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ORIGINAL ARTICLE

Validation of the five-item version of the Geriatric Depression Scale (GDS-5) in a Turkish elderly population

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Abstract

Background: Late-life depression is a geriatric syndrome which should be taken seriously. Many clinical scales have been developed for the screening of geriatric depression. Most of these have been validated at different times and in diverse populations. A five-question version of the Geriatric Depression Scale (GDS-5) was developed in 1997. This test has been validated and used in different populations. In the present study, we plan to validate the GDS-5 for the Turkish elderly population.

Methods: Patients aged 60 years and older who applied to the Geriatrics Clinic of our hospital between November 2018 and November 2019 were included in the study. We compared the effectiveness of Yesavage Geriatric Depression Scale-30 (YGDS-30) and GDS-5 in screening depression, based on Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5) depression criteria.

Results: Four hundred participants were included in the study. A significant positive correlation was found between the DSM-5 scale and the GDS-5 scale (rho = 0.726, P <0.001). According to DSM-5, YGDS-30 and GDS-5, 112 participants (28%), 154 patients (%38.5) and 199 patients (%49.8) were diagnosed with depression respectively. When the cut-off value was taken as ≥2, the sensitivity, specificity, positive predictive and negative predictive values for the GDS-5 scale were determined as 96%, 68%, 54%, and 98%, respectively. We obtained these diagnostic measures with 95% confidence intervals.

Conclusion: This study demonstrated the validity and reliability of the GDS-5 for Turkish elderly populations. This five-question scale will be significant in daily use to screen for depression in elderly individuals with multiple problems.

Key words: *depression, elderly, GDS-5, screening, Turkish.*

INTRODUCTION

Late-life depression is a geriatric syndrome which should be taken seriously. In this late stage of life, the relationship between depression and many comorbidities is bidirectional.[1] It is well known that while chronic diseases or symptoms can cause depression, depression itself plays a role in the onset or worsening of some conditions.[1] Many clinical scales have been developed for the screening of geriatric depression. Most of these have been validated at different times and in diverse populations. In 1983, the 30-item Geriatric Depression Scale (YGDS-30) was developed by Yesavage *et al*.[2] According to this study, when the cut-off point of the test was chosen as 14, the sensitivity and specificity were determined as 80% and 100%, respectively. This test was validated for our population by Ertan *et al*. in 1997.[3] The short form of the Geriatric Depression Scale (GDS-15) was developed by Burke *et al*. in 1991.[4] In this test, when the cut-off point was accepted as seven, sensitivity and specificity were determined as 67% and 78%, respectively.[4] The validation of the GDS-15

for Turkish elderly populations was validated by Durmaz *et al*. in 2018.[5] In this study, when the cut-off value was taken as seven, the sensitivity and specificity were determined as 87% and 99%, respectively.[5] These two validated tests are still widely used. The problem is that these elderly individuals, who may have certain diseases and limitations, may not tolerate 15- or 30-question tests. Due to defects in vision or hearing, these tests can be challenging to complete. While vision loss due to various reasons is seen in 25% of individuals aged ≥80 years[6] disability due to visual impairment has been reported in 7% of adults aged ≥65 years.[7] It is known that presbyopia begins in the 40s and most elderly individuals use presbyopic glasses in their advanced age. Hearing loss is present in 37% of adults aged 61–70 years and ≥80% of adults aged 85 and over.[8] Hearing loss is the most common sensory loss in the elderly.[9] Considering the frequency of diseases such as chronic pain and dementia that may affect the quality and duration of the examination in elderly patients, it will be essential to give brief but sufficient time for the tests to be applied. A five-question version (GDS-5) of the Geriatric Depression Scale was developed by Hoyl *et al*. in 1997;[10] this test has been validated and used in different populations.[11,12] In the present study, we plan to validate the GDS-5 for a Turkish population.

METHODOLOGY

Procedure and participants

Patients aged 60 years and older who applied to the Geriatrics Clinic of our hospital for any reason between November 2018 and November 2019 were included in the study. A shorter, practical depression screening method is necessary for these elderly individuals who may have chronic diseases, sensory deficiencies, and reduced tolerance for long questions. Therefore, it is planned to determine the validity and reliability of the five-question geriatric depression test in a Turkish population. It is planned to compare the effectiveness of the YGDS-30 and GDS-5 in screening depression, based on Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5) depression criteria.

The primary technical principles were considered before the validation study of the GDS-5 scale, and a preliminary pilot study was carried out after the translation phase. The number of participants was determined according to the power analysis. In this five-item scale, 'Are you satisfied with your life?' 'Do you often get bored?' 'Do you often feel helpless?' 'Do you prefer to stay at home rather than going out and doing new things?' 'Do you feel pretty worthless the way you are now? ' were asked. Participants were asked to answer the questions as yes/no. The answer 'no' for the first question and 'yes' for the other four questions were evaluated for depression. The Turkish translation of this scale, made according to the rules, is included in Appendix S1.

Those with a history of acute life-threatening events in the last two months, those under drug addiction or addiction treatment, and those requiring hospitalisation for any reason were initially excluded. Patients with cognitive problems that did not allow them to understand what they read or what was spoken, patients diagnosed with dementia, and patients with both visual and auditory advanced disabilities were excluded. In the first clinical evaluation of a geriatrician, the patient's depressive mood, cognitive competence level, polypharmacy, medications, comorbidities, general examination, and laboratory data were examined and recorded. According to DSM-5, it was recorded whether the patient had depression or not. This choice was made for validation purposes. However, in Table 1, which shows the relationship between depression and demographic and clinical characteristics, the presence or absence of depression was determined according to the GDS-5 test, which was the main subject of the study. Comprehensive geriatric assessment (CGA) was administered to participants who met the criteria by another researcher. GDS-30 and GDS-5 questions were asked by the same expert. In addition to these scales for depression, Mini-Mental Status Examination (MMSE)[13] to evaluate patients' cognitive functions, Mini-Nutrition Assessment Testing-long form (MNA)[14] to evaluate nutritional status, Katz Index of Activities of Daily Living (KATZ-ADL)[15] and Instrumental in Activities of Daily Living (IADL) to evaluate basic and instrumental ADL,[16] FRAIL test (fatigue, resistance, ambulation, illness and loss of weight)[17] for frailty screening, SARC-F test[18] for sarcopenia screening, and EAT-10 test[19] for dysphagia screening were also performed. Relationships between CGA and depression were also examined.

Statistical analysis

The distribution of the data was evaluated with Shapiro-Wilks test statistics, histogram, Q-Q graphs.

The Levene test was used to test variance homogeneity. The Pearson Chi-square test was applied for categorical variables, and Mann–Whitney *U*-tests, and independent samples *t*-tests for continuous variables to compare the differences between groups.

The compliance of the two quantitative data sets was tested with Spearman correlation analysis. Factor analysis was used to evaluate the factorial structure of the data, while principal component analysis was used as a factor extraction method. Moreover, the Bartlett and Kaiser-Meyer-Olkin (KMO) tests were used to determine the factor score, and the Varimax rotation method was used to analyse the factor rotation.

The validity analyses for the GDS-5 scale was examined in two categories: construct validity and content validity. In the construct validity analysis, three different methods were used; examining differences between the study groups in terms of subscale scores and total scale scores (construct validity analysis with group differences), examining the correlations between subfields, calculating factor analysis results, and calculating the internal consistency coefficient (Cronbach's alpha) and regarding validity.

As for the criterion validity analysis, the DSM-5, considered a gold standard test, was applied and was based on the concurrent validity method specified in the literature. The obtained results were analysed. As for the GDS-5 reliability analyses, Cronbach's alpha reliability coefficients were calculated for each subfield. All five-items of the scale were examined for the internal consistency method, inter-item correlation, and item-total score correlation coefficient average. Furthermore, the equivalence method was applied by examining the correlation with the DSM-5 scale. GDS-5 reliability analyses were examined (ICC, intra-correlation coefficient). Cohen's Kappa coefficient (κ) was used to measure inter-rater reliability for qualitative variables.

Receiver operating characteristic (ROC) curves were used to identify the discriminative effect of DSM-5 on GDS-5. The area under the ROC curves was calculated with 95% confidence intervals. The Youden index was applied to determine the optimal cut-off value. Sensitivity, specificity, positive (PPV) and negative predictive values (NPV) were calculated with 95% confidence intervals. Validity and reliability analyses were applied to scale. Cronbach's analyses were conducted using R 3.2.0 (http://www.r-project.org), MVN,[20] and easyROC[21] software. The data analysis was conducted with the R 3.6.2 program and TURCOSA (Turcosa Analytics Ltd. Co., Turkey, www.turcosa.com.tr) statistics software. Statistical significance was accepted as $P < 0.05$.

RESULTS

Results regarding clinical features

Four hundred participants were included in the study. The mean age of these patients was 71.5 (60–98) years, and 71.5% of the participants were female. The demographic and characteristic features and chronic diseases of the patients are given in Table 1. The comparison of the participants' detailed geriatric assessment data according to their depression status is also shown in Table 1. According to DSM-5, GDS-30, and GDS-5, the prevalence of depression in the participants was 28%, 38.5%, and 49.8%, respectively. The mean MMSE score of the participants included in the study was 26.2. Again, the comparison of the laboratory data of the participants between the groups with and without depression according to the GDS-5 scale is given in Table 1.

Results regarding the validity of GDS-5

Construct validity

When the GDS-5 scale was evaluated in all its subdomains and overall scale, the GDS-5 total and subgroup scale scores of the participants with depression were significantly higher than those without depression ($P < 0.001$). Accordingly, it was determined that the GDS-5 scale had a structure suitable for the desired purpose.

When the GDS-5 total and subgroup scale scores were evaluated, there was a significant difference between male and female individuals, favouring the female group.

1 Calculating factor analysis resultsThe suitability of the sample for factor analysis was examined by KMO. At the same time, the adequacy of the sample number was tested. Sampling adequacy was found to be good, with a KMO value of 0.706. The Bartlett test result was seen as $P < 0.001$. The scores obtained from the sub-domains of the GDS-5 scale were analysed with principal component factor analysis. According to the analysis results, a factor with an Eigenvalue above 1.00 and

Table 1 Comparison of demographic, clinical characteristics, and laboratory findings of participants based on Geriatric Depression Scale-5

Characteristics	Depression $n = 199$	Non-depression $n = 197$	P
*Age, years	71 (66–77)	70 (66–75)	0.452
*Gender, female	161 (56.3)	125 (43.7)	**<0.001**
*Years of education			
Illiterate	80 (61.5)[a]	50 (38.5)[b]	
Literate	33 (54.1)[a]	28 (45.9)[a]	
Primary school	70 (45.5)[a]	84 (54.5)[a]	**0.002**
Middle school	9 (37.5)[a]	15 (62.5)[a]	
High school	7 (33.3)[a]	14 (66.7)[a]	
University	1 (11.1)[b]	8 (88.9)[a]	
Number of drugs	4 (2–6)	3 (2–5)	**0.038**
*Marital status			
Married	132 (48.2)	142 (51.8)	
Single	3 (75.0)	1 (25.0)	0.322
Widow/widower	66 (54.1)	56 (45.9)	
*Living status			
With a partner	125 (48.6)	132 (51.4)	
With a child	52 (57.8)	38 (42.2)	0.159
Alone	20 (41.7)	28 (58.3)	
*Smoking			
Current	13 (52.0)	12 (48.0)	
Former	22 (41.5)	31 (58.5)	0.395
No	165 (51.9)	165 (51.9)	
*Comorbidity			
HT	149 (56.4)	115 (43.6)	**0.001**
DM	100 (56.2)	78 (43.8)	**0.049**
COPD	53 (64.4)	29 (35.4)	**0.002**
CVA	9 (50.0)	9 (50.0)	0.572
CAD	26 (61.9)	16 (38.1)	0.083
CHF	8 (42.1)	11 (57.9)	0.307
UI	104 (56.8)	79 (43.2)	**0.021**
**CGA parameters			
MMSE	26.00 (24.75–28.00)	27.00 (25.00–29.00)	0.001
MNA	22.50 (19.25–24.50)	25.00 (23.12–26.50)	<0.001
KATZ-ADL	12.00 (12.00–12.00)	12.00 (12.00–12.00)	0.107
IADL	15.00 (11.00–16.00)	16.00 (14.00–16.00)	<0.001
FRAIL	2.00 (1.00–3.00)	1.00 (1.00–2.00)	<0.001
SARC-F	3.00 (2.00–6.00)	2.00 (1.00–4.00)	<0.001
EAT-10	0.00 (0.00–4.00)	0.00 (0.00–0.00)	<0.001
**Laboratory findings			
Creatinine, mg/dL	0.82 (0.68–0.99)	0.82 (0.70–0.98)	0.594
GFR, mL/min	77.21 (61.27–88.98)	79.33 (66.0–89.86)	0.341
ALT, U/L	15.50 (12.00–20.00)	15.00 (12.00–20.75)	0.924
Albumin, g/dL	4.61 (3.39–4.78)	4.62 (4.40–4.80)	0.612
Total protein, g/dL	7.40 (7.07–7.72)	7.43 (7.08–7.65)	0.626
Hgb, g/dL	13.80 (12.80–14.80)	14.00 (13.00–14.90)	0.146
HTC	42.00 (39.00–44.60)	42.25 (39.62–44.87)	0.256
TSH, mIU/mL	1.57 (1.02–2.53)	1.52 (0.96–2.38)	0.862
fT4, ng/dL	1.25 (1.14–1.40)	1.23 (1.08–1.47)	0.327
Folic acid, mg/dL	7.98 (5.85–9.87)	8.07 (5.94–10.76)	0.659
B_{12}, pg/mL	372.00 (258.00–535.00)	365.80 (260.90–520.80)	0.906
Vitamin D, ng/mL	18.40 (12.27–25.28)	18.28 (13.05–26.00)	0.724

*Values are expressed either as n (%), median (1st–3rd quartiles).

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ALT, alanine aminotransferase; CAD, coronary artery disease; CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease; CVA, cerebrovascular accident; DM, diabetes mellitus; EAT-10, eating assessment tool-10; fT4, free thyroxine 4; GFR, glomerular filtration rate; Hgb, haemoglobin; HTC, haematocrit; HT, hypertension; IADL, instrumental activity of daily living; KATZ-ADL, Katz index of daily living activities; MMSE, Mini-Mental Status Examination; MNA, Mini-Nutrition Assessment; SARC-F, strength, assistance with walking, rising from a chair, climbing stairs, and falls; TSH, thyroid stimulating hormone; UI, urinary incontinence.

[a,b] The same letters show similarity, but different letters differ. Different superscripts in the same row indicate a statistically significant difference among groups.

corresponding to 42.711% of the total variance emerged.When factorability is examined, it is factored under a single factor. Varimax rotation was used to present results on the factorisation of the items. According to the axis rotation analysis results, it was seen that the scale could not be factored in. In the light of these results, it was found that the five-item GDS-5 scale was not divided into factor components, and it was statistically more appropriate to explain the GDS-5 scale with five sub-items.

2 Calculating the internal consistency coefficient (Cronbach's alpha)Another proof of construct validity in scale studies is the high internal consistency coefficient (Cronbach's alpha). In this study, the internal consistency coefficient for the GDS-5 scale was found to be 0.635, providing evidence for construct validity.

3 Regarding validity

The average of item-total score correlation coefficients, inter-item correlation coefficients, and Cronbach's alpha analysis results in the internal consistency sub-analyses of the GDS-5 reliability analysis are presented in Table 2.

Content validity

In the adaptation of the scale, content validity analysis was carried out by adhering to the original version. To investigate the scale's content validity with statistical methods, the DSM-5 scale, which is accepted as the current standard measure of the field, was applied to all participants. Later, the GDS-5, which was to be validated, and the GDS-30 scales, which are still in clinical use, were administered simultaneously to the participants. The coefficients were calculated according to the scores of the individuals from all three scales. This coefficient was accepted as the content coefficient. Comparison results are given in Table 3. A statistically significant correlation was found between GDS-5 and the DSM-5 (P <0.001). This relationship is positive and at a reasonable level (rho = 0.719). Likewise, a statistical correlation was found between the GDS-5 and the GDS-30 scales (P <0.001). This relationship is also positive and is an excellent relationship (rho = 0.837).

Reliability analysis

1 Equivalence analysis

For this purpose, the DSM-5 scale was used as the gold standard test at this study stage. Comparisons of these two scales were made by correlation analysis, and a high and good significant positive correlation was found between the depressed and non-depressed groups. An excellent positive correlation was found between DSM-5 and the GDS-5 scale (rho = 0.726, P <0.001) (Table 4).

2 Interclass correlation coefficient (ICC)

ICC results (95% CI) of factored items were found to be significant for all items. A significance value of 0.632 (0.572–0.686) was also found (P <0.001).

Concordance statistics were evaluated between GDS-5, GDS-30, and DSM-5. The number of participants diagnosed with depression in both GDS-5 and DSM-5 is 108. The number of participants who were not diagnosed with depression in both GDS-5 and DSM-5 is 195. According to these results, a statistical agreement was found between GDS-5 and the DSM-5, and this agreement was evaluated as a

Table 2 Inter-item correlation analysis results for the GDS-5 communication subfield

	GDS-5-1	GDS-5-2	GDS-5-3	GDS-5-4
GDS-5-1				
GDS-5-2	0.278**			
GDS-5-3	0.277**	0.424**		
GDS-5-4	0.078	0.040	0.163*	
GDS-5-5	0.312**	0.326**	0.537*	0.147*

Geriatric Depression Scale-5 (GDS-5) Spearman's rho analysis, *P <0.05; **P <0.01; ***P <0.00.

Table 3 Comparison of DSM-5 and GDS-30 scale with GDS-5

	GDS-5 total	
	rho	*P*
DSM-5 total score	0.719	<0.001
GDS-30 total score	0.837	<0.001

rho: Spearman's correlation analysis coefficient.
DSM-5, Diagnostic and Statistical Manual of Mental Disorders Fifth Edition; GDS-5, Geriatric Depression Scale-5; GDS-30, Geriatric Depression Scale-30. P < 0.05 is significant.

Table 4 Correlation coefficients indicating the relationship between GDS5, DSM5 for depression and non-depression

	DSM-5 and GDS-5	
Group	*rho*	*P*
Depression	0.373	<0.001*
Non-depression	0.208	0.003

Spearman's rho analysis (r); *P < 0.05.
DSM-5, Diagnostic and Statistical Manual of Mental Disorders Fifth Edition; GDS-5, Geriatric Depression Scale-5.

Table 5 ROC curve for essential prediction performance of DSM-5 ≥ 5 on GDS-5

Statistics	Estimate	95% CI
ROC curve statistics		
Area under curve	0.877	0.845–0.911
P-value	<0.001	
Diagnostic measures		
Sensitivity	0.964	0.911–0.990
Specificity	0.677	0.620–0.731
Positive predictive value	0.537	0.474–0.813
Negative predictive value	0.980	0.949–0.984

DSM-5, The Diagnostic and Statistical Manual of Mental Disorders Fifth Edition; GDS-5, Geriatric Depression Scale-5; ROC, receiver operating characteristic.

moderate agreement between the two (Kappa = 0.655, $P = 0.038$). While 143 patients were diagnosed with depression in the GDS-5 scale and were diagnosed with depression in the GDS-30 scale, 183 patients were not diagnosed with depression in the GDS-5 scale and were not diagnosed with depression in the GDS-30 scale. According to these results, a statistical agreement was found between the GDS-5 scale and the GDS-30 scale, and this agreement was evaluated as a good agreement between the two scales (Kappa = 0.655, P <0.001).

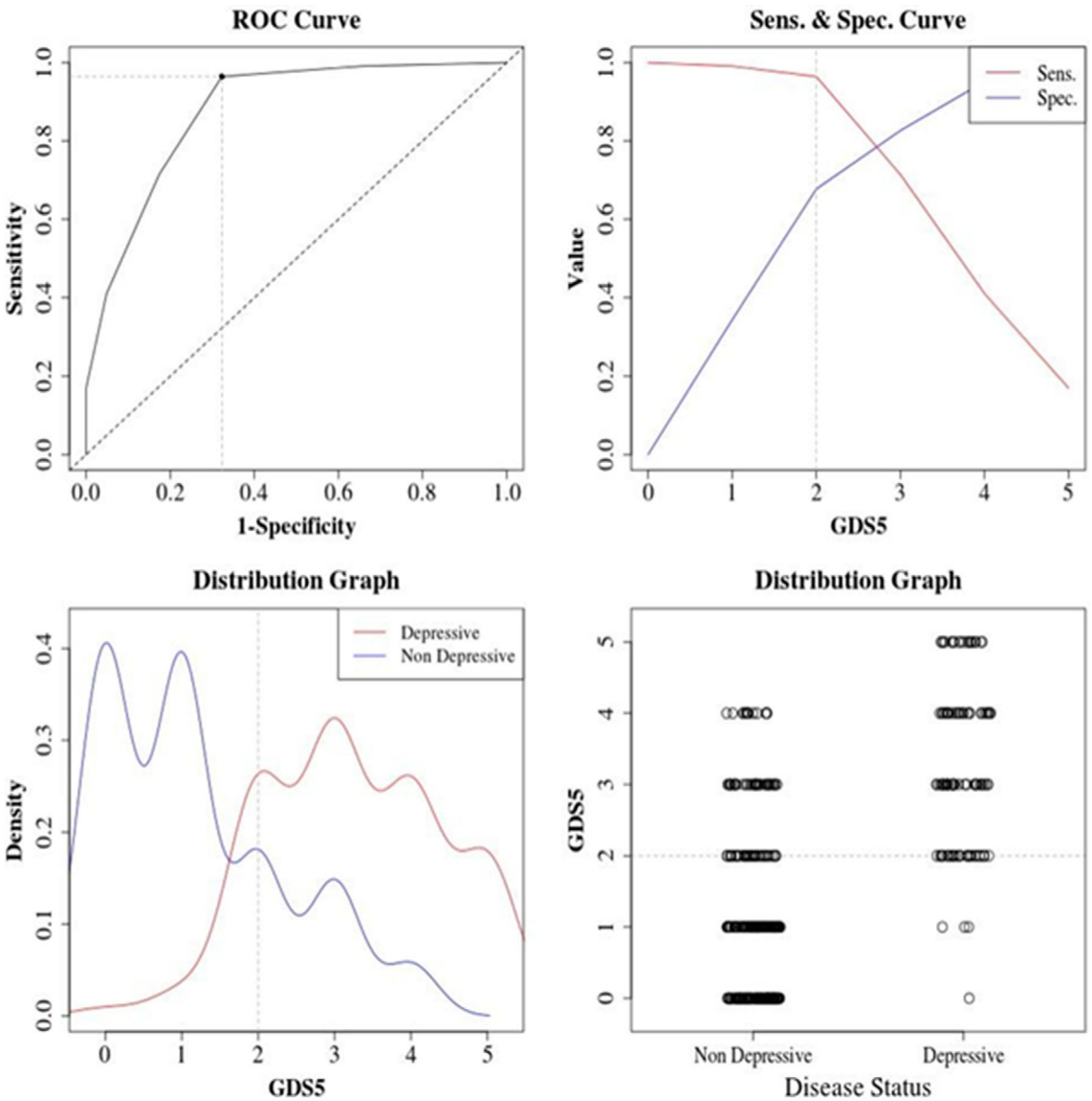

Figure 1 Determination of optimal cut-off values. ROC, receiver operating characteristic; Sens, sensitivity; Spec, specificity; GDS-5, 5-question Geriatric Depression Scale

There were 112 participants diagnosed with depression from the DSM-5, 28% of the total participants. There were 154 participants diagnosed with depression from the GDS-30 scale, 38.5% of the total participants. There were 199 participants diagnosed with depression on the GDS-5 scale, constituting 49.8% of the total participants. As shown in Table 5, when the cut-off value was taken as ≥2, the sensitivity, specificity, PPV, and NPV values for the GDS-5 scale were determined as 96%, 68%, 54%, and 98%, respectively.

We obtained diagnostic measures with 95% confidence intervals **(**Fig. 1**).** We got a sensitivity of 96% and a specificity of 68%. The first plot in the upper-left corner displays the optimal cut-off value on the ROC curve. Users can observe the change of sensitivity and specificity measures based on the value of the marker on the plot placed in the upper-right corner. The density and the scatter of the expression values in each group are displayed in the bottom-left and the bottom-right corners.

DISCUSSION

This study has shown that the GDS-5 scale has appropriate validity and reliability for depression screening in Turkish elderly populations without dementia. It has also been shown to be statistically consistent with the GDS-30 scale, which is still in clinical use. According to our study, when the sensitivity and specificity of DSM-5, GDS-30, and GDS-5 tests in depression screening were compared, it was concluded that the sensitivity of the GDS-5 test was higher. It was determined that the GDS-5 scale had a strong correlation with the DSM-5. The sensitivity and specificity values of GDS-5 were compatible with the data for GDS-5 found in different studies[10,12] in the literature.

In Table 1, the relationship between depression and demographic and clinical characteristics, the presence or absence of depression was determined according to the GDS-5 test. When the participants' demographic data are examined, it can be said that depression is more common for the female gender (56.3%). As the educational status of the participants is shown in Table 1, when they are categorised into six groups as illiterate, only literate, primary school graduate, secondary school graduate, high school graduate, and university graduate, it is seen that the depression rate decreases significantly as the education level increases. The fact that the socioeconomic levels of the participants were not recorded in this study is one of its limitations. It would not be correct to claim that this strong inverse relationship between education level and the development of depression is independent of socioeconomic status. When the data on the number of drugs used by the participants, their marital status, and with whom they lived are examined, there is no significant difference in depression.

When the relationship between polypharmacy and depression is examined in the literature, although there are conflicting findings,[22] it has been shown there is a significant relationship between polypharmacy and depression in most studies.[23–25] However, we did not find a significant relationship in this direction in our study.

In the current study, the prevalence of depression was statistically significantly higher in participants with hypertension, diabetes, chronic obstructive pulmonary disease and urinary incontinence. These findings are generally compatible with the literature for hypertension,[26,27] diabetes,[28] chronic obstructive pulmonary disease[29] and urinary incontinence.[30] In the light of our general literature, it is known that there is an increase in the frequency of depressive symptoms or the prevalence of depression in the presence of anaemia,[31,32] vitamin B_{12}[32] and folic acid deficiencies.[32] Although the relationship between vitamin D deficiency and depression has been investigated in many studies[13,33,34] in the literature, the results are inconsistent. No significant difference was found in the relevant laboratory data between the depressed and non-depressed groups in our study. We think that this situation is due to the design of the study. We believe that different results can be obtained if depression is investigated on patient groups with and without isolated vitamin deficiency. We believe that this contradictory situation can be clarified by using other studies.

When a study is conducted to screen for depression, it will be essential to perform geriatric tests that assess cognition and functionality if participants are elderly. Within the scope of CGA, the MMSE, MNA, KATZ-ADL, IADL, FRAIL, SARC-F, EAT-10 total scores of the depressed and non-depressed groups were compared. It is known that low scores are also obtained in the presence of depression with the

MMSE,[35] which is routinely used for cognitive function screening. In our study, the significant difference in the MMSE scores of the groups with and without depression was compatible with the literature. According to the MNA test, which evaluates nutritional status, the scores of the groups with and without depression were also found to be compatible with the literature.[14,25]

The fact that there was no significant difference between the two groups in terms of basic activities of daily living (KATZ-ADL) may be related to the exclusion of dementia patients at the beginning of the study. A significant difference was found in IADL scores, which is consistent with the adverse effects of depression on daily instrumental life in the literature.[13] The relationship between frailty and depression, which was previously shown in the literature,[36] was also demonstrated in this study. The scores of SARC-F used to screen for sarcopenia and EAT-10 test scores used for screening for oropharyngeal dysphagia also showed significant differences between the groups with and without depression. This may be related to the fact that depression can be seen more frequently in sarcopenic patients with loss of muscle mass, muscle strength and function, and in patients living with dysphagia for various reasons.[37]

The effect of clinical depression on the quality of life, mortality, and other comorbidities of the elderly is well known.[1] In these elderly patients, it is essential to correctly diagnose depression, but we believe that it is also vital that it is not overlooked. In the current study, considering the clinical characteristics of the participants to whom the scale was applied, having a screening test with high sensitivity should be interpreted as an advantage, not a disadvantage. The study's limitations are that it was conducted in a single-centre, only outpatients were included, and patients diagnosed with dementia were excluded. Another limitation of this study is; the average application times were not recorded when applying the YGDS-30 and GDS-5 tests. The test, which has five questions and is easy to tolerate, will increase the willingness of patients, relatives, and clinicians to investigate the presence of depression. The strengths of this study are that detailed geriatric tests such as MMSE, MNA, KATZ-ADL, IADL, FRAIL, SARC-F, EAT-10 were performed, and a high number of participants were included. In this way, a holistic clinical view was provided to the participants.

There are similar tests that have already been validated and are currently used. However, these elderly individuals may have various diseases and limitations and may have a low tolerance for tests with 15 or 30 questions. Defects in vision and hearing make it challenging to complete current tests. Considering the frequency of diseases that may affect the quality and duration of the examination, such as chronic pain and cognitive disorders in elderly patients, we think that it will be essential to set the time required for depression screening to be adequate but short. As the number of questions asked to screen for depression in the elderly increases, the patient's and patient's relatives' compliance to the test and their tolerance to the interview decrease. This may adversely affect the accuracy of the test and cause the clinician to be negligent in screening for depression in the elderly individual.

In conclusion, this study demonstrated the validity and reliability of the GDS-5 for a Turkish elderly population. This scale will be significant in daily use to screen for depression in elderly individuals with multiple problems. The five-question and easy-to-use test will be convenient to implement in daily practice and research projects.

DATA AVAILABILITY STATEMENT

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

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SUPPORTING INFORMATION

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Appendix S1: Supporting Information