A Pilot Binational Study of Health Behaviors and Immigration

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Introduction

Background

Mexican immigrant women residing in the US often have better health outcomes than non-Hispanic white women; including lower rates of low birth weight and infant mortality, lower incidence and mortality rates for cancer and cardiovascular disease, and lower all-cause mortality rates [1–5]. This phenomenon is referred to as the “Hispanic Epidemiologic Paradox” [5–7]. One hypothesis to explain this paradox is “selective migration,” which suggests that immigrant women are a healthier subset of the population of origin and therefore have better than expected birth and other health outcomes because they have been positively selected by the migration process due to physical, mental or other health characteristics [1, 3–5, 8, 9]. Another hypothesis is that cultural traditions and behaviors followed in Mexico protect women for some period of time after they immigrate from risks associated with disadvantaged socioeconomic status once in the US [10–12]. These are thought to be related to cultural values and norms intrinsic to the Hispanic community such as the role of social support networks, interpersonal relationships and the importance of family [13, 14].

Negative health behaviors and impacts on health outcomes are associated with acculturation, particularly among Hispanic women [13, 15, 16]. Acculturation refers to the process of adopting new behaviors and practices when individuals come into contact with another culture. There is much evidence in the epidemiologic literature that the multifactorial, complex relationship between declining health behaviors and the process of acculturation is particularly strong among women [10, 17–20]; as women become more acculturated to a “US lifestyle,” they engage...
in less healthy behaviors, which adversely impacts their health. Therefore, the importance of examining acculturation is in measuring an indicator for potential cultural influences at work in modifying health risk behaviors.

Acculturation among US Hispanic women has been associated with increased alcohol and cigarette use [15, 17, 20–25]. In the Hispanic Health and Nutrition Examination Survey (HHANES), acculturation was found to be a major predictor of cigarette smoking among US Hispanics, with more acculturated individuals reporting higher levels of smoking. This trend was especially marked among females [2, 20, 23, 26]. In California, the prevalence of smoking and number of cigarettes smoked per day is greater among highly acculturated women than among the less acculturated Hispanics [27]. Between 2001–2003, the average prevalence of current cigarette smoking in the US among non-Hispanic white women was 21.8% versus 9.4% among Mexican-born women living in the US (acculturation level not accounted for) [28]. Similarly, data from 2003 show that 61.6% of non-Hispanic white women reported currently consuming alcohol while only 33.4% of Mexican-born women in the US reported current alcohol consumption [28]. Additionally, a much greater proportion of low-acculturated Mexican–American women reported abstaining from alcohol (87.2%) than their more highly acculturated counterparts (53.4%) [29].

Another topic of concern related to this pattern of increasing acculturation and declining health behaviors is the association between acculturation and high-risk sexual behaviors, such as multiple sexual partners. Multiple partners places women at higher risk for sexually transmitted diseases (STDs), including HIV, [30] and more than one sexual partner may be more frequent among higher acculturated Mexican immigrants [21, 31]. In a study of 1062 Hispanic women from a northern California community, nearly 75% of low-acculturated women reported only one sexual partner during their lifetime as compared to 46% of moderately acculturated women and about 20% of highly acculturated women [21].

Objectives

Given the central role of the population of origin in explaining the Hispanic Epidemiologic Paradox, an ideal study to test the two main hypotheses would compare health outcomes and risk profiles between Mexican-born women currently living in Mexico and Mexican-born women who have migrated to the US. Previous binational studies have addressed specific health issues in Mexican and Mexican–American populations such as obesity and diabetes [32], HIV/AIDS [33], and women’s health [34], but few have attempted to specifically examine the health paradox that seems to accompany migration from Mexico to the US [35].

This binational cross-sectional pilot study sought to explore the hypothesis that Mexican-born women living in Madera, California have similar health behavior profiles with regard to smoking, alcohol use and number of sexual partners as Mexican-born women (who had never lived in the US) currently living in Chavinda, Michoacán. It was also expected that this profile changes with increasing levels of acculturation.

Methods

Study Organization

Community Identification and Participant Recruitment

Chavinda, Michoacán and Madera, California were selected as communities from which to sample women currently living in Mexico and the US because previous research had shown that these communities share an established sending/receiving relationship [36]. Eligibility criteria for participants in Michoacán were defined as women between the ages of 18–49 years, born in Chavinda, Michoacán, and who had never previously emigrated. In California, the criteria were defined as women 18–45 years of age, born in Mexico or who had lived at least 10 years in Mexico, lived in the US for at least 6 months, and resided in Madera, California at the time of the interview.

In Chavinda, interviewers conducted a door-to-door enumeration of the town from a population census made between April and May 2004. The sample was selected from a population-based census of 5558 inhabitants (1538 homes). The total population of women 18–49 years of age was 1242, and of that group, 14% (174) had migrated previously and 86% (1068) had not. The study population was selected from the group of non-immigrant women and a total of 102 eligible women were randomly selected.

A household enumeration procedure for recruitment of participants living in Madera was initially planned, but a network sampling scheme proved more efficient since the primary interest was in women who had immigrated from Chavinda. However, due to funding limitations and time constraints, it was necessary to alter the original goal of selecting only residents from Chavinda and include women who had immigrated from other areas of Mexico. Initial contacts were made in the community through local health service organizations and migrant housing programs. These contacts led to a network of women within the community who linked the field team with potential participants for the study, and a total of 93 women from Madera were interviewed between July and November 2004. Just over a third (35.5%) of the Madera study sample migrated from Chavinda and the remainder were from other areas in
Mexico. There were no differences in sociodemographic characteristics or behavioral risk factors between women who migrated from Chavinda and those from other areas of Mexico. The participation rate among eligible women was 86%.

Data Collection

Data were collected in Spanish by in-person interviews in Chavinda and Madera. The questionnaire included demographic characteristics, acculturation, women’s health and reproductive issues, and health behaviors including tobacco and alcohol use. All questions were developed from relevant existing survey instruments [21, 37, 38]. The research was approved by the Institutional Review Board at the University of California, Davis.

Acculturation

Acculturation scores were calculated for Madera participants using a 12-item version of the Acculturation Rating Scale for Mexican Americans-II (ARSMA-II) developed by Cuellar and colleagues [38]. The ARSMA-II instrument provides an overall acculturation score based on measures of language use and preference, ethnic identity, ethnic behaviors and ethnic interaction through the use of two subscales, a Mexican-oriented scale (MOS) and an Anglo-oriented scale (AOS). Responses to items on the MOS and AOS range from “not at all” (response score = 1) to “extremely often or almost always” (response score = 5). The MOS and AOS questions were summed separately and a mean calculated for each orientation subscale. The raw acculturation score was calculated by subtracting the MOS mean from the AOS mean. Criteria for determining levels of acculturation were based on mean and standard deviation scores from the ARSMA-II validation study [21, 38]. The ARSMA-II identified five acculturation levels and their corresponding scores as shown in Table 1. Because there were relatively few women in levels II through V, these levels were collapsed to create a “medium/high acculturation” category. The ARSMA-II is a validated multidimensional instrument used in a variety of studies measuring relationships between acculturation and health [21, 39–44].

Health Risk Outcomes

The selected outcome variables included smoking, alcohol use and number of sexual partners and were chosen because of their relationship to acculturation and public health importance. Because of small sample sizes and low numbers of positive responses for many categories, we dichotomized outcomes as follows: ever having smoked defined as smoked at least 100 cigarettes during lifetime, ever having consumed alcohol defined as more than 12 alcoholic beverages during lifetime, and number of sexual partners defined as one partner (reference group) or more than one partner. Although levels of smoking and alcohol use assessed were low and may not be directly attributable to adverse health outcomes, they were included in analysis because they illustrated behavioral changes that occur within this population. Having more than one sexual partner however, is associated with increased risk for sexually transmitted infections, especially human papillomavirus (HPV) [45, 46].

Data Analysis

Associations between place of residence (Mexico vs. US), acculturation level (low vs. medium/high) and the selected health risk outcomes were first evaluated by bivariate analyses, followed by multiple logistic regression analyses. Bivariate analyses compared the outcomes of interest with place of residence and acculturation level; chi-square and Fisher’s exact tests were used to assess these comparisons across groups. Factors such as age, marital status and education level were assessed for effect modification and confounding. Crude and adjusted odds ratios and 95% confidence intervals were calculated for the main outcomes using multivariate logistic regression models that included age, education level and place of residence or acculturation level. Data analysis was performed using SAS® software, Version 9.2 of the SAS system for Windows® (SAS Institute Inc., Cary, NC).

Table 1: Scores for determining acculturation level of Madera, CA participants using ARSMA-II

| Acculturation level | Description                                   | ARSMA-II acculturation scorea | Number of women (n = 93) |
|---------------------|-----------------------------------------------|-------------------------------|--------------------------|
| Level I             | Very Mexican oriented                         | ≤ −1.33                       | 77                       |
| Level II            | Mexican oriented to approximately balanced bicultural | ≤ −1.33 and ≤ −0.07           | 7                        |
| Level III           | Slightly Anglo oriented bicultural            | > −0.07 and < 1.19            | 8                        |
| Level IV            | Strongly Anglo oriented                       | ≥ 1.19 and < 2.45             | 1                        |
| Level V             | Very assimilated; Anglicized                  | > 2.45                        | 0                        |

a scores from Cuellar et al. [38]
Results

Sociodemographic Characteristics

Data were analyzed for 195 study participants; 102 women living in Chavinda, Mexico and 93 women living in Madera, California. The ages of study participants ranged from 18 to 49, with a mean age of 32, which did not differ by study location. Overall, almost 80% of women were married or living with a partner with 74.5% of Mexican residents, 89.6% of low-acculturated US residents and 56.3% of medium/high-acculturated US residents reporting married/living together status (Table 2). The average age at immigration for women in Madera was 19 years (median: 19; 25–75th percentile: 15–24 years) and the average length of time in the US was 13 years (median: 13; 25–75th percentile: 7–16 years). Women living in Mexico were less educated than women living in the US, only 30.4% had achieved greater than primary education (approximate 6th grade equivalent). Among US women, low-acculturated women were less likely to have achieved greater than a primary education than their medium/high-acculturated counterparts (54.6% vs. 93.8%) (Table 2).

Among US women, age at immigration and the number of years living in the US were strongly associated with acculturation level. The average age at which low-acculturated women migrated to the US was 21 years (median: 20; 25–75th percentile: 17–25 years) and they had lived in the US an average of 11 years (median: 10; 25–75th percentile: 6–15 years). Medium/high-acculturated women came to the US at about age 10 (median: 8.5; 25–75th percentile: 5.5–12.5 years) and had lived in the US on average for 21 years (median: 20.5; 25–75th percentile: 14.5–27 years). Low-acculturated women living in the US were more likely than their medium/high-acculturated counterparts to be married but less likely to have achieved higher than a primary education (Table 2).

Health Risk Behaviors

There was no difference in smoking prevalence between Mexican and US residents, but the overall prevalence of smokers was very low in both groups (Table 3). Logistic models adjusted for age and level of education did not show any significant association between place of residence or acculturation level with odds of smoking (Table 4).

Mexican residents were less likely than US residents to have consumed at least 12 alcoholic beverages in their lifetimes (8.8% vs. 24.7%, *P* = 0.0027). However, models adjusted for age and education comparing Mexican residents to low-acculturated US residents did not statistically differ with regard to alcohol use (Table 4). In comparisons between low-acculturated and more highly acculturated Mexican-born women residing in the US, those in the medium/high-acculturated group were 3.5 times more likely (CI 1.1–11.5) to have consumed at least 12 alcoholic beverages in their lifetime (Table 4). Education was independently associated with greater odds for alcohol use regardless of place of residence or acculturation level (results not shown).

Women living in Mexico were less likely to report more than one sexual partner in their lifetimes than US residents (3.9% vs. 15.1%, *P* = 0.0073). Both crude and models adjusted for age and education comparing Mexican residents and low-acculturated US residents were of borderline significance and suggested that Mexican residents were a third less likely (CI 0.1–1.0) to have more than one lifetime partner (results not shown).

| Table 2 Demographic characteristics of Mexican and US women by place of residence and acculturation level | Mexican resident (n = 102) | US resident Low-acculturated (n = 77) | Medium/high-acculturated (n = 16) | *P* value |
| Demographic | | | |
| Age | | | |
| 18–27 years old | 37 (36.3%) | 22 (28.6%) | 6 (37.5%) | 0.6718 |
| 28–36 years old | 29 (28.4%) | 28 (36.4%) | 6 (37.5%) |
| 37–49 years old | 36 (35.3%) | 27 (35.1%) | 4 (25.0%) |
| Greater than primary education | 31 (30.4%) | 42 (54.6%) | 15 (93.8%) | <0.0001 |
| Married/living together | 76 (74.5%) | 69 (89.6%) | 9 (56.3%) | 0.0033 |
| Age at immigration, M (SD) | N/A | 21.1 (7.3) | 9.6 (5.2) | <0.0001 |
| Years in the US, M (SD) | N/A | 11.2 (6.6) | 20.8 (7.2) | <0.0001 |

*Based on Fisher’s exact test

Based on Pearson’s chi-square test

Based on Student’s *t*-test
Comparisons by acculturation level approached significance with medium/high-acculturated US residents being 3.8 times as likely (CI 1.0–15.0) to have more than one sexual partner in adjusted models (Table 4).

Results showed that women who consumed alcohol were more likely to smoke cigarettes. Effect modification between place of residence (US or Mexico) and alcohol consumption with smoking was not significant. It is likely that persons who drink are more likely to smoke, regardless of place of residence.

**Discussion**

The goal of this pilot study was to explore the two main hypotheses (selective migration and protective cultural traditions) frequently suggested to explain the Hispanic Epidemiologic Paradox. This pilot binational study compared women living in Mexico to Mexican-born women living in the US. If selective migration best explains the paradox, we expected that Mexican immigrant women living in the US would report better health risk behavior profiles than women living in Mexico, because women who migrate represent a healthier selection of the population of origin. However, the results of this pilot study do not support this explanation because comparisons between Mexican and US residents indicated that US residents did not have healthier risk behavior profiles but rather may be more likely to consume alcohol and have more than one lifetime sexual partner.

Conversely, if protective cultural traditions is a better explanation for the paradox, then women residing in Mexico would look similar to low-acculturated women residing in the US with regard to health risk behaviors, but as Mexican women living in the US become more acculturated, the effect of these protective cultural traditions would decline. In this study, Mexican residents were less likely than low-acculturated US residents to use alcohol and have more than one sexual partner, but these results were marginally significant. However, among low- and medium/high-acculturated women in the US, increasing levels of acculturation were significantly associated with increased risk of alcohol use. Higher acculturation was marginally associated with more than one lifetime sexual partner. While these findings suggest that protective cultural traditions may help to protect low-acculturated immigrant women from adopting unhealthy behaviors, we cannot rule out that some elements of selective migration may also play a role in explaining the paradox. A full
exploration of this question requires a prospective assessment of a population residing in Mexico with comparisons of those who chose to migrate and not to migrate.

No statistically significant trends related to smoking behaviors were observed, but this is likely due to the fact that there were very few smokers in the study. Although the study did not find that Mexican-born women residing in the US were more likely to have ever smoked, the fact that US residents are significantly more likely to consume alcohol is of concern due to the strong association between alcohol use and smoking [47].

The ARSMA-II acculturation measure used in this study setting may have limitations due to the lack of variability in acculturation level observed in our small sample. While associations between acculturation and the outcomes of interest were observed, this population of primarily rural farmworking women may possess different characteristics than other Latino populations in California and the United States, thus limiting the generalizations that we are able to make.

The original goal of the pilot study was to compare a community of origin in Mexico (Chavinda, Michoacán) with a receiving community in the US (Madera, California) to evaluate the selective migration and protective health behaviors hypotheses. While previous research suggested a relationship between the communities [36], a network sampling technique used to locate Chavindena women currently residing in Madera, California was not successful due to time constraints and funding limitations. To increase the number of participants, the eligibility criteria for the Madera sample was amended to include women who had migrated to the US from anywhere in Mexico. This sampling limitation may have influenced our ability to measure the impact of the population of origin and its relationship to changes in behavioral risk factors and associated disease. These concerns are somewhat minimized because there were no statistically significant differences with regard to sociodemographic characteristics or behavioral risk factors between women who migrated from Chavinda vs. other areas of Mexico. The potential for selection bias in studies utilizing a network sampling scheme limits the generalized inferences that can be made, but the explorative nature of this study provides an initial examination of specific hypotheses related to the Hispanic Epidemiologic Paradox [48].

A major strength of this effort was the unique opportunity to conduct a binational study and collect data from women living in Chavinda who have never traveled to the US, as well as from women who have migrated to the US from Chavinda and other areas of Mexico. Through this study we developed a working relationship between institutions in Mexico and California.

Another strength of the study is its focus on women, especially regarding investigation of health and sexual behaviors that are difficult to measure and have not been widely explored in other studies. It is widely recognized in the literature that Mexican men and women acculturate differently when they immigrate to the US; however, many of the negative changes observed with increasing acculturation tend to occur to a greater degree in women [2, 17, 26, 49]. While restricting the study population to women limits our ability to generalize the results of the study to all Mexican immigrants, overall, it provided greater power to assess the relationship between immigration, acculturation and adverse health risk behaviors in the group in which we are most likely to observe change. Although this was a small study on a specific population, these results may be relevant to other Hispanic immigrant populations because studies in other populations have shown similar relationships between acculturation and health risk behaviors [50–53].

The small sample size of this pilot study limits the generalizability and conclusions that can be drawn with regard to relationships of acculturation with smoking and sexual partners as reflected in the strength of associations observed and wide confidence intervals. This study was designed as a pilot for initial examination of these important questions and the suggestive nature of the findings have implications for future research. Acculturation is a normal process with immigration, and it is an essential concept that summarizes a variety of epidemiologic factors that influence behavioral changes accompanying migration from Mexico to the US. While we cannot make any inferences about the trajectory or speed of the acculturative process among immigrant women, the findings from this study will be useful for guiding the design of a larger, multi-community binational investigation. Ultimately, a prospective cohort study will provide the most information to elucidate factors that may be responsible for the behavioral health risks associated with acculturation in this large and crucial population.

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