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English Language Use, Health and Mortality in Older Mexican Americans

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Abstract

The purpose of this study is to determine if English language use is associated with smoking, diabetes, hypertension, limitations in Activities of Daily Living (ADL), and 12-year mortality in older Mexican Americans. Using data from a cohort of 3,050 Mexican Americans aged 65 years and older, we examined prevalence of 4 health indicators and survival over 12 years of follow-up by English language use. English language use is associated with increased odds of hypertension in men, independent of nativity and sociodemographic control variables. Among women, English language use is associated with lower odds of ADL limitations and increased odds of smoking. The associations for women were partially explained by occupational status and nativity. After adjusting for health conditions, sociodemographics, and nativity, English language use was associated with increased mortality among men. Interaction terms revealed that for both men and women, higher English language use was associated with mortality for respondents with the highest level of income only. English language use is a predictor of health and mortality in older Mexican Americans separate from country of birth.

Keywords

English; Chronic illness; Death and dying; Latinos; Gender

Introduction

Although Mexican Americans are overrepresented among those living in poverty, their health and mortality profiles are more similar to non-Hispanic whites [1]. A prominent explanation for this ‘paradox’ is that Mexican culture promotes a healthier lifestyle through more favorable health behaviors and greater social and familial support [1]. A second explanation is that since immigrants comprise nearly 50% of the Mexican American population in the United States [2,3], the selection of healthier Mexicans to this country may account for better health and mortality patterns.

Research indicates that immigrant health advantage attenuates to native levels with more time in the United States [3]. This decline in health with length of stay may reflect a number of factors, such as exposure to social inequalities known to have enduring effects on health

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[4], long-term limited access to health care [5], or a simple process of regression to the mean as settled migrants become less selected and disease and mortality rates necessarily converge to U.S. norms [1,6]. Alternately, the health profiles of immigrants may approach native levels with increased length of residence because of exposure to common environmental risk factors [5] or through the process of acculturation whereby immigrants acquire the health behaviors and lifestyles of the U.S.

Acculturation is described as the process by which immigrants adopt the attitudes, values, behaviors, and customs of the host country [7]. Hispanics with higher levels of acculturation are more likely to use illicit drugs, abuse alcohol, and smoke [8,9], and acculturation is associated with obesity, cancer, infant mortality, hypertension, and several indicators of poor mental health [6,8]. The dietary behaviors of Hispanics with higher levels of acculturation are more similar to those of non-Hispanic whites [9,10]. However, acculturation is also associated with positive health behaviors such as greater likelihood of exercising [8] and improved access to care and use of preventive services [9], and therefore may function as both a risk and protective factor.

Previous research has employed nativity and time in U.S. as measures of acculturation, rather than more direct measures such as English language use, which is more representative of incorporation into and access to the mainstream. The present study uses data from the Hispanic Established Population for the Epidemiological Study of the Elderly (EPESE) to determine to what extent English language use is associated with select health outcomes and 12-year mortality risk. The Hispanic EPESE cohort is a sample of immigrant and native-born Mexican Americans aged 65 years or older in 1993. The immigrant subjects have been residing in the United States on average for 17 years or more, making them ideal for a study investigating the long-term effects of acculturation to the United States. We hypothesize that English Language Use (ELU), regardless of country of birth, will be associated with health and 12-year mortality risk in older Mexican Americans. In addition, the relationship between ELU and health will attenuated by socioeconomic status.

Design and Methods

Participants

The Hispanic EPESE is a longitudinal cohort study of older Mexican Americans living in the Southwest United States. The original data was collected in 1993–1994 and has four subsequent waves (1995–1996, 1998–1999, 2000–2001, and 2003–2004). The follow-up rate is nearly 86% of the original sample of 3,050.

Measurement

In this study health conditions are measured as self-reported diabetes, hypertension, ever smoked, and disability. We use having at least one limitation in Activities of Daily Living (ADL) as a measure of disability. Subjects' mortality information was collected throughout the duration of the study from 1993 until 2005 from proxy informants and confirmed using the Social Security registry.

English language use was measured by a composite scale evaluating subjects' use of and proficiency in the English language based on the Hazuda scale [11]. In all, nine items were included out of a total of 16 questions in this English language use measure. Subjects were asked to rate on a scale to what extent they used English or Spanish with their children and neighbors, and to what extent they watched television, read newspapers or magazines, and listened to the radio in English or Spanish. In addition, subjects were asked to rate how well they spoke, read, and understood English on a four point scale. Factor analysis was conducted and higher factor loading variables were maintained, as were age-appropriate

items. For example, one item asked to what extent subjects used English or Spanish when speaking with their parents. Scores were combined to create a composite English language use variable. A categorical variable was then created based on quartile distributions of English language use. Categories were labeled as low (reference), low/medium, medium, and high.

Confounding variable controls include nativity, socioeconomic status, age, gender, marital status, and years of education. For nativity, US born subjects were coded as "1" and immigrants as "0". Socioeconomic status was measured by occupation and income. Respondents' work experience was categorized into six classes based on 1990 Census classifications: professional (reference group), services, farming, craft/repair, laborer, never worked/homemaker. Income was measured as 0 to $4,999 (reference group), $5,000 to $9,999 and $10,000 or more. Finally, age (continuous), gender, marital status (married versus not married), and years of education (continuous) were used as demographic controls.

Analysis

Descriptive statistics were generated in order to identify major relationships between English language use and health outcomes. Logistic regression models were performed to determine the unadjusted and adjusted associations between the four health outcomes and English language use. Continuous Cox proportion hazard models were conducted to predict survival to wave 5 (12 years). Survival was based on the number of days subjects survived in the study prior to mortality. A total possible numbers of days were 4,500 or 7,494,461 person days. All analyses were performed using Stata SE 10 [12]. All regression analyses were stratified by gender. The research for this study was approved by the University of Texas Medical Branch IRB.

Results

Table 1 presents demographic characteristics by English language use. Subjects who use English the least tend to be older and have less education. Married subjects use English more than the unmarried. Women and men differed only slightly by number of subjects in the highest English use category (28.9% vs. 32.8%). With respect to income, subjects in the higher income categories were more likely to speak English. Also, the majority (70.2%) of professionals were in the highest English language use category, whereas, subjects employed in farming or never worked/homemakers were most often represented in the low English use category (34.4% and 32.8% respectively). Subjects who had ever smoked were most represented in the highest level of English language use (36.4%). The differences between levels of English language use for those with any ADL limitations do not follow any type of consistent pattern, however. Finally, subjects who report having diabetes and hypertension tended to be in the highest English language use categories.

Table 2 presents the odds ratio of the four health indicators by English language use. English language use is associated with an increased odds of hypertension for men in model 1 for low/medium (OR = 2.40, $P < .001$), medium (OR = 1.65, $P < .10$), and high (OR = 2.14, $P < .05$). In the subsequent models including occupation and income, little change to the odds ratio was observed. In the very last model (model 5), including nativity does not explain the relationship between English language use and hypertension (low/medium OR = 2.34, $P < .001$; medium OR = 1.59, $P > .10$; high OR = 2.18, $P < .05$).

Among the male subjects, high English language use increased the odds of having ever smoked by 67% (OR = 1.67, $P < .10$). In model 2, 9% of this effect is explained by occupation (OR = 1.58, $P < .10$), however, when including income in model 3, the effect of occupation is explained for men (OR = 1.67, $P < .10$). In model 4, when income only is

added the odds ratio increases by an additional 5% (OR = 1.72, $P < .10$). In model 5, these marginally significant effects are explained by nativity (OR = 1.62, $P < .10$). To explore this relationship further, interaction models were conducted between occupation and English language use. There were no significant interaction effects for men.

In model 1, for women, being in the highest acculturation category increases the odds of having ever smoked by more than two-fold (OR = 2.44, $P < .001$). Adding occupation to the model (model 2) explains 58% of the effect of high English language use on having ever smoked (OR = 1.86, $P < .05$). Including income in model 3 and in model 4 does not substantially change this relationship. Adding nativity in model 5 accounts for an additional 13% of the effect of English language use from model 3 (OR = 1.77, $P < .05$).

English language use is associated with lower odds of ADL limitations in model 1 for medium English language use for women only. The odds of having an ADL limitation is 47.4% ($P < .05$) less for female subjects who were moderately acculturated, controlling for demographic conditions. In model 2, when including occupation, 11.1% of this effect is now explained (OR ≤ .585, $P < .10$) and the odds ratio is now only marginally significant. In model 3, the odds ratio is changed very little (OR = .580, $P < .10$), as is the case in model 4 when including income without occupation (OR = .471, $P < .01$). Finally in model 5 when including nativity the odds ratio changes little from model 3 (OR = .572, $P < .05$).

Table 3 presents hazard ratio models for 12-year mortality risk by English language use. In model 3, after adding economic factors, men who are high in English language use are marginally significantly more likely to have died during the 12 years of the study (HR = 1.42, $P < .10$). When adding health conditions in model 4 the hazard ratio is increased by 3% (HR = 1.45, $P < .10$). Nevertheless, in model 5, after including nativity, the hazard ratio increased by 11% (HR = 1.56) and is now significant at the $P < .05$.

Table 4 presents interaction effects for English language use with socioeconomic indicators and nativity for mortality. For men significant interaction effects can be observed for those earning $10,000 or more per year across all levels of English language use. For women, there is a significant interaction effect for the high English language use category for subjects earning more than $10,000 a year. Significant interaction effects can also be observed for occupation for both men and women. In general, relative to professional women, women in other occupations who are low/medium, medium, or high on English language use are more likely to have died over the 12 years of the study. On the contrary, for men who are medium or high in English language use, relative to professionals, other professions tend to be at lower risk for 12-year mortality.

Discussion

This study shows that English language use has varying effects on certain health outcomes and mortality in old age and is not completely explained by nativity. English language use was associated with an increased risk for hypertension in men and having ever smoked for both men and women, yet there was not a significant effect on diabetes. This is contrary to what we might expect, since we know that English language use is associated with obesity, and, obesity is a known risk factor for diabetes. However, a previous study on diabetes demonstrated that more acculturation was associated with higher risk of diabetes in non-Mexican Hispanics, but not Mexican-origin subjects [13]. With respect to hypertension, older Mexican Americans who are less proficient in English may be more inclined to be undiagnosed because of language barriers with health professional staff, or information about preventive health care may be unavailable in Spanish language mass media. Eamranond, Paterl, Legedza, Marcantonio, and Leveille [14] found that older Mexican

American subjects who used Spanish more often than English when reading or viewing mass media were more likely to have undiagnosed hypertension.

English language use had a substantial association with having ever smoked. For women, occupation explained a large part of this effect, however did not completely explain this relationship, nor did nativity. However, for men, the marginally significant effect for high English language use on smoking was explained by occupation. Although previous studies have been able to demonstrate that specific occupations and industries are associated with increased risk of certain forms of lung cancer [15], in the gender stratified interaction models in the present study, there were no significant effects of specific occupations with acculturation on having ever smoked.

In this study English language use was associated with lower likelihood of reporting functional limitations in women only. This is contrary to the general thesis that immigrants' health declines with greater acculturation. There are few studies that have formally investigated this relationship however, in a study examining racial and ethnic differences in activities of daily living, Spanish language preference was associated with less walking disability, but higher dressing disability [16]. These findings reflect the varying associations English language use has on health behaviors and healthcare access. On the one hand, people who use English more may take on poorer health habits, such as smoking, leading to greater risk of cardiovascular disease (i.e. hypertension), At the same time, because they have better English language skills, they may have better access to healthcare services [9].

Finally, the results from the gender-stratified Cox proportional hazard models demonstrated that high English language use is associated with mortality risk in men only. Interaction models suggest that men who have the highest income level with low/medium, medium, or high English skills are at a greater risk of mortality compared to their counterparts. There was also a marginal association for women, but only for those in the high English category. This is a remarkable finding since it suggests that if Mexican Americans are able to become economically and linguistically assimilated into mainstream America, one negative consequence may be earlier mortality. This finding gives insight to the Hispanic paradox [1], since it perhaps lends support to a common thesis that Mexican Americans have better mortality outcomes because of aspects within their culture that are protective from poor health and earlier mortality.

This study has a number of limitations. First, we used four measures of health and our significant findings only apply to those outcomes. Other measures may have similar results and therefore should be tested in future studies. In addition, our sample is 65 years and older, and, it may be that in younger ages these relationships differ. Despite the limitations, this study adds to the current literature on health, immigrant, and acculturation by determining that in old age English language use is associated with certain health outcomes that are not explained by nativity.

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Table 1

Sample characteristics by English language use for older Mexican Americans 65+ in 1993 (n = 2728)

	English language use				
	Low	**Low/medium**	**Medium**	**High**	**F or χ^2 (*P*-value)**
Demographics					
Age (mean, ± SE)	73.8 (.35)	74.4 (.36)	73.5 (.36)	72.6 (.31)	
Education (mean, ± SE)	2.4 (.11)	3.2 (.15)	5.1 (.18)	8.1 (.22)	
Marital Status					
Married	363 (21.7)	348 (21.0)	377 (23.6)	445 (33.7)	22.2 (.000)
Unmarried	311 (21.9)	342 (29.2)	271 (22.1)	271 (26.7)	
Gender					
Female	417 (22.9)	409 (26.0)	341 (22.2)	391 (28.9)	14.7 (.002)
Male	257 (20.4)	281 (22.9)	307 (24.0)	325 (32.8)	
Socioeconomic indicators					
Income					
0–$4999	336 (34.9)	288 (26.2)	212 (22.6)	177 (16.4)	236.9 (.000)
$5000–$9999	304 (19.3)	337 (26.4)	332 (22.2)	322 (32.1)	
$10000+	34 (9.5)	65 (15.5)	104 (23.5)	217 (51.5)	
Occupation					
Professional	13(5.1)	21 (7.1)	48 (17.6)	166 (70.2)	463.2 (.000)
Services	71 (13.3)	110 (27.4)	105 (26.0)	122 (33.4)	
Farming	203 (34.4)	150 (26.0)	112 (22.1)	69 (17.5)	
Craft/repair	34 (12.6)	48 (13.9)	88 (30.2)	99 (43.4)	
Laborer	70 (11.6)	149 (26.6)	130 (24.9)	137 (36.9)	
Never worked/homemaker	283 (32.8)	212 (30.4)	165 (19.8)	123 (16.9)	
Nativity					
US Born	(9.9) 204	(16.4) 281	(24.8) 428	(48.9) 627	514.8 (.000)
Immigrant	(34.4) 477	(33.3) 434	(21.1) 251	(11.2) 119	
Health indicators					
Ever smoked (yes = 1)	264 (20.4)	295 (24.4)	241 (18.8)	334 (36.4)	14.7 (.002)
Diabetes	152 (20.1)	180 (23.8)	148 (22.9)	192 (33.7)	5.3 (.150)

	English language use				
	Low	**Low/medium**	**Medium**	**High**	**F or χ^2 (*P*-value)**
Hypertension	253 (20.1)	326 (26.7)	261 (22.6)	321 (30.6)	16.0 (.001)
Any ADL limitation	97 (25.6)	124 (31.9)	75 (16.8)	72 (25.8)	21.6 (.000)

Note: Represented as n (%) unless otherwise specified

SE standard error

Table 2

Odds ratios for health conditions by English language use in older Mexican Americans 65+ in 1993 stratified by gender

	Diabetes		Hypertension		Smoked		ADL limitation	
	Women	Men	Women	Men	Women	Men	Women	Men
Model 1								
Low/medium	.902	1.38	1.03	2.40***	1.45†	.999	.862	1.72
Medium	1.22	1.06	1.03	1.65†	1.03	.715	.474*	.597
High	1.08	1.33	.924	2.14*	2.44***	1.67†	.606	.895
Model 2								
Low/medium	.930	1.35	1.01	2.35***	1.26	.889	1.02	1.57
Medium	1.27	1.02	.992	1.56	.87	.647†	.585†	.540
High	1.15	1.29	.857	2.06*	1.86*	1.58	.844	.905
Model 3								
Low/medium	.935	1.29	1.05	2.31***	1.27	.918	1.01	1.59
Medium	1.27	.934	1.01	1.56	.867	.676	.580†	.546
High	1.16	1.13	.957	2.09*	1.90**	1.67†	.814	1.07
Model 4								
Low/medium	.910	1.30	1.09	2.36***	1.45†	.925	.858	1.76
Medium	1.23	.957	1.06	1.63†	1.02	.737	.471**	.621
High	1.10	1.15	1.05	2.15*	2.44***	1.72†	.591	1.08
Model 5								
Low/medium	.907	1.25	1.08	2.34***	1.26	.912	1.00	1.57
Medium	1.17	.857	1.08	1.59	.835	.664	.572†	.520
High	1.00	.974	1.09	2.18*	1.77*	1.62	.792	.985

All models adjust for demographic characteristics

Men = 1167, women = 1553

Model 1 adjusts for demographics only

Model 2 = model 1 + occupation

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Model 3 = model 2 + income

Model 4 = model 1 + income

Model 5 = model 3 + nativity

† $P < .10$

* $P < .05$

** $P < .01$

*** $P < .001$

Table 3

Hazard ratios for 12-year mortality for older Mexican Americans 65+ in 1993

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Women	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**
English language use (low)										
Low/Medium	1.01	1.24	1.03	1.07	1.04	1.25	1.06	1.20	1.07	1.22
Medium	.87	1.13	.93	1.15	.92	1.24	1.04	1.30	1.06	1.38†
High	.84	1.10	1.00	1.15	1.03	1.42†	1.20	1.45†	1.24	1.56*

Men = 1167, women = 1553

Model 1 = unadjusted; Model 2 = model 1 + demographic characteristics; Model 3 = model 2 + economic factors; Model 4 = model 3 + health conditions; Model 5 = model 4 + nativity;

†$P < .10$

*$P < .05$

**$P < .01$

***$P < .001$

Table 4

Interaction effects for 12-year mortality by English language use for older Mexican Americans 65+ in 1993

	English language use					
	Low/medium		Medium		High	
	Women	Men	Women	Men	Women	Men
Model 1						
Socioeconomic indicators						
Main effect	.280*	.647	.421†	2.46	.504	1.36
Income (ref cat 0–$4999)						
$5000–$9999	.826	1.13	1.14	1.41	.895	1.27
$10000+	2.94	5.10*	2.87	4.27*	4.73*	3.39†
Census occupational class (ref. cat. professional)						
Services	4.88*	1.34	2.78†	.371	2.40†	.566
Farming	3.93*	1.98	2.04	.438	3.09*	.818
Craft/repair	2.45	.895	3.19	.319	1.65	.931
Laborer	5.91†	.865	1.55	.199*	1.70	.539
Never worked/homemaker	3.77*	1.08	2.12†	.085*	2.04	.402
Model 2						
Nativity						
Main effect	1.10	1.11	.933	1.20	.964	.914
US Born (ref cat. Immigrant)	.820	.827	.935	.821	.966	1.18
Model 3						
Health indicators						
Main effects	1.16	.805	.718	1.09	.976	1.02
Ever smoked (yes = 1)	.993	.950	1.30	1.10	1.49	1.08
Any ADL limitation	.907	1.04	.892	.551	1.66	.983
Diabetes	.576†	1.87†	.854	1.40	.708	1.80†
Hypertension	1.13	1.21	1.78†	1.19	1.00	.856

Men = 1167, women = 1553

Model 1 = demographic characteristics + income + occupation + English language use + English language use *income + English language use *occupation

Model 2 = demographic characteristics + income + occupation + English language use + English language use *nativity

Model 3 = demographic characteristics + income + occupation + English language use + English language use *ever smoked + English language use *any ADL limitations + English language use *diabetes + English language use *hypertension;

$^{\dagger}P < .10$

$^{*}P < .05$

$^{**}P < .01$

$^{***}P < .001$