Usefulness of two instruments in assessing depression among elderly Mexicans in population studies and for primary care

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Abstract

Objective. To determine the psychometric qualities of the CES-DR and GDS scales in the elderly and compare them to clinical psychiatric diagnoses. **Material and Methods.** The first phase consisted of home interviews for determining the psychometric qualities of the GDS and CES-DR scales. In the second phase, psychiatrists conducted diagnostic interviews. The sample consisted of 534 participants older than 60 years of age insured by the Mexican Institute of Social Security. **Results.** First phase: Cronbach's alpha for the GDS was 0.87 and 0.86 for CES-DR. The GDS factorial analysis found eight factors that could explain 53.5% of the total variance and nine factors that explained 57.9% in the CES-DR. Second phase: Compared to the psychiatric diagnoses, CES-DR reported a sensitivity of 82% and a specificity of 49.2%; GDS reported 53.8% sensitivity and 78.9% specificity. **Conclusions.** CES-DR and GDS scales have high reliability and adequate validity but the CES-DR reports higher sensitivity.

Key words: depression; elderly; Mexico

Resumen

Objetivo. Determinar las propiedades psicométricas de las escalas CES-DR y GDS para depresión en población anciana y compararlas con el diagnóstico clínico psiquiátrico. **Material y métodos.** La primera fase consistió en entrevistas en casa para determinar las propiedades psicométricas. En la segunda fase, los psiquiatras condujeron entrevistas diagnósticas. La muestra consistió en 534 participantes de 60 años y más asegurados por el Instituto Mexicano del Seguro Social. **Resultados.** Primera fase: Alfa de Cronbach para el GDS y CES-DR fue de 0.87 y 0.86, respectivamente. El análisis factorial del GDS reportó ocho factores que explicaron 53.5% de la varianza, comparado con nueve del CESDR que explicaron 57.9%. Segunda fase: Comparado con el diagnóstico psiquiátrico, el CES-DR reportó una sensibilidad de 82% y una especificidad de 49.2% comparado con 53.8% y 78.9%, respectivamente del GDS. **Conclusiones.** Las escalas CES-DR y GDS tienen consistencia y adecuada validez pero el CES-DR reporta más alta sensibilidad.

Palabras clave: depresión; ancianos; México

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Depression is a geriatric syndrome which has a significant impact on public health.[1] Worldwide prevalence of depressive disorders in adults over 55 can exceed 35%, and that of depressive disorders considered to be clinically relevant is 13.5%.[2] However, there are few reports on depression in older adults from developing countries.[3] A longitudinal study conducted on elderly beneficiaries of the IMSS (Mexican Institute of Social Security), a main component of the Mexican public health system, estimated a prevalence of 43% using an abridged version of the Geriatric Depression Scale (GDS).[4] More recently, Bello *et al*.[5] estimated that 10% of women aged 60 or older in Mexico had depression.

The effects of depression in elderly people become more often and more intensely evident when declining state of health is involved,[1,6] as well when there is a decrease in both functional capability[7] and cognitive capability;[7,8] this generates a high degree of dependence on their families and society,[9] thus increasing the cost of health care and resulting in the loss of potentially productive individuals.[10,11]

Previous studies have proven that depression is under-diagnosed in elderly people, especially in primary care.[12] Several factors have been associated with the lack of diagnosis, such as atypical manifestations of this condition, misdiagnosis as a chronic disease,[1] cognitive decline,[8] gender and ethnicity,[13] cultural factors, and finally, shortcomings in the diagnosis and treatment on the part of medical service providers.[14] For this reason, the use of screening scales to identify possible cases and begin treatment earlier is of utmost importance.[15]

The Center for Epidemiologic Studies -Depression scale (CES-D)[16,17] and the Geriatric Depression Scale (GDS)[18,19] have been the two most widely used.[20]

Evidence shows that the CES-D scale is reliable and useful in identifying people with high depressive symptomatology. However, the scale was developed over 25 years ago and needed to be revised in order for it to correspond to the 10th edition of the International Statistical Classification of Diseases (ICD-10) or the American Psychiatric Association's Diagnostic and Statistical Manual, 4th edition (DSM-IV).[17,21] The GDS scale has been the subject of extensive research. Nevertheless, the existing information on the performance of both the CES-DR and GDS in Mexico is insufficient. Hence, it is necessary to test both the GDS and the CES-DR for their psychometric qualities as well as for their usefulness in identifying possible cases of depression. The present study aimed at determining the psychometric qualities of the CES-DR and GDS screening scales in a population-based study of older adults in Mexico City as well as comparing them to clinical psychiatric diagnoses in a subsample of participants.

Materials and Methods

The study was divided into two phases. The first phase consisted of in-home interviews for determining the psychometric qualities of the CES-DR and GDS scales. In the second phase, psychiatrists conducted diagnostic interviews on a subsample to compare each one of the scales to the clinical psychiatric diagnosis. The study was carried out between the months of January and June, 2005.

First phase of the study: interviews by non-medical staff

The sample consisted of 534 individuals randomly chosen from 35 191 individuals who were aged 60 or older, beneficiaries of the IMSS, and residents in the southwest area of Mexico City who made up the final sample of a cohort study for identifying risk factors for root caries. Sample size was calculated using a Cronbach's alpha of 0.8 for both scales,[17, 22] with 95% confidence and 80% power.

Each participant was interviewed in his or her home after granting verbal and written informed consent. A questionnaire was used containing the following variables: sex, age, marital status, schooling, employment status, personal perception of their state of health, cognitive impairment,[23] morbidity, consumption of antidepressant medication, as well as the two instruments for assessing depressive symptoms described below. The information was gathered by three trained interviewers.

The revised version of the CES-D was created by Eaton *et al*.[17] and adapted for a sample of older Mexican adults.[21] The correspondence of items with the DSM-IV was analyzed and new items were generated. Time scale was adjusted to assess the frequency of symptoms within the past 15 days. The revised version, comprising 35 items, includes the entire original version of the CES-D. The dimensions that constitute the CES-DR are dysphoria, anhedonia, drastic weight change (appetite), sleep disturbance, agitation / psychomotor retardation, fatigue, excessive or inadequate guilt, suicidal ideation / thoughts, and friends, occupation, and family (social). The CES-DR algorithm for data analysis characterizes responses into five groups as follows: (a) without clinically significant symptoms of major depressive episode (MDE), (b) sub threshold MDE symptoms, (c) possible MDE, (d) probable MDE, and (e) with clinically relevant symptoms of MDE (Table I). Those participants who scored less than 16 points according to the criteria in Table I were considered to have no symptoms of depression.

Table I

Categories and criteria for the diagnosis of depression in elderly Mexicans, 2005

	CES-DR	Clinical diagnosis
Category	*Criteria*	*Criteria*
Clinically significant symptoms of a major depressive episode	Presence of symptoms in at least five dimensions, necessarily including the presence of anhedonia or dysphoria for at least two weeks	Presence of five clinical symptoms of depression, necessarily including the presence of anhedonia or dysphoria
Probable major depressive episode	Presence of anhedonia or dysphoria nearly every day for the past two weeks, but with only four symptoms (one dimension less than the DMS-IV)	Presence of four clinical symptoms of depression, necessarily including anhedonia or dysphoria
Possible major depressive episode	Presence of anhedonia or dysphoria almost every day for the past two weeks, but with only three symptoms (two dimensions less than the DMS-IV)	Presence of three clinical symptoms of depression, necessarily including anhedonia or dysphoria
Subthreshold depressive episode	Scoring 16 points or more and not belonging in any of the previous categories	Presence of clinical symptoms of depression except anhedonia or dysphoria
Without clinically significant symptoms of a major depressive episode	It includes those who scored less than 16 in the revised scale	Absence of clinical symptoms of depression

The original Geriatric Depression Scale consisted of 100 items[18] and the version currently in use comprises 30 items (20 positive and 10 negative), since somatic symptoms were eliminated.[19] The categories for the classification are based on the sum of the scores as follows: "normal" (without clinically significant symptoms) from 0 to 9, "moderate depression" from 10 to 19 points, and "severe depression" from 20 to 30 points.[22]

Second phase

All the participants were informed about the purpose of the second phase of the study by telephone three months after the first phase, on average, and invited to participate. Those who accepted were scheduled for an appointment with a psychiatrist for clinical assessment.

The GDS and CES-DR were administered again in this phase before making the psychiatric assessment in order to compare recent results with clinical psychiatric diagnoses. Psychiatric assessments took place in an enclosed cubicle and included only the medical doctor and the participant, who were sitting face-to-face. The medical assessment lasted between 45 and 60 minutes, approximately. The psychiatrists were provided with a semi-structured tool based on the DMS-IV to register depressive symptoms. The clinical diagnosis of depression was classified according to the categories and criteria in Table I. The psychiatrists that

participated in the study were blinded to the results of the screening test.

Participants who did not present depressive symptoms during the psychiatric assessment, or who scored less than 16 points on the CES-DR or less than or equal to nine points on the GDS were considered to have no symptoms of depression.

Statistical analysis

First phase: Cronbach's alpha was calculated to determine the internal consistency of the CES-DR and GDS. The probabilistic estimates were weighted according to the number of patients registered per family physician.

The underlying dimensions were explored through factorial analysis; factor extraction used the principal components method and orthogonal varimax rotation. The adequacy of the factorial analysis was evaluated by means of the Kaiser-Meyer-Olkin test and Bartlett's sphericity test for each one of the scales.

Second phase: The medians for the GDS and CES-DR scores of individuals with and without clinically significant symptoms of a depressive episode were compared using the Mann-Whitney U test. In this phase, exact tests were used due to the relatively low prevalence of major depressive episodes. Sensitivity, specificity, and positive and negative predictive value for both scales and between the CES-DR and the GDS were calculated.

Ethical approval

The Institutional Review Board of the Mexican Institute of Social Security reviewed and approved the research procedures. This document is part of the research proposal registered with the code 2001-785-015.

Results

First phase

The sample included 534 individuals, 68% of whom were women (n = 363) and 32% men (n = 171). Three out of every ten participants reported depressive symptoms according to both the GDS and CES-DR. The unweighted and weighted frequency and distribution of the characteristics of the sample can be seen in Table II. The average age was 71.5 ± 7.0 years, without weighting, and 69.9% (n = 357) of the participants were in the 60 to 74 age-group. Forty-nine percent of the participants were married or in a domestic partnership, 56.6% reported having six or more years of schooling. Employed participants accounted for 45.7% of the sample and 38.2% perceived their health as being good or excellent. It was determined that 76.2% did not present cognitive impairment. Only 8.8% of the participants reported not having any illness and 2.4% (n = 13) took antidepressants (Table II).

The internal consistency of the GDS was determined with a Cronbach's alpha of 0.87 (0.86 once weighted) for the 30 items. Cronbach's alpha was 0.88 for women and 0.85 for men. The alpha coefficient was 0.89 among participants aged 60 to 74 and 0.83 among participants aged 75 or older; it was 0.87 for participants with less than six years of schooling and 0.86 for those with six or more years of schooling (Table III).

The GDS factorial analysis confirmed that there were eight factors that could explain 53.5% of the total variance. The factors appeared in the following order: a) hopelessness, b) cognitive functioning, c) life satisfaction, d) well-being, e) social isolation, f) apprehension, g) indecision, and h) anxiety. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.88 and Bartlett's sphericity test was 3 884.88 with 435 degrees of freedom ($p < 0.001$).

The internal consistency of the CES-DR was determined with a Cronbach's alpha of 0.86 (0.82 once weighted) for the 35 items. Cronbach's alpha was 0.86 for women and 0.85 for men. The alpha coefficient was 0.88 among participants aged 60 to 74 and 0.83 among participants aged 75 or older; it was 0.85 for participants with less than six years of schooling and 0.78 for those with six or more years of schooling (Table III).

Table II
Overall characteristics of elderly Mexicans studied in the first phase, 2005

	n	Unweighted %	Weighted %
Sex*			
Women	363	68.0	70.1
Men	171	32.0	29.1
Age (years)*			
60-74	357	66.9	66.0
≥ 75	177	33.1	34.0
Marital status*			
Single / divorced / widowed	272	51.0	49.5
Married	262	49.0	50.3
Schooling*			
<6 years	232	43.4	41.7
≥6 years	302	56.6	58.3
Employment status*			
Unemployed	290	54.3	60.3
Employed	244	45.7	39.7
Personal perception of their state of health*			
Excellent / good	204	38.2	37.2
Regular / bad	330	61.8	62.8
Cognitive impairment*			
Presence	127	23.8	21.7
Absence	407	76.2	78.3
Morbidity*			
Absence	47	8.8	8.8
1-2	330	61.8	71.1
≥3	157	29.4	20.1
Consumption of antidepressants*			
Yes	13	2.4	2.1
No	521	97.6	97.9
Geriatric Depression Scale (GDS)*			
No depression symptoms	379	71.0	72.0
Depression symptoms	155	29.0	28.0
Center for Epidemiologic Studies Depression Scale (CES-DR)*			
No depression symptoms	382	71.5	73.3
Depression symptoms	152	28.5	26.7

* *p*>0.05 with Chi-square test

Table III
INTERNAL CONSISTENCY OF THE SCALES USED, ELDERLY MEXICANS, 2005

	Cronbach's alpha			
	Geriatric Depression Scale (GDS)		Center for Epidemiologic Studies Depression Scale (CES-DR)	
	Unweighted	Weighted	Unweighted	Weighted
Sex				
Women	0.88	0.87	0.86	0.82
Men	0.85	0.83	0.85	0.80
	p>0.05 with Chi-square test		p>0.05 with Chi-square test	
Age				
60-74 years	0.89	0.88	0.88	0.84
75 years or older	0.83	0.81	0.83	0.77
	p>0.05 with Chi-square test		p>0.05 with Chi-square test	
Schooling				
<6 years	0.87	0.86	0.85	0.85
≥6 years	0.86	0.85	0.78	0.78
	p>0.05 with Chi-square test		p>0.05 with Chi-square test	

	Cronbach's alpha							
	GDS				CES-DR			
	Women		Men		Women		Men	
	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted
Age / Sex								
60-74 years	0.89	0.89	0.86	0.85	0.84	0.84	0.84	0.84
75 years or older	0.81	0.80	0.80	0.80	0.81	0.79	0.71	0.71
	p>0.05 with Chi-square test		p>0.05 with Chi-square test		p>0.05 with Chi-square test		p>0.05 with Chi-square test	

	Women		Men		Women		Men	
Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted	
Schooling / Sex								
<6 years	0.87	0.87	0.86	0.86	0.85	0.85	0.84	0.84
≥6 years	0.86	0.86	0.85	0.85	0.79	0.78	0.75	0.77
	p>0.05 with Chi-square test		p>0.05 with Chi-square test		p>0.05 with Chi-square test		p>0.05 with Chi-square test	

The factorial analysis confirmed that there were nine factors that could explain 57.9% of the total variance. The factors were a) hopelessness, b) life satisfaction, c) fatigue, d) pessimism, e) sleep disturbance, f) poor concentration, g) drastic weight change, h) apprehension, and i) well-being. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.88 and Bartlett's sphericity test was 6 289.36 with 595 degrees of freedom ($p < 0.001$).

Second phase

A total of 206 individuals accepted the clinical assessment, 65.5% of who were women (n=135), and 34.5%, men (n=71). The age range was 60 to 90 years and the average age was 71.2±6.8 (70.9±6.7 for women and 71.8±7.1 for men). Table IV shows the characteristics of the participants in the clinical psychiatric diagnosis and assessment. When comparing the samples in the first and second phases of the study, no major differences were observed in any of the variables under study or in the classifications obtained with the GDS and CES-DR.

The frequency of depressive symptoms assessed by the psychiatrists was as follows: 10.2% (n= 21) of the participants presented dysphoria, 3.9% (n= 8) presented anhedonia, 4.4% (n= 9) had drastic weight changes (appetite), 15.5% (n= 32) had sleep disturbance, 3.4% (n=7) experienced agitation or psychomotor inhibition, 15.5%

Table IV
Characteristics of elderly Mexicans in the first and second phases of the study, 2005

	First phase		Second phase	
	n	*%*	*n*	*%*
Sex				
Women	363	68.0	135	65.5
Men	171	32.0	71	34.5
			p>0.05 with Chi-square test	
Age (years)				
60-74	357	66.9	140	68.0
≥ 75	177	33.1	66	32.0
			p>0.05 with Chi-square test	
Marital status				
Single / divorced / widowed	272	51.0	107	51.9
Married	262	49.0	99	48.1
			p>0.05 with Chi-square test	
Schooling				
<6 years	232	43.4	78	37.9
≥6 years	302	56.6	128	62.1
			p>0.05 with Chi-square test	
Employment status				
Unemployed	290	54.3	96	46.6
Employed	244	45.7	110	53.4
			p>0.05 with Chi-square test	
Personal perception of state of health				
Excellent / good	204	38.2	76	36.9
Regular / bad	330	61.8	130	63.1
			p>0.05 with Chi-square test	
Cognitive impairment				
Presence	127	23.8	38	18.4
Absence	407	76.2	168	81.6
			p>0.05 with Chi-square test	
Morbidity				
Absence	47	8.8	18	8.7
1-2	330	61.8	126	61.2
≥ 3	157	29.4	62	30.1
			p>0.05 with Chi-square test	
Consumption of antidepressants				
Yes	13	2.4	5	2.4
No	521	97.6	206	97.6
			p>0.05 with Chi-square test	
Geriatric Depression Scale (GDS)				
No depression symptoms	379	71.0	150	72.8
Mild depression	132	24.7	48	23.3
Moderate to severe depression	23	4.3	8	3.9
			p>0.05 with Chi-square test	
Center for Epidemiologic Studies Depression Scale (CES-DR)				
No clinical significance	382	71.5	145	70.4
Subthreshold depression	107	20.0	45	21.8
Possible DSM-IV Major Depressive Episode	8	1.5	3	1.5
Probable DSM-IV Major Depressive Episode	16	3.0	7	3.4
DSM-IV Major Depressive Episode	21	3.9	6	2.9
			p>0.05 with Chi-square test	

First phase: Interviews by non-medical staff. Second phase: Clinical psychiatric assessment using DSM-IV criteria

Table V
DISTRIBUTION AND FREQUENCY OF AGREEMENT BETWEEN MEASUREMENT INSTRUMENTS. ELDERLY MEXICANS, 2005

	No clinical significance		Subthreshold depression		Possible DSM-IV major depressive episode		Probable DSM-IV major depressive episode		DSM-IV Major depressive episode		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Clinical diagnosis of depression												
CES-DR												
No clinical significance	63	49.2	11	26.8	2	50.0	-	-	1	3.8	77	37.4
Subthreshold depression	54	42.2	23	56.1	2	50.0	5	71.4	14	53.8	98	47.6
Possible DSM-IV Major Depressive Episode	2	1.6	2	4.9	-	-	-	-	2	7.7	6	2.9
Probable DSM-IV Major Depressive Episode	7	5.5	4	9.8	-	-	1	14.3	5	19.2	17	8.3
DSM-IV Major Depressive Episode	2	1.6	1	2.4	-	-	1	14.3	4	15.4	8	3.9
Total	128	100.0	41	100.0	4	100.0	7	100.0	26	100.0	206	100.0
Clinical diagnosis of depression												
GDS												
No depression symptoms	101	78.9	25	61.0	3	75.0	2	28.6	6	23.1	137	66.5
Mild depression	25	19.5	15	36.6	1	25.0	5	71.4	14	53.8	60	29.1
Moderate to severe depression	2	1.6	1	2.4	-	-	-	-	6	23.1	9	4.4
Total	128	100.0	41	100.0	4	100.0	7	100.0	26	100.0	206	100.0
CES-DR												
GDS												
No depression symptoms	70	90.9	59	60.2	2	33.3	4	23.5	2	25.0	137	66.5
Mild depression	7	9.1	38	38.8	3	50.0	10	58.8	2	25.0	60	29.1
Moderate to severe depression	-	-	1	1.0	1	16.7	3	17.6	4	50.0	9	4.4
Total	77	100.0	98	100.0	6	100.0	17	100.0	8	100.0	206	100.0

CES-DR= Center for Epidemiologic Studies Depression Scale
GDS= Geriatric Depression Scale

(n= 32) experienced fatigue, 7.8% (n=16) experienced excessive or inadequate guilt, 14.6% (n= 30) had a decrease in the ability to think or concentrate and 0.5% (n= 1) had recurring death thoughts or recurrent suicidal ideation. Thus, medical assessment indicated that 69.4% (n= 143) of the participants had no clinically significant symptoms of a major depressive episode, 21.4% (n= 44) had a subthreshold depressive episode, 2.9% (n= 6) had a possible major depressive episode, 3.4% (n= 7) had a probable major depressive episode, and 2.9% (n= 6) had clinically significant symptoms of a major depression episode.

Regarding the GDS scores, the participants without clinically significant symptoms of a depressive episode had a median of 6 points (R= 0 – 26) on the GDS, while those with clinically significant symptoms had a median of 8 points (R= 0 – 22); the median difference was significant (p= 0.030).

The distribution of the CES-DR categories was as follows: 70.4% (n= 145) of the participants had no clinically significant symptoms, 21.8% (n= 45) presented subthreshold depressive symptoms, 1.5% (n= 3) had a possible major depressive episode, 3.4% (n= 7) had probable major depression and, finally, 2.9% (n= 6) had clinically relevant symptoms of a major depressive episode.

Table V shows the distribution and frequency of agreement between the clinical psychiatric diagnosis and the CES-DR and GDS, and between the CES-DR and the GDS. The CES-DR classified 49.2% (n= 63) of the 128 elderly people that were diagnosed as not having clinically significant symptoms of a depressive episode through clinical psychiatric diagnosis, while the GDS classified 78.9% (n= 101) of the 128 participants diagnosed as not having clinically significant symptoms of a depressive episode through clinical psychiatric diagnosis. The GDS classified 90.9% (n= 70) of the 77 participants diagnosed as not having clinically significant symptoms of a depressive episode by the CES-DR.

Compared to the psychiatric diagnosis, the CES-DR sensitivity was 82.0% (95% CI, 81.3% - 82.7%), with a specificity of 49.2% (48.7% - 49.6%). Positive predictor

value was 49.6% (49.1% - 50.0%), and negative predictor value was 81.8% (81.1% - 88.5%). For the GDS, sensitivity was 53.8% (53.1% - 54.5%), with specificity of 78.9% (78.4% - 54.5%). Positive and negative predictor values were 60.8% (60.0% - 61.6%) and 73.7% (73.3% - 74.1%), respectively.

Between the CES-DR and the GDS, sensitivity was 81.5% (80.8% - 82.2%), with a specificity of 90.9% (90.2% - 91.6%). Positive predictor value was 89.8% (89.0% - 90.6%), and negative predictor value was 83.3% (82.6% - 83.9%).

Discussion

First phase

It was found that one-third of the participants had at least one symptom of depression and that approximately one out of twelve elderly people in this sample possibly suffered from a major depressive episode. The results of this study show that the GDS and CES-DR have overall high internal consistency; however, we observed that there is greater reliability in women, as well as in 60-to-74-year-olds.

In the validation of the Spanish version of the GDS, there was a Cronbach's alpha of 0.82.[22] As for the CES-DR, a Cronbach's alpha of 0.90 and 0.93 has been estimated.[17,21] The results of our study with respect to internal consistency are similar to those reported in these studies.

Second phase

Based on our results, the frequency of patients diagnosed with at least one clinically significant symptom of a depressive episode was 30.6% based on clinical psychiatric diagnosis, 27.2% based on the GDS, and 29.6% based on the CES-DR; the results being very similar. A report from Evans & Katona[24] found a frequency of depressive symptoms of 37% in elderly patients in primary care in London, 24% in the Netherlands,[25] 13% in Switzerland,[26] 18% and 9% in North American women and men, respectively, [27] and finally, 43% in Mexico.[4] The CES-DR has reported a 36% frequency of depression symptomatology in elderly patients in primary care in Mexico.[21]

It is important to consider that the participants in the second phase of the study were not chosen randomly; however, the original sample is representative of elderly IMSS beneficiaries in the southwest region of Mexico City. It may be observed that there are no differences between the results obtained in the first and second phases of our study with respect to the variables under study, or with respect to the GDS and CES-DR, so we can assume that the subsample in the second phase is not different from the base population of this study.

There was a significant difference between the mean GDS scores of participants with and without clinically significant symptoms of a depressive episode based on clinical psychiatric diagnosis. In a study that compared mean GDS scores using the Geriatric Mental Schedule (GMS) and confirmed cases of depression through psychiatric diagnosis, it was observed that depression cases had a higher mean score than those that were not depression cases, which confirms our results.[22]

There is a difference among the reports of the various studies conducted in primary care due to the diversity of criteria used as a reference (gold standard) to classify elderly patients in "cases" of depression. We must admit that clinical psychiatric diagnosis may pose the risk of imperfect gold standard bias, which could lead to the results being underestimated;[28] that is, the frequency of participants with clinically significant symptoms of a depressive episode being either underestimated or overestimated. The use of psychiatrists as a gold standard reference in this study has the disadvantage that clinical judgment is not structured and there might have been variations in medical practices as well as in the reviewers' own judgments; thus, the reference that we used in this study could be questioned.[29] In this field, a perfect diagnosis can rarely be used as a gold standard. Therefore, researchers need numerous approximations with various methods in order to establish the validity and reliability of their measurements.[30]

We were not able to compare the classification of categories for depression according to the DSM-IV since the GDS was developed earlier, which was not the case with the CES-DR. Unfortunately, the size of the subsample did not allow us to make this comparison with the CES-DR as the highest frequency was found in the categories that corresponded to patients without clinically significant symptoms of a major depressive episode and patients with a subthreshold depressive episode. Ongoing studies by our research group will offer new data, but it is clear that more research with various samples will be necessary in order to continue perfecting the criteria and parameters of tools for assessing depressive symptoms in large groups of the population.

According to our results, the CES-DR properly classified 82% of our participants with significant depressive symptoms; however, it has a low probability (49.2%) when classifying participants without depressive symptoms. The opposite occurs with the GDS, since this scale presents low sensitivity (53.8%) but higher probability (78.9%) of proper classification for those without sig-

nificant depressive symptoms. Therefore, CES-DR may be more useful in the context of primary care since this questionnaire is able to increase the probability of correct diagnosis, even when the positive predictive value is scarcely 50%.

Family physicians may be a valuable resource to address the health care needs of patients with mental health problems such as depression, anxiety, and cognitive impairment at IMSS, which also faces the severe deficit of psychiatry and psychogeriatric specialists that affect Mexico and other countries.[31,32]

It is true that the incorporation of treatment for depression in primary care units could give rise to an increase in the use of costly therapeutic resources. Yet, treatment of depression is necessary and it can free resources that could be applied to improving the therapeutic response of other co-morbidities and to diminishing services utilization.[3] A secondary purpose of this study is to point out that mental health in general, and mental problems in the elderly, in particular, should be considered as priorities by health policy decision makers.

The importance of systematically conducting assessments of mood disorders and, especially, depression in elderly people in primary care lies in the fact that depressive disorders are highly prevalent, have a high incidence, high recurrence, and tendency to chronicity, and entail high morbidity, both direct and indirect.[33] For instance, a study on psychological disorders in primary care by the World Health Organization found that, on average, approximately one-in-four patients requesting services in primary care units had an identifiable mental disorder.[34] Depressive disorders were the most common and nearly 13% presented with symptoms of anxiety and/or depression, although not enough in number to qualify as a case according to pre-established clinical criteria. Nevertheless, nearly one out of two patients with anxiety or depression was not identified as a case by physicians in all participating centers around the world.[35]

Conclusion

Our study helps demonstrate that the CES-DR and GDS have high reliability and adequate validity, which enable their use among the elderly population. However, CESDR reports a higher sensitivity compared with physicians' diagnoses.

Competing interests

The authors declare that they have no competing interests.

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