS-15 showed an equal sensitivity rate for MDD at a cut-off point of 4/5, 96.3%, and a

GDS items	GDS	GDS	GDS	GDS
	15	12R	10	8
1. Are you basically satisfied with your life?	+	+	+	+
2. Have you dropped many of your activities and interests?	+	+	+	
3. Do you feel that your life is empty?	+	+	+	+
4. Do you often get bored?	+	+		+
5. Are you in good spirits most of the time?	+	+		+
6. Are you afraid that something bad is going to happen to you?	+	+	+	
7. Do you feel happy most of the time?	+	+	+	+
8. Do you often feel helpless?	+	+	+	+
9. Do you prefer to stay at home, rather than going out and doing new things?	+			
10. Do you feel you have more problems with memory than most?	+		+	
11. Do you think it is wonderful to be alive now?	+	+		+
12. Do you feel pretty worthless the way you are now?	+	+		
13. Do you feel full of energy?	+	+	+	
14. Do you feel that your situation is hopeless?	+	+	+	+
15. Do you think that most people are better of than you are?	+		+	

Figure 1. GDS-items of the GDS-15 (Sheik *et al.*, 1986); GDS-12R (Sutcliffe *et al.*, 2000); GDS-10 (D'Ath *et al.*, 1994); and the GDS-8

lower sensitivity rate for MinD (80.9%). Moreover, specificity was found to be lower for the GDS-15; 63.3%.

DISCUSSION

Although the GDS-30 was designed for older people, some of its items are not appropriate for elderly nursing home patients, as was noticed years ago by Snowdon and Donnelly (1986). Since its introduction, several shortened versions of the GDS-30 have been constructed. The GDS-15 for example, was constructed for physically ill and dementia patients, in order to improve its reliability and validity. However, the 15 items were selected by calculating correlations with depression without regard for their suitability for

nursing home patients. Therefore, in the present study, a shortened version of the GDS was constructed out of the GDS-15, by excluding questions deemed inappropriate for nursing home patients. Sutcliffe *et al.* (2000) constructed the GDS-12R for both nursing and residential homes. By excluding three items that they considered less suitable for this population from the GDS-15, the scale was validated against the one item Yale Depression Screen ('Do you often feel sad or depressed?'). In the present study, these three items were also considered unsuitable (items 9, 10 and 15 of Figure 1). Additionally, in this study four other items were regarded inapt for nursing home patients (items 2, 6, 12 and 13 of Figure 1). Internal consistency analyses showed that, given the equal alpha of the GDS 12R and the new GDS-8, indeed, they did not

Table 2. Effectiveness of the Shortened Geriatric Depression Scale (GDS) versions Compared with the Clinical Diagnosis of Depression

GDS	Reliability	Cut-off	Sensitivity	Sensitivity	Specificity	ROC	ROC	PPV	PPV	NPV
			MDD %	MinD %	MDD/MinD %	MDD	MinD	MDD %	MinD %	MDD/MinD %
GDS-30	0.88	10/11	96.3	85.1	69.1	0.91	.79	17.8	27.4	95.7
		13/14	96.3	70.2	83.4			25.5	32.4	93.5
GDS-15	0.79	4/5	96.3	80.9	63.3	0.90	.76	16.4	23.9	94.3
		5/6	96.3	63.8	75.7			21.8	25.2	91.6
GDS-12R	0.80	3/4	96.3	78.7	65.3	0.90	.77	17.0	24.2	93.9
		4/5	96.3	68.1	74.1			20.8	25.6	92.3
GDS-10	0.72	2/3	96.3	91.5	52.5	0.89	.77	13.5	22.4	96.5
		3/4	96.3	78.7	69.5			18.3	26.1	94.5
GDS-8	0.80	2/3	96.3	83.0	71.7	0.89	.75	18.7	28.1	95.4

MDD = Major depression; MinD = Minor depression; NPV = Negative predictive value; PPV = Positive predictive value; ROC = Receiver Operating Characteristic curve.

contribute significantly to the scale. Removing these seven items from the GDS-15 not only improved the feasibility of scale administration, but also its psychometric properties. The new 8-item GDS version showed similar internal consistency and even better sensitivity and specificity estimates than the original GDS-15.

The strength of the present study is the use of two datasets, which provided validation of the newly constructed scale in a large nursing home sample wherein a diagnostic instrument was available to be used as a 'gold standard'. A limitation is that, because the administration of the shortened versions of the GDS was embedded in the GDS-30, we cannot be sure that the results would be similar if the shortened versions were administered separately. Therefore, a validation study of the GDS-8 should be carried out in the future. In such a study it would be useful to ask the respondents which items they consider to be inappropriate. Moreover, it would be interesting to examine the applicability of the GDS-8 in patients with MMSE scores below 15 and to compare the GDS-8 with an observational measurement instrument for depression. Yet, this will not be easy, since it is difficult to define a gold standard for this group.

In perspective of the great importance to recognize depressive symptoms adequately and the need to diminish administration problems, important gains of the GDS-8 are that it has high ease of assessment, takes limited time to complete and does not contain items that lead to confusion or misunderstanding. Consequently, the GDS-8 might be used more frequently to screen for depression, which is an important first step in providing care that is specifically tailored to meet the needs of the depressed nursing home patient.

ACKNOWLEDGEMENTS

This study was primarily financed by the Netherlands Organization for Scientific Research (NWO grant 94033041). An additional grant from Lundbeck B.V. is gratefully acknowledged.

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