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Depression and Chronic Health Conditions Among Latinos: The Role of Social Networks

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Abstract

The purpose of this study was to examine the "buffering hypothesis" of social network characteristics in the association between chronic conditions and depression among Latinos. Cross-sectional self-report data from the San Diego Prevention Research Center's community survey of Latinos were used (n = 393). Separate multiple logistic regression models tested the role of chronic conditions and social network characteristics in the likelihood of moderate-to-severe depressive symptoms. Having a greater proportion of the network comprised of friends increased the likelihood of depression among those with high cholesterol. Having a greater proportion of women in the social network was directly related to the increased likelihood of depression, regardless of the presence of chronic health conditions. Findings suggest that network characteristics may play a role in the link between chronic conditions and depression among Latinos. Future research should explore strategies targeting the social networks of Latinos to improve health outcomes.

Keywords

Depression; Chronic diseases; Social network; Social support; Latinos

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Compliance with Ethical Standards

Conflict of interest The authors have no conflict of interest to disclose.

Ethical Standards All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Introduction

The combined rate of mild, moderate, and severe depression among Latinos is estimated at 26 % [1]. Given that by 2050, 30 % of the total U.S. population is expected to be Latino [2], understanding the clinical, behavioral, and social factors associated with depression among this group is imperative. Studies suggest an association between chronic conditions and depression [3], in particular among individuals with diabetes [4], arthritis [5], and a history of heart disease and stroke [6]. Co-occurrence of physical and mental health conditions warrant an investigation of the mechanisms underlying their connection.

Social networks consist of the social relationships that surround an individual and include family members, friends, and others [7]. These networks are important because they facilitate the flow of resources to individuals that can modify mental and physical health [8]. For example, networks can either promote or prohibit the flow of health information, social support, and access to other resources that can improve or hinder health and health behaviors [9]. Additionally, social networks can determine social norms that result in the “spread” of health and health behaviors (e.g., obesity and tobacco use) [10].

On the whole, research suggests that characteristics of the social network are related to improved physical [11] and mental [9] health outcomes. Specifically, social networks have been shown to buffer, or moderate the relationship between chronic conditions and mental health [12, 13]. Cohen’s [14] “buffering hypothesis” posits that the social support received from social networks could reduce the negative impact (e.g., depressive symptoms) of difficult situations (e.g., chronic health conditions). For example, members of the social network may provide support for managing the symptoms and burdens of chronic conditions, thus diminishing the impact of the condition(s) on mental health [11]. Network members, in particular women, who tend to adopt a caregiving role [15], may also provide additional social support in a manner that increases self-esteem and feelings of hope [16]. Among older adults, living with a partner and feeling less lonely buffered the association between having a chronic condition (e.g., atherosclerosis, lung diseases and arthritis) and reporting depressive symptoms [17]. In another study, among a sample of adults with type 2 diabetes (n = 119; 29 % Latino), satisfaction with support and the size of the support network buffered the burden of having diabetes on diabetes distress [18].

Although there is theoretical and empirical evidence for the buffering role of social networks in physical and mental health [9, 19], most evidence is among non-Latino white populations, which fail to acknowledge the interdependent culture of Latinos [9]. Characteristics of Latino culture, including familism (i.e., the central role of family in Latino culture) [20], may enhance the role of the social network, making the network a more relevant factor in health outcomes among this population [21, 22]. For example, family support tends to be greater among Latinos compared to non-Latinos even though support from families lessens as Latinos become more acculturated to U.S. culture [22]. Tight social networks often found in traditional Latino culture have been identified as one possible explanation for “the Latino paradox”, which posits that recent Latino immigrants tend to have better health outcomes (e.g., lower cardiovascular disease and all-cause mortality) than non-Latino whites and other Latinos and minorities of similar socioeconomic status [23]. This phenomenon has also been

observed for lower prevalence of mental health disorders among recent immigrants and Latinos who predominantly speak Spanish relative to other Latinos [24]. The unraveling of tight social networks, loss of resources, and reduced social support experienced by Latinos after prolonged residence in the U.S. may increase their risk for poor health outcomes [23]. It is therefore important to investigate if and how social networks buffer the impact of chronic health conditions on depression among Latinos residing in the U.S.

Thus, the purpose of this study is to test the "buffering hypothesis" of social networks in the relationship between chronic health conditions and depression. It is anticipated that the presence of a larger social network, more family in the network (vs. friends), more women in the network (vs. men), and longer–lasting relationships in the network will buffer the association between having a chronic condition and reporting moderate-to-severe depressive symptoms among Latinos.

Methods

Design and Procedures

This is a secondary analysis study using cross-sectional self-report data from the San Diego Prevention Research Center's (SDPRC) community survey with 397 predominantly Mexican-origin Latino residents of southern San Diego County. Data collection occurred between June and September 2009 with residents from four communities close to the U.S.–Mexico border using a multistage sampling method. Initially, 200 out of 1958 census blocks from the four communities were randomly selected for household recruitment and houses in the chosen census blocks were enumerated. Then, a skip pattern was used to randomly select 4123 houses for recruitment.

Participants

Households were eligible for the study if at least one household member identified as Latino and lived in the house for at least four or more days per week. After households were recruited and consented, a list of household members was obtained and used to randomly select a Latino member who was at least 18 years old to complete the survey. Two bilingual and bicultural research assistants conducted home visits to assist participants with the survey in either English or Spanish. The study objectives and procedures were explained to the household member and verbal consent was obtained. The San Diego State University and University of California, San Diego Institutional Review Boards approved the study protocol and materials.

Measures

Depression—The 9-item Patient Health Questionnaire (PHQ-9) [25] was used to assess the presence of depressive symptoms in the past 2 weeks. Response options range from 0 (*not at all*) to 3 (*nearly every day*). The PHQ-9 has been validated among a racially/ethnically diverse sample of 5053 patients from obstetrics and gynecology (n = 2128) and primary care (n = 1964), consisting of 974 Latinos, 73.6 % of whom predominantly spoke Spanish [26]. Over 50 % of the primary care patients had a physician-reported chronic health condition (e.g., hypertension, arthritis, diabetes). The authors noted no racial/ethnic

group differences in the higher end of the scale (moderately severe to severe depressive symptoms) and internal consistency was .80. Scores range from 0 to 27 with higher scores indicating more depressive symptoms. Developers identified cut-points to determine the severity of depression, ranging from none to severe. Given the low prevalence of more severe categories of depression in the current sample, the alternative, clinically significant cutoff value of ten or greater recommended by the developers was used to indicate moderate-to-severe depressive symptoms. Among the present sample, internal consistency was .83.

Chronic Conditions—Participants were asked if a healthcare provider had ever told them that they have the following medical conditions: diabetes, heart disease (includes arteriosclerosis, angina/coronary heart disease, or stroke), hypertension, high cholesterol, asthma, cancer, and/or arthritis or other joint pain. Each health condition was treated as a separate dichotomous variable. In addition, a continuous variable was created from the total number of health conditions reported by the participant.

Social Network—Characteristics of the social network were captured using an egocentric network approach [27]. In this approach, participants describe their social network from their perspective [28]. Participants were asked to list up to five individuals that they "*have relied on to talk with about personal issues or problems*" during the past year [29]. For each person listed, participants reported the following: (1) the gender of the person, (2) their relationship to the person (e.g., friend), and (3) the length of time in years they have known the person (length of association). The characteristics of each individual named in the network were combined to form an egocentric social network for each participant [28]. For example, the number of friends named by a participant was used to develop a variable indicating the proportion of friends in that participant's network. This scheme was used for all other members named in the network. The length of association was averaged across all individuals named by the participant. The size of the network was assessed by the sum of the number of individuals listed in the network (ranging from 0 to 5). Finally, marital status was used to further characterize the social network.

Socio-Demographics—The following demographic information was collected from the participants: age, gender, level of education, and employment status. Country of birth and number of years living in the U.S. were used as proxy measures for acculturation.

Data Analysis

Descriptive statistics of the sample, the outcome variable (moderate-to-severe depression) and the predictor variables (chronic health conditions and social network characteristics) were obtained. Initially, bivariate logistic regression models were tested with each chronic condition and social network characteristic separately predicting the depression variable. Then, multiple logistic regression was used to model the odds of moderate-to-severe depression, predicted by each chronic condition and social network characteristic separately, controlling for the following demographic variables: age, gender, marital status, number of years living in the U.S., and employment status. If statistically significant interactions between a chronic condition and a social network characteristic was found, it was probed in

post hoc analyses by exploring the simple slopes of the regression of depression and the chronic health condition at three levels of the mean-centered social network characteristic: one standard deviation above the mean, at the mean, and one standard deviation below the mean [30]. Statistical significance was established at $p < 0.05$. Analyses were performed using SAS® Version 9.2.

Results

Four participants were removed from the analysis because they did not respond to the chronic disease or depression questions, resulting in a total sample size of 393. Table 1 presents the demographic characteristics of the sample. Participants were primarily (73 %) female, had an average age of 44 (±17), were unemployed (54 %), had less than a high school education (55 %), and were born outside the U.S. (77 %). More than 75 % of participants who were born outside the U.S. were born in Mexico and had been living in the U.S. an average of 21 (±13) years. Twelve percent of participants reported moderate-to-severe depressive symptoms and nearly half reported at least one chronic condition. Due to the low prevalence of cancer and asthma (3 and 7 %, respectively), these conditions were not included in the analyses. On average, participants reported 4 individuals in their social network (±1). The majority of the network was comprised of women (64 %) versus men and family (55 %) versus others. Sixty percent of participants were married or cohabitating, and the average amount of time that participants knew those in their network was 22 (±13) years.

Table 2 presents bivariate results of each chronic condition and social support characteristic and Table 3 presents results combining each of the chronic health conditions with each social network characteristic, adjusting for covariates. At the bivariate level, individuals with the following chronic health conditions were more likely to report moderate-to-severe depression: heart disease (OR 3.58; 95 % CI 1.59–8.05), hypertension (OR 2.05; 95 % CI 1.08–3.88), high cholesterol (OR 2.67; 95 % CI 1.42–5.02), arthritis (OR 4.21; 95 % CI 2.11–8.42), and the total number of conditions (OR 1.51; 95 % CI 1.24–1.83). With the exception of hypertension, these chronic conditions remained significantly related to moderate-to-severe depression in the presence of each social network characteristic and after adjusting for covariates (Table 3). The association between heart disease and depressive symptoms ranged from OR 2.80 (95 % CI 1.03–7.58) with the size of the network variable in the model to OR 2.99 (95 % CI 1.09–8.20) with the length of association variable in the model. For high cholesterol, the association with depressive symptoms ranged from OR 2.94 (95 % CI 1.33–6.48) with the percentage of women variable in the model to OR 3.91 (95 % CI 1.72–8.91) with the length of association variable in the model. Between arthritis and depressive symptoms, the association ranged from OR 5.43 (95 % CI 1.85–15.90) with the percentage of the network comprised of the partner variable in the model to OR 6.33 (95 % CI 2.02–19.82) with the length of association variable in the model. Finally, the association between the number of conditions and moderate-to-severe depressive symptoms ranged from OR 1.73 (95 % CI 1.26–2.38) with the percentage of women variable in the model to OR 1.83 (95 % CI 1.32–2.54) with the length of association variable in the model. Individuals with a greater percentage of women in the social network were more likely to report moderate-to-severe depressive symptoms at the bivariate (OR 7.68; 95 % CI 2.21–26.73) and multivariate levels, ranging from OR 5.17 (95 % CI 1.23–21.71) with high cholesterol in

the model to OR 6.75 (95 % CI 1.53–29.80) with arthritis in the model. None of the other social network characteristics were directly related to moderate-to-severe depressive symptoms.

All possible interactions between the chronic health conditions and the social network characteristics were tested. Table 4 describes the simple slopes of the only statistically significant social network moderator found in this sample. Those with a history of high cholesterol were more likely to have moderate-to-severe depressive symptoms when they had average (OR 3.03; 95 % CI 1.35–6.83) and above average (OR 6.81; 95 % CI 2.43–19.05) percentage of friends in their network, adjusting for age, marital status, employment status, gender, and the number of years living in the U.S.

Discussion

The “buffering hypothesis” was confirmed with one social network characteristic in the relationship between chronic conditions and moderate-to-severe depressive symptoms. Although our findings did not support our hypothesis that having more family in the network would buffer the relationship between chronic diseases and depressive symptoms, having more friends in the network was found to increase the odds of moderate-to-severe depressive symptoms among those with high cholesterol. In other words, the greater the percentage of the network comprised of friends, the more likely individuals with high cholesterol were to report moderate-to-severe depressive symptoms. This finding is in contrast to previous literature showing that friendships, rather than family relationships, are more important in promoting mental health [31, 32]. However, it is important to note that these studies were not conducted among younger, Latino adults as was the case in the current sample. There may be cultural mechanisms for why the relationship between friends and depressive symptoms is inverted in the present sample that should be further explored. Furthermore, researchers have noted that individuals with *high* cholesterol are less likely to report symptoms of depression [33–35], possibly due to the anti-depressive effect of prescription statins [35]; therefore, adherence to these medications results in fewer depressive symptoms. Studies indicate that individuals are more adherent to their medication regimen if they have strong family support [36]. Thus, those with more support from friends may be less adherent to their cholesterol medications than those with less support from friends (and potentially more family support), and therefore may not benefit from the antidepressant effects of their statin medications. Further research among samples with a higher prevalence of moderate-to-depressive symptoms is needed to confirm this theory.

Although there was no additional evidence of the “buffering hypothesis” of social networks between the association of chronic health conditions and depressive symptoms, we did find a consistent direct and inverse association between having women in the network and moderate-to-severe depressive symptoms. In other words, the greater the percentage of women in the social network, the more likely individuals were to report depressive symptoms. This finding supports the conclusions from a study of a densely interconnected social network of 12,067, primarily Caucasian individuals [37]. The authors noted that female friends were more influential in the spread of depression than male friends, and reasoned that this was because women communicate their mood states more effectively than

men. Another possible explanation for our finding is that women may exert an abundance of support, perceived as control over one's health (e.g., changes to the diet, limiting alcohol consumption), resulting in emotional distress, feelings of dependency, and helplessness [17, 19, 38–40]. On the other hand, researchers have also shown that women positively influence the mental health of others by providing more emotional and instrumental support and by being more communicative than men [9]. Thus an alternative explanation for this finding may be that individuals who are experiencing psychological distress may seek support from more women than men to receive more emotional support. Longitudinal research is required to ascertain the direction of the relationship between support from women and depression. Studies should also investigate how women deliver support, how Latinos perceive support, and test strategies that use female-delivered support to promote emotional well-being.

In the current sample of predominantly Mexican-origin Latino adults, 12 % reported clinically significant moderate-to-severe depression, slightly lower than the 14 % prevalence found among Latino adults in a previous epidemiological study [41]. Contrary to previous findings [42], this study did not find an association between diabetes and depressive symptoms. However, heart disease, high cholesterol, arthritis, and the total number of conditions were associated with moderate-to-severe depressive symptoms before and after controlling for social network characteristics and demographic covariates, indicating the persistence of the relationship between physical and mental health [6].

There were several limitations that should be considered when interpreting these results. Other than hypertension and high cholesterol, the prevalence rates of other conditions were low in this sample. Given the wide confidence intervals observed, these results should be treated with caution. Moreover, the low prevalence of conditions perhaps limited the ability to detect significant findings, especially with regard to diabetes. A larger sample with a higher prevalence of chronic health conditions and depressive symptoms, along with a longitudinal design could further elucidate the role of the social network. Another limitation is that chronic health conditions were self-reported and thus may have been under-reported or misreported. Our analyses only investigated the presence of chronic conditions, not the duration or severity of the conditions, which may impact depressive symptoms and the need for resources from the social network. Finally, the current sample is comprised of mostly women, largely of low socio-economic status (e.g., 54 % unemployed), who were born in Mexico and live near the U.S.–Mexico border. Although the prevalence of depression in the present sample was consistent with that of a previous study on depression among Latinos [41], our findings may not be generalizable to other Latino subgroups.

New Contribution to the Literature

These findings suggest that certain aspects of Latinos' social network characteristics have a direct and moderating role in the well-established link between chronic health conditions and depressive symptoms. Exploring these mechanisms is especially salient given the interdependent culture prevalent among Latinos. It is important to note that with a few exceptions [43, 44], the majority of literature investigating the role of social networks in the physical and mental health of adults has primarily been conducted among non-Latino white populations [9]. The findings found in the present study may be attributed to unique aspects

of Latino culture that should be further investigated. Overall, these social network findings are relatively unique to the literature and should be used as a basis for future research to identify potentially clinically significant intervention strategies that promote physical and mental health among Latinos.

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Table 1

San Diego prevention research center's community survey participant characteristics (n = 393)

Demographic characteristics	% (n) or mean ± SD
Female	73 (288)
Mean age	44 ± 17
Unemployed (vs. employed)	54 (212)
<High school/GED (vs. ≥ high school/GED)	55 (214)
Born outside of the US	77 (304)
Mexico	76 (300)
U.S.	23 (89)
Other	1 (4)
Mean years living in the US (only if foreign-born)	21 ± 13
Disease prevalence	
Depressive symptoms	4.33 ± 4.72
None-to-mild (0–9)	88 (347)
Moderate-to-severe (10–27)	12 (46)
Diabetes	13 (52)
Heart disease, arteriosclerosis, angina/coronary heart disease or stroke	9 (35)
Hypertension	26 (101)
High cholesterol	27 (104)
Arthritis	14 (55)
Presence of at least one of the above diseases[a]	46 (182)
Social network characteristics	
Social network size	4 ± 1
Mean percentage of network comprised of women (vs. men)	64 ± 29
Mean percentage of network comprised of:	
Family (excludes partner/spouse)	55 ± 36
Friends	29 ± 35
Partner/spouse	12 ± 19
Other	3 ± 10
Married or cohabitating (vs. single, divorced, widowed, or separated)	60 (234)
Length of association with network individuals in years	22 ± 13

SD standard deviation

[a]Does not include depressive symptoms

Table 2

Bivariate logistic regression results of moderate-severe depressive symptoms with chronic health conditions and social network characteristics (n = 393)

	Moderate-severe depressive symptoms OR (95 % CI)
Chronic health conditions	
Diabetes	2.02 (0.93–4.36)
Heart disease	3.58 (1.59–8.05) **
Hypertension	2.05 (1.08–3.88) *
High cholesterol	2.67 (1.42–5.02) **
Arthritis	4.21 (2.11–8.42) ***
Number of conditions	1.51 (1.24–1.83) ***
Social network characteristics	
Size of network	0.83 (0.66–1.04)
Percentage women	7.68 (2.21–26.73) **
Percentage partner	0.11 (0.01–1.05)
Percentage friends	1.97 (0.85–4.56)
Percentage relatives	0.79 (0.34–1.84)
Length of association	0.98 (0.96–1.01)
Marital status[a]	0.78 (0.42–1.45)

df degrees of freedom, *OR* odds ratio, *CI* confidence interval

* $p < 0.05$;

** $p < 0.01$;

*** $p < 0.001$

[a] Reference = not married or cohabitating

Table 3

Multiple logistic regression results between moderate-to-severe depressive symptoms, chronic health conditions, and social network characteristics (n = 393)

	Moderate-to-severe depressive symptoms OR_a (95 % CI)						
	Model 1: Size of network	**Model 2: % Women**	**Model 3: % Partner**	**Model 4: % Friend**	**Model 5: % Relative**	**Model 6: Marital status[a]**	**Model 7: Length of association**
Diabetes	1.90 (0.74–4.88)	1.75 (0.68–4.49)	1.71 (0.67–4.36)	1.84 (0.72–4.68)	1.86 (0.73–4.74)	1.79 (0.71–4.54)	1.97 (0.77–5.09)
SNC	0.83 (0.63–1.09)	5.84 (1.40–24.35) *	0.34 (0.03–3.91)	1.86 (0.72–4.79)	0.62 (0.24–1.60)	0.70 (0.34–1.42)	0.96 (0.93–0.99) *
Heart disease	2.80 (1.03–7.58) *	2.83 (1.03–7.82) *	2.84 (1.06–7.61) *	2.90 (1.08–7.80) *	2.96 (1.10–7.95) *	2.88 (1.08–7.71) *	2.99 (1.09–8.20) *
SNC	0.85 (0.65–1.13)	5.85 (1.38–24.90) *	0.32 (0.03–3.73)	1.83 (0.71–4.73)	0.62 (0.24–1.60)	0.80 (0.39–1.64)	0.96 (0.93–0.99) *
Hypertension	1.98 (0.79–4.97)	1.83 (0.73–4.57)	1.87 (0.75–4.66)	2.01 (0.81–4.98)	2.09 (0.84–5.21)	1.98 (0.80–4.90)	2.16 (0.85–5.48)
SNC	0.84 (0.64–1.11)	5.64 (1.34–23.74) *	0.36 (0.03–4.35)	1.84 (0.72–4.75)	0.59 (0.23–1.54)	0.77 (0.38–1.56)	0.96 (0.93–0.99) *
High cholesterol	3.20 (1.45–7.07) **	2.94 (1.33–6.48) **	3.07 (1.39–6.79) **	3.37 (1.52–7.49) **	3.54 (1.57–7.96) **	3.19 (1.45–7.03) **	3.91 (1.72–8.91) **
SNC	0.85 (0.65–1.12)	5.17 (1.23–21.71) *	0.43 (0.04–4.98)	2.08 (0.79–5.44)	0.50 (0.19–1.32)	0.75 (0.37–1.54)	0.95 (0.92–0.99) **
Arthritis	5.84 (1.98–17.23) **	6.03 (2.02–18.00) **	5.43 (1.85–15.90) **	6.05 (2.02–18.11) **	6.18 (2.06–18.55) **	5.62 ** (1.93–16.33)	6.33 (2.02–19.82) **
SNC	0.82 (0.62–1.09)	6.75 (1.53–29.80) *	0.42 (0.04–5.07)	2.02 (0.75–5.44)	0.54 (0.20–1.45)	0.94 (0.45–1.97)	0.96 (0.93–0.99) *
Number of conditions	1.79 (1.30–2.46) ***	1.73 (1.26–2.38) ***	1.74 (1.27–2.39) ***	1.77 (1.29–2.42) ***	1.81 (1.32–2.49) ***	1.76 (1.29–2.41) ***	1.83 (1.32–2.54) ***
SNC	0.82 (0.61–1.08)	5.43 (1.25–23.67) *	0.62 (0.05–7.20)	1.91 (0.72–5.10)	0.51 (0.19–1.36)	0.89 (0.43–1.85)	0.96 (0.93–0.99) *

Each model consists of one chronic disease, specified in the left-hand column and one social network characteristic, specified in the top row by the model number. Models were adjusted for age, gender, marital status, number of years living in the U.S., and employment status

df degrees of freedom, OR_a adjusted odds ratio, *CI* confidence interval, *SNC* social network characteristic specified in the top row

* p <0.05;

** p < 0.01;

*** p < 0.001

[a] Reference = not married or cohabitating

Table 4

Significant interaction between high cholesterol and percentage of friends in the network on moderate-to-severe depressive symptoms

Level of percentage of friends	OR_a (95 % CI)
High cholesterol 9 percentage of friends in the network	
Above average	6.81 (2.43–19.05) **
Average	3.03 (1.35–6.83) *
Below average	1.35 (0.44–4.16)

Adjusted for age, marital status, employment status, gender, and years living in the US

OR_a adjusted odds ratio, *CI* confidence interval

* $p < 0.01$;

** $p < 0.001$