



Published in final edited form as:

NAPA Bull. 2010 November 1; 34(1): 84–104. doi:10.1111/j.1556-4797.2010.01053.x.

HPV AWARENESS AMONG LATINA IMMIGRANTS AND ANGLO AMERICAN WOMEN IN THE SOUTHERN U.S.: CULTURAL MODELS OF CERVICAL CANCER RISK FACTORS AND BELIEFS

John S. Luque

Jiann-Ping Hsu College of Public Health, Georgia Southern University

Heide Castañeda

Department of Anthropology, University of South Florida

Dinorah Martinez Tyson

Department of Aging and Mental Health Disparities, University of South Florida

Natalia Vargas

Department of Global Health, University of South Florida

Sara Proctor

Catholic Mobile Medical Services, Catholic Charities

Cathy D. Meade

Department of Oncologic Sciences, University of South Florida; Health Outcomes and Behavior, H. Lee Moffitt Cancer Center and Research Institute

Abstract

Latinas have higher cervical cancer age-adjusted incidence and mortality rates, and present with more advanced disease compared to non-Latino whites. This study used a cross-sectional mixed methods survey design, exploring knowledge, attitudes, and beliefs regarding the human papillomavirus (HPV), the HPV vaccine, and cervical cancer screening with four groups of women (Mexican, Honduran, Puerto-Rican, Anglo American; n=80) attending low-income health clinics along with one group of Latina health care workers (n=17). Data analyses included univariate frequency distributions and one-way ANOVA tests for quantitative data, thematic and content analysis of qualitative data, and cultural consensus analysis using the covariance method to compare groups. Results indicate overall cultural consensus for the five subgroups for both the agree/disagree questions and rankings on cervical cancer risk factors. However, differences were found between Latina women compared to Anglo American patients and health care clinic workers around birth control practices as possible causal factors for cervical cancer. Other findings suggested greater awareness of HPV and the HPV vaccine among Anglo American and Puerto Rican women compared to Mexican and Honduran women. Mexican and Honduran women were less likely to be aware of HPV and the HPV vaccine, and more likely to be uninsured and without a regular health care provider. Results point to the need to assess knowledge, attitudes, and beliefs in specific subgroups experiencing cervical cancer disparities to identify target areas for health education. Study findings will be used to inform the development and pilot testing of health education curriculum modules for cervical cancer prevention.

While cervical cancer screening using the Papanicolaou (Pap) smear has resulted in dramatic reductions in cervical cancer incidence and mortality for women in the United States, its benefits have not been equitably distributed through all sociodemographic groups, based on age, socioeconomic and insured/uninsured status, and cultural and racial/ethnic categories (Downs et al. 2008; McDougall et al. 2007; Newmann and Garner 2005; Watson et al. 2008). In the last 50 years, cervical cancer mortality decreased by 75 percent. Yet, in spite of

such remarkable success, a disproportionate incidence and mortality burden continues to be shouldered by Latinas, including the rural and migrant populations (Howe et al. 2006). Numerous factors have been cited to explain these cancer disparities, including unequal access to health care, lower screening rates, lower adherence to follow-up recommendations, a lack of regular health care provider, lower health literacy, low levels of acculturation, income inequality, immigration status, lower education, cultural beliefs, and additional structural factors (Coronado et al. 2004; Freeman and Wingrove 2005; Hiatt et al. 2001; Howell et al. 2009; Jacobs et al. 2005; Ramirez et al. 2005; Zambrana et al. 1999). In order to understand cultural factors that might explain cervical cancer disparities, the aim of this pilot study was to use a cross-sectional mixed methods survey design to explore knowledge, attitudes, and beliefs regarding human papillomavirus (HPV), the HPV vaccine, and cervical cancer screening with four groups of women (Mexican, Honduran, Puerto-Rican, Anglo American) attending low-income health clinics in central Florida along with one group of health care workers in order to characterize subgroup differences. The applied objective of the project is to use the results to inform the development and pilot testing of health education curriculum modules which could be later incorporated into existing lay health advisor curricula on cervical cancer prevention.

Low screening rates and higher prevalence of cancer-causing strains of HPV in some Latin American populations reflect the disproportionately high cervical cancer rates reported by these countries. Mortality rates for cervical cancer are over 15/100,000 women in Ecuador, Mexico, and Venezuela, and over 10/100,000 women in most other Latin American countries compared to 4/100,000 women in the US (Bosetti et al. 2005). Among Latina immigrant groups, Mexican Americans have the lowest prevalence of recent Pap testing, and, along with Puerto Rican women, are characterized by two times the risk of developing cervical cancer than Cuban American women (Byrd et al. 2007). Differentiating the Latino subethnicities by occupation, class, and country of origin is critical for teasing out these differences, which are conflated in the way data are typically collected for Latinos as a homogenous group. For example, in the case of Latino migrant farmworkers in Florida, who are predominately from Mexico, Honduras and Guatemala, poor cancer mortality outcomes are more striking. Specifically, this subpopulation is characterized by abnormally high rates of stomach, skin, prostate, lymphatic, and cervical cancer (Coughlin and Wilson 2002; Hanson and Donohoe, 2003).

While cervical cancer incidence rates have been found to be highest among Latinas (14.2 per 100,000 women) compared to non-Latinas (8.4 per 100,000), there have been challenges to characterize differences based on subethnicities in the regional context (Watson et al. 2008). Latinas in Florida are comprised of native, US-born groups, as well as immigrant populations of diverse backgrounds from all parts of Latin America and the Caribbean, and consequently experience varied cancer outcomes (Martinez-Tyson et al. 2009). Borrowing from the Diffusion of Innovations model, some segments of Latino subethnicities might be characterized as late majority adopters for both knowledge of HPV and uptake of the HPV vaccine (Rogers 1995). A recent study found that cervical cancer incidence rates for Latinas were higher in south Florida (higher population of Cuban, Central and South Americans) than central Florida (higher population of Puerto Ricans) (Patel et al. 2009). Thus, differences in immigration history and socioeconomic status might be important variables for understanding these incidence rates. These findings suggest that long-term epidemiological and social science research is needed to explore and explain variations in cervical cancer rates and screening practices among and between Latino subethnicities.

Another fertile area of research are studies examining perceived differences in knowledge, attitudes and beliefs toward HPV and the two FDA-approved HPV vaccines (Gardasil® and Cervarix®). In the post-HPV vaccine landscape for cervical cancer prevention and control,

there is a continued need for regular Pap testing, as the HPV vaccines only prevent the most prevalent subtypes linked to cervical cancer. While studies have shown that vaccine acceptability remains high with Latino parents, results from qualitative research have demonstrated the need for increased health literacy on the topic of HPV, to enhance understanding about the link between HPV and cervical cancer, and methods for primary and secondary prevention of HPV (Scarinci et al. 2007; Vanslyke et al. 2008; Watts et al. 2009).

This study is part of a larger study designed to develop and test curriculum health education modules on HPV and cervical cancer for a new *promotora* [lay health advisor] program targeting Latina immigrants in central Florida and southern Georgia. The research presented here, conducted in 2009, aimed to explore the cultural domain of cervical cancer risk factors, by examining the knowledge, attitudes, and beliefs about HPV, the HPV vaccine, and cervical cancer screening with four groups of women (Mexican, Honduran, Puerto-Rican, Anglo American) (n=80) attending low-income health clinics and one group of Latina health care workers (n=17). By drawing extensively from the work of Chavez et al. (1995, 2001), which examined the differential effects of knowledge, attitudes, and beliefs on cervical cancer screening among US-born Latinas, Mexicans, Salvadorans, Anglo Americans, and physicians in California, this research purposively selected participants recruited from a semi-rural health care setting in west-central Florida to explore subgroup differences. Since the HPV vaccine approvals in the US and the related media coverage are relatively recent events – within the last five years – it was hypothesized that a sample recruited from the clinic setting would be more likely to be knowledgeable about cervical cancer risk factors, prevention methods and the vaccine, a necessary precursor in order for respondents to answer meaningfully to the survey questions.

Following from the previous work by Chavez et al. (1995), the primary research aim was to explore cultural models of knowledge, attitudes, and beliefs about cervical cancer risk factors between subgroups of Latinas and Anglo American women attending low-income-serving clinics, and health care workers (as a proxy for the biomedical model). Specifically, by comparing and contrasting these subgroups, it was hypothesized that there would be cultural differences between the subgroups around HPV and cervical cancer knowledge, attitudes, and beliefs and the relative importance ascribed to cervical cancer risk factors. Huerta and Macario (1999) emphasize the importance of understanding a group's core cultural values for developing relevant communications. Thus, such variations within Latino subethnicities would have important implications for the development of culturally targeted educational materials.

Methods

Study design

This study employed a cross-sectional mixed methods survey design to gather data from patients in clinic waiting rooms and health care workers and providers who served them. In order to facilitate recruitment, the study team engaged key stakeholders at a migrant-serving health clinic, and a nearby federally-qualified community health center. This study was approved by the Office of the Institutional Review Board at the University of South Florida.

Study Sample

The study population included Latinas who self identified as Mexican, Honduran, or Puerto Rican, along with Anglo American women and primarily Latina health care workers (HCW) who served this population. This pilot study used a quota sample of women recruited from the waiting rooms in two clinic settings located in the same geographic vicinity. For the

patient survey, participants were screened for study inclusion based on age (18 to 55 years old), cancer history (no previous diagnosis of cervical cancer), and language (either English or Spanish speaking). From prior research in these clinics, the research team had collected cervical cancer screening chart audit data suggesting that the women receiving screening would be largely in this age range, and the study aimed to limit sample variability based on generational differences. For the HCW survey, the inclusion criteria were that they be 18 years old or older and worked as clinic staff, ranging from outreach workers to nursing staff.

Survey Development

Patient Survey—The patient survey was initially developed based on a combination of questions drawn from the cervical cancer section of the NCI HINTS survey (Nelson et al. 2004), and from the work of Scarinci et al. (2007) and Chavez et al. (1995, 2001). The final version of the survey included three main sections: (1) cervical cancer knowledge questions; (2) structured questions on cervical cancer risk factor knowledge, attitudes, and beliefs, i.e., agree/disagree questions and ranking in order to conduct cultural consensus analysis; and (3) sociodemographics. The HINTS questions covered Pap testing and clinical history, along with closed-ended questions on HPV knowledge, attitudes, and beliefs. The questions adapted from Scarinci et al. (2007) related to HPV awareness, concerns, and effectiveness of the vaccine, and barriers and motivators for obtaining the vaccine. The questions adapted from Chavez et al. (1995) were a series of 31 agree/disagree questions on cervical cancer knowledge, attitudes, and beliefs and a ranking exercise, which asked participants to rank 15 items on the likelihood of causing cervical cancer. The agree/disagree questions were separated into 24 questions on possible risk factors and seven questions on attitude and belief statements. The survey was professionally translated by a certified translator from English to Spanish, and the Spanish verbiage was further modified through pilot testing. Lay language was used for Spanish terms and aimed for a low literacy level to ensure comprehension.

Pilot testing of the patient survey for readability, ease of understanding, and difficulty level was carried out with 10 community informants of similar ethnic backgrounds as the target population (both in English and Spanish). We completed two rounds of revisions to ensure face validity, wording, and ease of administration. The final patient survey contained 92 questions, including demographic questions which included a validated language acculturation scale (Marin and Gamba 1996).

After the survey was developed, we conducted an initial survey phase of 12 participants (three women each of Mexican, Honduran, Puerto Rican, and Anglo American origin) to collect freelisting data to create items for the ranking exercise section of the survey. This section was then incorporated into the final survey, which was then administered to an additional 68 participants (17 women from each group). Sample size was determined using an assumed average level of cultural competence (0.5) – represented here by a proportion of questions answered correctly – and strict criteria for proportion of items ordered correctly (95% confidence level), producing a minimum of 17 participants per group (Weller and Romney 1988). Two versions of the final survey were created, in order to control for question order bias. Survey administration via face-to-face interviews was carried out by a trained, bilingual female interviewer (NV). There was an overall survey response rate of 83 percent for the 80 completed surveys.

Health Care Worker Survey—Concurrent with the patient survey, the team developed a HCW survey. This survey included the same agree/disagree and ranking questions on cervical cancer risk factors as the patient survey, but did not include the HINTS questions on screening history and HPV knowledge, since we were not interested in their gynecological

health histories. In addition, there were questions asking HCWs to characterize their patient population and discuss their patients' attitudes toward the HPV vaccine. These surveys were pretested with eight HCWs prior to administration to ensure readability, ease of understanding, and face validity. The HCW surveys were digitally recorded and transcribed. In order to compare the results of the structured questions, an identical sample size was selected (n=17) for the purposes of the subgroup analysis with the patient surveys. For the HCW surveys, there was a 94 percent response rate for the 17 completed surveys, administered in face-to-face interviews by two of the study investigators (JL, HC).

Data Analysis

Survey data were entered into a database by participant ID number. Data were exported into a spreadsheet program and then imported into SPSS, Version 17.0 (Chicago, IL) for data cleaning, frequency distributions, univariate analysis, and categorical data analysis. All statistical tests were two-tailed with an alpha level set at 0.05.

Cultural Consensus Analysis

In addition to using established survey methods to explore subgroup differences, this study employed cultural consensus analysis (CCA), a quantitative method to analyze structured qualitative data. CCA uses a mathematical measurement model that derives from a cognitive theory of culture in cultural anthropology (Romney, Weller, and Batchelder 1986). This theory posits that cultural models are shared between members of the same group, meaning that such members have a similar set of guidelines for a particular domain. CCA is used to explore this domain through systematic elicitation techniques such as freelists, triad tests, and ranking exercises. While the CCA model has been critiqued as advocating an idealist view that people agree with each other on particular cultural domains, Romney (1999) has defended the model for its grounding in systematic data collection and appropriate statistical analysis. Romney acknowledges that model fit does not necessarily mean that culture or learning is the sole explanation for knowledge sharing. The analysis uses a measurement model in order to calculate the level of shared knowledge within groups and solves for individual estimates of cultural competency, as well as the average level of competency for the group, and produces a “culturally correct” answer key. This model has been used effectively to explore cultural domains of breast and cervical cancer, prostate cancer, diabetes, malaria, HIV/AIDS, depression, and various folk illnesses (Baer et al. 2008; Chavez et al. 2001; Dressler 2005; Luque et al. in press, Trotter et al. 1999).

Data for the structured responses (rank order and dichotomous response) were analyzed with UCINET 6.0 (Harvard, MA) in order to conduct CCA using the covariance method. Principal components analysis produces eigenvalues to characterize the dimensionality of the solution. If the ratio of the first to second eigenvalue is larger than 3.0, then it denotes a substantial amount of sharing of the cultural model, justifying the assertion of a single factor solution. This study employed the formal consensus analysis method on the categorical response data (Weller and Baer 2002). In order to calculate the between-sample agreement, the proportion of “unique” attitudes and beliefs were calculated using the within- and between-group agreement differences based on competence values as described by Weller and Baer (2002) and Moore et al. (1999). In addition, average competence values between groups were compared using the one-way ANOVA test, and estimated correlations among samples were calculated with Spearman's method. These procedures allowed for the comparison of groups to characterize both within- and between-group agreement.

Qualitative Data Analysis

Short answer qualitative data from the patient surveys were analyzed by two independent reviewers to identify codes and themes and quantify common response categories using

content analysis techniques (Bauer 2000). The first reviewer (DMT) identified the codes and themes, and the second reviewer (HC) identified illustrative quotes, further refined the categories, and performed the content analysis. The HCW surveys contained more open-ended questions and were recorded and transcribed; therefore, two other independent reviewers (JL, NV) employed a thematic analysis approach by developing codes and the codebook in the MAXQDA 2007 software package (Marburg, Germany) during the process of analysis (Joffe and Yardley 2004). After analyzing two of the 17 transcripts using this codebook, the reviewers calculated an inter-rater reliability kappa coefficient of 0.80. Both pairs of coders developed codes and themes, and analyzed the qualitative data. Qualitative data were used to explain the quantitative data results.

Results

Demographic Characteristics – Patients

Demographic data for all 80 patients by ethnic group are summarized in Table 1. The average age of survey participants was 35 years old (standard deviation (SD) = 9.1). The majority of patients were married (58%) or living with a partner (18%), with higher proportions of Mexican and Honduran women married than Puerto Rican and Anglo American women. There was a range of educational backgrounds, with 65 percent having either high school education or less. Puerto Rican and Anglo American women had an average 13 years of education compared to the eight years of education for the Mexican and Honduran group. Household income was measured by categories for weekly income, and Puerto Rican and Anglo American households earned significantly more than Mexican and Honduran households and had higher proportions of home owners. There were significant differences in insurance status, with Mexican and Hondurans largely uninsured and the Puerto Rican and Anglo American participants insured. However, most Anglo American women were insured by the income-dependent county health plan, and the Puerto Rican women were largely insured through their employer. Puerto Ricans scored significantly higher on the English language scale than Mexican or Honduran participants, meaning they were comfortable with both languages.

Demographic Characteristics – Health Care Workers

The 17 female HCWs participating in the study were all working in one of the participant recruitment sites, a federally-qualified community health center. The average age of the HCWs was 42 years old (SD = 11.8). Most were married (71%), and Latino (94%) (16 of 17), predominately of Puerto Rican (41%) or South American (24%) backgrounds. Most HCWs had post high-school educational training (88%), and two HCWs had graduate degrees. Most HCWs were insured (82%), but a few women did not have health insurance, because of their part-time employment status. The frequency summary of occupational categories included: Medical Assistants (6), Registered Nurses (3), Community Outreach Workers (2), Licensed Practical Nurses (2), Support Staff (2), Nurse Practitioners (1), and Physician Assistants (1).

Cervical Cancer Screening History and Knowledge of HPV and the HPV Vaccine

All patients in the sample had received a Pap smear sometime in their lifetimes; HCWs were not asked health history questions. History of cervical cancer screening and HPV knowledge by group is summarized in Table 2. For the entire study sample, most participants were up-to-date, within 3 years, for their last Pap smear (91%). For receiving a Pap smear within 3 years before the most recent Pap, the proportion dropped to 76 percent, also with no significant difference between groups. There were, however, significant differences between groups for those women who had heard of HPV, had heard of the HPV vaccine, and thought HPV might cause abnormal Pap smears. Anglo American and Puerto Rican women were

more likely to have heard of HPV and the HPV vaccine, but only Anglo American women held the belief that HPV might cause abnormal Pap smears. Relatively low proportions of participants believed that HPV would go away on its own without treatment – a common outcome – or that HPV was an uncommon infection, which it is not. Approximately 59 percent of participants overall (range = 55–70%) thought the HPV vaccine was an effective way to prevent HPV.

Cultural Consensus Analysis for Dichotomous Data

Patients and HCWs responded to a series of questions with dichotomous response categories (agree/disagree) replying to the question of whether each risk factor possibly increased the chance of someone getting cervical cancer as well as statements regarding cervical cancer attitudes and beliefs (Table 3). The average within-sample agreement levels were marginally higher (.54, SD = .17) compared to between-sample agreement levels (.53, SD = .17), leaving a unique difference of .01 (Table 4). There was no statistically significant difference between average within-sample agreement levels. Moreover, there was cultural consensus both within each subgroup and for all groups together (overall eigenratio = 5.78). The HCWs had the highest mean competency levels (.60, SD = .14), followed by the subgroups, Anglo American (.57, SD = .16), Mexican (.54, SD = .17), Puerto Rican (.53, SD = .16), and Honduran (.46, SD = .21). In order to further explore between-group differences, each of the ten possible pairs met the eigenvalue ratio criteria for consensus. Using Spearman's method for the dichotomous data, the overall shared knowledge expressed as a correlation coefficient was .92. The following five correlation coefficients, (2 high, 3 low) out of ten possible pairs, show the range of correlations: Puerto Rican and Anglo American women ($r = .98$), Puerto Rican and Mexican women ($r = 0.98$), Anglo American and Honduran women ($r = 0.76$), Mexican and HCWs ($r = 0.76$), and Honduran and HCWs ($r = .74$).

The majority of survey participants agreed that the following were risk factors for cervical cancer: sex before age 16, multiple sex partners, spouse with multiple sex partners, family history, abnormal vaginal bleeding, not getting a regular check-up, HIV infection, and Chlamydia. Likewise, the majority across subgroups disagreed that the following risk factors were related to cervical cancer: urinating frequently, diet, and low income. The majority of Latina participants agreed that birth control pills, abortion, sex during a woman's period were risk factors, but HCWs and Anglo American women disagreed. All participants agreed that poor feminine hygiene and vaginal trauma (described as blows to the vagina) were risk factors, but HCWs disagreed. For attitudes and beliefs, the majority of patients across subgroups agreed that early detection of cervical cancer promised a cure and that the tradeoff for undergoing unpleasant cancer treatments was worth the cost if it increased survival chances. Although the majority of patients disagreed with the statement, I need a Pap smear only when I experience vaginal bleeding other than menstruation, a small percentage of the Latinas agreed, which matched the responses for abnormal vaginal bleeding as a possible symptom. In contrast, for the statement, I am very likely to get cervical cancer sometime in my lifetime, Mexican and Honduran women were more likely to agree, and the other three subgroups were more likely to disagree.

Cultural Consensus Analysis for Rank Data

For causes of cervical cancer determined by the 15-item ranking exercise, according to the “culturally correct” answer key, HPV was ranked first by HCWs, Anglo American, and Puerto Rican women (Table 5). All five subgroups ranked multiple sex partners as one of the top two causes, besides Puerto Rican women who ranked it third. Honduran women ranked abnormal vaginal bleeding as the top cause. Mexican women ranked HPV as the fifth highest cause and Honduran women ranked it tenth. Diet and fate ranked as the least important causes for all participants. The average within-sample agreement levels were

slightly higher (.56, SD = .29) compared to between-sample agreement levels (.53, SD = .31), leaving a unique difference of .03 (Table 6). Similar to the dichotomous data results, the difference between average within-sample agreement levels was not statistically significant. Likewise, there was cultural consensus both within each subgroup and for all subgroups analyzed together (overall eigenratio = 4.20). The Mexican women had the highest mean competence values (.68, SD = 0.17), followed by HCWs (.60, SD = .20), Anglo American women (.60, SD = .32), Puerto Rican (.49, SD = .35), and Honduran women (.43, SD = .31). Using Spearman's method for the rank data, the overall shared knowledge using the correlation coefficient was 0.87. The following four correlation coefficients (2 high, 2 low) are presented to report the range: Anglo American women and HCWs ($r = .98$), Puerto Rican and Anglo women ($r = .98$), Honduran and Anglo women ($r = .69$), and Honduran women and HCWs ($r = .61$).

Qualitative Responses from Patient Survey Questions on the HPV Vaccine

A content analysis was performed on three questions relating to the HPV vaccine: 1) *what are your concerns with a vaccine such as this*; 2) *what would keep someone from getting the vaccine*; and 3) *what would motivate a woman to get the vaccine*. Of the 65 percent of patients who reported concerns, the top unprompted response categories included: 1) needing more information, 2) potential side effects, 3) concern about vaccinating young girls, and 4) encouragement of sexual activity in young girls. Puerto Rican women were characterized by higher proportions of responses in these latter two categories. For example, a Puerto Rican woman stated, "It's scary because I have teenagers. I think I educate them but I also don't want to encourage them to be sexually active by telling them about the vaccine."

Relating to barriers to receiving the HPV vaccine, the top unprompted response categories were: (1) lack of information, (2) cost (also whether insurance would cover it), (3) fear of a new vaccine, and (4) access barriers (time, transportation, immigration status, and location). More than half of the Mexican participants cited cost and access barriers. Puerto Rican women had the highest proportion reporting lack of information. Hondurans were most likely to report not knowing where to obtain the vaccine. One Honduran woman responded, "There is no education in the schools, and a lack of information programs."

For the third question concerning motivation to receive the vaccine, the top response categories were: 1) wanting more information about the vaccine; 2) emphasizing the prevention benefits; 3) desiring to stay healthy, and 4) physician recommendation. The Anglo American women cited physician recommendation as a motivator more often than the other groups and were also the group with the highest proportion requesting more information about the vaccine as a motivating factor. One Anglo American woman responded, "If their doctors make it an option, inform them about it, and they tell people more ... if they tell you why it's important you'd be more likely to go and take some time out to get it."

Qualitative Responses from HCW Survey Questions

The researchers also questioned the HCWs about their perceptions of their patients' attitudes toward the HPV vaccine. The HCWs cited a keen interest on the part of their mostly Latino patient base to learn more, ask questions about the vaccine, and have an interest in getting the vaccine for themselves or for their children. One HCW responded, "Once you explain to them what it does and that it's a preventive measure – I think they're very receptive at this point." Nevertheless HCWs cited knowledge deficits and the need for education, explaining that their patients were confused between HIV and HPV, mistakenly thinking the HPV vaccine protected against HIV. Relating to barriers to vaccine access, HCWs listed both structural and cultural reasons. First, HCWs stated the problem of patients not completing

the full course of vaccinations because of the high cost or because of time challenges (e.g., conflicting work schedules). Second, not just for vaccinations, but for other medical procedures, HCWs noted that some immigrants would return to their home countries for medical services. Third, they felt that cultural attitudes and beliefs such as cancer fatalism, psychosocial issues like depression, and traditional gender roles against talking about certain issues between couples complicated addressing health issues in their largely Mexican patient population.

Discussion

This research sought to explore whether competing cultural models around cervical cancer might be identified in participants attending health clinics and to explore differences in knowledge, attitudes and beliefs about HPV, the HPV vaccine, and cervical cancer screening. This study found that for low-income Latina and Anglo American women, and HCWs, the cultural model of cervical cancer risk was shared to a great degree, justifying the assertion of a single factor solution. However, further subgroup analysis revealed subtle differences between the Honduran group and both the Anglo American women and HCWs.

In Chavez et al. (2001), individual Latinas' correlation with the ideal physicians' ranking of cervical cancer risk factors correlated negatively with use of Pap smears (OR = 0.60), which appears to be counterintuitive. However, the authors argued that Latinas whose cultural model emphasized sex-related risk factors – similar to the biomedical model of HPV transmission – would be less likely to be screened because of the associated moral stigma. In contrast, Latinas whose cultural model correlated with the Anglo American model, emphasizing the hereditary nature of cancer, were more likely to be screened (OR = 1.67). Given the substantial amount of overlap in the findings from the two systematic elicitation techniques, this research did not find competing cultural models, even when including a sample of HCWs, suggesting that there might be a range of beliefs even within the biomedical model. The lack of a strong consensus between the HCWs on cervical cancer risk factors, as well as the qualitative findings which found varying levels of understanding of the HPV vaccine, suggest that continuing education for all HCWs on this timely topic is needed.

The study results partially replicated Chavez' findings for the rankings, inasmuch as the Anglo American and HCW groups ranked family history higher than the Mexican and Honduran groups, yet, all groups also ranked multiple sex partners very high. The Honduran group was the only group to place abnormal vaginal bleeding, chemicals in food, and poor feminine hygiene into their top five ranking responses. Further research with a larger sample of Honduran women might reveal some significant differences with the biomedical model or Anglo American model that could be explored in relation to cervical cancer screening or HPV vaccine uptake.

Major cervical cancer risk factors identified by the American Cancer Society (2009) include HPV, smoking, HIV infection, Chlamydia, and diet. Neither smoking nor diet was ranked high by any subgroup, suggesting the need for more education on lifestyle changes for cancer prevention for both HCWs and patients. Additional analyses to determine between-group differences found that for both dichotomous and ranked data, differences between Puerto Rican women and Honduran women were more pronounced than any of the other group pairs. This finding might be a result of different cultural illness beliefs on this domain, and not differences in sociodemographic characteristics, since the Honduran women and Mexican women were very similar in terms of sociodemographics, but cultural illness belief differences were not pronounced between the Mexican and Puerto Rican women.

The results of the CCA found more similarities between the cultural models of the Puerto Ricans, Anglo Americans, and HCWs than the Mexican and Honduran groups, which may be a function of some sociodemographic characteristics, such as education level. Moreover, for the knowledge questions about HPV, the Mexican and Honduran groups were less likely to have heard of HPV and the HPV vaccine as the other patient groups, or to know of the association between HPV and an abnormal Pap test. A recent study found the greatest differences for HPV and HPV vaccine awareness to be a function of sociodemographic characteristics, particularly race and ethnicity (Hughes et al. 2009). However, the findings of this study suggest that language acculturation could be a factor as well, given the differences between the Mexican and Hondurans compared to the Puerto Ricans. Moreover, negative attitudes toward the HPV vaccine were reported in terms of the need for more information and concern about young daughters receiving the vaccine, themes also reported in a qualitative study by Bair (2008). Another study found that parental acceptance of the HPV vaccine was lower among Latinos in the US when compared to parents from Latin American countries, possibly as a function of higher education among US subjects or history of abnormal cytology in the Salvadoran sample (Podolsky et al. 2009). The study findings suggest that Mexican and Honduran participants' lack of HPV awareness and knowledge may be a function of lower education, low English language acculturation, and lack of exposure to media messages, resulting in their categorization as late majority adopters, according to the Diffusion of Innovations model. However, the effect of other sociodemographic characteristics as possible factors to explain either similarities or dissimilarities in cultural beliefs around cervical cancer merits further research.

From the qualitative data results, women had concerns relating to the unknown effects of the HPV vaccine. Specifically, they were concerned about potential side effects in what was perceived to be a “new” vaccine (in some cases implying this meant “untested for long-term effects”). Some women were specifically hesitant about vaccinating young girls, both because of potential long-term side effects and the possibility of condoning or encouraging sexual activity. This clearly points to the need for more information dissemination about the vaccine's safety and negligible impact on sexual behavior. However, women did report they would be motivated to receive the vaccine if they “had more information,” not only about side effects but also about the vaccine's preventative value and would prefer if the message were underscored by physician recommendation. Furthermore, HCWs clearly felt that their Latina patient population was open toward receiving the vaccine and eager to learn more.

It continues to be seen that groups of individuals who are faced with the persistent demands of an increasingly complicated health care system often fall behind more literate groups in adopting and using health education and promotion procedures and interventions (Meade et al. 2007; Murphy-Knoll 2007). People need to have advice that makes sense to them, that is easily understood and is logical from their cultural perspective and situational reality (Doak et al., 1996; Meade, in press). This means creating understandable messages about HPV that are informative, empowering and usable. Thus, our findings have high relevance for improving the health literacy of Latino subethnicities, and offer significant implications for the development of messages on the topic of HPV. Specifically, three possible causal points for intervention along the health care continuum could be explored: access and utilization, patient-provider interactions and self-care (Paasche-Orlow and Wolf 2007). Further, the use of a health literacy framework is suggested to guide future education efforts. A framework for conceptualizing health literacy, as outlined by Nutbeam (2008), offers a wider perspective of health literacy beyond functional health literacy (e.g., comprehension of subject matter), and encompasses interactive health literacy (increasing skills to interact with provider) and critical health literacy (enhancing capacity to use the information and act on it). In this way, findings such as those described in this article, can be introduced into health education programs to help learners to not only understand information, but also to interact

with health care providers in a meaningful manner, and to make well-informed decisions about new health behaviors.

While the strengths of this pilot study have been highlighted, there were also some limitations. Even though differences in knowledge, beliefs, and attitudes were found between subgroups, the study did not find statistically significant differences between cultural competence values of the patient subgroups and the HCWs. This may partly be explained by the small clinic-based sample size and nonrandom selection of participants. In order to perform logistic regression to determine whether differences in cultural consonance with the physician model or Anglo American model predict cervical cancer screening, a larger, randomly selected sample would be necessary (Dressler 2005). Since all patients and HCWs were recruited from two sites in a particular geographical region of semi-rural, central Florida, there may have been less variation between participants despite their different ethnic backgrounds and educational levels. The results of the CCA point to possible cultural differences that might be more pronounced with a larger random and more geographically diverse participant sample.

Conclusion

This study describes methods for assessing knowledge, attitudes and beliefs of Latina women in order to inform cervical cancer prevention and control efforts with Latino subethnicities. The survey results indicate that the Latina migrant farmworker patient population (Mexicans and Hondurans) had different perceptions of risk factors and lower levels of HPV knowledge than Puerto Ricans or Anglo Americans. In addition, this study contributes to the literature on characterizing the biomedical model related to cervical cancer (i.e., the biomedical model held by physicians may not mirror the model held by other health care staff). One would hypothesize that the HCWs would share more of a consensus on cervical cancer risk factors than the patient subgroups, but given the diversity of the HCW sample, there was significant within-group variation. HCWs need to employ effective strategies to encourage and influence age-appropriate uptake of the HPV vaccination and regular cervical cancer screening among their patients.

This pilot study presents an innovative approach toward the use of CCA to identify target areas for health education based on resulting cultural models of illness. While CCA methodology has been frequently used in medical anthropology studies to explore cultural models of illness knowledge, attitudes, and beliefs, this methodology might also be used in evaluation of lay health advisor or other health education intervention programs to measure changes in knowledge in target populations over time. While not a common use of the methodology, this approach may complement the standard pretest/posttest evaluation approach through measurement of changes in cultural knowledge. Future studies will examine the effect of a lay health advisor education and outreach program on cervical cancer knowledge, attitudes and beliefs among Mexican and Guatemalan immigrants in southern Georgia using the CCA methodology to measure this dimension of the program's effects.

The pilot curriculum modules on cervical cancer prevention that are currently being developed focus on awareness and knowledge of risk factors, as well as recommendations for routine cervical cancer screening and HPV vaccine uptake. Moreover, a directory of resources will direct women toward cervical cancer screening services and provide information to reduce screening barriers using culturally- and literacy-appropriate materials. Given the second phase of the study is currently being conducted in rural, southern Georgia, access to health care providers is one of the major barriers. While many studies in the US have shown that low levels of knowledge about cancer etiology are negatively associated

with regular cervical cancer screening practices, other barriers such as transportation, rising health care costs, and work and family conflicts may present even greater challenges to practitioners working to reduce cervical cancer disparities.

Acknowledgments

Funding source: National Institutes of Health, National Cancer Institute

This publication was supported by Grant Number R03 CA138123, Small Grants for Behavioral Research in Cancer Control, National Cancer Institute. Preliminary studies providing initial pilot data were provided by Grant Number U01 CA114627 from the National Cancer Institute. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the National Cancer Institute.

REFERENCES CITED

- American Cancer Society. Cancer Facts and Figures 2009. American Cancer Society; Atlanta: 2009.
- Baer, Roberta D.; Weller, Susan C.; Garcia de Alba Garcia, Javier E.; Salcedo-Rocha, Ana L. Cross-Cultural Perspectives on Physician and Lay Models of the Common Cold. *Medical Anthropology Quarterly*. 2008; 22(2):148–166. [PubMed: 18717364]
- Bair, Rita M.; Mays, Rose M.; Sturm, Lynne A.; Zimet, Gregory D. Acceptability of the Human Papillomavirus Vaccine among Latina Mothers. *Journal of Pediatric and Adolescent Gynecology*. 2008; 21(6):329–334. [PubMed: 19064226]
- Bauer, Martin W. Classical Content Analysis: A Review. In: Bauer, Martin W.; Gaskell, George, editors. *Qualitative Researching with Text, Image, and Sound*. Sage; London: 2000. p. 131-151.
- Bosetti C, Malvezzi M, Chatenoud L, Negri E, Levi F, La Vecchia C. Trends in Cancer Mortality in the Americas, 1970–2000. *Annals of Oncology*. 2005; 16(3):489–511. [PubMed: 15668262]
- Byrd, Theresa, L.; Chavez, Rafaelita; Wilson, Katherine M. Barriers and Facilitators of Cervical Cancer Screening among Hispanic Women. *Ethnicity and Disease*. 2007; 17(1):129–134. [PubMed: 17274222]
- Chavez, Leo R.; McMullin, Juliet M.; Martinez, Rebecca G.; Mishra, Shiraz I.; Hubbell, F. Allan Beliefs Matter: Cultural Beliefs and the Use of Cervical Cancer-Screening Tests. *American Anthropologist*. 2001; 103(4):1114–1129.
- Chavez, Leo R.; McMullin, Juliet M.; Mishra, Shiraz I.; Hubbell, F. Allen Structure and Meaning in Models of Breast and Cervical Cancer Risk Factors: A Comparison of Perceptions among Latinas, Anglo Women, and Physicians. *Medical Anthropology Quarterly*. 1995; 9(1):40–74. [PubMed: 7697550]
- Coronado, Gloria D.; Thompson, Beti; Koepsell, Thomas D.; Schwartz, Stephen M.; McLerrana, Dale. Use of Pap Test among Hispanics and Non-Hispanic Whites in a Rural Setting. *Preventive Medicine*. 2004; 38(6):713–722. [PubMed: 15193891]
- Coughlin, Stephen S.; Wilson, Katherine M. Breast and Cervical Cancer Screening among Migrant and Seasonal Farmworkers: A Review. *Cancer Detection and Prevention*. 2002; 26(3):203–209. [PubMed: 12269767]
- Doak, Leonard G.; Doak, Cecilia C.; Meade, Cathy D. Strategies to Improve Cancer Education Materials. *Oncology Nursing Forum*. 1996; 23(8):1305–1312. [PubMed: 8883075]
- Downs, Levi S.; Smith, Jennifer S.; Scarinci, Isabel; Flowers, Lisa; Parham, Groesbeck. The Disparity of Cervical Cancer in Diverse Populations. *Gynecologic Oncology*. 2008; 109(2 Suppl):S22–30.
- Dressler, William W. Measuring Cultural Consonance: Examples with Special Reference to Measurement Theory in Anthropology. *Field Methods*. 2005; 17(4):331–355.
- Freeman, Harold P.; Wingrove, Barbara K. NIH Pub. No. 05-5282. National Cancer Institute, Center to Reduce Cancer Health Disparities; 2005. Excess Cervical Cancer Mortality: A Marker for Low Access to Health Care in Poor Communities.
- Hanson, Eric; Donohoe, Martin. Health Issues of Migrant and Seasonal Farmworkers. *Journal of Health Care for the Poor and Underserved*. 2003; 14(2):153–164. [PubMed: 12739296]
- Hiatt, Robert A.; Pasick, Rena; Stewart, Susan; Bloom, Joan; Davis, Patricia; Gardiner, Phillip; Johnston, Monica; Luce, Judith; Schorr, Kimberley; Brunner, Wendel; Stroud, Florence.

- Community-Based Cancer Screening for Underserved Women: Design and Baseline Findings from the Breast and Cervical Cancer Intervention Study. *Preventive Medicine*. 2001; 33(3):190–203. [PubMed: 11522160]
- Howe, Holly L.; Wu, Xiaocheng; Ries, Lynn A. G.; Cokkinides, Vilma; Ahmed, Faruque; Jemal, Ahmedin; Miller, Barry; Williams, Melanie; Ward, Elizabeth; Wingo, Phyllis A.; Ramirez, Amelie; Edwards, Brenda K. Annual Report to the Nation on the Status of Cancer, 1975–2003, Featuring Cancer Among U.S. Hispanic/Latino Populations. *Cancer*. 2006; 107(8):1711–1742. [PubMed: 16958083]
- Howell, Lydia; Gurusingheb, Sunitha; Tabnack, Farzaneh; Sciortinob, Stan. Cervical Cancer Screening in Medically Underserved California Latina and Non-Latina Women: Effect of Age and Regularity of Pap Testing. *Cancer Detection and Prevention*. 2009; 32(5–6):372–379. [PubMed: 19264426]
- Huerta, Elmer E.; Macario, Everly. Communicating Health Risk to Ethnic Groups: Reaching Hispanics as a Case Study. *Journal of National Cancer Institute Monographs*. 1999; 25:23–26.
- Hughes, Jessica; Cates, Joan R.; Liddon, Nicole; Smith, Jennifer S.; Gottlieb, Sami L.; Brewer, Noel T. Disparities in How Parents are Learning about the Human Papillomavirus Vaccine. *Cancer Epidemiology, Biomarkers, and Prevention*. 2009; 18(2):363–372.
- Jacobs, Elizabeth A.; Karavolos, Kelly; Rathouz, Paul J.; Ferris, Timothy G.; Powell, Lynda H. Limited English Proficiency and Breast and Cervical Cancer Screening in a Multiethnic Population. *American Journal of Public Health*. 2005; 95(8):1410–1416. [PubMed: 16043670]
- Joffe, Helene; Yardley, Lucy. Content and Thematic Analysis. In: Marks, David F.; Yardley, Lucy, editors. *Research Methods for Clinical and Health Psychology*. Sage; London: 2004. p. 56–68.
- Luque, John S.; Rivers, Brian; Gwede, Clement; Kambon, Maisha; Green, B. Lee; Meade, Cathy. Barbershop Communications on Prostate Cancer Screening Using Barber Health Advisers. *American Journal of Men's Health*. In press.
- Marin, Gerardo; Gamba, Raymond J. A New Measurement of Acculturation for Hispanics: The Bidimensional Acculturation Scale for Hispanics (BAS). *Hispanic Journal of Behavioral Sciences*. 1996; 18(3):297–316.
- Martinez-Tyson, Dinorah; Pathak, Elizabeth Barnett; Soler-Villa, Hosanna; Flores, Ann Marie. Looking Under the Hispanic Umbrella: Cancer Mortality among Cubans, Mexicans, and Puerto Ricans and Other Hispanics in Florida. *Journal of Immigrant and Minority Health*. 2009; 11(4):249–257. [PubMed: 18506623]
- McDougall, Jean A.; Madeleine, Margaret; Daling, Janet R.; Li, Christopher I. Racial and Ethnic Disparities in Cervical Cancer Incidence Rates in the United States, 1992–2003. *Cancer Causes and Control*. 2007; 18(10):1175–1186. [PubMed: 17805982]
- Meade, Cathy D.; Menard, Janelle; Martinez, Dinorah; Calvo, Arlene. Impacting Health Disparities through Community Outreach: Utilizing the CLEAN Look (Culture, Literacy, Education, Assessment, and Networking). *Cancer Control*. 2007; 14(1):70–77. [PubMed: 17242673]
- Meade, Cathy D. Community Health Education. In: Nies, Mary A.; McEwen, Melanie, editors. *Community/Public Health Nursing*. Elsevier; Amsterdam: In press
- Moore, Carmella C.; Romney, A. Kimball; Hsia, Ti-Lien; Rusch, Craig D. The Universality of the Semantic Structure of Emotion Terms: Methods for the Study of Inter- and Intra-Cultural Variability. *American Anthropologist*. 1999; 101(3):529–546.
- Murphy-Knoll, Linda. Low Health Literacy Puts Patients At Risk: the Joint Commission Proposes Solutions to National Problem. *Journal of Nursing Care Quality*. 2007; 22(3):205–209. [PubMed: 17563587]
- Nelson, David; Kreps, Gary; Hesse, Bradford; Croyle, Robert; Willis, Gordon; Arora, Neeraj; Rimer, Barbara; Viswanath, K. Vish; Weinstein, Neil; Alden, Sara. The Health Information National Trends Survey (HINTS): Development, Design, and Dissemination. *Journal of Health Communication*. 2004; 9(5):443–460. [PubMed: 15513791]
- Newmann, Sara J.; Garner, Elizabeth O. Social Inequities Along the Cervical Cancer Continuum: A Structured Review. *Cancer Causes and Control*. 2005; 16(1):63–70. [PubMed: 15750859]
- Nutbeam, Don. The Evolving Concept of Health Literacy. *Social Science and Medicine*. 2008; 67(12):2072–2078. [PubMed: 18952344]

- Paasche-Orlow, Michael K.; Wolf, Michael S. The Causal Pathways Linking Health Literacy with Health Outcomes. *American Journal of Health Behavior*. 2007; 31(Suppl. 1):S19–26. [PubMed: 17931132]
- Patel, Nitin R.; Rollison, Dana E.; Barnholtz-Sloan, Jill; MacKinnon, Jill; Green, Lee; Giuliano, Anna R. Racial and Ethnic Disparities in the Incidence of Invasive Cervical Cancer in Florida. *Cancer*. 2009; 115(17):3991–4000. [PubMed: 19544552]
- Podolsky, Rebecca; Cremer, Miriam; Atrio, Jessica; Hochman, Tsivia; Arslan, Alan A. HPV Vaccine Acceptability by Latino Parents: A Comparison of U.S. and Salvadoran Populations. *Journal of Pediatric and Adolescent Gynecology*. 2009; 22(4):205–215. [PubMed: 19646665]
- Ramirez, Amelie G.; Gallion, Kipling J.; Suarez, Lucina; Giachello, Aida L.; Marti, Jose R.; Medrano, Martha A.; Perez-Stable, Eliseo J.; Talavera, Gregory A.; Trapido, Edward J. A National Agenda for Latino Cancer Prevention and Control. *Cancer*. 2005; 103(11):2209–2215. [PubMed: 15822119]
- Rogers, Everett M. *Diffusion of Innovations*. Free Press; New York: 1995.
- Romney, A. Kimball; Weller, Susan C.; Batchelder, William H. Culture as Consensus: A Theory of Culture and Informant Accuracy. *American Anthropologist*. 1986; 88(2):313–338.
- Romney, A. Kimball Culture Consensus as a Statistical Model. *Current Anthropology*. 1999; 40(Suppl.):S103–115.
- Scarinci, Isabel C.; Garces-Palacio, Isabel C.; Partridge, Edward E. An Examination of Acceptability of HPV Vaccination among African American women and Latina Immigrants. *Journal of Women's Health*. 2007; 16(8):1224–1233.
- Trotter, Robert T., II; Weller, Susan C.; Baer, Roberta D.; Pachter, Lee M.; Glazer, Mark; Garcia de Alba Garcia, J Javier E.; Klein, Robert E. Consensus Theory Model of AIDS/SIDA Beliefs in Four Latino Populations. *AIDS Education and Prevention*. 1999; 11(5):414–426. [PubMed: 10555625]
- Vanslyke, Jan G.; Baum, Julie; Plaza, Veronica; Otero, Maria; Wheeler, Cosette; Helitzer, Deborah L. HPV and Cervical Cancer Testing and Prevention: Knowledge, Beliefs, and Attitudes Among Hispanic Women. *Qualitative Health Research*. 2008; 18(5):584–596. [PubMed: 18337618]
- Watson, Meg; Saraiya, Mona; Benard, Vicki; Coughlin, Stephen S.; Flowers, Lisa; Cokkinides, Vilma; Schwenn, Molly; Huang, Youjie; Giuliano, Anna. Burden of cervical cancer in the United States, 1998–2003. *Cancer*. 2008; 113(10 Suppl):2855–2864. [PubMed: 18980204]
- Watts, Luisa A.; Joseph, Naima; Wallace, Maria; Rauh-Hain, Jose A.; Muzikansky, Alona; Growdon, Whitfield B.; del Carmen, Marcela G. HPV Vaccine: A Comparison of Attitudes and Behavioral Perspectives Between Latino and Non-Latino Women. *Gynecologic Oncology*. 2009; 112(3):577–582. [PubMed: 19150120]
- Weller, Susan C.; Baer, Roberta D. Measuring Within- and Between-Group Agreement: Identifying the Proportion of Shared and Unique Beliefs Across Samples. *Field Methods*. 2002; 14(1):6–25.
- Weller, Susan C.; Romney, A. Kimball *Systematic Data Collection*. Sage Publications; London: 1988.
- Zambrana, Ruth E.; Breen, Nancy; Fox, Sarah A.; Gutierrez-Mohamed, Mary Lou. Use of Cancer Screening Practices by Hispanic Women: Analyses by Subgroup. *Preventive Medicine*. 1999; 29:466–477. [PubMed: 10600427]

Table 1

Demographic Characteristics of Client Survey Participants by Ethnic Group

Characteristic	Mexican (n=20)	Honduran (n=20)	Puerto Rican (n=20)	Anglo American (n=20)
Age, years	32.7 (19–51)	35.9 (23–54)	35.6 (19–50)	38.9 (21–50)
Years of schooling	8.2 ^{***} (0–13)	8.6 (4–18)	13.5 (7–20)	13.2 (9–16)
Years in U.S.	11.9 ^{**} (3–36)	11.3 (3–31)	12.1 (2–37)	N/A
Income/week	\$275 ^{***} (\$0–\$650)	\$275 (\$0–\$750)	\$540 (\$0–>\$1,200)	\$400 (\$0–>\$1,200)
English language scale, 4-point scale	1.6 ^{***} (1–4)	1.6 (1–3)	3.0 (1–4)	N/A
Marital status				
Married/living together	19 (95%) [*]	16 (80%)	14 (70%)	11 (55%)
Single/Other	1 (5%)	4 (20%)	6 (30%)	9 (45%)
Currently employed	14 (70%)	9 (45%)	15 (75%)	8 (45%)
Regular health care provider	3 (15%) ^{***}	5 (25%)	14 (70%)	16 (80%)
Health insurance	0 (0%) ^{***}	4 (20%)	12 (60%)	16 (80%)
Residence				
Rent	16 (80%)	16 (80%)	14 (70%)	10 (50%)
Own	4 (20%)	4 (20%)	6 (30%)	10 (50%)

Notes: Columns in mean values/ranges for continuous variables and number/percentages for categorical variables. Statistical significance determined by one-way ANOVA test for continuous variables and by Pearson's chi-square test for categorical variables. N/A=not applicable.

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

Table 2

Client Cervical Cancer Screening Hx and HPV Knowledge by Ethnic Group

Characteristic	Mexican (n=20)	Honduran (n=20)	Puerto Rican (n=20)	Anglo American (n=20)
Women who have had a Pap smear within the past 3 years	19 (95%)	19 (95%)	17 (85%)	18 (90%)
Women whose Pap smear before the most recent Pap was within the past 3 years	16 (80%)	16 (80%)	16 (80%)	13 (65%)
Women who have heard of HPV	7 (35%)**	7 (35%)	13 (65%)	17 (85%)
Women who think HPV causes cervical cancer	5 (25%)	5 (25%)	8 (40%)	9 (45%)
Women who think HPV is sexually transmitted	6 (30%)	6 (30%)	7 (35%)	12 (60%)
Women who think HPV is uncommon	4 (20%)	6 (30%)	5 (25%)	6 (30%)
Women who think HPV will go away on its own without treatment	0 (0%)	0 (0%)	1 (5%)	2 (10%)
Women who think HPV can cause abnormal Paps	3 (15%)***	4 (20%)	8 (40%)	14 (70%)
Women who think HPV can affect a woman's ability to get pregnant	8 (40%)	5 (25%)	8 (40%)	9 (45%)
Women who have heard of the HPV vaccine	6 (30%)**	13 (65%)	16 (80%)	16 (80%)
Women who think the HPV vaccine is an effective way to prevent HPV infection	12 (60%)	11 (55%)	10 (50%)	14 (70%)

Notes: Columns in number/percentages for categorical variables. Statistical significance determined by Pearson's chi-square test.

**
 $p < 0.01$

 $p < 0.001$

Table 3
 Knowledge, Attitudes and Belief Variables About Cervical Cancer Among Hispanic/Latinas and Anglo American Women (Client and Health Care Worker)

Variables	Mexican (n=20)	Honduran (n=20)	Puerto Rican (n=20)	Anglo American (n=20)	Health Care Worker (n=17)
Risk Factors					
Behaviors and lifestyle choices					
Sexual intercourse before age 16 years [§]	85	75	75	65	77
Multiple sexual partners [§]	95	80	90	85	88
Spouse with multiple sexual partners [§]	95	75	85	80	88
Sex during monthly period	75***	60	50	15	18
Smoking [§]	65**	30	75	80	65
Poor feminine hygiene	90***	80	90	85	35
Abortion	90**	90	65	45	47
Not getting a regular check-up [§]	100	95	95	80	82
Diet [§]	25	40	40	35	35
Many pregnancies [§]	55	55	40	40	24
Birth control pills [§]	60	60	55	40	41
Physical trauma					
Vaginal trauma	85**	75	55	55	24
Genetic predisposition					
Family history	95	75	90	85	88
Other					
Worry	60*	50	25	25	24
Chemicals in food	65	50	70	50	47
Fate	40*	70	50	25	29
Low income [§]	35	25	25	30	35
Symptoms					
Abnormal vaginal bleeding [§]	100	90	80	75	71

Variables	Mexican (n=20)	Honduran (n=20)	Puerto Rican (n=20)	Anglo American (n=20)	Health Care Worker (n=17)
Bloody stools	45	70	45	30	29
Urinating frequently	40	40	30	0	0
Groin rash	60	70	40	40	29
HIV infection [§]	85	85	75	75	77
Yeast infections	75	85	75	45	65
Chlamydia [§]	80	60	90	70	88
Attitudes and Beliefs					
If cervical cancer is found early, it can be cured	100	100	95	90	100
I would undergo cervical cancer treatment that is unpleasant or painful if it would increase my chances of living longer	95	95	85	95	94
I would rather not know if I had cervical cancer	5	25	20	5	0
I would be afraid to tell my husband or partner if I had cervical cancer	15	20	5	5	6
I need a Pap smear only when I experience vaginal bleeding other than menstruation (or when I experience other symptoms)	30**	30	15	0	0
There is not much I can do to prevent cervical cancer	20	5	10	20	18
I am very likely to get cervical cancer sometime in my lifetime	55**	70	30	20	29

Notes: Columns represent % agreed; Statistical significance determined by Pearson's chi-square test.

[§]Risk factors/symptoms generally accepted by medical profession

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

Table 4

Cultural Consensus Analysis for Dichotomous Data (n=97)

Measure	Mexican (n=20)	Honduran (n=20)	Puerto Rican (n=20)	Anglo American (n=20)	Health Care Worker (n=17)	Corr.
Eigenratio	6.95	4.44	5.51	4.73	7.51	-
Average Competence [§]	0.54	0.47	0.53	0.57	.60 [†]	.92 [‡]

Notes: Eigenvalue ratios of 3.0 or greater and lack of negative competence scores indicate a good fit to the consensus model. Statistical significance of competence values determined by one-way ANOVA test.

[§]Mean within-sample agreement levels = .54, SD = .17; Mean between-sample agreement levels = .53, SD = .17; unique = .01

[†] $F(4, 92) = 1.54, p = .20$

[‡]Square-root of estimated correlation among samples, using Spearman's method

Table 5

Order of Cervical Cancer Risk Factor Rankings for All Groups (n=85)

Item	Mexican (n=17)	Honduran (n=17)	Puerto Rican (n=17)	Anglo American (n=17)	Health Care Worker (n=17)
Multiple sex partners [§]	1	2	3	2	2
HIV (human immunodeficiency virus) [§]	2	7	4	6	6
Lack of a regular check-up	3	3	5	8	7
Abnormal vaginal bleeding	4	1	6	5	5
HPV (human papilloma virus) [§]	5	10	1	1	1
Sex before age 16 years old	6	8	8	3	3
Family history [§]	7	6	2	4	4
Abortion	8	5	12	11	10
Poor feminine hygiene [§]	9	4	7	7	9
Many pregnancies	10	9	13	9	14
Birth control pills [§]	11	12	11	10	13
Smoking [§]	12	11	10	12	8
Chemicals in food	13	13	9	13	12
Diet	14	14	14	15	11
Fate	15	15	15	14	15

[§] Categories were generated from free listing questions in pilot survey phase, before rank items were determined (n=12). Other rank items were added from Chavez et al. (1995, 2001) and risk factors identified by the American Cancer Society.

Table 6

Cultural Consensus Analysis for Rank Data (n=85)

Measure	Mexican (n=17)	Honduran (n=17)	Puerto Rican (n=17)	Anglo American (n=17)	Health Care Worker (n=17)	Corr.
Eigenratio	5.77	4.33	3.18	4.31	3.44	
Average Competence [§]	0.68	0.43	0.49	0.60	.60 [†]	.87 [‡]

Notes: Eigenvalue ratios of 3.0 or greater and lack of negative competence scores indicate a good fit to the consensus model. Statistical significance of competence values determined by one-way ANOVA test.

[§] Mean within-sample agreement levels = .56, SD = .29; Mean between-sample agreement levels = .53, SD = .31; unique = .03

[†] $F(4,80) = 2.23, p = .07$

[‡] Square-root of estimated correlation among samples, using Spearman's method