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Fatalism and hypertension prevalence, awareness, treatment and control in US Hispanics/Latinos: results from HCHS/SOL Sociocultural Ancillary Study

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Abstract

Compared with non-Hispanic whites, US Hispanics/Latinos display similar hypertension prevalence, but lower awareness, treatment, and control. Sociocultural factors may affect these patterns. Fatalism, the belief that health is predetermined by fate, relates to poorer adoption of risk reducing health behaviors. We examined the association of fatalism with hypertension prevalence, awareness, treatment, and control among 5313 Hispanics/Latinos, ages 18–74, who were enrolled from four US communities in the Hispanic Community Health Study/Study of Latinos Sociocultural Ancillary Study. After accounting for socioeconomic status and acculturation in logistic regression analyses, higher fatalism was associated with increased odds of hypertension (*OR* 1.14, 95 % CI 1.02, 1.28). This association was non-significant when diabetes and other health-related covariates were statistically adjusted. Fatalism was not associated with hypertension awareness, treatment, or control. Findings suggest that the association of fatalism with hypertension may be due largely to its association with SES, acculturation, or related health conditions.

Keywords

Fatalism; Hispanic; Hypertension; Latino; Sociocultural

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Conflict of interest Angela P. Gutierrez, Jessica L. McCurley, Scott C. Roesch, Patricia Gonzalez, Sheila F. Castañeda, Frank J. Penedo, and Linda C. Gallo declare that they do not have any conflict of interest.

Compliance with ethical standards

Human and animal rights and Informed consent All procedures followed were in accordance with ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all patients for being included in the study.

Hypertension is a major risk factor for stroke, heart disease, and cardiovascular mortality (Xu et al., 2016; Go et al., 2013; Kaplan & Victor, 2010). Research suggests that although US Hispanics/Latinos have a hypertension prevalence similar to that of non-Hispanic whites (Nwankwo et al., 2013), when Hispanic/Latino background groups are considered separately hypertension prevalence varies (Sorlie et al., 2014). Additionally, hypertension is highly responsive to medication and lifestyle changes (Chobanian et al., 2003), and the last decade has seen increases in hypertension awareness, treatment and control among all racial/ethnic groups. However, Hispanics/Latinos have had the lowest increase in hypertension awareness (Yoon et al., 2010), and they are less likely than other racial/ethnic groups to be treated for hypertension or have their hypertension under control (Gu et al., 2012). Given these disparities, there is a need for a more nuanced understanding of the factors that affect hypertension prevalence, awareness, treatment, and control among Hispanics/Latinos.

Previous research among Hispanics/Latinos suggests that structural barriers (e.g., transportation), socioeconomic factors (e.g., income), poor access to care (e.g., lack of health insurance, communication barriers), and health behaviors (e.g., smoking) affect hypertension development and control (Aranda & Vazquez, 2004; Betancourt et al., 2004; Perez-Stable et al., 2004; Sorlie et al., 2014). The hypertension literature also suggests that capability barriers (e.g., health literacy) and intention barriers (e.g., low motivation, low self-efficacy) can be detrimental to successful hypertension prevention and management (Khatib et al., 2014), but these have been less frequently examined among Hispanics/Latinos.

Fatalism, the belief that one's health and health outcomes are determined by fate and are outside of one's control, has been suggested to affect self-efficacy with regards to engaging in healthy behaviors (Straughan & Seow, 1998), and to be prevalent among ethnic/racial minorities (Austin et al., 2002; Caban & Walker, 2006). For example, Hispanics/Latinos are more likely than non-Hispanic whites to endorse the beliefs that there is nothing one can do to prevent cardiovascular disease (Christian et al., 2007), or to prevent cancer (Niederdeppe & Levy, 2007). To date, no research has examined the relationship between fatalism and hypertension among Hispanics/Latinos. However, among non-Hispanic whites, a few studies have shown that a high external locus of control (a belief similar to fatalism where it is believed that events and outcomes are out of one's control) was associated with worse adherence to hypertension medication (Hong et al., 2006; Stanton, 1987). A different study among non-Hispanic whites showed that high internal control and low fatalism were also associated with lower mean arterial pressure (Younger et al., 2008). Among Hispanic/Latinos, endorsement of fatalism has been found to be associated with other health behaviors, such as reduced utilization of cancer screening services (Espinosa de Los Monteros & Gallo, 2011), lower likelihood of adopting behaviors to lower cardiovascular disease (Mosca et al., 2006), and lower odds of being a non-smoker, exercising weekly, and eating five servings of fruits and vegetables a day (Niederdeppe & Levy, 2007). These data would indicate that fatalism is associated with health behaviors that are relevant to hypertension; however, other researchers have failed to find a relationship between fatalism and health outcomes among Hispanics/Latinos.

Considering the strong association cited by many between fatalism and socioeconomic status (SES), and between fatalism and acculturation (Cuéllar et al., 1995), some researchers

have suggested that fatalism might not be an independent construct but a proxy for the effects of SES and acculturation on health and health behaviors (Abraido-Lanza et al., 2015; De Jesus & Xiao, 2014; Drew & Schoenberg, 2011). Others argue that although fatalism may capture something beyond SES and acculturation effects, it is not a cultural value per se but an understandable learned helplessness response to structural, social, and political barriers and to frequent experiences of disempowerment (Abraido-Lanza et al., 2007). As a result, it has been suggested that studies that have identified a relationship between fatalism and health among Hispanics/Latinos have likely not appropriately accounted for confounding factors. Indeed, several studies have either failed to find an association between fatalism and health care utilization after access to care barriers are accounted for (Abraido-Lanza et al., 2015; Castaneda et al., 2014) or have noted that access to care barriers explained most of the association (De Jesus & Xiao, 2014). However, in a different study fatalism was both a significant independent correlate and helped explain the association between SES and cardiometabolic dysfunction in women of Mexican descent, after accounting for age and acculturation (Espinosa de Los Monteros & Gallo, 2013). Considering that possible confounders are rarely accounted for in analyses, and in light of most research examining only one Hispanic/Latino background group, the relationship between fatalism and health among Hispanics/Latinos remains unclear.

Building on identified gaps in the literature, the current study aimed to elucidate the relationship between fatalism and hypertension among individuals from a multi-site study of Hispanics/Latinos from multiple background groups [the Sociocultural Ancillary Study to the Hispanic Community Health Study/Study of Latinos (HCHS/SOL)], using a fatalism measure developed and validated for Hispanics/Latinos (Cuéllar et al., 1995), and considering covariates often neglected in prior research. The study had three objectives. The first was to examine whether fatalism varied across Hispanic/Latino background groups, demographic factors, socioeconomic factors, and acculturation levels. Based on the current body of literature, we hypothesized that fatalism would be higher among women, those of older age, and those of lower income, education and acculturation, and that fatalism levels would be similar across Hispanic/Latino background groups. The second goal was to examine the relationship between fatalism and hypertension prevalence after accounting for SES and acculturation (given the previous literature on fatalism), and while controlling for health variables that the health literature suggests are risk factors for hypertension (e.g., health insurance, health behaviors, and related health conditions). We hypothesized that higher fatalism would be associated with higher odds of hypertension, after accounting for the covariates. Third, this study examined the relationship between fatalism and hypertension awareness, treatment, and control. We hypothesized that after accounting for the covariates, greater fatalism would be associated with lower odds of hypertension awareness, treatment, and control.

Method

Participants and procedures

HCHS/SOL—A full description of the HCHS/SOL study design (Sorlie et al., 2010) and sampling approach (Lavange et al., 2010) has been published elsewhere. Briefly, the

HCHS/SOL is a community based prospective cohort study of 16,415 non-institutionalized adults self-identified as belonging to a Hispanic/Latino background group (Central American, Cuban, Dominican, Mexican, Puerto Rican, South American, and other/more than one group). The goal of HCHS/SOL is to better understand determinants and prevalence of chronic health conditions among the Hispanic/Latino population. Participants were recruited in four US cities (Bronx, NY; Chicago, IL; Miami, FL; and San Diego, CA) through a stratified two-stage area probability sample of household addresses in each of the field centers. Recruitment took place between 2008 and 2011, during which participants completed baseline clinical examinations that included comprehensive biological (e.g., oral glucose tolerance test, ankle brachial pressure index, anthropometrics), behavioral (e.g., dietary 24-h recalls, alcohol and tobacco assessments), and sociodemographic (e.g., migration history, SES) assessments.

Sociocultural Ancillary Study—The design and methods of the Sociocultural Ancillary Study (SCAS) to the HCHS/SOL have been previously published (Gallo et al., 2014). Briefly, the SCAS is a cross-sectional cohort of 5313 HCHS/SOL participants, who completed in-depth sociocultural self-report assessments 3–9 months after the HCHS/SOL clinical baseline. Most participants (72.6 %) completed the sociocultural assessment within 4 months of their baseline exam. The SCAS sample is broadly representative of the HCHS/SOL cohort, except that certain higher SES block groups were less likely to participate (Gallo et al., 2014). The goals of the SCAS were to examine psychosocial and sociocultural factors related to cardiometabolic diseases and relevant health sequelae.

Measures

Hypertension—Blood pressure readings were obtained during the HCHS/SOL baseline clinical exam. Hypertension prevalence was defined according to JNC-VII criteria (Chobanian et al., 2003), and consistent with a prior HCHS/SOL paper (Sorlie et al., 2014), as having either an average systolic or diastolic blood pressure of ≥140/90 mm/Hg or self-reported use of antihypertensive medications in the last 4 weeks. Hypertension awareness, treatment, and control were assessed only in those participants classified as hypertensive at baseline assessment. Consistent with a prior HCHS/SOL paper (Sorlie et al., 2014), awareness was defined as meeting criteria for hypertension and also self-reporting that a doctor had previously informed the participant that they had hypertension; hypertension treatment was defined as meeting hypertension criteria and also self-reporting use of antihypertensive medications; hypertension control was defined as meeting hypertension criteria and also having systolic and diastolic blood pressure readings <140/90 mm/Hg during the baseline clinical exam.

Fatalism—Participants completed the 8-item fatalism scale from the Multiphasic Assessment of Cultural Constructs—Short Form (Cuéllar et al., 1995) during the SCAS interview. This scale assesses participants' agreement (*True/False*) with statements about whether the future is a result of destiny and outside of one's control; for example "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". A sum score was created with higher scores indicating greater endorsement of fatalism. In the current study, the original 8-item version was found to have

poor psychometric properties and internal consistency, with two items having inadequate factor loadings on the scale and low item-total correlations. Thus, a 6-item version was derived by removing those two items. Confirmatory factor analysis showed that the 6-item scale had a one-factor structure that was invariant across English and Spanish forms. Internal consistency reliability of the 6-item version for the sample was acceptable (English: $\alpha = .65$; Spanish: $\alpha = .62$).

Sociodemographic covariates—Demographic variables included age (modeled continuously), sex, Hispanic/Latino background, and field center (Bronx, NY; Chicago, IL; Miami, FL; San Diego, CA). Education level (<high school diploma/general education degree [GED], high school diploma/GED only, and >high school diploma/GED) and yearly household income (modeled continuously) were used as measures of SES. Acculturation measures included language of interview (English or Spanish), and nativity/duration of US residence (US born, immigrated <10 years ago, and immigrated ≥10 years ago).

Health covariates—The health covariates included in the analyses were those considered to be hypertension risk factors, and thus hypothesized to independently account for variance in hypertension outside of fatalism. Health covariates were assessed during the HCHS/SOL baseline clinical examination. Analyses controlled for health insurance status given prior research from HCHS/SOL suggesting that health insurance was a significant correlate of hypertension awareness, treatment, and control (Sorlie et al., 2014), and was defined as participant self-report of current health insurance (i.e., *insured/not insured*). Diabetes diagnosis was included as a health covariate because previous research suggests that chronic insulin resistance, hyperglycemia, and diabetic nephropathy can contribute to the development of hypertension (Epstein & Sowers, 1992). Diabetes diagnosis (i.e., *diabetes present/not present*) was calculated based on the American Diabetes Association definition (American Diabetes Association, 2010) which takes into account serum glucose levels adjusted for fasting time, and when available, post-oral glucose tolerance test (OGTT) glucose levels, glycosylated hemoglobin (HbA1c) percentages, and glucose lowering medications brought to the baseline exam. The remaining health covariates (i.e., body mass index [BMI], dietary quality, physical activity, smoking status, and alcohol use) were included because of the vast literature noting them as independent risk factors for hypertension. BMI was calculated as participant weight (kg) divided by their height (cm^2), and was modeled continuously. Physical activity was assessed using the Global Physical Activity Questionnaire ([GPAQ]; Armstrong & Bull, 2006), and was defined as participant self-report of the average amount of time spent per day in moderate and vigorous physical activity across work, leisure, and transportation settings, and was modeled continuously (min/day). Dietary quality was assessed using the alternative healthy eating index (AHEI-2010), a measure of diet quality based on foods predictive of chronic disease risk (Chiuve et al., 2012). The AHEI-2010 scores range from 0 to 110, with higher scores indicating healthier eating habits, and it was modeled continuously. Smoking status was calculated from participant self-report of cigarette use history, and was defined as *current smoker* (smoke daily or on some days), *former smoker* (smoked >100 cigarettes in lifetime but no present use), *and non-smoker* (smoke <100 cigarettes in lifetime and no present use). Alcohol use was calculated from participant self-report of alcohol use history, and was

defined as *non-drinker* (if reported never having used alcohol), *former drinker* (if no current alcohol use but reported past use) *low-risk drinker* (<7 drinks/week for women and 14 drinks/week for men), and *at-risk drinker* (≥7 drinks/week for women and 14 drinks/week for men).

Statistical analyses

All descriptive analyses were performed in IBM SPSS Statistics 22 (IBM Corp, 2013) using complex survey procedures. All inferential analyses were performed using Mplus 7.0 (Muthén & Muthén, 1998–2012), and accounted for HCHS/SOL design effects and sample weights. Model parameters were estimated using the maximum likelihood robust estimation procedure in Mplus, which allows cases with missing data to be included in the analysis. This procedure generates unbiased model parameters and robust standard errors through a full-information maximum likelihood approach (Muthén & Muthén, 1998–2012).

Hypertension was conceptualized as the dependent variable and fatalism as the independent variable for analyses, although directionality cannot be inferred given the cross-sectional design. In the analyses, the hypertension dependent variables were treated as binary (i.e., *hypertension present/no hypertension*, *hypertension controlled/not controlled*). The fatalism variable was normally distributed and modeled continuously. All continuous covariates were normally distributed except physical activity, which was natural-log transformed. To facilitate interpretation of model parameters, fatalism scores were standardized into z-scores prior to analysis.

First, a multiple linear regression model was used to test the sociodemographic correlates of fatalism. This model regressed fatalism on demographic (age, sex, Hispanic/Latino background group), SES (education, income) and acculturation (nativity/immigration, and language) indicators. Next, four multivariable logistic regression models were used to evaluate the associations of fatalism with hypertension prevalence, awareness, treatment, and control. For all hypertension dependent variables, Model 1 adjusted only for demographic covariates (age, sex, Hispanic/Latino background group, and field center). Model 2 adjusted additionally for SES (education and income) and acculturation covariates (language and nativity/immigration). Model 3 adjusted for the health covariates (health insurance, diabetes, BMI, alcohol use, smoking status, diet, and physical activity), in addition to the Model 1 and 2 covariates. To examine whether the association of fatalism with hypertension varied by sex, a multiplicative sex by fatalism interaction term was created.

Results

Descriptive analyses

As shown in Table 1, the majority of the sample was female (62.1 %) and over the age of 45 (61.7 %). Approximately half the sample had a yearly household income less than $20,000 (52.5 %), and about a third had not completed high school education or GED (36.3 %). Most of the sample was born outside of the US (82.7 %), preferred to complete the interview in Spanish (80.9 %), and 39.2 % belonged to the Mexican background group. The majority of the sample did not have diabetes, did not report at-risk alcohol consumption, and were not

current smokers. Half of the sample had some form of health insurance (50.9 %). Hypertension prevalence, awareness, treatment and control prevalence estimates based on the HCHS/SOL cohort have previously been reported (Sorlie et al., 2014). In the SCAS, the weighted hypertension prevalence was 27.7 %. Of those, 74.2 % were not aware of their hypertension status, 63.4 % were not being treated for hypertension, and 40.1 % did not have their hypertension under control (<140/90).

Sociodemographic correlates of fatalism

As shown in Table 2, higher fatalism scores were significantly associated with the female sex ($B = -0.06$, $p = .001$), Spanish language preference ($B = -0.14$, $p < .001$) and lower yearly household income ($B = -0.19$, p <.001). Compared to those with an education level higher than a high school diploma/GED, those with only a high school diploma/GED and those with less than a high school diploma/GED had significantly higher fatalism scores ($B = .012$, $p < .001$ and $B = 0.25$, $p < .001$, respectively). Fatalism scores did not vary significantly between individuals born in the US and those who immigrated more than 10 years ago ($B = 0.04$, $p = 0.221$) or <10 years ago ($B = 0.05$, $p = 0.116$). Among Hispanic/Latino background groups, Cubans and Central Americans reported significantly higher fatalism scores than the reference group of Mexicans, (Cubans $B = 0.05$, $p = 0.017$, Central Americans $B = 0.04$, $p = 0.014$). Because Hispanic/Latino background group was highly correlated with field center in the HCHS/SOL sample, the effect of field center was examined as an additional variable in a second model (not shown). However, field center had a negligible effect on the Model 1 parameters and thus was dropped from the final model.

Association of fatalism with hypertension prevalence, awareness, treatment, and control

The interaction of sex by fatalism was not significant in any of the models, and thus results were not stratified by sex. As shown in Table 3, in a model that adjusted only for demographic covariates, fatalism was significantly associated with hypertension prevalence. Specifically, a one-SD increase in fatalism was associated with a 17 % higher odds of meeting criteria for hypertension (*OR* 1.17, 95 % CI 1.05, 1.31). When indicators of SES and acculturation were added to the model, fatalism remained significantly associated with hypertension prevalence, with a one-SD increase in fatalism associated with 14 % higher odds of having hypertension (*OR* 1.14, 95 % CI 1.02, 1.28). The association became nonsignificant ($p > .05$) when the third model adjusted for health covariates. Fatalism was not a significant correlate of the other hypertension dependent variables (awareness, treatment, and control; all $ps > .05$).

To further examine which health covariates explained the association of fatalism with hypertension prevalence, additional regression analyses were performed to independently test the impact of each health covariate. These analyses showed that the association between fatalism and hypertension prevalence was attenuated in particular when diabetes diagnosis was included in the model. In the SCAS sample, the extent of comorbidity (i.e., those with hypertension who also had diabetes) was 34.9 % and the correlation between hypertension and diabetes prevalence was $r = 0.292$, $p < .01$. Examination of the pattern means revealed that fatalism was highest among participants with both hypertension and diabetes, and lowest among participants with neither hypertension nor diabetes.

Discussion

If a person believes their health outcomes are mostly a result of fate and outside of their control, they might experience low self-efficacy and be less motivated to engage in preventive or curative health behaviors. Thus, fatalism has been hypothesized to detrimentally affect health behaviors through decreased self-efficacy, leading to negative health outcomes. As a result, researchers examining Hispanic/Latino health disparities have looked to fatalism as a possible contributor to poor health outcomes among this population. Given that in the continuum between developing, managing, and controlling hypertension there are multiple points during which health behaviors take place, the purpose of this study was to examine the association of fatalism with hypertension prevalence, awareness, treatment and control. Our study also aimed to further the debate on the relationship between fatalism and health outcomes by addressing limitations of previous studies, specifically, by attempting to separate the association of fatalism with hypertension from the confounding effects of acculturation, SES and health covariates.

As hypothesized, fatalism was more prevalent among women and among participants with lower income and education levels. Older age was not associated with higher fatalism, suggesting that other factors (e.g., SES) may play a larger role in shaping fatalistic beliefs among Hispanics/Latinos. This is consistent with arguments from researchers that consider fatalism a proxy for social disempowerment (Abraido-Lanza et al., 2007), and with results from another study among Hispanic/Latina women, which reported that even after accounting for age and acculturation, the association between SES and fatalism remained significant (Espinosa de Los Monteros & Gallo, 2013). As hypothesized, lower acculturation as assessed by Spanish language interview was associated with higher fatalism scores; however, acculturation measured as time lived in the US was not associated with fatalism. Previous research has suggested that proxies of acculturation can be useful to assess acculturation in large epidemiological surveys, and that the proxies of language spoken and nativity/time in the US are generally highly correlated with more lengthy acculturation scales (Alegria, 2009). However, researchers caution that proxies of acculturation can lack scope and sensitivity (Thomson & Hoffman-Goetz, 2009) and thus may lead to varying results. One potential explanation for our inconsistent results is that time lived in the US does not capture immersion into US culture as accurately as preferred language use. In general, language spoken has been considered the strongest predictor of acculturation and has been described as a precursor of subsequent acculturative processes by many researchers (Alegria, 2009; Thomson & Hoffman-Goetz, 2009).

Contrary to our hypothesis, fatalism levels varied between Hispanic/Latino groups even after examining for possible study site effects and while accounting for sociodemographic factors. Specifically, Cubans and Central Americans endorsed significantly greater fatalistic beliefs than Mexicans, although effect magnitude was small. It is possible that the different historical, socioeconomic, and political contexts from each country of origin have shaped fatalistic attitudes differently and to varying degrees for each Hispanic/Latino group. Future research could examine how the pattern of responding to the fatalism measures varies across groups, through the use of methods such as latent class analysis, and assess how the

predicted fatalistic profiles relate to variables capturing historical aspects of the country of origin.

As predicted, higher fatalism was associated with prevalence of hypertension even after accounting for SES and acculturation. However, the association was attenuated to non-significance once health covariates were added to the model. The additional analyses revealed that diabetes diagnosis was primarily responsible for attenuating the relationship between fatalism and hypertension prevalence, and that participants with both diabetes and hypertension reported higher fatalism compared with participants with neither diabetes nor hypertension. One potential explanation for this pattern is that, given the common pathways leading to both diabetes and hypertension (Cheung & Li, 2012), fatalism may have similar effects on the development of both diabetes and hypertension, and thus accounting for one in the analyses might obscure the effects of fatalism on the other. Another explanation is that fatalism might affect the development of hypertension through its effects on diabetes. An alternative explanation is that fatalism may not precede diabetes or hypertension but instead be a response to having both conditions concurrently. Future prospective research would be needed to elucidate these possibilities, thus we recommend using the next wave of the HCHS/SOL study (currently underway) as an ideal approach to testing for directional associations.

Finally, fatalism was not associated with hypertension awareness, treatment, or control in any of the models. It is possible that fatalism affects the self-efficacy of engaging in preventive health behaviors prior to the development of hypertension, but that it might not affect self-efficacy of engaging in treatment-related behaviors (e.g., medication adherence) once diagnosed. In fact, most studies have focused on the health effects of fatalism in relation to preventive health behaviors (e.g., screening tests) rather than treatment behaviors. Additionally, by attributing negative health events to fate, fatalism could facilitate short term coping in the face of significant distress that occurs in the context of some debilitating health conditions. Thus, fatalism relationships might be more pronounced in the context of conditions that, unlike hypertension, have more apparent symptoms and imposed limitations. It may also be that other factors contributing to health disparities (e.g., low SES, access to care, comorbid health conditions) best explain differences in hypertension awareness, treatment, and control among Hispanics/Latinos.

This study has important limitations that should be considered. First, the HCHS/SOL and SCAS data are cross-sectional, and thus causality and temporality cannot be inferred from these findings. Second, blood pressure measurements were taken only during one visit, and blood pressure readings can have high within-individual variability, so that repeated blood pressure measurements may be better predictors of clinical outcomes (Pickering et al., 2005). Additionally, blood pressure readings were taken up to 9 months prior to the assessment of fatalism. However, fatalism is generally conceived to be a stable construct over short-time periods, and given that most SCAS participants completed the measures soon after the HCHS/SOL clinical visit (Gallo et al., 2014), this is unlikely to have affected the results. In addition, although the fatalism measure was chosen due to its development and validation with Hispanics/Latinos, in this sample the original fatalism measure exhibited poor psychometric properties and thus a modified version was used in analyses. As noted by

other researchers (Abraido-Lanza et al., 2007; Espinosa de Los Monteros & Gallo, 2011), most studies that examine fatalism health effects have used different measures of fatalism and standardization of fatalism assessment should be prioritized in future studies. Furthermore, the health behavior covariates included in the models (e.g., smoking status, physical activity) relied on participant self-report, introducing some degree of error. Finally, considering the potential overlap between the constructs of fatalism and locus of control it would have been helpful to include a measure of locus of control in the study. However the HCHS/SOL SCAS study was a large epidemiological cohort study ($N = 5313$) that included a thorough clinical examination (averaging 8 h in length) in addition to the sociocultural battery of tests, thus it was not feasible to include measures for all variables of interest and the study focused on those sociocultural measures that were felt to have greatest relevance to health in this particular population. On the other hand, the research was conducted in a well-characterized, large, national, and representative sample including multiple Hispanic/Latino background groups, which provides a critical contribution to the literature concerning Hispanic/Latino health.

Despite its limitations the present study adds to a growing body of literature on the associations of fatalism with health outcomes among Hispanics/Latinos. In particular, the findings show that at least for hypertension, fatalism may not be a significant independent health risk factor after controlling for acculturation, SES, and health covariates. These findings have implications for public health interventions, which if solely focused on fatalistic attitudes without consideration of social and structural barriers, as well as comorbid health conditions, are likely to fail at best and be harmful at worst.

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Table 1

Sample characteristics ($N = 5313$)

	n	Sample %	Weighted % (95 % CI)
Age 18–44 years	2035	38.3	56.5 (54.2, 58.7)
Female sex	3299	62.1	54.9 (52.9, 56.8)
Hispanic/Latino background group			
Central American	553	10.4	7.6 (6.2, 9.2)
Cuban	775	14.6	20.3 (16.3, 25.1)
Dominican	534	10.1	11.7 (9.9, 13.8)
Mexican	2080	39.2	36.5 (32.6, 40.6)
Puerto Rican	880	16.6	15.8 (13.8, 18.0)
South American	350	6.6	4.8 (4.0, 5.8)
More than one/other	137	2.6	3.3 (2.4, 4.5)
Household yearly income			
≤$10,000	888	18.2	17.7 (15.8, 19.8)
$10,001–20,000	1673	34.3	33.6 (31.4, 35.9)
$20,001–40,000	1577	32.4	31.7 (29.5, 33.9)
$40,001–75,000	556	11.4	12.0 (10.3, 13.8)
> $75,000	178	3.7	5.0 (3.7, 6.7)
Education			
< High school or GED	1923	36.3	32.5 (30.4, 34.8)
High school or GED	1383	26.1	28.0 (26.3, 29.8)
> High school or GED	1998	37.7	39.4 (37.0, 42.0)
Nativity/immigration status			
Born in the US mainland	917	17.3	22.0 (19.7, 24.4)
Immigrated ≥10 years ago	3137	59.2	50.9 (48.4, 53.4)
Immigrated <10 years ago	1247	23.5	27.2 (24.4, 30.1)
Spanish language interview	4296	80.9	75.4 (72.5, 78.1)
Hypertension prevalence	1735	32.7	27.7 (25.7, 29.9)
Hypertension awareness	1324	76.3	74.2 (71.1, 77.1)
Hypertension treated	1123	64.7	63.4 (60.1, 66.6)
Hypertension controlled	723	41.7	40.1 (36.7, 43.7)
Current health insurance	2670	50.9	52.3 (49.7, 54.8)
Diabetes diagnosis	1079	20.3	16.0 (14.7, 17.4)
Smoking status			
Current smoker	974	18.3	20.7 (18.8, 22.7)
Former smoker	1094	20.6	18.1 (16.7, 19.5)
Non-smoker	3240	61.0	61.3 (59.2, 63.3)
Alcohol use			
At-risk	261	4.9	6.0 (5.1, 7.1)
Low risk	2193	41.3	43.6 (41.1, 46.1)
Former drinker	1752	33.0	30.4 (28.4, 32.5)

	n	Sample %	Weighted % (95 % CI)
Non-drinker	1105	20.8	20.0 (17.9, 22.2)
	n	Unweighted *M* (*SD*)	Weighted *M* (*SD*)
Fatalism (6-item scale; range 0–6)	5297	3.86 (1.6)	3.73 (3.3)
Body Mass Index (kg/m^2)	5302	30.0 (6.2)	29.6 (11.2)
Physical activity (min/day)	5295	113.8 (168.8)	123.7 (292.4)
Dietary quality (AHEI score, 0–110)	5274	49.1 (7.6)	47.7 (15.3)

Note Hypertension awareness, treatment, and control examined only among those with hypertension. Alcohol use: low risk defined as<7 drinks/week for women and 14 drinks/week for men; and at-risk defined as ≥7 drinks/week for women and 14 drinks/week for men. Physical activity was assessed using the GPAQ, and defined as average amount of time spent per day on moderate and vigorous activity across settings (min/day). *GED* general education development test, *AHEI* alternative healthy eating index

95 % CI 95 % confidence interval

Table 2

Results from multiple regression analysis regressing fatalism on sociodemographic variables

Variable	Fatalism	
	Model 1	
	B	[95 % CI]
Age[a]	0.03	[−0.02, 0.07]
Sex[b]	−0.06**	[−0.10, −0.03]
Income[a]	−0.19***	[−0.24, −0.14]
Education[c]		
< High school/GED	0.25***	[0.21, 0.29]
High school/GED	0.12***	[0.09, 0.16]
Nativity/years in US[d]		
Immigrated < 10 years ago	0.05	[−0.002, 0.10]
Immigrated ≥10 years	0.04	[−0.01, 0.10]
Language of interview[e]	−0.14***	[−0.18, −0.09]
Hispanic/Latino background[f]		
Dominican	0.02	[−0.02, 0.06]
Central American	0.04*	[0.01, 0.07]
Cuban	0.05*	[0.02, 0.08]
Puerto Rican	0.03	[−0.01, 0.07]
South American	0.02	[−0.004, 0.05]
More than one/other	−0.01	[−0.04, 0.03]

Model 1 $R^2 = 0.14$, $p < .001$

* $p < .05$;

** $p < .01$;

*** $p < .001$

[a] Modeled continuously

[b] Dummy coded with female as reference group

[c] Dummy coded with > High School/GED as reference group

[d] Dummy coded with born in the US mainland as reference group

[e] Dummy coded with Spanish language as reference group

[f] Dummy coded with Mexican as reference group

Table 3

Results of multiple logistic regression analyses regressing hypertension prevalence, awareness, treatment and control on fatalism and covariates

Fatalism association with	Model 1[a] *OR* [95 % CI]	Model 2[b] *OR* [95 % CI]	Model 3[c] *OR* [95 % CI]
Hypertension prevalence	1.17 * [1.05, 1.31]	1.14 * [1.02, 1.28]	1.12 [1.00, 1.26]
Hypertension awareness	0.97 [0.77, 1.22]	1.02 [0.81, 1.28]	1.00 [0.80, 1.25]
Hypertension treatment	0.95 [0.78, 1.16]	1.00 [0.83, 1.22]	1.00 [0.83, 1.21]
Hypertension control	0.85 [0.69, 1.04]	0.89 [0.73, 1.08]	0.91 [0.78, 1.11]

n = 5222–5309

OR odds ratio, *95 % CI* 95 % confidence interval

* $p < .05$

[a] Controls for age, sex, Hispanic/Latino background group, and field center

[b] Controls for Model 1 covariates, as well as education, income, language of interview, and nativity/immigration

[c] Controls for Model 2 covariates, as well as health insurance status, diabetes, BMI, dietary quality, physical activity, and cigarette and alcohol consumption