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## Human papillomavirus awareness in Haiti: Preparing for a national HPV vaccination program

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### Abstract

**Study Objective**—Cervical cancer morbidity and mortality are pressing public health issues impacting women in Haiti. To inform efforts to develop a human papillomavirus (HPV) vaccination program in Haiti, we sought to understand HPV awareness and willingness to get HPV vaccination in Haiti.

**Design, Setting, Participants**—We interviewed a convenience sample of 475 women and men in two clinical settings in Port-au-Prince and Léogâne, Haiti between April and July 2014.

**Main Outcome measures**—HPV awareness and willingness to get HPV vaccine for daughters.

**Results**—Few (27%) participants had heard of HPV. Awareness of HPV was higher among respondents with a previous sexually transmitted infection (STI) as compared to those without a previous STI (OR=2.38, 95% CI: 1.10–5.13). Adults who had heard of genital warts were also more likely to be aware of HPV compared to those who had not (OR=4.37, 95% CI: 2.59–7.38).

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#### Disclosure of Potential Conflicts of Interest

N.T. Brewer has received HPV vaccine-related grants from or been on paid advisory boards for Merck Sharp & Dohme and Pfizer; he served on the National Vaccine Advisory Committee Working Group on HPV Vaccine and is chair of the National HPV Vaccination Roundtable. The other authors of this paper have no financial disclosures or potential conflicts of interest to report.

Only 10% of parents had previously heard of HPV vaccine; however, after researchers explained the purpose of the vaccine, nearly all (96%) said they would be willing to get HPV vaccine for their daughters if it were available.

**Conclusions**—Despite low awareness of HPV in Haiti, interest in HPV vaccination was nearly universal in our study of healthcare-seeking adults. This high acceptability suggests that HPV vaccination programs instituted in Haiti would be well received.

### Keywords

Human papillomavirus; Cervical cancer; HPV awareness; HPV vaccine; Haiti

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### Introduction

Cervical cancer is the leading cause of cancer deaths among women in Haiti.<sup>1</sup> Chronic infection with oncogenic types of human papillomavirus (HPV) causes cervical cancer and other cancers.<sup>2</sup> Incident cervical cancer affects 23.2 per 100,000 Haitian women and claims the lives of 18.3 per 100,000 women annually.<sup>1</sup> Corresponding rates for cervical cancer morbidity and mortality in the United States (U.S.) are much lower at 7.7 and 2.3 per 100,000 respectively.<sup>3</sup> These data portray an alarming public health crisis in Haiti that is largely preventable.

Cervical cancer screening is effective at preventing the disease, and indeed widespread screening is why cervical cancer rates in the U.S. have dropped by three quarters since its introduction.<sup>4</sup> However, cervical cancer screening requires routine application, an infrastructure for follow-up and potential treatment of screening-identified abnormalities, which is unrealistic in many low-resource and rural settings. HPV vaccination offers an important alternative for cervical cancer prevention.<sup>5</sup> The recently approved 9-valent HPV vaccine may prevent 90% of cervical cancers.<sup>6</sup> HPV vaccine will be increasingly realistic in developing country settings like Haiti, as the vaccine becomes available at low or no cost through donations mainly from non-governmental organization-sponsored vaccination programs like the Gavi Alliance—a global coalition of public and private sector vaccine partners,<sup>7</sup> and as two-dose series replace the more costly and resource intensive three-dose series.<sup>8</sup>

As immunization programs develop that can make HPV vaccine available in Haiti, more research is needed to assess HPV awareness and how receptive Haitians are likely to be towards the vaccine. To date, no study has assessed HPV awareness among Haitians, and data on HPV vaccine acceptability in this population is limited.<sup>9</sup> Much of the research has been conducted with Haitian immigrants in the U.S. Studies have shown that Haitian immigrants have varying levels of HPV and HPV vaccine awareness.<sup>10–12</sup> HPV awareness is a necessary antecedent of behavior change,<sup>13–15</sup> according to several leading stage theories of health behavior.<sup>16–18</sup> Given the dearth of information on HPV awareness in Haiti, we sought to examine levels of HPV awareness and predictors of HPV awareness among healthcare-seeking adults in Port-au-Prince and Léogâne, Haiti. We hypothesized that adults with previous sexually transmitted infections (STIs) would be more likely to be aware of HPV because of their subsequent medical care and related information seeking. We also

hypothesized that adults with higher socioeconomic status would be more likely to be aware of HPV because they have better resources to access healthcare services and information.

## Materials and Methods

### Participants and Procedures

Between April and July 2014, we recruited adults seeking healthcare services in two clinics in Haiti. The first was a women's health clinic located in the Terre Noire district—a neighborhood of about 120,000 people located in Port-au-Prince, the capital of Haiti. This clinic provides routine clinical care including cervical cancer screening. The second clinic was located in the Léogâne Commune, one of the 140 communes of Haiti, located 22 miles west of Port-au-Prince with a population of 90,000 residents. The Léogâne clinic provides general medicine services to both men and women.

### Procedures

A team of Duke University undergraduate students and local Haitian translators conducted the interviews. Interviewers received training on survey administration at Duke University as part of their field research project. Study participants were consented orally through a Haitian Creole translator. This method of consent was used due to the low rate of literacy among the Haitian population. At the interviewer's direction, the translator read the consent form in Haitian Creole to determine intention to participate. Afterwards, participants signed their name or mark to confirm consent or agreed for a designee to sign on their behalf. Patients were surveyed in private rooms by the interviewer(s) and one translator. The translator read the survey questions in Haitian Creole while the interviewer followed along with the English version. After each response, the translator orally translated the participant's response to English which was promptly hand-written on the English version of the survey by the interviewer. Participants received no monetary incentive to participate in the study. Institutional review boards at Duke University (Durham, NC) and Misyon Sante Fanme Ayisyen (Port-au-Prince, Haiti) approved the study protocol.

### Measures

The survey was adapted from a questionnaire previously used by one of the authors (NB) to explore knowledge about HPV and cervical cancer and attitudes about HPV vaccination in Botswana.<sup>19</sup> The original questionnaire was translated into Haitian Creole by an independent contractor, CreoleTrans, and was slightly modified by on-site clinical staff from the Terre Noire clinic for clarity of the content and literacy of the clinics' population. The final version of the survey appears in the appendix.

The main outcome measure was awareness of HPV, assessed by a question that asked participants whether they have ever heard about HPV. The response options were "yes" or "no." The survey then provided brief information about HPV, for example, "HPV (human papillomavirus) is a common sexually transmitted infection that sometimes leads to genital warts and cervical cancer" and "HPV is different from HIV." The survey also asked participants who had daughters to rate their perceived likelihood of getting infected with HPV and the perceived threat of such an infection. The response options were "no

chance”/”no threat,” “low,” “moderate,” or “high.” The survey then asked respondents to list up to 3 reasons why getting the HPV vaccine for their daughters might be difficult. Instructions stated that respondents with daughters outside the HPV vaccine age range should answer these questions as if they were age-eligible.

The survey also asked parents whether they had ever heard of HPV vaccine, willingness to get the vaccine for their daughters, who they would consult in the decision to vaccinate their daughters, most common place they would take their daughters to get HPV vaccine, and how much they would be willing to pay for HPV vaccine. The survey assessed the following demographic characteristics and personal health variables: sex, age, marital status, education, employment status, religious background, children’s sex and gender (if any), history of STIs, contraceptive use, and awareness of genital warts.

### Data Analysis

We used bivariate logistic regression models to examine correlates of HPV awareness. We then entered statistically significant ( $p<0.05$ ) covariates in a multivariable logistic regression model using a forward stepwise procedure. Analyses were conducted using Stata version 14 (College Station, TX). All statistical tests were two-tailed, using an alpha of 0.05. With regard to the open-ended question about potential barriers to HPV vaccination, two authors (MG, WC) independently coded responses and resolved any discrepancies through discussions.

### Results

Most (86%) of the 475 study participants were women (Table 1). The majority of respondents were between the ages of 18 and 39 years (58%), were married or lived with a partner (57%), had more than primary education (65%), and were currently employed (76%). Of the 250 respondents who had daughters, 147 (31% of study sample) had at least one daughter who was between ages 11 and 26, the age range recommended in the U.S. to receive routine or catch-up HPV vaccination (5). Ten percent of respondents reported a history of STIs. The majority of survey participants did not use any methods of contraception or were unaware of the method their partner regularly used (79%) and had not heard of genital warts (75%). Participants seen at the Léogâne clinic and Terre Noire clinic differed on several demographic characteristics (Table 1).

### HPV awareness

Twenty-seven percent of participants were aware of HPV at the time of the survey. Respondents who previously had a STI were over twice as likely to be aware of HPV as compared to those with no previous STI (OR = 2.38, 95% CI: 1.10–5.13) in multivariable analysis (Table 2). Adults who had heard of genital warts were also more likely to be aware of HPV than those who were not aware of genital warts (OR = 4.37, 95% CI: 2.59–7.38). In bivariate but not multivariable analyses, HPV awareness was associated ( $p<0.05$ ) with female sex, older age, current employment, Christian Protestant religion, and having a daughter in recommended age range for HPV vaccination.

Of the 250 parents, one-third (32%) thought their daughters had a moderate to high chance of getting HPV infection and one-fourth (27%) had similar thoughts for cervical cancer (Figure 1). The majority rated these diseases as serious threats to their daughters' health (HPV infection = 75%, cervical cancer = 92%).

### HPV vaccine acceptability

Only 10% of parents had heard of HPV vaccine. However, after interviewers explained the purpose of the vaccine, the majority of parents (96%) said they would definitely get it for their daughters. Nearly all parents (98%) would definitely get the vaccine if a doctor recommended it. When asked who they would consult in the decision to vaccinate their daughter (respondents were allowed to provide more than one option), respondents said they would involve family members (82%), elders in their communities (14%), or their doctors (13%). Sixty-five percent of parents believed that getting HPV vaccine would increase their daughter's likelihood of having sex.

Parents reported that the most common place they would take their daughters to get HPV vaccine was a public or community clinic (57%), followed by a primary care office (20%), and a school clinic (13%). The majority (87%) stated that they would get the vaccine for their daughters if it were offered at their schools. The most common barriers that parents listed for getting HPV vaccine were cost (52%), transportation (23%), family responsibilities (19%), lack of awareness of places to procure the vaccine (17%), and availability of the vaccine (16%) (Figure 2). The median amount that parents said they would be willing to pay for HPV vaccine was 250 gourdes (US \$4.65), which is higher than the country's minimum wage (225 gourdes) for an eight-hour shift among garment workers.<sup>20</sup>

## Discussion

In a sample of healthcare-seeking adults in Haiti, awareness of HPV was low. This finding is consistent with studies conducted in other Latin American and Caribbean countries, for example, cross-sectional studies in Trinidad, Honduras, and Brazil found HPV awareness ranging from 23% to 37%.<sup>21–23</sup> In addition, the high level of HPV vaccine acceptability for daughters among our sample of healthcare-seeking parents (96%) was nearly identical to that found in a previous study of 485 women in rural Haiti (95%).<sup>9</sup> High acceptability of HPV vaccine has been previously demonstrated across Latin American and Caribbean countries.<sup>22–25</sup>

Studies of HPV awareness among Haitian immigrants in the U.S. have reported a range in levels of awareness. On the high end of the spectrum, two studies conducted in the U.S. Northeast region reported levels of awareness close to and exceeding the 68% found in the general population of the U.S.<sup>26</sup> For example, a study of young U.S.-born and immigrant Haitian women found that 72% were aware of HPV.<sup>10</sup> Similarly, a study of Haitian immigrant mothers of 11–17 year old daughters reported that 65% had heard of HPV.<sup>11</sup> In contrast, a community based sample in Little Haiti, a predominantly Haitian neighborhood in Miami, Florida, found that only 22% were aware of HPV<sup>12</sup> which is similar to that found in our sample. The variation in awareness in these different populations indicate that U.S. samples may not be an appropriate proxy. Depending on geographic location and healthcare

access, Haitian immigrants in the U.S. may be exposed to different levels of information about HPV.

Contrary to studies conducted in other Latin American and Caribbean countries, we did not find differences in HPV awareness based on socioeconomic factors such as education level or employment status. In a study conducted in Trinidad, adult women with secondary education and above were more likely to be aware of HPV.<sup>21</sup> Research conducted in both Brazil and the Bahamas, found that awareness was associated with higher education and income.<sup>21, 27</sup> Rather, we found that respondents with a history of STIs and those who were aware of genital warts, a disease caused by HPV, were more likely to be aware of HPV. This could indicate that healthcare providers may be primarily giving information about HPV to patients that are already diagnosed with a STI or those considered to be at high-risk for such an infection. Considering the high prevalence of carcinogenic strains of HPV in Haiti (19% of adult Haitian women have oncogenic HPV infection),<sup>28</sup> information should be distributed to all adolescents and young adults, not based on risk.

Currently, HPV vaccine is offered in Haiti in limited quantities through non-governmental organization (e.g., Gavi Alliance)<sup>7</sup> and industry (e.g., Gardasil Access Program) donations.<sup>29</sup> However, a coordinated national program of HPV vaccine administration does not exist in Haiti. In June 2014, Family Health Ministries, a non-profit corporation which provides healthcare and education services in Haiti, held discussions with senior officials at the Haitian Ministry of Health to discuss national priorities around HPV vaccination. Officials noted that in light of the urgency to increase widespread coverage of childhood vaccinations like Tdap and polio, HPV vaccination was a lower priority. While private clinics may import the vaccine independent of government-sponsorship for administration to patients willing to pay, there is no data available to assess the prevalence of this practice. In Latin American and Caribbean countries with high rates of communicable childhood diseases, health officials are often forced to make decisions about which vaccines to implement given vaccine costs and disease incidence.<sup>30</sup> The burden of cost was echoed by participants in the study. Over half of the sample said that they anticipated cost to be their primary barrier to getting HPV vaccine were to become more widely available. The median amount participants said they would be willing to pay was \$4.65. Given that the current price of HPV vaccine ranges from \$4.50 per dose for low income countries and over \$150 per dose in high income countries,<sup>31</sup> the necessary 2–3 doses<sup>8</sup> of the vaccine would be out of reach for participants without government assistance.

In addition to cost, any effort to distribute HPV vaccine in Haiti should consider the locations that residents would most easily reached and use. The majority (57%) of participants said that the first place they would go to get the vaccine for their daughter would be a community clinic, and almost all (87%) said they would get the vaccine for their daughter at her school if it were offered there. A previous evaluation of school-located vaccination program in 7 schools in Haiti showed HPV vaccine uptake rates as high as 87% among girls 9–13 years old.<sup>29</sup> School-located programs are a promising avenue for increasing HPV vaccination coverage, however, such programs may leave out the many girls who do not attend primary or secondary school. About 78% of girls attend primary school and only 29% attend secondary school in Haiti.<sup>32</sup> A study of vaccination programs in

multiple low-income countries found that those that included both school and clinic sites had higher coverage and higher rates of completion of the full 3 dose vaccine course.<sup>29</sup> In Haiti, a hybrid approach would be critical due to the high proportion of adolescent girls that do not attend school.

Despite low awareness of HPV, almost all parents said that they would get HPV vaccine for their daughters if their doctor recommended it. Studies in high income countries have demonstrated the power of provider recommendations on HPV vaccine uptake,<sup>33–35</sup> thus provider recommendation should be a central part of any vaccine programs to be instituted in Haiti. Furthermore, parents responded that they would include spouses/partners, immediate and extended family members, and even elders in their decision to vaccinate their daughter. Having this wide range in decision makers means that HPV vaccine messages should be disseminated beyond clinical settings to reach family members and elders who may not be present at clinic appointments. Vaccination programs which have involved the community in following up with girls participating in the program have shown higher rates of HPV vaccine uptake,<sup>36</sup> which signifies the importance of community education and positive social norms towards HPV vaccination.

Study limitations include our use of a cross-sectional design which limits our ability to infer causality to the associations we observed. The study's convenience sample of healthcare-seeking adults from two urban areas may have overestimated HPV awareness relative to the general population in Haiti as nearly half of adults in Haiti lack regular access to healthcare.<sup>37</sup> Our sample was also of a higher socioeconomic status than the general population; a greater percentage of participants were employed (76% vs. 59% population)<sup>38</sup> and had more than a primary education (65% vs. 49% to 54% population).<sup>32</sup> However, neither education or employment were significant predictors of HPV awareness in multivariate analyses which leads us to believe that this does not considerably hinder the generalizability of the results. Future studies will need to establish the generalizability of our findings to other adults in the general population. Additionally, hypothetical study of HPV vaccine acceptability may overestimate the interest in vaccination as programs are put in place, given barriers such as cost, transportation needs, and local health events related to vaccination.

The findings from this study have several implications for practice. First, approaches to increasing HPV awareness in Haiti should occur at the population level and not vary by socioeconomic status and risk level. In one of the study clinics, HPV and cervical cancer information is only provided to women before cervical cancer screening.<sup>39</sup> This may be too late to prevent infection. An alternative strategy may be to provide HPV information to all patients at every clinical appointment. Second, given the high acceptability of the vaccine and the significant barrier of cost, the Haitian government should reconsider efforts towards applying for support from organizations that provide HPV vaccine at a reduced cost to low-income countries. Haiti is one of the countries eligible for Gavi Alliance support due to its gross domestic product,<sup>7</sup> and already receives funds from the organization for Hepatitis B, rotavirus, and pneumococcal vaccines.<sup>40</sup> Finally, health education messaging about HPV and HPV vaccine should be designed to engage parents, family members, and community elders in order to ensure the highest level of vaccine uptake.

In conclusion, our results provide unique information about HPV and HPV vaccine related attitudes in Haiti. Overall, awareness of HPV was low in a sample of healthcare-seeking adults. Health interventions should focus on increasing awareness of HPV. Moreover, as vaccination programs are introduced in Haiti, special attention should be taken in selecting vaccine distribution sites that are accessible, making the vaccine affordable, and ensuring messaging about HPV vaccine reaches a wide audience.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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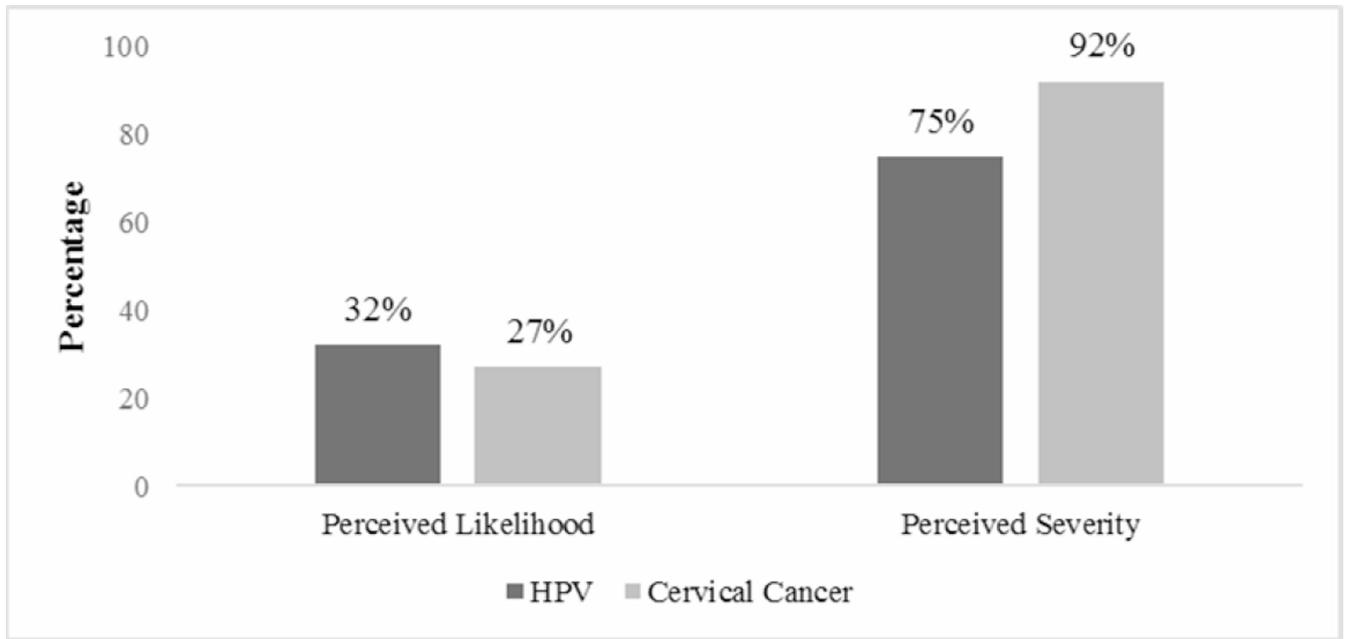
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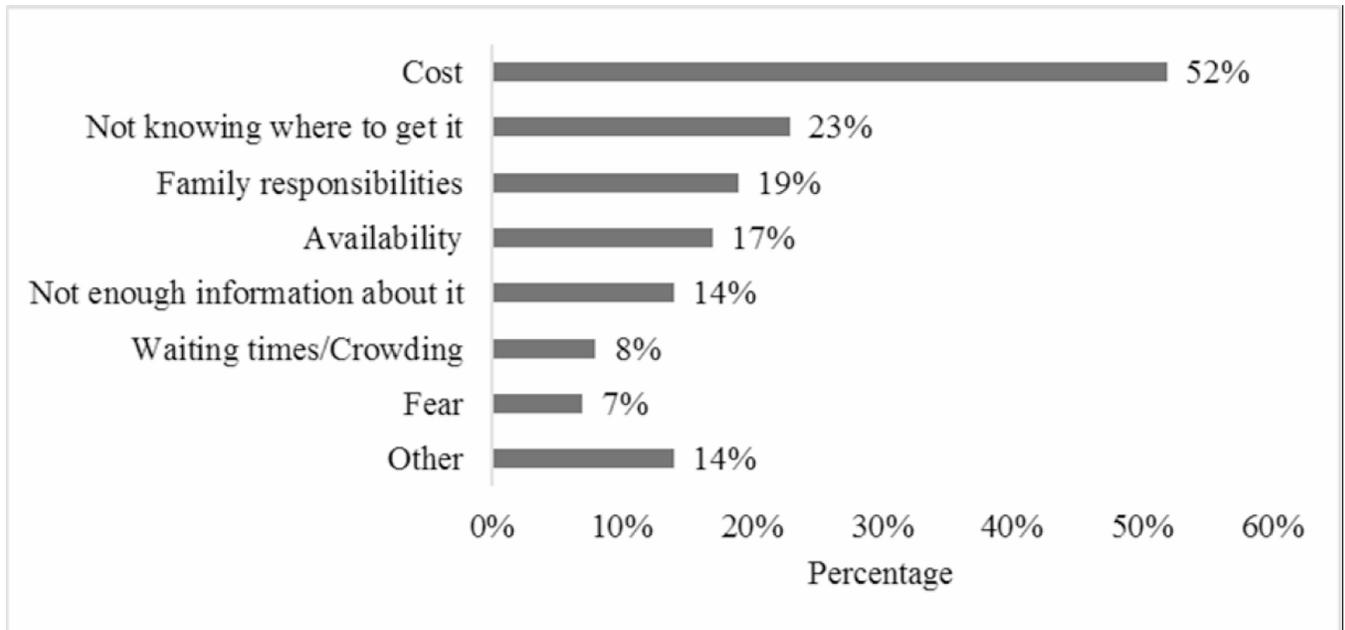
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**Figure 1.** Parents' beliefs about HPV-related diseases ( $n=250$ ).



**Figure 2.**  
Parents' perceived barriers to HPV vaccination ( $n=250$ )  
Only parents of daughters answered this question. Participants could list up to 3 responses.  
Responses in the "other" category included daughter's pregnancy, more pressing health concerns, and lack of confidence in vaccine efficacy.

**Table 1**Characteristics of respondents ( $n = 475$ ).

	Terre Noire <i>n</i> (%)	Léogâne <i>n</i> (%)	Overall <i>n</i> (%)
<i>Demographic characteristics</i>			
Sex **			
Male	N/A	65 (21)	65 (14)
Female	160 (100)	250 (79)	410 (86)
Age **			
18–39 y	67 (42)	232 (74)	299 (58)
40 y	93 (58)	83 (26)	176 (42)
Marital status			
Not married	59 (37)	144 (46)	203 (43)
Married or living together	101 (63)	171 (54)	272 (57)
Education *			
Primary education or less	66 (41)	99 (31)	165 (35)
More than primary education	94 (59)	216 (68)	310 (65)
Employment status **			
Unemployed or student	17 (11)	98 (31)	115 (24)
Employed	143 (89)	217 (69)	360 (76)
Religious background **			
Catholic	24 (15)	91 (29)	115 (24)
Other Christian/Protestant	128 (80)	200 (63)	328 (69)
Other/ No religion	8 (5)	24 (8)	32 (7)
Daughter in HPV vaccine age range **			
No female children	26 (16)	117 (37)	225 (47)
Daughter outside of age range	25 (15)	57 (18)	103 (22)
Daughter ages 11–26	109 (68)	141 (45)	147 (31)
<i>Personal health &amp; disease awareness</i>			
Had sexually transmitted infection			
No	133 (83)	295 (94)	428 (90)
Yes	27 (17)	20 (6)	47 (10)
Contraceptive use			
No	105 (66)	269 (85)	374 (79)
Yes	55 (34)	46 (15)	101 (21)
Heard of genital warts			
No	90 (56)	265 (84)	355 (75)
Yes	70 (44)	50 (16)	120 (25)
Knew someone with cervical cancer			
No	116 (72)	201 (64)	317 (67)
Yes	44 (28)	114 (36)	158 (33)

N/A = Not applicable

\*  
 $p < .05$ ;

\*\*  
 $p < .01$

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**Table 2**Correlates of human papillomavirus (HPV) awareness ( $n = 475$ ).

	No. respondents aware of HPV/total (%)	Bivariate OR (95% CI)	Multivariable OR (95% CI)
Overall	130/475 (27)	N/A	N/A
<i>Demographic characteristics</i>			
Sex			
Male	11/65 (17)	Ref	--
Female	119/410 (29)	2.00 (1.01–3.97) *	--
Age			
18–39 y	63/299 (21)	Ref	--
40 y	67/176 (38)	2.30 (1.52–3.48) **	--
Marital status			
Not married	80/272 (29)	Ref	--
Married or living together	50/203 (25)	0.78 (0.52–1.18)	--
Education			
Primary education or less	51/165 (31)	Ref	--
More than primary education	79/310 (25)	0.76 (0.50–1.16)	--
Employment status			
Unemployed or student	18/115 (16)	Ref	--
Employed	112/360 (31)	2.43 (1.40–4.22) **	--
Religious background			
Catholic	23/115 (20)	Ref	--
Christian/Protestant	103/328 (31)	1.83 (1.10–3.06) *	--
Other	4/32 (13)	0.57 (0.18–1.79)	--
Daughter in HPV vaccine age range			
No female children	44/225 (20)	Ref	--
Daughter outside of age range	29/103 (28)	1.61 (0.94–2.77)	--
Daughter ages 11–26	57/147 (39)	2.61 (1.63–4.16) **	--
<i>Personal health &amp; disease awareness</i>			
Had sexually transmitted infection			
No	106/428 (25)	Ref	Ref
Yes	24/47 (51)	3.17 (1.72–5.85) **	2.38 (1.10–5.13) *
Contraceptive use			
No	97/374 (26)	Ref	--
Yes	33/101 (33)	1.39 (0.86–2.23)	--
Heard of genital warts			
No	62/ 355 (17)	Ref	Ref
Yes	68/120 (57)	6.18 (3.93–9.72)	4.37 (2.59–7.38) **
Knew someone with cervical cancer			
No	83/317 (26)	Ref	--

	No. respondents aware of HPV/total (%)	Bivariate OR (95% CI)	Multivariable OR (95% CI)
Yes	47/158 (30)	1.19 (0.78–1.82)	--

Multivariate model contains all correlates significant ( $p < .05$ ) in bivariate models adjusting for clinic site.

OR = Odds ratio; CI = confidence interval; Ref = Referent group; N/A = Not applicable.

\*  
 $p < .05$ ;

\*\*  
 $p < .01$

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