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Individual, cultural and structural predictors of vaccine safety confidence and influenza vaccination among Hispanic female subgroups

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Abstract

Background—Rates of influenza vaccination among US Hispanics are lower than for non-Hispanic whites, yet little is known about factors affecting vaccination in this population.

Additionally, although Hispanics are a diverse population with culturally distinct subgroups, they are often treated as a homogenous population. This study (1) examines how confidence in vaccine safety and influenza vaccine use vary by Hispanic subgroup and (2) identifies individual, cultural and structural correlates of these outcomes.

Methods—This study analyzed survey data from 1,565 Hispanic women who were recruited at clinic- and community-based sites in Los Angeles.

Results—Education, healthcare coverage, acculturation, fatalism, and religiosity were predictors of influenza vaccination behavior and predictors varied by subgroup.

Discussion—These findings provide guidance for how influenza vaccine promotion efforts can be developed for Hispanic subgroups. Confidence in the safety of a vaccine is a major predictor of flu vaccination and an important modifiable target for intervention.

Keywords

Hispanics; Immunizations; Influenza; Vaccines; Vaccine hesitancy

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Background

Influenza vaccinations are an important tool for maintaining public health [1]. The Advisory Committee on Immunization Practices recommends that all individuals over 6 months of age receive an annual influenza vaccine [2]. Despite this recommendation, influenza vaccination coverage in the US remains low, with only 42.2% of adults receiving the vaccine during the 2013-2014 influenza season [3]. Consequently, it is crucial to understand the factors that facilitate or impede influenza vaccination uptake so that more effective mechanisms to promote vaccination can be developed.

Historically, Hispanic adults are less likely than non-Hispanic whites to be vaccinated against influenza [4]. During the 2014-15 influenza season only 33.1% of Hispanic adults received the influenza vaccine, compared to 45.4% of non-Hispanic whites [3]. Despite this disparity, little is known about correlates of influenza vaccine behavior among Hispanics in the United States. It has been shown that at least some of the disparity is due to differences in sociodemographic factors and perceived health status [5]. One study focusing on Mexican immigrants to the US found that believing that the vaccine was effective and believing that influenza could make one very sick were associated with an increased likelihood of receiving the influenza vaccine [6]. Knowledge of additional factors that facilitate or impede influenza vaccination in Hispanics, however, is limited.

Exacerbating this dearth of knowledge regarding influenza vaccination among US Hispanics is the fact that this population is extremely diverse, containing multiple subgroups hailing from many different countries [7,8]. The US Hispanic population consists of individuals born domestically as well as immigrants born in other countries [9] with different infrastructures to support vaccination and different cultural beliefs about vaccines. Given this diversity, it is vital to understand differences in influenza vaccine between Hispanic subgroups, especially because prior research that indicates that health behaviors and outcomes vary across Hispanics by ethnic subgroup and nativity [10-17].

One factor predicting use of the influenza vaccine is confidence in vaccine safety: individuals who are concerned about the safety of the influenza vaccine are less likely to be vaccinated [18-21]. Because vaccine safety confidence is a key modifiable factor predicting influenza vaccine use [18], understanding how vaccine safety confidence varies and is related to influenza vaccine use across Hispanic subgroups is crucial to develop effective influenza vaccine promotion methods for Hispanics.

Theoretical and Conceptual Framework

Dutta's culture-centered approach [22] uses a multilevel framework for understanding health behavior. Building on earlier work by Airhihenbuwa [23], the culture-centered approach argues that health behavior is influenced by the interaction between cultural factors (e.g. cultural beliefs, values, etc.), structural factors (e.g. access to health resources) and agentic factors (e.g. individual-level beliefs and actions). This framework allows for the examination of multiple determinants of a health behavior, and provides a more nuanced and comprehensive understanding of a health disparity.

We use the culture-centered approach as the guiding framework for this study and examine individual, cultural and structural influences on Hispanic women's confidence in vaccine safety and influenza vaccine behavior. At the individual level, we examine sociodemographic predictors (education, income and age) and health status. It is well-established that older individuals [3,6,24], and wealthier or more educated individuals [25] have higher rates of influenza vaccination [26]. Additionally, Hispanic subgroups vary in regards to these factors. For example, in the United States, Hispanics of Mexican origin have the lowest median age, Guatemalans have lower levels of education, and Hondurans have lower annual median incomes [8].

At the cultural level, we examine acculturation to the US, years lived in the US, fatalism (beliefs that one's health outcomes are predetermined and that one has limited control over one's health outcomes [27]), and religiosity. These factors are associated with many health beliefs and behaviors [28-30] suggesting they may likewise be related to vaccine-related beliefs and uptake. Finally, potential structural barriers to vaccination include access to healthcare and health literacy. Health literacy is an important predictor of many health behaviors [31], and healthcare systems are often not adequately equipped to communicate with individuals who have low health literacy. Access to healthcare, in the form of having healthcare coverage, has been linked to influenza vaccination [25,26] and also varies across Hispanic subgroups, with Mexican Americans being more likely to have health insurance than other subgroups [32,33].

Given this conceptual framework, the objectives of this study are to (1) describe levels of vaccine safety confidence and regular influenza vaccination among US Hispanic female subgroups and (2) identify the structural, cultural and individual-level correlates of vaccine safety confidence and influenza vaccine use among each subgroup. We analyzed data from a survey on women's health conducted with Hispanic women in Los Angeles County. Because Hispanic women often act as the motivators for health and healthcare behavior change in their families [7], understanding the barriers to influenza vaccination they identify is an initial means to understand how to intervene for this target population more generally. This study adds to our knowledge of influenza vaccine behavior in the US by providing a more nuanced understanding of vaccine safety confidence and influenza vaccination use among Hispanic female subgroups that can be used to inform the development of influenza vaccine promotion efforts.

Methods

Participants

Eligibility criteria for this study were that participants be female, Hispanic, and between ages 21 and 50. Participants ($N=1,632$) were recruited from clinics and community sites in Los Angeles County. Country of birth was established by asking participants where they were born. Participants were born mainly in Mexico ($n=934$, 57.2%), the United States ($n=336$, 20.6%), El Salvador ($n=161$, 9.9 %) and Guatemala ($n=134$, 8.2%). Sixty-six participants (4.0%) born in other countries (Belize, Bolivia, Colombia, Costa Rica, Ecuador, Honduras, Nicaragua, Panama, Peru or another country they did not wish to name) and one

participant who did not answer the question were excluded, leaving a total of 1,565 participants in the analyses. Table 1 displays participant characteristics.

Data collection

Data for the current analysis were collected from April 2012 to December 2013 as part of a larger study on Hispanic women's health [blinded for peer review]. Eligible participants took an interviewer-administered survey lasting between 45-60 minutes. All study procedures were administered in Spanish or English, as per request of the participant. Participants were compensated with a \$20 gift card. All study procedures were approved by the university Institutional Review Board.

Measures

Influenza vaccination behavior—Participants were asked how often they were vaccinated against influenza. Participants who responded “Almost always” or “Always” were coded as regularly receiving the influenza vaccine (‘1’). Participants who responded “Never”, “Rarely”, or “Sometimes” were coded as not regularly receiving the influenza vaccine (‘0’).

Vaccine safety confidence—Participants were asked the extent to which they agreed with the statement “Vaccines are safe.” Response options ranged on a six-point scale from “Strongly Disagree” to “Strongly Agree”. We dichotomized responses so that participants who strongly agreed or agreed were coded as confident about vaccine safety (‘0’) and participants who somewhat agreed, somewhat disagreed, disagreed or strongly disagreed were coded not confident (‘1’).

Individual-level factors—Participants reported their highest level of education, coded into four categories (0=eighth grade or less, 1=some high school, 2=high school diploma, 3=some college or more). Household income was measured in \$10,000 increments and coded into four categories (\$10,000; between \$10,001-\$20,000; between \$20,001-\$30,000; >\$30,000) based on the distribution of the data. To reduce the likelihood of bias or non-response in reporting income, participants who wished to could select their income level from a card. Participants reported their age in years and their general self-rated health [34].

Cultural factors—Acculturation to the US was measured using the non-Hispanic domain subscale of Marin and Gamba's [35] bi-dimensional acculturation scale. Years lived in the US was measured by asking participants how many years ago they first came to the US. This question was asked to only those women born outside the US. Fatalism was measured by asking participants how much they disagreed or agreed (on a scale from 0-5) with the statement “You avoid seeing your doctor because you fear you may have a serious illness.” This measure was developed after conducting focus groups with Latina women in Los Angeles [blinded for peer review]. Religiosity was assessed by asking participants how often they attended church or other religious services [36]. Response options were ‘Never’ (0), ‘Less than once a month’ (1), ‘At least once a month’ (2), ‘At least once every few weeks’ (3), ‘At least once a week’ (4), ‘More than once a week’ (5).

Structural factors—To assess healthcare coverage, participants were asked (yes/no) whether they had any type of healthcare coverage. Health literacy was assessed using Chew and colleagues' [37, 38] validated measure, which asks participants how confident they are filling out medical forms by themselves. Participants who reported they were “extremely” or “quite a bit” confident were coded as having adequate health literacy, while participants who were “somewhat,” “a little bit,” or “not at all” confident were coded as having inadequate health literacy.

Analysis

Data were analyzed using SPSS 17.0 [39]. Missing values were excluded listwise, except for the income variable. Because a significant number of participants (n=191) declined to report their income, we imputed these values as the modal income category for the country where the participant was born. Descriptive statistics were conducted for the entire sample and each sub-group. We conducted bivariate chi-square and t-test analyses to examine whether vaccine safety confidence and influenza vaccination varied by country of birth and by each structural, cultural and individual-level predictor. We then conducted multivariate logistic regression analyses to examine the associations of vaccine safety confidence and influenza vaccination behavior with the predictors of interest, first with the entire sample and then separately for each sub-group.

Results

Bivariate analyses

Bivariate analyses (Table 2) revealed that vaccine safety confidence varied across Hispanic subgroups. Individuals born in Mexico had the highest rate of vaccine safety confidence, while those born in the US were less likely to feel confident about vaccine safety. Vaccine safety confidence also varied by education, healthcare coverage and health literacy. Those with healthcare coverage and higher health literacy were more confident in vaccine safety, while those with higher levels of education were less confident in vaccine safety. Participants who were confident about the safety of vaccines had slightly lower levels of fatalism and acculturation.

Participants' report of influenza vaccination frequency did not vary significantly by Hispanic subgroup, but did vary by age and healthcare coverage. Individuals who regularly received an influenza shot had lower levels of fatalism and higher levels of religious attendance, differences that were statistically significant but slight. Individuals who regularly received influenza vaccination had higher levels of vaccine safety confidence.

Multivariate analysis of predictors of vaccine safety confidence

Table 3 displays adjusted odds ratios and significance levels for the logistic regression analyses predicting vaccine safety confidence in the entire sample and by Hispanic subgroup. Among the entire sample, individuals born in Mexico were significantly more likely to be confident in vaccine safety than those born in the US (AOR=1.50, $p < .05$). Individuals with healthcare coverage (AOR=1.28, $p < .05$) and with adequate health literacy (AOR=1.54, $p < .01$) were more likely to be confident about vaccine safety, while those with

a poorer self-rated health status ($AOR=.77, p < .05$) were less likely. Higher levels of fatalism were associated with less confidence in vaccine safety ($AOR=.79, p < .01$).

Subgroup analyses also revealed several differences in the specific factors associated with vaccine safety confidence in each subgroup. Among those born in Mexico, only healthcare coverage ($1.39, p < .05$) and health literacy ($AOR=1.68, p < .01$) remained as significant predictors of vaccine safety confidence. Among those born in El Salvador, none of the variables were predictors of vaccine safety confidence. Among those born in Guatemala, individuals with some high school were more likely to be confident in vaccine safety than those with an 8th grade or less education ($AOR=8.56, p < .05$), and those with a high school diploma were marginally significantly more likely to be confident in vaccine safety ($AOR=3.63, p = .07$). Fatalism ($AOR=.65, p < .05$) and years lived in the US ($AOR=.89, p < .05$) were significantly associated with a lower likelihood of being confident about vaccine safety among those born in Guatemala. Among those born in the US, those with some college or higher had a significantly lower likelihood of being confident in vaccine safety than those with some high school or less education ($AOR=.37, p < .05$).

Multivariate analysis of predictors of influenza vaccination

Table 4 displays adjusted odds ratios and significance levels for the logistic regression analyses predicting influenza vaccination behavior in the entire sample and by Hispanic subgroup. Among the entire sample, older individuals ($AOR=1.02, p < .05$) and those with healthcare coverage ($AOR=1.64, p < .001$) were also more likely to be regularly vaccinated against influenza. Higher levels of religiosity ($AOR=1.09, p < .01$) were associated with an increased likelihood of being regularly vaccinated against influenza, while acculturation to the US ($AOR=.90, p < .05$) was associated with a decreased likelihood. Confidence in vaccine safety ($AOR=2.27, p < .001$) was associated with a greater likelihood of regular influenza vaccination.

Among each sub-group, similar patterns emerged, with a few notable differences highlighted here. Among those born in Mexico, having healthcare coverage ($AOR=1.41, p < .05$), higher religiosity ($AOR=1.12, p < .007$) and higher vaccine safety confidence ($AOR=2.38, p < .001$) were associated with higher likelihood of regular influenza vaccination. Among those born in El Salvador, earning between \$20,001 and \$30,000 per year ($AOR=3.92, p < .05$) increased the likelihood of regular influenza vaccination compared to earning \$10,000 or less per year. Having healthcare coverage ($AOR=4.24, p < .002$) and being confident in vaccine safety ($AOR=3.94, p < .05$) were also associated with an increased likelihood of regular influenza vaccination. Among those born in Guatemala, women with a high school diploma ($AOR=.26, p < .05$) were significantly less likely to receive a regular flu vaccination than those with an 8th grade or less education. Additionally, Guatemalan women earning more than \$30,000 per year ($AOR=28.19, p < .05$) were significantly more likely to be vaccinated against the flu than those earning \$10,000 or less. Among women born in the US, having healthcare coverage ($AOR=1.89, p < .05$) and being confident in vaccine safety ($AOR=2.18, p < .01$) were the only significant predictors associated with an increased likelihood of regular influenza vaccination.

Discussion

This study identified several factors associated with vaccine safety confidence and regular influenza vaccination among Hispanics. Importantly, this study found that factors that predict influenza vaccination and vaccine safety confidence may vary by Hispanic sub-group.

Among those born in Mexico, being confident in the safety of vaccines, having healthcare coverage and regularly attending church were all associated with increased likelihood of regular influenza vaccination. Among those born in El Salvador, income, vaccine safety confidence, and healthcare coverage predicted regular influenza vaccination. Among those born in Guatemala, education and income significantly predicted regular influenza vaccination. Among those born in the US, vaccine safety confidence and having healthcare coverage were associated with a greater likelihood of regular influenza vaccination.

Vaccine safety confidence emerged as a significant predictor of regular influenza vaccination among the majority of the Hispanic sub-groups examined in this study. Vaccine safety confidence was associated with several factors including healthcare coverage, health literacy, and fatalism, but the extent of these associations varied by sub-group. For example, years lived in the US was associated with a lower likelihood of vaccine safety confidence only among women born in Guatemala. Similarly, higher education was associated with lower likelihood of vaccine safety confidence only among women born in the US.

These findings illustrate the diversity of the Hispanic population in the United States. That different individual-level, cultural and structural factors associated with vaccine safety confidence and influenza vaccination behavior emerge among different Hispanic sub-groups indicates that there may be broader cultural, structural and policy-level factors at play in the countries where these women were born and where they may continue to have strong ties that influence their beliefs about vaccines [40,41]. However, it should also be noted that there were also similarities across subgroups as well. Healthcare coverage was a consistent predictor of vaccination behavior across different subgroups, underscoring the importance of ensuring access to healthcare and influenza vaccination. Vaccine safety confidence was associated with regular influenza vaccination among women born in Mexico, El Salvador and the US, which highlights the need for education about the safety of the influenza vaccine.

Health promotion and medical practitioners seeking to promote vaccination should be aware of this diversity and target interventions accordingly. Specific strategies to promote influenza vaccination in each subgroup can be developed. For example, because income was a major factor impeding influenza vaccination among women born in Guatemala, efforts to increase vaccination in this population in the US could focus on offering free vaccines in neighborhoods with high concentrations of Guatemalans. Efforts to increase confidence in vaccine safety could be useful at improving vaccination rates among those born in Mexico, El Salvador and the US. For instance, healthcare providers working with these populations could incorporate vaccine education into their practices. *Promotoras*, or community health workers, could also be leveraged to promote influenza vaccination among Latina women

[42,43]. Spanish-language media or community groups that are important to different Hispanic subgroups could also be used to promote the safety of the influenza vaccination. Similarly, among these populations, increasing healthcare coverage could address a major structural barrier to vaccine uptake.

Practitioners seeking to increase vaccine uptake among the US Salvadoran population could also talk to patients about fatalistic attitudes and take a culturally-sensitive approach to mitigate the negative effect of fatalism on vaccination behavior. For instance, practitioners could explain influenza vaccination in a way that aligns with a fatalistic approach to health [see Powe & Weinrich [44] for an example of an intervention to reduce fatalism]. Among Latinos, faith-based programs are a popular and typically effective means to promote health behavior [45]. However, our study indicates that Mexican-American women who were not being regularly vaccinated were also not attending church regularly – so other strategies to promote vaccination in this population are also warranted.

Finally, there were several differences in factors predicting vaccine safety confidence compared to regular influenza vaccination. This suggests that, while vaccine safety confidence and regular influenza vaccination are related, they likely require connected, but distinct, strategies for intervention that focus on the unique factors associated with each outcome. For example, increasing influenza vaccination behavior may require structural interventions, such as increasing healthcare access, while improving vaccine safety confidence may require educational approaches and strategies targeting concerns in specific sub-group to more effectively communicate about vaccines.

Limitations

While this study is the first that we are aware of to provide an analysis of the individual, cultural and structural factors affecting influenza vaccination across Hispanic sub-groups, there are several limitations that must be noted. Foremost, we did not have access to clinical data on influenza vaccination behavior. Self-reported measures of influenza vaccination have little risk for bias [46], but the potential for error in reporting still exists. In particular, the validity of self-reported influenza vaccination measures among Central American populations is less well-established [47]. Additionally, our measure of influenza vaccination was a more global assessment of general, or typical, vaccine receipt, and may not reflect year-to-year variations and trends in vaccine coverage. A strength of this measure is its suitability for capturing more persistent disparities in influenza vaccination experienced by Hispanics in the US, because it is not tied to a specific timeframe that could be influenced by year-to-year trends.

Our study population was local to Los Angeles County and while Los Angeles has a large Hispanic population, findings may not generalize to Hispanics elsewhere. Notably, our analysis did not include Cubans, Puerto Ricans or Dominicans who make up 3.5%, 9.6% and 2.2% of the US Hispanic or Latino population [48]. Our work also focused on only female Hispanics, which eliminated any gender confound. However, given that males and females differ considerably with respect to their influenza vaccine uptake [3], further research that includes Hispanic males – and in particular, young males -- is warranted.

While we measured multiple structural, cultural and individual determinants of vaccine safety confidence and influenza vaccination behavior, there may be other constructs (such as cost of vaccination) we were unable to measure. Finally, we wish to acknowledge that acculturation is a complex concept [49] and that our measurement of it, while leveraging a validated and commonly used scale, may have omitted other dimensions. Although some differences in vaccination by acculturation may be related to immigration generation or how recently people moved to the United States, other elements of acculturation should be further explored. Given the association we found between acculturation and influenza immunization, future research into how acculturation operates here is required. In addition, given the importance of cultural determinants that emerged from our study, and the community-based approach to understanding health behavior advocated by the culture-centered approach, further research using qualitative and participatory methods is warranted.

New Contribution to the Literature

This study makes a contribution to the understanding of influenza vaccination among Hispanic women in the US by using the culture-centered-approach [22] to identify individual, structural and cultural level determinants of flu vaccination. This study illustrates the importance of understanding the health behavior differences and distinctions among various Hispanic subgroups in the US. In particular, this study found that predictors of vaccine safety confidence and influenza vaccination behavior may vary among Hispanics living in the US based on country of origin. Thus, interventions to address these distinct populations could have a more substantial and sustained impact by accounting for specific cultural origins. Additionally, this study's findings contribute to existing literature on the role of education in vaccination and vaccine hesitancy. The finding that among individuals born in the U.S., education was negatively associated with vaccine safety confidence supports others' work finding a similar relationship [50, 51]. Ultimately, this study's findings can inform influenza vaccine promotion efforts by offering a nuanced understanding of the multi-level determinants of flu vaccination among different Hispanic sub-groups in the US.

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