



Factors associated with first-generation immigrant parents' unwillingness to vaccinate their daughters for HPV

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ARTICLE INFO

Keywords:

Immigrant parents

HPV vaccine

Secondary generation immigrant children

ABSTRACT

Purpose: Human papillomavirus (HPV) vaccination rates for children of immigrant parents are substantially lower than US peers. This study aimed (1) to assess the prevalence of immigrant parents' unwillingness to vaccinate their daughters, (2) to compare by race/ethnicity the prevalence of immigrant parents' unwillingness to vaccinate their daughters, and (3) to examine predictors of the unwillingness stratified by race/ethnicity.

Method: This study conducted a secondary analysis of data from the Health Information National Trends Survey (HINTS). HPV-related data were extracted and analyzed from first-generation immigrant parents ($n = 784$) with daughters 11–12 years of age.

Results: The frequency of unwillingness was high for all racial/ethnic groups (43–58%). Non-Hispanic White and Asian parents who were aware of or heard about the HPV vaccine were less likely to be unwilling to vaccinate their daughters. Also, older Hispanic immigrant parents were more likely to be unwilling to vaccinate their daughters for HPV.

Conclusion: To curb future incidences of HPV-related cervical cancers among second-generation immigrant women, efforts are needed to encourage first-generation immigrant parents to presently vaccinate their daughters for HPV.

1. Introduction

Human papillomavirus (HPV) infection is responsible for nearly 90% of cervical cancers, 70% of vaginal and vulvar cancers, 60% of penile cancers, and 70% of oropharyngeal cancers (Viens et al., 2016). Annually, there are an estimated 42,700 newly diagnosed HPV-related cases of cancer, and an estimated 6100 HPV-related deaths (Senkomago et al., 2019).

The HPV vaccine can avert HPV-associated cancers. It is estimated that the current HPV vaccine can prevent more than 80% of all cervical cancers (Saraiya et al., 2015). The Advisory Committee for Immunization Practices (ACIP) recommends universal HPV vaccination for children who are 11–12 years of age and catch-up vaccination (for those who were not vaccinated between 11 and 12 years of age) for individuals who are 13–26 years of age (Markowitz et al., 2014). Despite

this recommendation, only 60% of 13–17 year olds have received at least one dose of the HPV vaccine and only 49% of 13–17 year olds have received more than one dose (Walker et al., 2017). Vaccination rates for 11–12 year olds are lower than their 13–17 year older counterparts (Stokley et al., 2014).

In the United States, about 18.1 million children live with at least one foreign-born parent (Landale et al., 2011), and HPV vaccination rates for children of immigrant parents are substantially lower than children of US born parents (Stokley et al., 2014). For example, adolescent girls ages 11–17 who live with Asian immigrant parents have the lowest HPV vaccine initiation and completion rates (Laz et al., 2012). Immigrant parents' unwillingness to vaccinate their 11–12 year-old children has been previously noted as a barrier to HPV vaccine uptake (Holman et al., 2014; Hansen et al., 2016; Remes et al., 2012). Prevalence and predictors of immigrant parents' unwillingness to vaccinate their daughters

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<https://doi.org/10.1016/j.jmh.2023.100161>

Received 17 October 2021; Received in revised form 21 June 2022; Accepted 23 January 2023

Available online 30 January 2023

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are not well established, and this is representative of a knowledge gap. This type of knowledge would be advantageous for public health professionals and clinicians who provide public health and healthcare services to immigrant parents and their daughters.

Andersen’s Behavioral Model of Health Services Use (Andersen, 1995) is a theoretical framework that can be used to consider and identify factors that may be associated with parental unwillingness to vaccinate. The model considers predisposing factors (e.g. parenting role, age, relationship or marital status), enabling factors (e.g. education level, income), and need factors (e.g. awareness and knowledge). Using Andersen’s Behavioral Model of Health Services Use, the objectives of this cross-sectional study were (1) to assess the prevalence of immigrant parents’ unwillingness to vaccinate their daughters, (2) to compare by race/ethnicity the prevalence of immigrant parents’ unwillingness to vaccinate their daughters, and (3) to examine predictors of immigrant parents’ unwillingness to vaccinate their daughters stratified by race/ethnicity.

2. Material and methods

2.1. Research design and sample

The present study conducted a secondary analysis of data from the Health Information National Trends Survey (HINTS), 2007. To maximum the response rate and to capture a representative sample in the United States, HINTS 2007 used a dual-frame design with mixed modes of random digit dialing for telephone survey completion and a national listing of addresses available from the United States Postal Services (USPS) for mailed survey completion. The survey specifically asked participants about their knowledge and views of HPV and other cancer related disease states. In terms of HPV-related questions, the survey captured data on HPV awareness, HPV vaccine use, HPV literacy, and HPV screening. HINTS 2007 is the latest nationally representative dataset that provides this type of comprehensive and empirical data on HPV vaccination knowledge, beliefs, and behaviors for children of immigrant parents. Other details of HINTS 2007 can be found elsewhere (Cantor et al., 2009). A total of 7674 individuals participated in HINTS 2007. Of those who participated in the survey, the present study extracted data from first-generation immigrant parents ($n = 784$) who were parents of 11–12 year old adolescent girls.

2.2. Outcomes of interest

Primary outcomes of interest were the prevalence of immigrant parents’ unwillingness to vaccinate their daughters, the prevalence of immigrant parents’ unwillingness to vaccinate their daughters by race/ethnicity, and predictors of immigrant parents’ unwillingness to vaccinate their daughters stratified by race/ethnicity. The following (yes/no) question from HINTS 2007 was used to categorize immigrant parents who were and were not unwilling to vaccinate their daughters: *A vaccine to prevent the human papillomavirus or HPV infection is recommended for girls ages 11–12 and is called the cervical cancer vaccine, HPV shot, or GARDASIL®. If you had a daughter that age, would you have her get it?* Immigrant parents who endorsed no were defined as being unwilling to vaccinate their daughters for HPV.

2.3. Variables

2.3.1. Predisposing factors

Predisposing factors included parenting role (father vs. mother), number of years as an immigrant, relationship or marital status, and age.

2.3.2. Enabling factors

Enabling factors included education attainment (<Bachelor’s degree vs. ≥Bachelor’s degree), employment status (employed vs. unemployed), and annual household income. Annual household income was

Table 1
Summary of socio-demographic characteristics of the study sample.

| Dependent Variables Predisposing Variables | n^a (%) / mean, std |
|---|-----------------------|
| Parenting Role | |
| Father | 323, 43.2% |
| Mother | 460, 56.8% |
| Age (Years) | 48, 16.0 |
| Number of Immigration Years | 26, 16.8 |
| Marital Status | |
| Unmarried | 253, 33.8% |
| Married or partnered | 531, 66.2% |
| Enabling Factors | |
| Educational Attainment | |
| < Bachelor’s degree | 298, 39.8% |
| ≥ Bachelor’s degree | 485, 60.2% |
| Employment Status | |
| Employed | 451, 60.3% |
| Unemployed | 333, 39.7% |
| Annual Household Income | |
| Need Factors | |
| Have heard of HPV (yes) | 416, 50.8% |
| Have heard of the HPV Vaccine (yes) | 15, 1.9% |
| HPV can go away without treatment (yes) | 531, 67.7% |
| Women who get the HPV vaccine should continue to get screened for cervical cancer with the Pap test | 318, 40.6% |

* std = standard deviation.

stratified into four levels: 1 = \$0–\$14,999, 2 = \$15,000–\$34,999, 3 = \$35,000–\$74,999, 4 = ≥\$75,000.

2.3.3. Need factors

Four (yes/no) questions from HINTS 2007 were used to provide data on need factors: *Have you ever heard of HPV?* (HPV awareness); *Have you ever heard of the cervical cancer vaccine or HPV shot?* (HPV vaccine awareness); *Do you think HPV can go away on its own without treatment?*; *Do you think women who get the HPV vaccine or shot should continue to get screened for cervical cancer with the Pap test?*

2.4. Data analysis

Measures of central tendency and frequency distributions were used to characterize the sample. Binomial logistic regression was used to identify predictors of unwillingness to vaccinate. Thereafter, three additional binomial logistic regression models were run to examine predictors of unwillingness to vaccinate stratified by race/ethnicity. Tolerance statistics ($1 < VIF < 10$) and correlations were checked to avoid multicollinearity. All statistical analyses were conducted by SPSS IBM Corp. Released 2017. SPSS Statistics for Windows, Version 25.0 Armonk, NY: IBM Corp.

Table 2
Prevalence rates of immigrant parents’ unwillingness to vaccinate their daughters for hpv—stratified by race/ethnicity.

| Race/Ethnicity (n,%) | Unwillingness to Vaccinate (n,%) |
|---------------------------|----------------------------------|
| 784,100% | 364, 46% |
| Non-Hispanic White | 98, 43% |
| 227, 30.3% | |
| African | 26, 58% |
| 45, 6.0% | |
| Hispanic | 135, 45% |
| 298, 39.8% | |
| Asian | 105, 54% |
| 195, 26.1% | |

Table 3
Binomial logistic regression predicting immigrant parents' unwillingness to vaccinate their daughters for HPV—stratified by race/ethnicity.

| | White (n = 227, 30.3%) | | | Hispanic (n = 298, 39.8%) | | | Asian (n = 195, 26.1%) | | |
|--|------------------------|------|----------------------|---------------------------|------|----------------------|------------------------|------|----------------------|
| | O.R. | S.E. | p-value ^b | O.R. | S.E. | p-value ^b | O.R. | S.E. | p-value ^b |
| Predisposing Variables | | | | | | | | | |
| Parenting Role | | | | | | | | | |
| Mother | 1.03 | 0.37 | 0.92 | 1.27 | 0.32 | 0.45 | 1.37 | 0.40 | 0.43 |
| Father (reference) | | | | | | | | | |
| Age (Years) | 0.99 | 0.01 | 0.88 | 1.02 | 0.01 | 0.02* | 1.00 | 0.01 | 0.84 |
| Immigration years | 1.00 | 0.01 | 0.74 | 1.00 | 0.01 | 0.58 | 0.99 | 0.01 | 0.81 |
| Marital Status | | | | | | | | | |
| Married or partnered | 1.38 | 0.39 | 0.40 | 0.50 | 0.28 | 0.00*** | 0.86 | 0.30 | 0.64 |
| Unmarried or other (reference) | | | | | | | | | |
| Enabling Factors | | | | | | | | | |
| Educational Attainment | | | | | | | | | |
| ≥ Bachelor's degree | 1.52 | 0.40 | 0.29 | 1.13 | 0.28 | 0.65 | 1.07 | 0.36 | 0.84 |
| < Bachelor's degree (reference) | | | | | | | | | |
| Annual Household Income | 0.80 | 0.15 | 0.15 | 1.00 | 0.14 | 0.98 | 0.88 | 0.14 | 0.36 |
| Need Factors | | | | | | | | | |
| Have heard of HPV No (reference) | 0.39 | 0.29 | 0.00*** | 0.88 | 0.30 | 0.67 | 0.49 | 0.38 | 0.03** |
| Have heard of HPV the Vaccine No (reference) | 0.62 | 0.89 | 0.59 | 0.51 | 0.73 | 0.37 | 0.14 | 1.18 | 0.04* |
| HPV can go away without treatment No (reference) | 0.85 | 0.43 | 0.71 | 0.51 | 0.73 | 0.37 | 0.53 | 0.51 | 0.22 |
| Women who get the HPV vaccine should continue to get screened for cervical cancer with the Pap test No (reference) | 0.70 | 0.39 | 0.36 | 0.60 | 0.33 | 0.13 | 1.25 | 0.44 | 0.61 |

* p < 0.05 ** p < 0.01 *** p < 0.00; O.R.=odds ratio; S.E.= standard error.

* The African immigrant parent sample size was too small to run binomial logistic regression.

3. Results

3.1. Sample characteristics

The mean age of participants was 48 ± 16.06 years and the majority were mothers (57%) (Table 1). The mean number of immigration years was 16 ± 16.08. The majority were married or partnered (66%), more than a third of the sample was Hispanic (40%).

The majority of immigrant parents (51%) had heard of HPV. More than two-thirds (68%) of immigrant parents thought that HPV could go away without treatment. Forty-two percent thought women who are vaccinated for HPV should continue to get screened for cervical cancer with the Pap test.

The prevalence of immigrant parents' unwillingness to vaccinate their daughters for HPV was 46% (Table 2). The prevalence of unwillingness to vaccinate their daughters by race/ethnicity was 43% among non-Hispanic White, 58% among African, 45% among Hispanic, and 54% among Asian immigrant parents.

3.2. Multivariate analysis—stratified by race/ethnicity

3.2.1. Non-hispanic white immigrant parents

HPV awareness (OR=0.39, p = 0.00) was negatively associated with unwillingness to vaccinate among non-Hispanic White immigrant parents (Table 3).

3.2.2. African immigrant parents

The African immigrant parent sample size was too small to run binomial logistic regression.

3.2.3. Hispanic immigrant parents

Older age (OR=1.02, p = 0.02) was positively associated with unwillingness to vaccinate; whereas, being married or partnered (OR=0.50, p = 0.00) was negatively associated with unwillingness to vaccinate among Hispanic immigrant parents.

3.2.4. Asian immigrant parents

HPV awareness (OR=0.49, p = 0.03) and having heard of the HPV vaccine (OR=0.14, p = 0.04) were negatively associated with unwillingness to vaccinate among Asian immigrants.

4. Discussion

This study assessed the prevalence of immigrant parents' unwillingness to vaccinate their daughters, stratified and compared by race/ethnicity the prevalence of immigrant parents' unwillingness to vaccinate their daughters, and examined predictors of immigrant parents' unwillingness to vaccinate their daughters stratified by race/ethnicity. Several main findings emerged from the analysis. First, more than half (51%) of immigrant parents had heard of HPV, but only a very small minority (2%) had heard of the HPV vaccine. When immigrant parents were informed of the availability of a HPV vaccine and of the HPV vaccination guidelines, 48% were unwilling to vaccinate their daughters. Though prevalence rates of unwillingness to vaccinate were highest among African immigrant parents followed by Asian and Hispanic immigrant parents, there were no wide variations in prevalence rates stratified by race/ethnicity—the frequency of unwillingness to vaccinate was high for all racial/ethnic groups. The findings suggest a need for public health professionals and clinicians to develop targeted health education and health promotion efforts to further increase HPV awareness, especially HPV vaccine awareness—an obvious deficit, and the benefits of vaccination for immigrant parents with adolescent girls. Perhaps such concerted efforts will improve immigrant parents' willingness to vaccinate their daughters for HPV. Programs that offer incentives to qualified immigrant parents, such as offsetting partial healthcare costs, have been previously suggested as a potential means of improving parents' willingness to vaccinate (Kornfeld et al., 2013; Rubens-Augustson et al., 2019). However, existing literature on coordinated efforts to improve HPV vaccine uptake among immigrant parents are scant.

Second, non-Hispanic White and Asian parents who were aware of or heard about the HPV vaccine were less likely to be unwilling to vaccinate their daughters. Our suggests that HPV awareness alone may motivate and increase non-Hispanic White and Asian immigrant parents' acceptance of the HPV vaccine, but HPV vaccine awareness plays a more important role in increasing Asian parents' acceptance of the HPV vaccine (Todd and Hoffman-Goetz, 2011). In public health and healthcare settings, it is important to inform Asian immigrant parents of the HPV vaccine, the recommended vaccination recommendation, and the benefits of vaccination to decrease potential unwillingness to vaccinate; and it is plausible that it may reduce unwillingness among White and

Asian immigrant parents.

Third, older Hispanic immigrant parents were more likely to be unwilling to vaccinate their daughters for HPV. Previous literature suggests older Hispanic parents may hold an attitude of stigma toward HPV and related issues which may increase their unwillingness to accept HPV vaccination for their children (Friedman and Sheppard, 2007). Interestingly, Hispanic immigrant parents who were married or partnered were more likely to vaccinate their daughters. It is plausible that this is due to the greater availability of insurance coverage with two parents compared to a single parent and due to shared decision making patterns regarding healthcare decisions among two parenting Hispanic families (Marlow et al., 2009). However, more research is needed to replicate and to explore the meaning of this finding—single Hispanic immigrant parents being more reluctant to vaccinate their daughters than married or parented Hispanic immigrant parents.

The study had noteworthy limitations and strengths. The small sample size of African immigrant parents was too small for regression modeling. The study only included immigrant parents with daughters 11–12 years of age—future studies are needed to examine immigrant parents' willingness to vaccinate their adolescent sons. Notwithstanding, the study analyzed a nationally representative dataset that included a relatively large sample size of immigrant parents. To the authors' knowledge, this was the first study to examine predictors of first-generation immigrant parents' unwillingness to vaccinate their daughters aged 11–12 for HPV.

To curb future incidences of HPV-related cervical cancers among second-generation immigrant women, efforts are needed to encourage first-generation immigrant parents to presently vaccinate their daughters for HPV. Otherwise, young adolescent second-generation girls will have higher rates of HPV-related morbidity and mortality as women in the coming years compared to their non-immigrant counterparts. Public health professionals and clinicians who provide public health and healthcare services to immigrant parents and their daughters are encouraged to take action at the policy and practice level to garner warranted attention to improve HPV knowledge and awareness deficiencies that negatively impact HPV vaccination uptake in this respective population.

Declaration of Competing Interest

None.

Acknowledgment

N/A

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