Psychometric properties of the Hindi version of Geriatric depression scale (HGDS)

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Abstract

The present study reports the Hindi version of the Geriatric depression scale (GDS) and its psychometric properties. The Hindi version of the GDS was developed following the contemporary methodology of cross-cultural adaptation of psychometric tools. The Geriatric depression scale, The Brief Assessment Schedule Depression Cards (BASDEC) and Mini Mental Status Examination were administered on a sample of 176 elderly in the age range of 60 to 90 years. The data were analyzed and tested on the basis of traditional test theory. The cross language equivalence of Hindi version of GDS was ascertained by back translation method. Findings revealed a satisfactory subscale to total correlation as well as satisfactory reliability (Internal consistency assessed by Chrobach's alpha was 0.74). For ascertaining the convergent validity coefficient of HGDS, two criterion measure such as Brief assessment schedule card (BASDEC) and Hindi version of Mini Mental Status Examination (HMMS) were taken and found to be significant correlation between them. The findings suggest that the HGDS is a reliable and valid tool for evaluation of depression in elderly population. The HGDS provide a quick assessment of depression in elderly person and total score of this test reflects the gloomy mood in geriatric population.

Key words: Geriatric depression, elderly population, Hindi version

Elderly or old age consists of ages nearing or surpassing the average life span of human beings. The boundary of old age cannot be defined exactly because it does not have the same meaning in all societies. Government of India adopted 'National Policy on Older Persons' in January, 1999. The policy defines 'senior citizen' or 'elderly' as a person who is of age 60 years or above. The phenomenon of population ageing is becoming a major concern for the policy makers all over the world, for both developed and developing countries, during last two decades. But the problems arising out of it will have varied implications for underdeveloped, developing and developed countries. Ageing of population is affected due to downward trends in fertility and mortality i.e. due to low birth rates coupled with long life expectancies.

Age is an important determinant of mental health. Old age is a period of transition when one has to deal not only with the physical aging, but also with the challenges affecting the mental and social well-being. Due to normal aging of the brain, deteriorating physical health and cerebral pathology, the overall prevalence of mental and behavioral disorders tends to increase with age (Ingle GK and Nath A 2008). Disability arising due to various illnesses, loneliness, and lack of family support, restricted personal autonomy, and financial dependency are other important contributing factors for higher prevalence of mental and behavioral disorders. Among the various mental disorders, depression accounts for the greatest burden among elderly. Depression decreases an individual's quality of life and increases dependence on others. If depression is left untreated, it can have significant clinical and social implications in the lives of the elderly (Blanchard MR, Waterreus A and Mann AH 1994). Early recognition, diagnosis, and initiation of treatment for depression in older people present opportunities for improving their quality of life, preventing suffering or premature death, and maintaining optimal levels of function and independence. Early diagnosis and effective treatment of depression in old age can also lead to significant reduction in mortality due to suicide and medical illnesses, and health care costs.

In a review of world literature, Barua *et al*., (2011) evaluated the median prevalence rates of depression in elderly population of India and compared the same with the rest of the world. The median prevalence rate of depression among elderly was reported to be 18.2%, which was significantly higher than the rest of the world (5.4%). However, it is important to note that the comparison was based on only six relevant studies from India, which formed only 0.5% of total study sample evaluated, in contrast to the 68 studies from the rest of the world covering 99.5% of the participants. The largest community-based data arising from India come from the study on Global aging and adult health Wave-1 study (Anand A. 2015). This study was conducted from 2007 to 2010 in six countries (China, Ghana, India, Mexico, Russian Federation, and South Africa) across the world. Depression was diagnosed on the basis of reporting of one or more of three symptoms (1) had a sad, empty, or depressed feelings (2) lost interest in most things that they usually enjoy such as personal relationships, work, hobbies/recreation, and (3) decreased energy or feeling tired all the time for 2 weeks in 12 months. Multistage, stratified, random cluster sampling design was used and those above 18 years of age were recruited. Data

of those above 50 years of age extracted from this study show that the prevalence of depression among those aged above 50 years is highest in India (27.1%) followed by Mexico (23.7%), Russia (15.6%), Ghana (11%), South Africa (6.4%), and least in China (2.6%). Prevalence of depression in clinic-based studies has ranged from 42.4% to 72%. The sample has varied from patients attending psychiatry units to multidisciplinary wards. Studies that have compared patients with specific medical illnesses with those without illnesses, in general, suggest that elderly patients with medical illnesses such as diabetes mellitus have a higher prevalence (42.4% versus 18%) of depression (R.S. Kaulgud et. al.2013).

Some of the studies have recruited subjects across different setting and have reported prevalence rates of depression. These studies suggest that the prevalence rate of depression is more in inmates of old age homes when compared with those either living in the community, affluent societies, and slums (Guha S and Valdiya PS 2000, Jariwala V et al. 2010 and AP Singh 2012) .Tiple *et al*., 2006 did a study in Varanasi where they studied the psychological morbidity in four groups. Group A consisted of geriatric subjects who visited the Psychiatric Outpatient Department. Group B consisted of geriatric subjects suspected to have psychiatric illness and referred from the Geriatric Clinic. Group C consisted of householders living in Varanasi in the hope of attaining "moksha" and were paying for their boarding and lodging. They had occasional contact with their family members. Group D consisted of ascetics who had left their families earlier, and their daily living costs were borne by Mumukshu Bhavan (old age home). This study suggested that the prevalence of depressive disorders was highest among those suspected to have psychiatric disorders referred to geriatric clinics and least in ascetics.

In India with majority of its population aged less than 30, the problems and issues of its grey population has not been given serious consideration and only a few studies on them have been attempted in our country. To reap the advantage of demographic dividend, the focus is mainly on the children and the youth and fulfillment of their basic needs for proper development. Also the traditional Indian society and the age-old joint family system have been instrumental in safeguarding the social and economic security of the elderly people in the country. However, with the rapid changes in the social scenario and the emerging prevalence of nuclear family set-ups in India in recent years the elderly people are likely to be exposed to emotional, physical and financial insecurity in the years to come. This has drawn the attention of the policy makers and administrators at central and state governments, voluntary organizations and civil society. In view of the increasing need for intervention in area of old age welfare, Ministry of Social Justice and Empowerment, Government of India adopted 'National Policy on Older Persons' in January, 1999. The policy provides broad guidelines to State Governments for taking action for welfare of older persons in a proactive manner by devising their own policies and plans of action. The policy defines 'senior citizen' as a person who is 60 years old or above. It strives to ensure well-being of senior citizens and improve quality of their lives through providing specific facilities, concessions, relief, services etc. and helping

them cope with problems associated with old age. It also proposes affirmative action on the part of Government Departments for ensuring that the existing public services for senior citizens are user friendly and sensitive to their needs. It provides a comprehensive picture of various facilities and covers many areas like financial security, health care, shelter education, welfare, protection of life and property etc.

Although India is the second-most populous country in the world in terms of elderly population, there has been meager research on depression in elderly, and none of the effective screening tool has developed to compile the research. The most common instruments that have been used to diagnose depression include international classification of diseases (ICD), tenth revision (ICD-10) criteria, patient health questionnaire-9, Zung depression scale, and case detection schedule, etc. In most of the studies, the age cut-off which has been used to identify elderly patients is 60 or above. The sample size in community-based studies has ranged from as low as 70 to as high as 7150 and prevalence of depression has ranged from 8.9% to 62.16%. Some of the community-based studies have evaluated the prevalence of other psychiatric disorders too and have reported depression/affective disorders to be the most common psychiatric morbidity (Tiwari SC 2000, 2011, Sood, A. 2006). In this background, this article attempts to develop the Hindi version of geriatric depression scale for Indian elderly population.

Methods

Participants:

Data were collected from various places such as old age home, rural areas and urban areas. Participants were volunteers from the community and old age home and willing to participate in research. The sample of the study was comprised of 120 male and 56 females with the mean age 71.45, and SD=9.4 (Range 60-90 years). The mother language of all participants was Hindi. The sample was drawn from the diverse education level, residential areas and socioeconomic conditions. Out of 176 participants, 120 were male (68%) and remaining were females (32%). Maximum participants belonging to middle class family (N=144) and had educational level of High school and middle. More than 90% respondents were married and had a more than 3 children. The occupation of participants is concern with pensioner and former. All participants had provided inform consent to their participation.

Tools:
1. **The geriatric depression scale (Yesavage 1983)**: This scale was first created by yesavage et al (1983) has been tested and used extensively with the older population. The Geriatric Depression Scale (GDS) is a self-report measure of depression in older adults. Users respond in a "Yes/No" format. The GDS was originally developed as a 30-item instrument. Since this version proved both time-consuming and difficult for

some patients to complete, a 15-item version was developed. The shortened form is comprised of 15 items chosen from the Geriatric Depression Scale-Long Form (GDS-L). These 15 items were chosen because of their high correlation with depressive symptoms in previous validation studies (Sheikh & Yesavage, 1986). Of the 15 items, 10 indicate the presence of depression when answered positively while the other 5 are indicative of depression when answered negatively. This form can be completed in approximately 5 to 7 minutes, making it ideal for people who are easily fatigued or are limited in their ability to concentrate for longer periods of time. A validation study was conducted by Sheikh and Yesavage (1986) in which the GDS-S was compared to the GDS-L in differentiating depressed from non-depressed patients. Both measures were successful in classifying the 2 populations accurately with a reported correlation of r = .84, p < .001.

2. **The Brief Assessment Schedule Depression Cards (BASDEC) Boon Loke et al 1996:** BASDEC consists of 19 cards, each with a statement of a symptom in big bold letters. In that study, BASDEC had a sensitivity of 71% and specificity of 88% among non-demented geriatric inpatients using a cut of score of 7. The adjusted PPV was 72%. There has been no replication study to date.

3. **HMMSE-The Hindi version mini mental status examination (S.Gopal Jee, Dwivedi, C.B. and Pandey, R. 1996):** It assess on individual on 11 content areas and 19 items related to different aspects of mental and cognitive functioning. These areas include time orientation, place orientation, attention, calculation, recall, naming, repetition reading, writing and coping of a figure. The total score of this scale range from 0-30. The reliability and validity of the scale was very high. Lower the score indicates cognitive impairment in aged person.

Procedure: A group of five clinical psychologists practicing in psychiatric set up were entrusted with the job of translating the item of the original version of GDS in to Hindi (yesavage et al 1983). They were requested to retain the original psychological content and grammatical structure of each item. Two bilingual expert as well as three clinical psychologist from the department of psychology DAV PG college, they edited the Hindi translation obtain from each of this expert. Most of the test items though, could be directly translated, some item required restructuring and adaptation suitable to Hindi spiking Indians. The cross language equivalence of Hindi version of GDS was ascertained by back translation method (Brisline, 1970). The original English version of GDS was adjusted for similarity of item content on a three point scale 1-exactly similar, 3-entirely dissimilar by a panel of five experts. None of the item obtained a rating of 3 by any expert which attested the psycholinguistic equivalence of the two versions.

The measures in the present study were including in the battery of cognitive test which took approx 40 min to complete. The HGDS was administer on the reliability sample(N=176) either individual or group by trained examiner who was unaware the propose of examination response to each item to scoring procedure of original version of GDS and total score was obtain by summing the item score.

Then item analysis was carried out by computing correlation between item score and total score. Before evaluating the psychometric property of the GDS, Its Hindi version was developed. The item of English version of GDS (15 items) were translate in Hindi and the Hindi version of scale was submitted to a panel of three subject expert for evaluating the adequacy of translated item content on the three point scale(1-exactly similar),(3= entirely dissimilar) the comment of the expert of reviewed. None of the item obtain a rating of 3 by any expert which at least the psychologist equivalence of the two version. The entire expert suggested that it will be more appropriate to the screening of GDS. After establishing a psycholinguistic equivalence, the GDS was administrator on a small sample of 20 aged populations (in which 10 literate 10 illiterate 10 male and 10 female) whose age range from 60 to 80 years. The purpose of this pilot study was to evaluate the adequacy of communication of meaning of HGDS in terms of item content and attend emotionally aspect of the target population. Review of responses that revealed that scale is free from item ambiguity and there was no evidence of difficult in understanding either the instruction or the intended meaning of any item. This revised and find HGDS was than administer on the final sample (N = 176) in order to examine its psychometric properties

Results

Mean and standard deviation of all the items were computed which are given in table -1. The mean of the responses to the scale ranged from 2.63 to 3.77 and SD of the responses to the scale ranged from 0.972 to 1.19. A perusal of table - 2 the minimum mean score was found on item 6 and maximum score was concern with item no 2, which indicate that item no 6 is more sensitive and person feel maximum wary so they scored minimum.

Table 1: Mean of SD of the items of GDS Hindi version (N=176)

Item no	Mean	S.D	N
GDS1	2.68	1.19	176
GDS2	3.77	1.18	176
GDS3	3.25	1.16	176
GDS4	3.26	1.18	176
GDS5	2.72	1.13	176
GDS6	2.63	.97	176
GDS7	2.65	1.06	176
GDS8	3.12	1.28	176
GDS9	3.69	1.09	176
GDS10	3.26	1.16	176
GDS11	2.82	1.21	176

GDS12	2.04	1.19	176
GDS13	3.01	1.17	176
GDS14	3.11	1.25	176
GDS15	3.40	1.29	176

To assess the psychometric adequacy of the item translated in Hindi version, they were analyzed by using item total correlation. The item total correlation ranged from 0.16 to 0.70 and all items were statistically significant which is presented in table no 2.

Table-2 Inter item correlation matrix for GDS Hindi version

	GDS1	GDS2	GDS3	GDS4	GDS5	GDS6	GDS7	GDS8	GDS9	GDS10	GDS11	GDS12	GDS13	GDS14	GDS15
GDS1		.23	.36	.35	.33	.20	.37	.25	.043	.17	.25	.31	.19	.29	.13
GDS2			.40	.27	.21	.30	.23	.22	.11	.25	.17	.33	.05	.28	.15
GDS3				.61	.38	.21	.41	.48	.70	.24	.39	.47	.13	.43	.17
GDS4					.42	.25	.49	.51	.13	.18	.31	.45	.25	.51	.25
GDS5						.23	.65	.35	.05	.17	.28	.34	.23	.32	.15
GDS6							.31	.21	.09	.21	.21	.35	.03	.34	.17
GDS7								.34	.05	.26	.33	.43	.27	.36	.18
GDS8									.13	.28	.33	.51	.11	.53	.29
GDS9										.08	.009	.20	.05	.11	.14
GDS10											.15	.28	.13	.19	.18
GDS11												.49	.30	.33	.13
GDS12													.17	.48	.23
GDS13														.21	.05
GDS14															.26

Results of table-2 indicates that HGDS3 and HGDS9 are highly positively correlated with (0.70) , HGDS 5 and HGDS7 item are also highly correlated (0.65) , HGDS4 and HGDS5 , HGDS8 and HGDS12 are also highly correlated (.51). No of the alpha item deleted values excluded the overall alpha which provides the important evidence of the reliability of the item of HGDS. The internal consistency of the HGDS was assessed by computing Cronbach alpha coefficient. The reliability of the scale was found to be 0.87. The results indicate that none of the items were psychometrically poor. The item total statistic (homogeneity index) with cronbach alpha has been given in table-3, which indicates the good cronbach alpha ranged from 0.72 to 0.74.

Table -3 Item total statistics (homogeneity index) reliability of HGDS

Item no	Scale Mean If Item Deleted	Scale variance If item deleted	Corrected item total correction	Cronbach's alpha if item deleted
GDS1	90.20	354.06	.494	.728
GDS2	89.12	355.80	.454	.730
GDS3	89.64	347.55	.662	.722
GDS4	89.63	345.96	.690	.720
GDS5	90.17	352.15	.570	.726
GDS6	90.26	361.16	.417	.734
GDS7	90.23	350.91	.642	.724
GDS8	89.73	345.53	.639	.720
GDS9	89.19	369.70	.158	.742
GDS10	89.63	358.40	.404	.732
GDS11	90.07	352.32	.522	.727
GDS12	89.85	345.19	.700	.719
GDS13	89.88	361.73	.328	.735
GDS14	89.77	345.79	.648	.720
GDS15	87.49	359.09	.342	.734

The retest reliability calculated after an interval of one month and found to be significant on 0.01 level of confidence (0.73, P<.001) which showed that test work stable over time for asserting the reliability coefficient of GDS. Split half method was applied which is presented in table 4.

Table-4 Reliability statistics of Test

Cronbach's Alpha	**Part 1**	Value	**.72**
		No of item	28[a]
	Part 2	Value	**.74**
		No of item	28[b]
		Total no of item	56
		Correlation between form	.235
Spearman Brown Coefficient		Equal Length	.381
		Unequal Length	.381
Guttman split half coefficient			.231

In this table there are two parts in test item. The Cronbach's Alpha Value of part one is 0.72 and value of part second is 0.74 which is also highly statistically Significant (P<.001), Spearman Brown Coefficient Of Correlation is 0.381 which Indicate the reliability of the Item.

To assess the validity of items, an item discrimination index was obtained by computing statistical differences (t value) for each item between high and low depression (Q3=high and Q1=low). This index was used in the item difficulty index and coefficient alpha to determined which item to drop. The discrimination index for each item has been presented in table 5. The indices were found to significant for all items on .0001 levels

Table – 5 Item discrimination Index for HGDS

items	t	df	Mean difference	95% confidence Interval of the difference	
				lower	Upper
GDS1	29.99**	175	2.68	2.51	2.86
GDS2	42.99**	175	3.76	3.59	3.94
GDS3	32.20**	175	3.25	3.08	3.42
GDS4	36.77**	175	3.26	3.08	3.43

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GDS5	32.00**	175	2.72	2.55	2.88
GDS6	35.94	175	2.63	2.49	2.78
GDS7	33.27**	175	2.65	2.50	2.81
GDS8	32.81**	175	3.16	2.97	3.35
GDS9	45.00**	175	3.69	3.53	3.86
GDS10	37.23**	175	3.26	3.08	3.43
GDS11	30.90**	175	2.82	2.64	3.00
GDS12	33.96**	175	3.04	2.86	3.22
GDS13	34.55**	175	3.01	2.84	3.18
GDS14	33.03**	175	3.11	2.93	3.30
GDS15	34.89**	175	3.39	3.21	3.59

For ascertaining the convergent validity coefficient of HGDS, two criterion measure such as BRIF ASSESSMENT SCHEDULE DEPRESSION CARD (BASDEC) and Hindi version of Mini Mental Status Examination (HMMS) were taken. The correlation Coefficient between HGDS score and item of the BASDEC and total score of MMSE were calculated. The obtained validity coefficient is reported in Table 6

Table- 8 Convergent validity coefficient of HGDS with two criterion measure of depression

Sub Scale	correlation
HMMSE	0.28
HBASDEC	0.56

Discussion

The Hindi version of GDS was developed to adept and accesses its suitability for Indian sample. The psychometric properties of Hindi version of GDS were evaluated. The Cronbach alpha for GDS of Hindi version was obtained 0.74 and the item total correlation range from .21 to .70. For the French version, the Cronbach alpha value was obtained 0.74, which are nearly similar to Hindi version of GDS. The differences in the value of internal reliability of HGDS may be because of social & cultural background of the population. On the basis of result it can be concluded that the value of alpha is considerably good (.72) for HGDS. According to the rule of thumb when alpha lies to 0.70 and 0.80, the internal consistency of the instrument was considered to be

acceptable and good when alpha lies between .80 and .90. In this study the alpha is .72 which is also good reliability index and useful in the future research and clinical setting. It can be used in the field of temperament, emotion and clinical research. It may be also useful in hospital setting.

The HGDS provide a quick assessment of depression in elderly person and total score of this test reflects the gloomy mood in geriatric population. Accordingly for obtaining the convergent validity coefficient, total score on HGDS were correlated with various items of BASDEC and total score of MMSE, but MMSE are not correlated with HGDS because MMSE is a screening tool of cognitive impairment. Yeasuage (1986) and Parmelee et al. (1989) reported that the scale was highly internal consistent and a clean factor structure emerged basically uni-dimensional. The finding of the present study also extends the result of Miriam et.al, who were also examined the psychometric properties of the short version of GDS-15 item.

Brown et al. reported that the GDS is broadly accepted in the clinical and research setting and it is suitable for rapid screening tools of Geriatric depression. Some study (Jang et al. 2001 and Chau et al. 2006) have demonstrated that the full GDS item 30 and short GDS present a similar index of criterion validity. But a Brazilian study (Sousa et al. 2007) has demonstrated that better performance of full version.

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