Health status of older migrants in the Netherlands: Cross-cultural validation of health scales

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Translation and validation of the short Geriatric Depression Scale (GDS-15) among Turkish, Moroccan and Surinamese older migrants in the Netherlands

Özgül Uysal-Bozkir, Rianne Hoopman and Sophia E. de Rooij
Chapter 5

Abstract

Background: The Geriatric Depression Scale (GDS-15 items) was translated and validated for use among first-generation older migrants from Turkish and Moroccan descent, and the Dutch version was validated for Surinamese migrants living in the Netherlands.

Methods: The data were derived from a cross-sectional observational cohort study among 253 Turkish, 67 Moroccan, 40 Berber, 132 Surinamese-Creole, 212 Surinamese-Hindustani and 83 native Dutch participants. Psychometric analyses were performed to assess the reliability and validity of the GDS-15.

Results: The GDS-15 proved highly internal consistent among all ethnic groups. Known groups validity was observed for subgroups of participants differing in presence of comorbidity, limitations in daily activities and loneliness feelings, but not for subgroups differing in age, gender or education level.

Conclusion: The results provided support for the use of the (translated version of the) GDS-15 among Turkish, Moroccan and Surinamese older migrants as a reliable and valid screening measure of depression. Further research is needed to investigate ethnic differences in the levels and determinants of depression.
Depression and older migrants

Background
Worldwide, depression is a common mental disorder. Globally, more than 350 million people of all ages suffer from depression. Depression is the leading cause of disability worldwide, and is a major contributor to the global burden of disease. Depressive disorders are common among the elderly and are associated with higher utilization of in- and out-patient services and increased mortality risk. With the aging of the first-generation migrants, age-related diseases (including depression) are emerging health care problems.

In the Netherlands, the prevalence of depression among older persons above 55 years is 14.5%. Among ethnic minority migrants these numbers are even higher. Prevalence rates of self-reported depressive symptoms around 34% for Moroccan and 60% for Turkish migrants living in the Netherlands were reported in 2004.

Important risk factors for the development of depression among elderly persons, and especially elderly migrants, are physical limitations, chronic medical illnesses and living under adverse socio-economic circumstances. In addition, previous studies report ethnicity to be a strong independent predictor to develop depressive symptoms and depression as these risk factors are frequently present among migrants.

The prevalence rate of depression in the Netherlands is usually measured by generic depression scales like the Center for Epidemiologic Studies Depression Scale (CES-D). However, Turkish and Moroccan elderly migrants often (45%) lack proficiency in the Dutch language. This hampers the inclusion of these groups in clinical research, as formal diagnostic and therapeutic procedures for depression require good mastery of Dutch.

The availability of a translated and valid cross-culturally adapted geriatric depression screening instrument for use in older non-Western migrants living in the Netherlands is currently lacking.

For the present study we first translated the GDS-15 into Dutch and five mother-tongue languages that are spoken among Turkish, Moroccan (Moroccan-Arabic and Tarifit language) and Surinamese migrants (Sranantongo and Sarnámi) in the Netherlands.

We aimed also to evaluate the psychometric properties (acceptability, reliability, construct validity and cross-cultural validity) of the cross-culturally adapted GDS-15 for use among the Turkish, Moroccan and Surinamese elderly migrants living in the Netherlands. We report on the equivalence of translations to the Dutch version of the GDS-15, based on preliminary differential item function analysis.

Methods

Design and setting
This validation study of the GDS-15 is part of a population-based cohort study called the SYMBOL study (Systematic Memory testing Beholding Other Languages). The study took place among the older general population living in the four largest Dutch cities, i.e.
Amsterdam, Rotterdam, The Hague and Utrecht. The SYMBOL study assessed a newly-developed reliable neuropsychological screening test that could be applied to screen for dementia in both literate and illiterate persons. Besides screening for dementia, depressive symptoms, functional ability, loneliness and quality of life were measured.

Community-dwelling participants of Turkish, Moroccan and Surinamese descent as well as native Dutch elderly were recruited from general practices in suburbs with low socio-economic status (SES). Inclusion took place between May 2010 - April 2013.

Participants and procedures
Participants were eligible for inclusion if they were aged 55 years or older and they or one of their parents were born in Turkey, Morocco or Surinam. They had to be proficient in either Dutch or one of the languages of the study (Turkish, Moroccan-Arabic, Tarifit, Sranantongo or Sranâmî), irrespective of their proficiency level in Dutch. Moroccan-Arabic and Tarifit (spoken by Rifberbers) are the two most commonly spoken oral languages among Moroccans in the Netherlands.

All participants were invited to participate via a (bilingual) letter followed by a personal invitation by phone by one of the bilingual research assistants, which were mainly female. The interviews were conducted either at the centre of the general practitioner or in a social centre (i.e., primary care health centers and community centers) or at the participant’s home, depending on the preference of the participants. The duration of the complete health status interview (including the cognitive screening test) was 60 to 90 minutes and the GDS-15 was about 10 minutes.

The SYMBOL study was approved by the local medical ethical committee of the Academic Medical Centre of the University of Amsterdam.

Instruments
There is not yet a geriatric depression scale available for migrant ethnic minority groups. The original Geriatric Depression Scale (GDS) is a self-reporting questionnaire, developed by Yesavage et al. (1983), measuring depressive symptoms particularly in the older populations. The GDS was originally developed as a 30-item questionnaire (GDS-30) in a simple yes/no response format. This format frames questions within the past week and responses require only a “yes” or “no,” making comprehension easier for elderly compared with the instruments that present four-choice answers.

In 1986 Sheik and Yesavage developed and validated a GDS-15 item short form in order to improve its acceptability for the elderly. In this short form, 10 items indicate the presence of depression when answered positively, while the other five items indicate depression when answered negatively. Total scores range from 0 to 15, representing no symptoms and maximum symptoms, respectively. The GDS-15 is used as screening instrument, using a cut-off score of >6 for depression. The GDS-15 has been validated and shown to have good criterion validity in detecting depression. In a meta-analysis, the GDS-15 showed an average sensitivity of 0.81, a specificity of 0.75 and a Cronbach’s alpha of 0.90. If participants were
unable to provide a response to one to five items, the mean item score of the remaining items was used to impute the score for the missing items. If six or more items were missing the questionnaire was left out for further analysis.

In this study we used the GDS-15. In the first part of the study group we used the GDS-15 in combination with the GDS-2 screening (for 523 participants, see Figure 1). The GDS-2 consists of two verbal questions for screening depressive symptoms: “During the past month have you often been bothered by feeling down, depressed, or hopeless?” and “During the past month have you often been bothered by having little interest or pleasure in doing things?”. These two GDS-2 questions were used for (preliminary) screening, and if either was positive, the screening was considered positive and therefore participants were presented the GDS-15. A previous study \(^{29}\), showed a sensitivity of 97% and specificity of 67% for the GDS-2. The sensitivity is therefore considered appropriate to detect most cases of depression in general practice \(^{29}\).

In the second part of the study, the GDS-15 was administered to all participants (for 247 participants), regardless of their GDS-2 result (from January 2013).

**Translation and cultural adaptation of the GDS**

We used a forward-backward translation procedure, according to the Guidelines for the Process of Cross-Cultural Adaptation \(^{30}\). The Dutch version of the GDS-15 \(^{31}\) was translated into five other languages. We generated the Moroccan-Arabic version in phonetic Arabic script and the Tarifit version in commonly used Latin script to make it appropriate for interviewer administration purposes. The questionnaires were orally administered to participants. The GDS-30 has already been translated into Turkish in Turkey \(^{32}\). However, as Turkish migrants differ linguistically and culturally from Turkish people living in Turkey, we translated the GDS-15 for the Turkish population in the Netherlands. We used this Turkish-translated GDS-15 and the Turkish version of Ertan et al. (2000) to evaluate all possible differences between the two versions, and linguistically and culturally adapt the final version for use among Turkish participants \(^{32}\).

A large part of the Surinamese population, who came from former Dutch colonies, does speak Dutch, and for whom the Dutch version of the GDS-15 was used. We also created two Surinamese versions, (in the languages Sranantongo and Sarnâmi for people from Creole and Hindu origin, respectively), for those who did not have a high proficiency in Dutch.
Figure 1: Flowchart showing participants included in the analysis

Enrolled in the SYMBOL-study
N=2170

< 2013 GDS-2

< 2013 GDS-2+15

> 2013 GDS-15

Turkish participants
n=270

Moroccan participants
n=150

Berber participants
n=51

Creole participants
n=259

Hindustani participants
n=182

Dutch participants
n=424

Total
N=1336

Turkish participants
n=129

Moroccan participants
n=54

Berber participants
n=16

Creole participants
n=98

Hindustani participants
n=149

Dutch participants
n=77

Total
N=523

Turkish participants
n=120

Moroccan participants
n=13

Berber participants
n=24

Creole participants
n=27

Hindustani participants
n=61

Dutch participants
n=2

Total
N=247

$523 + 247 + 17^* = 787$ enrolled in the analysis

*GDS-15 available, GDS-2 missing

Measurers
For the Turkish and Moroccan participants, all questionnaires were orally administered in their mother tongue (Moroccan-Arabic and Tarifit) by the bilingual research assistant in an interview setting. All Surinamese participants appeared to have sufficient Dutch language
Depression and older migrants

proficiency and preferred to fill in the questionnaire as a self-administered questionnaire in
the Dutch language. Therefore no questionnaires were administered in Sranantongo and
Sarnâmi. The Dutch group filled in the self-administered questionnaire in the Dutch
language. All participants completed the health status interview. Alongside the GDS-2 and
GDS-15, information was collected on demographic characteristics, morbidity, health-
related quality of life (EuroQoL-5D+C)\textsuperscript{33,34}, functional limitations (Katz Index of
Independence Basic and Instrumental Activities of Daily Living ((I)ADL))\textsuperscript{35,36} and feelings of
loneliness (De Jong Gierveld Loneliness scale)\textsuperscript{37}. The presence of depressive symptoms
was assessed using Dutch, Turkish, and two Moroccan versions of the GDS-15.

Statistical analyses

We first examined the acceptability and reliability (internal consistency) of the GDS scale,
then the content validity (qualitative results), construct validity (hypotheses testing/known
groups) and cross-cultural validity. Descriptive statistics were computed to describe the
study sample, the characteristics of the participants, score distributions and floor and
ceiling effects. Acceptability of the GDS was established by calculating the percentage of
items missing and the number of participants who missed 6 or more GDS-15 items.
Internal consistency of the GDS was assessed by Cronbach’s alpha for the total GDS scale
(15 items). Cronbach’s alpha had to be at least 0.70 in each ethnic group. Known-groups
validity was evaluated by comparing subgroups of participants, which were differentiated
on relevant clinical and sociodemographic variables known to affect depressive symptoms.
We hypothesized that those aged 65 years and older, female, lower educated, reported
limitations in daily functioning, with 2 or more comorbid conditions, and who also
reported feelings of loneliness would report more depressive symptoms than those less
than 65 years, men, educated, with no limitation in daily functioning, no or one comorbid
conditions and with no feelings of loneliness. We also hypothesized that the largest mean
differences would be observed on the basis of comorbidity and loneliness subgrouping,
and the smallest difference on the basis of age and gender grouping. Finally, we
hypothesized that the native Dutch group would generally score lower on the GDS-total-
scale score then all migrant groups separately. Previous studies report more depressive
symptoms among elderly migrants from Turkey and Morocco in the Netherlands in
comparison to the native Dutch\textsuperscript{7,12}.

Differential item functioning (DIF) analyses were done for assessing cross-cultural validity,
to test the equivalence of the Turkish, Moroccan and Tarifit translations and the
Surinamese-Creole and Hindustani answers compared to the Dutch version of the GDS-15.
We compared the data of the migrant groups with the Dutch group. We tested uniform
and non-uniform DIF for all items from the GDS-15 scale using logistic regression analysis.
We first tested for non-uniform DIF by modeling the item response as a logit-linear
function of the translation (Dutch versus Turkish, or Dutch versus Moroccan), the scale
score and the interaction between translation and scale score. The interaction term
represents the possible non-uniform DIF. Non-uniform DIF (indicating that the magnitude
and direction of cultural/language differences in item scores varies as a function of the overall scale score) was considered to be present when the interaction term was significant with a $p$-value less than 0.001. For items without non-uniform DIF, uniform DIF was tested by modeling the item response as a logit-linear function of the translation and the scale score, with the translation term representing possible uniform DIF. Uniform DIF (testing the direction and magnitude of cultural/language differences in item scores) was considered to be present if the odds ratio of the translation term was outside the interval 0.53–1.89 (log odds ratio, beta, numerically larger than 0.64) \(^{38}\). All analyses were corrected for age, sex and education.

If the results of structural validity, the known-groups validity and the cross-cultural validity are acceptable, then this supports the construct validity of the Dutch GDS among Surinamese and translated (Turkish and Moroccan) scales, respectively. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 20.0.

**Results**

**Sample background characteristics**

Complete GDS-15 data were available for 787 participants (Figure 1). Table 1 shows the results of the background characteristics of each participating ethnic group. Compared to the Dutch participants, the Turkish, Moroccan and Surinamese participants were generally younger. Turkish and Moroccan participants tended to have no/less formal education. Education differed significantly between the ethnic groups. The native population and migrants differed in the number of chronic diseases reported. The median score for the number of chronic diseases was highest for the Turkish participants at 4.00 (range 0.00 – 11.00), followed by Hindus at 3.00 (0.00 – 15.00). The other study groups had a median score of 2.00. The mean score for health-related quality of life among the group of all migrants, measured by EuroQol-5D+C, was higher in comparison to the native Dutch group. This was also seen for the reported (I)ADL limitations.

Table 2 summarizes the descriptive statistics for the GDS-15. Relatively high floor effects were observed for the GDS-total-scale score in the Moroccan group and some smaller floor effects were seen for all groups except the Turkish group. The items that had more than 4% missing were item 13 in the Moroccan group, item 5 in the Berber, item 13 and 14 in the Creole group and 2, 5 and 15 in the Dutch group (not tabled) (see Appendix).

**Internal consistency**

Internal consistency estimates (Chronbach’s $\alpha$) for the GDS-15 scale were above 0.80 (range 0.82-0.88) in all the groups (Table 2).
## Table 1: Background characteristics of the native Dutch and the migrant groups in the Netherlands

<table>
<thead>
<tr>
<th>Variable</th>
<th>Turkish*</th>
<th>Moroccan*</th>
<th>Berber*</th>
<th>Surinamese-Creole*</th>
<th>Surinamese-Hindustani*</th>
<th>Dutch native</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total, n (%)</strong></td>
<td>253 (32.2)</td>
<td>67 (8.5)</td>
<td>40 (5.1)</td>
<td>132 (16.8)</td>
<td>212 (26.9)</td>
<td>83 (10.5)</td>
</tr>
<tr>
<td>Age in years,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>63.9 (6.6)</td>
<td>63.2 (7.0)</td>
<td>64.5 (7.0)</td>
<td>64.7 (8.5)</td>
<td>63.6 (8.5)</td>
<td>67.8 (8.7)</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>63.0 (55-84)</td>
<td>61 (55-81)</td>
<td>64 (55-78)</td>
<td>62 (55-93)</td>
<td>62 (55-88)</td>
<td>65 (55-94)</td>
</tr>
<tr>
<td>Gender, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>150 (59.3)</td>
<td>26 (38.8)</td>
<td>22 (55.0)</td>
<td>92 (69.7)</td>
<td>137 (64.6)</td>
<td>42 (50.6)</td>
</tr>
<tr>
<td>Male</td>
<td>103 (40.7)</td>
<td>41 (61.2)</td>
<td>18 (45.0)</td>
<td>40 (30.3)</td>
<td>75 (35.4)</td>
<td>41 (49.4)</td>
</tr>
<tr>
<td>Education, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No education</td>
<td>67 (26.5)</td>
<td>26 (38.8)</td>
<td>28 (70.0)</td>
<td>-</td>
<td>5 (2.4)</td>
<td>-</td>
</tr>
<tr>
<td>Low education</td>
<td>157 (62.1)</td>
<td>28 (41.8)</td>
<td>11 (27.5)</td>
<td>39 (29.5)</td>
<td>121 (57.1)</td>
<td>15 (18.1)</td>
</tr>
<tr>
<td>Middle education</td>
<td>15 (5.9)</td>
<td>7 (10.4)</td>
<td>1 (2.5)</td>
<td>76 (57.6)</td>
<td>70 (33.0)</td>
<td>50 (60.2)</td>
</tr>
<tr>
<td>High education</td>
<td>14 (5.5)</td>
<td>4 (6.0)</td>
<td>-</td>
<td>17 (12.9)</td>
<td>13 (6.1)</td>
<td>18 (21.7)</td>
</tr>
<tr>
<td>Missing</td>
<td>-</td>
<td>2 (3.0)</td>
<td>-</td>
<td>-</td>
<td>3 (1.4)</td>
<td>-</td>
</tr>
<tr>
<td>Living situation, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living alone</td>
<td>42 (16.6)</td>
<td>16 (23.9)</td>
<td>5 (12.5)</td>
<td>75 (56.8)</td>
<td>108 (50.9)</td>
<td>32 (38.6)</td>
</tr>
<tr>
<td>Living with others (partner, children etc.)</td>
<td>211 (83.4)</td>
<td>51 (76.1)</td>
<td>35 (87.5)</td>
<td>57 (43.2)</td>
<td>104 (49.1)</td>
<td>51 (61.4)</td>
</tr>
<tr>
<td>Marital status, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>191 (75.5)</td>
<td>51 (76.1)</td>
<td>33 (82.5)</td>
<td>33 (25.0)</td>
<td>86 (40.6)</td>
<td>50 (60.2)</td>
</tr>
<tr>
<td>Divorced</td>
<td>17 (6.7)</td>
<td>10 (14.9)</td>
<td>3 (7.5)</td>
<td>33 (25.0)</td>
<td>61 (28.8)</td>
<td>15 (18.1)</td>
</tr>
<tr>
<td>Widowed</td>
<td>37 (14.6)</td>
<td>5 (7.5)</td>
<td>4 (10.0)</td>
<td>22 (16.7)</td>
<td>43 (20.3)</td>
<td>11 (13.3)</td>
</tr>
<tr>
<td>Never married</td>
<td>8 (3.2)</td>
<td>-</td>
<td>-</td>
<td>44 (33.3)</td>
<td>21 (9.9)</td>
<td>7 (8.4)</td>
</tr>
<tr>
<td>Missing</td>
<td>-</td>
<td>1 (1.5)</td>
<td>-</td>
<td>-</td>
<td>1 (0.5)</td>
<td>-</td>
</tr>
<tr>
<td>Comorbidity\textsuperscript{1}, number of diseases (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>11 (5.2)</td>
<td>10 (20.4)</td>
<td>4 (10.3)</td>
<td>8 (8.8)</td>
<td>12 (6.2)</td>
<td>6 (14.6)</td>
</tr>
<tr>
<td>One</td>
<td>20 (9.5)</td>
<td>15 (3)</td>
<td>4 (13.3)</td>
<td>3 (22.4)</td>
<td>23 (11.8)</td>
<td>6 (14.6)</td>
</tr>
<tr>
<td>Two or more</td>
<td>179 (85.2)</td>
<td>27 (55.1)</td>
<td>22 (56.4)</td>
<td>61 (67.0)</td>
<td>160 (82.1)</td>
<td>29 (70.7)</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>4.6 (2.8)</td>
<td>2.2 (2.1)</td>
<td>2.4 (1.9)</td>
<td>2.7 (2.1)</td>
<td>3.8 (2.5)</td>
<td>2.1 (1.4)</td>
</tr>
<tr>
<td>Median (Range)</td>
<td>4.0 (0-11)</td>
<td>2.0 (0-11)</td>
<td>2.0 (0-7)</td>
<td>2.0 (0-10)</td>
<td>3.0 (0-15)</td>
<td>2.0 (0-7)</td>
</tr>
</tbody>
</table>

**Some/severe problems in domains:**

- **Mobility:** 147 (58.1) 36 (53.7) 21 (52.5) 67 (50.8) 132 (62.3) 30 (36.1)
- **Self-care:** 147 (58.1) 36 (53.7) 21 (52.5) 67 (50.8) 132 (62.3) 30 (36.1)
- **Usual activities:** 147 (58.1) 36 (53.7) 21 (52.5) 67 (50.8) 132 (62.3) 30 (36.1)
- **Pain / discomfort:** 148 (58.5) 43 (64.2) 21 (52.5) 72 (54.5) 143 (67.5) 47 (56.6)
- **Anxiety / depression:** 158 (62.5) 38 (56.7) 17 (42.5) 73 (55.3) 142 (67.0) 43 (51.8)
- **Cognition:** 158 (62.5) 38 (56.7) 17 (42.5) 73 (55.3) 142 (67.0) 43 (51.8)

**Sum score of six domains:**

- **(range 0-6):** 3.6 (1.8) 3.4 (1.9) 3.3 (1.9) 3.2 (1.8) 3.7 (1.6) 2.7 (1.5)
- **Mean (SD):** 4.0 4.0 3.0 4.0 4.0 3.0

**(I)ADL limitations \textsuperscript{1}, n (%)**

- **none:** 100 (39.5) 30 (44.8) 14 (35.0) 60 (45.5) 73 (34.4) 56 (67.5)
- **one or more:** 153 (60.5) 37 (55.2) 26 (65.0) 72 (54.5) 139 (65.6) 27 (32.5)

**Loneliness (≥ 9 points on the loneliness scale)\textsuperscript{1}, n (%)**

- 86 (35) 16 (24) 5 (13) 35 (27) 59 (30) 12 (15)

**Depressive symptoms \textsuperscript{1}, n (%)**

- **No (score < 6):** 103 (40.7) 42 (62.7) 26 (65.0) 74 (56.1) 98 (46.2) 55 (66.3)
- **Suggestive depression (≥26):** 71 (28.1) 13 (19.4) 11 (27.5) 30 (22.7) 58 (27.4) 19 (22.9)
- **Indicates depression (score≥30):** 79 (31.2) 12 (17.9) 3 (7.5) 28 (21.2) 56 (26.4) 9 (10.8)

See next page for further information
Chapter 5

**Continuation of Table 1**

SD = Standard deviation. Mean values (SD) are given for continuous variables with a normal distribution. Median values (IQR = Interquartile Range) are given for variables that are not normally distributed (i.e. comorbidity).

a Participating Turkish and Moroccan participants who completed the questionnaire, incl. GDS-15, in their mother tongue; d Participants who completed the questionnaires, incl. GDS-15, in Dutch; Comorbidity is measured by the GGD Health Monitor Index (GHMI): the number of chronic diseases present (one or more) in an individual patient at the same time. Range of scores = 0-18, 0 indicating no comorbidities, 2 or more indicating presence of severe comorbidities; Health-related quality of life (EQ-5D+C). Problems in each domain of the EQ-5D+C (six domains); where 1 indicates no problem, 2 some problems and 3 severe problems. Problems in the EQ-5D+C in two categories 0=no problems, 1= some or severe problems; scored with the Katz (I)ADL index score; Loneliness scores measured with the De Jong Gierveld loneliness scale; total score range 0-11; Depressive symptoms measured with the GDS-15; total score depressive symptoms in 3 categories: total score 0-5 no depression, score 6-9 suggestive of depression / score 10 or higher indication of depression.

<table>
<thead>
<tr>
<th>Ethnic group</th>
<th>Turkish N=253</th>
<th>Moroccan N=67</th>
<th>Berber N=40</th>
<th>Surinamese Creole N=132</th>
<th>Surinamese Hindustani N=212</th>
<th>Dutch N=83</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (SD)</td>
<td>7.1 (4.2)</td>
<td>5.1 (4.3)</td>
<td>4.7 (3.7)</td>
<td>5.5 (4.3)</td>
<td>6.4 (4.2)</td>
<td>4.7 (3.6)</td>
</tr>
<tr>
<td>Median</td>
<td>7.0</td>
<td>4.0</td>
<td>3.6</td>
<td>4.3</td>
<td>6.0</td>
<td>4.0</td>
</tr>
<tr>
<td>IQR</td>
<td>3.0-11.0</td>
<td>2.0-8.0</td>
<td>2.0-8.75</td>
<td>2.0-9.0</td>
<td>3.0-10.0</td>
<td>2.0-7.0</td>
</tr>
<tr>
<td>Depressive symptoms (≥ 6 points on the GDS-15), n (%)</td>
<td>150 (59.3)</td>
<td>25 (37.3)</td>
<td>14 (35.0)</td>
<td>58 (43.9)</td>
<td>114 (53.8)</td>
<td>26 (31.3)</td>
</tr>
<tr>
<td>% Floor (GDS-15 score=0)</td>
<td>1.2</td>
<td>16.4</td>
<td>10.0</td>
<td>9.8</td>
<td>8.0</td>
<td>7.2</td>
</tr>
<tr>
<td>% Ceiling (GDS-15 score=15)</td>
<td>1.6</td>
<td>1.5</td>
<td>2.5</td>
<td>1.5</td>
<td>0.9</td>
<td>2.4</td>
</tr>
<tr>
<td>Chronbach’s α</td>
<td>0.86</td>
<td>0.87</td>
<td>0.86</td>
<td>0.88</td>
<td>0.85</td>
<td>0.82</td>
</tr>
</tbody>
</table>

Notes: SD = Standard deviation; IQR = Interquartile Range.

Depressive symptoms measured with the GDS-15; subjects who answered 6 or more questions positively.

Significant difference in depressive symptoms between Turkish and all other ethnic groups, except Hindu. Difference between Hindu and Dutch group.

**Known-groups validity**

A summary of the results of the known-groups validity analyses are presented in Table 3. The hypothesis that participants who were older, female, less educated and having more than one comorbid condition would indicate more symptoms of depression as assessed by the GDS-15 (in total, six comparisons) was confirmed for 50% (three out of the six comparisons were significant) in the Turkish group, 50% in the Moroccan group, 33% in the Berber group, 50% in the Creole group, 50% in the Hindu group and 33% in the Dutch group. The hypothesis that those with comorbid conditions, who report limitations in daily functioning and those who report feelings of loneliness would report more depressive symptoms was confirmed in the GDS-total-scale score for almost all groups (except comorbidity in the Berbers). Finally, the Dutch and Berber groups reported lower depressive symptoms than the other ethnic groups (data not presented in tabular form). Among elderly migrants, Turkish participants in particular reported more depressive symptoms. This finding was true not only compared to the Dutch group, but also to the
other ethnic groups. All results were in the direction of what had been hypothesized, regardless of whether there was or was not a significant difference.

DIF analyses
In the Turkish group, the interaction term between translation and scale score was significant (P<0.001) for one item (GDS-15 item 2), indicating non-uniform DIF (Table 4). Uniform DIF was observed for item 4, in the Turkish group, item 4 in the Moroccan group and item 1, 12 and 15 in the Berber group, and item 1, 4, 7, 11 and 12 in the Creole group and item 1, 4, 10, 11, 12, 13 and 15 in the Hindu group (see Appendix). Odds ratios above 2.20 were found in the Berber group for items 1 and 12, for the Creole in item 11 and for the Hindu 1, 11 and 12th item. Most commonly DIF was observed for item 1 (basically satisfied with life), 4 (often get bored) and 12 (feel pretty worthless).

Table 3: Summary of known-groups comparisons with the GDS-15 total score (Student’s t test and Mann-Whitney)

<table>
<thead>
<tr>
<th></th>
<th>Turkish (N=253)</th>
<th>Moroccan (N=67)</th>
<th>Berber (N=40)</th>
<th>Surinamese Creole (N=132)</th>
<th>– Surinamese-Hindustani (N=212)</th>
<th>Dutch (N=83)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young 7.43</td>
<td>-0.26 5.19 -0.2</td>
<td>-2.10 1 0.6</td>
<td>-3.03 5.86 -0.9</td>
<td>-0.61 6.55 -0.6 -0.64</td>
<td>5.21 -1.0 -0.58</td>
<td></td>
</tr>
<tr>
<td>Young 1.86</td>
<td>2.59 1.85</td>
<td>2.46 1.85</td>
<td>2.46 1.85</td>
<td>2.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender Male 0.9</td>
<td>-1.99 4.99 0.3</td>
<td>-2.50 4.69 -0.1</td>
<td>-2.34 5.68 -0.3</td>
<td>-1.48 6.02 0.5 -1.74</td>
<td>5.04 -0.6 -0.99</td>
<td></td>
</tr>
<tr>
<td>Gender Male 0.11</td>
<td>1.81 2.46</td>
<td>1.88 0.67</td>
<td>2.17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education No/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No/low 1.5</td>
<td>5.50 2.05 0.9</td>
<td>4.75 3.75 0.93</td>
<td>6.16 2.56 1</td>
<td>5.04 0.61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No/low 0.11</td>
<td>1.89 11.33</td>
<td>1.78 0.67</td>
<td>2.17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comorbidity No/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No/yes 3.8</td>
<td>-5.22 3.02 1.8</td>
<td>-5.84 3.56 1.8</td>
<td>-4.18 3.08 2.6</td>
<td>-4.32 3.93 2.7 -4.21</td>
<td>3.70 2.2 -4.81</td>
<td></td>
</tr>
<tr>
<td>No/yes 2.83</td>
<td>-1.67 0.58</td>
<td>-0.90 1.19</td>
<td>0.38</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limitations No/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No/yes 1.9</td>
<td>-3.90 3.48 3.0</td>
<td>-4.95 2.82 2.8</td>
<td>-5.17 3.74 3.3</td>
<td>-4.64 3.80 3.9 -5.00</td>
<td>3.98 2.3 -3.94</td>
<td></td>
</tr>
<tr>
<td>No/yes 5.37</td>
<td>-1.90 1.00</td>
<td>-0.50 -1.86</td>
<td>-2.82 0.72</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loneliness No/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No/yes 4.7</td>
<td>-5.70 2.87 3.4</td>
<td>-5.27 3.11 2.7</td>
<td>-4.85 2.96 4.2</td>
<td>-5.52 2.84 4.6 -5.68</td>
<td>2.41 3.3 -4.71</td>
<td></td>
</tr>
<tr>
<td>No/yes 3.54</td>
<td>-1.72 -1.57</td>
<td>-0.48 -2.96</td>
<td>3.59 1.90</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes. Age = old (≥66years) vs young (55-65 years) (T, n=97 vs. 156; M, 19 vs. 48; B, 16 vs. 24; S-Cr, 50 vs. 82; S-H, 65 vs. 147; D, 40 vs. 43); Gender = female vs male; Education = no/low education vs mid/high education; Comorbidity = two or more conditions vs no or one condition; Limitations = one or more limitations vs no limitations; Loneliness = loneliness vs no loneliness; CI = Confidence Interval; ES = effect size. Group differences were tested with the Mann-Whitney U test.

*p < 0.05. In bold mean difference in the opposite direction to what had been hypothesized.
### Table 4: Uniform and non-uniform DIF in GDS-15 scale by Logistic Regression analyses (corrected for age, sex and education); odds ratio, confidence interval and p-values of the Dutch group versus the Turkish, Moroccan and Surinamese groups

<table>
<thead>
<tr>
<th></th>
<th>Turkish</th>
<th>Moroccan</th>
<th>Berber</th>
<th>Surinamese-Creole</th>
<th>Surinamese-Hindustani</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>p-value</td>
<td>OR</td>
<td>p-value</td>
<td>OR</td>
</tr>
<tr>
<td>GDS item 1</td>
<td>1.35 (1.09-1.67)</td>
<td>0.007</td>
<td>1.38 (0.96-1.98)</td>
<td>0.078 2.27 (1.14-4.50)</td>
<td>0.019 2.03 (1.20-3.45)</td>
</tr>
<tr>
<td>GDS item 2</td>
<td>0.93 (0.80-1.08)</td>
<td>0.363</td>
<td>0.96 (0.70-1.32)</td>
<td>0.814 0.70 (0.38-1.28)</td>
<td>0.245 0.67 (0.47-0.96)</td>
</tr>
<tr>
<td>GDS item 3</td>
<td>0.81 (0.66-0.99)</td>
<td>0.038</td>
<td>0.94 (0.67-1.32)</td>
<td>0.715 1.27 (0.71-2.26)</td>
<td>0.427 0.96 (0.59-1.55)</td>
</tr>
<tr>
<td>GDS item 4</td>
<td>0.43 (0.32-0.57)</td>
<td>0.00</td>
<td>0.48 (0.33-0.72)</td>
<td>0.00 0.57 (0.29-1.14)</td>
<td>0.114 0.33 (0.18-0.59)</td>
</tr>
<tr>
<td>GDS item 5</td>
<td>0.87 (0.69-1.08)</td>
<td>0.203</td>
<td>0.88 (0.61-1.27)</td>
<td>0.506 1.01 (0.48-2.13)</td>
<td>0.988 1.36 (0.85-2.18)</td>
</tr>
<tr>
<td>GDS item 6</td>
<td>1.08 (0.91-1.28)</td>
<td>0.391</td>
<td>1.03 (0.77-1.39)</td>
<td>0.822 1.23 (0.72-2.09)</td>
<td>0.448 1.12 (0.78-1.60)</td>
</tr>
<tr>
<td>GDS item 7</td>
<td>1.32 (1.05-1.65)</td>
<td>0.017</td>
<td>1.33 (0.93-1.91)</td>
<td>0.119 1.79 (0.97-3.31)</td>
<td>0.061 1.97 (1.14-3.41)</td>
</tr>
<tr>
<td>GDS item 8</td>
<td>1.08 (0.87-1.34)</td>
<td>0.472</td>
<td>1.44 (1.00-2.09)</td>
<td>0.051 1.27 (0.73-2.22)</td>
<td>0.397 1.05 (0.68-1.63)</td>
</tr>
<tr>
<td>GDS item 9</td>
<td>1.05 (0.89-1.23)</td>
<td>0.572</td>
<td>1.29 (0.99-1.67)</td>
<td>0.061 0.95 (0.60-1.52)</td>
<td>0.842 0.85 (0.61-1.18)</td>
</tr>
<tr>
<td>GDS item 10</td>
<td>1.17 (0.98-1.39)</td>
<td>0.079</td>
<td>0.87 (0.66-1.14)</td>
<td>0.317 1.19 (0.75-1.90)</td>
<td>0.456 0.84 (0.59-1.19)</td>
</tr>
<tr>
<td>GDS item 11</td>
<td>1.41 (1.09-1.81)</td>
<td>0.008</td>
<td>1.10 (0.72-1.67)</td>
<td>0.667 1.22 (0.48-3.07)</td>
<td>0.678 4.19 (1.94-9.06)</td>
</tr>
<tr>
<td>GDS item 12</td>
<td>1.25 (1.00-1.55)</td>
<td>0.047</td>
<td>1.51 (1.02-2.25)</td>
<td>0.041 2.76 (1.28-5.93)</td>
<td>0.01 2.77 (1.61-4.77)</td>
</tr>
<tr>
<td>GDS item 13</td>
<td>1.21 (1.01-1.45)</td>
<td>0.035</td>
<td>0.98 (0.74-1.30)</td>
<td>0.885 0.59 (0.35-1.01)</td>
<td>0.054 1.07 (0.73-1.56)</td>
</tr>
<tr>
<td>GDS item 14</td>
<td>1.06 (0.83-1.36)</td>
<td>0.624</td>
<td>0.89 (0.59-1.35)</td>
<td>0.597 1.08 (0.56-2.07)</td>
<td>0.825 1.35 (0.79-2.32)</td>
</tr>
<tr>
<td>GDS item 15</td>
<td>0.87 (0.73-1.05)</td>
<td>0.153</td>
<td>0.89 (0.63-1.27)</td>
<td>0.523 0.50 (0.26-0.96)</td>
<td>0.036 0.6 (0.39-0.92)</td>
</tr>
</tbody>
</table>

Notes: OR= Odds ratio= \( e^{\hat{b}} \). Uniform DIF for language/culture was considered to be present if the odds ratio is outside the interval 0.53-1.89 and is presented in **bold**. Non-uniform DIF was considered to be present if the interaction of ethnicity and total score of the scale was found to be statistically significant (\( p \leq 0.001 \)) and is presented in the table with an *. 

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Chapter 5
Discussion

This study showed that the translated version of the GDS-15 had good psychometric properties in Turkish, two Moroccan languages (Moroccan-Arabic, Tarifit) and two Surinamese languages (Sranantongo, Sarnámi).

The GDS-15 is the most commonly used geriatric depression screening tool, and performs well. To our knowledge, this is the first study of the cross-cultural translation and validation of the GDS-15 for older migrants of Turkish, Moroccan and Surinamese descent in Western Europe. For the planning of adequate mental health care for elderly migrants it is of importance to obtain insight into the prevalence and risk factors of depression. Therefore it is important to have depression screening instruments that are applicable to migrants and have good psychometric properties.

The Turkish and Moroccan participants preferred to administer the questionnaire in their own languages (Turkish, Moroccan-Arabic or Tarifit). All Surinamese participants preferred to complete the questionnaire in Dutch, because of their sufficient Dutch language proficiency. The study-translated versions of the GDS-15 were readily applicable and have good psychometric properties.

The number of missing responses for individual items was very low (mean of less than 3%) and was comparable with other studies in which a questionnaire was administered as an interview in non-Western samples. Higher rates of missing data (3.0-8.3%) were observed within Surinamese-Creole, Surinamese-Hindustani and native Dutch participants, which could be explained because these were collected mostly through self-administering the questionnaire, including the GDS-15.

The internal consistency of the GDS-15 was satisfactory for all groups (Turkish, two Moroccan and two Surinamese). The Chronbach’s alpha yielded in this study is compatible with Sheikh (1986) and in general, validations studies of the short form of the GDS-15 from other countries have all reported a high internal consistency with alphas of 0.77 and higher.

The known-group validity of the GDS-15 was moderate. Hypothesized differences in GDS-15 scores were observed for subgroups of participants differing in presence of comorbidity, limitations in daily activities and feelings of loneliness, but not for subgroups differing in age, gender or educational level. That we did not find the subgroup difference for comorbidity in Berbers could be attributed to the smaller sample size. The associations with functional limitations were consistent with those of previous clinical and epidemiological studies. The fact that there were no significant correlations of depressive symptoms with age in all the groups may be attributed to the fact that the study sample included relatively few participants with higher age (n=287 participants of age ≥66 years vs. n = 500 of age 55-65 years), especially in the migrant groups. Similarly, no significant differences were observed between education in the Turkish, Moroccan and Surinamese-Hindustani groups. This may be due to the lack of variability among these groups in comparison with the higher education levels among Surinamese-Creole and
Dutch group. The lack of association between age, gender and education and depression rates has also been reported in studies in Iran, India and migrants in Netherlands. Furthermore, the GDS-15 exhibited DIF (uniform and non-uniform) in all the migrant groups, but in different items. Clear examples of non-uniform DIF were only found in the Turkish group for item GDS-2 (stopped undertaking activities), where Dutch participants tended to score higher (stopped more frequently with activities) than Turkish participants. This may be due to cultural differences in undertaking activities at older ages: Turkish tend to undertake activities at older ages less often. The 4th item appeared to be most vulnerable to uniform DIF in all groups except Berber, and the 1, 12 and 15th item in the Berber and Surinamese groups. This may explain an example of uniform DIF, item 4 (often get bored), where all migrant groups, except Berber, tend to score lower (less bored) compared to Dutch participants with the same GDS-15 total score. This may be attributed due to cultural differences in undertaking less activities at older age.

Nevertheless, this study has some limitations which should be noted. First, the sample size for the known-groups analyses (Student’s t-test) was relatively small for the Berber group (n=40). We would need a larger sample size to detect a moderate effect size. Second, the study group consisted of relatively depressed participants due to the use of the GDS-2 screening at the beginning of the study. This means that there is now less variability in the groups, so the results are likely to be more beneficial in a wider group. Third, some of the psychometric properties, such as test-retest reliability, could not be assessed as the SYMBOL study was a cross-sectional cohort study currently without planned follow up. Finally, different modes of administration were used for the Turkish and Moroccan groups on the one hand and Surinamese and Dutch groups on the other hand, namely, a face-to-face interview format and a self-completion questionnaire, respectively. This may have introduced additional measurement error. In addition, qualitative research that explores the concept of depressive symptoms for ethnic groups with different cultures could add information about the content validity. Unfortunately, we lacked the resources to conduct independent psychiatric evaluations (criterion validity with a golden standard) of study participants. Future research is therefore necessary to determine a specific cutoff score for the first generation Turkish and Moroccan participants, as they have high rates of illiteracy.

In conclusion, these findings supported that the 15-item Geriatric Depression Scale is reliable and valid for use among Turkish, Moroccan and Surinamese groups. The translated versions in Turkish, Moroccan-Arabic and Tarifit of the GDS-15 are shown to have moderately good psychometric properties, which is in favor of the applicability of the GDS-15 among older migrants of Turkish and Moroccan descent. The Dutch version is appropriate and has good psychometric properties for use among older migrants of Surinamese descent. Further studies with larger groups of participants are necessary to establish other psychometric values and risk factors for depression in this growing older population group. Additionally the use of the GDS-2 as a pre-screening instrument for depression would be of interest.
Appendix
English version GDS-15 short form

Choose the best answer for how you have felt over the past week:

1. Are you basically satisfied with your life? YES / NO
2. Have you dropped many of your activities and interests? YES / NO
3. Do you feel that your life is empty? YES / NO
4. Do you often get bored? YES / NO
5. Are you in good spirits most of the time? YES / NO
6. Are you afraid that something bad is going to happen to you? YES / NO
7. Do you feel happy most of the time? YES / NO
8. Do you often feel helpless? YES / NO
9. Do you prefer to stay at home, rather than going out and doing new things? YES / NO
10. Do you feel you have more problems with memory than most? YES / NO
11. Do you think it is wonderful to be alive now? YES / NO
12. Do you feel pretty worthless the way you are now? YES / NO
13. Do you feel full of energy? YES / NO
14. Do you feel that your situation is hopeless? YES / NO
15. Do you think that most people are better off than you are? YES / NO
Chapter 5

References

Depression and older migrants


Chapter 5


