Geriatric Depression Scale for community-dwelling older adults in Nepal

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ABSTRACT

Purpose. To evaluate the use of the Geriatric Depression Scale (GDS) and the GDS Short Form (GDS-15) in community-dwelling Nepalese older adults.

Methods. Cross-sectional samples of 247 male and 242 female Nepalese older adults aged ≥60 years who lived with at least one married son, were able to communicate in Nepali, and were not cognitively impaired were included. Data were collected in September 2006 using face-to-face structured questionnaires. Depressive symptoms were measured using the GDS. The GDS-15 scores were then calculated.

Results. The GDS and GDS-15 had a good Cronbach’s alpha (r=0.964, p<0.001). After a one-week interval, the intraclass correlation coefficients for GDS and GDS-15 were 0.75 and 0.86, respectively. The correlations between cut-off points of both scales were high. Life satisfaction index was negatively correlated with the GDS scores (r= -0.745, p<0.001) and with the GDS-15 scores (r= -0.562, p<0.001), indicating divergent validity. The GDS showed a 6-factor model, whereas the GDS-15 showed a 2-factor model with a good fit (GFI=0.928, AGFI=0.903, RMSEA=0.062). Depression was significantly more severe with increasing age (p<0.001), female gender (p<0.001), widows/widowers (p<0.001), and illiteracy (p<0.001).

Conclusion. The GDS and GDS-15 were reliable and valid instruments to measure depression among community-dwelling Nepalese older adults.

Key words: Aged; Depression; Nepal

BACKGROUND

Prevalence of late-life depression is consistent across countries and cultures and has a negative effect on quality of life.1 Having reliable instruments to screen for depression is important, as early diagnosis and treatment of depression reduces medical costs and institutionalisation.

The Geriatric Depression Scale (GDS) is a widely used instrument to identify depression in older adults.2 The GDS has been translated into 27 languages4 and has a good internal consistency and test-retest reliability. It was developed specifically to measure affective and motivational/cognitive components of depression in older adults.4 It is a 30-item scale that uses a yes-no response for a possible score of 0 to 30. Higher scores denote higher levels of depression.

A shorter version—the GDS-15—contains 15 items.5 In a study of 35 respondents, the correlation between the GDS-15 and GDS was 0.84.5 The GDS-15 has been validated with geriatric...
inpatients,\textsuperscript{6} outpatients,\textsuperscript{7} primary care patients,\textsuperscript{8} and community-dwelling older adults.\textsuperscript{9} The GDS-15 is an adequate substitute for the GDS to screen for late life depression,\textsuperscript{10} and has good internal consistency reliability and an acceptable criterion-related validity.\textsuperscript{11} It has been used to measure depression among community-dwelling older adults in Asian countries.\textsuperscript{12}

Establishing the reliability and validity of instruments to measure depression in developing countries is needed.\textsuperscript{13} This study aimed to evaluate the use of the GDS and GDS-15 among community-dwelling older adults in Nepal. The GDS was administered to Nepali older adults and the GDS-15 scores were calculated from the original GDS.\textsuperscript{14} There is a need for the shortened version of the GDS.\textsuperscript{15}

**METHODS**

This cross-sectional study used a face-to-face structured questionnaire, based on data collected from a survey that examined intergenerational relationships between older adults and their married sons in Nepal.\textsuperscript{16} Data were collected by 10 researchers in September 2006.

Persons aged ≥60 years who lived with at least one married son, were able to communicate in Nepali, and were not cognitively impaired were included. Only one older adult from each household was selected based on their willingness to participate.

Of 1539 persons aged ≥60 years in a population of >25 000, 92 were un-contactable, 43 refused to provide data, 332 were not living with a married son, 86 refused to participate, 101 could not communicate well in Nepali, 58 terminated the interview, and 338 had >1 older adult in the household. The remaining 247 men and 242 women (mean±SD age, 69.9±8.1 years) were successfully interviewed.

This study was approved by The Institutional Review Board of the Graduate School of Medicine, University of Tokyo and the Kathmandu Municipality office. Verbal informed consent was obtained from each participant. Participants could withdraw from the interview at any time.

The GDS was translated into Nepali from English by the first author. It was reviewed by 3 Nepali graduate students at the University of Tokyo, Japan. It was then back translated into English by a professional Nepali-English translator. All versions were checked for any differences and were corrected by the first author. Pilot testing was conducted on a sample of 50 Nepali older adults. Descriptive statistics from the pilot study and the feedback from the interviewee and interviewers were used to revise and finalise the questionnaire. Test-retest reliability was conducted with 10 older adults after a one-week interval.

Descriptive statistics and the gender distribution of depression were analysed. T-tests or ANOVA were conducted for patient age, gender, marital status, literacy, as well as GDS and GDS-15 scores. The internal consistencies of the GDS and GDS-15 were computed with Cronbach alpha reliability coefficients. Divergent validity was evaluated by correlating the scores on the life satisfaction index (Nepali version)\textsuperscript{17} with the GDS-15 and the GDS scores. Severity of depression was analysed using the widely used cut-off scores for levels of depression of the GDS and GDS-15. Levels of depression between the GDS and GDS-15 were correlated. Intraclass correlation coefficients were calculated for test-retest reliabilities. Exploratory factor analysis was used to analyse the construct validity of the GDS-30 and GDS-15.

**RESULTS**

54% of the respondents were married, 46% were widowed, and 57% were illiterate. The mean GDS and GDS-15 scores were 11.3 and 5.6, respectively (Table 1). 54.6%, 26.2%, and 19.2% of the older adults were categorised as having low (0-9), moderate (10-19) and severe (20-30) depression based on the GDS,\textsuperscript{18} whereas 57.3%, 27.4%, and 15.3% of older adults were categorised as having low (0-5), moderate (6-10), and severe (11-15) depression based on the GDS-15\textsuperscript{11} (Table 2). Correlations between GDS and GDS-15 in terms of low, moderate, and severe depression were 0.906, 0.740, and 0.815, respectively (p<0.001). Depression was significantly more severe with increasing age (p<0.001), female gender (p<0.001), widows/widowers (p<0.001), and illiteracy (p<0.001) [Table 1].

The correlation between overall scores of the GDS and GDS-15 was high (r=0.964, p<0.001).
The internal consistencies (evaluated by Cronbach alpha reliability coefficients) for the GDS and GDS-15 were 0.928 and 0.862, respectively. To measure the test-retest reliability (stability) after a one-week interval (n=10), the intraclass correlation coefficients for the GDS and GDS-15 scores were 0.75 and 0.86, respectively.

Life satisfaction index was negatively correlated with the GDS scores ($r = -0.745, p<0.001$) and with the GDS-15 scores ($r = -0.562, p<0.001$), indicating divergent validity.

Principal component factor analysis with varimax rotation was used to evaluate construct validity of the GDS (Table 3) and GDS-15 (Table 4). The varimax rotation showed 6 factors for the GDS with an eigenvalue of >1 explaining 57.48% of the variance.
Factor loadings of ≥0.4 were obtained for each item. The factor analysis of GDS-15 showed 2 factors with eigenvalues of >1, explaining 47.11% of the variance (Table 5). The GDS-15 showed a good fit in the model (GFI=0.928, AGFI=0.903, RMSEA=0.062), whereas the GDS did not.

For GDS, the first factor had an eigenvalue of 10.70, explaining 35.66% of the variance and consisting of 11 items that could be labelled as ‘sad mood’ (Table 5). Items loading onto the first factor were related to life satisfaction, happiness, feeling sadness, hopefulness, helplessness, restlessness, and perceptions about how it feels to be alive. The second factor had an eigenvalue of 1.94, explaining 6.47% of the variance and consisting of 8 items relating to past, present and future. Items loading on this factor were fear about the future, worry, emptiness, boredom, troublesome thoughts, emotional upset, and crying. The third factor had an eigenvalue of 1.26, explaining 4.21% of the variance and consisting of 4 items relating to functioning. The items on this factor included concentrating, starting projects, energy, and worthlessness. The fourth factor titled ‘lack of

<table>
<thead>
<tr>
<th>Factor No.</th>
<th>Factor</th>
<th>Factor component</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>Basically satisfied with life (not)</td>
<td>0.745 0.191 0.066 0.073 -0.016 -0.014</td>
</tr>
<tr>
<td>G9</td>
<td>Feel happy most of the time (do not)</td>
<td>0.733 0.345 0.140 0.178 -0.082 0.053</td>
</tr>
<tr>
<td>G7</td>
<td>In good spirits most of the time (not)</td>
<td>0.730 0.286 0.129 0.138 -0.078 0.127</td>
</tr>
<tr>
<td>G15</td>
<td>Think it is wonderful to live now (do not)</td>
<td>0.692 0.184 -0.019 0.121 0.213 -0.127</td>
</tr>
<tr>
<td>G16</td>
<td>Often feel downhearted and blue</td>
<td>0.635 0.459 0.117 0.095 0.126 -0.059</td>
</tr>
<tr>
<td>G19</td>
<td>Find life exciting (do not)</td>
<td>0.572 0.333 0.346 0.139 -0.104 0.002</td>
</tr>
<tr>
<td>G22</td>
<td>Feel that your situation is hopeless</td>
<td>0.566 0.448 0.175 0.180 0.105 0.026</td>
</tr>
<tr>
<td>G27</td>
<td>Enjoy getting up in the morning (do not)</td>
<td>0.540 0.128 0.127 0.190 0.190 -0.002</td>
</tr>
<tr>
<td>G11</td>
<td>Often get restless and feel fidgety</td>
<td>0.504 0.486 0.120 0.130 -0.068 0.082</td>
</tr>
<tr>
<td>G10</td>
<td>Often feel helpless</td>
<td>0.495 0.435 0.126 0.265 -0.060 0.107</td>
</tr>
<tr>
<td>G5</td>
<td>Hopeful about the future (not)</td>
<td>0.419 0.218 0.335 0.149 0.052 0.025</td>
</tr>
<tr>
<td>G13</td>
<td>Frequently worry about the future</td>
<td>0.125 0.730 0.140 0.110 0.038 0.061</td>
</tr>
<tr>
<td>G8</td>
<td>Afraid something bad will happen to you</td>
<td>0.230 0.691 0.110 0.188 -0.103 0.130</td>
</tr>
<tr>
<td>G4</td>
<td>Often get bored</td>
<td>0.284 0.652 0.206 0.194 0.047 0.055</td>
</tr>
<tr>
<td>G6</td>
<td>Bothered by thoughts that cannot be out of head</td>
<td>0.267 0.641 0.230 0.119 0.013 0.141</td>
</tr>
<tr>
<td>G18</td>
<td>Worry about the past</td>
<td>0.273 0.620 -0.007 0.098 0.148 -0.167</td>
</tr>
<tr>
<td>G24</td>
<td>Frequently feel upset over little things</td>
<td>0.533 0.575 0.009 0.056 0.214 -0.056</td>
</tr>
<tr>
<td>G25</td>
<td>Frequently feel like crying</td>
<td>0.334 0.573 -0.008 0.033 0.230 -0.110</td>
</tr>
<tr>
<td>G3</td>
<td>Feel that life is empty</td>
<td>0.423 0.472 0.331 0.078 -0.018 -0.033</td>
</tr>
<tr>
<td>G26</td>
<td>Have trouble concentrating</td>
<td>0.045 0.080 0.791 0.073 0.086 0.068</td>
</tr>
<tr>
<td>G20</td>
<td>Hard for you to start new projects</td>
<td>0.104 0.159 0.774 0.144 0.002 -0.064</td>
</tr>
<tr>
<td>G21</td>
<td>Feel full of energy (not)</td>
<td>0.375 0.261 0.476 0.408 0.063 -0.028</td>
</tr>
<tr>
<td>G17</td>
<td>Feel pretty worthless the way you are now</td>
<td>0.341 0.095 0.457 0.116 0.148 0.174</td>
</tr>
<tr>
<td>G14</td>
<td>Have more memory problem than most</td>
<td>0.157 0.143 0.023 0.762 -0.036 0.013</td>
</tr>
<tr>
<td>G30</td>
<td>Mind not as clear as it used to be</td>
<td>0.156 0.151 0.153 0.740 0.170 -0.058</td>
</tr>
<tr>
<td>G2</td>
<td>Dropped many interests and hobbies</td>
<td>0.130 0.089 0.132 0.542 0.008 0.197</td>
</tr>
<tr>
<td>G29</td>
<td>Easy to make decisions (not)</td>
<td>0.237 0.243 0.268 0.505 0.401 -0.100</td>
</tr>
<tr>
<td>G12</td>
<td>Prefer to stay home rather than going out</td>
<td>-0.074 0.071 0.195 0.169 0.694 -0.049</td>
</tr>
<tr>
<td>G28</td>
<td>Prefer to avoid social gatherings</td>
<td>0.217 0.032 -0.098 -0.072 0.571 0.385</td>
</tr>
<tr>
<td>G23</td>
<td>Think most people are better off than you</td>
<td>-0.053 0.055 0.070 0.100 0.050 0.856</td>
</tr>
</tbody>
</table>

**Table 5** Factor structure of the Geriatric Depression Scale (GDS)
motivation’ had 4 items and an eigenvalue of 1.93, explaining 3.98% of the variance. The items were related to decision-making, hobbies and interests, and memory. ‘Social withdrawal’ was the fifth factor and had an eigenvalue of 1.09, explaining 3.64% of the variance. The sixth factor included only one item and had an eigenvalue of 1.06, explaining 3.52% of the variance.

For GDS-15, the first factor with an eigenvalue of 5.79 explained 38.59% of the variance (Table 5). It described affective aspects of depression and included spirit, life satisfaction, hopelessness, emptiness, boredom, fear of bad things, and energy level. The second factor with an eigenvalue of 1.28 explained 8.51% of the variance. Its 5 items could be described under the heading ‘social engagement and cognition’ and included items regarding interests and hobbies, social isolation, memory, and worthlessness.

**DISCUSSION**

This study explored the psychometric properties of the GDS and the GDS-15 in older adults in Nepal.
Nepal. In community-dwelling Asian immigrants in the United States, the mean GDS score was 15.0 among Japanese, 12.4 among Vietnamese, and 11.1 among Indian older adults. A comparative geriatric assessment between community-dwelling older adults in Asian countries reported a mean GDS-15 score of 5.4 among Koreans and 3.4 among Japanese.

The correlations between the GDS and GDS-15 were high ($r=0.964, p<0.001$), which was comparable to another study reporting a correlation of 0.84. The alpha reliability of the GDS and GDS-15 scores was 0.923 and 0.862, respectively, which was comparable to the original studies, and studies in India, Iran, Saudi Arabia, and Turkey. Internal consistency of 0.70 for newly developed instruments and 0.80 for established instruments is considered the minimal acceptable level of internal consistency. Similarly, the test-retest reliability (intraclass correlations coefficient) was acceptable (0.75 for GDS and 0.86 for GDS-15). A coefficient of >0.70 is regarded as an acceptable level of stability.

Higher levels of depression lead to lower quality of life. The life satisfaction index correlated negatively with the GDS and GDS-15, indicating divergent validity.

There were significant differences in the levels of depression associated with age, gender, marital status, literacy and chronic illnesses. Increasing age significantly correlated with increased levels of depressive symptoms. In a Korean study, increased age was positively associated with depression in an urban sample, but negatively associated in a rural sample. Females were significantly more depressed than males. This could be due to the patriarchal society in Nepal. Older adults who had less education reported significantly higher levels of depression. Higher education results in higher social status, well-paid jobs, and pensions. Less education reported significantly higher levels of depression. Older adults with more chronic diseases were also more depressed.

The variances explained in the factor analysis for both the GDS and GDS-15 were comparable to those reported in previous studies. The GDS-15 is a frequently used measure of depression because it takes less time than the GDS and has shown good internal consistency and validity. Further research involving measurement of depression in late life among Nepalese should consider using the GDS-15, as older adults may fatigue easily.

As our sample included only older adults living with their married son, this could be regarded as a limitation reducing generalisability to other populations. This sample was selected because living with a son is a cultural norm and almost 80% of older adults live in a joint family in Nepal. Older adults living with their children might not feel lonely and get adequate support and report lower levels of depression. On the other hand, close relationships are more likely to attribute to conflict and stress, so that higher levels of depression may result. Future studies on GDS should be focused on overall community-dwelling older adults, irrespective of their living arrangements. The GDS-15 was appropriate to measure depression in Nepalese older adults and can be an adequate substitute for the GDS.

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