Validation of geriatric depression scale in a general outpatient clinic

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Abstract

Objective
The Geriatric Depression Scale for screening depressive symptoms in the elderly has not been assessed in elderly outpatients who seek primary health care in Brazil. The objective was to determine the validity of the Short Scale for Major Depressive Episode or Dysthymia (GDS-15) in elderly outpatients.

Methods
The scale was applied in 302 subjects with 65 years and older and then examined by an independent geriatrician, blinded to the results. Major depression and dysthymia were diagnosed using the Diagnostic and Statistical Manual of Mental Disorders-IV criteria. Sensitivity and specificity were calculated at several cutoff values and a Receiver Operator Characteristic curve was plotted.

Results
The best equilibrium was at the cutoff value of 5/6 showing 81% sensitivity and 71% specificity; the area under the Receiver Operator Characteristic curve was 0.85 (95% CI: 0.79-0.91).

Conclusions
The GDS-15 can be used for screening depressive symptoms in Brazilian elderly outpatients. The previously suggested cutoff value of 5/6 is adequate.

INTRODUCTION

Mood disorders are of one the most common psychiatric conditions seen in the elderly, causing loss of autonomy and worsening of preexisting conditions. Depression is the most frequently seen condition and is associated with higher risk of morbidity and mortality, increased utilization of healthcare services, self-care neglect, reduced compliance to treatment plans and higher risk of suicide.[8]

Comorbidities and multiple medication use are often seen among the elderly population making it more complicated diagnosing as well as treating mood disorders.

In Brazil, Veras[16] investigated the depression prevalence in the city of Rio de Janeiro in a population stratified in three strata according to their socioeconomic condition. Depression prevalences ranged according to socioeconomic group, from 20.9% in upper socioeconomic areas to 36.8% in lower socioeconomic areas. The significant variations found in different neighborhoods of the same city were attributed to socioeconomic disparities of the population studied.

Given the impact of mood disorders and the difficulties in diagnosing them, systematically evaluating those elderly who experience sadness and/or anhedonia can help improve identifying such conditions. Several scales for evaluating depressive symp-

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toms have been developed and many of them have been applied for screening such symptoms in the general population.

The Geriatric Depression Scale (GDS) is one of the most commonly used instruments to screen depression in the elderly. Several studies have showed the GDS to provide valid reliable measures.[1,2,13] First developed in English by Yesavage et al.[17] (1983), the original GDS comprise 30 items and has been especially created for screening mood disorders in the elderly using a questionnaire that leave out somatic complaints. Its advantages include easily understandable questions with little room for different answers that can be self-administered or administered by a trained interviewer.

The 15-item GDS (GDS-15) is a short version of the original GDS, developed by Sheikh & Yesavage[15] (1986) from items more strongly correlated to the detection of depression. Altogether, GDS items have showed good diagnostic accuracy as well as adequate sensitivity, specificity and reliability. This GDS short version is quite an attractive instrument for screening mood disorders in outpatients in general as well as other non-specialized settings since its application is shorter.

Some studies on GDS-15 validity evidenced slight differences concerning the most adequate cutoff value. Cwikel & Ritchie[5] study (1989) in Jerusalem obtained 72% sensitivity and 57% specificity for a cutoff value of 5/6. Lyness et al.[11] (1997) applied the GDS-15 in elderly seen in three general outpatient clinics in New York, US, and a cutoff value of 5/6 showed 92% sensitivity and 81% specificity. When a cutoff value of 6/7 was set, Fountoulakis et al[7] (1999) found 92.2% sensitivity, 95.2% specificity and 0.94 internal consistency using Cronbach's alpha coefficient. While studying Chinese elderly, Lim et al[9] (2000) reported the cutoff value of 4/5 as the most adequate, which is lower than the cutoff value of 5/6 recommended by the GDS' authors, and obtained 84% sensitivity and 85.7% specificity.

In Brazil, Almeida & Almeida[1] (1999) applied the GDS-15 to 64 elderly in a psychiatric outpatient clinic following the diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)[4] for major depression or dysthymia. At a cutoff value of 5/6, 85.4% sensitivity and 73.9% specificity was obtained whereas at a cutoff value of 6/7, 84.8% sensitivity and 67.7% specificity was obtained. The authors showed the GDS-15 to be a valid reliable instrument in a specialized outpatient clinic but, as the scale's performance remained unknown in non-specialized settings, they suggested this same study to be reproduced in general outpatient clinics.[1,2]

The purpose of the present study was to determine the concurrent validity of the Portuguese version of GDS-15 among elderly seeking care in a general outpatient clinic, following to the DSM-IV criteria for diagnosing major depression or dysthymia.

METHODS

A cross-sectional validation study was carried out in a public outpatient clinic in the city of Rio de Janeiro, Brazil. The study sample comprised a convenient sample drawn from the source population according to the study group's daily capacity of meeting the demand in the period between April 8 and June 15, 2002. The source population comprised subjects aged 65 years or more who sought care at an internal medicine outpatient clinic of a multispecialty center. This health unit serves people spontaneously seeking primary care in several specialties. The elderly who approached the clinic's reception desk were invited to participate in the study. Those who agreed signed a free informed consent and then were referred for medical evaluation.

The inclusion criteria included being 65 years old or more, agree to sign a free informed consent form and not having any hearing impairment that would make it difficult to understand the questionnaire. Those who had mild hearing impairments or wore well-adjusted hearing aids were invited to participate in the study as well. Exclusion criteria included reporting —personally or through others— having any uncorrected hearing impairments or cognitive disorders and/or mental diseases at advances stages that would prevent subjects from understanding the questionnaire. Those who met the exclusion criteria, but were not identified as such when the sample was drawn, were excluded after their conditions were identified during the medical evaluation. A total of 302 subjects were studied.

The evaluation instrument used in the study was the GDS-15, Brazilian Portuguese version, proposed by Almeida & Almeida[1,2] (1999), which was translated into Portuguese from the original in English and then back translated into English by an independent translator. The English back translation was then compared to the original scale.

Data collection was carried out in two steps. The first step was completed by two trained study assistants, a

social worker and an occupational therapist with expertise in test administration to the elderly. The GDS-15 was administered in person; if any question was not understood, the interviewer would repeat it more slowly but without interpreting words. If a subject would give a negative answer or would not know how to answer a question, this same question would be repeated three times; if even so no answer was given, the interviewer would then move to the next question.

The second step consisted of a medical evaluation conducted by two other study assistants (geriatricians), blinded to the outcome of the first step. All subjects underwent both evaluations sequentially at the same day, i.e., after the GDS-15 administration, they were referred to a medical evaluation. If a subject had come with an escort, before starting the GDS-15 administration, the interviewer would ask him/her to leave the room and then return to escort the subject to the medical evaluation. This was intended to prevent any interference from the escort and/or any potential changes in the subjects' answers resulting from the presence of a relative or friend.

The age recorded was that recorded in the subjects' identification cards, though some reported being born at a different date than that recorded in their papers. Schooling was assessed through years of formal education.

The reference test used for assessing GDS-15 concurrent validity was the medical evaluation conducted by geriatricians, who had two years of training in internal medicine and at least two years of training in geriatrics. These geriatricians were trained to detect the most common mental disorders in the elderly, i.e., major depression and dysthymia.

During the medical evaluation, the geriatrician first assessed the main complaint and then actively searched for characteristic symptoms of mood disorders guided by the Portuguese version* of the Structured Clinical Interview for DSM-IV (SCID-I),[6] an structured instrument for diagnosing DSM-IV Axis I disorders.

The geriatrician conducted structured interviews using objective questions to assess the occurrence of depressed mood, anhedonia, short attention span, sleep and eating disorders, mental slowing, restlessness, feelings of uselessness and suicidal thoughts.

Every complaint was assessed in-depth to identify and determine whether there was or not major depression or dysthymia.

Table 1 - Sociodemographic characteristics of patients in the general outpatient clinic (n=302). Rio de Janeiro, Brazil, 2002.

	Frequency	%
Gender		
Male	57	28.6
Female	160	71.4
Age		
65-69	71	32.7
70-74	67	30.8
75-79	51	23.6
>80	28	12.9
Schooling (years of formal education)		
None	58	26.6
1-4	101	45.5
5-8	50	23.2
>9	8	3.2
Marital status		
Married/Partner	82	35.4
Separated	26	11.8
Widowed	94	39.7
Single	15	8.0

Table 2 - GDS-15 sensitivity and specificity at different cutoff values. Rio de Janeiro, Brazil, 2002.

Cutoff values	Sensitivity (%)	Specificity (%)
(4/5)	86.5	63.3
(5/6)	81.1	71.1
(6/7)	73.0	78.3

To assess the GDS-15 measure characteristics, the scale's sensitivity, specificity and discrimination capacity were determined using the Receiver Operator Characteristic Curve[12] (ROC). The Chi-square test was used for comparing frequencies.

A trained specialist entered the collected data and they were analyzed using the Stata software, version 7.0.

The study was approved by the Research Ethics Review Board of the Hospital Universitário Pedro Ernesto of the Universidade do Estado do Rio de Janeiro. All subjects signed a free informed consent form.

RESULTS

Of 302 subjects studied, 71.4% were women. Their age ranged between 65 and 94 years, mean 73.1 years (SD ±8.2). Of them, 26.6% had never attended school, 72% had studied up to four years, and 3.2% had more than nine years of schooling. Concerning marital status, 35.4% were married or had stable partners and nearly 60% did not have a partner (Table 1).

Only one subject refused to answer one of the GDS-15 questions and therefore was excluded from the study; however, this same subject went through the medical evaluation and was referred accordingly.

A total of 51 cases (16.9%) were diagnosed in the

*Del Ben CM, Zuardi AW, Vilela JAA, Crippa JAS. Entrevista estruturada para o diagnóstico de transtornos do eixo I do DSM-IV (SCID-I/Versão Clínica). Tradução e adaptação. Departamento de Neurologia, Psiquiatria e Psicologia Médica do Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto. Universidade de São Paulo; 1998.

sample, 16 cases of major depression (5.3%) and 35 cases of dysthymia (11.6%).

In regard to mood disorders, no significant statistical difference was found between cases and non-cases as for gender (χ^2=3.53; p=0.06), schooling (χ^2=6.93; p=0.07), age group (χ^2=4.41; p=0.22) and being employed or not (χ^2=3.53; p=0.43). However, there was significant difference between married and widowed or separated subjects (χ^2 =6.55; p =0.01).

For all mood disorder cases, the cutoff values of 4/5, 5/6 and 6/7 showed 86%, 81% and 73% sensitivity, respectively, and 63%, 71% and 78% specificity, respectively (Table 2). At a cutoff value of 5/6, the area under the ROC curve was 0.85 (95% CI: 0.79–0.91).

DISCUSSION

The GDS-15 is an instrument for screening depressive symptoms in the elderly, mostly in specialized centers. It can also be a valuable instrument in non-specialized settings for screening elderly who potentially have these disorders. In non-specialized, the human resources required are not easily available since internal medicine practitioners have still no proper training to detect these conditions.

Being familiar with the GDS-15 and knowing its most adequate cutoff value can be helpful in managing scarce human and material resources available in public healthcare services providing care to the elderly. Having that in mind, within a hierarchical healthcare system, a good strategy would be to favor the GDS-15 sensitivity, which would allow most affected subjects to advance to more specialized and complex levels of attention, which are not widely delivered.[10]

While an optimal balance between sensitivity and specificity was achieved in the present study at a cutoff value of 6/7, a cutoff of 5/6 was recommended as the most adequate, favoring sensitivity over a slightly lower specificity.

The study population had similar characteristics to that of other Brazilian studies that showed a higher proportion of low schooling elderly women who were either married or widowed.[3,14] No sociodemographic difference was found between cases and non-cases, except for the variable marital status, which was significantly different between those who lived with a partner and those who lived alone (widowed or separated). It can be assumed that "lonely people" might have more depressive complaints and that they might be associated to their loneliness. Nevertheless, the cross-sectional study design did not allow to testing this assumption.

The different sensitivity and specificity found for different GDS-15 cutoff values[1,5,7,9,11] suggest they are variable according to the population studied and the reference test used. Of the studies mentioned above, three of them recommended a cutoff value of 5/6 as the most adequate.[1,5,11] Despite this variability, a relative concordance is seen for both the "area" where the cutoff value lies and the instrument validity and effectiveness in several different working settings.

The instrument had good acceptance among users and the methodology applied in this study was uncomplicated, efficient and low-cost, which allows it to be reproduced in other working settings, such as hospitals, households, family health programs and long-term elderly homes. The lack of previous studies assessing the GDS-15 among non-psychiatric elderly outpatients in Brazil makes the present study a valuable reference for elderly healthcare services.

One of the limitations of the study was its design since a longitudinal design would be more appropriate for establishing psychiatric diagnoses. Given that, misidentification of cases could have occurred. Also, as inter-evaluator reliability concerning depression and/or dysthymia diagnoses was not provided in the study, it was not possible to know the level of concordance between evaluators after adopting the diagnostic standardization procedures mentioned before.

The study results showed GDS-15 to be a valid instrument for screening mood disorders in medical settings and detect such conditions among elderly outpatients in Brazil. The cutoff value of 5/6 —first recommended by those authors who translated the GDS-15 into Portuguese and then corroborated by other studies— also proved to be adequate. Given the high prevalence of mood disorders, its diagnostic challenges and low clinical detection, if properly used, the GDS-15 can become a valuable public health instrument for detecting and managing such conditions in non-specialized settings.

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REFERENCES

1. Almeida OP, Almeida SA. Short versions of the geriatric depression scale: a study of their validity for the diagnosis of a major depressive episode according to ICD-10 and DSM-IV. *Int J Geriatr Psychiatry* 1999;14(10):858-65.

2. Almeida OP, Almeida SA. Confiabilidade da versão brasileira da escala de depressão em geriatria (GDS) versão reduzida. *Arq Neuropsiquiatr* 1999;57(2B):421-6.

3. Almeida OP, Garrido R, Tamai S. Unidade para idosos (UNID) do departamento de saúde mental da Santa Casa de São Paulo: características clínicas de idosos ambulatoriais. *J Bras Psiquiatr* 1998;47(6):291-6.

4. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th ed. Washington (DC); 1994.

5. Cwikel J, Ritchie K. Screening for depression among the elderly in Israel: an assessment of the short geriatric depression scale (S-GDS). *Isr J Med Sci* 1989;25(3):131-7.

6. First MB, Spitzer RL, Gibbon M, Williams JBW. Structured clinical Interview for DSM-IV, clinical version. New York: American Psychiatric Press; 1994.

7. Fountoulakis KN, Tsolaki M, Iacovides A, Yesavage J, O'Hara R, Kazis A, et al. The validation of the short form of the geriatric depression scale (GDS) in Greece. *Aging* (Milano) 1999;11(6):367-72.

8. Katona C, Livingston G, Manela M, Leek C, Mullan E, Orrell M, et al. The symptomatology of depression in the elderly. *Int Clin Psychopharmacol* 1997;12 Suppl 7:S19-23.

9. Lim PP, Ng LL, Chiam PC, Ong PS, Ngui FT, Sahadevan S. Validation and comparison of three brief depression scales in an elderly chinese population. *Int J Geriatr Psychiatry* 2000;15(9):824-30.

10. Lourenço RA, Martins CSF, Sanches MAS, Veras RP. Assistência ambulatorial geriátrica: hierarquização da demanda. *Rev Saúde Pública* 2005;39(2):311-8.

11. Lyness JM, Noel TK, Cox C, King DA, Conwell Y, Caine ED. Screening for depression in elderly primary care patients: a comparison of the center for epidemiologic studies depression scale and the geriatric depression scale. *Arch Intern Med* 1997;157(4):449-54.

12. Metz CE. Basic principles of ROC analysis. *Semin Nucl Med* 1978;8(4):283-98.

13. Montorio I, Izal M. The geriatric depression scale: a review of its development and utility. *Int Psychogeriatr* 1996;8(1):103-12.

14. Ramos LR, Toniolo Neto J, Cendoroglo MS, Garcia JT, Najas MS, Perracini M, et al. Two-year follow-up study of elderly residents in S. Paulo, Brazil: methodology and preliminary results. *Rev Saúde Pública* 1998;32(5):397-407.

15. Sheikh JI, Yesavage JA. Geriatric depression scale (GDS): recent evidence and development of a shorter version. *Clin Gerontol* 1986;5:165-73.

16. Veras RP, Coutinho ESF. Estudo de prevalência de depressão e síndrome cerebral orgânica na população de idosos, Brasil. *Rev Saúde Pública* 1991;25(3):209-17.

17. Yesavage JA, Brink TL, Rose TL, Lum O, Huang V, Adey M, et al. Development and validation of a geriatric depression screening scale: a preliminary report. *J Psychiat Res* 1983;17(1):37-49.