

PREVALENCE OF DEPRESSIVE SYMPTOMS IN NEW MEXICO HISPANIC AND NON-HISPANIC WHITE ELDERLY

Objective: To evaluate the prevalence rates, risk factors, and pattern of depressive symptoms in elderly Hispanic and non-Hispanic Whites (NHWs).

Methods: This survey was a community-based, cross-sectional survey of randomly selected Medicare recipients living in Bernalillo County (Albuquerque, New Mexico). The survey's objective was to examine the health and health-related issues of Hispanic and NHW elderly persons (≥ 65 years of age). As part of the survey, participants were administered the Geriatric Depression Scale-short form (GDS).

Results: Complete data were available on 798 subjects with a mean age of 73.7 years, age range 65–96. The prevalence of a GDS score ≥ 6 was: Hispanic males, 9.5%; Hispanic females, 19.2%; NHW males, 5.4%; and NHW females, 8.7%. Hispanics ($P=.001$) and women ($P=.003$) had higher prevalence rates. Sociodemographic variables, health, social support, and the activities of daily living (ADLs) were significantly related to symptoms. English skills ($P<.0001$) and birthplace ($P=.011$) were associated with symptoms in Hispanics. Significant differences were found in the response patterns between Hispanics and NHWs. Logistic regression analyses showed that ethnic differences were largely explained by differences in the level of education and income among Hispanics and NHWs.

Conclusion: A difference was seen in the prevalence rates of depressive symptoms between Hispanic and NHW elderly persons and between men and women. In addition to the traditional risk factors for depressive symptoms, we found that ethnic differences in prevalence rates can be largely explained by education and income differences in the two groups. (*Ethn Dis.* 2005;15:691–697)

Key Words: Depression, Depressive Symptoms, Elderly, Hispanic

Linda J. Romero, MD; Irene E. Ortiz, MD; M. Rosina Finley, MD; Sharon Wayne, MSPH; Robert D. Lindeman, MD

INTRODUCTION

The World Health Organization, in its report on a worldwide study on the global burden of disease, reports that depression and its health and social consequences were the fourth most important cause of disease burden during the 1990s. With the aging of the population, depression may be the second most important source of disease burden by the year 2020.¹ Physical illness, functional disability, and social and economic problems contribute to depression in the elderly.² Healthcare costs of patients with depressive symptoms in a primary care setting are 50% higher than costs for those with no depressive symptoms.³

Studies on Hispanic elderly are few, and prevalence rates for depressive symptoms have yielded variable results. The Hispanic Established Populations for Epidemiologic Study of the Elderly (EPESE), a survey of older Mexican Americans living in five southwestern states, found an overall higher prevalence rate of 25.6% for depressive symptoms. This study evaluated 2,823 Hispanic subjects by using the Centers for Epidemiologic Studies Depression Scale (CES-D) and found the prevalence rate for Hispanic women at 31.9% and for Hispanic men at 17.3%. Gender, lack of insurance, financial strain, chronic health conditions, and disability

With the aging of the population, depression may be the second most important source of disease burden by the year 2020.¹

were associated with depressive symptoms. Associated cultural factors were immigrant status, level of acculturation, locus of control, and recent immigration.⁴ Other studies have also found high rates, including the study by Kemp et al of older Hispanics in the Los Angeles area which reported a prevalence rate of 26.7%⁵ and Vega et al who reported a rate of 16% to 18%.⁶ A 20% prevalence rate was found in the Three Generations Studies of Mexican Americans with the CES-D.⁷ In contrast, other studies have not shown a higher rate of depressive symptoms. The Hispanic Health and Nutrition Examination Survey (HHANES) found a prevalence rate of 13.2% for depressive symptoms in those aged 65 to 74,⁸ and the San Luis Valley Health and Aging Study reported a prevalence rate of depressive symptoms of 11.4%.⁹

Within-group variability of depressive symptoms for Hispanics regardless of age has been found when considering cultural factors such as immigrant status, ie, birthplace (Mexico vs United States),^{8–10} and acculturation level.^{9,11–14} In addition to differences in prevalence rates, differences in the expression or pattern of depressive symptoms have been reported.^{15,16}

From the Department of Family and Community Medicine (LR, MF), Department of Psychiatry (IO), and Department of Internal Medicine (RL, SW), University of New Mexico Health Sciences Center, Albuquerque, New Mexico.

Address correspondence reprint requests to Linda J. Romero, MD; University of New Mexico Health Sciences Center, Department of Family and Community Medicine; Albuquerque, NM 87131; 505-272-2165; 505-272-8045 (fax); lromero@salud.unm.edu

The objective of this paper is to report on prevalence rates, risk factors, and patterns of depressive symptoms found in the New Mexico Elder Health Survey. This survey was a community-based, cross-sectional survey of randomly selected Medicare recipients living in Bernalillo County (Albuquerque area) that was conducted from May 1993 to September 1995. The survey's objective was to examine the health and health-related issues of Hispanic and non-Hispanic White (NHW) elderly persons.

METHODS

Survey Procedure

A comprehensive description of the sample design, survey methods, and participation rates are described in a separate paper.¹⁷ Briefly, from the Medicare list of 50,700 county recipients, a randomized sample ($N=2200$) of elderly (≥ 65 years of age) Hispanics and NHWs, equally stratified by ethnicity and gender ($n=550$ per group), was selected. The Generally Useful Ethnic Search System computer program was used to designate ethnicity by surname patterns.¹⁸ Ethnicity was further verified by self-identification and ethnic heritage (3 of 4 grandparents reported as Hispanic or NHW). After excluding those who had died, those we were unable to locate, and those who were not eligible by ethnicity criteria, 1666 subjects remained. No other exclusion criteria applied once individuals qualified by ethnicity. Of these participants, 1130 (67.8%) completed the home interview, and 883 (53.0%) completed the full examination. No significant difference in participation rate was seen by ethnicity. A significant difference was found by gender, however, with women being slightly less likely to participate. The survey was conducted in two phases: an initial home visit of 30 minutes, followed by a four-hour session in

a senior health clinic. Data were collected with comprehensive interview questionnaires of health and health-related issues; physical, cognition, and nutrition assessments; body composition measurements; laboratory tests; and electrocardiogram. Most participants (88.9%) were interviewed and examined in a senior health clinic, 9.7% were evaluated in their home, and 1.4% were evaluated in a nursing home. Interviews were obtained from the participant 96% of the time and from a spouse, relative, or caregiver 4% of the time.

For this analysis, data were available on 798 subjects who completed all the questions of the Geriatric Depression Scale-Short Form (GDS). This survey was approved and monitored by the local institutional review board.

Measures

The GDS was developed as a screening tool for depression specifically tailored to the elderly.¹⁹⁻²¹ Fifteen questions from the longer version, which had the highest correlation with depressive symptoms in the validation studies, were chosen. Each item is answered in a true/false format for ease of administration in the elderly. Of the 15 items, 10 suggest the presence of depression when answered positively, while the rest indicate depression when answered negatively. The range of scores is from 0 to 15. A score ≥ 6 suggests depression that may need further clinical evaluation. The GDS was interviewer administered in our survey.

Sociodemographic information was collected with an interviewer-administered questionnaire developed by the research team. Participants were also asked about 20 physical health variables, social support/resources, and activities of daily living (ADL).

Translations

A seven-member committee of Hispanics was created to offer recommendations on cultural issues. Members

included a geriatrician, nurse practitioner, linguist, and the study interviewers. This committee was familiar with the Spanish used in New Mexico and translated all instruments and questionnaires. The Spanish version of the GDS was backtranslated and field tested in a pilot study prior to use. The research staff team was composed of trained bilingual interviewers for administration of questionnaires. The interview was performed in the preferred language of the participant.

Statistical Analysis

To test for differences in the means of the total score, a Kruskal-Wallis test was used instead of a t test because the GDS scores were not normally distributed. To test for differences in the frequency of categorical variables and to test for differences in the frequency of six or more depressive symptoms, chi-square tests were used.

A logistic regression model was used to evaluate the effect of ethnicity on depressive symptoms controlling for the variables of gender, age, years of schooling, income, three or more current symptoms, three or more friends to call for help, and being able to prepare meals. Data were analyzed with the statistical analysis system (SAS) version 8.01 for Windows.²²

RESULTS

Sociodemographic Characteristics of the Subjects

Of the 883 participants who participated in the full four-hour survey, complete data were available on 798 (90%) subjects who completed the GDS (201 Hispanic males, 177 Hispanic females, 224 NHW males, and 196 NHW females). Sociodemographic characteristics of the subjects are as follows (data not shown in table format). The mean age was 73.7 years (age range 65-96). No statistically

Table 1. Prevalence of Geriatric Depression Scale (GDS) score ≥ 6 stratified by ethnicity and gender and sociodemographic variables

Sociodemographic Variable	Hispanic Men <i>n</i> =201			Hispanic Women <i>n</i> =177			Non-Hispanic White Men <i>n</i> =224			Non-Hispanic White Women <i>n</i> =196		
	<i>n</i> (%)	% GDS ≥ 6	<i>P</i>	<i>n</i> (%)	% GDS ≥ 6	<i>P</i>	<i>n</i> (%)	% GDS ≥ 6	<i>P</i>	<i>n</i> (%)	% GDS ≥ 6	<i>P</i>
Age (years)												
65–69	73 (36.3)	8.2		58 (32.8)	12.1		52 (23.2)	0.0		58 (29.6)	8.6	
70–79	195 (47.3)	7.4		88 (49.7)	19.3		131 (58.5)	3.8		105 (53.6)	5.7	
80–89	129 (14.4)	20.7		30 (17.0)	30.0		38 (17.0)	13.2		32 (16.3)	18.8	
≥ 90	4 (2.0)	0.0		1 (0.6)	100.0		3 (1.3)	66.7		1 (0.5)	0.0	
			ns			.039			<.0001			ns
Education (years)												
0–4	24 (11.9)	25.0		27 (15.3)	33.3		0 (0.0)	0.0		0 (0.0)	0.0	
5–8	60 (29.9)	13.3		60 (33.9)	23.3		12 (5.4)	16.7		4 (2.0)	0.0	
9–12	72 (35.8)	5.6		62 (35.0)	14.5		74 (33.0)	6.8		80 (40.8)	7.5	
≥ 13	44 (21.9)	2.3		27 (15.3)	7.4		138 (61.6)	3.6		110 (56.1)	10.0	
Missing	1 (0.5)			1 (0.6)						2 (1.0)		
			.009			.060			ns			ns
Marital status												
Never married	5 (2.5)	20.0		7 (4.0)	28.6		3 (1.3)	66.7		8 (4.1)	25.0	
Married	159 (79.1)	8.2		77 (43.5)	10.4		183 (81.7)	1.6		99 (50.5)	4.0	
Widowed	23 (11.4)	13.0		66 (37.3)	27.3		22 (9.8)	22.7		66 (33.7)	13.6	
Separated/ divorced	12 (6.0)	16.7		27 (15.3)	22.2		16 (7.1)	12.5		22 (11.2)	9.1	
Missing	2 (1.0)									1 (0.5)		
			ns			.066			<.0001			.06
Income (annual)												
<\$4,999	6 (3.0)	16.7		21 (11.9)	28.6		1 (0.5)	100.0		6 (3.1)	16.7	
5,000–9,999	36 (17.9)	13.9		71 (40.1)	25.4		16 (7.1)	25.0		21 (10.7)	19.0	
10,000–14,999	46 (22.9)	17.4		27 (15.3)	14.8		17 (7.6)	0.0		23 (11.7)	8.7	
15,000–19,999	31 (15.4)	0.0		21 (11.9)	0.0		29 (13.0)	10.3		25 (12.8)	8.0	
20,000–49,999	59 (29.4)	1.7		21 (11.9)	9.5		115 (51.3)	3.5		96 (49.0)	5.2	
50,000–79,999	8 (4.0)	12.5		1 (0.6)	0.0		30 (13.4)	0.0		9 (4.6)	0.0	
$\geq 80,000$	4 (2.0)	0.0		2 (1.1)	0.0		9 (4.0)	0.0		1 (0.5)	0.0	
Missing	11 (5.5)	27.3		13 (7.3)	30.8		7 (3.1)	0.0		15 (7.7)	20.0	
			.035			ns			<.0001			ns

significant difference was seen in age between Hispanic and NHW participants. Compared to NHWs, Hispanics were more likely to have less years of school (9.1 vs 13.7 years; $P<.0001$); to have less than an eighth-grade education (29.5% vs 1.4%; $P<.0001$); to have a lifetime occupation of unskilled labor (66.6% vs 26.5%; $P<.0001$); to have an annual household income <\$10,000 (37.9% vs 11.1%; $P<.0001$); to need financial help (19% vs 3.4%; $P<.0001$); and to not have enough money for daily expenses (12.4% vs 1.2%; $P<.0001$). Most Hispanic participants were born in New Mexico (91%) or in surrounding states (6% in Texas or Colorado). Most NHW participants were not born in New Mexico

(91%). Hispanics self-reported their ethnicity as 82.2% Spanish American, 10.4% Mexican American, 4.4% Hispanic/Native American, and 3% other Hispanic category. Most were bilingual and reported being able to speak Spanish well or very well (93.7%) and English well or very well (80.7%). Only 3.7% of Hispanics reported that they did not speak any English.

Prevalence of Depressive Symptoms

The percentage of participants with a GDS score ≥ 6 is 9.5% Hispanic men, 19.2% Hispanic women, 5.4% NHW men, and 8.7% NHW women. Compared to NHWs, Hispanics reported a significantly higher prevalence

(14.4% vs 7.1%, $P=.001$) of depressive symptoms. Women reported a significantly higher prevalence (13.9% vs 7.5%, $P=.003$) of depressive symptoms compared to men. Hispanic females reported a significantly higher prevalence of depressive symptoms compared to all other groups ($P<.0001$).

The prevalence of depressive symptoms arranged by sociodemographic variables, stratified by ethnicity and gender is presented in Table 1. Relationships to depressive symptoms were found in all participant groups for the various sociodemographic variables.

An inverse relationship was seen between lower income and depressive symptoms, but it reached statistical significance for men only. An inverse

trend noted for women did not reach statistical significance, probably because of the small numbers in the higher-income categories. We collapsed the higher-income categories for reanalysis, but doing so did not change the significance for women.

Table 2 presents data evaluating the relationship between depressive symptoms and physical health, specific diseases, social support, stressors, and activities of daily living. When comparing the presence or absence of diabetes, heart disease, and cancer, some trends toward an association with depressive symptoms were seen in all four groups, but the only statistically significant finding was for diabetes in NHW women ($P=.014$).

Social support was statistically significant for the number of relatives seen per month for all groups except NHW women. Also, the number of friends one could call for help was significant for all groups except for NHW men. Participation in group activities was not significant for any of the four participant groups.

We also looked at the relationship of stressors and ability to perform ADLs to depression. These results are also presented in Table 2.

Table 3 shows the prevalence of depressive symptoms as related to English-language skills for Hispanics. Hispanics who self-report that they are unable to speak, understand, or read English well or very well were more likely to have a GDS score of ≥ 6 , and these results were statistically significant, all at a P value of $<.0001$. Additionally, Hispanic persons born in Mexico were more likely to have a GDS score ≥ 6 compared to persons born in the United States (33.3% vs 9.1%; $P=.011$).

Because of the higher prevalence rate in Hispanic women, we looked at the risk factors for high depressive symptoms in these women. Our findings show that the risk of depression (GDS score ≥ 6) is high for

Hispanic women. Compared to all other groups, the odds of depression are 4.72 (95% confidence interval [CI] 2.56–8.71) for Hispanic women age >65 , widowed or divorced, with low income ($< \$10,000/\text{year}$), and low school attainment (less than or equal to eight years of school). Adding a fifth factor of poor physical health, ie, three or more comorbid diseases, results in an odds ratio of 7.68 (95% CI 3.58–16.49). Adding a sixth factor of poor social support, ie, number of relatives they can call on for help (one or none) the odds ratio is 6.70 (95% CI 1.47–30.50). We also substituted the sixth factor of poor social support with number of friends they can call on for help and the odds ratio increased to 8.52 (95% CI 3.19–22.77).

A logistic regression model (shown in Table 4) was used to evaluate the effect of ethnicity on depressive symptoms, after controlling for other variables associated with depressive symptoms. These variables included gender, age, education (in years), three or more current symptoms, few friends to call for help, and needing help to prepare meals. Ethnicity remained significantly associated with depressive symptoms after controlling for both gender and age. However, the inclusion of years of education in the model caused ethnicity to no longer be significantly associated with depression ($P=.47$). The full model, which includes all seven variables described above, shows all variables to be significantly associated with depressive symptoms, with the exception of ethnicity. Income level was also used in the model. The inclusion of either income or years of school in the model had the same results, ie, ethnicity lost its association with depression. Inclusion of both into the full model (eight variables) produced associations that are not as strong as those when only one is in the model. Since income and education are highly correlated, we used only education for our results.

We evaluated the responses to individual items of the GDS stratified by ethnicity and gender for subjects who scored ≥ 6 . No gender differences in the pattern of responses were seen. Hispanics were more likely to report feeling that others were better off than them ($P=.0013$). Non-Hispanic Whites were more likely to report feeling less satisfied with life ($P=.0029$), not feeling happy most of the time ($P=.0130$), and not feeling full of energy ($P=.0021$).

DISCUSSION

We found a statistically significant difference in the prevalence rates of depressive symptoms between older Hispanics and NHWs and a higher rate for Hispanic women in particular. Our prevalence rates were in the intermediate range when compared to those found in other studies on older subjects of Mexican-American heritage.^{7–10} Our study participants are most similar in ethnic background to those of the San Luis Valley Health and Aging Study. The variability in prevalence rates is most likely due to differences in methods and instruments used among the different studies.

As with other studies, we found the traditional sociodemographic factors of increasing age, lower educational level, marital status, and lower income, to be associated with a higher prevalence rate of depressive symptoms.^{5,6,21} Depressive symptoms have also been found to be associated with physical health and functioning.²² In our study, the inclusion of education or income into our logistic regression model caused ethnicity to no longer be significantly associated with depressive symptoms.

In our study, Hispanics born in Mexico had a higher prevalence rate of depressive symptoms compared to US-born Hispanics. Other studies have reported similar findings based on immigrant status and attribute this to various factors such as differences in

Table 2. Percentage of participants with a Geriatric Depression Scale (GDS) score ≥ 6 stratified by ethnicity and gender for physical health, specific diseases, social support, stressors, and activities of daily living

	Hispanic Men <i>n</i> =201		Hispanic Women <i>n</i> =177		Non-Hispanic White Men <i>n</i> =224		Non-Hispanic White Women <i>n</i> =196	
	<i>n</i> (%)	% GDS ≥ 6	<i>n</i> (%)	% GDS ≥ 6	<i>n</i> (%)	% GDS ≥ 6	<i>n</i> (%)	% GDS ≥ 6
Diseases								
≥ 3 diseases	90 (44.8)	15.6*	83 (46.9)	27.7*	99 (55.4)	6.1	102 (52.0)	13.7*
< 3 diseases	111 (55.2)	4.5	94 (53.9)	11.7	124 (44.2)	4.8	94 (48.0)	3.2
Symptoms								
≥ 3 symptoms	101 (49.8)	15.8*	91 (51.4)	27.5*	105 (46.9)	9.5*	99 (50.5)	14.4*
< 3 symptoms	100 (50.3)	3.0	86 (48.6)	10.5	118 (52.7)	1.7	97 (49.5)	3.0
Suffer pain								
No	150 (74.6)	8.0	114 (64.4)	13.2	162 (72.3)	3.1	121 (61.7)	2.5
Yes	50 (24.9)	14.0	62 (35.0)	30.6*	61 (27.2)	11.5*	75 (38.3)	18.7*
Diabetes								
No	165 (82.1)	7.6	152 (85.9)	17.1	201 (89.7)	6.0	186 (94.9)	7.5
Yes	36 (17.9)	16.3	25 (14.1)	32.0	22 (9.8)	0.0	10 (5.1)	30.0*
Heart disease								
No	158 (78.6)	7.6	153 (86.4)	17.0	182 (81.3)	5.5	164 (83.7)	7.3
Yes	43 (21.4)	16.3	24 (13.6)	33.3	41 (18.3)	4.9	30 (15.3)	16.7
Cancer								
No	194 (96.5)	9.8	176 (99.4)	19.3	200 (89.3)	5.0	192 (98.0)	8.0
Yes	7 (3.5)	0.0	1 (.6)	0.0	23 (10.3)	8.7	4 (2.0)	25.0
Relatives seen per month								
0	1 (.5)	100*	0 (0.0)	0*	8 (3.6)	12.5*	7.0 (3.6)	28.6
1–2	19 (9.5)	15.8	16 (9.0)	43.8	35 (15.6)	14.3	34 (17.4)	11.8
≥ 3	181 (90.1)	8.3	160 (90.4)	16.9	181 (80.8)	3.3	154 (78.6)	7.1
Friends can call for help								
0	37 (18.4)	21.6*	35 (19.8)	25.7*	29 (13.0)	6.9	18 (9.2)	25.7*
1–2	52 (25.9)	11.5	63 (35.6)	25.4	38 (17.0)	7.9	52 (26.5)	25.4
≥ 3	111 (55.2)	4.5	78 (44.1)	10.3	157 (70.1)	4.5	126 (64.3)	10.3
Participation in group activities								
< 1 per week	169 (84.1)	9.5	141 (79.7)	21.3	169 (75.5)	5.9	126 (64.3)	21.3
> 1 per week	39 (14.9)	6.7	34 (19.2)	11.8	54 (24.1)	3.7	67 (34.2)	11.8
Recent death								
No	136 (67.7)	7.4	118 (66.7)	19.5	172 (76.8)	5.2	149 (76.0)	6.7
Yes	65 (32.3)	13.8	57 (32.2)	17.5	52 (23.2)	5.8	47 (24.0)	14.9
Financial crisis								
No	179 (89.1)	7.3*	157 (88.7)	17.2*	217 (96.9)	4.6	187 (95.4)	8.0
Yes	20 (10.0)	30.0	19 (10.7)	36.8	6 (2.7)	16.7	9 (1.6)	22.2
Separation from family								
No	192 (95.5)	8.9	157 (88.7)	16.6*	218 (97.3)	5.0	188 (95.9)	6.4*
Yes	9 (4.5)	22.2	18 (10.2)	38.9	6 (2.7)	16.7	7 (3.6)	57.1
Abused or taken advantage of								
No	192 (95.5)	9.9	166 (93.8)	18.7	211 (94.2)	4.7	180 (91.8)	7.8
Yes	9 (4.5)	0.0	6 (3.4)	33.3	10 (4.5)	20.0*	12 (6.1)	25.0
Activities of daily living								
Walk								
No help	195 (97.0)	8.7*	161 (91.0)	16.8*	213 (95.1)	5.3*	182 (92.9)	7.1*
With help	6 (3.0)	33.3	16 (9.0)	43.3	10 (4.5)	50.0	13 (6.6)	30.8
Out of bed								
No help	196 (97.5)	9.2*	171 (96.6)	17.5*	222 (99.1)	4.5*	190 (96.9)	6.8*
With help	4 (2.0)	25.0	5 (2.8)	80.0	2 (.9)	100.0	5 (2.6)	80.0
Prepare meals								
No help	181 (90.1)	5.5*	163 (92.1)	15.3*	213 (95.1)	3.8*	187 (95.4)	7.0*
With help	20 (10.0)	45.0	13 (7.3)	61.5	11 (4.9)	36.8	8 (4.1)	50.0
Dress self								
No help	199 (99.0)	9.0*	171 (96.6)	17.5*	217 (96.9)	4.1*	189 (96.4)	6.9*
With help	2 (1.0)	50.0	6 (3.4)	66.7	6 (2.7)	50.0	7 (8.6)	57.1

* $P < .05$.

Table 3. Prevalence of Geriatric Depression Scale (GDS) score ≥ 6 stratified by ethnicity and gender and language variable for Hispanics

Language Variable	Hispanic Men <i>n</i> =201			Hispanic Women <i>n</i> =177		
	<i>n</i> (%)	%GDS ≥ 6	<i>P</i>	<i>n</i> (%)	% GDS ≥ 6	<i>P</i>
Speak English						
Well/very well	165 (82.1)	5.5		140 (79.1)	12.1	
Not very well	36 (17.9)	27.8		37 (20.9)	45.9	
			<.0001			<.0001
Understand English						
Well/very well	174 (86.6)	5.7		147 (83.1)	13.6	
Not well	27 (13.4)	33.3		30 (17.0)	46.7	
			<.0001			<.0001
Read English						
Well/very well	165 (82.1)	4.8		137 (77.4)	12.4	
Not well	36 (17.9)	30.6		40 (22.6)	42.5	
			<.0001			<.0001

assimilation into the mainstream culture, which results in social isolation or increased stress.¹¹ Those finding lower levels of depressive symptoms in Mexico-born subjects^{6,7,9} often attribute this finding to family solidarity and support. In one study, the rate of depression was higher in US-born Mexicans, ie, born in San Antonio, Texas, at 26.8% vs Mexicans living in Monterrey, Mexico, 7.6%.²³

Within the Hispanic group, we found a strong association between poor English-language skills and a high prevalence of depressive symptoms. This association has been found in other studies as well, although we studied an older Hispanic population.^{6,10} Possible reasons for this finding are difficulty with functioning in the mainstream culture, which results in social isolation. Golding, on the other hand, reported no significant difference in language

skills when looking at lifetime prevalence of a major depressive episode in two samples of Mexican Americans.¹²

Hispanic women in our study had a higher risk of depressive symptoms. Our theory is that, besides a larger proportion of women being in the lower socioeconomic strata, Hispanic women are often subjected to ageism, sexism, and racism.²⁴ In addition, within-culture discord arises from the stress of adhering to traditional values of *marianismo*, ie, in which the man is the authority figure and the woman is expected to be submissive, self-sacrificing, dependent, and repressed.²⁴

Poor people are not only exposed to more stress, but also have fewer psychological and social resources to cope with stress.²⁵ Markides presents a discussion of the double jeopardy hypothesis (ageism and racism) in his review of minority status, aging, and mental

. . . we found the traditional sociodemographic factors of increasing age, lower educational level, marital status, and lower income, to be associated with a higher prevalence rate of depressive symptoms.

health.²⁶ In addition to the traditional stresses, newer, modern-day stresses are imposed on many elderly women. Women often become the primary caretaker for a disabled spouse, children, or grandchildren. Women experience lack of independence from not having learned to drive, financial restrictions, or health problems. Social isolation through widowhood and/or relocation of their children or working families is common.

Limitations of this study are that the prevalence rates of depressive symptoms may be an underestimate of the true rate in that persons with depression may have been less likely to agree to participate in the study. Our Hispanic elder group may have more protective factors than other Hispanic subgroups in that they are nonimmigrant, long-term residents who have survived to an older age. Another limitation is that we used a screening tool, and these symptoms were not validated for clinical signs of depression with a clinical exam. Also, since Medicare records were used to identify the sample, the undocumented Mexican is not represented in these results. Another limitation of these analyses includes the usual possible potential bias associated with the use of self-report instruments. Additionally, these data have the same limitations as other studies using cross-sectional methods.

Table 4. Results of logistic regression analyses for ethnicity and other variables

Variable	Odds Ratio	95% Confidence Interval
Ethnicity (Hispanic)	1.1080	.576–2.132
Sex (female)	2.366	1.361–4.114
Age	1.050	1.008–1.093
Education	.896	.831–.966
≥ 3 Symptoms	4.211	2.273–7.802
<3 Friends to call for help	1.747	1.008–3.024
Need help with meals	6.313	3.068–12.988

This paper presents data on depressive symptoms from the New Mexico Elder Health Survey. This survey reports on data from a randomly selected community-based population and included the oldest members of the community, since we did not have an upper age limit. Published data on older Hispanic are sparse. The main purpose of this paper is to provide more data relative to the evaluation of depressive symptoms in elderly Hispanic and NHWs. An important finding in this study included the high rate of depressive symptoms in elderly Hispanic females. Additionally, the ethnic differences in depressive symptoms found in our data may be largely explained by the difference in level of education and income between Hispanic and NHWs.

This study provides information that calls attention to the disparity in the prevalence of depressive symptoms between older Hispanics and NHWs. Our results are in the intermediate range when compared to other studies on Hispanic populations and were most closely aligned to the San Luis Valley Survey, a study whose geographic location and Hispanic heritage is most similar to our study. Results from one Hispanic subgroup cannot be generalized to other subgroups. Our study reports on Hispanics who are primarily not immigrants, mostly bilingual, and established longtime residents of the area.

ACKNOWLEDGMENTS

This work was supported by grants from the National Institute on Aging (R01-AG10941) and UNM GCRC (NCRRCRC Grant M01RR00997). The authors wish to thank the research team and study participants.

REFERENCES

1. Murray CJL, Lopez AD, eds. *The Global Burden of Disease. Summary*. Cambridge, Mass: Harvard University Press; 1996.
2. Lebowitz BD, Pearson JL, Schneider LS, et al. Diagnosis and treatment of depression in late

- life: consensus statement update. *JAMA*. 1997;278(14):1186-1190.
3. Unutzer J, Patrick DL, Simon G, et al. Depressive symptoms and the cost of health services in HMO patients aged 65 years and older: a four-year prospective study. *JAMA*. 1997;277(20):1618-1623.
4. Black SA, Markides KS, Miller TQ. Correlates of depressive symptomatology among older community-dwelling Mexican Americans: the Hispanic EPESE. *J Gerontol B Psychol Sci Soc Sci*. 1998;53B:198-208.
5. Kemp BJ, Staples F, Lopez-Aqueres W. Epidemiology of depression and dysphoria in an elderly Hispanic population, prevalence and correlates. *J Am Geriatr Soc*. 1987; 35:920-926.
6. Vega W, Warheit G, Buhl-Auth J, et al. The prevalence of depressive symptoms among Mexican Americans and Anglos. *Am J Epidemiol*. 1984;120:592-607.
7. Mendes de Leon CF, Markides KS. Depressive symptoms among Mexican Americans: a three generation study. *Am J Epidemiol*. 1988; 127(1):150-159.
8. Moscicki EK, Locke BZ, Rae DS, et al. Depressive symptoms among Mexican Americans: the Hispanic Health and Nutrition Examination Survey. *Am J Epidemiol*. 1989;130:348-360.
9. Swenson CJ, Baxter J, Shetterly SM, et al. Depressive symptoms in Hispanic and non-Hispanic White rural elderly. *Am J Epidemiol*. 2000;152:1048-1055.
10. Golding JM, Karno M, Rutter CM. Symptoms of major depression among Mexican Americans and non-Hispanic Whites. *Am J Psychiatry*. 1990;147:861-866.
11. Vega WA, Kolody B, Aguilar-Gaxiola S, et al. Lifetime prevalence of DSM-III-R psychiatric disorders among urban and rural Mexican Americans in California. *Arch Gen Psychiatry*. 1998;55:771-778.
12. Golding JM, Burnam MA. Immigration, stress, and depressive symptoms in a Mexican-American community. *J Nerv Ment Dis*. 1990;178:161-171.
13. Krause N, Goldenhar LM. Acculturation and psychological distress in three groups of elderly Hispanics. *J Gerontol B Psychol Sci Soc Sci*. 1992;47:5279-5288.
14. Zamanian K, Thackrey M, Starrett RA, et al. Acculturation and depression in Mexican-American elderly. *Clin Geriatrics*. 1992;11(3-4):109-121.
15. Golding JM, Aneshensel CS, Hough RL. Responses to depression scale items among Mexican Americans and non-Hispanic Whites. *J Clin Psychol*. 1991;47(1):61-75.
16. Aneshensel CS, Clark VA, Frerichs RR. Race, ethnicity, and depression: a confirmatory analysis. *J Pers Soc Psychol*. 1983;64:385-398.
17. Romero LJ, Lindeman RD, Hundley R, et al. Outcome of recruitment and report on participation rate in the New Mexico Elder Health Survey. *Ethn Dis*. 1998;8: 350-359.
18. Buechley RW. *Generally Useful Ethnic Search System (GUESS). Protocol Manual*. Albuquerque, NM: New Mexico Cancer Research and Treatment Center; November 1976.
19. Yesavage JA, Brink TL. Development and validation of a geriatric scale: a preliminary report. *J Psychiatr Res*. 1983;17: 37-49.
20. Parmelee PA, Lawton MP, Katz IR. Psychometric properties of the Geriatric Depression Scale among the institutionalized aged. *Psychol Assess*. 1989;1(4):331-338.
21. D'Ath P, Katona P, Mullan E, et al. Screening, detection, and management of depression in elderly primary care attenders. I: The acceptability and performance of the 15 item Geriatric Depression Scale (GDS15) and the development of short version. *Fam Pract*. 1994;11(3):260-266.
22. SAS Institute Inc. *SAS User's Guide. Basics, Version 8.01*. Cary, NC: SAS Institute Inc; 1995.
23. Hoppe SK, Garza-Elizondo T, Leal-Isla C, et al. Mental disorders among family practice patients in the United States-Mexico border region. *Soc Psychiatry Psychiatr Epidemiol*. 1991;26:178-182.
24. Gil RM. Hispanic women and mental health. *Ann NY Acad Sci*. 1996;789:147-159.
25. Kessler RC, Cleary PD. Social class and psychological distress. *J Health Soc Behav*. 1980;45:463-478.
26. Markides KS. Minority status, aging, and mental health. *Int J Aging Hum Dev*. 1986;23(4):285-300.

AUTHOR CONTRIBUTIONS

Design and concept of study: Romero, Lindeman
Acquisition of data: Romero, Lindeman
Data analysis and interpretation: Romero, Ortiz, Finley, Wayne, Lindeman
Manuscript draft: Romero, Ortiz, Finley, Wayne, Lindeman
Statistical expertise: Romero, Wayne, Lindeman
Acquisition of funding: Romero, Lindeman
Administrative, technical, or material assistance: Romero, Ortiz, Finley, Lindeman
Supervision: Romero, Lindeman