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Fatalism and Cardio-Metabolic Dysfunction in Mexican–American Women

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Abstract

Background—Mexican-American women are disproportionately vulnerable to cardio-metabolic dysfunction and related health conditions such as cardiovascular disease and diabetes. Research shows that low socioeconomic status contributes to this populations excess vulnerability to cardio-metabolic dysfunction, but little is known about the contribution of cultural factors to these associations.

Purpose—The current study explored the association between fatalism and cardio-metabolic dysfunction in a randomly selected community cohort of middle-aged Mexican–American women and examined whether fatalism could be conceptualized as a pathway linking socioeconomic status to cardio-metabolic dysfunction in this population.

Method—Participants included 300 women (ages 40–65), recruited from San Diego communities located near the Mexican border, who completed a self-administered survey battery and underwent a fasting clinical exam between the years 2006 and 2009.

Results—Linear regression analyses and mediation analyses utilizing bootstrapping procedures were performed to test study hypotheses. After controlling for age, menopausal status, and acculturation level, fatalism was associated with cardio-metabolic dysfunction. Although slightly attenuated, this relationship persisted after accounting for socioeconomic status. In addition, individuals of low socioeconomic status displayed more fatalistic beliefs and higher cardio-metabolic dysfunction after accounting for relevant covariates. Finally, the indirect effect of socioeconomic status on cardio-metabolic dysfunction via fatalism reached statistical significance.

Conclusions—Fatalism may be an important independent risk factor for cardio-metabolic dysfunction in Mexican–American women as well as a mechanism linking socioeconomic status to cardio-metabolic health.

Keywords

Fatalism; Socioeconomic status; Metabolic syndrome; Women's health; Hispanic

Introduction

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The metabolic syndrome (syndrome X, insulin resistance syndrome) represents an array of cardio-metabolic dysregulations that affect individuals in a clustered fashion and are believed to directly promote the development of CVD and type 2 diabetes [1]. Although it has been variously defined, the metabolic syndrome generally describes the occurrence of at least three of the following risk factors: central adiposity (i.e., elevated waist circumference), elevated serum triglycerides, high systolic or diastolic blood pressure, reduced high-density lipoprotein cholesterol, and hyperglycemia [2]. Mexican–Americans, particularly Mexican–American women [3–5], are at high risk for the development of the metabolic syndrome with prevalence estimates of 40.6 % in adult Mexican–American women, compared to 31.5 % in non-Hispanic Whites [6]. The fact that Mexican–Americans represent the largest and fastest-growing ethnic minority group in the USA highlights the need for efforts aimed at identifying and understanding the factors contributing to this population's excess risk [7].

Low Socioeconomic Status and Metabolic Syndrome Risk—One known risk factor for the metabolic syndrome and related health conditions is low socioeconomic status [8–11]. Socioeconomic status (SES) is thought to exert its influence on health through a variety of complex pathways including increased exposure and vulnerability to stressors (e.g., financial insecurity, environmental toxins), as well as limited access to both tangible (e.g., healthcare access, health education, healthy food options) and intangible (e.g., social support and optimism) resources that could influence physiological and behavioral mechanisms proximal to health [12–14]. Whereas there exists a large body of literature supporting the robust effect of SES on health [15–17], and specifically cardio-metabolic functioning [18–20], few studies have directly examined the relevance of psychosocial and cultural pathways in contributing to socioeconomic disparities in health within ethnic minority populations [21, 22]. Such studies are key to efforts aimed at eliminating such disparities as they could be used to guide the development and implementation of effective and culturally competent public health interventions.

Fatalism as a Pathway Contributing to Socioeconomic Disparities in Health—

Although definitions vary, fatalism refers to the general belief that events, such as the actions and occurrences that form an individual life, are determined by fate. Fatalism or *fatalismo* is a particularly dominant cognitive orientation among Mexican–Americans, a population that has often been described in the literature as passive, subjugating, and fatalistic [23]. For example, in an anthropological study comparing an Anglo-American's and a Mexican–American's reactions to misfortune, findings revealed a marked contrast between the Anglo-American's tendency to seek control over life events and the Mexican–American's tendency to accept things as they come. These differences were attributed to contrasting views regarding the causes of good or bad fortune, i.e., personal effort vs. fate [24, 25].

In recent years, fatalism has received marked attention from scientists interested in understanding the factors contributing to health disparities experienced by Mexican–Americans for its potential to explain the underutilization of health-promoting services observed in this population [26, 27]. Fatalism's effect on the Mexican–American's health may stem from its impact on an individual's motivation to adopt health-enhancing behaviors in light of perceived limitations in personal control over health outcomes [28–30]. For example, an asymptomatic individual who believes that illness is unavoidable regardless of personal action is likely to perceive few benefits to preventive health measures (e.g., annual checkups, changing dietary patterns, becoming more physically active), particularly in light

of the losses (e.g., time, money, enjoyment) associated with the behavior. Indeed, fatalism has been associated with the underutilization of cancer screening services, delay of care, smoking, physical inactivity, and poor dietary practices [30–32]. Notably, most research on fatalism and health has focused on cancer fatalism, defined as the belief that cancer is unavoidable and that death from cancer is inevitable [31], but preliminary evidence suggests that the construct may also be associated with high-risk sexual behavior and diabetes management [33–35].

Although fatalistic health beliefs are often viewed as irrational, theories on the development and maintenance of fatalism stress the importance of considering how social and material barriers to health (e.g., poverty, discrimination, limited access to health education, and quality treatment) contribute to their development. Moreover, poor health outcomes experienced by disadvantaged populations are likely to reinforce fatalistic perceptions about diseases [26, 28]. A consideration of the roles of socioeconomic factors in associations between fatalism and health is particularly important when studying Mexican–American women given their overrepresentation among the poor, less educated, and uninsured. In view of the disadvantages faced by this population, one could argue that for low-SES Mexican–American women, fatalistic beliefs about health and illness are grounded in realistic appraisals of individual control and may more accurately represent a balance between the almost universally valued goal of good health and the recognition that barriers to health exist that are difficult to overcome through personal effort [28, 36]. In other words, fatalism may be best conceptualized as a mechanism underlying the SES and health relationship instead of an irrational belief that independently predicts health risk and outcomes.

The Current Study

The overarching goal of the current study was to explore the association between fatalism and metabolic syndrome risk as captured by an index of cardio-metabolic dysfunction (composite score comprised of indicators of hyperlipidemia, hyperglycemia, hypertension, and abdominal obesity) in a community sample of middle-aged Mexican–American women. It is well established that cardio-metabolic functioning is strongly influenced by lifestyle factors (e.g., diet and physical activity; [2]). As such, fatalistic beliefs about health may represent one contributing factor to the high incidence of cardio-metabolic dysfunction in this population, in as much as fatalistic beliefs about health preclude Mexican–American women from taking an active role in disease prevention. Given concerns regarding the confounding influence of socioeconomic status in associations between fatalism and health, this study also tested whether fatalism could be conceptualized as a pathway linking low SES to cardio-metabolic dysfunction, rather than just an independent risk factor. To the authors' knowledge, this is the first study to date that explores the association between fatalism and cardio-metabolic health. This study also builds on a growing body of literature examining the relevance of psychosocial factors in explaining SES disparities in health [13, 37]. We predicted that women from more disadvantaged backgrounds would exhibit more fatalistic beliefs, that fatalism would be associated with higher cardio-metabolic dysfunction (theoretically due to a decreased likelihood of engaging in health-enhancing behaviors among individuals who endorse more fatalistic beliefs), and that fatalism would represent an explanatory pathway linking low SES to cardio-metabolic dysfunction (refer to Fig. 1).

Method

Participants

The current study was based on data from an epidemiological examination of socio-emotional factors in CVD and included 300 Mexican–American women of diverse socioeconomic backgrounds recruited from communities on the US side of the Tijuana, Baja

California (Mexico)–San Diego, CA (USA) border between the years of 2006 and 2009. Women were eligible to participate in the parent study if they were of Mexican descent, between 40 and 65 years of age, and able to read and write in English or Spanish. Exclusionary criteria included history of CVD, diabetes, kidney disease, or other serious illness; pregnancy; taking medications with autonomic effects (e.g., stimulants, major tranquilizers); shift work; or living in a group home situation. A total of 656 women were screened by telephone; 363 of those screened (55.3 %) were eligible based on the criteria outlined above, and 321 (88.4 %) of those eligible agreed to participate. The current study includes 300 women with data on fatalism, SES, the variables comprising the metabolic syndrome, and relevant covariates.

Procedure

Participants were randomly recruited via targeted telephone and mail procedures from San Diego communities with high densities of Mexican–American residents and wide-ranging SES. Eligible women who agreed to participate were scheduled for a series of in-home assessments. During the initial visit, bilingual/bicultural research assistants obtained written informed consent and provided women with a self-administered survey battery in their preferred language (i.e., Spanish or English). During the second visit, resting blood pressure readings, anthropometric measurements, and 12-h fasting blood draws were conducted by a trained research technician and a licensed phlebotomist. All procedures for this study were approved by San Diego State University's Institutional Review Board.

Measures

Fatalism

Four items derived from the original eight-item fatalism subscale of the Multiphasic Assessment of Cultural Constructs— Short Form [23] were used to assess fatalism. The original scale was translated via forward and back translation procedures and validated by the scale's authors. The four-item version that was utilized in this study derives from a study that examined the role of psychosocial and cultural predictors in explaining Latinas' utilization of cancer screening services [38]. The four-item scale was created due to the original measure's poor internal consistency ($\alpha = 0.63$; [23]). The resulting scale demonstrated good internal consistency ($\alpha = 0.84$; [38]) and included the following items: (1) It is more important to enjoy life now than to plan for the future; (2) we must live for the present, who knows what the future may bring; (3) it is not always wise to plan too far ahead because many things turn out to be a matter of good and bad fortune anyway; (4) it does not do any good to try to change the future because the future is in the hands of God. In the current sample, internal consistency for this scale was adequate ($\alpha = 0.73$) with the distribution of scores ranging from 4 to 16.

Socioeconomic Status

A composite score was created to represent aspects of an individual's social and economic environment that could influence perceptions of personal control over life events. The composite included three traditional indicators of wealth and status (i.e., educational attainment, gross household income, and home ownership) as well as an indicator of health care access (i.e., health insurance status). Educational attainment was categorized as follows: (1) less than the 9th grade, (2) 9th–11th grade, (3) high school diploma or equivalent, (4) some college, (5) bachelors degree, and (6) graduate or professional degree. Gross household income was assessed on an ordinal scale in increments of \$500. Dichotomous variables were used to represent access to health insurance and home ownership (1, yes; 0, no). All indicators were standardized (mean 00; standard deviation, SD 01) and summed to represent SES based on results from a principle component analysis suggesting a single

factor underlying these variables (eigenvalue=1.94, 48.43 % variance explained; all factor loadings >0.49; all correlation coefficients were statistically significant and ranged from $r=0.20$ to $r=0.48$).

Metabolic Syndrome Risk

Metabolic syndrome risk was assessed via a composite score based on the number of metabolic syndrome components—i.e., blood pressure, waist circumference, plasma glucose, triglycerides, and high-density lipoprotein cholesterol—that met the Adult Treatment Panel III of the National Cholesterol Education Program's high-risk clinical criteria (National Cholesterol Education Program Expert Panel on Detection, 2002) with modifications set forth by the American Heart Association and the National Heart, Lung and Blood Institute [39]. Cutoff scores were as follows: waist circumference, >88 cm; fasting triglycerides, 150 mg/dL; fasting high-density lipoprotein cholesterol, <50 mg/dL; systolic blood pressure, 130 mmHg, or diastolic blood pressure, 85 mmHg; and fasting glucose, 100 mg/dL. Consistent with these guidelines, individuals who did not display high values for a component but were on drug to meet the criteria for the component in question. The composite score ranged from 0 (no components) to 5 (five components) with higher scores indicating more cardio-metabolic dysfunction. We chose to use a continuous indicator of cardio-metabolic dysfunction rather than a categorical indicator of metabolic syndrome prevalence, given the fact that only healthy women who were not taking medications having an effect on the autonomic nervous system were selected for the current study. Thus, it was felt that a dichotomous representation of metabolic syndrome prevalence would under-represent the degree and variability of cardio-metabolic dysfunction in this sample. A similar approach towards measuring biological risk for CVD and related disorders has been used in prior studies [19, 40, 41].

Covariates

Analyses controlled for age, menopausal status, and acculturation. Self-reported date of birth was utilized to calculate age at assessment. A dichotomous variable (coded 0, 1) was created to indicate menopausal status (participants who reported no menstruation for the past 12 months were considered postmenopausal). Exposure to US culture and language in which the survey was completed (i.e., Spanish or English) were used as proxies for acculturation. US exposure was assessed by calculating the percent of each participant's life that was spent in the USA (i.e., years in the USA/participant's age $\times$ 100). Scores on the US exposure scale ranged from 9 to 100.

Analyses

Descriptive statistics were calculated, and all variables were examined to determine if they met assumptions for conducted analyses. US exposure was positively skewed, and thus, the variable was log transformed. To facilitate the interpretation of regression coefficients, all covariates and predictors were standardized (i.e., mean 0, SD 1) prior to analysis. First, bivariate correlations were estimated to assess associations among all observed variables. Second, three linear regression models were tested to determine the independent associations between fatalism and cardio-metabolic dysfunction, SES and cardio-metabolic dysfunction, and SES and fatalism after accounting for relevant covariates. Finally, bootstrap procedures [42] were used to estimate the magnitude of the indirect effect of SES on cardio-metabolic dysfunction through fatalism. All analyses were conducted in SPSS (version 18). The indirect effect was tested using Preacher and Hayes' mediation analyses macro for SPSS [42] and is based on a bias-corrected confidence interval set at 99 % with 5,000 resamples. Minimal missing data were evident; 98 % of participants had complete

data, and bivariate statistical analyses revealed no statistically significant differences in target study variables for those with missing vs. complete data (all $ps>0.05$).

Results

Descriptive Statistics

Descriptive statistics for all observed variables are presented in Table 1 and bivariate correlations in Table 2. On average, women were 49.77 years old ($SD=6.54$). Seventy-five percent of participants were foreign born, with the average age at time of migration being 22.70 ($SD=10.60$). Approximately 34 % of the participants did not complete high school or receive a GED, 24 % reported an annual household income of less than \$21,000, and 52 % were postmenopausal.

Both fatalism ($\beta=0.23$, $SE=0.07$, $R^2=0.03$, $p<0.01$) and SES ($\beta=-0.23$, $SE=0.09$, $R^2=0.02$, $p<0.01$) were independently and significantly associated with cardio-metabolic dysfunction. Specifically, participants who endorsed more fatalistic beliefs and scored lower on the SES composite displayed higher cardio-metabolic dysfunction scores. Although slightly attenuated, the effect of fatalism on cardio-metabolic dysfunction remained significant after SES was included in the model ($\beta=0.23$, $SE=0.07$, $R^2=0.02$, $p<0.01$). In addition, the association between SES and fatalism was statistically significant with participants of lower SES endorsing more fatalistic beliefs after accounting for age and acculturation level ($\beta=-0.29$, $SE=0.07$, $R^2=0.06$, $p<0.001$).

Subsequently, a simple mediation model was tested with SES as the predictor, fatalism as the mediator, cardio-metabolic dysfunction as the outcome, and age, menopausal status, and US exposure and language preference (proxies for acculturation) as control variables (Figs. 1). The indirect effect for fatalism was significant, with a point estimate of -0.06 , $SE=0.02$, $p<0.001$, and a 99% bias-corrected bootstrap CI of -0.14 to -0.01 , indicating that fatalistic beliefs mediated the relationship between SES and cardio-metabolic dysfunction (Fig. 2). More specifically, those individuals who reported lower SES were more likely to endorse fatalistic beliefs and in turn displayed higher cardio-metabolic dysfunction risk. The model accounted for 7 % of the variance in the outcome, $p<0.001$.

Discussion

The overarching goal of the current study was to explore the association between fatalism and cardio-metabolic health and, more specifically, to examine whether fatalism could be conceptualized as an explanatory pathway that links low SES to cardio-metabolic dysfunction in a community sample of middle-aged Mexican–American women. As predicted, after controlling for age, menopausal status, and acculturation level, fatalism was associated with cardio-metabolic dysfunction explaining 3 % of the observed variance in the outcome. Although slightly attenuated, this relationship persisted after including SES in the model. In addition, individuals of low SES displayed more fatalistic beliefs and higher cardio-metabolic dysfunction after accounting for relevant covariates with SES explaining 6 % of the variance in fatalistic beliefs and 2 % of the variance in cardio-metabolic dysfunction scores. Finally, fatalism emerged as a possible pathway linking low SES to cardio-metabolic dysfunction with the full model accounting for 7 % of the variance in the outcome. Specifically, individuals of low SES displayed more fatalistic beliefs, which in turn were associated with higher cardio-metabolic dysfunction scores.

With few exceptions, to date, most research on fatalism and health has focused on cancer risk, and in general, fatalism has been associated with higher risk profiles [27, 31, 32]. To the authors' knowledge, this is the first study to examine the association between fatalism

and cardio-metabolic health, and our findings are consistent with the fatalism and cancer literature suggesting that fatalistic beliefs represent a barrier to cardio-metabolic health. Fatalism's influence on health may stem from its impact on an individual's health beliefs, self-efficacy, and motivation to adopt or maintain health-enhancing behaviors [28–30]. However, future research is needed to determine the relevance of these pathways in explaining the fatalism and cardio-metabolic health relationship as no studies to date have tested these associations.

The inclusion of participants from a wide-range of socioeconomic backgrounds in this study enabled a detailed examination of the relationship between SES and fatalism. This approach to the study of fatalism and health addresses concerns regarding the significance of fatalism in predicting health risk and outcomes above the influence of tangible barriers to health experienced by low-SES and ethnic minority populations [26, 27]. Our findings support the notion that for low-SES Mexican–American women, fatalistic beliefs may partially reflect realistic appraisals of the life constraints associated with low social status and that these fatalistic beliefs contribute to the SES and health relationship. However, the fact that the association between fatalism and cardio-metabolic dysfunction persisted even after accounting for SES also suggests that viewing fatalism as a mere reaction to the socioeconomic disadvantages faced by this population is incorrect. Future research is necessary to determine the extent to which other indicators of disadvantage (e.g., racism and discrimination) as well as cultural norms and values may contribute to the development of fatalistic perceptions in this population. Research is also needed to determine which aspects of the fatalism construct are most pertinent to health and in what contexts these beliefs are most likely to lead to negative health outcomes.

In sum, these findings highlight the importance of considering how social and cultural variables work together to shape the health profile of our nation's largest and fastest-growing ethnic population. The fact that fatalism emerged as both a significant mechanism linking low SES to cardio-metabolic health, as well as an independent risk factor for cardio-metabolic dysfunction, suggests that efforts aimed at reducing socioeconomic and ethnic disparities in CVD, diabetes, and related health conditions should consider the role of fatalistic beliefs in shaping this at-risk population's health behavior. Public health interventions that empower Latinas, particularly low-income Latinas, to take control over their health may be particularly effective in meeting the needs of this population.

Limitations

Due to the cross-sectional design of this study, we cannot rule out the possibility of reverse causation. While the fact that this study focused on a sample of healthy women lowers the probability that poor health is driving changes in SES or fatalistic beliefs, the possibility that fatalistic beliefs are driving differences in SES cannot be ruled out by this study. Therefore, longitudinal research is needed to clarify the nature of these associations. In addition, the inclusion of a more comprehensive measure of fatalism, inclusive of fatalistic beliefs specific to health, would have enabled a more nuanced examination of the SES, fatalism, and health relationship, as there is evidence to suggest that different aspects of fatalism (e.g., believing in fate vs. believing a particular disease cannot be prevented or treated) may be differentially associated with health [26]. Moreover, the inclusion of such a measure would have allowed for a more accurate comparison between the current study's findings and existing literature on fatalism and health, which has almost exclusively focused on cancer fatalism.

The exclusion of nonliterate women is another important limitation to this study. Efforts should be made to utilize assessment methods that enable the inclusion of this at-risk subpopulation in future studies. We chose to create a composite score of SES to help reduce

type 1 error risk while still representing the participants' socioeconomic context as comprehensively as possible. However, this approach impeded a more detailed examination of the unique association of each SES indicator with the outcomes of interest. Finally, this study focused exclusively on middle-aged Mexican–American women limiting the generalizability of these findings. Research on the SES, fatalism, and cardio-metabolic dysfunction relationship that includes other Latino subgroups is needed to provide a clearer picture of how these socio-cultural variables work together to impact health outcomes in the US Latino population.

In conclusion, fatalism may be an important independent risk factor for cardio-metabolic dysfunction in Mexican–American women as well as a mechanism linking low SES to cardio-metabolic dysfunction. Future research is needed to identify how other social and cultural factors (e.g., discrimination, racism, cultural norms, and values) contribute to the development of fatalistic beliefs in this population. In addition, efforts to uncover the construct that is most pertinent to health, are warranted. mechanism via which fatalism exerts its influence on health, as well as the aspect of the construct that is most pertinent to health, are warranted.

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Fig. 1. Possible direct and indirect associations between socioeconomic status, fatalism, and cardio-metabolic function

Fig. 2.

Results of analyses investigating the indirect pathways from SES to cardio-metabolic dysfunction risk via fatalism. Analyses control for age (in years), menopausal status, US exposure, and language preference (proxies for acculturation). The numbers shown are unstandardized coefficients. * $p < 0.05$, ** $p < 0.01$

Table 1
Sociodemographic characteristics of sample and descriptive statistics for all study variables, San Diego, California, 2006–2009

	N (%)	Mean (SD)
Age (years)		49.77 (6.54)
Educational attainment		
<9th grade	51 (16.90)	
Some high school	53 (17.50)	
High school diploma/GED	36 (11.90)	
Some college	96 (31.80)	
Bachelor's degree	47 (15.60)	
Graduate/professional degree	47 (6.30)	
Annual household income		
\$21,000	72 (23.80)	
\$21,001–33,000	51 (16.90)	
\$33,001–51,000	83 (27.50)	
\$51,001–75,000	42 (13.90)	
\$75,001	54 (17.90)	
Own home	221 (73.20)	
No health insurance	87 (28.80)	
US exposure		65.69 (26.97)
Survey completed in English	124 (41.10)	
Postmenopausal	158 (52.30)	
Fatalism		10.23 (2.87)
Cardio-metabolic dysfunction score		1.44 (1.28)
Elevated BP	64 (21.20)	
Elevated WC	128 (42.40)	
Elevated TRI	89 (29.50)	
Elevated PG	41 (13.60)	
Elevated HDL-c	89 (29.50)	

BP blood pressure, WC waist circumference, TRI triglycerides, PG plasma glucose, HDL-c high-density lipoprotein cholesterol, US exposure percent of each participant's life that was spent living in the USA, Elevated meets high-risk clinical criteria for the component in question

Table 2

Bivariate associations among all observed variables

Variables	1	2	3	4	5	6	7
Fatalism							
SES	-0.27**						
Income	-0.24**	0.81***					
Edu	-0.31**	0.70***	0.48**				
Home	-0.12**	0.66***	0.46***	0.25***			
HIA	-0.07	0.58***	0.28***	0.20***	0.11*		
CMD	0.19**	-0.19***	-0.19**	-0.18**	-0.12**	-0.04	

SES socioeconomic status composite, *Edu* education, *Home* homeowner, *HIA* health insurance access, *CMD* cardio-metabolic dysfunction score

* $p < 0.10$;

** $p < 0.05$;

*** $p < 0.01$