RELIABILITY, VALIDITY AND STRUCTURE OF THE CHINESE GERIATRIC DEPRESSION SCALE IN A HONG KONG CONTEXT: A PRELIMINARY REPORT

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ABSTRACT

Depression is one of the commonest psychiatric illness in the elderly. Screening instruments of depression can greatly facilitate its identification in the community, leading to early recognition and diagnosis. The Geriatric Depression Scale was translated into Chinese and its reliability, validity and factor structure examined in a population of Chinese elderly in Hong Kong. One hundred and thirteen normal and 80 depressed elderly subjects were studied and a cut-off score of 15 on the scale was found to be optimal. The scale's reliability and validity was satisfactory and thus it is a promising instrument for screening geriatric depression in Hong Kong.

Keywords: *Geriatric Depression Scale, Chinese, elderly*

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INTRODUCTION

Depression is common in the elderly and is associated with a high suicidal risk. Reported prevalence rates in the elderly population ranged from 0.8% for major depression[1] to 26% for affective disorders and neurosis[2]. As depression can often be treated successfully, early detection and diagnosis are crucial. Screening instruments can greatly facilitate the identification of depression in a relatively large number of subjects. In the elderly, however, the identification of depression may be difficult, because depressive symptoms such as sleep disturbance and poor appetite, may be concomitant features of normal ageing or various physical illnesses rather than of depression per se. In an attempt to overcome these problems, the Geriatric Depression Scale (GDS)[3,4] was developed specifically for use in the elderly population. It is a 30-item self-rating scale designed in a yes-no format, and includes only affective and behavioural items. The scale's brevity and simple response format are particularly favourable for use among the elderly. It has been shown to have good reliability and validity in Western cultures[4-8] and in Israel[9]. The factor structure of the scale has also been examined in several studies, using different elderly samples[10-13]. Of particular interest is Salamero and Marcos' study[13], which attempted to compare the factor structure of the scale with Beck's cognitive model of depression[14]. However, they failed to find any correlation between the factor structure of the scale and Beck's model of depression.

At the present time, no clinical rating scales specifically designed for the screening of depression in the Chinese elderly could be found. Neither is the use of the Geriatric Depression Scale examined in this population. Therefore, the objectives of our study were: (i) to develop a Chinese version of the Geriatric Depression Scale (CGDS); (ii) to establish its reliability, validity and factor structure; and (iii) to examine the usefulness of the CGDS as a clinical screening instrument for geriatric depression in Hong Kong.

METHOD

Measures of Depression

(1) *The Geriatric Depression Scale* (GDS) was first translated into Chinese by two bilingual clinical psychologists and a psychiatrist. It was later back translated into English by an independent bilingual researcher. This instrument was then administered to five normal and five depressed elderly patients in a pilot study. The wording of some of items on the scale items was modified according to the feedback provided by the pilot subjects, so as to fit the culture of the Hong Kong Chinese elderly better. In particular, the wording of two items (Items 19 and 21) were changed, as their semantically translated equivalents were not completely appropriate to the Chinese culture. Item 19 "Do you find life exciting?" was replaced by "Do you find life full and colourful?", for the word "exciting" may be construed to have a negative connotation in the Chinese language. Item 21 "Do you feel full of energy?" was changed to "Do you feel you have adequate energy?". These changes were considered to be more appropriate for use in the Chinese elderly.

Furthermore, an example each was provided for items 12 and 20 to clarify their meaning. For question 12 "Do you prefer to stay at home, rather than going out and doing new

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things?", an example of going out to have dinner in a new restaurant with one's relatives or friends was used. For question 20 "Is it hard for you to get started on new projects?", an example of helping to decorate for Christmas was given. These examples were appropriate to our local setting and enabled the elderly subjects to better grasp the meaning of the questions.

Two other measures of depression were also used in addition to the CGDS:

(2) The Chinese version of the *Zung Self-Rating Depression Scale* (CSDS)[15], is a 20-item self-rating scale originally developed by Zung[16] that assesses the subjects' current depressive symptoms, using a response format emphasising frequency. There are 4 choices for each item ranging from none or little of the time to most or all the time.

(3) The Chinese version of the *Hamilton Depression Rating Scale* (CHDS)[17], a 17-item observer-rated scale assessing depression in areas of affective and somatic concomitants.

Subjects

A sample of 193 (144 female, 49 male) subjects between the ages of 60 and 87 were included in the analysis of the study (mean age 72.8 ± 6.4). The subjects could be divided into two groups. The first group consisted of normal elderly persons recruited from a local senior citizens' centre (n=113, 86 females and 27 males, mean age 73.8 ± 5.8). The second group consisted of depressed patients referred to a university psychiatric unit and patients diagnosed as depressed in the senior citizens' centre (n=80, 58 females and 22 males, mean age 71.4 ± 6.7). These patients all carried one of the following three diagnoses according to the DSM-III-R criteria: 38 had major depression, 20 dysthymia, and 22 adjustment disorder with depressed mood. Both groups of subjects were predominantly from the lower social class and of similar mean age as shown above.

Procedure

The research team was sent to a local senior citizens' centre on prearranged dates and all consenting elderly were examined. One hundred and thirty-four elderly were interviewed, of whom 21 were excluded from the normal control group (12 of whom were depressed, 5 had dementia and 4 were on psychotropic drugs for various psychiatric problems). Thus, only 113 ambulant elderly not suffering from psychiatric disorders or dementia were included in the normal control group.

The depressed group consisted of consecutive depressed patients referred to a university psychiatric unit (n=68) from October 1991 to June 1992 and 12 depressed patients identified in the senior citizens' centre. Many of them were newly diagnosed as suffering from depression and were still untreated.

All subjects in both groups gave informed consent for participation and were interviewed by two psychiatrists who gave diagnosis to the subjects. A clinical interview was used for the diagnosis as there were no structured psychiatric interviews for the elderly available for use in our Chinese elderly. Semi-structured interviews like the Geriatric Mental State[18] and the CAMDEX[19] had not been translated into Cantonese and it was unknown if these instruments were valid for our local elderly. A rating on the CHDS for each subject was also provided by the two psychiatrists. Inter-rater reliability of the CHDS was 0.94. All subjects remained anonymous and were assured that the information provided was strictly confidential and used for research purpose only. Subjects found to be suffering from dementia in the clinical interview were excluded from the study.

The CGDS and the CSDS were administered by another independent psychiatrist blind to the clinical diagnosis. For subjects who were unable to complete the self-rating scales because of illiteracy or poor vision, the psychiatrist read the questions aloud, elicited answers from the subjects, and then recorded their responses on the questionnaire.

A random subset of subjects (n=30) from the normal elderly were examined one week after the first interview and the CGDS was administered again to assess the scale's test-retest reliability.

RESULTS

Statistical analyses included the examination of the internal consistency and split-half reliability of the CGDS, the convergent validity of the CGDS with CHDS and CSDS, and the correlation of the scores of CGDS with the clinical diagnoses of depression. An item analysis was also performed to determine if the scale was an appropriate clinical screening instrument for depression in our sample of elderly subjects. In addition, maximum likelihood factor analysis was conducted to examine the structure of CGDS.

Reliability

The CGDS for all subjects emerged as internally consistent with the Cronbach's alpha = 0.92. The Guttman Split-half reliability was 0.89. Test-retest reliability was also obtained on the normal subjects and it was equally satisfactory ($r=0.84$, $p<0.05$). Corrected item to total correlations ranged from 0.22 to 0.82, with a median score of 0.59.

Validity

Discriminant validity

One important test of the validity of the CGDS as a measure of depression rests in the ability of its scores to discriminate between normal elderly subjects and those who have been diagnosed to be depressed. To test for this, two methods were used. First, the mean CGDS scores of the normal and depressed subjects were compared. Second, a discriminant analysis was performed to determine if the CGDS correctly classified subjects in their respective groups, using their CGDS scores and clinical diagnosis for guidance. Results showed that the mean CGDS scores of the normal elderly (mean ± SD = 6.4 ± 4.6) were significantly lower than that of the depressed group (mean ± SD = 20.7 ± 3.7) ($t = 22.9$, $p<0.001$). Discriminant analysis was performed using the direct method. The discriminant function was calculated, with X^2 (1, n=192) = 250.97, $p<0.001$. The canonical correlation was 0.86, which showed a strong correlation between the discriminant scores and group membership. The discriminant function correctly classified 78 (97.5%) cases in the depressed group, and 98 (87.5%) cases in the normal group. Thus, the percentage of "grouped" cases correctly classified was 91.67%.

Convergent validity

Both the correlations between the CGDS and the CSDS and that between the CGDS and CHDS were 0.88. These figures were statistically significant ($p < 0.001$).

Sensitivity and specificity

Using the original cut-off score of 11, the sensitivity was 98.8% whereas specificity was only 77.7%. A high cut-off score of 15 yields a sensitivity rate of 96.3 and a specificity of 92.0. This score appears to be the best cut-off score for our sample of subjects.

Factor analysis of the CGDS

Maximum likelihood factor analysis with both varimax and oblimin rotations were performed to examine the structure of the scale. A magnitude of 0.40 or greater was used in assigning variables to factor. Although both varimax and oblimin rotations yielded very similar factors, the latter was reported here (Table I) because clinical conceptions of depression suggested that the factors were likely to be intercorrelated (Parmelee et al, 1989; Salamero & Marcos, 1992). Two factors with eigenvalues greater than unity emerged, accounting for 37.2% of total variance. Factor 1 (eigenvalue = 9.94, 33.1% of variance) included various items conveying the feelings of unhappiness, hopelessness and worthlessness, with crying spells and so on, and could be labeled general depressed mood. Factor 2 consisted of two items only and they described a reluctance in getting up in the morning and avoidance of social gatherings. This factor was not readily interpretable and did not seem to be meaningful. As a result of this consideration, the scale was viewed as essentially unidimensional and this was also supported by Cattell's screen test[20].

Table I – Summary of Oblimin-rotated 2-factor structure of the Geriatric Depression Scale

Items		Factor 1	Factor 2
04	Feel bored	.87134	
16	Down hearted and blue	.85026	
11	Irritable or restless	.78192	
03	Life is empty	.73159	
17	Feel worthless	.70554	
07	In good spirits	.67124	
10	Feel helpless	.66549	
25	Feel like crying	.65067	
01	Satisfied with life	.63914	
26	Difficulty in concentration	.63081	
13	Worried about future	.61896	
15	Wonderful to be alive	.61526	
06	Recurring thoughts	.59643	
22	Feel hopeless	.59545	
29	Easy to make decision	.59047	
02	Dropped activities	.54623	
20	Hard to start new projects	.53520	
08	Something bad might happen	.50586	
05	Hopeful about future	.47901	
19	Life exciting	.47738	
24	Get upset over little things	.40579	
27	Enjoy getting up in morning		.54725
28	Avoid social gathering		.47971

Note: Items are ordered and loading of magnitude < 0.40 are not shown.

DISCUSSION

The findings of the present study show that the CGDS is a reliable and valid screening instrument for depression among the Chinese elderly in Hong Kong. A high degree of internal consistency was found for the scale, and scores were reliable over a one-week interval for the normals. The validity of the scale was established by its high correlations with two other established depression scales, namely the CHDS and CSDS, as well as the scale's ability to significantly discriminate between the depressed and normal groups. Using an optimal cut-off score of 15+, the sensitivity (96.3%) and specificity (92.0%) levels are both very high, suggesting that the scale is a useful screening device for geriatric depression in Hong Kong.

The sensitivity and specificity levels in our study are higher than the original validation study[4]. One possible reason is that in our study, subjects in the community were interviewed by psychiatrists to ascertain their mental status and subjects who were depressed were categorised with the Depressed group. In the original validation study[4], it was not mentioned whether this was done and in another validation study[5], the community sample was not interviewed by psychiatrists. This might have led to misclassification of subjects and thus confounded the finding. Furthermore, subjects with dementia were carefully excluded from our study as the presence of dementia might be one confounding factor in the rating of the CGDS. The other possible reason is that our depressed patients were collected prospectively. Many of them were newly diagnosed as suffering from depression and were still untreated so that their depressive symptoms were still quite florid. This might result in the selection of a group of acutely depressed patients, who had a relatively high rating on the CGDS and were thus readily differentiated from the normal control group.

When compared with the usual cut-off score of 11 used in the West, the cut-off score of 15 established in this study was 4 points higher. This result was initially not expected, especially in view of the argument that Chinese patients tended to somatise their emotional problems and suppress their affective symptoms[21,22]. However, similar findings of a higher cut-off score for various scales have been reported with the Hong Kong Chinese. A higher cut-off score of 5/6 on the General Health Questionnaire was found to yield higher validity indices in Chinese sample than the generally accepted cut-off score 4/5[23]. Similarly, a much higher cut-off score of 18/19 compared with that (9/10) of Western studies was found for the Beck Depression Inventory[24]. In another study on the Chinese Minnesota Multiphasic Personality Inventory (MMPI) in Hong Kong, elevation of the scores on the depressive subscale was found compared with American norms[25].

Various reasons for an elevated depression subscale in the Chinese MMPI and a higher cut-off score on some of the self-rating questionnaires have been proposed by authors of the above studies. For instance, in a study of Chinese depressive patients seen in general practice in Hong Kong[26], it was found that they were more likely to admit psychological and depressive symptoms on a symptom checklist when asked directly by a researcher rather than to complain about them to the physician during consultation. In other studies using self report questionnaires among Chinese subjects, the admission of both somatic and psychological problems were found to be as high if not higher than among Western subjects[27,28]. Hence, it was suggested that the Chinese might tend to endorse more symptoms and might be more ready to report personal problems in self report inventories[24].

Another explanation is that cultural differences may affect the pattern of item endorsement. Recent cross-cultural research on affective disorders has found that different cultural and ethnic groups have different

expressions for emotional experiences and self-rating scales can be biased by different cultural concepts and idioms[29,30]. In addition, cross-cultural differences in attitudes and behavioural styles may be important in determining the choice of item endorsement on the various scales. More specifically, Cheung[25] suggested that when compared to the American norm, most Asian cultures appeared more "depressed", "constrained", and "withdrawn" on the MMPI profile. For example, the admission of the Hong Kong Chinese to a low activity level and social withdrawal might make them look lethargic, whereas this could actually be a means of relaxation amidst the busy urban life in Hong Kong[25]. Moreover, as the elderly people in Hong Kong are still heavily rooted in the traditional Chinese philosophy, the teaching of Confucianism and Taoism, which tend to promote a preference for moderation, calmness and forbearance, may influence their pattern of item endorsement[25]. Therefore, what is regarded as psychopathology in one culture may be regarded as normal behaviour in another.

Similar to our present findings, a recent study on the use of GDS in English-speaking Australians also reported the use of a higher cut-off score of 15 for their group[31]. In addition, another study on the use of the short form of GDS in Israel has found that a cut-off score of 7 is best for their sample instead of the usual cut-off score of 6[9]. These two studies serve to highlight once again the importance of establishing the appropriate sensitivity and specificity levels of an instrument when used in different cultures or settings.

Factor analysis of the CGDS shows that the scale is essentially unidimensional. This is consistent with previous reports in the literature[12,13]. Salamero and Marcos[13] found that the three cognitive patterns of depression according to Beck (ie negative view of self-esteem, the future and one's own experiences) were distributed among the various factors without achieving a coherent conceptual structure. Their finding of the lack of fit between the factorial structure and Beck's model of depression is also supported by our results.

One limitation of our study is the small number of subjects. Ideally, a larger sample of depressed patients and normal control subjects would be desirable. The second limitation is that our sample of normal and depressed subjects are relatively discrete groups due to the methodology. Whether the findings of our study can be generalised to the community at large would await further cross-validation studies. Thirdly, the group of depressed patients had more associated medical illness compared with the normal group, which might have influenced the scores on the CGDS. Further study is needed to look into the effect of physical health, socio-economic status and other factors that might influence the CGDS scores or alternatively, act as possible risk factors for depression.

CONCLUSION

The results of our findings on the reliability and validity of the CGDS are encouraging and suggest that it is a promising screening instrument for depression in our locality. Further large-scale cross-validation studies are necessary to examine its usefulness to screen for geriatric depression in the community.

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