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Racial and Ethnic Group Knowledge, Perceptions and Behaviors about Human Papillomavirus, Human Papillomavirus Vaccination, and Cervical Cancer among Adolescent Females

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Abstract

Study Objective—Human papillomavirus (HPV) vaccines provide an opportunity to greatly reduce the burden of cervical cancer. Although there has been improvement in uptake, there are notable ethnic/racial disparities. This qualitative study was conducted to better understand factors related to vaccine uptake among female adolescents from 3 racial/ethnic groups: African American (AA), Hispanic, and Caucasian. Findings can inform the development of optimal messages and strategies for clinical and population-based interventions.

Design and Setting—This mixed-methods descriptive study included completion of a brief structured survey and focus group discussion. Six focus groups were conducted with female adolescents, 2 each in the AA, Hispanic, and Caucasian groups. Brief structured survey questions and the focus group protocol addressed knowledge, perceptions, and behaviors related to HPV, HPV vaccination, and cervical cancer.

Participants, Interventions, and Main Outcome Measures—Participants were 60 female adolescents (ages 13–19, mean age = 16.6 years) recruited from high schools, public health clinics, and churches.

Results—Themes across questions were remarkably similar among AA, Hispanic, and Caucasian participants. Each group had high awareness of the terms HPV, HPV vaccination, and cervical cancer, but with little in-depth knowledge about these topics. There was a high acceptance of HPV vaccination. Misperceptions about optimal cervical cancer prevention strategies such as simply knowing one's partner and good hygiene were most common among Hispanic adolescents. Awareness about Pap testing was most common among Caucasian adolescents.

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Conclusion—Predominantly uniform perceptions of HPV vaccines across racial/ethnic groups suggest a “one size fits all” approach will likely have greater reach with cervical cancer prevention messaging than culturally tailored interventions.

Keywords

Adolescent; Healthcare disparities; HPV vaccines; Vaccination; Cervical cancer; Prevention

Introduction

Despite the long-term steady decrease in cervical cancer incidence and mortality rates in all segments of the United States population, pronounced racial/ethnic disparities remain.¹ Compared with Caucasian women, the cervical cancer incidence and mortality rates in African American (AA) women are 38% and 105% higher, respectively, and in Hispanic women 70% and 52% higher respectively.¹

Human papillomavirus (HPV) is the principal cause of cervical cancer. In the United States, the US Food and Drug Administration approved the first HPV vaccine in 2006 that can prevent the oncogenic HPV strains that are found in approximately 70% of cervical cancer cases,² and in 2014 they approved a new vaccine that can prevent 90% of oncogenic HPV strains.³ HPV vaccines are recommended for girls and boys aged 11-12, with catch-up vaccination for girls aged 13-26 and boys aged 13-21.⁴ A major cancer prevention breakthrough, HPV vaccines have the potential to dramatically reduce cervical cancer rates.

Further, HPV vaccines have the potential to reduce the racial/ethnic disparities in cervical cancer rates,⁵ depending on whether uptake occurs across the population subgroups. In adolescent Medicaid enrollees, the prevalence of completed HPV vaccination was 20%, 27%, and 32% in AA, Hispanic, and Caucasian groups, respectively.⁶ The observation of racial/ethnic differences in vaccine uptake⁶ increases the concern about the longstanding disparities in cervical cancer morbidity and mortality.⁵ To address this issue of apparent differential adherence to vaccine recommendations, additional evidence is needed to understand the factors that drive HPV vaccine decision-making. Public and patient education efforts might need to consider culturally-targeted education that is designed to overcome specific barriers to vaccination.⁶⁻⁸

Although HPV vaccination for younger adolescents is primarily driven by parental decision and health care provider recommendation,⁹ adolescents can influence whether they will be vaccinated in a number of ways. First, lack of parental understanding about HPV vaccination is a barrier to HPV vaccination,⁹ which adolescents can help to overcome by providing parents with vaccine information. Second, parents often piggyback discussion of sexually-related topics onto conversations arising from their children,¹⁰⁻¹² and so adolescents can initiate discussion and decision-making about HPV vaccination. Third, parental decisions about vaccination are influenced by subjective norms (or the belief that family and friends find the vaccine acceptable), and so parents often consider their children's perceptions in making vaccination decisions.¹³⁻¹⁵ Thus, because of the adolescent's role in HPV vaccination decisions, the purpose of this study was to obtain a better understanding of the factors that affect decision-making and how they vary across racial and ethnically diverse

young women. This information will inform the messages and strategies promoted in public and health education.

Materials and Methods

Design

A mixed-methods study was conducted to compare knowledge, perceptions, and practices regarding HPV, HPV vaccination, and cervical cancer among female adolescents of AA, Hispanic, and Caucasian ancestry. Six focus groups were conducted, 2 each in groups of AA, Hispanic, and Caucasian adolescents. Study participation was completed during a single appointment that lasted approximately 2.5 hours. Participants first completed a self-administered survey and then participated in a focus group discussion. Participants received \$25 cash for their time and effort. The Medical University of South Carolina institutional review board approved the study; all participants provided assent and written informed consent from a parent or guardian was obtained.

Guiding Framework

The study design was guided by the Preventive Health Model, a psychological model that attempts to predict the factors that influence preventive health behaviors. In the context of the Preventive Health Model, adolescent receipt of HPV vaccination might be influenced by their perceptions about susceptibility to HPV infection and cervical cancer, severity of cervical cancer, benefits and barriers to HPV vaccination, and cues to HPV vaccination (eg, education, media).

Participants and Setting

Participants were recruited from high schools, public health clinics, and churches in Charleston, South Carolina. Embracing the principles of community-based participatory research, trusted community members such as school nurses, a bilingual clinic staff, and a church leader helped to recruit participants. Focus group participants were recruited from a Hispanic church (n = 1 group), a public health clinic that serves underinsured Hispanic and AA youth (n = 1 group), and racially diverse high schools (n = 4 groups). Focus groups were conducted at high schools (2 AA groups; 1 Caucasian group), a health clinic (1 Hispanic group), a community meeting facility (1 Hispanic group), and a home (1 Caucasian group). Female adolescents were eligible if they were ages 13-19, able to provide parental or guardian consent, and identified themselves as AA, Hispanic, or Caucasian.

Data Collection, Management, and Analysis

Data sources for this study consisted of surveys and focus groups. The survey instrument and moderator's guide for the focus group were developed by a team of investigators with expertise in survey design, HPV, cervical cancer, and focus group methodologies, and underwent cognitive testing with female adolescents before use.

Focus Groups

The focus group protocol, guided by our model focused on the inquiry domains of: (1) usual (non-HPV) vaccines; (2) HPV, HPV vaccination, and cervical cancer; and (3) barriers to HPV vaccination. Discussion around other themes was encouraged as necessary.

Focus group moderators were women with previous training and experience in moderating focus groups and matched the race/ethnicity of the groups they moderated. They participated in a training session covering the study goals and the focus group discussion guide. When the focus group moderators shifted discussion from non-HPV vaccines to HPV infection and cervical cancer, a pictorial depiction of the uterine cervix was presented to each group to acquaint participants with the anatomical site for cervical cancer. On the basis of participant preference, 1 Hispanic focus group was conducted in Spanish and the other in English.

Supplemental Surveys

The self-administered supplemental survey covered the domains of: (1) demographic characteristics; (2) knowledge, attitudes and practices about HPV, HPV vaccination, and cervical cancer; (3) barriers and facilitators to HPV vaccination; and (4) sources of information about HPV vaccination.

Data Management and Analysis

Survey data were entered into a Microsoft Excel (Excel 2010 Version 14.0; Redmond, WA) spreadsheet. Each record was reviewed for accuracy. Frequency distributions were calculated for categorical variables and means (SD) and medians (range) for all continuous variables. The study was not powered to examine differences across racial and ethnic groups.

Focus groups were audiotaped and transcribed. A certified translator transcribed the one focus group conducted in Spanish. Transcripts were checked for accuracy against the digital recordings and notes taken during each group. Content analysis was conducted using NVivo software Version 9.0 (QSR International; Doncaster, Victoria, Australia).¹⁶ First, themes and subthemes were independently coded by 2 reviewers. Using an iterative approach, the 2 reviewers met repeatedly to develop consensus on themes, determine a final codebook, and organize themes. Themes were summarized overall and comparisons were made across the 3 racial and ethnic groups. Survey data were compared with focus group data.

Results

Of the total of 60 female adolescents who participated in the 6 focus groups (7-12 participants per group), 21 were AA, 22 were Hispanic, and 17 were Caucasian. The overall mean age of participants was 16.6 years (SD = 1.37), with the average age across race/ethnicity groups being 17.1 (SD = 1.00) for AA, 16.4 (SD = 1.68) for Hispanic, and 16.3 (SD = 1.22) for Caucasian groups.

In all racial/ethnic groups, family's adherence to recommended vaccinations was reported as 85% or more and 71% or more of participants agreed with the concept of mandatory HPV vaccination for school (Table 1). The prevalence of HPV vaccination reported on the survey

among participants was 14.3% (3 of 21), 22.7% (5 of 22), and 41.2% (7 of 17) in the AA, Hispanic, and Caucasian groups, respectively (Table 1).

The focus group themes that emerged from the data are summarized in Table 2; the 6 key themes used to organize the results presented are summarized in the first column. Racial/ethnic group comparisons are highlighted only when discordant responses were observed.

Awareness and Knowledge about HPV, HPV Vaccination, and Cervical Cancer

Despite a high awareness of the term HPV, participants knew very little about it. For example, one girl asked, “Isn't HPV the same as herpes?” and another stated, “I've heard of HIV, but not HPV.” There were a few exceptions, however. In a Hispanic group, girls mentioned hearing “something about HPV being warts.” Without prompting, several AA girls mentioned that HPV was sexually transmitted, with comments such as “My momma told me that people get it when they are having sex with a lot of different people,” and “You can get it the first time you have sex.” When prompted about HPV transmission, sexual transmission was the common theme across all groups. For example, one girl commented, “In school, they have a class and they showed different [sexually transmitted diseases] STDs and they mentioned that one.” Other comments reflecting common responses were that people get HPV “when they have unprotected sex,” and “from having sexual relations.” One girl commented about the high prevalence of HPV infection stating, “I heard HPV can be common and it can be treated if it is caught early enough.”

Across focus groups, some girls knew that HPV vaccines protect against cervical cancer. This knowledge was commonly described in vague terms, with statements such as “get the shot” and “take the vaccine” to prevent cervical cancer or “you get an HPV vaccine with a small dose of it, so that it can help prevent it.” Within each group, girls knew that HPV vaccination requires 3 shots, with comments such as: “I heard that you had to have three shots.”

A lack of knowledge about cervical cancer was pervasive. Only a few girls were able to convey any understanding of the disease, with statements such as “I'm under the impression that HPV can cause cervical cancer,” and “Before I heard my aunt had cervical cancer, I saw a commercial about this virus.” Another girl expressed that men do not get cervical cancer but can transmit “the germ” to women: “It's kind of like an STD, men carry it but they don't have symptoms because they don't have a cervix. When they have sex with women, that's why we get it. So men carry the germ I guess.”

Prevention of HPV and Cervical Cancer

HPV vaccination was commonly mentioned as a way to prevent HPV and cervical cancer. Girls made comments such as “Make sure all the females get the shot so nobody get that cervix cancer thing” and “Just get the shot,” as ways to prevent HPV. A few girls elaborated on how to prevent HPV, with comments such as “My doctor said you are supposed to get a shot before you are at risk, before you become sexually active.” Other ways to prevent HPV and/or cervical cancer mentioned were abstinence and condom usage. Girls made statements such as “Use condoms; that's what they tell you to prevent any type of STD,” “Just don't have sex and wrap it up,” and “Keep your clothes on,” to prevent HPV. Pap tests were only

mentioned in the 2 Caucasian groups. Misinformed cervical cancer prevention methods were only mentioned in the 2 Hispanic groups. For example, Hispanic girls cited “Be clean, wash yourself,” and “Know whom you are having sex with,” as ways to prevent HPV.

Concerns about HPV Vaccination

Participants were prompted to assess the extent that the following were barriers to HPV vaccination: (1) vaccine side effects; (2) fear of needles and pain; (3) the less than 100% overall efficacy of HPV vaccines to prevent cervical cancer; and (4) the possible need for booster shots. Of these, the only consistently reported factor that would keep participants from getting vaccinated was the threat of serious side effects, such as paralysis, sterility, serious illness including increased risk of cervical cancer, and death. For example, one girl commented, “If I had heard that people were getting paralyzed from it or getting sick, then I wouldn't want it. I wouldn't want to jeopardize my health.” Another girl stated she would not get the vaccine if “You could become sterile later on when they find out something is wrong with the vaccine.” One girl expressed that she “Worried about getting whatever it is that it's supposed to vaccinate me against, just because I've been under the impression that there is a minuscule possibility of actually getting sick from it.” Another girl described, “If it's going to kill me or someone else then I'm not going to get it.”

Participants tended to agree that pain would not be a barrier to HPV vaccination. One girl noted, “Pain from the vaccine is not really an issue for me; there are some things (vaccine-preventable diseases) that never stop hurting.” Similarly, girls made comments such as “The pain wouldn't matter,” and “If the vaccine is going to prevent something that is worse; then I think you can go ahead and take the pain.” Only in 1 Caucasian group were a few comments made about possibly weighing the benefits vs the pain of the vaccine. For example, one girl described “Depends on how painful and how beneficial the vaccine was. If it is something that's really going to benefit and it hurts, its ok; but if it's something that I don't really need and it hurts, then...”

None of the participants reported that side effects such as fainting, nausea, or the pain of getting a shot would prevent them from getting the HPV vaccine. For example, one girl commented, “I'd take it if there was just a little rash or fever, as long as I don't die. Another girl said, “If it's just a cold or a fever that's not a big deal.”

When informed that current HPV vaccines protect against approximately 70% of cervical cancers, most considered 70% efficacy to be sufficient. For example, one girl noted, “That's pretty good for a vaccine that just came out. It could be better in the future but right now that's pretty good.” Girls made comments such as “To me it's probably good if it passes 50/50 protection,” and “If you get the shot that protects 70%, then you can do your best to protect the other percent, I mean if you are sexually active or whatever.” However, a subset of teens indicated they might avoid vaccination because of low net efficacy; for example, one girl noted, “I wouldn't use it. If there was something that was more thorough, I would take that probably.” Similarly, a girl joked, “Not too too good,” and another said, “I wouldn't take the risk because it's going to hurt and it might not work.”

When informed that booster shots might be needed in the future to enhance the long-term protection of HPV vaccines, no participants believed this was a barrier to vaccination. Typical comments were, “If you were trying to protect yourself the first time it shouldn't matter,” “I would still get it,” and “I guess if I already had it I might as well just do the other shot.”

Each focus group had at least 1 girl who had experienced the HPV vaccination series. Representative comments on this topic were “I just got a shot that was to help us prevent cervical cancer. I got the first one and I can get the other two. There are three of them.” and “You go; then you have to wait three months and then I had to wait a couple more months before I got my shot.” Unique to the 3-shot series, a few girls in the AA and Caucasian groups stated each shot in the series grew progressively more painful. For example, a Caucasian girl commented “The second one hurts more than the first one and the third one hurts more than the second one,” and an AA girl commented, “The first time it didn't hurt, but the second time and the third time it hurt real bad.” Girls across groups also reported redness, swelling, and fever as side effects and symptoms not mentioned in the discussion of vaccines in general. For example, one girl noted, “It got swollen. I also felt that it burned and then it got swollen and then I also had a fever.” Other girls commented, “Yeah, you are really sore afterwards,” and “It got red.”

Importance of Vaccinations Overall

Girls consistently valued vaccines because they are an effective disease prevention strategy that benefits human health, as reflected in the following quote: “There was a reason why people died when they were young before all these vaccines came out.” Another theme was much more practical: vaccines are required to participate in school and sports. This was reflected in responses such as “You have to get them to go to school. You have to be around other kids, so you have to get the shot.” and “You gotta have a record of them to play sports.”

Understanding of How Vaccines Work

In none of the focus groups was there a demonstrated understanding of how vaccines protect against disease. In each group, just 1 brief comment was made that vaccines provide immunity (eg, “Vaccines make you immune,” “Vaccines build up your immunities.”). Girls in the Caucasian and Hispanic groups noted that vaccines protect by giving you a little of the causal microbe. For example, a Caucasian girl said, “They give you some of the virus and it builds up your immunity to it.” Similarly, a Hispanic girl described “Isn't the vaccine the actual virus in a lower dose so your body becomes immune. so if you end up getting the flu, it won't be as severe as if you didn't have the vaccine.” When asked what diseases vaccines can protect against, girls correctly mentioned the flu, chickenpox, and measles, but incorrectly mentioned the common cold. One girl believed that vaccines must not confer protection against STDs because STDs are so common.

Vaccination Practices and Behavior

Only pro-vaccine comments were expressed, except for the short-term side effects. The participants' concerns with HPV vaccines as described previously were mirrored for other

vaccines: pain, soreness, and fear of shots. Responses were consistent in expressing dislike of getting shots, but that fear of shots was not a strong enough deterrent to keep from getting vaccinated. The reasons for disliking shots included fear of needles, pain of the shot, the vaccine going into their arm, and soreness afterward. One teen commented “I remember getting my chicken pox shot when I was younger and I don't like needles, so it was not fun.” Other girls made comments such as “I don't like needles. they hurt,” “I am scared because it hurts later. It leaves a red spot,” and “I am terrified of the injection, but not the needle.” A minority of girls in each racial/ethnic group stated they did not mind getting vaccines, with comments such as “I was nervous the first time I got a shot, but then I was ok,” and “I know I have to get them so it doesn't matter.”

Discussion

With the goal of searching for barriers to the uptake of HPV vaccines across racial/ethnic groups, this qualitative study was carried out among female adolescents of AA, Hispanic, and Caucasian ancestry. The principal finding was that for most of the topics related to HPV vaccination and cervical cancer prevention, the similarities in themes across the racial/ethnic groups far outweighed the few observed differences. Although these findings might contradict patterns in the adult literature that highlight ethnic differences in ethnic women's perceptions, the generation born between 1996 and 2002 (ie, current adolescents) might exhibit a change in youth culture that might attenuate these previously reported ethnic differences. Thus, considerations about the need for culturally-tailored educational materials might need to be evaluated separately for adult learners vs adolescents who have been educated using standardized educational curricula in schools.

In this study population, a major theme was an ubiquitous awareness of HPV, cervical cancer, and the HPV vaccine, but a lack of in-depth understanding of these topics. For example, there was little understanding of HPV transmission, the contribution of HPV to cervical carcinogenesis, and the detection and treatment of cervical cancer. These observations corroborate previous studies that documented a high prevalence of having heard of HPV and/or the HPV vaccine,^{17–19} but also revealed a lack of enough knowledge base to make a fully informed decision about HPV vaccination.^{20,21}

Similar to previous findings,^{22,23} a high vaccine acceptability was observed in the present study. Vaccines in general were appreciated for their public health importance as well as the practical importance as a requirement for school enrollment and sports participation. However, the focus groups uncovered a lack of understanding of how vaccines work. Adolescents commonly reported that they did not like to get shots because of fear of needles and pain; however, none cited this as a deterrent to vaccination. The finding was also shown empirically in an experimental study, in which teenagers' reports of vaccine fears were documented and then a voucher provided for free HPV vaccination; 63% of girls reported vaccine-related fear of needles and pain, but only 8% were not vaccinated because of vaccine fear.²⁴

Girls in the present study reported similar minor HPV vaccine side effects (eg, pain, swelling) as previous reports.²⁵ HPV vaccination was reported to be increasingly painful as

the vaccine series continued in our study; we have not seen this observation previously reported. The formulation of HPV vaccines is constant across the 3-shot series,^{26,27} so anticipation of the repeated shots might exacerbate the sense of needle fear and pain.

The participants consistently reported that only risk of serious side effects would be a deterrent to HPV vaccination, with no major differences according to racial/ethnic group. The importance of fears of serious side effects has been reinforced in surveys of adolescents^{20,28} and parents^{29,30} that have documented that fear about safety of these relatively new vaccines are a major reason for HPV vaccine refusal.

Most—but not all—girls in the present study believed that the HPV vaccine's coverage of 70% of oncogenic HPV strains was sufficient to opt for vaccination, a finding consistent with the findings of other studies suggesting that vaccine efficacy concerns are not a major barrier to HPV vaccination.^{28–30} Other studies have documented that long-lasting protection is a desired quality for an HPV vaccine,^{31,32} but most studies have not found the potential need for a booster shot to be a major barrier to HPV vaccination in adolescents.^{28–30} Similarly, in the present study the hypothetical need for booster shots was not perceived as a barrier to HPV vaccination.

The concordant responses across racial/ethnic groups far exceeded the few discordant findings. Abstinence and safe sex were often correctly cited as ways to prevent HPV and cervical cancer. However, only Caucasian groups mentioned Pap tests as a method for cervical cancer prevention; consistent with previous findings documenting that minority women were half as likely as Caucasian women to understand the purpose of the Pap test.³³ Conversely, only Hispanic girls mentioned misinformed approaches to cervical cancer prevention, such as knowing one's partner and having good hygiene. This lack of sexual health knowledge in Hispanic women is not uncommon, especially because sex remains a taboo topic for Hispanic women and that Hispanic women are least likely to communicate with sexual partners about condom use.³⁴ In addition, use of “douching” to keep themselves “clean” actually increases the probability of contracting HPV and other STDs. These observations identify content that if corroborated in larger confirmatory studies, might be emphasized if tailored interventions according to racial/ethnic group were being considered in sexual risk prevention strategies, but these differences in prevention behavior do not affect adoption of the HPV vaccine.

The Center for Disease Control and Prevention's 2014 National Immunization Survey for Teens (NIS-Teen) coverage data showed that 41.7% of Caucasian adolescent females, but only 30.1% of AA adolescent females between 13 and 17 years of age in South Carolina have received the 3-series HPV vaccine.³⁵ Additionally, Caucasian adolescent females in SC have higher vaccine uptake than Caucasian adolescent females nationally (41.7% vs. 37.5%), but AA adolescent females have lower vaccine uptake than AA adolescent females nationally (30.1% vs. 39.0%). These ethnic differences in uptake of the vaccine merit further investigation and also highlight disparities related to geographical location. Despite South Carolina having one of the fastest growing rates of Hispanic populations in the country,³⁶ no data were presented for this ethnic group. Similar ethnic patterns were seen in rates of female adolescents aged 13-17 years who had only received 1 dose of HPV vaccine,

suggesting that dropout before the completion of the 3-series shot is not a function of ethnic differences. This information again corroborates focus group data showing no ethnic differences in opinions about the 3-series design/booster shot and indicates that a “one size fits all” educational approach might have the most reach and effect on uptake of the HPV vaccine.

The strength of the focus group approach is that it generates in-depth information, but there are inherent limitations that should be kept in mind when drawing inferences. These findings were based upon gathering information from a relatively small number of female adolescents residing in a confined geographic region, and so the generalizability of our overall and race-specific findings might not be generalizable within the broader US population. However, our sample (ie, 17-22 participants per race/ethnic group) was consistent with qualitative research recommendations, which state that thematic saturation is usually achieved with 15-30 participants and near saturation with 12 participants.^{37,38} The fact that many of the study findings are closely aligned with previously reported results is reassuring in this regard. Another strength of the study is the direct comparison of perceptions across these 3 ethnic groups in one study whereas other studies have only evaluated racial and ethnic group differences among 2 ethnic groups (ie, white and black).³⁹ In addition, most research studies have used quantitative designs to show ethnic differences in perceptions of the HPV vaccine.⁴⁰ Findings from this study suggest that more qualitative work might be needed before resources and effort are spent on cultural modifications to interventions increasing HPV vaccines, which might be unnecessary. Subsequent studies that find uniformity of perceptions across ethnic youth might help streamline efforts and support implementation of school-based vaccination programs, a recommendation made on the basis of a systematic review of adolescent vaccination adherence.⁴⁰

In summary, although ethnic differences in sexual risk behaviors might exist, the primary finding was the relatively uniform results with regard to perceptions of the HPV vaccine across racial/ethnic groups, suggesting that the reach of adolescent HPV vaccine educational strategies might be optimized with a uniform “one size fits all” educational approach, without the need for cultural or ethnic tailoring. The uniformity in results was not always positive, however, because the across-the-board lack of in-depth understanding of the topics of HPV vaccination and cervical cancer represents a serious deficit to be overcome among adolescent girls of AA, Hispanic, and Caucasian ancestry.

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Table 1
Descriptive Characteristics of Participants According to Race and Ethnic Group (Overall N=60)

Item	Response	Total (%)	Caucasian (%)	AA (%)	Hispanic (%)
Ever heard of cervical cancer	Yes	88.3 (53/60)	100 (17/17)	95.2 (20/21)	72.7 (16/22)
Ever heard of HPV	Yes	72.9 (43/59)	100 (17/17)	66.7 (14/21)	57.1 (12/21)
Ever heard of a vaccine to prevent HPV or cervical cancer	Yes	79.0 (45/57)	88.2 (15/17)	70.0 (14/20)	80.0 (16/20)
Likelihood of getting HPV vaccine	Already received HPV shot	25.0 (15/60)	41.2 (7/17)	14.3 (3/21)	22.7 (5/22)
	Will definitely/probably get HPV shot	45.0 (27/60)	47.1 (8/17)	52.4 (11/21)	36.4 (8/22)
	Not sure	16.7 (10/60)	12	9.5 (2/21)	27.3 (6/22)
	Will probably/definitely not get HPV shot	1.7 (1/60)	0.0 (0/17)	0	4.6 (1/22)
	My parent will decide for me	11.7 (7/60)	0.0 (0/17)	23.8 (5/21)	9.1 (2/22)
Agreement with mandatory HPV vaccination	Agree/strongly agree	80.0 (48/60)	82.4 (14/17)	71.4 (15/21)	86.4 (19/22)
	Undecided	15.0 (9/60)	11.8 (2/17)	23.8 (5/21)	9.1 (2/22)
	Disagree/strongly disagree	5.0 (3/60)	5.9 (1/17)	4.8 (1/21)	4.6 (1/22)
Family member receipt of usual recommended vaccines	Yes	90.0 (54/60)	94.1 (16/17)	85.7 (18/21)	90.9 (20/22)
Rate vaccines as “very important” for health	Rate vaccine importance as a “10” on a scale from 1-10 (with “10” being the highest rating of importance)	81.7 (49/60)	70.6 (12/17)	95.2 (20/21)	77.3 (17/22)

AA, African American; HPV, human papillomavirus

Table 2
Summary of Focus Group Themes

Topic	Theme	Subtheme
Awareness and knowledge of HPV, HPV vaccination, and cervical cancer	HPV	• Mostly just heard of HPV
		• HPV is sexually transmitted
		• Some confusion between the term HPV and other STD terms such as HIV and herpes
		• HPV is in the news because many people are getting it (not because it can be prevented)
		• HPV is treated with the HPV vaccine; HPV is treated with medicine or surgery
	HPV vaccine	• Don't know anything about the HPV vaccine
		• Heard about the HPV vaccine on vaccine commercials, but this information was vague
		• Vaccines protect you by giving immunity or a little of the disease
		• HPV vaccination requires multiple shots
	Cervical cancer	• Mostly just heard of cervical cancer
		• Sporadic facts about cervical cancer: can be cured if caught early; men are asymptomatic carriers
Prevention of HPV and cervical cancer	Prevention methods	• Get the HPV vaccine (common)
		• Be abstinent or use condoms (common)
		• Get checkups from a doctor (less common)
		• Know your partner (less common)
		• Be clean (less common)
Concerns about HPV vaccination	Serious side effects	• Serious side effects would prevent me from getting the HPV vaccine (eg, death, paralysis, sterility)
	Pain and other minor side effects	• Pain or discomfort from vaccine would not prevent me from getting the vaccine
		• Minor side effects would not prevent me from getting the vaccine (eg, soreness, rash, fever)
	Vaccine efficacy	• 70% Efficacy is good enough to get the vaccine
		• 70% efficacy is not good enough to get the vaccine
	Booster shots	• Need for a booster shot is not a concern if the vaccine works
Importance of vaccinations overall	Why vaccines are important	• Vaccines build up your immunity
		• You have to get vaccines to go to school or play sports
Understanding of how vaccinations work	How vaccines work	• Vaccines build up your immunity
		• Vaccines give you a little of the disease
HPV vaccination practices and behaviors	Previous experience with standard vaccines	• I am scared of vaccines because they hurt
		• I don't mind getting vaccines

Topic	Theme	Subtheme
	Prior experience with HPV vaccination	<ul style="list-style-type: none">• Already had the HPV vaccine• I completed all 3 of the shots
	Experiences of side effects	<ul style="list-style-type: none">• Pain and soreness were common• Vaccine was increasingly painful over the 3 shot vaccine series• Experiences of swelling, redness and burning at the injection site were common• Fever also reported

HPV, human papillomavirus; STD, sexually transmitted disease