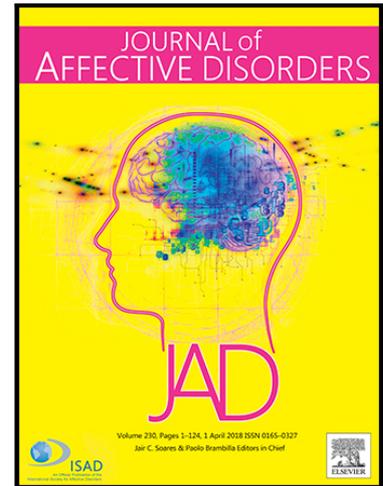


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The validity of the Hospital Anxiety and Depression scale and the Geriatric Depression scale-5 in home-dwelling old adults in Norway

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Highlights

- GDS-5 and HADS-D are useful screening tools for old home-dwelling adults, but only fairly good to identify depression according to criteria of ICD-10.
- The cut-off point for GDS-5 should be ≥ 2 for old home-dwelling adults.
- The cut-off point for HADS-D should be ≥ 4 for old home-dwelling adults.

ACCEPTED MANUSCRIPT

The validity of the Hospital Anxiety and Depression scale and the Geriatric Depression scale-5 in home-dwelling old adults in Norway

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Abstract

Background: Little is known about the validity of the Norwegian versions of the Geriatric Depression Scale-5 (GDS-5) and the Hospital Anxiety and Depression Scale-D (HADS-D). The aim of this study was therefore to validate the two assessment tools in a population of home-dwelling persons of 60 years of age and above.

Methods: A sample of 194 home-dwelling old adults with and without depressive symptoms were recruited. The participants were examined for depressive symptoms (GDS-5, HADS-D) and cognitive impairment. Sociodemographic information was collected. The participants underwent a blinded diagnostic evaluation for a depressive episode according to the diagnostic criteria of ICD-10.

Results: In all, 56 (28.9%) participants fulfilled criteria for a depressive episode according to ICD-10. The Receiver Operating Characteristics analyses of HAD-D and GDS-5 using the diagnostic criteria of ICD-10 for depression as gold standard was performed. For GDS-5 the Area under the Curve was 0.81 and for HAD-D 0.75. The cut-off points of the measures that produced the highest accuracies were ≥ 2 for GDS-5 with a sensitivity of

73.2% and a specificity of 73.2% and ≥ 4 for HADS-D with a sensitivity of 70.3% and a specificity of 69.6%.

Limitations: A larger sample would have given the opportunity for analyzing home dwelling old adults with and without home health care separately. The participants were talked through the self-filling questionnaires. The procedure could have influenced the participants' answers.

Conclusion: GDS-5 and HADS-D are useful screening tools for old adults, but only fairly good to identify depression according to criteria of ICD-10.

Introduction

Depression in older adults

Depression may be the most prevalent mental disorder in the older population in general (McCall et al., 2013). However, the estimate of depression varies from 0.4-39% depending on the definition of depression, the survey methods used, geographical variance and the population being investigated (Beekman et al., 1999; Blazer and Williams, 1980; Copeland, 1978; Rosenvinge and Rosenvinge, 2003; Borza, 2016). A review and meta-analysis of studies on the prevalence of depressive symptoms in people above 75 years of age from all continents reported a pooled prevalence rate of 17.1% (Luppa, 2012). Older adults above 60 years living at home show a lower prevalence of depression (13%) than people living in nursing homes (32%) and those admitted to hospitals (31%) (Rosenvinge and Rosenvinge, 2003). In a Norwegian study by Wergeland et al. (2014) of people 70 years and older living in their own homes and receiving domiciliary care, 13.6% had clinically significant symptoms of depression.

Screening tools for depressive symptoms in older adults

A considerable variety of tools for screening depressive symptoms currently exist; however, most were developed for younger adult populations, and only a few scales have been validated for older populations (Engedal et al., 2012; Barca et al. 2010; Helvik et al., 2012).

Two of the most common screening tools for depression in older adults, the Geriatric Depression Rating Scale (GDS) and the Hospital Anxiety and Depression Rating

Scale (HADS), have been translated into Norwegian. These tools are well established and tested for assessing depressive symptoms in older adults in Norway (Helvik et al., 2012; Helvik et al., 2011; Mykletun et al., 2001; Olsson et al., 2005).

The Geriatric Depression Rating Scale (GDS) is used within a wide range of settings for those with a medical illness or mild to moderate cognitive impairment. The GDS was originally developed as a 30-item instrument for older adults (Yesavage et al. 1983). Because this version proved to be both time-consuming and difficult for some patients to complete, several short versions of the scale were developed. Weeks et al. (2003) conducted a comparison of three published short version GDS scales (D'Ath GDS-4, van Marwijk GDS-4, and Hoyl GDS-5) and the 15-item GDS (D'Ath et al. 1994; van Marwijk 1995; Hoyl 1999) with a sample of 816 acute care patients. They found that the Hoyl GDS-5 item version showed the best properties, with a sensitivity of 0.97 and a specificity of 0.85 using ≥ 2 as a cut-off.

The GDS-5 version was developed from the GDS-15 (Hoyl et al., 1999). Combinations of 3-7 items and different cut-offs were tested to determine the most accurate short version for depression screening; finally, five items were chosen for which a score of two or more indicated clinically significant depressive symptoms warranting further assessment (Hoyl et al., 1999). The GDS-5 was tested in 74 frail geriatric outpatients in the USA using diagnostic evaluation (PRIME-MD, DSM) as the gold standard for depression. The 5-item GDS (compared with the 15-item GDS results shown in parentheses) had a sensitivity of 0.97 (0.94), a specificity of 0.85 (0.83), a positive predictive value of 0.85 (0.82), a negative predictive value of 0.97 (0.94), and an accuracy of 0.90 (0.88) for predicting depression. Significant agreement was found between depression diagnosis and the 5-item GDS (kappa =0.81) (Hoyl et al., 1999).

Hoyl et al. (2000) also tested the effectiveness of the 5-item version of the GDS-5 in 110 patients at a geriatric outpatient clinic in Chile. They found a mean score of 1.9 for the 5-item GDS. The Pearson correlation for the 15-item and 5-item GDS scores was 0.92, $p < 0.001$. Using the 15-item GDS score as a reference standard, the 5-item GDS had a sensitivity of 0.88, a specificity of 0.90, a positive predictive value of 0.88 and a negative predictive value of 0.90.

Rinaldi et al. (2003) examined the effectiveness of the GDS-5 for depression screening in 181 cognitively intact participants with a mean age of 79.4 years who were living in their own homes, hospitalized or living in nursing homes in Italy. The authors used a cut-off of 2 and found that the GDS-5 had a sensitivity of 0.94 (0.91-0.98), a specificity of 0.81 (0.75-0.87), a positive predictive value of 0.81 (0.75-0.87), a negative predictive value of 0.94 (0.90-0.97), a positive likelihood ratio of 4.92 (4.39-5.5), and a negative likelihood ratio of 0.07 (0.06-0.08). The GDS-5 showed a significant agreement with the diagnosis of depression based on a blinded evaluation using the DSM-IV criteria ($\kappa = 0.74$ for both scales). The GDS-5 had good interrater reliability ($\kappa = 0.88$) and test-retest reliability ($\kappa = 0.84$). Similar values were obtained in each setting and for both sexes (Rinaldi et al. 2003).

Additionally, Dokuzlar et al. (2018) conducted a blinded evaluation of different GDS scales compared with the DSM-V findings in a sample of community-dwelling people aged 65 years and older in Turkey. They found that the best cut-off value on the GDS-5 was ≥ 2 .

The Hospital Anxiety and Depression Rating Scale (HADS) was originally developed for adult patients with physical health problems in a hospital setting by Zigmond and Snaith (1983). The HADS is a fourteen-item scale with seven items related to anxiety and seven related to depression (the HADS-A and HADS-D subscales, respectively). The outcome measure was developed specifically to avoid reliance on conditions that are also common physical symptoms of illness, for example, fatigue and insomnia or hypersomnia. The scale is commonly used to determine the levels of depression for different groups of adult patients. From the original norms, a score on the HADS-D between 0 and 7 was within the normal range; scores between 8 and 10 and between 11 and 14 indicated mild and moderate depressive symptoms, respectively; and scores between 15 and 21 indicated severe symptoms (Bjelland et al., 2002; Bjelland et al., 2009).

In a review of the validity of the HADS across age groups, Bjelland et al. (2002) found that an optimal balance between sensitivity and specificity was achieved in most studies when case was defined by a score of ≥ 8 on the HADS-D. They concluded that the HADS-D performed well when assessing symptom severity and caseness of depression in somatic, psychiatric and primary care patients and in the general

population. This finding was supported by Olsson et al. (2005), who examined the usefulness of the HADS for general practitioners in 1,781 Norwegian patients with a mean age of 45.7 years for women and 49.8 for men. They concluded that the HADS-D had an optimal cut-off of ≥ 8 (sensitivity 0.80 and specificity 0.88) and an AUC of 0.93 and that 87% of the patients were correctly classified in relation to major depressive disorder. In addition, other large Norwegian population-based studies (among subjects aged 20-89) of the prevalence of possible depression all used a cut-off of ≥ 8 (Bjelland et al., 2009; Bjerkeset et al., 2008; Mykletun et al., 2001). However, the cut-off applied in these studies has not been validated using diagnostic criteria (ICD/DMS) as the gold standard.

Spinhoven et al. (1997) investigated the HADS in a sample of 6,165 Dutch people divided into different categories of age. The researchers reported that the dimensional structure and reliability of the HADS seems stable across medical settings and age groups, but the sensitivity, specificity and positive predictive value of the HADS scales depends on the nature and severity of the psychiatric disorder as defined by the Present State Examination. The authors suggested cut-off points for the total scale (Ravazi et al., 1990) and noted that the subscales (Zigmond and Snaith, 1982-1983) cannot be indiscriminately used in different samples.

Although the HADS-D is one of the most widely used measures in older populations and has been extensively validated among medical inpatients, outpatients and psychiatric patients, no study has explored the validity of the HADS-D exclusively for adults aged 65 years and older (Roberts, 2014) or used diagnostic criteria (ICD/DSM) as the gold standard.

Furthermore, there is a need for short and effective screening tools for depression, and the GDS-5 could be such a tool. No studies have validated the GDS-5 or the HADS-D among community-dwelling older adults in Norway. Therefore, this study aims to validate the Norwegian GDS-5 and HADS-D in a sample of community-dwelling people aged 60 years and above. The goal is to ensure that the measurements used for assessing depressive symptoms are suitable and of good quality for the target group.

Methods

Design

The study was conducted in line with design for studies on validity described by Jaeschke et al. (1994). An independent, “blinded” diagnostic evaluation of all participants should be carried out the same way. The diagnostic evaluation should not be influenced by results from the screening test being validated and vice versa. An appropriate broad range of participants must be included and represent the setting in which the tests were meant to be used (Jaeschke et al., 1994).

Recruitment of the participants

A broad range of adults aged ≥ 60 years with and without depressive symptoms living in their own homes in the community were recruited for participation in the study through advertisements in the local newspaper, home nursing agencies, senior centers, volunteer organizations and a psychogeriatric outpatient clinic.

Exclusion criteria: Severe aphasia; a life-threatening medical condition; inability to complete the study questionnaires; and inability to understand the purpose of the study or to provide informed consent.

In total, 203 older adults were included to participate in the study. Nine persons did not complete the required outcome measures. Thus, 194 older adults constituted the sample of this study.

Measures

The HADS-D (Zigmond and Snaith, 1983) and the GDS-5 (Yesavage et al., 1983) were used to assess symptoms of depression. The GDS-5 consists of five items and has a “Yes/No” response format with a two-point rating scale from 0-1, and the score ranges from 0-5 points (Yesavage et al., 1983; Hoyl et al. 1999). The HADS is a fourteen-item scale with seven items related to anxiety and seven related to depression, comprising the subscales HADS-A and HADS-D, respectively.

Responses are made on a four-point Likert scale. Subscale scores range from zero to 21 points. Both the GDS-5 and HADS have been translated into Norwegian. The HADS is widely used in studies including samples of older adults (Helvik et al., 2011), but the GDS-5 is not so commonly used.

To describe the sample, we assessed information on sociodemographic characteristics; cognitive status with The Mini Mental Status Examination-Norwegian Revised Version (MMSE-NR); activities of daily living with the I-ADL measurement;

and the severity of potential depressive symptoms with the Montgomery-Aasberg Depression Rating Scale (MADRS). Sociodemographic characteristics (sex, age, level of education and physical health) were assessed by self-report questions that have been used in several studies of older adults in Norway (HUNT, 2011; Valen-Sendstad, 2010). Physical health was evaluated by the number of physical disorders and the number of regular medications used, as reported by the participants. The MMSE-NR is a 20-item interviewer-administered assessment scale with scores ranging from 0 to 30 points. A score of 27 or more usually indicates healthy global cognitive functioning (Strobel, 2008). The MMSE-NR is a translated, adapted, and validated version of the MMSE-NR for older adults in Norway (Bystad et al., 2013; Engedal et al., 1988; Folstein et al., 1975).

The I-ADL measurement by Lawton and Brody (1996) is an eight-item scale with a response scale ranging from one to four points on three items, one to five points on two items, and one to three points on three items (min-max 8-31). A higher sum score indicates a lower level of I-ADL. The scale has been translated and widely used in studies including samples of older adults in Norway (Groven et al., 2010; Omli et al., 2013).

The MADRS is a ten-item rating scale. Each item is rated on a seven-point scale from 0 to 6, giving a minimum total score of zero and a maximum score of 60 (Montgomery and Aasberg, 1979). A higher score indicates more severe depression. The MADRS is validated for older adults in Norway (Engedal et al., 2012) and has been applied in several Norwegian studies including older adults (Lövdahl et al., 2009; Naess et al., 2005; Thommessen et al., 2002). The MADRS was used as part of the diagnostic evaluation.

Procedure

First, the participants self-completed the GDS-5, HADS-D, I-ADL, sociodemographic variables and physical health questionnaires. Then, research assistants conducted the MMSE-NR through an interview. The research assistants included seven trained students in nursing, psychology or medicine. In addition, one member of the research team participated. Everyone received training in assessment through workshops led by the research group.

Within the following week, an evaluation for a depressive episode according to the diagnostic criteria of ICD-10 was conducted using a standardized template that comprised all symptoms of a depressive episode. The diagnostic evaluations were conducted independently by an experienced specialist in geropsychology and a specialist in geriatric medicine. The diagnostic procedures were performed separately, and the evaluators were blinded for to the HADS-D and GDS-5 screening results. When doubts arose concerning diagnosis, consensus was reached by including a third specialist. The degree of depressive symptom severity was also supported by using the MADRS. The patient history of mental health problems was recorded.

Statistics

Data management and analysis were conducted with SPSS version 25 (IBMSPSS, Chicago, Ill, USA). Descriptive analysis of independent samples was performed with the chi-square statistic for categorical variables and with the nonparametric Mann–Whitney test for continuous variables because the distribution was not normal. The correlations between the GDS score, HADS-D score and MADRS score were inspected with the Spearman's rho nonparametric analysis. The graphic plot receiver operating characteristics (ROC) analysis was performed to illustrate the diagnostic ability (yes/no) of each screening test as the cut-off threshold varied. The area under the curve (AUC) was calculated, as were the sensitivity, specificity, and positive and negative likelihood (LR+ and LR-) ratios for the best cut-off points on the HADS-D and the GDS-5. The positive likelihood ratio is the ratio of the number of true test-positive participants (sensitivity/ 100% specificity). The negative likelihood ratio is the ratio of the number of false test negatives divided by true test negatives (100% sensitivity / specificity). The positive and negative likelihood is used to measure and express the diagnostic accuracy for the cut-off thresholds. Accuracy is defined as the proportion of the study group correctly classified as positive or negative.

Ethics

This clinical research project was approved by the Regional Committee for Ethics in Medical Research in Southeastern Norway and by the Data Inspectorate (012/1984/REK).

The participants were given oral and written information about the study and acquire informed consent.

Results

A total of 194 participants with a mean (SD) age of 73.4 (8.0) participated. Of those, 129 (74%) were women, 74 received home health care or treatment from a psychogeriatric outpatient clinic, and 120 received no public health care. The community-dwelling participants receiving in home nursing care or psychiatric outpatient treatment were older, had fewer years of education, were more often living alone, and had poorer physical health, as defined by a higher number of physical disorders and regular medications and higher I-ADL scores and cognitive health measures (see table 1).

Among the total number of participants, 56 (28.9%) fulfilled the criteria for a depressive episode according to the ICD-10. The prevalence of depression according to the ICD-10 was higher among those receiving home health care (45.9%) than among those not receiving home health care (18.3%). The mean (SD) scores of the GDS-5 and HADS-D for the depressed group were 2.4 (1.3) and 6.7 (SD 5.1), respectively, while the mean (SD) scores of the GDS-5 and HADS-D for the nondepressed group were significantly lower, i.e., 0.9 (1.2) and 2.7 (2.9), respectively (Table 2). The depressed group had poorer I-ADLs and used a higher number of medications regularly than the nondepressed, but cognitive function did not differ between these groups.

The Spearman correlations between the GDS-5 and HADS-D and the MADRS both in the depressed and nondepressed group were low to moderate (varying between 0.4 and 0.6) (Table 3).

ROC analyses of the HADS-D and GDS-5 were performed using the diagnostic criteria of the ICD-10 (WHO) for depression as the gold standard (Figure 1). The AUC was 0.81 for the GDS-5 and 0.75 for the HADS-D. The cut-off points of each measure that produced the highest accuracies are displayed in table 4.

Discussion

To our knowledge, this is the first study examining the validity of the GDS-5 and HADS-D screening instruments for depression in a sample of community-dwelling adults aged 60 years or above, using the ICD-10 criteria as the gold standard. Both the GDS-5 and the HADS-D had relatively low sensitivity and specificity, and their positive likelihood was 2.7 and 2.3, respectively. We found that the AUC was good for the GDS-5 (0.81) but fair for the HADS-D (0.75). These results indicate that the

GDS-5 and HADS-D are best suited as screening tools that describe the symptom load and indicate a need for further diagnostic evaluation for a depressive episode or disorder in samples of community-dwelling older adults (Leiknes et al., 2016).

For the GDS-5, the best cut-off point indicating a depressive episode was ≥ 2 . This is in line with studies of Dokuzlar (2018) and Rinaldi (2003), who also included samples of older adults. While Dokuzlar included community-dwelling patients ≥ 65 years from a geriatric outpatient clinic, Rinaldi included participants from a geriatric acute care ward, a geriatric outpatient clinic and a nursing home.

For the HADS-D, a cut-off ≥ 4 was best suited for identifying a depressive episode. This is in line with studies including older people suffering from stroke or low vitamin D levels (Johnson et al., 1995; Sagen et al. 2009; Kjærgaard et al. (2011). Although a cut-off ≥ 8 on the HADS-D is well established for depression in a variety of adult samples (Bjelland et al., 2002), no studies have validated the HADS-D for older adults exclusively (Roberts et al., 2014; Leiknes et al., 2016). The low cut-off (≥ 4) for older community-dwelling adults raises a concern regarding generalizing results from younger to older adult populations and may contribute to the underreporting of older adults with depression. Underreporting of depressive symptoms in older age cohorts may also be influenced by historical and cultural contexts in which mental illness is associated with negative stigma (Turvey et al., 2012). In general, older adults in the Western world complain less about affective symptoms such as sadness, anxiety and hopelessness and report more physical symptoms, such as disturbances in appetite and sleeping patterns, fatigue, and cognitive disturbances such as problems with memory and concentration (Baldwin and Tomenson, 1995; Corcoran et al., 2013; Fiske et al., 2009; Hegeman et al., 2012; Korten et al., 2012). A change in these perceptions of mental illness, including depression, may very well occur among new generations who have new knowledge and a more accepting attitude. Our findings thus point to the urgent need for further studies of the validity of screening tools such as the HADS-D and GDS-5 for different ages and subgroups of older people to make screening tools relevant to and suited for identifying depression in older people.

Strengths and limitations

The sample consisted of participants representing a broad range of community-dwelling older adults in Norway. The participants volunteered to participate, and it is possible that there are groups of home-dwelling older adults we did not reach. The

research assistants conducting the screening interviews received comparable training. The participants underwent a blinded diagnostic evaluation for a depressive episode according to the diagnostic criteria of the ICD-10 by independent and experienced specialists. All the participants underwent screening first, and the blinded diagnosis was scheduled for the coming week. This schedule could have influenced the participants' answers. There were several research assistants involved in the screening interviews. We did not determine the kappa or ICC when administering the instruments, and this is a weakness of our study.

The sample and the assessment procedure need some consideration. To strengthen the analysis, the sample of 194 participants was analyzed as one group. A larger sample would have allowed the opportunity to separately assess community-dwelling older adults who were and were not receiving home health care.

We found both the HADS-D and the GDS-5 to be useful screening tools for assessing the depressive symptom load. We did not systematically ask the respondents which of the inventories was easiest to answer. Nonetheless, our clinical experience is that respondents without dementia, such as those in the present study, find it easier to answer the HADS-D than the GDS-5 because the flexibility of the GDS-5 is low. However, this observation needs to be examined. When searching for suitable screening tools for community-dwelling older adults, the experience of the participants is also important.

Conclusion

Both the GDS-5 and the HADS-D are screening tools used to assess the depressive symptom load in community-dwelling older adults. The ability to identify depression was good for the GDS-5 and fair for the HADS-D compared with the gold standard ICD-10. A cut-off ≥ 2 on the GDS-5 and ≥ 4 on the HADS-D should thus lead to further diagnostic examination of depressive symptoms. There is a need for more studies investigating the GDS-5 and HADS-D in samples of older adults.

Conflict of interest:

The authors declare no conflicts of interests.

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Description of authors' roles:

SE collected the data, assisted in the statistical analysis and drafted the paper. GHB collected the data, assisted in the statistical analysis and assisted in writing the paper. ASH carried out the statistical analysis and assisted in writing the article. ML collected data and assisted in writing the paper. KE designed the study in cooperation with the other authors, he supervised the data collection and was responsible for the statistical design of the study and for carrying out the statistical analysis.

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Table 1. Characteristics of older adults with and without home health care services

		Receives home health care	Receives no home health care	Comparison ¹ p-value
N (%)		74 (100)	120 (100)	< 0.05
<i>Socio-demographic variables</i>				
Females	N (%)	55 (74.3)	74 (61.7)	0.070
Age	Mean (SD)	77.7 (8.3)	70.9 (6.6)	<0.001
Living alone	N (%)	60 (81.1)	48 (40.0)	<0.001
Education	Mean (SD)	10.8 (3.8)	13.6 (3.8)	<0.001
<i>Clinical variables</i>				
Number of physical disorders	Mean (SD)	1.8 (1.7)	0.8 (1.1)	<0.001
Number of regular medications	Mean (SD)	6.8 (3.9)	2.5 (2.7)	<0.001
I-ADL	Mean (SD)	16.7 (5.8)	8.9 (2.7)	<0.001
Depression diagnosed with ICD-10	N (%)	34 (45.9)	22 (18.3)	<0.001
MMSE-NR score	Mean (SD)	25.6 (3.6)	28.9 (1.8)	<0.001

¹ Continuing variables were compared using Mann-Whitney U test, two sided, and categorical variables were compared using chi square

Table 2. Characteristics of older adults with and without depression

		Depressed	Non-depressed	Comparison p- value ¹
N (%)		56 (100)	138 (100)	< 0.05
MMSE sum score	Mean (SD)	27.4 (2.8)	27.7 (3.2)	0.144
IADL sum score	Mean (SD)	13.7 (5.6)	11.1 (5.4)	<0.001
Number of regular medications	Mean (SD)	5.3 (3.8)	3.7 (3.8)	<0.001

MADRS sum score	Mean (SD)	12.3 (6.7)	2.5 (3.0)	<0.001
GDS -5 score	Mean (SD)	2.4 (1.3)	0.9 (1.2)	<0.001
HADS – D score	Mean (SD)	6.7 (5.1)	2.7 (2.9)	<0.001

¹ Continuing variables were compared using Mann-Whitney U test, two sided, and categorical variables were compared using chi square

Table 3. Correlations between measurements for depression ¹

	Depressed (N=56)		Non-depressed (N=138)		Total Sample (N=194)	
	HADS-D	MADRS	HADS-D	MADRS	HADS-D	MADRS
<i>GDS-5</i>	0.510**	0.386**	0.505**	0.456**	0.606**	0.620**
<i>HADS-D</i>		0.600		0.352**		0.527**

¹ Spearman correlation

** p value < 0.001

Table 4. Receiver Operating Characteristics analysis including all participants evaluated by using ICD-10 criteria for a depressive diagnosis as gold standard. Best cut-off points for GDS-5 and HADS-D that produced the highest accuracy.

N= 194	AUC	95%CI of AUC	SS, %	SP, %	LR+	LR-	ACC %
GDS-5 ≥ 2	0.810	(0.747 - 0.874)	73.2	73.2	2.7	0.4	73.2
HADS-D ≥ 4	0.753	(0.675 - 0.831)	70.3	69.6	2.3	0.4	70.1

AUC= Areal under the curve, CI= Confidence Interval, SS=Sensitivity, SP=specificity, LR+ = Positive likelihood, LR-= Negative likelihood, ACC= accuracy

Figure 1. Receiver Operating Curves for HADS-D and GDS-5 for depression according to ICD-10 (WHO)

