

A Profile of US-Mexico Border Mobility Among a Stratified Random Sample of Hispanics Living in the El Paso-Juarez Area

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Abstract Examination of border-specific characteristics such as trans-border mobility and transborder health service illuminates the heterogeneity of border Hispanics and may provide greater insight toward understanding differential health behaviors and status among these populations. In this study, we create a descriptive profile of the concept of trans-border mobility by exploring the relationship between mobility status and a series of demographic, economic and socio-cultural characteristics among mobile and non-mobile Hispanics living in the El Paso-Juarez border region. Using a two-stage stratified random sampling design, bilingual interviewers collected survey data from border residents ($n = 1,002$). Findings show that significant economic, cultural, and behavioral differences exist between mobile and non-mobile respondents. While

non-mobile respondents were found to have higher social economic status than their mobile counterparts, mobility across the border was found to offer less acculturated and poorer Hispanics access to alternative sources of health care and other services.

Keywords Border health · Health care utilization · Health disparities · Hispanic · Trans-border mobility

Introduction

In the US-Mexico border region, the burden of disease among Hispanics is impacted by both high rates of chronic and infectious diseases [1]. This combination of poor health is further compounded by disproportionately higher rates of poverty, lack of or insufficient medical coverage, and limited access and utilization of health care services, as compared to non-Hispanic whites and populations in non-border areas [2]. The purpose of this article is to illuminate our understanding of the social determinants of health among Hispanics living in the Texas-Mexico border region, taking into account ecological and resource-based contextual factors.

Although heterogeneity of Hispanic subgroups by economic, legal, and socio-cultural factors are increasingly recognized [3], border-specific elements such as trans-border mobility [4] and trans-border health service utilization [5] may offer further insight toward understanding the heterogeneity of border Hispanics. Thus, the purpose of this exploratory descriptive study is two-fold. First, we will highlight the heterogeneity of Hispanics living within the El Paso-Juarez border region by creating a descriptive profile of the concept of trans-border mobility. This descriptive profile will help characterize the heterogeneity

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of border residents as a key contextual factor that will be useful for future studies of differential health status and behavioral patterns among this population. The second purpose of this study is to determine the relationship between mobility status and a series of demographic, economic and socio-cultural characteristics among mobile and non-mobile Hispanics living in the El Paso-Juarez border region. Understanding the context of trans-border mobility will provide a more nuanced social profile of Hispanic border residents.

Methods

Sampling Design/Participants

This study was conducted in El Paso County, Texas. The proportion of Hispanics in the population is over 80% [6]. Subjects were selected through a stratified two-stage probability sampling design based on geography and stratified by population density. El Paso County was divided into fifty strata using electronic 2000 census tract data. Adjacent census tracts were combined to develop strata with approximately 13,000 residents ($\pm 2,000$ residents). Accordingly, population density was centered in urban areas, resulting in a combination of population-dense strata near the urban core and population sparse strata in rural areas.

From the fifty strata, ten blocks were randomly selected in two stages by an online program. First, two randomly selected blocks were identified for the survey. Second, up to eight supplementary blocks were randomly selected in case the required number of homes (20 per stratum) was not achieved in the first stage. Zoomed maps were used for all selected blocks to delineate street numbers, corners and other physical markers.

Bilingual interviewers traveled to selected blocks throughout El Paso County to distribute flyers indicating the purpose of the study, study eligibility and dates interviews would be in the area. Interviews were done either by appointment or at the time the interviewers reached the assigned area. Participants within the household were randomly chosen by selecting the adult (18 years of age or older) with the nearest birthday to the date of the interview (availability of informants however, introduced a somewhat female bias to the sample). In addition to age, eligible participants had to self-identify as Hispanic and be willing to participate in a survey that took 1 hour to complete. A total of 1,002 surveys were collected from the 50 strata. The survey was completed in either Spanish or English and included 143 questions addressing a range of topics, including: (1) social position and demographic characteristics, (2) self-reported health status, (3) tobacco, substance

use and violence, (4) access and barriers to healthcare including trans-border utilization, and (5) acculturation, trans-border mobility and family measures. This study was approved by the IRB boards of the University of Texas at El Paso and the University of Texas Health Science Center-Houston, School of Public Health.

Measures

Demographics measures include: sex, age, marital status, and mobility. Sex was self-reported and coded as either male or female. Age was calculated for each respondent by taking their birthday (month/day/year) and subtracting it from the interview date (month/day/year). Marital status was based upon self-report as either never married, married or living together like a married couple, and separated/divorced/widowed. Cross-border mobility is measured in this paper with a single item: How frequently do you go to [Juarez]? Responses range from daily to once a year. However, due to uneven distribution among response categories, responses were dichotomized so that respondents traveling to Juarez < 1 time a year are coded as non-mobile, whereas those traveling to Juarez ≥ 1 a year are coded as mobile.

Four different economic indicators were measured, all of which were based upon self-report: highest level of education completed, income, receipt of public assistance, and car ownership. Highest level of education completed was measured in years of school attended. Grades 1–5 were categorized as elementary school, grades 6–8 were categorized as middle school, and grades 9–12 were categorized as having at least a high school level education. Income was assessed by asking respondents to approximate their household income, which was categorized within one of the following income brackets: \$0–10,000, \$10–20,000, \$20–30,000, \$30–40,000, or \$40,000 or more. Whether or not a respondent receives public assistance was ascertained with a single question: *Do you receive Lone Star, Temporary Aid to Needy Families, or other public assistance?* Responses were recorded as either yes or no. Finally, auto ownership was determined with a single item: *Do you own a working car?* to which respondents answered “yes” or “no”.

In addition to economic characteristics, several socio-cultural characteristics were measured, including: language of interview, primary country of education, years spent in the United States, acculturation, ethnic pride, and *familismo*. Language of interview was determined by the language form (English or Spanish) used during data collection by the interviewer. Primary country of education was measured by asking respondents *where did you attend school?* and *how many years attended?* Responses were coded as Mexico only, US only, US and abroad (including

Mexico, Central America, South America, as well as other countries). Years in the US were measured by asking foreign-born respondents how *many years they have resided in the United States?* For native born respondents, age was entered for years residing in the US. Acculturation was measured with three items: (1) *In general, what language(s) do you speak?*, (2) *In general, what language(s) do you read?*, and (3) *What language(s) you used as a child to teenage years?* Responses to each of these questions were: Spanish only (coded as 1), Spanish more than English (coded as 2), Spanish and English equally well (coded as 3), English more than Spanish (coded as 4), and English Only (coded as 5). Scores from each of the three items were summed, which produced overall scores ranging from 3 to 15, where higher scores indicated greater English language dominance. For the current sample, Cronbach's Alpha was $\alpha = .89$.

Ethnic pride was assessed by asking respondents a single question: *How do you feel about having a Hispanic/Latino, or Mexican background?* Responses included: very proud, proud, somewhat proud, little pride, and no pride. Because of small cell sizes for each of these categories however, responses were collapsed into two categories: very proud/proud and somewhat proud/little pride/not proud. The concept of *familismo* is a core and distinctive cultural value among Hispanic populations [7] that focuses on strong identification and attachment to the family. Dimensions of *familismo* include interdependence, cohesiveness, cooperation and solidarity among family members as well as reliance on relatives for help and support [8–10]. In this work, a four-item scale was employed to assess *familismo*. Respondents were asked how often they experienced the following family situations: (1) *My family discusses problems and solutions*, (2) *My family spends free time with each other*, (3) *Family members feel close to each other*, and (4) *Family members go along with family decisions*. For each of these items, respondents answered either “never” (coded as 0), “rarely” (coded as 1), “sometimes” (coded as 2), “usually” (coded as 3), or “always” (coded as 4). These four items were summed to create an overall score ranging from 0 to 16, with higher scores indicating greater family cohesion or *familismo*. In this sample, reliability for the scale using Cronbach's Alpha was $\alpha = .78$.

Two measures of social support were also used (i.e., availability of social support and types of enacted support) in addition to one social network characteristic measure (i.e., ethnic heterogeneity of respondent's friends). To assess availability of social support, respondents were asked: *Do you have a friend or family member who helps you when you are sick?*, to which respondents answered yes or no. To determine types of social support received, respondents were asked a follow-up question about the

types of help received. Specifically, respondents were instructed to state whether they received help with transportation, money, and/or advice. A social network heterogeneity measure was assessed by asking respondents whether their current circle of friends were All Hispanic, More Hispanic than non-Hispanic, About half (Hispanic) and half (Non-Hispanic), More non-Hispanic than Hispanic, or All Not Hispanic. Due to limited variation in responses however, these response categories were further collapsed into predominately Hispanic friends, equally Hispanic and non-Hispanic friends, and predominately non-Hispanic friends.

The final set of measures examined facilitating factors for border mobility, which included: health care utilization in Mexico, reasons for commuting between El Paso and Juarez, and whether or not one grocery shopped in Juarez. In order to measure health care service utilization in Mexico, an indicator variable was created that combined the following three items into a single measure: (1) *In the past three years, has gone to Mexico for medical care?*, (2) *In the past three years, has gone to Mexico for pharmaceuticals?*, and (3) *In the past three years, has gone to Mexico for medicinal herbs?* Responses for each of these items were originally coded as yes/no, but were transformed so that one or more “yes” response was counted as having accessed health care in Mexico whereas three “no” responses were coded as not utilizing Mexican health care services. Facilitating factors or reasons for commuting between El Paso and Juarez were measured by asking respondents whether they commuted for one or more of the following reasons: work, business, education, family, pleasure/entertainment, or other. Additionally, respondents were asked whether they grocery shop in Juarez. For each of these questions, responses were coded either yes or no.

Analysis

For this study, frequency statistics were analyzed to study the distribution of economic and socio-cultural variables as well as variables related to social networks and social support and reasons for border-crossing among mobile and non-mobile respondents. Additionally, t-tests and the chi-square test of independence were used to test for significant differences between the two groups. Due to the large number of statistical tests performed, p-values were adjusted to control for the familywise error rate. For example, four tests were conducted to examine four different dimensions of socio-economic position (i.e., highest level of education, income, receipt of public assistance, and car ownership). Statistical significance was set as $P < .0125$ (i.e., $.05/4$) for each of these four tests. All statistical procedures were conducted with SPSS 17.0.

Results

Among mobile respondents, the frequency in which people traveled to Juarez varied widely (Table 1), with the largest proportions of people traveling once every 3–6 months (30.6%), followed by once a month (29.9%), and once a week (20.4%). Additionally, approximately 10% of mobile respondents traveled to Juarez once a year, but fewer than 10% reported traveling to Juarez 2 or more days per week. With regard to respondent sex, though women composed a greater proportion (65.7%) of the overall study sample, there were no significant differences between mobile and non-mobile respondents for sex (Table 1). Likewise, there were no statistically significant differences on the

demographic measures of age, marital status, or receipt of public assistance. For the socio-economic variables under study, there were statistically significant differences between mobile and non-mobile respondents for highest level of education completed, income, and car ownership. In particular, mobile respondents were more likely to report junior high as the highest level of education completed ($P < .001$) in comparison to non-mobile respondents, who reported significantly higher rates of having a high school level education ($P < .001$) than their mobile counterparts. For income variables, a greater proportion ($P < .01$) of mobile respondents reported incomes between \$10–20,000, while a non-mobile respondents reported a greater proportion ($P < .001$) of incomes of \$40,000 or more

Table 1 Demographic and socio-economic characteristics of Mexican-origin adults living on the Texas-Mexico border by mobility status

	Mobile respondents, n = 324 n(%)	Non-mobile respondents, n = 678 n(%)
Gender		
Men	100(30.9)	243(35.9)
Women	224(69.1)	433(64.1)
Mean age	45.71(15.5)	45.68(17.6)
Marital status		
Never married	66(20.4)	130(19.5)
Married or living with partner	181(56.0)	372(55.9)
Separated/Divorced/Widowed	76(23.5)	164(24.6)
Highest level of education completed*		
Elementary	33(10.2)	59(8.7)
Junior high	58(17.9)	43(6.3)
≥High school	233(71.9)	576(85.0)
Household income*		
\$0–\$10,000	65(22.7)	130(21.0)
\$10,000–\$20,000	84(29.4)	121(19.5)
\$20,000–\$30,000	52(18.2)	95(15.3)
\$30,000–\$40,000	35(12.2)	77(12.4)
\$40,000 or more	50(17.5)	196(31.7)
Receives public assistance		
No	229(70.7)	485(71.5)
Yes	77(23.8)	141(20.8)
Own a car*		
No	74(22.8)	114(16.8)
Yes	249(76.9)	554(81.7)
Frequency of border crossing		
Daily	11(3.4)	–
4×/week	1(0.3)	–
3×/week	4(1.2)	–
2×/week	13(4.0)	–
1×/week	66(20.4)	–
1×/month	97(29.9)	–
1×/3–6 months	99(30.6)	–
1×/year	33(10.2)	–

Given missing data, percent totals for each variable may not add up to 100%

P values were adjusted for Type I error for four measures of socio-economic position (i.e., education, income, public assistance, and car ownership), thus * denotes statistical significance (.05/4) at $P < .0125$

(Table 1). Finally, non-mobile respondents reported significantly greater ($P < .05$) rates of car ownership than their mobile counterparts. Examination of socio-cultural characteristics among mobile and non-mobile respondents revealed several statistically significant differences between the two groups (Table 2). Mobile respondents were significantly more likely to complete the interview in Spanish ($P < .001$), whereas non-mobile respondents were significantly more likely to complete the interview in English ($P < .001$). Mobile respondents were also more likely to be educated in Mexico ($P < .001$) or from more than one country ($P < .01$). In contrast, non-mobile respondents were more likely to receive their education primarily from the United States ($P < .001$) than their mobile counterparts. For number of years residing in the United States, there were significant differences ($P < .001$) between mobile and non-mobile respondents. Mean years in the United States for mobile respondents

was 27.99 (SD = 15.85), which was approximately 10 years fewer than non-mobile respondents, with a mean of 37.13 (SD = 18.08) years in the United States. Level of acculturation also significantly differed ($P < .001$) for the two groups. Non-mobile persons scored higher on the acculturation scale, indicating greater English language dominance. Finally, no statistically significant differences were found for either ethnic pride or *familismo*. For both mobile and non-mobile respondents, high levels of ethnic pride 92.3 and 91.4% and family cohesion were reported 15.70(SD 3.19) and 15.78(SD 3.53) respectively.

In looking at social network and social support characteristics by mobility status, there were no significant differences on perceived availability of social support or enacted support (Table 3). Results regarding social network heterogeneity for ethnicity however did reveal statistically significant differences, where mobile respondents

Table 2 Socio-cultural characteristic of Mexican-origin adults living on the Texas-Mexico border by mobility status

	Mobile respondents, n = 324 n(%)	Non-Mobile respondents, n = 678 n(%)
Language of interview*		
English	125(38.6)	473(69.8)
Spanish	199(61.4)	203(29.9)
Primary place of education*		
United States	119(36.7)	446(65.8)
Mexico	138(42.6)	137(20.2)
US & Abroad	55(17.0)	68(10.0)
Mean years in the US*	27.99(15.85)	37.13(18.08)
Mean acculturation level*	6.46(3.02)	8.96(3.59)
Ethnic pride		
Very proud-proud	299(92.3)	620(91.4)
Somewhat-not proud	22(6.8)	43(6.3)
Mean Score for Familismo	15.70(3.19)	15.78(3.53)

Given missing data, percent totals for each variable may not add up to 100%
P-values were adjusted for Type I error for all six socio-cultural measures, thus * denotes statistical significance (.05/6) at $P < .0083$

Table 3 Social support and social network characteristic for Mexican-origin adults living on the Texas-Mexico border by mobility status

	Mobile respondents, n = 324 n(%)	Non-mobile respondents, n = 678 n(%)
Perceived availability of social support		
Yes	245(75.6)	519(76.5)
No	77(23.8)	142(20.9)
Types of support		
Transportation	165(50.9)	342(50.4)
Monetary	111(34.3)	229(33.8)
Emotional/Advice	178(54.9)	387(57.1)
Network heterogeneity*		
Predominately Hispanic	230(71.0)	425(62.7)
Equally Hispanic and non-Latino	82(25.3)	206(30.4)
Predominately non-Latino	8(2.5)	35(5.2)

Given missing data, percent totals for each variable may not add up to 100%
P-values were adjusted for Type I error for all three social networks and support measures, thus * denotes statistical significance (.05/3) at $P < .0166$

Table 4 Reasons for border mobility among Mexican-origin adults living on the Texas-Mexico border

	Mobile respondents, n = 324 n(%)	Non-mobile respondents, n = 678 n(%)
Gone to Mexico for health care, pharmaceuticals and/or medicinal herbs*		
No	82(25.3)	527(77.7)
Yes	202(62.3)	52(7.7)
Reasons for commuting between El Paso and Juarez*		
Work	13(4.0)	1(0.1)
Business	15(4.6)	1(0.1)
Education	2(0.6)	0(0.0)
Family	186(57.2)	12(1.8)
Pleasure/Entertainment	94(29.0)	4(0.6)
Other	62(19.1)	6(0.9)
Grocery shop in Juarez*		
No	181(55.9%)	629(92.8%)
Yes	138(42.6%)	11(1.6%)

Given missing data, percent totals for each variable may not add up to 100%

P-values were adjusted for Type I error for all three indicators of border mobility measures, thus * denotes statistical significance (.05/3) at $P < .0166$

were more likely ($P \leq .01$) to have friends of Hispanic origin than their non-mobile counterparts.

Table 4 displays the distribution (in percentages) of respondents engaging in various cross-border activities. With the exception of education, for each of these indicators of border mobility, statistically significant differences were found between the two groups. Specifically, mobile respondents were more likely ($P < .001$) to travel to Juarez to access health care services, including health care, pharmaceuticals, and/or medicinal herbs. Mobile respondents were also more likely to commute across the Texas-Mexico border for work ($P < .001$) and business ($P < .001$). In addition, mobile respondents were also more likely to commute to and from El Paso and Juarez to visit family ($P < .001$), for pleasure and entertainment ($P < .001$), as well as “other” reasons ($P < .001$). Moreover, mobile respondents ($P < .001$) were also more likely to travel to Juarez to grocery shop than their non-mobile counterparts.

Discussion

Findings from this study show that while there were no significant differences in basic demographic characteristics such as age, sex, and marital status between mobile and non-mobile respondents, important economic, cultural, and behavioral differences were found. Among this adult sample, slightly more than 28% of mobile respondents reported their highest level of education as fewer than 9 years (high school level), in comparison to only 15% of non-mobile respondents. Additionally, while only 17.5% of mobile respondents fell under the highest income category of \$40,000 or more annually, 31.7% of non-mobile respondents had incomes in this range. Collectively, these results suggest that non-mobile respondents have higher

social economic status than their mobile counterparts. Perhaps because they have fewer economic resources, mobile respondents travel to Juarez for various goods and services, including relatively less expensive health care.

Examination of socio-cultural variables by mobility status highlighted important similarities as well as differences between the two groups. For example, both mobile and non-mobile respondents reported high levels of ethnic pride and family cohesion or *familismo*. These results are consistent with previous findings that a strong sense of pride and *familismo* remain strong among Hispanics across generations and regardless of length of residence in the United States [11]. Yet, mobile respondents were more likely to speak Spanish (based on acculturation and language of interview measures), be educated in Mexico or in more than one country, and reside in the United States for a shorter period of time. These cultural indicators suggest that mobile respondents may be more oriented toward Mexico, while non-mobile respondents are more oriented toward the United States.

This interpretation of results is supported by the findings that the social networks of mobile respondents reported greater proportions of Hispanic friends than their non-mobile counterparts. The differences in socio-cultural integration detected in this study, may help to offer additional insight to understanding economic differences between mobile and non-mobile respondents, while also highlighting the heterogeneity of this border population. For instance, in addition to lower educational achievement, mobile respondents are likely to be placed in lower income segments of the local economy because of language barriers, recentness of immigration, and related socio-cultural factors [12, 13], thus impacting their employment and earning potential. Our work suggests that mobile residents are more marginal to the United States in both economic

and socio-cultural categories. Current research [3, 14] identifies both sets of factors as barriers to the health of Hispanic populations. The distinctive element in the present case is that mobility across the border offers less acculturated and poorer Hispanics access to alternative sources of health care and other services.

There are many reasons why Hispanics cross the Texas-Mexico border. With the exception of education, for each of the facilitating factors we examined, mobile respondents were significant more likely to travel to Juarez than their non-mobile counterparts. For instance, in addition to commuting back and forth from El Paso to Juarez for social and economic reasons such as work, to visit family members or for entertainment, border-crossing behaviors also included accessing health care services in Mexico and purchasing groceries. Both of these latter factors have important health implications for this local population and should be examined in subsequent analyses. Issues regarding continuity of care, communication among health care providers, and safety of pharmaceuticals and foods purchased in Mexico all have implications for understanding differences in health status and patterns of health among Hispanic mobile and non-mobile populations. Indeed, the costs and benefits of transnational health seeking behaviors are not well understood among Hispanic populations [15]. Overwhelmingly, studies of transnational health service utilization have focused on the influence of health insurance status and cost and not other facilitating and risk factors [16–18]. Understanding how these behaviors may be linked to diet, health prevention, as well as the detection and treatment of illness and disease, will provide much needed insight into understanding the relationship between border-mobility and health along the US-Mexico border.

As with all research, this descriptive study is not without limitations. The conceptualization of cross-border mobility is specific to movement between El Paso, Texas and Juarez, Mexico and may therefore fail to capture movement to other parts of Mexico or abroad. Additionally, due to a high (87%) non-response rate, we are unable to determine any correlations between citizenship status and border mobility. Although our sample of mobile and non-mobile border residents have lived an average of 28 and 37 years in the United States respectively, we are unable to classify their legal status and how such status may influence border crossing from El Paso to Juarez. Further, given the recent and escalating violence occurring in Juarez [19], which have been linked to reductions in border-crossing [20], it is plausible that border mobility responses reflect these current trends, thus resulting in some misclassification of respondents as non-mobile. The results may underestimate true differences in the profiles of mobile and non-mobile Hispanics residing and commuting among the Texas-Mexico border. The survey includes data that may

allow future analysis of previously mobile, now-not crossing respondents, as a separate group from never mobile respondents. Finally, the use of a cross-sectional design does not allow for inferring causal relationships between border mobility and socio-economic and socio-cultural variables of interest.

This work contributes to the understanding of Hispanic immigrant and border health by providing a descriptive account of the phenomenon of border mobility, including economic and socio-cultural correlates of border-crossing behavior and their continued influence on the lives of border residents. By examining border-mobility, this concept provides a contextual account that can be used for future research associated with border residents' decision making and its relationship to health and well being.

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