The Prevalence of Hypertension in Older Mexicans and Mexican Americans

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Objective: To evaluate the prevalence of hypertension in older Mexicans in the United States and Mexico.

Methods: Stratified by sex, logistic regression models to predict physician-diagnosed hypertension were conducted by using the Hispanic Established Populations for Epidemiologic Study of the Elderly (wave 3) and the Mexican Health and Aging Study (age ≥70 years) datasets.

Results: Older Mexican and Mexican American women have a greater prevalence of hypertension than their male counterparts. Mexican women who have migrated to the United States and returned to Mexico have similarly high rates of hypertension as their female counterparts in the United States. After adjusting for demographic characteristics, diabetes, obesity, alcohol use, and smoking, older Mexican women who have migrated to the United States are at increased risk for hypertension. Conversely, immigrant older Mexican American men are at significantly lower odds of hypertension.

Conclusions: Sex differences exist in hypertension risk for older Mexicans and Mexican Americans living in the United States and Mexico. Older women who migrate to the United States are at a particular risk for hypertension in Mexico. (*Ethn Dis*. 2008;18:294–298)

Key Words: Emigration and Immigration, Hypertension, Mexican Americans, Aged

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Introduction

In the United States, Mexican Americans have hypertension prevalence rates similar to those of non-Hispanic Whites (23.2% for non-Hispanic White men, 23.5% for non-Hispanic White women; 19.7% for Mexican American men, and 22.1% for Mexican American women).[1,2] In Mexico, however, the prevalence of hypertension nationally is substantially higher than in the United States for young and middle-aged adults (34.2% for men, 26.3% for women).[3,4] Although some studies have compared the prevalence of hypertension risk in younger cohorts, no previous study has compared older Mexican Americans to older Mexicans. Since the population is aging rapidly in both countries and the prevalence of chronic diseases is increasing, understanding the epidemiology of diseases such as hypertension in older people is essential.

When comparing hypertension in older Mexicans and Mexican Americans, we must consider the role of migration for a number of reasons. First, migration from Mexico to the United States has been long standing,[5] and as a result, Mexican Americans are the largest Hispanic group in the United States.[6] Second, substantial literature in the United States has demonstrated an immigrant health advantage[7–10] that declines with years spent in this country.[11] Finally, little is known as to what extent migration to the United States affects the likelihood of hypertension in former migrants who have returned to Mexico. Therefore, this study will extend the literature by examining how previous migration to the United States may put older Mexicans and Mexican Americans at risk for hypertension.

We used the Hispanic Established Population for Epidemiologic Studies of the Elderly (EPESE) and the Mexican Health and Aging Study (MHAS) datasets to evaluate the prevalence of hypertension in older Mexicans in the United States and Mexico. We pay particular attention to migration status since this information is available for both the United States and Mexico and is a factor to consider with respect to the health of older Mexicans and Mexican Americans on both sides of the border.

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Methods

Data

The data for this study come from the MHAS and the Hispanic EPESE.[12,13] The MHAS is a nationally representative panel survey of Mexicans aged ≥50 years in 2000 and their spouses in Mexico (N=15,186). Participants were identified in conjunction with the 2000 National Employment Survey/Encuesta Nacional de Empleo. A follow-up wave of interviews was conducted in 2003 with the individuals or a proxy respondent (N=14,277, 93.32% response rate).

The Hispanic EPESE is a cohort longitudinal study of older Mexican Americans living in the Southwest United States. The sample was selected

by using probability design to represent older Mexicans living in Texas, Arizona, California, Colorado, and New Mexico. The original data were collected in 1993 and 1994, and four subsequent waves were surveyed (in 1995 and 1996, 1998 and 1999, 2000 and 2001, and 2003 and 2004). If a respondent was not located in person because of death or relocation, proxy information about him or her was collected from family or friends. The follow-up rate was nearly 86% of the original sample of 3050.

We use wave 3 from the Hispanic EPESE to equivocate the same period as the MHAS sample in 2001. In the Hispanic EPESE we excluded 105 cases that did not self-identify as of Mexican descent. Since the Hispanic EPESE dataset's age distribution is quite old (≥70 years in wave 3), cases from the MHAS dataset were limited to those aged ≥70 years to optimize comparability of the 2 datasets. In addition, cases for the MHAS were limited to sampled subjects, and spouses where not included. The final sample sizes for this analysis, therefore, were 2232 (939 men, 1293 women) for the MHAS and 1792 (751 men, 1041 women) for the Hispanic EPESE. Individual-level sample weights created by the principal investigators of the datasets were used in the statistical analysis for this study.

Statistical Analysis

The outcome variable for this study is self-reported diagnosis of hypertension. Using self-report is associated with limitations, primarily the risk of underestimating the actual number of cases because many may unknowingly have the condition. Because this potential problem exists in both US and Mexican data, the number of cases is not likely to be inflated, and these measures are expected to be consistent but conservative estimates.

Our explanatory variables are sex, level of education (continuous), age (continuous), income (lowest, low, medium, high quartiles), and migration/immigration to the United States. We also control for four health conditions or behaviors: diabetes, obesity, current drinking, and current smoking. In the United States, subjects were coded as US born or immigrant. In Mexico, subjects were classified as never migrated or previously migrated to the United States and have returned. Body mass index (BMI) was measured as the respondents' self-reported weight divided by their self-reported height squared. Subjects with a BMI ≥30 kg/m^2 were categorized as obese on the basis of National Institutes of Health recommendations.

Prevalence of hypertension was calculated by sex for each dataset. Since the analysis was limited with respect to number of waves collected for the MHAS data, logistic regression was used rather than hazard or growth curve models. All analysis was conducted by using STATA SE 9.[14] We used the jackknife method of standard error estimation, which systematically replicates statistical analysis by selecting random subsamples of the full sample.

RESULTS

Table 1 presents the prevalence of hypertension at follow-up stratified by sex. Older Mexican men living in Mexico have the lowest prevalence of hypertension (30.5%), followed by Mexican American men (40.7%), women in Mexico (51.5%), and then Mexican American women (55.2%). Level of education among those with hypertension was lowest among Mexican women (2.6 years) and highest among Mexican American men (4.9 years). Unmarried Mexican American women have the greatest prevalence of hypertension at 56.7%. In addition, women who migrated to the United States but returned to live in Mexico had a high incidence of hypertension (72.5%). Finally, men and women in Mexico and the United States who are in higher income brackets were more likely to have hypertension than did those at the lowest income level.

With respect to health conditions and behaviors, approximately two-thirds of women in both the United States and Mexico who have diabetes or are obese also have hypertension. In addition, ≈50% of women who currently drink report having hypertension. Approximately 50% of older Mexican American men who have diabetes or are obese also have hypertension, but only ≈16% of older Mexican men who smoke have the condition.

Table 2 presents logistic regression results for hypertension at follow-up stratified by sex. Beginning with women, in model 1, in Mexico, with every additional year of education, the odds of hypertension increase by 6% (P=.098) and being in the medium income level also increases the odds of hypertension marginally by 6.7% (P=.069). In addition, the odds of hypertension are increased by 2.35 (P=.033) for those who had migrated to the United States. Including health indicators in model 2 explains the marginally significant odds ratio (OR) for years of education but increases the OR for medium income by 7%. The OR for migration to the United States is reduced by 16% in model 2 with the inclusion of the health conditions. Finally, the only significant health conditions that predict hypertension are diabetes (OR 2.76, P=.000) and being obese (OR 1.78, P=.030).

In the United States (Table 2, model 1), for women, the only marginally significant OR is income, so that those Mexican American women who are in the high income bracket have 2.05 greater odds of having hypertension than their counterparts in the lowest category. In model 2, including health conditions explains the marginal significance of high income. Finally, as with older Mexican women, having diabetes increases the odds of having hypertension by 3.52 (P<.001).

Table 1. Prevalence of hypertension in older Mexicans in Mexico and the United States

Characteristic	Women		Men	
	Mexico (*n*=1293)	United States (*n*=1041)	Mexico (*n*=939)	United States (*n*=751)
Age (mean ± SE)	78.0 (.24)	77.6 (.22)	77.1 (.35)	77.4 (.32)
Years of education (mean ± SE)	2.6 (.12)	4.8 (.16)	3.0 (.22)	4.9 (.24)
Marital status, *n* (%)				
Married	113 (44.2)	207 (52.2)	140 (31.6)	230 (42.1)
Unmarried	555 (49.9)	444 (56.7)	147 (32.2)	81 (37.5)
Migration status, *n* (%)				
Former migrant (Mexico)	38 (72.5)		63 (32.3)	
Non-migrant (Mexico)	630 (48.0)		224 (31.9)	
US born (United States)		373 (53.1)		185 (44.5)
Immigrant (United States)		278 (57.6)		126 (36.3)
Income, *n* (%)				
Lowest	167 (42.4)	47 (48.6)	49 (28.2)	11 (27.2)
Low	189 (44.3)	286 (54.3)	77 (28.5)	103 (41.0)
Medium	154 (56.9)	165 (50.8)	89 (40.8)	134 (43.0)
High	158 (56.5)	72 (65.6)	72 (31.1)	39 (33.6)
Health conditions and behaviors, *n* (%)				
Diabetes	162 (70.4)	241 (75.5)	50 (38.8)	94 (55.4)
Obese	115 (64.4)	230 (58.5)	42 (38.3)	94 (51.8)
Smoker	40 (37.9)	32 (42.8)	39 (16.4)	78 (36.9)
Drinker	73 (53.9)	43 (57.4)	89 (30.8)	78 (34.7)
Total	668 (51.5)	651 (55.2)	287 (30.5)	311 (40.7)

SE = standard error.

For older men in Mexico (Table 2), only medium income is marginally significant (OR 1.82, *P*=.100); however, no other ORs are significant in model 1. In model 2, being a current smoker significantly reduces the odds of hypertension by .344 (*P*=.001). In the United States, for Mexican American men, years of education was marginally significant (OR .95, *P*=.088), as was being an immigrant (OR .60, *P*=.020). In model 2, after adding health conditions, years of education and immigrant status continue to be significant. Finally, those who have diabetes (OR 2.15, *P*=.001) or are obese (OR 1.65, *P* = .047) are at significantly greater odds of having hypertension.

Table 2. Odds ratios from logistic regression at baseline for hypertension in older mexicans in Mexico and the United States*

Explanatory Variables	Women				Men			
	Mexico		United States		Mexico		United States	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Demographics								
Age	.99 (.562)	.99 (.904)	.98 (.149)	.99 (.390)	1.03 (.168)	1.02 (.294)	.99 (.733)	1.00 (.863)
Years of Education	1.06 (.098)	1.04 (.233)	.99 (.784)	1.01 (.768)	1.04 (.255)	1.03 (.354)	.95 (.088)	.955 (.090)
Married	.88 (.631)	.86 (.600)	.77 (.193)	.78 (.24)	1.03 (.904)	.979 (.932)	1.32 (.238)	1.26 (.327)
Income (Lowest)								
Low	1.08 (.779)	1.17 (.591)	1.19 (.562)	1.08 (.80)	1.06 (.869)	1.19 (.624)	1.86 (.190)	1.54 (.381)
Medium	1.67 (.069)	1.74 (.054)	1.12 (.727)	.98 (.97)	1.82 (.100)	1.86 (.094)	1.90 (.176)	1.64 (.320)
High	1.50 (.184)	1.51 (.184)	2.05 (.073)	1.97 (.11)	1.11 (.775)	1.15 (.696)	1.37 (.551)	1.22 (.717)
Former Migrant = 1 (Mexico)	2.35 (.033)	2.19 (.052)			1.04 (.884)	1.012 (.965)		
Immigrant =1 (United States)			1.03 (.868)	1.07 (.725)			.60 (.020)	.577 (.012)
Health Conditions and Behaviors								
Diabetes		2.76 (.000)		3.52 (.000)		1.22 (.594)		2.15 (.001)
Obese		1.78 (.030)		1.10 (.607)		1.32 (.414)		1.65 (.047)
Current Smoker		.582 (.198)		.79 (.481)		.344 (.001)		.91 (.760)
Currently Uses Alcohol		1.39 (.295)		1.44 (.22)		1.17 (.576)		.89 (.632)
n	1293	1293	1041	1041	939	939	751	751

* Results are reported in odds ratios. *P*-values are reported in parentheses.

DISCUSSION

In this study, we set out to determine the prevalence of hypertension in two older Mexican-origin populations living in Mexico and the United States. The two major findings from this research are that prevalence differs by sex, and migration to the United States has a significant negative effect for women who live in Mexico and a protective effect for immigrant men in the United States. First, older Mexican and Mexican American women have a higher risk of hypertension then men in both the United States and Mexico. Our findings are similar to results from the 2000 Encuesta Nacional de Salud in Mexico in that women had a higher prevalence of hypertension than men older than 50 years of age.[3] Studies of Mexican Americans in the United States have also consistently documented higher prevalence of hypertension in women.[1,15] Therefore, this disadvantage continues into older age for both Mexican and Mexican American women.

Men in Mexico, on the other hand, have an unusually low rate of hypertension in this study. In the Mexican National Health Survey 2000, men aged 60–69 years had a hypertension prevalence of 52.4%,[4] which is significantly higher than what was found in this study; we would expect the rate to be approximately the same or higher for the group aged ≥70 years. We suspect that since hypertension was self-reported, the low rate of hypertension among Mexican men may be explained by underreporting.

Second, migration to the United States significantly increased the odds of having hypertension for older Mexican women. This effect remained even after taking into account diabetes, obesity, alcohol use, and smoking. These findings are similar to results from other studies conducted in other countries that have demonstrated health disadvantages for migrating women after controlling for health behaviors.[16] Factors associated with migration may increase the propensity to have hypertension, such as psychological or physiological stressors from being separated from loved ones or difficulties in navigating a foreign country that may have a greater effect on women than men.[11] Also, migrating men and women to the United States enter into different labor markets.[17] In addition, women and men have different types of social networks or opportunities for social support, leading to very different pathways of health. Thus, as a result of these differences, women may be at a greater risk of health problems than men.

In this study, older Mexican American immigrant women were not significantly different from their native-born counterparts in their odds of having hypertension. In a previous study, Mexican immigrants and US-born Mexican Americans on the border region of Texas were observed to be no different with respect to depressive symptoms, life satisfaction, or self-esteem, but immigrants exhibited a significantly greater amount of stress than their native born counterparts.[18] Older Mexican immigrant women have been shown to be more at risk for depressive symptoms than their US-born Mexican American counterparts.[19] In addition, other studies have shown that an immigrant advantage in mental health declines with longer duration of stay and earlier age at entry.[20] Although women who immigrate to the United States may have a mental health advantage earlier in the life course, stress associated with the experience may manifest itself in poor mental health and physiologic damage over the years that results in similar risk for chronic condition as native-born older Mexican Americans.

The inclusion of health conditions and behaviors did not explain the effect of migration status for older Mexican women, which is surprising given the well-documented propensity to adopt negative health behaviors with longer time spent in the United States for Mexican immigrants.[11,21] The more Mexican immigrants in the United States adopt these deleterious behaviors, the more likely they are to have associated conditions such as hypertension.[22–24] However, this did not prove to be the case for older Mexican women in Mexico, which suggests that the relationship between migration and health may involve other factors for returning female migrants.

Older Mexican American immigrant men had a significantly lower risk of hypertension than did US-born Mexican American men. These findings are consistent with other studies that have demonstrated a lower overall risk for cardiovascular and metabolic diseases among Mexican-origin immigrants to the United States.[25,26] Since these previous studies used younger samples than in the present study, these findings suggest that the immigrant health advantage extends into old age for Mexican-origin men but not for women.

An unusual finding from this study was the protective effect of smoking on the propensity to have hypertension for older men in Mexico. Although insignificant, older Mexican and Mexican American men and women were also less likely to have hypertension if they were current smokers. These findings may be due to the fact that people who are diagnosed with hypertension may have quit smoking after diagnosis and therefore those who are still smoking have yet to be diagnosed. Another possibility is that people who continue to smoke into late life may be unusually salubrious, affording them the ability to maintain negative health behaviors into their later years without the ill effects of such habits.

This study is the first to compare the risk of hypertension in older Mexican Americans in the United States to Mexicans in Mexico. As a result we have revealed similarities and differences that

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exist between these two populations. Still, limitations to this study exist. For example, relying on self-reported hypertension does not capture the full extent of hypertension prevalence in these two populations. Nonetheless, we believe that this study makes a contribution to the literature on aging and health in older Hispanic populations.

Our findings suggest that, in Mexico, hypertension is more prevalent in older age than in previous studies of younger cohorts and affects women to a greater extent than men. The results from this study also suggest that progression to disease occurs at different points in the life course and at different time points for men and women. This difference may also influence variations between Mexican Americans in the United States and Mexicans living in Mexico. Paying attention to these differences may hold clues for understanding areas in which interventions can be successfully implemented and may contribute a better grasp of the unusual mortality advantage that Mexican Americans have in the United States.[27]

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AUTHOR CONTRIBUTIONS

Design concept of study: Salinas, Eschbach
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Acquisition of funding: Markides
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