



Brief Communication

Comparison of Two Psychometric Scales to Detect Depression Among Old Adults Residing in a Slum Area of a Metropolitan City : GDS-15 and DASS-21

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ABSTRACT

Background/Purpose:

1. Comparison of the Geriatric Depression Scale (GDS-15) and Depression Anxiety Stress Scale (DASS-21) to analyse their psychometric properties.
2. Observe the agreement between both the scales to screen depression among the geriatric population.

Methods: Sample (n=209) was collected from a population of elderly people residing in an urban slum area via a multi-stage sampling method and screening of depression among them was done by using DASS-21 and GDS-15. Analyses the psychometric properties of the scales by finding out the prevalence of depression among elderly, internal consistency, reliability of the scales and later finding the agreement (Cohen's K) between both the scales' findings.

Results: The geriatric population showed that the psychometrics results of both scales had high internal consistency. The kappa's test which measured the inter-rater's agreement between the judgement of depression made by using DASS-21 and GDS-15 was 0.92, proving a very good agreement in the judgement. The mean score using DASS-21 is 7.224 (SD±4.33) and GDS-15 is 6.306 (SD±3.1).

Conclusion: The DASS and GDS are both easy and reliable scale in judging depression among the old population. The DASS appeared to be more specific and GDS appeared to be more sensitive in judging depression. The agreement between the scales at the designated cut-off is very good and the identified prevalence was almost similar.

Advances in Knowledge

- To the best of the authors' knowledge, this study is one of its first kind which compares two psychometric scales to evaluate depression among geriatric population residing in a slum area.
- The results of this study suggests good agreement between both the scales while screening depression among elderlies in a slum area.

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1. INTRODUCTION

The burden of geriatric depression in India is very high and has a pattern of silent epidemic. The problem of mental disorders and morbidities is rising in the Indian old adults due to ageing of the brain, cerebral diseases, issues associated with physical health, loneliness and social isolation, decrease in economic and financial independence and also breakdown of the joint family status. As the symptoms of depression, is erroneously similar to normal part of aging hence it is often overlooked and hence it is transforming into a serious public health problem.

For doctors who are working at primary, secondary and tertiary level recognizing and categorizing patients with symptoms of depression and thereafter observing and supervising their management protocol is an constant and arduous task.¹ Nonetheless, there are difficulties in diagnosing patients with depression in primary care, and only about half of patients with depression are identified by consultants.² To simplify this procedure there are various inventions of self-rating scales and other psychometric scales which helps to screen for depression.³ There is evidence that psychometric scales like the Primary Care Evaluation of Mental Disorders (PRIME-MD, Hospital Anxiety and Depression Scale (HADS), Depression Anxiety Stress Scale (DASS), Geriatric Depression Scale (GDS) and the Patient Health Questionnaire (PHQ-9) are valuable to screen depression and also assess its severity and determining the treatment course in primary care and referrals to secondary and tertiary care centres.^{2,3}

The aim of this study is to explore the psychometric properties of the GDS-15 and DAS-21 scales among the geriatric population of a slum area residing in a metropolitan city. Also, it aimed to assess the comparability between these two instruments in determining depression among geriatric population. This research study will further provide a scientific evidence in helping the primary practioners to make proper judgement to which scale to be utilized in resource-limited setting for obtaining effective outcome. Appropriate diagnosis on time will increase the compliance among patients also.

2. METHODS

2.1. Participants

After obtaining necessary ethical clearance from Seth G.S Medical College, Mumbai the data was collected from October 2018 to October 2019 from a slum area located at Mumbai city, Maharashtra, India.

The study population comprised of permanently inhabitant geriatric population of this slum area without any known disorders affecting cognition or critically diseased patients. The sample comprised

209 participants altogether selected via multi-stage sampling technique from the urban slum community. After informed consent, all the selected old adults were involved in the study by house to house collection of data and necessary socio-demographic, personal and medical details were obtained followed by application of DASS and GDS scale on this population to screen depression.

2.2. Geriatric Depression Scale (GDS)

Yesavage et al. gets the credit of creating a scale which is extensively used across the globe among geriatric population for screening depression.⁴ The original version of the scale consists of 30 questions and short-version consists of 15 questions where 'YES' and 'NO' are the two valid responses. Each positive response is given 1 point and diagnostic criteria of this scale is affixed in 3 categories i.e. 0-4 score-normal; 5-8 score- mild depression, 9-11 score-moderate depression and 12-15 score-severe depression over the years, researchers have proved the validity and reliability of this scale and it has been found 92% sensitive but 89% specific in screening depression.⁴ In this study, we have utilized short form GDS.

2.3. Depression Anxiety Stress Scale (DASS)

There are two versions of DAS scale: DASS-42 (longer version) and DASS-21 (shorter version). Four responses are allocated to a set of 21 questions which are framed in Depression, Anxiety and Stress Scale (DASS-21) in which three set of self-reporting scales are present which apparently determines three states of mind i.e. anxiety, stress and depression and each of these three domain is determined by a set of 7 questions, consisting of total 21 questions.^{5,6} In this study we have used DASS-21 scale to determine depression which assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest, anhedonia and inertia.⁶ Responses for each question pertaining to depression can be ranging from 0-4 score. But, as we are using the shorter version of DASS scale we have to multiply the obtained score by 2.^{5,6} This scale has set its cut-off for mild depression as 10-13 score, followed by moderate depression as 14-20 score then severe depression as 21-27 score and extremely severe depression as 28 and above scores.⁵

2.4. Statistics

All statistical analyses were performed using SPSS (version 15.0). Mean differences and standard deviation were tested using the independent t-test and the level of statistical significance was set at $p < 0.05$ for all the tests of both the scales. In this research design we have two rating scales (which is termed as "raters"/ "judges"/ "observers") responsible for measuring the variable of depression

on a categorical scale. Therefore, it is important to determine whether these two scales agree with each other or not. So, we will applied Cohen's kappa (k) to measure inter-rater agreement between the two scales i.e. Geriatric Depression Scale (GDS) and Depression Anxiety Stress Scale. The internal consistency of the DASS and GDS were explored via inter-items correlation via using Cronbach's α .

3. RESULTS

3.1. Inter-Rater's Agreement (Kappa's test)

Cohen's Kappa value while determining the agreement between the two scales (i.e. DASS & GDS) to screen depression among 209 old adults inhabiting in the slum were found to be 0.921 when $p < 0.005$. The two scales agreed on 80 people having depression and 121 people having no depression. DAS scale rated total 80 people as depressed whereas GDS rated total 88 people as depressed. Hence, concordant cases=(121+80)=201 and Discordant cases=(8+0)=8, proving a very good agreement between the judgement of the two scales. (Table 1)

3.2. Severity Ratings of Depression Using DASS-21 and GDS-15 Psychometric Scale

Out of 209 geriatric population 88 were having depression when screened via GDS-15 scale and 80 were depressed when screened by DASS-21 scale. 81 people among 88 has mild depression and 7 has severe depression as screened by GDS-15 scale. Nonetheless among 80, 54 people has mild depression, 20 people has moderate depression, 5 people had severe depression and 1 elderly has extremely severe depression as screened by DASS-21 scale. (Table 2)

The mean score on the GDS scale was 6.306 (SD \pm 3.1) and mean score of DASS scale was found to be 7.224 (SD \pm 4.33).

3.3. Depression Scores in the Geriatric Population

On univariate analysis we found: gender, increasing age, illiteracy, un-employed status, difficult financial state, death of spouse, low socio-economic status, no physical activity, inadequate sleep, addictions, food habits, presence of chronic diseases and low BMI were significantly associated with depression by using both the scales. (Table 3)

3.4. Cronbach's Alpha.

Cronbach's alpha is a convenient test used to estimate the reliability or internal consistency, of a composite score.⁷ Cronbach's alpha will generally increase as the intercorrelations among test items

increase.⁷ The Cronbach alpha coefficient for GDS scale is 0.920 and overall Cronbach alpha coefficient for DASS scale is 0.88.

Few differences between DASS-21 and GDS-15 were obtained in following domains: DASS-21 categorized depression into mild, moderate, severe and extremely severe whereas GDS-15 categorized depression into mild, moderate and severe only. Secondly, we found that DASS-21 scale required an average time of 12 minutes to administer however, average time of administration of GDS-15 was 7 minutes. This property of GDS-15 made it ideal for using it among old adults who are easily fatigued or have inadequate ability to concentrate for longer periods of time. Thirdly, GDS-15 screened more number of depressed old adults compared to DASS-21.

4. DISCUSSION

The findings of the present study which involved geriatric population showed that the psychometrics results of both scales i.e. the DASS-21 and GDS-15 were very good and also had high internal consistency. The kappa's test which measured the inter-rater's agreement between the judgement of depression made by using DAS Scale and Geriatric Depression Scale (GDS) was 0.92, proving a very good agreement in the judgement (Table 1). When the recommended severity scores were used, DASS-

Table 1. Agreement between the judgement made by use of DAS Scale and Geriatric Depression Scale: Inter-rater's agreement (Kappa's test)

Depression Anxiety Stress Scale (DASS)	Geriatric Depression Scale (GDS)		Total
	Depression	No Depression	
Depression	80	0	80
No Depression	8	121	129
Total	88	121	209

Measure of Agreement	Value	Asymptotic Standardized Error	Approx. t_b	Ap "Proximate Significance"
Cohen's Kappa	0.921			
N of Valid Cases	209	0.027	13.350	0.000

Table 2. Distribution of the geriatric population (n=209) in the severity ratings according to the DASS-21 and GDS-15 psychometric scale

GDS-15 Severity (Score Range)	n (%)	DASS-21 Severity (Score Range)	n (%)
Mild (5-10)	81 (38.7%)	54	54 (25.8%)
Moderate	-	20	20 (9.5%)
Severe (10-15)	7 (3.3%)	5	5 (2.39%)
Extremely Severe	-	1	1 (0.47%)

DASS=Depression Anxiety Stress Scale. GDS=Geriatric depression Scale

21 scale found 25.8% of the sample have mild depression, 9.5% sample have moderate depression, 2.39% of the sample have severe depression and 0.47% have extremely severe depression. Whereas, GDS-15 scale found 38.7% mildly depressed and 3.3% of total sample severely depressed. (Table 2)

These findings points out the benefit of DASS-21 scale in understanding accurate stage of depression hence can help the primary practioners for early referrals and planning more complaint management protocol. Another point is that, the DASS scale found less number of geriatric people depressed than Geriatric depression scale (Table 2). This may be because the GDS-15 scale have been standardized for old age range (60 years and above age). Nevertheless, by this finding we cannot comment on the sensitivity and specificity of any of these scales as we are not comparing these two psychometric scales in relation to one gold standard diagnostic measure

. Additionally, the most common responses obtained while using DASS-21 scale were "I could not seem to experience any positive feeling at all", "I felt that I had nothing to look forward to" and "I felt down-hearted and blue". Similarly, when the recommended severity score was utilized for Geriatric depression scale-15 (GDS-15) we obtained 38.7% sample population mildly depressed and 3.3% severely depressed.

Most common responses were "I am not in good spirit most of the times", "My situation is hopeless" and "I have dropped many of my activities and interest".

In this study, the DASS scale found 59 females depressed and 29 male depressed whereas the DASS scale found 55 females depressed and 25 males depressed (Table 3). Other studies also found depression is more in females.^{8,9} Another point noted on analysis was the mean score of GDS was 6.306 and DASS scale mean score was 7.22. Other psychometric

Table 3. Sample characteristics of the geriatric population

Characteristics	Screened Depression by GDS	Chi-Square Value (GDS)	p-Value	Screened Depression by DASS	Chi-Square Value (DASS)	p-Value
1. SOCIO-DEMOGRAPHIC FACTORS						
Sex		12.66			13.76	
Male	29 (29.3%)		p <0.05	25		p <0.05
Female	59 (53.6%)			55		
Age group		19.134	p <0.05		18.95	p <0.05
66-70 years	30 (55.6%)					
Education		7.67	p <0.05		7.374	p <0.05
Illiterate (only)	39			36		
Current employment status		9.86	p <0.05		10.83	p <0.05
No	78					
Financial source		15.71	p <0.05		17.43	p <0.05
Social assistance (family members, other sources)	63			58		
Marital status		5.23	p >0.05	5.36	4.928	p >0.05
Widowed	45			41		
Socio-economic status		7.23	p >0.05		6.759	p >0.05
IV	69			65		
2. PERSONAL DETAILS						
Physical activity		42.89	p <0.05		42.06	p <0.05
No	87			80		
Sleep		66.52	p <0.05		64.43	p <0.05
Disturbed	61			60		
Addictions		8.15	p <0.05		7.98	p <0.05
Yes	87			78		
Type of diet		41.73	p <0.05		39.89	p <0.05
Vegetarian	44			44		
3. MEDICAL EXAMINATION						
Illness		11.78	p <0.05		11.98	p <0.05
Chronic Illness	76			77		
BMI		15.40	p <0.05		15.67	p <0.05
Below 18.5	75			71		

scales comparative studies have also shown such findings.² Among the geriatric sample population, older age group with no education, lower socio-economic status, un-employed and dependence on social-assistance as financial source are the factors which were found significantly associated with depression by using both the scales (Table 3). Other factors which were found significantly associated with depression by using both the scales are: personal habits of addictions, reduced sleep, less physical activity and people preferring vegetarian diet alone (Table 3). Chronic diseases and BMI (less than 18.5) were other factors found significantly associated with depression (Table 3). Other studies conducted also found above factors significantly associated with geriatric depression.^{10,11,12,13} The factors were found significantly associated with depression while using both the scales. (Table 3)

4.1. Strengths and Limitations of the Study

One of the strengths of this study is that it is among those rare studies which is comparing two psychometric scales to screen depression among elderly people permanently residing in a slum area of a developing country. This study is performed by house to house visit in the community, following multi-stage sampling technique, hence the selection of sample is perfectly randomized with less bias. Nevertheless, this comparative study of diagnostic tools are of significance to primary care practitioners and other clinician as it can help them in choosing the diagnostic tool more efficiently and effectively.

A limitation of this study is that its sample is collected from one urban slum with small sample, hence generalizability of the study is less. Secondly, in this study we couldn't calculate sensitivity or specificity of the instruments as we didn't compare the two psychometric scales in relation to one gold standard diagnostic measure.

Future Propositions:

This kind of comparative study can be done with larger population among varied age-group and also in different resource-setting. This can help us to understand the suitability of specific psychometric scale for a particular group of people. These scales seemly can be utilized as screening instruments and treatment outcomes but appropriate diagnosis is based on clinical interview.

5. CONCLUSION

The GDS-15 scale is an well-established tool for screening geriatric depression and via this study we found DASS-21 has a good agreement with this scale in screening geriatric depression. Though GDS-15 found more number of depressed

elderly it can be because this scale GDS-15 have been standardized for above 60 years age range. Administration time for DASS-21 was 5 minutes more than GDS-15 but this didn't have a significant impact on concentration of the old adults neither caused fatigue among them. Nevertheless, DASS-21 categorized the depression into four categories: mild depressed, moderate depression, severe depression and extremely severe which may help primary practitioners to be more specific about the stage of depression enhancing the management protocol, follow-up process and referrals.

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