RESEARCH ARTICLE

VALIDATION OF GUJARATI VERSION OF 15-ITEM GERIATRIC DEPRESSION SCALE IN ELDERLY MEDICAL OUTPATIENTS OF GENERAL HOSPITAL IN GUJARAT

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ABSTRACT
Background: Depressive disorders are a public health problem in developing countries. Access to valid and reliable screening tool is needed to identify geriatric depression.
Aims & Objectives: To validate Gujarati version of geriatric depression scale -15 (GDS-15) as a screening instrument to identify geriatric Depression in elderly medical patients.
Materials and Methods: This is a hospital based cross -sectional study. 200 Gujarati elderly patients (>65 years) attending the medical out patients department, unaware about their mental health status, were selected and Gujarati GDS-15 was administered. Then all patients were interviewed by a psychiatrist (blind to their GDS-15 scores). DSM-IV diagnostic criteria for major depression were used. Various thresholds of the GDS-15 were compared against the standards of the DSM-IV. A Receiver operator characteristic curve was drawn to obtain the best threshold value. Internal reliability of GDS-15 was assessed using Cronbach's alpha reliability coefficients.
Results: 33.5% (67/200) elderly patients satisfied DSM-IV diagnostic criteria for Major Depression. The optimal threshold for the GDS-15 was 7.5 with a sensitivity of 86.6% and a specificity of 73.3%. The area under the curve was 0.877. Cronbach's alpha of the total scores was 0.806.
Conclusion: The Gujarati GDS-15 has good properties as screening instruments for major depression in Gujarati elderly medical patients, as presented in our findings.
Key Words: Geriatric Depression Scale-15 (GDS-15); Elderly; Validation; Depression

Introduction

The world population is growing old today, and about two third of all older people are living in developing countries.[1] India has around 100 million (about 8.26 % of total population) elderly at present, and the number is expected to increase to 323 million, constituting 20% of the total population, by 2050.[2] The median prevalence rate of depression among the elderly Indian population was determined to be 21.9% (IQR: 11.6%–31.1%). Although there was a significant decrease in the trend of world prevalence of geriatric depression, it was significantly higher among Indians, in recent years, than the rest of the world.[3] Despite depression being a common psychiatric disorder, depressive disorders are inadequately diagnosed in the elderly population with co morbid medical problems.[4]

Geriatric medical outpatients need to be screened with a short, feasible and easily administered instrument leading to effective diagnosis and management. This would definitely improve mental outcomes of distressed elderly.[5] Among different instruments used for screening depression in old people, Geriatric Depression Scale (GDS) developed by Yesavage and Brink (1983) is used extensively.[6] In this study, we used GDS-15,[7] which seems to be a relevant and easy self-report for assessment of depression in elderly.[8] Sensitivity and specificity of the GDS-15 are well within acceptable ranges, and accuracy is not influenced by severity of medical burden, age or other socio-demographic characteristics, even in medically ill patient population. It is more easily used by physically ill, and mildly to moderately demented patients, who have short attention span, and/or feel easily fatigued. It takes about 5-7 minutes to complete. It is useful for detection of depression across culture specific population.[9] GDS-15 has been translated in many foreign languages and validated in Brazil[10], China[11], UK[12], Netherlands[13] and Iran[14]. GDS-30 and GDS-15 has been translated and validated in Hindi version.[5,15] In all cultures, spoken language plays an important role for expressing their symptoms, which may influence the screening and diagnosis. Research is needed not only to confirm psychometric properties of the GDS when used in other languages, but also to initiate cross cultural studies.[8] India has 22 languages, which have been given grade of national languages, including Gujarati.[16] So, present study was undertaken in geriatric medical outpatients of our institute, for validation of GDS-15 Gujarati version.

Materials and Methods

Participants

The study was conducted at geriatric clinic in Out Patient Department (O.P.D.) of Medicine, GMERS, Gotri General Hospital, Vadodara for period of 6 months. Total 200 Gujarati speaking elderly medical patients (above 65 years of age) attending the clinic were consecutively included in the study. Those Participants who could not finish the interview due to severe physical disabilities, who could not communicate adequately due to language barrier (non-Gujarati), speech disorder and deafness, and whose score with Mini Mental Status Examination (MMSE) was below 18 – were excluded from the study.

Procedure

The elderly Guajarati patients who approached at geriatric clinic in medicine O.P.D, were invited to participate in the study. Those who agreed, were sent to the person associated with the study. After a brief introductory phase, the written informed consent of patients / close relative was obtained in Gujarati. GDS-Gujarati version was administered to each participant by a person associated with study. After that, each participant was assessed by psychiatrist, using format including socio-demographic data, history, mental status examination and DSM-IV diagnostic criteria for evaluation of major depression. Mini mental status examination was also done to assess cognitive impairment. The evaluating psychiatrist was blind to GDS results.

Instrument

Geriatric Depression Scale (GDS) – 15: Geriatric depression scale (GDS) is reliable and valid self-rating depression screening scale which was developed by Yesavage and Blink in 1983 consisting of 30 items.[6] To simplify this screening device, Sheikh and Yesavage, in 1986, developed a GDS-Short form, which includes 15 items extracted from original GDS.[7] This short form is more easily used by physically ill and mildly to moderately demented patients who have short attention span, and/or feel easily fatigued. It takes about 5-7 min to complete. GDS was found to have a 92% sensitivity and a 82% specificity when evaluated against diagnostic criteria.[7] Its validity was confirmed by other studies in china, UK, and Malay with a range of 0.7-0.9,[17-19] Test – retest reliability (range: 0.7-0.84) and split-half reliability (0.82) were acceptable. Most of the studies found the GDS-15 more acceptable in primary care, and preferable as a waiting room screen. Depression scales are used commonly in western countries, and in a few developing countries: for e.g. India, Korea etc. In India, validation of GDS in Hindi version was done by Ganguli M.[15] There is no study validating GDS in Guajarati Population till now. So we aim to validate GDS-Short form in our population.

Translation: The translation of GDS-15 into Gujarati was followed by a back translation into English by different researchers associated with study. This procedure was done twice. Then it was applied to sample of 25 elderly patients to find out any difficulty in reading and understanding. After that, it was used in our study.

DSM-IV-TR Diagnostic criteria was used for Major Depressive Disorder.[20]

Mini Mental Status Examination (MMSE-30): Cognitive impairment was assessed using the MMSE[21], an instrument shown to have consistency and reliability in detecting cognitive functioning in an elderly population.[22] Single cut off of less than 24 indicated cognitive impairment. For severity of cognitive impairment, 24-30 indicates no impairment, 18-23 mild impairment, and below 18 severe impairment. So Patients who scored less than 18 on MMSE were excluded from the analysis.[23] The study received an approval from the Institutional Human Ethics Committee, GMERS, Medical College, Gotri, Vadodara.

Results

Total 200 geriatric patients were studied for their depression status during their geriatric clinic visits. Out of 200, 67 patients (33.5%) were found to be suffering from depressive episode currently according to DSM-IV - TR criteria.

Socio-demographic distribution of study population is shown in Table 1. It shows majority of patients in both groups (depressed and non-depressed) were between 65 to 70 years of age (74.5%), male (60%), and married (61%), or widow (38%). In both groups, majority of patients were Hindu (93.5%), unemployed (61.5%), having income less than 5000/month (98%) and coming from nuclear family (86.4). Significantly higher proportion of depressed patients were from 65- 70 years of age as compared to non-depressed patients (p=0.01) and significantly higher proportion of depressed patients were illiterate as compared to non-depressed patients (p=0.03).

Table-1: Socio-demographic profile of the geriatric patients attending Medicine Department

Variables		Depressed N=67 N (%)	Non-Depressed N=133 N (%)	Total N=200 N (%)	χ^2 (p value)
Age	65-70	58 (86.6)	91 (68.4)	149 (74.5)	11.19 (0.01)*
	71-75	5 (7.5)	31 (23.3)	36 (18)	
	76-80	2 (3)	10 (7.5)	12 (6)	
	>80	2 (3)	1 (0.8)	3 (1.5)	
Sex	Male	37 (55.2)	83 (62.4)	120 (60)	0.95 (0.16)
	Female	30 (44.8)	50 (37.6)	80 (40)	
Marital status	Unmarried	0 (0)	1 (0.8)	1 (0.5)	4.80 (0.18)
	Married	35 (52.2)	87 (65.4)	122 (61)	
	Widow	32 (47.8)	44 (33.1)	76 (38)	
	Divorced/ separated	0 (0)	1 (0.8)	1 (0.5)	
Religion	Hindu	62 (92.5)	125 (94)	187 (93.5)	1.99 (0.36)
	Muslim	4 (6)	8 (6)	12 (6)	
	Others	1 (1.5)	0 (0)	1 (0.5)	
Types of Family	Joint	3 (4.5)	10 (7.6)	13 (6.5)	1.18 (0.55)
	Nuclear	58 (86.6)	115 (86.4)	173 (86.4)	
	Single	6 (9)	8 (6.1)	14 (7)	
Education	Literate	28 (41.8)	76 (57.6)	104 (52.3)	4.43 (0.03)*
	Illiterate	39 (58.2)	57 (42.4)	96 (47.7)	
Occupation	Employed	17 (25.4)	30 (22.6)	47 (23.5)	2.88 (0.23)
	Unemployed	44 (65.7)	79 (59.4)	123 (61.5)	
	Retired	6 (9)	24 (18)	30 (15)	
Income	<2000	24 (35.8)	47 (35.1)	71 (35.4)	0.14 (0.92)
	2000-5000	42 (62.7)	83 (62.6)	125 (62.6)	
	>5000	1 (1.5)	3 (2.3)	4 (2)	
Habitat	Rural	34 (50.7)	78 (58.6)	112 (56)	1.12 (0.28)
	Urban	33 (49.3)	55 (41.4)	88 (44)	

** Statistically significant*

Table-2: Socio-clinical profile of geriatric patients attending Medicine Department

Variables		Depressed N=67 N (%)	Non-Depressed N=133 N (%)	Total N=200 N (%)	χ^2 (p value)
Social pathological factors	Present	26 (78.8)	7 (5.3)	33 (16.5)	36.38 (<0.0001)*
	Absent	41 (24.6)	126 (94.7)	167 (83.5)	
Spouse details	Death	18 (26.9)	29 (21.8)	47 (23.5)	0.63 (0.42)
	Healthy/alive	49 (73.1)	104 (78.2)	153 (76.5)	
Physical illness	Present	52 (77.6)	105 (78.9)	157 (78.5)	0.04 (0.82)
	Absent	15 (22.4)	28 (21.1)	43 (21.5)	
Positive Family history	Present	10 (14.9)	10 (7.5)	20 (10)	2.71 (0.09)
	Absent	57 (85.1)	123 (92.5)	180 (90)	
MMSE	<24/30	26 (39.4)	22 (15.8)	48 (23.6)	13.62 (0.0002)*
	>=24/30	40 (60.6)	112 (84.2)	152 (76.4)	

** Statistically significant*

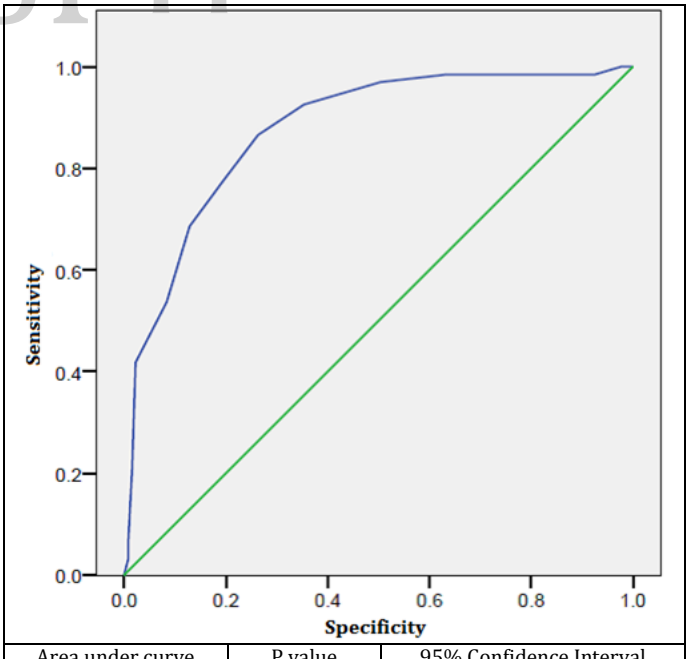
Socio-clinical profile of geriatric patients is shown in Table 2. It shows that a significantly higher proportion of depressed patients (78.8) had a history of socio pathological factors like psychiatric illness in children, poor support from children, as compared to non-depressed patients (5.3). In both groups, majority of patients (77.6% depressed and 78.9% non-depressed) had concurrent physical illness. Although higher proportions of depressed patients had positive family history (14.9 vs7.5) and history of death of spouse 26.9 vs. 21.8) as compared to non-depressed patient – but difference was not significant. Significantly higher proportions of depressed patients (39.4) had low MMSE score (<24/30) as compared to non-depressed patients (15.8).

Table-3: Sensitivity and specificity at various cut off points for GDS

Cut off values	Sensitivity (%)	Specificity (%)
≥ -1.00	100	0
≥ 0.50	100	2.3
≥ 1.50	98.5	7.5
≥ 2.50	98.5	13.5
≥ 3.50	98.5	23.3
≥ 4.50	98.5	36.8
≥ 5.50	97	49.6
≥ 6.50	92.5	64.7
≥ 7.50	**86.6**	**73.7**
≥ 8.50	77.6	80.5
≥ 9.50	68.7	87.2
≥ 10.50	53.7	91.7
≥ 11.50	41.8	97.7
≥ 12.50	20.9	98.5
≥ 13.50	6	99.2
≥ 14.50	3	99.2
≥ 16.00	0	100

Table-4: Comparison of GDS with DSM IV

		DSM IV (Gold Standard)		Total	Mc Nemar χ^2 test (p value)
		Depressed	Non-Depressed		
GDS	Depressed	58	35	93 (46.5%)	14.205 (0.0002) statistically significant
	Non-Depressed	9	98	107 (53.5%)	
	Total	67 (33.5%)	133 (66.5%)	200	



Area under curve	P value	95% Confidence Interval
0.877	<0.000001	0.827-0.927

Figure-1: ROC curve of GDS-15 for depression (Diagonal segments are produced by ties)

Diagnostic Performance of the Instrument

Cronbach's Alpha was measured for GDS to check

internal consistency. It was around 0.8066. Since it was more than 0.7, internal consistency was implied as maintained.

MMSE score ranged from 21 to 30, with a mean of 26.16 and standard deviation of 2.44. The GDS -15 score ranged from 1 to 15, with a mean score of 7.31 and standard deviation of 3.62. The sensitivity and specificity for a range of cut-off scores are shown in Table-3. The area under the curve was 0.877 as shown in the graph of ROC (receiver operator characteristic) curve of GDS-15 against the DSM-IV as gold standard. (Figure 1) Since AUC >0.5, GDS is very good test as compared to gold standard, and it is found to be statistically significant with Mc Nemars' X^2 test (Table 4).

An optimum threshold for screening, obtained using an ROC curve, was 7.5 - with a sensitivity of 86.6% and a specificity of 73.7%. The positive predictive value was 74.10% and negative predictive value was 86.35%. At this cut-off, prevalence of depression was 29%. (Table3)
A cut-off of 6.5 would increase the sensitivity to 92.5%, but decrease the specificity markedly i.e. 64.7%. Therefore, for Gujarati version of GDS -15, 7.5 cut-off is the most suited.

Discussion

Diagnosing depression in the elderly needs more emphasis in developing countries. In this respect the validating an instrument, which is used in the local setting, is of much more importance.

In this study, we included 200 Guajarati speaking geriatric patients (>65yrs) from medicine outdoor patients department. They were not aware about their mental health status.

The prevalence rate of depression was found to be 33.5% through a clinical interview by psychiatrist, which included DSM-IV diagnostic criteria for major depressive disorder. In Patients treated in primary care settings, depression was identified 17-37% of patients.[24]

Depressed elderly were more commonly illiterate, had history of psychiatric illness in children, got poor support from their children and low MMSE score - as compared to non-depressed elderly patients. This needs further research to find association between these social factors and depression.

In the study of applicability of 15 items GDS in elderly medical outpatients, the prevalence of ICD-10 depressive disorder was 18%.[5] The study validated the Guajarati version of GDS-15, using DSM-IV criteria as gold standard for diagnosis of depression. The overall reliability of the scale was good. Crohnbach's alpha of the total score was 0.8066 for the Gujarati GDS-15. The crohnbach's coefficient was 0.9 for Farsi version of GDS-15[14] and 0.86 for Nepali version of GDS-15[25] and 0.85 for Korean version of GDS-15[26].

The optimum threshold for screening was 7.5, using receiver operator characteristics (ROC) method, which is the preferred method to determine optimal cut-off values for a test. At this cut-off, sensitivity was 86.6% and specificity was 73.7% - with a positive predictive value of 74.10% and negative predictive value of 86.35%.

The area under the curve was 0.877. The ROC curve of a test displays the relationship between sensitivity (true positive rate) and one – specificity (false negative rate) in a sample. The ROC result indicates that GDS-15 has good psychometric properties in discriminating between cases and non cases.

In the study of reliability, validity and factor structure of the GDS-15 in Iranian elderly, the optimum cut-off score for GDS-15 was 7/8, with a sensitivity of 0.9 and specificity of 0.84.[14]

In the study of validation of the GDS for an elderly Sri Lankan clinic population, the optimal cut-off score for GDS-15 was 8 for differentiating non-depressed from mildly depressed.[27]

Based on this score, 58 elderly Gujarati patients were identified as depressed. The prevalence of depression amongst Gujarati elderly medical outpatients assessed by GDS-15 was 29%. This finding is comparable with meta-analysis of the version of the GDS, which is most useful in medical settings and nursing homes. In this meta-analysis across all studies, the prevalence of late life depression was 29.2 % (95% confidence interval = 24.7%-33.9%), with no difference between inpatients, outpatients and nursing homes. For GDS 15 sensitivity was 84.3% (95%CI = 79.7%-88.4%) and specificity was 73.8% (95%CI = 68%-79.2%).[28]

Measures of validity are not easy to compare as other validation studies used differing comparative standards. However, our calculated values for sensitivity (86.6%), specificity (73.3%), positive predictive value (74.10%),

and negative predictive value (86.35%) are comparable with Iranian version.[14]

Sinhalese version of GDS shows both sensitivity and specificity as 73.3% at cut-off >5.[27] Although the GDS was translated into several languages, no adequate validity study has been carried out in all these translations. So, such research is needed to confirm psychometric properties of the GDS when used in other languages.

In a meta-analysis of GDS-30 and GDS-15 for depression in primary care, for GDS-15, the sensitivity of 81.3% (95%CI= 77.2%-85.2%) and specificity of 78.4% (95% CI= 71.2%-84.8%) was significantly more accurate, and had good clinical utility as a screening test. GDS-15 is more acceptable in primary care and preferable as good waiting room screen.[29]

Conclusion

This study was designed to resemble normal clinical practice, i.e. outpatients setting where screening of depression can be undertaken routinely. This study gives impetus to the notion that geriatric medical outpatients need to be screened with a short, feasible and easily administered instruments, leading to effective diagnosis and management. This would definitely improve the mental health outcomes and quality of life of distressed elderly. There is a need of sensitizing, orienting and training physicians in the use of GDS-15 to enhance detection of depression in routine practice.

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