

## The validity and factor analysis of the Geriatric Depression Scale using in Thai elderly

Sutthichai Jitapunkul\*

Raviwan Nivataphan\*\* Puanopoi Worakul\*\*

Chanya Atulayasak\*\* Punchong Hanvivadhanakul\*

**Jitapunkul S, Nivataphan R, Worakul P, Atulayasak C, Hanvivadhanakul P. The validity and factor analysis of the Geriatric Depression Scale using in Thai elderly. Chula Med J 1994 Jul;38(7):383-389**

*The validity of the Geriatric Depression Scale (GDS) was studied in a consecutive series of 197 Thai elderly patients aged 60 and over who attended the Geriatric clinic of the Chulalongkorn University hospital during June to August 1993. From factor analysis with varimax rotation, sixty percent of total variance is attributable to the five factors which their Eigenvalue are greater than one. These extracted factors represent emotion, negative will, psychomotor, cognition and isolation domains of depression. Constructed and concurrent validity of the GDS was also demonstrated by correlation of the GDS score with perceived health status and self rating of happy-sad rating score. Other factors correlated with the GDS score are income, self rating of present health status compared with their health status during adolescent period, frequency of exercise, frequency of leisure activity, frequency of social aggregation, number of visitings by their relatives or friends, self rating of happy-sad feeling at present compared to that of other elderly, and self rating of happy-sad feeling at present compared with their happy-sad feeling during adolescent period. This study showed that the GDS is valid for using in this elderly population and may be used for depression screening among Thai elderly. However, a cut-off score should be determined by further study.*

**Key Words:** Geriatric Depression Scale, Elderly, Thai, Validity

Reprint request: Jitapunkul S, Department of Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand.

Received for publication. Jun 6, 1994.

\* Department of Medicine, Faculty of Medicine, Chulalongkorn University .

\*\* Department of Psychiatry, Faculty of Medicine, Chulalongkorn University .

สุทธิชัย จิตะพันธ์กุล, ระวีวรรณ นีวาดพันธ์, พวงสร้อย วรกุล, จรรยา อคฺลยศักดิ์, พันธุ์จง หาญวิวัฒน์กุล. คุณค่าและการวิเคราะห์ปัจจัยของ เจริญแอทริคซ์ ดีเปริซัน สเคล ในผู้สูงอายุไทย. จุฬาลงกรณ์เวชสาร 2537 กรกฎาคม;38(7):383-389

คุณค่าของ Geriatric Depression Scale (GDS) ได้รับการศึกษาในผู้สูงอายุ ไทยที่มีอายุตั้งแต่ 60 ปีขึ้นไปและมารับการรักษา ณ คลินิกผู้สูงอายุโรงพยาบาลจุฬาลงกรณ์ระหว่างเดือนมิถุนายนถึงเดือนสิงหาคม พ.ศ. 2536 จำนวน 197 คน จากการวิเคราะห์ปัจจัยโดยอาศัยการหมุนชนิดแวนิแมกซ์พบ 5 ปัจจัยที่มีค่าไอเกนมากกว่าหนึ่ง โดยที่ครอบคลุมร้อยละหกสิบของการกระจายทั้งหมด ปัจจัยเหล่านี้ครอบคลุมมิติของภาวะซึมเศร้าได้แก่ emotion, negative will, psychomotor, cognition และ isolation การศึกษานี้ยังแสดงถึงคุณค่าชนิด constructed และ concurrent ของ GDS โดยการวิเคราะห์ ความสัมพันธ์ระหว่าง GDS กับตัววัดอื่น ๆ ที่ตรวจวัดในการศึกษานี้ ผลการวิจัยนี้แสดงให้เห็นคุณค่าของ GDS ในการนำมาใช้ในประชากรกลุ่มนี้และอาจมีประโยชน์สำหรับนำมา ใช้ค้นหาภาวะซึมเศร้าในผู้สูงอายุไทย อย่างไรก็ตามการศึกษาเพื่อวิเคราะห์หาจุดตัดที่เหมาะสมในการวินิจฉัยได้รับการศึกษาต่อไป

Geriatric Depression Scale (GDS) is one of the most popular depression screening test in developed countries.<sup>(1,2)</sup> It was developed by Yesavage JA, Brink TL and colleague.<sup>(3,4)</sup> Original version contains thirty questions. Its score ranges from zero to thirty. In 1986, Sheik JI and Yesavage JA made a shorter version which comprised offifteen questions.<sup>(5)</sup> Both versions are well recognized and widely used in clinical practice and epidemiological survey.

The GDS had been translated into many languages and used for depression assessment in many countries. It was also translated into Thai and has been used with Thai elderly.<sup>(6)</sup> However, there is no study about its validity and underlying factors in Thai elderly population. Thus, we conducted a study to determined the constructed and concurrent validity and the underlying factors of the short version GDS in Thai elderly who attended the Geriatric clinic of the Chulalongkorn University hospital.

### Subjects and methods

Short version of the GDS (fifteen questions) was translated into Thai by a group of specialists comprised of a psychiatrist, two psychologists and a geriatrician. This Thai version GDS (appendix) was applied with 197 cognitively intact elderly patients who consecutively attended the Geriatric clinic of the Chulalongkorn university hospital during June to August 1993. The elderly patients who were able to read and write fill in the questionnaire by themselves. The elderly who were not able to read or write were interviewed by a trained interviewer which took less than ten minutes.

General data such as age, sex, marital status, literacy, education level, working status, income, number of children and number of persons living with the subjects were collected. Perceived health status, self-rating of present health status compared with their health status during young adulthood period, self rating of happy-sad feeling, self- rating of happy-sad feeling

at present compared to that of other elderly, self rating of happy-sad feeling at present compared with their happy-sad feeling during young adulthood period, frequency of exercise, frequency of leisure activity, frequency of social aggregation and frequency of visitings by their relatives or friends were also collected. Happy-sad feeling was rated by using the Delighted-Terrible face scale.<sup>(7)</sup> Perceived health status was rated by using interval scale(0= death, 10= healthy). Self rating of present health status compared with health status during their young adult period, self rating of happy-sad feeling at present compared to that of other elderly, self rating of happy-sad feeling at present compared with happy-sad feeling during their young adult period were rated by using an ordinal scale (much better/happier, better/happier, same, worse/more sad, much worse/much more sad).

Factor analysis with varimax rotation was applied to all fifteen questions of the GDS. Underlying dimension of factors with Eigenvalue greater than one were explained. Constructed and concurrent validity of the GDS was determined by the correlation analysis with other data. Mann-Whitney U test or Kruskal-Wallis test was applied wherever they were appropriate in order to identify statistically significant effect on the GDS score. The SPSS-PC+ program was used for analysis.

### Results

One hundred and ninety-seven Thai elderly subjects were recruited of whom 102 (51.8%) were women and 95 (48.2%) were men. The mean age (SD) of the subjects was 68.9(6).25 (12.7%) subjects were illiterate. Thus these subjects were interviewed a the trained interviewer.

The number and percent of answer (score 1 or 0 of) of the fifteen questions of the GDS are shown in Table 1. The mean (SD,range) of the GDS score was 4.1 (2.8, 0-13) with no age, gender, marital status and literacy effect. Thirty nine(19.9%) subjects had GDS score more thanfive. Twenty of them were men (21% of all men).

**Table 1.** Frequency and percentage of subjects who get score 0 and 1 of each question of the Geriatric Depression Score.

Questions	Frequency (percent)	
	Score 1	Score 0
1 Are you basically satisfied with your life?	21 (10.7)	176 (89.3)
2 Have you dropped many of your activities and interests?	76 (38.6)	121 (61.4)
3 Do you feel that your life is empty?	32 (16.2)	165 (83.8)
4 Do you often get bored?	51 (25.9)	146 (74.1)
5 Are you in good spirits most of the time?	70 (35.5)	127 (64.5)
6 Are you afraid that something bad is going to happen to you?	67 (34.0)	130 (66.0)
7 Do you feel happy most of the time	57 (28.9)	140 (71.1)
8 Do you often feel helpless?	28 (14.2)	169 (85.8)
9 Do you prefer to stay at home, rather than going out and doing new things?	132 (67.0)	65 (33.0)
10 Do you feel you have more problems with memory than most?	126 (64.0)	71 (36.0)
11 Do you think it is wonderful to be alive now?	17 (8.6)	180 (91.4)
12 Do you feel pretty worthless the way you are now?	19 (9.6)	178 (90.4)
13 Do you feel full of energy?	46 (23.4)	151 (76.6)
14 Do you feel that your situation is hopeless?	24 (12.2)	173 (87.8)
15 Do you think that most people are better off than you are?	42 (21.3)	155 (78.7)

Nineteen of them were women (18.6% of all women).

From factor analysis with varimax rotation, sixty percent of variance is attributable to the five factors with their Eigenvalue are greater than one. (Table 2) Questions (variables) that have large factor loadings

(not less than 0.5) are grouped for the same factors.

These extracted factors represent emotion, negative will, psychomotor, cognition and isolation domain of depression.

**Table 2.** Factor loadings of 15 questions of the GDS obtained from Thai elderly subjects: all questions were recorded as score 1 or 0 (appendix).

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
<b>Eigenvalue</b>	<b>3.83</b>	<b>1.69</b>	<b>1.40</b>	<b>1.09</b>	<b>1.00</b>
<b>% variance</b>	<b>25.5</b>	<b>11.2</b>	<b>9.3</b>	<b>7.3</b>	<b>6.7</b>
GDS1	<u>0.53232</u>	0.11896	0.32360	0.12064	-0.18463
GDS2	-0.09459	0.21097	<u>0.77143</u>	0.05194	0.00540
GDS3	0.19883	<u>0.63643</u>	0.13510	0.27897	0.05410
GDS4	<u>0.65257</u>	0.20672	0.15699	0.18130	0.03028
GDS5	<u>0.86905</u>	0.04912	-0.07528	0.10272	-0.04578
GDS6	0.21134	0.12384	-0.11217	0.61838	-0.07215
GDS7	<u>0.87121</u>	0.08866	-0.02827	0.08445	-0.03323
GDS8	0.19869	<u>0.50229</u>	-0.16033	0.36294	-0.10442
GDS9	-0.11390	-0.07136	0.06635	0.09085	<u>0.92634</u>
GDS10	0.09253	0.08827	0.08520	<u>0.66820</u>	0.16823
GDS11	0.39553	<u>0.50314</u>	-0.04637	-0.37771	0.28908
GDS12	0.31912	<u>0.55634</u>	0.29645	0.11672	-0.20593
GDS13	0.19316	-0.00647	<u>0.79413</u>	-0.10623	0.08321
GDS14	0.15051	<u>0.65744</u>	0.25499	-0.14760	0.02671
GDS15	-0.11048	<u>0.73225</u>	-0.01759	0.12819	-0.06380

GDS score correlates with perceived health status, self rating of present health status compared with health status during their young adult period, happy-sad feeling, self rating of happy-sad feeling at present compared to that of other elderly, self rating of happy-

sad feeling at present compared with happy-sadfeeling during their young adult period, frequency of exercise, frequency of leisure activity, frequency of social aggregations, frequency of visitings by their relatives or friends and income. (Table 3)

**Table 3.** Spearman correlation coefficients of the GDS with other factors.

Factors	Correlation coefficient	P value
Age	0.05	NS
Education level	-0.16	NS
Working status	0.05	NS
Income	-0.25	<0.001
Number of children	0.06	NS
Number of person living with the subjects	-0.14	NS
Perceived health status	-0.23	<0.001
Self rating of present health status compared with their health status during young adulthood period	-0.24	<0.001
Self rating of happy-sad feeling	-0.31	<0.001
Self rating of happy-sad feeling at present compared to that of other elderly	-0.23	<0.001
Self rating of happy-sad feeling at present compared with their happy-sad feeling during young adulthood period	-0.24	<0.001
Frequency of exercise	-0.27	<0.001
Frequency of leisure activity	-0.28	<0.001
Frequency of social aggregation	-0.19	<0.01
Frequency of visiting by their relatives or friends	-0.23	<0.001

## Discussion

The subjects in this study were recruited only from the Geriatric clinic of Chulalongkorn University hospital and had considerably low rate of illiteracy compared with that of the general elderly population.<sup>(8,9)</sup> Limitation of this study, like the original validation study of Yesavage,<sup>(2)</sup> is that patients unable to complete the GDS were assisted and thus not all tests were completely self-administered. Although there was no effect of the type of administration (self administration or rater) on the GDS score, the study on other Thai elderly population to confirm this finding is required. Twenty percent of the subject had GDS score higher than five. If the cutoff level is equal to that suggested by the original study<sup>(2,3)</sup> (score of 6 or over is abnormal), 20% of subject had depression. This figure does not differ from those of other reports studied in Western population.<sup>(10-13)</sup> However, a study to determine criterion validity and appropriate cutoff score of the GDS used in Thai elderly is needed.

Factor analysis is a statistical technique used to identify a relatively small number of factors that can be used to represent relationships among sets of many interrelated variables. Factor analysis helps identify the underlying, not directly observable, constructs. Identification of underlying dimensions or factors greatly simplified the description and understanding of complex phenomena, such as social interaction. This study clearly demonstrated that there are five underlying factors of the GDS which represent emotion, negative will, psychomotor, cognition and isolation domains of depression (Table 2) It suggests that the GDS is valid for applying in this elderly population.

Because appropriate depression screening test which its validity has been proved is not available for Thai elderly at present and depressed mood is a major symptom of depression,<sup>(14)</sup> the happy-sad feeling was used for testing concurrent validation. From this study, the elderly who rated of having low income, poor health, sad feeling, low exercise, low leisure activity, less social aggregations and fewer visits by relatives or friends had a high GDS score. Therefore, constructed and concurrent validity of the GDS was also demonstrated.

In conclusion, the GDS appears to be a reasonable test for screening depression in cognitively older adults. However, determining its validity in other elderly population including the criterion validity is essential before it can be recommended for generalized usage in Thailand.

## References

1. Israel L, Djordje K, Sartorius N. Source book of geriatric assessment, vol 1: evaluations in Gerontology. Basel, Karger, 1984.
2. Research Unit of the Royal College of Physicians and the British Geriatrics Society. Standardised Assessment scale for elderly people. London, The Royal College of Physicians of London and the British Geriatrics Society, 1992.
3. Brink TL, Yesavage JA, Lum O, Heersema PH, Adey M, Rose TL. Screening tests for geriatric depression. *Clin Gerontol* 1982;1(1):37-43.
4. Yesavage JA, Brink TL, Rose TL, Lum O, Huang V, Adey M, Leiner O. Development and validation of a geriatric depression screening scale: a preliminary report. *J Psychiatr Res* 1982-83;17(1)37-49.
5. Sheik JI, Yesavage JA. Geriatric Depression Scale (GDS): recent evidence and development of a shorter version. In: Brink TL, ed. *Clinical Gerontology: a Guide to Assessment and Intervention*. New York: Haworth Press, 1986.
6. Sughondhabrom B. Depression in the Elderly who Attend Geriatric Clinic at Chulalongkorn Hospital. Presented at the 4th Asia/Occania Regional Congress on Gerontology, 1991, Yokohama, Japan (abstract page 266)
7. Andrews FM, Withey SB. Social indicators of Well-Being: Americans' Perception of Life Quality. New York: Plenum Press, 1976.
8. Jitapunkul S, Kamolratanakul P, Ebrahim S. The meaning of activities of daily living in a Thai elderly population: development of a new index. *Age Ageing* 1994;23:000-000. (in press)
9. Jitapunkul S, Bunnag S, Ebrahim S. Health care for the elderly people in developing countries: a case study of Thailand. *Age Ageing* 1993 Sep;22(5):377-81
10. Psychiatric illness among medical patients. *Lancet* 1979;1:479
11. Raft D, Spencer RF, Toomey T, Brogan D. Depression in medical outpatients: use of the Zung scale. *Dis Nerv Syst* 1977 Dec; 38(12):999-1004
12. Busse EW, Pfeiffer E. Behavior and adaptation in Late Life, ed 2. Boston: Little, Brown: 1977.
13. Blazer D, Williams CD. Epidemiology of dysphoria and depression in an elderly population. *Am J Psychiatry* 1980 Apr;37(4):439-44
14. American Psychiatric Association, Committee on Nomenclature and Statistics. *Diagnostic and Statistical Manual of Mental Disorders*. Revised 3ed. Washington, DC : American Psychiatric Association, 1983.

Appendix

The Geriatric Depression Scale - Thai version

- |   |                 |
|---|-----------------|
| 1. คุณรู้สึกพอใจในความเป็นอยู่รอบตัว                        | yes / <u>no</u> |
| 2. คุณหมดความสนใจและหยุดทำกิจกรรมต่าง                       | <u>yes</u> / no |
| 3. คุณรู้สึกว่าชีวิตของคุณว่างเปล่า                         | <u>yes</u> / no |
| 4. คุณเกิดความรู้สึกเบื่อหน่ายบ่อย ๆ                        | <u>yes</u> / no |
| 5. คุณรู้สึกสดชื่นเกือบตลอดเวลา                             | yes / <u>no</u> |
| 6. คุณกลัวว่าสิ่งที่ไม่ดีจะเกิดขึ้นกับคุณ                   | <u>yes</u> / no |
| 7. คุณรู้สึกมีความสุขอยู่เสมอ                               | yes / <u>no</u> |
| 8. คุณรู้สึกขาดที่พึ่ง                                      | <u>yes</u> / no |
| 9. คุณชอบที่จะอยู่ในบ้านมากกว่าออกไปข้างนอกหรือทำสิ่งใหม่ ๆ | <u>yes</u> / no |
| 10. คุณมีปัญหามากเกี่ยวกับความจำ                            | <u>yes</u> / no |
| 11. คุณคิดว่าคุณโชครืดที่มีชีวิตอยู่ขณะนี้                  | yes / <u>no</u> |
| 12. คุณรู้สึกว่าชีวิตค่อนข้างไร้ค่า                         | <u>yes</u> / no |
| 13. คุณรู้สึกว่ามึนงง (กระตือรือร้น) ที่จะทำสิ่งต่าง ๆ      | yes / <u>no</u> |
| 14. คุณรู้สึกหมดหวังกับสภาพในปัจจุบัน                       | <u>yes</u> / no |
| 15. คุณคิดว่าคนอื่น ๆ ดีกว่าคุณ                             | <u>yes</u> / no |

หมายเหตุ คำตอบที่ได้คะแนนคือคำตอบที่ขีดเส้นใต้