

Information Channels Associated with Awareness of Human Papillomavirus Infections and Vaccination among Latino Immigrants from Safety Net Clinics

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Abstract We report on information channels associated with awareness about human papillomavirus (HPV) among immigrant Central and South American Latinos. We conducted a survey of 1,334 Latino ≥ 21 years attending safety-net clinics in 2007–2008. Logistic regression analyses evaluated associations with HPV awareness. Forty-eight percent were aware of HPV infection and 40% were aware of the vaccine. Spanish television (38%) and providers (23%) were the primary HPV information sources. Infection awareness was associated with internet use (OR 1.47; 95% CI 1.10–1.96) and self-efficacy to find health information (OR 1.19; 95% CI 1.08–1.30). Vaccine awareness was associated with media use for health

information (OR 1.27; 95% CI 1.09–1.49) and internet use (OR 1.59; 95% CI 1.18–2.13). Although Spanish television has reached this low HPV awareness group, there may be missed opportunities for education by providers. Television and the internet may also be effective channels for future interventions.

Keywords Human papillomavirus · Latinos · Cervical cancer · Health communication · Vaccine

Introduction

Women from Central and South America have high incidence rates of cervical cancer [1]. Human papillomavirus (HPV) vaccination can reduce the burden of this cancer [2, 3]. While many countries are trying to use the Pan American Health Organization's Revolving Fund for Vaccination Procurement, there are multiple financial and organizational barriers to vaccine delivery [4]. These obstacles are compounded by very low levels of knowledge about HPV even among Latinas receiving Pap smears in South America [5]. Moreover, those who immigrate to the United States (US) have substantially lower HPV awareness and vaccine completion rates than Whites [6–8].

Despite a profusion of potential information channels about HPV in the US, there is a paucity of data on information sources for Latino immigrants. A seminal 1999 study by Brodie et al. found that large majorities of Latinos rely heavily on the media as general health information sources [9]; this result has been confirmed in more current studies [10]. Unfortunately, when seeking health information in this technological era, Latinos face disparate access [9, 11] and cultural and language barriers [12–15]. Additionally, Latinos often express minimal confidence in being

The Latin American Cancer Research Coalition (LACRC) members are given in the Appendix.

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able to obtain relevant information [14] and moderate to low trust of media as a health information source [16].

In this cross-sectional study, we describe the associations between sources of information and HPV vaccine awareness among immigrant Central and South American Latinos cared for in safety-net clinics. We include exploration of the role of self-efficacy for obtaining health information and trust of information channels. The results are intended to inform future interventions to increase HPV vaccine use among broad segments of the US Latino population.

Materials and Methods

Participants

We selected an age- and gender-stratified quota sample of Latinos ≥ 21 years old attending nine clinics (or their health fairs) providing services to uninsured, low-income immigrant Latinos between June 2007 and November 2008. We used this sampling frame to assess breast and colorectal cancer screening in other portions of the study. The study was powered to detect differences in these screening rates, and it had $>90\%$ power to detect odds ratios of at least 1.5 for the association between information channels and HPV-related knowledge, assuming equally sized groups and the proportion of interest in the reference group between 40 and 50%. Eligible participants were clinic users or individuals accompanying a registered patient, self-identified as Latino, and ≥ 21 years old. We excluded women enrolled in the Women Infants and Children (WIC) program since this group attended to receive services/food allowances for their children.

Data Collection

All procedures were IRB-approved. Approximately 90% of those approached agreed to participate. Consenting participants received a \$10 gift card. Bilingual native Spanish-speaking interviewers with survey experience conducted the in-person structured 30-min interview; 99% were completed in Spanish. Survey items were drawn from the Spanish version of the HINTs survey [17] and other validated tools. All new items were translated and back-translated by native speakers from the same countries as the participants. The entire survey was cognitively tested and piloted in each clinic to ensure that all terms were readily comprehensible.

Measures

Awareness of HPV infection and HPV vaccine were based on responses to two questions: “Have you ever heard of

HPV? This is a virus that infects the cervix and can cause cervical cancer. It can be given from one partner to another during sexual relations” and “Have you ever heard about the HPV vaccine? This shot can prevent the most serious types of HPV virus. It is now recommended for girls age 9–26.”

Independent variables included channels of health information and information self-efficacy (Cronbach's $\alpha = 0.91$) [18]. We also assessed perceptions of cancer risk and worry about cancer (high vs. low based on response distributions), access to the internet, use of newspapers, and use of magazines, radio, or TV at least once a week. We considered age, gender, education, language, acculturation, use of health fairs, region of origin, and smoking status as controlling variables.

Analysis

Bivariate associations were evaluated using chi-square tests for categorical variables and t-tests for continuous variables. All variables significant at the 0.05 level and variables related to face validity (i.e., age, gender and education) were included in the final multivariable logistic regression models to estimate adjusted odds ratios and 95% confidence intervals. We tested a priori interactions between gender, age, and education with use of different information channels; we present stratum-specific adjusted odds ratios for significant interactions.

Results

Our sample had lived in the US for a median of 8 years (mean = 11) and were predominately Central (64%) and South American (27%) (Table 1). Slightly less than one-half had heard of HPV-infection or the HPV vaccine, but 84% indicated they would like to receive more information.

Most reported hearing about HPV and its vaccine through Spanish language television (38 and 52%, respectively); 71% trusted television health information. The second most common information source was providers (23 and 20%, respectively), although only 22% of those age-eligible for the HPV vaccine reported having heard of it from providers.

The adjusted odds of HPV infection awareness (vs. no awareness) were 1.47 (95% CI: 1.10–1.96) times higher among participants with internet access compared to those without access (Table 2). For every unit increase in self-efficacy to find health information, participants' odds of HPV infection awareness increased 19% (OR 1.19, 95% CI: 1.08–1.30); higher education also increased infection awareness. The association between getting health

Table 1 Correlates of HPV awareness among Central and South American immigrant Latinos from safety-net clinics

	Total sample		Heard of HPV infection			Heard of HPV vaccine		
	<i>n</i>	(% total)	<i>n</i>	(%)	<i>P</i>	<i>n</i>	(%)	<i>P</i>
	1,334	(100)	640	(48)		529	(40)	
Gender					<0.001			<0.001
Male	596	(45)	236	(40)		165	(28)	
Female	738	(55)	404	(55)		364	(49)	
Age					0.62			0.16
21–26	188	(14)	84	(45)		66	(35)	
27–40	502	(38)	243	(48)		192	(38)	
>40	644	(48)	313	(49)		271	(42)	
Acculturation, mean (SD)	1.5	(0.6)	1.6	(0.7)	<0.001	1.6	(0.7)	<0.001
Years in the US, mean (SD)	11	(8.5)	11	(9.0)	0.02	11	(8.8)	0.03
Education					<0.001			<0.001
<12 year	661	(51)	262	(40)		220	(33)	
12 year	340	(26)	164	(48)		137	(40)	
>12 year	307	(23)	206	(67)		165	(54)	
Marital status					0.55			0.86
Unmarried	486	(36)	228	(47)		191	(39)	
Married	829	(63)	403	(49)		330	(40)	
Pap test					<0.001			<0.001
Yes	681	(94)	389	(57)		352	(52)	
No	40	(6)	10	(25)		8	(20)	
Smoking status					0.09			0.005
Current	115	(9)	44	(38)		33	(29)	
Former	233	(17)	115	(49)		81	(35)	
Never	985	(74)	481	(49)		415	(42)	
Perceived risk of cancer					0.004			0.05
Not at all/A little bit likely	630	(47)	279	(44)		239	(38)	
Somewhat/Very likely/Definitely	551	(41)	290	(53)		240	(44)	
Worry about getting cancer					0.01			0.003
Not at all/Rarely	588	(44)	260	(44)		208	(35)	
Sometimes/Often/A lot	726	(54)	373	(51)		316	(44)	
Go to health fairs					<0.001			<0.001
Yes	410	(31)	229	(56)		206	(50)	
No	895	(67)	401	(45)		316	(35)	
Have access to the internet					<0.001			<0.001
Yes	553	(41)	331	(60)		285	(52)	
No	776	(58)	306	(39)		241	(31)	
Watch TV					0.44			0.32
Yes	1295	(97)	618	(48)		515	(40)	
No	35	(3)	19	(54)		11	(31)	
Listen to radio					0.44			0.91
Yes	1119	(84)	542	(48)		443	(40)	
No	215	(16)	98	(46)		86	(40)	
Read magazines					<0.001			<0.001
Yes	649	(49)	348	(54)		287	(44)	
No	682	(51)	290	(43)		240	(35)	
Read newspapers					0.007			0.002
Yes	1114	(84)	556	(50)		463	(42)	

Table 1 continued

	Total sample		Heard of HPV infection			Heard of HPV vaccine		
	<i>n</i>	(% total)	<i>n</i>	(%)	<i>P</i>	<i>n</i>	(%)	<i>P</i>
	1,334	(100)	640	(48)		529	(40)	
No	211	(16)	84	(40)		64	(30)	
Interest in health info from media sources, mean (SD)	2.7	(0.9)	2.8	(0.9)	<0.001	2.9	(0.9)	<0.001
Interest in health info from health sources, mean (SD)	3.6	(1.2)	3.5	(1.1)	0.07	3.6	(1.1)	0.22
Self-efficacy, mean (SD)	6.8	(1.6)	7.1	(1.5)	<0.001	7.1	(1.4)	<0.001

Among 1,482 surveyed, 109 were excluded due to missing country of birth or were born outside of Central or South America and 17 were excluded due to missing HPV responses, leaving a sample of 1,334 (4% were from health fairs). Variables in the table had unknown/missing values that ranged from 26 subjects missing education to 1 subject missing smoking status. *P* values based on bivariate tests

information from media and HPV infection awareness was moderated by age (*P* for interaction = 0.01). Similar factors were associated with vaccine awareness as noted for infection awareness (Table 2). Greater vaccine awareness was associated with internet use (OR1.59; 95% CI 1.18–2.13). Vaccine awareness was also higher among those with increased use of media for health information (OR 1.27; 95% CI 1.09–1.49), considering covariates. The association between reading newspapers and vaccine awareness was also moderated by age (*P* for interaction < 0.01).

Discussion

This is the only study that we are aware of examining channels of communication for HPV awareness among immigrant Central and South American Latinos. Slightly less than one-half of this population had heard of HPV or its vaccine and men had lower knowledge than women. Leading sources of information and sources that were trusted were Spanish language television and providers. Those who often used the media for health information were more likely to be aware of HPV than those who used media less often. We also found that internet access and higher information seeking self-efficacy were associated with HPV awareness.

In 2005 the rates of HPV knowledge were 52–65% nationally in Latinos [7]. However, only a few years later, rates were less than 50% in our population. Similar low rates were found among Latina immigrants (predominately from Mexico) in North Carolina, where only 47% were aware of HPV [19]. This immigrant knowledge gap may be due to failure of marketing campaigns to reach this group [20], the broad age range of our sample, or differences in access or acculturation between Latinos in national telephone surveys and those in safety-net settings. Regardless of reasons for this gap, our data suggest that HPV vaccine education should be targeted to Latinos in safety-net

settings, especially those originally from areas with high cervical cancer rates. Also, since FDA recently licensed the vaccine for use in men [3], and men in our sample were less likely to be aware of HPV than women, campaigns may need to specifically target Latino men.

In our sample, Spanish-language television was both the most common and a highly trusted source of information about HPV. This result is consistent with previous studies in other Latino populations [19, 21]. In general, others have also found that trust in information sources is correlated with HPV awareness [8]. Our results also suggest that the internet may also be another important channel for HPV information among Latinos. Taken together these findings extend prior communication research that have shown that trust of health information sources is higher in English-versus Spanish-speaking Latinos [22], since our sample was mono-lingual in Spanish. These data have practical implications for public health campaigns targeting Latinos and suggest that these channels can be exploited to reach those in need of vaccinations.

While physicians are also a key health information channel for Latinos [19, 21], providers were *not* the most common source of HPV information in this study. It is possible that providers were too busy to provide health education, since volume exceeds capacity in our safety-net clinics, or that physicians did not discuss HPV vaccines since they are expensive and generally not offered in safety-net clinics (whose clientele was not Medicaid eligible due to immigrant status). Therefore safety-net clinics will need to address physician and other barriers before they can effectively leverage the trust in physicians by Latinos to increase knowledge about and uptake of HPV vaccination in this group.

Past research has shown that Latinos have a low level of confidence in being able to obtain relevant information [14]. In this study, self efficacy in getting health information was also positively associated with awareness of both HPV and the vaccine, suggesting that those who are the most confident in their ability ask questions of health

Table 2 Adjusted odds of HPV awareness in Central and South American immigrant Latinos in safety net clinics

Variables	Heard of HPV infection (<i>N</i> = 1042)		Heard of HPV vaccine <i>N</i> = 1035)	
	OR	(95% CI)	OR	(95% CI)
<i>Primary variables</i>				
Seek health info from media 1 unit increase ^a				
All ages			1.27	(1.09, 1.49)
21–26 year	0.69	(0.47, 1.00)	–	–
27–40 year	1.25	(0.98, 1.60)	–	–
>40 year	1.31	(1.06, 1.61)	–	–
Access to internet (Yes vs. No)	1.47	(1.10, 1.96)	1.59	(1.18, 2.13)
Read newspapers (Yes vs. No)				
21–26 year	–	–	0.67	(0.27, 1.63)
27–40 year	–	–	3.52	(1.76, 7.03)
>40 year	–	–	0.89	(0.49, 1.62)
Read magazines (Yes vs. No)	1.09	(0.83, 1.43)	1.00	(0.76, 1.32)
Information self-efficacy ^b				
One unit increase	1.19	(1.08, 1.30)	1.10	(1.00, 1.21)
Likelihood of cancer				
Not at all/A little bit likely	1.00	Referent	1.00	Referent
Somewhat/Very likely/Definitely	1.16	(0.89, 1.52)	1.05	(0.80, 1.38)
Worry of cancer				
Not at all/Rarely	1.00	Referent	1.00	Referent
Sometimes/Often/A lot	1.18	(0.90, 1.55)	1.21	(0.92, 1.60)
<i>Controlling variables</i>				
Gender				
Male	1.00	Referent	1.00	Referent
Female	1.56	(1.19, 2.05)	2.31	(1.75, 3.05)
Education				
<12 year	1.00	Referent	1.00	Referent
12 year	1.08	(0.79, 1.49)	1.11	(0.79, 1.54)
>12 year	2.07	(1.43, 3.00)	1.31	(0.90, 1.89)
Acculturation ^c				
One unit increase	1.21	(0.96, 1.52)	1.18	(0.93, 1.49)
Go to health fairs (Yes vs. No)	1.25	(0.94, 1.66)	1.46	(1.10, 1.95)

^a Health information from media sources. Interest in health information scales range from 1 to 5 with higher scores reflecting higher use

^b Self-efficacy ranges from 1 to 9 with higher scores reflecting higher information seeking self-efficacy

^c Acculturation ranges from 1 to 5 with higher scores reflecting higher language acculturation

The Hosmer–Lemeshow goodness of fit test for the two logistic regression models showed good fit ($P = 0.84$ and 0.37 , respectively)

professionals or seek information from media sources are more likely to be aware of HPV. It is possible that skills coaching interventions or other means of activating Latino immigrants could increase confidence in getting health information and be one avenue for increasing knowledge of cancer risk factors such as HPV. It will be important to test this idea empirically in future research.

There are some caveats that should be considered in interpreting our results, including generalizability, clinic setting, measurement of knowledge versus actual vaccine use, potential outcome measurement error due to poor

understanding of terms, prompted-format assessment or social desirability biases. These factors should over-estimate rates (or add random variation), so that true rates of HPV awareness in immigrant Latino communities may be lower than we reported.

Despite these limitations, this study fills gaps in knowledge about channels of health information for immigrant Latinos. Overall, our results indicate low awareness of HPV and HPV-vaccine among South and Central American Latinos. Our target population was young and may have been eligible themselves or been parents of eligible

children. It appears that while television media campaigns have been successful in reaching this at-risk population, there are missed opportunities for education during medical encounters in safety net clinics. Future research will be needed to test the effectiveness of communication interventions to address HPV knowledge gaps and translate awareness into health behavior among immigrant populations cared for in safety-net environments.

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Appendix

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