

## **Protective neighborhoods: The influence of percent Mexican American on depressive symptoms**

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### **Introduction**

A growing number of researchers have reported that neighborhood context has significant effects on individuals' health. For older Mexican Americans, living in neighborhoods with higher density of other Mexican Americans has shown increased physical health advantages including stroke (Eschbach, Ostir, Patel, Markides, & Goodwin, 2004), cancer (Reyes-Ortiz, Eschbach, Zhang, & Goodwin, 2008), cognitive functioning (Sheffield & Peek, 2009) and hip fracture (Eschbach et al., 2004).

However, very few researchers have considered the impact of neighborhoods on mental health. By 2020, it is expected that depression will be the second leading cause of disability (World Health Organization, 2009). Depression increases the odds of both mortality as well as morbidity (Evans & Mottram, 2009). Therefore, it is vital to public policy and public health to understand the potential protective effects of neighborhoods on mental health in addition to physical health.

In one of the few studies that examined the effect of neighborhood co-ethnic density on depressive symptoms (Ostir, Eschbach, Markides, & Goodwin, 2003) the authors found that despite the relatively high poverty rates of high density Mexican American neighborhoods, Mexican American elders living in dense co-ethnic neighborhoods were less likely to have higher depressive symptoms. However, this study did not account for the potential differences by gender. Extant literature has consistently found a female preponderance in both prevalence as well incidence of depressive disorders (Piccinelli & Wilkinson, 2000). This higher rate of depressive symptoms among women compared to men has been attributed to an interaction between biomedical and social factors (Zarit et al., 2007). Therefore, neighborhoods may have potentially differential effects on women and men.

This study uses recent large epidemiological survey data on older Mexican Americans to explore the impact of neighborhoods on depressive symptoms across gender. To our knowledge, this is the first study to examine neighborhood-level effects on depressive symptoms among Mexican American elders by gender.

### **Methods**

#### *Sample*

Individual level data was taken from Wave 5 (2004-2005) of the Hispanic Established Populations for the Epidemiologic Study of the Elderly (H-EPESE). The

H-EPESE is a prospective study examining the health and healthcare needs of Mexican American elders. In 1993-1994, area probability sampling was used to obtain a baseline cohort of 3,050 Mexican Americans aged 65 and over from five Southwestern states (Texas, New Mexico, California, Arizona and Colorado) (For further study details, please see (Markides, Rudkin, Angel, & Espino, 1997). Follow-up surveys were conducted every two to three years. Wave 5 added an additional sample of 902 Mexican Americans aged 75 and older resulting in a final sample size of 2,069. This study examined 1,857 Wave 5 respondents on whom complete data were available.

All individual level data were geocoded to their associated neighborhood level data using data from the 2000 US Census Summary Files (Census, 2001). Following the example of previous research (e.g. (Ostir et al., 2003; Sheffield et al., 2009), neighborhoods were approximated using census tracts.

*Outcome variable.* Depressive symptoms were measured using the 20-item Center for Epidemiological Studies Depression Scale (CES-D). Each item has 0-3 response scale. This results in a summary score ranging from 0-60, where higher scores indicate higher depressive symptomatology. This instrument has been shown to have high internal consistency across age and racial/ethnic subgroups (Radloff, 1977; Roberts & Vernon, 1983), high reliability coefficients (.82-.91)(Himmelfarb & Murrell, 1983), and factor structures that have been consistent even in the very old(Radloff & Teri, 1986). Due to the positive skewed distribution of the CES-D variable, we transformed the score using the natural log.

*Independent variables.* The multi-level models controlled for both individual as well as neighborhood level variables. Individual level covariates included whether the respondent was an immigrant, the respondent's age (continuous) and marital status (married versus other). Socioeconomic status was measured by educational attainment (more than sixth grade) and financial strain. Respondents were classified as experiencing financial strain if they reported either difficulty meeting monthly bill payments or if they reported not have enough money to make ends meet. Models controlled for co-morbidities by creating a summary index of the number of reported conditions (cancer, heart attack, stroke or diabetes). Additionally, respondents were coded as ADL disabled if they reported trouble with one or more of the following limitations: bathing, using the toilet, transferring from bed to chair, walking across the room, personal grooming, dressing or eating. Finally, cognitive function was controlled by the score on the Mini-mental State Examination (MMSE), left as a continuous measure in the models.

Neighborhood level variables included ethnic homogeneity as well as neighborhood poverty. Neighborhood ethnic homogeneity was measured using the percent Mexican or Mexican American in the neighborhood. Models adjusted for neighborhood poverty with a variable measuring the percent poverty within each census tract. Both variables were continuous as percentages ranging from 0 to 100.

### *Statistical Analyses*

Differences in descriptive characteristics between men and women were examined using chi-square tests (categorical) and t-tests (continuous variables) using SAS® 9.2 (SAS Institute, Cary, N.C.) to adjust for complex sample design. Hierarchical linear models were used to examine the association of neighborhood and individual level variables and CES-D score. Multi-level models were estimated using HLM 6.04 software (Raudenbush & Bryk, 2002), a statistical software program specifically designed for estimating models with data containing hierarchical structures. Random intercepts linear regression models were run separately for men and women due to research showing significant differences in depressive symptoms by gender (e.g. Piccinelli & Wilkinson, 2000; Zarit et. al, 2007) All analyses applied individual-level weights.

### **Preliminary Results**

Descriptions of the sample (Table 1) are presented by gender. Results show that women have significantly higher mean scores on the CES-D, which echoes findings in previous literature. Men had an average score of 7.9 depressive symptoms, whereas women had a mean score of 10.7. Other sample characteristics that differed by gender were in the expected direction. Men were significantly more likely to be married. Additionally, women were more likely to report at least one ADL limitation compared to men.

Multi-level models (Table 2) were estimated for men and women separately. The intercepts only models (Models 1 and 3) were run to determine if the probability of depressive symptoms varied across Census Tracts. For both men and women this was significant, and therefore all subsequent models were run with random intercepts.

The multi-level analyses showed that after controlling for individual level factors and for neighborhood poverty, there was a negative association between neighborhood percent Mexican American and depressive symptoms for men (Model 4). Although the direction of the association is the same for women, Model 2 shows that the effect of neighborhood percent Mexican is not significant among women.

Results also show a positive association between poverty and depressive symptoms, where neighborhoods with higher percent poverty were associated with higher depressive symptom scores.

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Table 1.  
 Subject characteristics by gender (percents unless otherwise noted) Hispanic  
 Established Populations for Epidemiologic Studies of the Elderly, 2004-2005

Characteristic	All Subjects	Women	Men
CES-D Score (range 0-51)	9.5	10.7	7.9***
Immigrant	43.2	42.8	43.9
Financial strain	25.8	26.0	25.5
Married	43.1	28.3	66.2***
Education (> Sixth grade)	33.5	33.2	34.0
Mean Age (Range 74-109)	81.6	81.6	81.4
Mean MMSE (Range 0-30)	21.6	21.7	21.5
Any ADL disability	31.3	35.8	24.4***
Mean Chronic diseases (Range 0-4)	0.69	0.68	0.69
Total N (unweighted)	1857	1145	712

Abbreviations: MMSE, Mini-Mental State Examination

Note: All numbers based on weighted data

Data: Hispanic Established Populations for the Epidemiologic Studies of the Elderly, 2004-2005

\*P<0.05; \*\*P<.01; \*\*\*P<.001 across gender

Table 2. Results from multilevel regression models predicting number of depressive symptoms among Mexican American adults aged  $\geq 75$  years, Hispanic Established Populations for Epidemiologic Studies of the Elderly, 2004-2005

	$\beta$ (Standard Error)			
	Women		Men	
	Model 1	Model 2	Model 3	Model 4
<b>Individual-level variables</b>				
Immigrant		0.06 (0.07)		0.15 (0.08)
Financial strain		0.12 (0.07)		0.32 (0.09)***
Marital status		-0.09 (0.07)		-0.24 (0.08)**
Education		-0.16 (0.08)		0.21 (0.10)*
Age		-0.01 (0.01)		-0.004 (0.10)
MMSE		-0.02 (0.01)**		-0.04 (0.01)***
Any ADL		0.49 (0.07)***		0.27 (0.09)**
Chronic disease		0.01 (0.04)		0.12 (0.06)*
Intercept	0.48 (0.23)***	0.45 (0.20)***	0.34 (0.11)***	0.30 (0.09)***
<b>Neighborhood-level variables</b>				
% Mexican-American		-0.003 (0.003)		-0.007 (0.002)**
% Poor		0.002 (0.005)		0.001 (0.005)
Intercept	2.14 (0.05)***	1.97 (0.02)***	1.91 (0.05)***	1.74 (0.09)***

Abbreviations: MMSE, Mini-Mental State Examination

\* $P < 0.05$ ; \*\* $P < .01$ ; \*\*\* $P < .001$

All numbers based on weighted data

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