

The Geriatric Depression Scale (GDS-15): Validation in Mexico and Disorder in the State of Knowledge

The International Journal of Aging and
Human Development
2021, Vol. 93(3) 854–863
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DOI: 10.1177/0091415020957387
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Abstract

The objective of this study was to evaluate the reliability and validity of the Geriatric Depression Scale in its 15-item version (GDS-15) in Mexican older adults. Participants included 1178 older adults between the ages of 60 and 94 ($M = 69.16$, $SD = 7.69$); 53.9% were women and 55.8% were married or with a partner. They completed the GDS-15, a subjective well-being scale, and a quality-of-life questionnaire. A Kuder–Richardson coefficient of .80 was obtained, which indicates an acceptable internal consistency of the GDS-15, as well as evidence of divergent validity with significant correlations of $-.783$ with subjective well-being and $-.569$ with quality of life, in addition to concurrent validity when discriminating between participants with low scores from those with high scores of depressive symptoms. The need for a simple screening tool such as the GDS-15 that helps in the identification of depressive symptoms in Mexican older adults is underlined.

Keywords

Geriatric Depression Scale, depression, older adults, subjective well-being, quality of life

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Introduction

The incidence of depressive disorders increases substantially in old age (Chiesi et al., 2018). Depression in old age is frequently ignored, as health professionals view depressive symptoms as normal manifestations of the aging process. The presence of these symptoms in old age may be responsible for the loss of independence and aggravation of preexisting pathological conditions. Depression in old age is associated with increased risks of morbidity and mortality, causing an increase in the use of health services, negligence in self-care, and poor adherence to treatments (Martins et al., 2012).

The use of self-reports has been suggested to improve the identification of depressive symptoms in older adults. However, the possible confusion of somatic symptoms of depression (insomnia, weight loss, reduced activity, and loss of energy) with some changes and losses associated with normal and pathological aging should be considered (Chiesi et al., 2017).

To solve this situation, the Geriatric Depression Scale (GDS) was created, first in a version of 30 items (Yesavage et al., 1982) and later of 15 items (GDS-15; Sheikh & Yesavage, 1986) to reduce administration time and fatigue in the respondents. Both versions do not include items on the somatic symptoms of depression and are one-dimensional. They present a dichotomous response format (Yes/No) that makes them easy to administer, where conventionally in the GDS-15, a number equal to or greater than five positive items assumes mild depression and a number equal to or greater than 10 positive items assumes moderate to severe depression, and hence follow-up through clinical evaluation is recommended to confirm the diagnosis (Ştefan & Băban, 2017).

Early detection of depressive symptoms in older adults leads to better treatment results and a better quality of life. The GDS-15 can help with the early detection of symptoms and diagnosis of depression, but it is important for this tool to be valid, reliable, and culturally appropriate in the population being used (Dow et al., 2018).

In the GDS-15, Ştefan and Băban (2017) found evidence of internal consistency, temporal stability, divergent validity with life satisfaction, and criterion validity when discriminating between depressed and nondepressed in Romanian older adults. Similarly, Dow et al. (2018) found evidence of internal consistency and convergent validity with other measures of depression in immigrant Chinese in Australia. Nyunt et al. (2009) also found evidence of internal consistency, temporal stability, and criterion validity based on age, gender, ethnic group, and chronic disease in older adults in Singapore. On the other hand, Chaaya et al. (2008) found evidence of internal consistency, temporal stability, and criterion validity when discriminating between depressed and nondepressed in Arabian older adults. Pedraza et al. (2009) found evidence of internal consistency and temporal stability in African American older adults.

On the other hand, Imai et al. (2014) found three factors with evidence of internal consistency and divergent validity with quality of life and activities of daily living in Japanese older adults. Similarly, Martins et al. (2012) found four factors with low

values of internal consistency in Brazilian older adults. Gómez-Angulo and Campo Arias (2008) found two factors and evidence of internal consistency in Colombian older adults, while Sugishita et al. (2017) found three factors and evidence of internal consistency in Japanese older adults. Similarly, Ximenes et al. (2010) found three factors with low internal consistency values in older Brazilian adults with coronary artery disease, and Campo-Arias et al. (2008) found two factors with evidence of internal consistency in Colombian older adults. Further, Lucas-Carrasco (2012) found two factors with evidence of internal consistency, convergent validity with another measure of depression, and divergent validity with quality of life in older Spanish adults with dementia. Friedman et al. (2005) also found two factors with evidence of internal consistency, convergent validity with suicidal ideation, divergent validity with life satisfaction, and criterion validity when discriminating between depressed and nondepressed in older Americans with functional impairment. Tang et al. (2005) found a factor in Chinese older adults with lung disease, while Chiang et al. (2009) found a factor in older American adults.

Chau et al. (2006) mention, in their study of older adults with stroke, that the one-dimensional model of the GDS-15 has an unsatisfactory fit to the data, while the two- or more dimensional models of other studies have an acceptable fit, which clearly indicates that the GDS-15 is a multidimensional instrument. More than a theoretical-conceptual fact, this suggestion of multidimensionality in the GDS-15 seems to obey methodological aspects. The reality is that the inconsistencies in the literature are evident, since in addition to the varied number of factors found in the different studies, there is disparity in the items that make up these factors, which makes it difficult to name the factors homogeneously among these studies.

In the aforementioned studies, evidence of reliability and validity was obtained through methods that are debatable considering the numerical properties of the GDS-15 and its one-dimensional nature. For example:

1. The reliability of the GDS-15 was obtained in most of the studies by evaluating the internal consistency of the scale using Cronbach's α , which is suitable for multiple-choice items (three or more response options). In the case of the GDS-15, the items are categorical, with two response options (Yes/No), so the appropriate statistic to assess the internal consistency of the scale is the Kuder-Richardson formula.
2. Without providing a theoretical-conceptual argument, in the previous studies factors were extracted in the GDS-15. An established number of factors were not found in the different studies, together with a low variance explained by these same factors and low internal consistency values in some. This may be because of cultural differences when translating the GDS-15 from English to another language, or because the ways of conceiving depression in populations are different from each other, or that, as it is a dichotomous scale, the use of the usual methods factor analysis can produce imprecise or biased results. But mainly,

it may be because a stable number of factors will not be found in the GDS-15 given its one-dimensional nature with which it was built.

3. On the other hand, the different studies mentioned used a very varied number of participants, some with significant numbers and others with a small number of older adults, which pose problems in generalizing results to larger populations with defined parameters.

This disorder in the state of knowledge involves a problem. A scientific investigation begins when a certain amount of knowledge has already been gathered and it indicates that something is being ignored. It may be that one simply does not have enough information to answer a question, or that the knowledge one has is in such a state of disorder that it cannot be adequately related to a research question. In any case, there is a problem. In this study, when reviewing previous research in the literature, it was noted that the lack of sufficient knowledge is manifested in research results that do not agree. This is one of the ways in which a research problem manifests itself (McGuigan, 1990).

In Mexico, no study has evaluated the reliability and validity of the GDS-15. The use of this scale is necessary given the prevalence of depression in Mexican older adults. In a study by De los Santos and Carmona (2018), the objective was to determine the prevalence of depression in women and older men in Mexico from the results of the National Survey of Health and Aging. The prevalence of depression was determined in 5275 people with an age range of 60–103 years. It was found that there was a prevalence of depression in people older than 74.3% (1734 men and 2186 women) where variables such as age, schooling, marital status, level of somatization, occupation, and social activities were factors statistically associated with the appearance of depression in older people.

Starting from the need for simple screening tools that help in the identification of depressive symptoms in old age, it becomes necessary to test the measurement properties of scales such as the GDS-15 in Mexican older adults, but this time recognizing the numerical properties of the scale and its one-dimensionality as a criterion for an adequate analysis of its psychometric properties given the disorder that currently exists in the literature regarding its reliability and validity.

In this context, the objective of this study was to evaluate the reliability and validity of the GDS-15 in Mexican older adults. Its internal consistency, divergent validity with subjective well-being and quality of life, and concurrent validity were evaluated to discriminate between participants with low scores from those with high scores of depressive symptoms. The Bioethics Committee of the Instituto Tecnológico de Sonora approved the realization of this study.

Methods

Participants included 1178 older adults aged between 60 and 94 ($M = 69.16$, $SD = 7.69$); 53.9% were women and 55.8% were married or with a partner. Participants

were recruited into meeting groups of older adults from the southern state of Sonora, Mexico.

Participants answered the following materials and measures: an informed consent, a sociodemographic data sheet, and the GDS in its 15-item version, with Yes/No response options (Sheikh & Yesavage, 1986).

The Subjective Well-Being Scale (Lawton, 1975), an instrument translated and adapted to Mexican Spanish with 18 items with Yes/No response options, distributed in three subscales: Agitation, Attitude toward one's own aging, and Loneliness/Dissatisfaction (González-Celis, 2002; González-Celis & Sánchez-Sosa, 2003). The scale shows an internal consistency measured by the Kuder–Richardson 21 formula of 0.77 in older adults from the state of Sonora, in Mexico (Gutiérrez, 2017). The higher the score on the scale, the greater the perception of well-being.

The World Health Organization Quality of Life for older adults (WHOQOL-OLD) questionnaire (Lucas-Carrasco et al., 2011), a Likert scale consisting of 24 items distributed in six subscales: Sensory capacity; Autonomy; Past, present and future activities; Participation/isolation; Intimacy; and Death and agony. The questionnaire shows an internal consistency measured by Cronbach's α of .84 in older adults from the state of Sonora, in Mexico (Acosta et al., 2013). The higher the score on the questionnaire, the higher the perception of quality of life.

The English version of the GDS-15 was translated into Spanish and then translated back into English to compare the items with the original version. Participants in the study read and signed an informed consent to subsequently fill out the sociodemographic data sheet and answer the items on the GDS-15, the Subjective Well-Being Scale, and the WHOQOL-OLD. For data analysis, the Kuder–Richardson 21 formula was used to assess the internal consistency of the GDS-15. Similarly, Spearman's Rho coefficient was used to correlate the GDS-15 scores with the subjective well-being scale and the quality-of-life questionnaire. Finally, the Student's *t* test for independent samples was used, and thus by means of the contrasting groups method, to establish whether the GDS-15 discriminates between participants with low scores from those with high scores of depressive symptoms.

Results

Using the Kuder–Richardson 21 formula, a coefficient of .80 of internal consistency was obtained in the GDS-15. In the same way, divergent validity was evaluated through the Spearman's Rho correlation coefficient between the total scores of the participants in the GDS-15 and the Subjective Well-Being Scale and the WHOQOL-OLD (Table 1).

The contrasting groups method was performed to assess the concurrent validity of the GDS-15 with the Student's *t* test, where we sought to identify the items that individually discriminate among those participants who obtained high scores (10 or more symptoms of depression) from those who obtained low scores (less than five

Table 1. Divergent Validity in GDS-15.

	GDS-15
Subjective Well-Being Scale	-.783***
WHOQOL-OLD	-.569***

Abbreviations: GDS-15 = Geriatric Depression Scale - 15 item version; WHOQOL-OLD = World Health Organization Quality of Life - for older adults.
 Note. *** $p \leq .001$.

symptoms of depression) on the GDS-15. To achieve this, the test compared the means of the responses of each item between the participants with high scores (High group) and with low scores (Low group). Table 2 shows that all items individually discriminate between those participants who obtained high scores from those who obtained low scores. None of the items were discarded since they all had $p \leq .001$ values.

Discussion

This study aimed to evaluate in the GDS-15 its internal consistency, divergent validity with subjective well-being and quality of life, and concurrent validity to discriminate

Table 2. Items That Discriminate Between Participants With High and Low Depression Scores.

Item	Low group		High group		t(849)	p
	Mean	SD	Mean	SD		
1	.02	.132	.43	.941	-11.085	.001
2	.37	.484	.95	.219	-12.869	.001
3	.03	.178	.78	.414	-33.632	.001
4	.06	.235	.96	.376	-35.165	.001
5	.03	.167	.74	.542	-28.339	.001
6	.31	.464	.86	.473	-11.934	.001
7	.01	.116	.81	.507	-36.96	.001
8	.04	.189	.96	.982	-22.972	.001
9	.47	.5	.88	.322	-8.725	.001
10	.29	.455	.79	.408	-11.327	.001
11	.02	.127	.36	.482	-16.115	.001
12	.05	.211	.84	.367	-33.808	.001
13	.13	.335	.88	.322	-22.925	.001
14	.05	.225	.85	.359	-32.613	.001
15	.22	.417	.89	.312	-16.824	.001

between participants with low scores from those with high scores of depressive symptoms.

Similar to the results of an acceptable internal consistency in the GDS-15 found in some studies (Chaaya et al., 2008; Dow et al., 2018; Friedman et al., 2005; Imai et al., 2014; Lucas-Carrasco, 2012; Sugishita et al., 2017; Ştefan & Băban, 2017), an acceptable internal consistency of the GDS-15 was found in this study too, but this time the Kuder–Richardson 21 formula was used and not Cronbach's α as in such studies. When the items of a measure have two response options, and one of these has a value or weight assigned of 0 and the other of 1, the internal consistency of the same is established by means of the Kuder–Richardson coefficient. Establishing the internal consistency of a measure is based on the assumption that the items that make it up are part of the same construct, so theoretically its inclusion in the measure is justified, and that, in addition, there must be a strong relationship between these items given that they measure the same trait. In the case of the GDS-15 items, a strong relationship was found between these, given the issues of dissatisfaction with life, dysfunctionality in daily life, discouragement, anguish, loneliness, hopelessness, and cognitive problems that they pose, all as part of the same construct of depression.

On the other hand, similar to the results of the correlation of the items in the GDS-15 with measures of life satisfaction, quality of life, activities of daily living, and suicidal ideation (Friedman et al., 2005; Imai et al., 2014; Lucas-Carrasco, 2012; Ştefan & Băban, 2017), in this study a significant negative correlation was found between the items of the GDS-15, and a subjective well-being scale and a quality of life questionnaire. This is evidence of divergent validity based on external criteria according to the theory. Here, it refers to correlating the scores obtained by the participants in the GDS-15 with the scores obtained in the measures of other constructs or variables, where the correlations obtained are of the magnitude and direction predicted by the theory. In this case, the inversely proportional relationship between depression, and subjective well-being and quality of life. In the case of the dimensions of the subjective well-being scale, it is established that attitudes toward aging, satisfaction with life, and the perception of loneliness and agitation in older adults are strongly related to the symptoms of depression. Regarding the dimensions of the quality-of-life questionnaire, it is known of the two-way relationship that exists between the sensory capacity, autonomy, participation in activities of daily living, and intimacy of older adults with depression.

Finally, similar to the results obtained in other studies on the ability of the GDS-15 to discriminate between individuals with depression and without depression (Chaaya et al., 2008; Friedman et al., 2005; Ştefan & Băban, 2017), evidence of concurrent validity of the GDS-15 was found in this study, which allows discrimination between extreme groups of the same variable. Participants with low and high depression symptoms scores were identified through contrasting groups. If the GDS-15 measures what is intended, it should be answered differently by a group that has this variable in great quantity than by another that has it in a lesser magnitude. Thus, it was obtained that all the items of the GDS-15 discriminate between participants with low scores from those

with high scores of depressive symptoms. This type of validity is especially pertinent for those studies whose main purpose is to diagnose, either individually or in groups.

The importance of having a simple screening tool such as the GDS-15 that helps in the identification of depressive symptoms in Mexican older adults is underlined, and having proven its reliability and validity by recognizing the numerical properties of the scale and its one-dimensionality for a proper analysis of their psychometric properties. Further validation studies are recommended considering other variables that allow establishing the discriminatory validity of the GDS-15.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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