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REVIEW

Validity and reliability of a shorter version of the Geriatric Depression Scale in institutionalized older Portuguese adults

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ABSTRACT

Objectives: Depressive symptoms are common in older adults in institutional contexts; however, there is a lack of validated measures for these settings. Identifying depressive symptoms can help clinicians to manage them and to prevent or delay their complications. This study aimed to validate the Geriatric Depression Scale (GDS) in an institutionalized sample of older adults.

Method: 493 institutionalized older people (73% women) aged 60 or over were evaluated through the GDS, the Mini International Neuropsychiatric Interview (MINI) (depression vs. no depression = 11% vs. 89%), the Geriatric Anxiety Inventory (GAI), the Positive Affect (PA) and Negative Affect (NA) Schedule, and the Satisfaction with Life Scale (SWLS). Test-retest reliability was assessed with 57 older adults.

Results: An 8-item version presented a Cronbach's alpha value of .87 with a single factor explaining its variance. The correlations ($p < .01$) attested the concurrent validity (GAI: $r = .76$; PA: $r = -.22$; AN: $r = .62$; SWLS: $r = -.32$). Test-retest reliability (6.51 months) was adequate ($r = .52$). ROC analysis ($AUC = .82$; sensitivity = 80%; specificity = 77%) and Youden index revealed a cutoff of 5/6 for the diagnosis of depression.

Conclusion: Results support the validity and the screening capacity of a short version of GDS in institutional contexts. Short screening instruments for depressive symptoms may facilitate their identification, allowing for timely clinical interventions in institutional settings.

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Introduction

According to a study by Horackova et al. (2019) in a European sample, depression in older adults was of 29%, with the highest prevalence being found in Southern Europe (35%), followed by Central and Eastern Europe (32%), Western Europe (26%), and Scandinavia (17%). In Portugal, a study by Frade, Barbosa, Cardoso, and Nunes (2015) showed a prevalence of depressive symptoms of 81% in institutionalized older-people, which contrasts with a prevalence of 53% in community-dwelling elderly. Older people institutionalization, among other factors, seem to trigger the development of depressive symptoms (Vicente et al., 2014), with this symptomatology being prevalent in the institutionalized population (Al-Amer et al., 2019; McDougall, Matthews, Kvaal, Dewey, & Brayne, 2007). Symptoms such as depressed mood and thoughts of death seem more frequent in institutionalized older adults when compared to their community-dwelling counterparts (McDougall et al., 2007). Indeed, institutionalization entails a lifestyle change, including formal caregiving and potential social and functional losses, which may contribute significantly to the development of depression (Al-Amer et al., 2019; McDougall et al., 2007; Napoleão, Monteiro, & Espirito-Santo, 2016). Despite of its high prevalence, depression is usually neglected in institutional settings (Al-Amer et al., 2019; McDougall et al., 2007), calling for the necessity of routine assessments, not only to make an early diagnosis but also to implement appropriate interventions to improve quality of life in institutional settings (McDougall et al., 2007). Institutionalized older people being more prone to suffer from cognitive and physical limitations, render Geriatric Depression Scale (GDS) especially appropriate because it assesses mainly the affective component of depression instead of the vegetative one (Parmelee, Lawton, & Katz, 1989). Yesavage et al. (1983) designed the GDS as a self-response report with a simple and accessible response format, not ruling out the possibility of being administered by an interviewer. Hence, the GDS was developed addressing the limitations of previous tools, and items considered inadequate in differentiating the presence and absence of depressive symptoms in older adults (physical and sexual issues) were excluded (Yesavage et al., 1983). The GDS also allows the assessment of the severity of depressive symptoms, fulfilling the criteria for the screening of depression, even in the presence of cognitive deterioration (Yesavage et al., 1983).

Considering the good psychometric properties (Yesavage et al., 1983; $n = 47$ older adults of the community, Cronbach's alpha = .94, test-retest $r = .85$), the GDS has been validated for several samples and in various

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Table 1. Review of the literature concerning the validation of the Geriatric Depression Scale in institutionalized samples.

Author	Sample	# items	Internal Consistency	Test-retest	Factorial structure	ROC	Cut-off Point
Parmelee et al. (1989)	$N = 417$[a]	30	0.91	0.85	1 factor	–	–
McGivney et al. (1994)	$N = 66$	30	–	–	–	Se = 63% Sp = 91%	15
Sutcliffe et al. (2000)	$N = 308$	12	0.81	–	–	Se = 73% Sp = 77%	4/5
Rinaldi et al. (2003)	$N = 181$[b]	5	–	0.84	–	Se = 95% E = 81%; *AUC* = .88	–
Jongenelis et al. (2007)	$N = 410$	8	0.80	–	–	Se = 96% Sp = 71%	2/3

Note. n = number of subjects; ROC = Receiver Operating Characteristic; Se = Sensitivity; Sp = Specificity; AUC = Area Under Curve.
[a]The sample included apartment and nursing home residents.
[b]The sample included geriatric outpatients, geriatric ward patients, and institutionalized older adults.

countries. Table 1 summarizes previous validations of the scale in institutionalized samples.

The number of people aged 65 and over in Portugal was estimated to be 2,194,957 in 2017 (21.3%) (PORDATA, 2012), and 4.6% of that was institutionalized in long-term care centers (Daniel, Monteiro, & Ferreira, 2016). Most of these care centers are private institutions of social solidarity, financially supported by the Portuguese government (Daniel et al., 2016), and obliged to comply with legislation stipulating the existence of a part-time social educator and one nurse for every 40 residents (Ministério da Solidariedade e da Segurança Social, 2012). The majority of this institutionalized population is female, present mental health issues, and physical/medical problems (Teixeira, Azevedo, Alves, Pires, & Paúl, 2017).

Considering institutional settings, it remains to ascertain what are the psychometric properties, diagnostic accuracy, and structure of the GDS in this context. Thus, this study aimed to validate the GDS in an institutionalized geriatric sample by analyzing its factor structure, construct validity, reliability, and diagnostic accuracy.

Methods

General scope

This study is part of the "Aging Trajectories Research Project" (ATRP), which aims to evaluate the cognitive, mental, and physical health of institutionalized older people from the central region of Portugal.

Procedures and participants

Procedures stemming from ATRP included compliance from the institutions and authors' permission to use the instruments. In the assessment, written informed consent and the measurement battery was read out to each participant, including a Sociodemographic Questionnaire, the GDS, the Mini International Neuropsychiatric Interview, the Geriatric Anxiety Inventory, the Mini-Mental State Examination, the Positive and Negative Affect Scale, and the Satisfaction with Life Scale. The Ethics Committee of Miguel Torga Institute of Higher Education approved this study (DI&D-ISMT/2-2013).

Inclusion criteria were age > 60 years and being institutionalized. The following participants were excluded based on information provided by the institutions: people with mental illnesses other than depression, and people with motor or sensory disabilities that hindered the evaluation. While some studies assumed cognitive impairment as an exclusion criterion (Rinaldi et al., 2003), cognitively impaired subjects were not excluded from this study since they typically represent the institutionalized population, which is also emphasized by previous validations (Parmelee et al., 1989; Sutcliffe et al., 2000). To strengthen the relevance of including these participants, the Mini-Mental State Examination was used to investigate the possible interference of cognitive functioning in GDS performance, and no relationship was found between both measures ($r = .02$; $p = .67$).

Thus, 493 institutionalized older people from 39 institutions of the central region of Portugal were evaluated. Regarding the sociodemographic characteristics of the sample (Table 2), the age ranged from 60 to 100 years ($M = 80.66$, $SD = 7.72$), it included mostly women (73.0%), older individuals without partners (77.7%), with primary education (48.5%), mostly rural (72.4%), and attending mainly day centers (57.6%).

Furthermore, 186 subjects were evaluated with a clinical interview. Of these, a group of twenty individuals (10.8%) had symptoms consistent with a diagnosis of a major depressive episode (designated as "depressive group"). The remaining 166 older adults were included in a group labeled "non-depressive group". With regard to cognitive functioning, 393 people (79.7%) had scores suggestive of cognitive impairment.

Finally, 11.6% of the participants ($n = 57$) were invited to complete the GDS again after 6.51 months ($SD = 5.98$), to evaluate its test-retest reliability. The number of participants was reduced due to logistic constrains ($n = 399$; 80.9%), the refusal from one subject to participate again (0.2%), exit from the institution ($n = 21$; 4.3%), illness ($n = 4$; 0.8%), and death ($n = 11$; 19.3%).

Measures

A **Sociodemographic Questionnaire** gathered information on participants' sex, age [continuous variable and dichotomized considering the median into *young-old* (60–80 years old), *old-old* (81–100 years old)], marital status (*single*, *divorced*, *widowed*, *married*), education level [*no schooling*, *can read and write*, *primary education* (1–4 years), *lower secondary education* (5–6 years), *middle secondary education* (7–9 years), *higher secondary education* (10–12 years), and *higher education* (> 12 years)], geographical area (*urban*, *rural*), institution typology (*day centers*, *long-term care centers*), and institutionalization duration (in months).

Table 2. Demographic characterization of an institutionalized sample ($N = 493$).

Variables	Categories	*n*	%
Sex	Male	133	27.0
	Female	360	73.0
Age	Young-old	100	20.3
($M = 80.66$; $SD = 7.72$)	Old-old	393	79.7
Marital status	Single	51	10.3
	Married	110	22.3
	Widowed	300	60.9
	Divorced	32	6.5
Education Level	No schooling	137	27.9
	Can read and write	63	12.8
	1st cycle	238	48.5
	2nd cycle	30	6.1
	3rd cycle	0	0
	Secondary education	25	5.1
	Higher education	0	0
Geographical area	Urban	136	27.6
	Rural	357	72.4
Institution typology	Day centers	284	57.6
	Long-term care centers	209	42.4
		M	***SD***
Institutionalization time (in months) ($n = 405$)[a]		32.02	36.94

Note. M = Mean; SD = Standard Deviation; n = number of subjects.
[a]Not all the institutions provided this information.

The **Geriatric Depression Scale** (GDS) (Barreto, Leuschner, Santos, & Sobral, 2007; Yesavage et al., 1983) consists of 30 items with a dichotomous response format (yes/no).

The **Geriatric Anxiety Inventory** (GAI) (Daniel, Vicente, Guadalupe, Silva, & Espirito-Santo, 2015; Pachana et al., 2007) is a 20-item scale that aims to evaluate anxious symptoms in the elderly, with a dichotomous response option and high internal consistency in the original study (Cronbach's alpha = .91; Pachana et al., 2007), in the Portuguese version (Cronbach's alpha = .94), and in the present study (Cronbach's alpha = .95; Daniel et al., 2015).

The ***Positive and Negative Affect Schedule*** (PANAS) (Costa, 2013; Watson, Clark, & Tellegen, 1988) evaluates the affective aspect of subjective well-being through 22 items answered on a five-point Likert scale (Watson et al., 1988). Cronbach's alpha values of the original version were .88 for positive affect (PA) and .87 for negative affect (NA) (Watson et al., 1988), and in the Portuguese version were of 0.79 for PA and 0.84 for NA (Costa, 2013). In this study, we found values of 0.78 for PA and of 0.83 for NA.

The ***Satisfaction with Life Scale*** (SWLS) (Costa, 2013; Diener, Emmons, Larsen, & Griffin, 1985) evaluates life satisfaction as a cognitive domain of subjective well-being through 5 items, with response options on a 5-point Likert scale (Diener et al., 1985). Cronbach's alpha value was of .76 in the Portuguese version (Costa, 2013), and a value of .77 was found in this study.

The ***Mini International Neuropsychiatric Interview*** (5.0.0.) (Amorim, 2000; Lecrubier et al., 1999) is a structured diagnostic interview with sensitivity to differentiate the presence of psychiatric disorders and to identify related symptoms in several nosological conditions (Lecrubier et al., 1999). Cohen's kappa of agreement was satisfactory for major depressive episode (0.68) (Amorim, 2000).

The ***Mini-Mental State Examination*** (MMSE) (Folstein, Folstein, & McHugh, 1975; Guerreiro, Botelho, Leitão, & Garcia, 1994) allows to distinguish subjects with and without cognitive deficit, and also determines its severity. MMSE integrates questions that include four cognitive areas: orientation, memory, attention, calculation, and language (Folstein et al., 1975). In the original study the psychometric properties were adequate (test-retest: $r = .99$; convergent validity with the Wechsler Intelligence Scale: $r = .78$). The same happened in the Portuguese version (split-half correlation = .71; Cronbach's alpha = .46; Guerreiro et al., 1994), and in this study (Cronbach's alpha = .83, Guttman's split-half coefficient = .83, test-retest = .68).

Statistical analyses

The IBM SPSS Statistics 25 program was used. The sample was characterized descriptively using means (*M*) and standard deviations (*SD*) for continuous variables, and frequencies for categorical variables. The 30 items of the GDS were subjected to principal component analysis (PCA) to extract factors with all of the variance in the items being used. Varimax rotation was performed to minimize the number of items having high loadings on each factor (Pallant, 2016). Monte Carlo parallel analysis (Watkins, 2000) was used to determine the number of extracted factors. For convergent and divergent validity, Pearson's correlation (*r*), coefficients of determination (R^2), and correlation interpretation following Cohen's guidelines (1988) were considered. Reliability analyses were performed by calculating the Cronbach's alpha and the test-retest analysis.

A Receiver Operating Characteristic (ROC) curve analysis and Area Under the Curve (*AUC*) were also performed to determine GDS optimal cutoff score able to discriminate the depressive group from the non-depressive group, according to the sensitivity-specificity pair that maximized the Youden index.

Individual differences in GDS scores according to the sociodemographic variables and participant groups were analyzed through Student's *t*-tests for independent samples or ANOVA, when appropriate. Effect sizes were presented as Cohen's *d* or Hedges' *g* for two-independent samples *t*-tests (similar sample sizes, and unequal sample sizes, respectively), Cohen's *d* adjusted for the repeated measures correlation, and eta-squared (η^2) for ANOVAs [interpretation according to Cohen's guidelines (Cohen, 1988)].

Statistical power analyses were based on G*Power software (Faul, Erdfelder, Lang, & Buchner, 2007). To have a power > 0.95, given medium effects ($d = 0.5$; $f = 0.25$; $r = .5$), with alpha of .05 for the statistical tests (respectively, *t*-test, ANOVA, and correlation), a total sample of > 305 and groups size of > 88 would be needed. Given the prevalence of the depression diagnosis in the Portuguese institutionalized population (11.1%) (Napoleão et al., 2016), for ROC analysis, a number of positive cases of > 4 and a number of negative cases > 33 would be required for a power of > 0.95 (MedCalc, 2019).

Results

Factor analysis

PCA revealed the existence of items with correlations lower than 0.3, communalities lower than 0.4, and with cross-loadings. Twelve items were, therefore, eliminated, with the scale being left with a total of eight items (Table 3), a single-factor solution with a variance of 52.51% (*KMO* = .91;

Table 3. Items, descriptive statistics, corrected item-total correlations, alpha if item excluded, and communalities of the eight-item Geriatric Depression Scale ($N = 493$).

Items	*M*	*SD*	*n*	%	*r* item-total corrected	Alpha if item excluded	h^2
1. Do you feel that your life is empty?	0.56	0.50	275	55.8%	0.60	0.86	0.49
2. Do you often get bored?	0.60	0.49	297	60.2%	0.66	0.85	0.58
3. Are you bothered by thoughts you can't get out of your head?	0.45	0.50	222	45.0%	0.60	0.86	0.49
4. Do you often feel helpless?	0.46	0.50	229	46.5%	0.56	0.86	0.44
5. Do you often get restless and fidgety?	0.59	0.49	293	59.4%	0.64	0.85	0.55
6. Do you often feel downhearted and blue?	0.56	0.50	275	55.8%	0.68	0.85	0.60
7. Do you frequently get upset over little things?	0.45	0.50	222	45.0%	0.64	0.85	0.55
8. Do you frequently feel like crying?	0.56	0.50	275	55.8%	0.61	0.86	0.51

Note. M = Mean; SD = Standard Deviation; n = number of subjects who answered "Yes"; r = correlation; h2 = communality values.

Bartlett test's significance level $< .001$). The single-factor solution was supported by the results of the parallel analysis, which exhibited only one-component with an eigenvalue exceeding the corresponding criterion value.

Convergent and divergent validity

Table 4 shows the Pearson correlation values between measures and GDS-8 scores. High and positive correlations between GDS-8 and NA ($R^2 = 38.4\%$), and between GDS and GAI ($R^2 = 57.8\%$) were revealed. A low and negative correlation was found between GDS and PA ($R^2 = 4.8\%$), and a moderate and negative correlation ($R^2 = 10.2\%$) was detected between GDS and SWLS.

Reliability analysis

The Cronbach's alpha value was .87 and interitem correlation varied between .35 and .55 (mean interitem correlation = .46). When alpha-if-item removed statistics were examined, the exclusion of any item did not lead to an appreciable improvement in the coefficient alpha, which suggested that the eight items should be retained (Table 3).

Temporal stability

A low test-retest correlation was discovered ($r = .52$, 27.0%; $p < .001$). A Student's *t*-test for paired samples showed declining scores between the first ($M = 5.35$, $SD = 2.53$) and the second moment of evaluation ($M = 5.04$; $SD = 2.47$), although not significant [$t(56) = 0.98$; $p = .332$; $d_{Repeated\ Measures} = 0.13$].

Receiver operating characteristic curve analysis

An *AUC* value of 0.82 (95%*CI*, 0.73 to 0.90; $p < .001$) was obtained. The cutoff of the ROC curve that maximized the Youden index was of 5/6 with a sensitivity of 80% and specificity of 77%.

Individual differences in the GDS-8

The depressive group had superior mean scores ($M = 5.33$, $SD = 3.06$) than the non-depressive group ($M = 3.30$, $SD = 2.84$), with the difference being statistically significant [$t(215) = 5.25$; $p < .001$)] with a high effect size ($g_{Hedges} = 0.71$; *CI* 95% = 0.24–1.18).

Table 4. Pearson's correlations between GDS-8, GAI, PANAS, MMSE, and SWLS ($N = 493$).

Measures	1	2	3	4	5	6
1. GDS-8	—	**.76****	-.22**	**.62****	.02	**-.32****
2. GAI		—	-.17**	**.65****	.12**	-.27**
3. Positive PANAS			—	-.13**	.20**	**.45****
4. Negative PANAS				—	-.09*	**-.30****
5. MMSE					—	.003
6. SWLS						—

Note. GDS-8 = Geriatric Depression Scale-8 item version; GAI = Geriatric Anxiety Inventory; PANAS = Positive and Negative Affect Schedule; MMSE = Mini-Mental State Examination; SWLS = Satisfaction With Life Scale. The moderate and high correlations were highlighted in bold.
* $p < .05$;
** $p < .01$.

Table 5. Individual differences in the eight-item Geriatric Depression Scale ($N = 493$).

		M	*SD*
Sex	Male	3.56	2.67
Student's $t = 3.35$**	Female	4.49	2.91
Hedges' $g = 0.33$			
Age	Young-old	4.27	2.72
Student's $t = 0.135$NS	Old-old	4.23	2.91
Hedges' $g = 0.01$			
Marital Status	Single	4.16	2.91
ANOVA's $F = 1.10$NS	Divorced	4.19	2.95
$\eta^2 = 0.01$	Widowed	4.40	2.89
	Married	3.83	2.78
Geographical area	Urban	4.43	2.73
Student's $t = 0.95$NS	Rural	4.16	2.93
Hedges' $g = 0.09$			
Educational level	No schooling	4.69	2.94
ANOVA's $F = 2.95$*	Can read and write	4.67	2.75
$\eta^2 = 0.02$	1st cycle	4.03	2.78
	2nd cycle	4.00	3.14
	Secondary education	2.92	2.90
Institutions	Day centers	4.24	2.83
Student's $t = 0.01$NS	LTCC	4.23	2.93
Hedges' $g = 0.00$			

Note. M = Mean; SD = Standard Deviation; F = ANOVA; t = Student t-test; η^2 = eta squared (sum of squares between groups / total sum of squares); g = Effect size Hedges' g; LTCC = Long-term Care Centers.
* $p < .05$;
** $p < .01$;
NSNot significant.

Women and participants with no schooling had the highest scores (Table 5). In other sociodemographic variables, the differences were not statistically significant.

Discussion

This study aimed to validate GDS in a sample of institutionalized older people. With the present validation cohort, PCA led to the exclusion of twelve items, which gave a total of eight items only loading on to a single factor, with an acceptable amount of total variance explained. The single factor found in this study meets the factor structure of

Parmelee et al. (1989) with a similar sample. Our small version of GDS adds to multiplying evidence of the utility and importance of shorter versions of this tool (e.g. Durmaz, Soysal, Ellidokuz, & Isik, 2018; Guerin, Copersino, & Schretlen, 2018; Sarkar, Kattimani, Roy, Premarajan, & Sarkar, 2015; Zalavadiya et al., 2017).

With regard to convergent validity, GDS-8 correlates strongly (according to Cohen, 1988's guidelines) and significantly with GAI. Other investigations also using GDS and GAI support these findings (Champagne, Landreville, Gosselin, & Carmichael, 2016; Johnco, Knight, Tadic, & Wuthrich, 2015), although having obtained lower values with different old-adults' samples (respectively, $R^2 = 17.6\%$; $R^2 = 42.3\%$). Studies indicating that individuals with symptoms or a diagnosis of depression have low levels of positive affect and high levels of negative affect (Castro-Schilo, Fredrickson, & Mungas, 2019; Daniel et al., 2015; Steffens, Wang, Manning, & Pearlson, 2017) support the high correlation between GDS-8 and Negative affect. Although the correlation between GDS-8 and Positive affect was relatively small, we do not question GDS-8 convergent validity, since negative affect has greater variance among institutionalized older people than positive affect (Vicente et al., 2014). Comparatively, Kim and Lee (2017) found a lower correlation value between GDS and Negative affect ($R^2 = 13.0\%$) and a higher correlation with positive PANAS ($R^2 = 32.5\%$). However, Kim and Lee (2017) participants were younger and were not institutionalized.

Regarding divergent validity, GDS-8 scores correlate negatively and moderately with SWLS. Kim and Lee's study (2017) support this result, and although they found a higher correlation with SWLS ($R^2 = 32.5\%$), again, their sample was younger and was not institutionalized.

Internal consistency of the GDS-8 is adequate, with the Cronbach's alpha coefficient being similar to previous validations with institutionalized (Jongenelis et al., 2007; McGivney, Mulvihill, & Taylor, 1994; Parmelee et al., 1989) and non-institutionalized older people (Yesavage et al., 1983).

A low coefficient of temporal stability was found, contrasting with the higher test-retest correlation values found by Parmelee et al. (1989) and Yesavage et al. (1983). As Crocker and Algina (2008) put it, factors like the time between moments of assessment and the types of samples affect the reliability estimate. Yesavage et al. (1983) time between tests was one week apart, and they used a community sample; in Parmelee et al. (1989) it elapsed one month, the mean length of institutionalization was shorter (25.2 months), and it comprised less institutionalized participants (28.8%).

The ROC analysis showed high sensitivity and specificity values at the 6/7 cut-off point. These values are similar to those obtained by Jongenelis et al. (2007) with an equal number of items, but their cut-off point was lower (2/3). Given that the mean value of depressive symptoms is higher in our study, our values may reflect cultural differences in the expression of depressive symptoms. Also, these differences may be due to the profile of Portuguese institutionalized older people (Daniel, Fernandes, Silva, & Espirito-Santo, 2018; Teixeira et al., 2017; Vicente et al., 2014), and the characteristics of the Portuguese institutional settings (da Luz & Miguel, 2015; Ministério da Solidariedade e da Segurança Social, 2012; Teixeira et al., 2017).

Regarding the individual differences, females scored higher in the GDS-8. These results are corroborated by Girgus, Yang, and Ferri (2017), which propose that older women could be more exposed to risk factors associated with depression. Another explanation could involve the way women cope with difficulties, presenting more rumination than men because they tend to focus on negative emotions, rather than engaging in problem-solving strategies (Trives, Bravo, Postigo, Segura, & Watkins, 2016). Moreover, some studies show the influence of the biological component concerning the higher propensity for depression among women (Soares, 2017).

Finally, non-educated participants had higher GDS values, and our results are corroborated, for example, by Liu et al. (2015), which indicate high schooling as a protective factor in old-adults.

A number of limitations in our study should be noted. The low level of literacy and the high prevalence of scores suggestive of cognitive impairment could have compromised the understanding of GDS items. However, as the questionnaires were read out, a standardized presentation and minimization of comprehension difficulties were ensured. Additionally, the non-exclusion of people with cognitive impairment and with a low literacy level is an added value in this study, because the institutionalized geriatric population is, thus, represented, and a similar approach has been taken in other studies (Parmelee et al., 1989; Sutcliffe et al., 2000).

Finally, in the present study, the period elapsed between the two assessments was probably too long, allowing changes in depressive symptoms to take place in the participants' true scores.

Conclusion

Adding to international evidence of the relevance of short forms of GDS and its use in a cross-cultural context, the GDS-8 proved to be a useful tool to screen for depression in the context of older-people institutionalization, due to its good psychometric properties and its short administration time. A sound psychometrically screening tool is relevant because depression and depressive symptoms are prevalent in the institutionalized geriatric population, being necessary to develop targeted clinical intervention strategies. Moreover, the use of a small and easy to understand tool is also an important aspect to avoid burdening older adults. Additionally, this study provided a cutoff for the scale, which is useful for clinical practice as it allows clinicians to identify those with depression accurately and to exclude those without depression. We suggest that future studies test GDS-8 psychometric properties in other samples of older adults.

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