

Validity of Self-rated Health among Latino(a)s

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The authors investigated whether self-rated health (SRH) had differential mortality risks for Latino(a) adults of various acculturation statuses living in the United States. They used cumulative National Health Interview Survey data from 1989 to 1994 ($n = 37,713$) linked with the National Health Interview Survey Multiple Cause of Death data files (1,364 deaths) that match records from the National Death Index through 1997. The authors specified survival models to estimate the effect of SRH on mortality and further stratified their model by birth and duration in the United States as proxies for acculturation. These estimates were compared across strata. Poor SRH was found to be a weaker predictor of subsequent mortality risk among the less acculturated, although the overall risk among the aggregated sample is similar to the risk reported in previous studies. The relation between poor SRH and mortality risk increases with United States acculturation among Latinos. While poor SRH was significantly associated with short-term mortality among the least acculturated, this association did not persist beyond 2-year mortality risk. Health researchers wishing to use SRH to assess the physical health of multiethnic populations should at least control for levels of acculturation among respondents. *Am J Epidemiol* 2002;155:755–9.

acculturation; emigration and immigration; health status; health surveys; mortality

The validity of self-rated health (SRH) measures, in terms of their predictive import for mortality risk, has been established in multiple studies. A well-cited review concludes that SRH is an independent predictor of mortality, above and beyond physician assessments of health (1). Global SRH measures generally include a question such as “How would you rate your overall health?” and offer five response categories that range from excellent to poor. SRH measures are often dichotomized as fair/poor versus all other categories since the poor/fair categories represent expressions of health distress and/or the presence of disease; a rating of fair/poor also represents a heightened mortality risk.

Responses to SRH may vary depending on the race/ethnicity of the person being interviewed, however. For example, Latinos may somatize their emotional/mental health into physical health constructs (2) such as SRH. Somatization in this regard is defined as the tendency to present health complaints that are indicative of personal or social problems. Because of this tendency, Latino immigrants rate themselves in poorer health than do native-born

Latinos; several studies have confirmed this result (3–5).

This finding is a troubling anomaly amidst burgeoning evidence of an inverse relation between acculturation and health (5). Numerous studies have demonstrated that higher levels of acculturation among immigrant Latinos are positively related to the following health outcomes: adult mortality (6–10), psychiatric disorders (11, 12), infant mortality (13), psychologic distress (14), deleterious health behaviors (15), substance use (16), low birth weight (17, 18), and risk for several nonfatal morbidities (19). Therefore, what should we make of the apparent anomalous relation between SRH and acculturation? After all, a growing Latino population in the United States, largely due to increased immigration, has important implications for the ability of health researchers to quickly and easily compare the health status of multiethnic populations in the United States through the use of SRH questions.

Following McGee et al. (20), we sought to assess the validity of SRH for mortality risk by using a sample of Latino adults who were characterized as having different levels of acculturation to US society. Our primary research question was, “Are subsequent mortality risks among Latinos who rate themselves in fair/poor health moderated by levels of acculturation?”

MATERIALS AND METHODS

Data set

We utilized a unique data set that aggregates multiple years (1989–1994) of the National Health Interview Survey (NHIS) (21) and is linked to the NHIS: Multiple Cause of Death (22) data set for 1989–1997. Adult respondents in

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Abbreviations: NHIS, National Health Interview Survey; SRH, self-rated health.

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each year of the NHIS were searched for in the National Death Index and matched according to a complex scoring algorithm. Potential matches were classified according to the strength of the match, and we utilize the match that is recommended by National Center for Health Statistics and has been estimated to classify more than 97 percent of the subjects correctly.

We selected only the subsample of respondents who self-identified as Latino/Hispanic from each year of the NHIS; 75 percent of respondents live in California, Texas, New York, Florida, Illinois, Arizona, and New Jersey. Although we excluded those for whom a self-rating of health is missing ($n = 160$), we utilized dummy variables for each covariate that controlled for missing data to minimize nonresponse bias. Our final sample size included 37,713 Latino adults who were age 18 years or older at the time of the survey between 1989 and 1994. Of the Latino respondents to the NHIS between these years, 1,364 (3.6 percent) had died as of the 1997 matching with the National Death Index.

Measures

Our key predictor variable was SRH, and our key interest was in the estimated magnitude of this variable on mortality risk across respondents of varying acculturation status. We treated SRH as a dichotomous measure, distinguishing between those who rate themselves in fair/poor health versus all others (excellent/very good/good). Since the language of the survey was not available, we used a proxy for acculturation from duration of stay in the United States; this variable was categorized into three strata, including 1) recent immigrant, less than 10 years in the United States ($n = 7,327$; 156 deaths); 2) long-term immigrant, 10 years or more in the United States ($n = 12,738$; 564 deaths); and 3) born in the United States ($n = 17,648$; 644 deaths). We also included dummy variables for national origin, comprising Mexican Americans, Puerto Ricans, Cubans, Central/South Americans, and other Latinos.

Other demographic variables included age, sex, and marital status. Socioeconomic controls included education, annual family income, and employment status. Since these variables came from a cross-sectional survey, they were measured at the time of the baseline survey only and were time invariant.

Methodology

We first used weighted Cox proportional hazards models (23) to estimate the effects of SRH on mortality risk. Our modeling strategy was to look first at the overall risk of mortality by SRH status among our entire Latino sample and then to stratify this relation according to birth/duration in the United States. We also estimated piecewise constant hazard models (23), which served two purposes. First, piecewise constants allowed us to account better for heterogeneity of hazards over time (i.e., nonproportionality), and second, piecewise constant models allowed us to determine whether SRH ratings had a short- or long-term predictive value for mortality risk.

RESULTS

We present the results of our proportional hazards models as hazard ratios in tables 1 and 2; 95 percent confidence intervals directly follow the hazard ratios.

Table 1 presents the models, stratified by birth/duration in the United States. The overall mortality risk (right-hand column) for rating oneself in fair/poor health relative to better health was nearly twofold (hazard ratio = 1.80) over the subsequent follow-up period (net of covariates). Our stratified models show a monotonic increase of SRH on mortality risk as level of acculturation increases. That is, the mortality risk of fair/poor SRH for recent immigrants is 1.28 times that of those who rate themselves in better health, but is statistically nonsignificant. Among long-term immigrants, fair/poor SRH is associated with a risk of dying that is 1.74 times that of those who rate themselves in better health; this risk rises to 2.04 among native-born Latinos.

We performed a formal chi-squared check of the proportionality assumption for SRH and mortality risk. Although proportionality was confirmed with 95 percent statistical confidence among immigrants, the hazard ratios among the native born begin to converge over the course of the follow-up period. Thus, we specified piecewise-constant hazard models to assess differential mortality risk over several different time periods. We ran four separate regression models that specify two constants for the following time periods: model 1, 0–24 and 25–108 months; model 2, 0–36 and 37–108 months; model 3, 0–48 and 49–108 months; and model 4, 0–60 and 61–108 months. Rather than present the full results for each of these models, we present only the hazard ratios (table 2) for each acculturation level, controlling for the full set of social and demographic factors.

In model 1 (table 2), for example, a fair/poor rating of health is associated with a two and a half-fold or higher mortality risk for 2-year mortality follow-up (0–24 months) among all acculturation groups. However, although poor SRH is predictive of mortality beyond 2 years for native-born and long-term immigrant respondents, it is not predictive for recent immigrants (model 1, 25–108 months). A similar pattern emerges when examining different periods of follow-up risk. That is, fair/poor SRH is predictive of mortality only for a very short period of risk (i.e., less than 2 years) among recent immigrants and is not a statistically significant predictor for any period of time beyond that. On the other hand, for both long-term immigrants and native-born respondents, fair/poor SRH is predictive of mortality risk for a much longer time period. However, the strength of this association diminishes over time such that fair/poor SRH is no longer predictive of mortality risk after an initial 5-year observation period.

DISCUSSION

Our results indicated that SRH has limitations in predicting mortality risk among Latinos. A previous study has shown that all race/ethnic groups exhibit similar mortality risks for fair/poor SRH (20); we observe a similar risk among the pooled sample of Latinos in our study. However,

TABLE 1. Latino(a) mortality risks of fair/poor self-ratings of health, stratified by birth/duration in the United States, 1989–1994*

Variables	<10 years in the US		≥10 years in the US		Born in the US		Total sample	
	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI
National origin								
Mexican	1.00		1.00		1.00		1.00	
Cuban	0.86	0.43, 1.68	1.23	0.96, 1.59	1.43	0.97, 2.09	1.27	1.04, 1.55
Puerto Rican	0.92	0.51, 1.65	1.16	0.98, 1.48	1.28	0.91, 1.79	1.14	0.95, 1.38
Central/South American	0.37	0.22, 0.63	0.70	0.49, 0.98	1.11	0.70, 1.76	0.72	0.56, 0.93
Other Latino	0.41	0.22, 0.77	0.69	0.49, 0.96	1.11	0.90, 1.36	0.90	0.76, 1.06
Age (years)	1.05	1.04, 1.06	1.06	1.06, 1.07	1.06	1.05, 1.06	1.06	1.05, 1.06
Sex								
Female	1.00		1.00		1.00		1.00	
Male	1.74	1.18, 2.56	2.01	1.64, 2.45	1.89	1.57, 2.27	1.96	1.73, 2.23
Place of birth								
US							1.00	
Foreign born							0.80	0.71, 0.91
Marital status								
Married	1.00		1.00		1.00		1.00	
Never married	2.05	1.35, 3.11	1.48	1.06, 2.08	1.86	1.45, 2.39	1.78	1.49, 2.13
Widowed	0.93	0.40, 2.15	1.13	0.86, 1.48	1.44	1.11, 1.86	1.28	1.07, 1.53
Divorced/separated	1.27	0.65, 2.48	1.02	0.74, 1.38	1.29	0.98, 1.71	1.16	0.95, 1.41
Education								
College graduate	1.00		1.00		1.00		1.00	
Less than high school	1.32	0.47, 3.73	1.30	0.85, 1.98	0.86	0.61, 1.23	1.10	0.85, 1.43
High school graduate	0.74	0.24, 2.28	1.11	0.70, 1.77	0.78	0.54, 1.11	0.91	0.69, 1.20
Some college	1.09	0.32, 3.65	1.08	0.63, 1.85	0.78	0.52, 1.15	0.93	0.68, 1.27
Family income (per year)								
≥\$20,000	1.00		1.00		1.00		1.00	
<\$20,000	0.73	0.52, 1.05	0.97	0.79, 1.18	1.08	0.88, 1.32	1.01	0.88, 1.15
Employment status								
Employed	1.00		1.00		1.00		1.00	
Unemployed	1.73	0.72, 4.15	0.82	0.41, 1.62	1.50	0.96, 2.34	1.29	0.91, 1.81
Not in labor force	1.96	1.28, 2.99	1.34	1.05, 1.70	1.78	1.40, 2.25	1.63	1.39, 1.90
SRH								
Good/excellent	1.00		1.00		1.00		1.00	
Fair/poor	1.28	0.77, 2.11	1.74	1.43, 2.11	2.04	1.68, 2.46	1.80	1.58, 2.05
Sample size	7,327		12,738		17,648		37,713	
Log-likelihood	-1,076.333		-4,253.232		-5,112.302		-11,663.514	
Test for proportional hazards assumption of SRH†	NS		NS		Sig			

* Cox proportional hazards estimates are presented as hazard ratios (HR) and 95% confidence intervals (CI).

† Tests for proportional hazards assumptions are presented for the self-rated health (SRH) variables only and are either nonsignificant at $p < 0.05$ (confirming proportionality assumptions) or significant (denying proportionality assumptions). NS, nonsignificant; Sig, significant.

our study indicates that these cross-ethnic comparisons may not be valid when immigrants make up a large portion of study samples. More specifically, although fair/poor SRH was associated with short-term mortality risk among those with low levels of acculturation, this rating was not predictive of long-term mortality risk (i.e., after 2 years). On the other hand, as levels of acculturation increase among

Latinos, fair/poor SRH has stronger effects and longer-lasting predictive power for subsequent mortality risk. That is, the predictive power of SRH among the more acculturated should more closely match those of non-Hispanic White and non-Hispanic Black respondents who are born in the United States.

As a cautionary note, differential rates of return migration

TABLE 2. Latino(a) mortality risks of self-ratings of health, stratified by birth/duration in the United States, 1984–1994*

Birth/duration in the US	Model 1			Model 2			Model 3			Model 4		
	0–24 months		25–108 months	0–36 months		37–100 months	0–48 months		49–108 months	0–60 months		61–108 months
	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI
<10 years	2.78	1.23, 6.29	0.92	0.50, 1.66	1.47	0.72, 2.98	1.10	0.58, 2.11	1.12	0.59, 2.12	1.52	0.74, 3.13
≥10 years	2.67	1.90, 3.74	1.44	1.15, 1.82	2.07	1.57, 2.73	1.47	1.13, 1.92	1.96	1.54, 2.48	1.41	1.01, 1.96
Born in the US	3.27	2.36, 4.54	1.68	1.35, 2.09	2.58	1.99, 3.34	1.65	1.28, 2.12	2.45	1.95, 3.09	1.51	1.21, 2.02

* Piecewise constant hazard estimates are presented as hazard ratios (HR) and 95% confidence intervals (CI). Models are first stratified by birth/duration (i.e., separate models are specified for each), and fair/poor self-ratings of physical health are interacted with each time period. HRs presented here are adjusted for the full range of variables, as presented in table 1, but all coefficients are not shown because of space constraints. Each model (1–4) represents a fully adjusted model that changes only in the length of the time period for each hazard ratio and its subsequent interaction with self-rated health.

(by acculturation) could potentially bias the baseline mortality estimates, although these estimates are not of direct concern for our study. However, if those who rate themselves in fair/poor health are lost to follow-up because of return migration to Mexico, at higher rates than those who rate themselves in good health, then our results may be affected by this bias.

Our findings imply that the use of SRH for cross-ethnic comparisons of physical health may be problematic. Demographically, since foreign-born respondents make up greater percentages of survey samples (because they are becoming a greater proportion of the US population), the ability to quickly assess health for all subjects equally through the use of SRH becomes more problematic. Therefore, it is very important to control for levels of acculturation within and between groups for whom comparisons are being made so that potentially artifactual components of SRH can be factored out.

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