

¡Habla de VPH! An Educational Activity for College Students in Puerto Rico

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Objective: To evaluate human papillomavirus (HPV) infection knowledge, willingness to get vaccinated, and vaccination uptake, following a brief educational activity entitled ¡Habla de VPH! (Let's talk about HPV!) in a sample of college students at the University of Puerto Rico, Bayamón.

Methods: Participants completed a self-administered questionnaire developed by the research team, which gathered information regarding sociodemographic characteristics, HPV vaccination status, and willingness to receive the vaccine. Once the participant completed the survey, the staff of the Outreach Program conducted an educational activity. Study participants completed a pre- and post-test, which included a scale with items related to knowledge about HPV infection, associated malignancies, and the vaccine. To compute the mean knowledge score for each test, the correct responses were summed; the total scores for each test ranged from 0 to 11. Follow-up interviews (3 and 6 months) explored knowledge changes and—in the previously unvaccinated students—vaccine uptake.

Results: A total of forty students answered the questionnaire. A significant difference between the average knowledge before (7.6 ± 2.1) and after the intervention (10.6 ± 0.6) ($P < .001$) was observed. Of the non-vaccinated group, 59.3% reported being interested in receiving the vaccine. By the 3- and 6-month follow-ups, only 2 students had started the vaccine series.

Conclusion: Knowledge about HPV and associated malignancies increased significantly. However, few students initiated the vaccine after either of the follow-ups. Future efforts should line up the vaccine promotion and outreach activities with immunization services, making the vaccine available in the communities to be impacted. [*P R Health Sci J* 2021;40:142-146]

Key words: HPV, HPV vaccine, College students

The number of cancers associated with the human papillomavirus (HPV) has increased in the United States (US) in recent years (1). HPV is the most common sexually transmitted infection (STI) (2) and the highest reported infection among college students (also in the US) (3). In the US, around 79 million Americans have been infected with HPV (3). Only a handful of studies have focused on college students' knowledge and perceptions of HPV (4–10), and even fewer have tested the effectiveness of educational interventions (11–15). This is especially true for 18- to 22-year-olds, who both have a higher risk of HPV infection than do the other age groups and are eligible for the HPV vaccine (16).

In Puerto Rico (PR), the epidemiology and burden of HPV-related cancers in both men (17–21) and women (22–24) have been widely documented. Meanwhile, behavioral studies have shown a low awareness of HPV in adults in this population (23, 25–27). Although community engagement programs

and community coalitions on the island have developed educational campaigns to increase HPV vaccine uptake, studies that document and evaluate the effectiveness of educational

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activities on changing these outcomes are limited. Such studies would inevitably lead to a better understanding of the barriers to HPV vaccine uptake in college students of Hispanic origin.

This study aimed to evaluate HPV knowledge and vaccination uptake both prior to and following a brief educational intervention entitled ¡Habra de VPH! (Let's talk about HPV!). This program was part of the community outreach activities of the PR Community Cancer Control Outreach Program (PRCCCOP) of the University of Puerto Rico (UPR) and the University of Texas MD Anderson Cancer Center (MDACC) Partnership for Excellence in Cancer Research.

Methods

In March 2014, the PRCCCOP collaborated with the PR Comprehensive Cancer Control Program and the Educational Services Program of UPR Bayamón; the collaborating entities offered the educational intervention “¡Habra de VPH!” to college students. The activity had the following objectives: (1) to provide college students with general information about HPV, HPV-related cancers, and the HPV vaccine and (2) to provide information regarding where to get the vaccine, tailored to the individual's age and health insurance–provider status.

Before the educational intervention, we held a series of meetings with the director of the Educational Services Program to discuss the Outreach Program's objectives and further describe the educational activity. Various strategies were used for advertising the activity, including mass emails, flyers, and invitations from professors.

After consenting to participate in the study, the students took a self-administered survey. The survey gathered demographic information, inquired after HPV vaccination status and intent to vaccinate, and asked for each respondent's contact information (name, phone, email) for follow-up. An 11-item pre-test was administered to each participant to assess his or her knowledge of HPV, after which, a 30-minute educational seminar was conducted by our research team. The participants were encouraged to ask questions at the end of the seminar. Finally, a post-test containing the same 11 items was administered to assess changes in each participant's knowledge.

At 3 and 6 months after the intervention, we conducted follow-up interviews by phone to knowledge and—among unvaccinated students—vaccination intention and uptake. The study protocol was approved by the Institutional Review Board (IRB) of the UPR Medical Sciences and UPR Bayamón campuses.

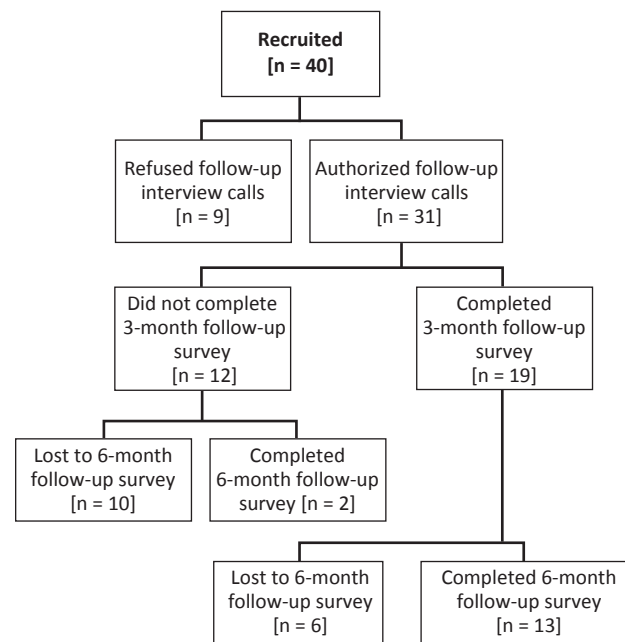
Statistical Analysis. Descriptive statistics were used to analyze each participant's demographic data, HPV vaccination status, and willingness to receive the HPV vaccine. An exact McNemar's test was used to explore the differences between the participant's knowledge of specific items about HPV and HPV vaccination before and after the educational activity. Correct answers were scored as 1 and incorrect answers as 0. The mean knowledge scores were computed by summing the correct responses to each

test (pre- and post-); total scores for each test ranged from 0 to 11. We performed a paired t-test to determine whether there were significant differences between the pre- and post-test scores. We used the Shapiro–Wilk test to assess the differences between the pre-test and the post-test scores. Statistical analyses were performed using Stata 13.0 (Stata Statistical Software: Release 13. College Station, TX: StataCorp LP).

Results

A total of 40 college undergraduate students answered the survey (Figure 1). The mean age of the participants was 19.9 (± 1.9) years (SD). Over half of the participants were female (67.5%) and either freshmen or sophomores (55.0%). Most of them had private health insurance (64.1%), followed by 28.2% that had the government's health plan (data not shown). Before the educational activity, most of the students had previously heard about HPV infection (92.1) and the HPV vaccine (87.2%). Print-based media were the most common sources of information reported (Table 1).

Figure 1. “¡Habra de VPH!” Participation and Follow-up



Almost one third (27.5%; $n = 11$) of the participants reported that they had received the HPV vaccine prior to the educational activity. The mean age for vaccination was 15 (± 2.38) years (SD). Over half of those who had initiated the vaccination (63.6%) had completed the HPV vaccination series. The main reasons for their getting the HPV vaccination were that (1) their physician recommended being vaccinated (26.0%), (2) they saw or heard about HPV and the vaccine (22.0%), and (3) they received a recommendation from a non-physician healthcare professional (e.g., nurse, health educator) (17.0%).

Table 1. HPV infection and vaccine knowledge in ¡Habla de VPH! participants (n = 40)

Characteristic	Total (%)
Have you heard about HPV? (n = 38)	
Yes	35 (92.1)
No	3 (7.9)
Where did you hear about HPV?*	
Newspaper or magazine	21 (26.6)
TV or radio	20 (25.3)
Internet	15 (19.0)
Healthcare provider	7 (8.9)
Healthcare facility	6 (7.6)
Academic environment	5 (6.3)
Family or friends	5 (6.3)
Have you ever heard of the HPV vaccine? (n = 39)	
Yes	34 (87.2)
No	5 (12.8)
Where did you hear about the HPV vaccine?*	
Newspaper or magazine	15 (25.9)
TV or radio	14 (24.1)
Internet	10 (17.2)
Healthcare provider	3 (5.2)
Healthcare facility	7 (12.1)
Academic environment	3 (5.2)
Family and/or friends	6 (10.3)

*Respondents were asked to check all the answers that applied.

Among those not vaccinated against HPV, the main reasons for not getting vaccinated were the following: (1) I don't have enough information about HPV (19.0%), (2) I'm worried about the vaccine's side effects (19.0%), and (3) my doctor or other healthcare professional hasn't recommended it (19.0%). Over half (59.3%) of the unvaccinated students (or those not sure about their vaccination status) reported being interested in receiving the vaccine (data not shown).

Thirty-six students responded to all the knowledge questions in the pre- and post-test. We observed a significant mean difference ($P < .0001$) between the average pre-test score (7.6 ± 2.1) and the average post-test score (10.6 ± 0.6). On examining the differences in individual items, we found significant improvements in terms of post-test knowledge in 6 of the 11 items ($P < .05$). We also observed a significant increase in anal and oropharyngeal-cancer knowledge after the educational intervention (Table 2).

Follow-up on HPV vaccine intention and uptake

Nineteen (61.2%) unvaccinated participants completed the 3-month follow-up (Figure 1), yet only 1 participant reported having gotten the HPV vaccine after the intervention. The participant identified the "physician's recommendation" as the

reason for vaccinating. The rest of the study participants (94.7%; n = 18) reported the following main reasons for not getting the vaccine: I'm interested, but I haven't gotten vaccinated yet (35.7%), and I don't have time (28.6%). The majority (94.4%; n = 17) of the participants reported at the 3-month follow-up interview that they were interested in receiving the HPV vaccine in the future.

At the 6-month follow-up, 15 (48.4%) participants completed this interview (Figure 1). An additional participant reported having received the first dose of the vaccine and identified the information provided in the educational activity as the main reason for vaccinating. Among those reporting not being vaccinated by the 6-month follow-up (93.3%; n = 14), the main reasons for not having done so were: I don't have time (41.2%), and I don't have enough information about HPV (11.8%). Nine participants reported an interest in receiving the vaccine in the future (64.2%). Two participants stated they were not interested, and the other 2 were not sure about it.

DISCUSSION

This is our first attempt to evaluate our outreach efforts in the field to inform future HPV vaccine-related community engagement activities. At baseline, 92.1% of the participating students reported knowing about the HPV infection and 87.2% about the HPV vaccine. A significant increase in the knowledge of HPV and HPV-related cancers was observed. Although a high vaccination intent was reported among unvaccinated students, a low vaccination initiation was reported, primarily due to time constraints as their main barrier.

Results from the pre-test showed that most of the students understood basic HPV concepts (HPV as an STI, HPV as a causal agent of HPV infection, the fact that both men and women can contract HPV from having vaginal, anal, or oral sex with someone who has the infection, and vaccine availability). However, the majority were unaware that HPV infection could cause anal or oropharyngeal cancer. After the educational assessment, we observed a significant increase in the knowledge of those specific items.

As happened in our study, other studies have shown that educational interventions targeting knowledge can increase the intention of vaccinating (13), although such interventions are not typically associated with vaccination uptake (11, 28). Our educational efforts resulted in a significant overall increase in knowledge; however, HPV vaccination initiation remained low, similar to rates reported by college-aged women in previous randomized control trials (11, 28). Several studies have demonstrated the effectiveness of HPV interventions targeting health clinics, health professionals, communities, and high schools, and some have focused on the college setting; yet, the effectiveness of these HPV interventions remains understudied (28–30). Additionally, since provider recommendation emerged as a correlate of vaccination, such providers (that is, PR-based healthcare personnel) need to be targeted by

interventions that will encourage them to recommend the HPV vaccine to their patients, especially those who are of college age. The low vaccination uptake after the educational assessment was not unforeseen. Nonetheless, it provided us with evidence that will enable us to efficiently develop initiatives that are more specifically targeted to our population of interest and, subsequently, increase. Future educational efforts should focus on a comprehensive intervention to address the barriers to and concerns about vaccinating against HPV. For example, Bennett et al. recommend using multilevel indicators (such as practice- and system-level approaches) that, ideally, would help decrease the barriers to increasing vaccine uptake (15). An intervention should also address perceived susceptibility for the individuals in this cohort (college students) and discuss the possible sequelae of HPV other than cervical cancer (e.g., anal and oropharyngeal cancer). Opportunities to collaborate with other community, academic, and immunization clinics to develop vaccination clinics during or right after our educational outreach efforts would be welcome, and their results could lead to decreasing one of the barriers to vaccine uptake that was most often mentioned by our participants during our follow-up calls.

Several limitations of this study should be acknowledged.

The small sample size and low retention rates following the educational program affected our ability to measure our main outcome. Due to the small sample size, stratifying the knowledge score by vaccination status was not possible. Despite these limitations, the evaluation of “¡Habla de VPH!” indicated that an educational intervention delivered on a college campus was feasible and well-received by students and the administration.

In summary, this educational intervention from the PR Outreach Program (part of the US4 UPR/MDACC Partnership for Excellence in Cancer Research) suggests that outreach and community engagement programs that target college students in PR and that are more comprehensive and robust are needed. Future efforts should include educational components that feature HPV-related cancers other than cervical cancer and should include, as well, targeted vaccination efforts (e.g., organizing on-campus HPV vaccination clinics) (31). New attempts at educating college students about HPV must be included in and promoted as part of the ongoing strategies delineated in the PR Comprehensive Cancer Control Plan, 2021-2026. Lastly, given ongoing and novel initiatives for COVID-19 vaccination in colleges, we should discuss bundling the HPV vaccination and the COVID-19 vaccination into a single targeted implementation strategy.

Table 2. Pre- and post-test results regarding knowledge of HPV infection, HPV-related cancers, and the HPV vaccine in college students: ¡Habla de VPH! (n = 36)

Item	Correct answer	Correctly answered		Exact McNemar's test P value
		Pre- test n (%)	Post-test n (%)	
HPV is a sexually transmitted infection.	True	31 (86.1)	36 (100.0)	.063
HPV affects only women.	False	31 (86.1)	36 (100.0)	.063
Some types of HPV can cause cervical cancer.	True	31 (86.1)	35 (97.2)	.125
Some types of HPV can cause genital warts.	True	26 (72.2)	36 (100.0)	.002
Some types of HPV can cause anal cancer.	True	13 (36.1)	36 (100.0)	< .0001
Some types of HPV can cause oropharyngeal (mouth and throat) cancer.	True	15 (41.7)	35 (97.2)	< .0001
A person infected with HPV can infect a sexual partner only if that person has signs or symptoms.	False	19 (52.8)	25 (69.4)	.146
The transmission of HPV can be prevented by using condoms.	False	24 (66.7)	36 (100.0)	< .001
There are vaccines to prevent infection with certain types of HPV.	True	34 (94.4)	36 (100.0)	.500
Only women can be vaccinated against HPV.	False	22 (61.1)	36 (100.0)	.0001
HPV is the least common sexually transmitted infection.	False	26 (72.2)	35 (97.2)	.004
Average score		7.6 ± 2.1	10.6 ± 0.6	< .0001*

*Paired t-test p-value; ^aOnly 36 participants responded to all the questions in the pre- and post-tests.

Resumen

Objetivo: Evaluar el conocimiento acerca del Virus del Papiloma Humano (VPH), disposición y utilización de la vacuna luego de la actividad “¡Habla de VPH!” entre una muestra de estudiantes de la Universidad de Puerto Rico, Bayamón. **Métodos:** Los participantes completaron un cuestionario autoadministrado desarrollado por el equipo de investigación, el cual recopiló características sociodemográficas, estatus de vacunación y disposición en recibir la vacuna. Una vez completada la encuesta, el equipo del programa de Alcance Comunitario ‘Outreach’ realizó la intervención educativa. Los participantes completaron una pre y post prueba, la cual incluía componentes relacionados con el conocimiento sobre la infección de VPH, cánceres asociados y la vacuna. Para calcular el promedio de la escala, las respuestas correctas fueron sumadas; con los totales alcanzados en cada prueba desde 0 hasta 11. Entrevistas de seguimiento fueron completadas a los 3 y 6 meses. **Resultados:** Un total de cuarenta estudiantes contestaron la encuesta. Una diferencia significativa entre el promedio de conocimiento previo (7.6±2.1) y

posterior a la intervención (10.6±0.6), (valor de $p < 0.001$) fue observada. En el grupo de participantes no vacunados, 59.3% reportó interés en recibir la vacuna. Durante los seguimientos de 3 y 6 meses, solo dos estudiantes comenzaron la serie de vacunas contra el VPH. Conclusión: El conocimiento sobre VPH y cánceres relacionados aumentó significativamente luego de la actividad educativa. Sin embargo, pocos habían iniciado la vacunación al seguimiento. Futuros esfuerzos deben alinear la promoción de la vacuna con servicios de inmunización disponibles en las comunidades a ser impactadas.

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