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Catching up with HPV Immunization: An Educational Video for College Students

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Abstract

HPV is the most common sexually transmitted infection in the US, and it can lead to minor health problems such as genital warts and serious problems like cancer in men and women. HPV vaccination can effectively prevent HPV-related cancers and is recommended by ACIP to individuals aged 9 - 26. HPV vaccine uptake is low among adolescents and young adults in the US. College students have a window of opportunity to catch up with their HPV immunizations, and are often uninformed about HPV, the HPV vaccine, their eligibility to receive the HPV vaccine, and where they can obtain the HPV vaccine. An online educational video about HPV was produced for Seattle University (SU) students with the purpose of informing them about HPV and prompting unvaccinated students to get vaccinated. The video was placed in an online survey containing pre- and post-video questionnaires testing viewers' HPV knowledge and self-reported likelihood to get vaccinated. Viewers' self-reported likelihood to vaccinate and correct answers to HPV knowledge questions increased in the post-video questionnaire. Educational interventions such as the one evaluated in this project can improve young adults' HPV knowledge and may have a positive influence on their intention to vaccinate against HPV.

Introduction

Human papillomavirus (HPV) is the most common sexually transmitted infection in the United States, and it can lead to genital warts and cancers of the cervix, vagina, anus, penis, mouth and throat (Centers for Disease Control and Prevention [CDC], 2021). Of these, only cervical cancer is screened, while other HPV-related cancers may go undetected until they cause significant health problems (CDC, 2020c). Immunization against HPV effectively prevents infection and thereby HPV-related cancers and is safe. The Advisory Committee on Immunization Practices (ACIP) recommends routine vaccination against HPV at age 11 - 12, but immunization can begin as early as age 9, and catch-up vaccination is recommended until age 26 for men and women (Meites et al., 2019). The vaccine is given in a series of two doses for individuals younger than 15, and three doses for those older than 15 or immunocompromised and between ages 9 and 26 (Meites et al., 2016).

Although the HPV vaccines are safe (Donahue et al., 2019) and have significantly decreased the incidence of HPV infection, genital warts and precancerous lesions in the cervical epithelium (Jach et al, 2016), only 48% of adolescents aged 13 - 15 had completed the HPV vaccination series by 2018 in the United States (US Department of Health and Human Services [DHHS], n.d.). That same year, only 41% of Washington State adolescents aged 13 - 17 were up to date on their HPV immunizations (Washington State Department of Health, n.d.). These numbers are well below the Healthy People 2020 and Healthy People 2030 target of 80% coverage among youth aged 13 - 15 (DHHS, n.d.). Data from the National Health Interview Survey (NHIS) showed that in 2014, among adults aged 19 - 26, only 40% of females and 8% of males had received at least one dose of the HPV vaccine, and a substantial proportion of these young adults had received their first dose after age 19 (Williams et al., 2016).

With less than 50% of adolescents completing their HPV immunizations until 2018, it can be inferred that a significant number of young adults in 2021 have missed their HPV immunizations in adolescence. A proportion of these unvaccinated adults may be found in college campuses, where they can be approached and informed about HPV and the HPV vaccine. Colleges and universities are a convenient place to search for unvaccinated young adults who still have time to get their HPV immunizations. The purpose of this project was to inform Seattle University (SU) students about HPV and HPV-related cancers, as well as the HPV vaccine with an educational video available online. It was expected that such information would prompt at least some unvaccinated students to get their HPV immunizations. A related aim was to evaluate the effectiveness of the video for improving viewers' HPV knowledge and increasing their intentions to vaccinate against HPV.

Theoretical framework - The precaution adoption process model

The precaution adoption process model (PAPM) asserts that before adopting protective or preventive health behaviors, individuals pass through an orderly sequence of discrete cognitive stages (Weinstein, 1988). The stages in the process are "unaware of the issue," "aware of the issue but not personally engaged," "engaged and deciding what to do," "decided to act but not yet having acted," "acting," and "maintenance" (Weinstein & Sandman, 1992). An additional stage, that of "decided not to act " branches off from the stage of "engaged and deciding what to do." Figure 1 depicts the stages of the PAPM as it pertains to HPV vaccine uptake. Weinstein (1988) proposes that "[individuals] at different stages in the precaution adoption process behave in qualitatively different ways and the kinds of interventions and information needed to move people closer to action will vary from stage to stage" (p. 358). Moreover, transitions from one stage to the next present barriers that must be overcome until an individual acts on an issue

(Weinstein, 1988). Taking HPV vaccination as an example, an individual may be unaware of HPV and the HPV vaccine (first stage). Then that individual learns about the existence of HPV, but will be unengaged by the issue (second stage). As the individual learns more about HPV and the HPV vaccine he starts deciding whether to get vaccinated (third stage), and he may either decide against vaccination or decide to get the vaccine (fourth stage). According to the PAPM, at this stage there may be significant barriers for the individual to overcome before getting the first dose of the HPV vaccine, i.e., "acting on the issue" (fifth stage). The individual, for instance, may not have insurance, requiring him to pay out of pocket for his vaccination, or he may have difficulty finding a place where the vaccine is given, or he may be extremely busy with other life demands that hinder him from acting on his decision. According to Weinstein, a reminder, or cue to action, or providing key information on how to make it easier to act (for instance, by providing information on convenient locations where the HPV vaccine can be obtained) may help the individual overcome barriers and get his first dose of the HPV vaccine. The individual may have to again overcome barriers to get his second and third doses of the HPV vaccine (maintenance stage).

Furthermore, an individual's progression through the stages of the PAPM, especially arriving at the decision to act, is contingent upon that individual's belief about his vulnerability to harm (Weinstein, 1988). For example, before deciding to adopt a protective behavior such as getting the HPV vaccine, an individual must believe that he is susceptible to HPV infection, that the infection will significantly harm him, and that the HPV vaccine will effectively protect him from HPV infection and its associated harms. In the PAPM, beliefs of personal susceptibility to harm are also developed in discrete stages (Weinstein, 1988). Using HPV as an example, the first stage is learning that HPV exists ("I have heard about HPV"), the second stage is believing that

there is a significant likelihood that others are affected by HPV ("HPV infection affects quite a few people"), and the third stage is for the individual to believe that he is personally susceptible to HPV infection and its consequences ("I could get infected with HPV and end up with genital warts or cancer"). In similar fashion, an individual must develop, step by step, the belief that a preventive behavior is effective in protecting him from harm (Weinstein, 1988), e.g., going from "I have heard about the HPV vaccine" to "I believe the HPV vaccine is effective in preventing HPV infection" to "I believe the HPV vaccine will protect me from HPV infection."

Progression along the stages of belief development is influenced by several factors including biases, information from media and acquaintances, and personal experience. One significant barrier that Weinstein (1988) identifies for individuals passing from the stage of "believing an issue poses risk for others" to the stage of "believing the issue poses personal risk" is optimistic bias, a belief that our own risk is less than others' risk. Optimistic biases may be reinforced by incorrect information, cognitive errors, or a desire to avoid anxiety (Weinstein, 1988). Personal experience, correct information about risk factors, and knowing about precautions taken by peers can decrease optimistic biases, but general facts about a hazard (e.g., human papillomaviruses are double-stranded DNA viruses, the global burden of HPV infection, or how HPV causes cancer) are unlikely to help individuals move from one belief stage to the next (Weinstein, 1988). Weinstein (1988) further notes that although individuals consider their susceptibility to a hazard, the magnitude of the harms caused by a hazard, and the cost and benefits of a preventive measure, people often arrive at a conclusion that a threat is "serious" based on notions of seriousness acquired from acquaintances and the media rather than a burdensome cost-benefit analysis that requires plenty of information and knowledge of probabilities.

Other factors influencing people's decisions and actions along the precaution adoption process include time (the time it takes for people to arrive at beliefs and make decisions), uncertainty (the costs of getting a vaccine are certain and immediate, but the benefits are a matter of probability and often are appreciated after a long time), and how an issue is framed (Weinstein, 1988). For example, presenting HPV vaccination as a measure to prevent cervical cancer may lead men to believe HPV is a female problem, but presenting HPV as a cause of genital warts and non-cervical cancers may help men realize they are susceptible to it.

Therefore, when designing an educational intervention about HPV for college students, it must be considered that individuals will be at different stages in their decision-making process, that each individual will need a different message depending on his stage in the precaution adoption process, and that messages need to be properly framed so individuals can see how they are personally susceptible to HPV, how serious the matter is, and how the HPV vaccine will benefit them personally.

Literature Review

It is estimated that each year in the United States 35,900 cases of cancer can be attributed to HPV infection, and immunization against HPV could prevent more than 90% of these cancers in both men and women (CDC, 2020b). It is important to distinguish between HPV-associated cancers and HPV-attributable cancers. HPV-associated cancers are cancers found at anatomic sites susceptible to HPV infection, such as the cervix vagina, vulva, penis, anus, and oropharynx (CDC, 2020a). The number of HPV-attributable cancers is estimated by multiplying the number of cancer cases of a particular anatomic site by the proportion of cancer tissue specimens, from the same anatomic site, where HPV is detected (CDC, 2020a). To estimate the proportion of cancers attributed to HPV prior to the introduction of the HPV vaccine, Saraiya et al. (2015)

collected tissue specimens from several cancer registries in the US and tested each specimen for HPV DNA. The tissue samples came from patients diagnosed between 1993 and 2005, before HPV vaccination was recommended in the US. In this genotyping study, it was estimated that 91% of cervical cancers, 69% of vulvar cancers, 75% of vaginal cancers, 91% of anal cancers, 63% of penile cancers, and 70% of oropharyngeal cancers are attributable to HPV of any type. Saraiya et al. also determined the type or HPV in each HPV positive sample, and found that of all HPV positive cervical cancers, 89% were attributable to HPV types 16, 18, 31, 33, 45, 52 and 58, the oncogenic HPV types covered by the 9-valent HPV vaccine currently available in the US. Similarly Saraiya et al. found the same vaccine-type HPV genotypes in 92%, 98%, 96%, 90% and 94% of HPV positive vulvar, vaginal, anal, penile and oropharyngeal cancers respectively. Although this study did not include any samples from the Washington State Cancer Registry, its findings were used in the discussion that follows to estimate the number of HPV-attributable cancer cases in Washington State.

Data from the Washington State Cancer Registry indicate that between 2013 and 2017 there were an average of 248 annual cases (6.8 per 100,000 population) of cervical cancer, 1084 annual cases (12.9 per 100,000 population) of oropharyngeal cancer, and 304 annual cases (7.4 per 100,000 population) of vulvar cancer (Washington State Department of Health, 2020). Using the HPV DNA detection results from the aforementioned genotyping study (Saraiya et al., 2015), it can be estimated that in Washington State between 2013 and 2017 there were on average 224 annual cases of cervical cancer, 760 annual cases of oropharyngeal cancer, and 209 annual cases of vulvar cancer attributable to HPV infection. If immunization against HPV can prevent at least 90% of HPV-attributable cancers (CDC, 2020b), a fully immunized population would have

decreased the annual number of HPV-related cancers by at least 1,073 cases, as this estimate does not include the number of penile and anorectal cancers in Washington.

The 9-valent HPV vaccine currently available in the US not only prevents infection with the oncogenic HPV types 16, 18, 31, 33, 45, 52 and 58, but also HPV types 6 and 11, which cause an estimated 90% of anogenital warts (Braaten & Laufer, 2008; Cox & Palefsky, 2020). Because a diagnosis of anogenital warts is not reportable to public health authorities, it is difficult to find precise incidence and prevalence statistics. However, prior to the introduction of the HPV vaccine it was estimated that one million new cases of anogenital warts were diagnosed annually in the US (Braaten & Laufer, 2008). Thus, with a fully vaccinated US population, it can be estimated that 900,000 cases of anogenital warts can be prevented each year.

Genital HPV infections are highly prevalent in the US. A study that used data from the National Survey of Family Growth (NSFG) estimated that before introduction of the HPV vaccine in the US, men and women had 80% probability of acquiring HPV infection by age 45 (Chesson et al., 2014 - STD). Between 2003 and 2006, before the ACIP recommendations for vaccinating adolescent women against HPV, the prevalence of genital infection with any type of HPV was estimated by the National Health and Nutrition Examination Survey (NHANES) to be 42% among non-institutionalized women aged 14 - 59 (Hariri et al., 2011). Prevalence of high-risk (i.e., oncogenic or cancer-causing) HPV types was 29%, and that of low risk (i.e., non-oncogenic, including those causing warts) HPV types was 28.5% (Hariri et al., 2011). Women aged 20 - 24 had the highest prevalence of high-risk (43.4%), and low risk (35.5%) HPV types (Hariri et al., 2011). In women 14 - 19 years old, it was found from NHANES data that prevalence of HPV types covered by the quadrivalent vaccine (4vHPV) decreased from 11.5% between 2003 and 2006 to 3.3% between 2011 and 2014, after the introduction of HPV

vaccination in the US (Oliver et al., 2017). Among 20 - 24 year-old women, prevalence of 4vHPV types (HPV types 6, 11, 16 and 18) decreased from 18.5% between 2003 - 2006 to 7.2% between 2011 - 2014 (Oliver et al., 2017).

Because of low vaccine uptake each year, multiple cohorts of unvaccinated young adults have accumulated since 2006, when ACIP recommended HPV vaccination for all girls aged 11 - 12 (Williams et al., 2017). It is estimated that in 2015 in the US, more than 9 million women aged 19 -26 and almost 14 million men in the same age range were unvaccinated (Williams et al., 2017). Evidence on the effectiveness of catch-up HPV immunization in women older than 20 years is conflicting. Some studies (Silverberg et al., 2018) have found a significant decrease in risk of developing high grade cervical lesions in women who get their first dose of HPV vaccine between ages 14 - 20, but not for women first vaccinated at age 21 or older. Other studies (Castellsagué, et al., 2011) have found that the quadrivalent HPV vaccine is highly efficacious in preventing persistent infection with vaccine-type HPV, high grade cervical precancerous lesions, and external genital lesions in women aged 24 - 45. The rationale for current ACIP immunization recommendations in young adults is that most sexually active women have not been infected with both HPV 16 and 18 (the most common oncogenic types targeted by the vaccines), and most young adults can benefit at least partially from vaccination (Williams et al., 2017; Markowitz et al., 2014).

Among college students, surveys have consistently found HPV vaccine uptake well below the Healthy People 2020 target of 80%, with lower immunization rates in males than in females (Barnard et al., 2017; Koplas et al., 2019; LaJoie et al., 2018; Ragan et al., 2018). Attempts have been made to assess knowledge of and attitudes toward HPV vaccination in the general adult population and young adults, and to identify barriers and facilitators of vaccination

against HPV (Fontenot et al., 2014; LaJoie et al., 2018; McBride & Singh, 2018, Ragan et al., 2018).

Studies have found varying levels of awareness of HPV and the HPV vaccine. In the 2014 Health Information National Trends Survey (HINTS) conducted in a sample of the general adult population by the National Cancer Institute, only 60% of females and 44% of males reported being aware of HPV (McBride & Singh, 2018). In a survey of 383 college students, 92% of females and 83% of males reported awareness of HPV, but less respondents of both sexes were aware of the HPV vaccine (Barnard et al., 2017). In several surveys respondents demonstrate knowledge of the link between HPV and cervical cancer, but knowledge of the link between HPV and non-cervical cancers is less common (Barnard et al., 2017; Fenkl et al., 2016; McBride & Singh, 2018).

Other knowledge deficits and misperceptions about HPV and the HPV vaccine among significant numbers of college students include the feeling of not being at risk for exposure to HPV, not knowing HPV is the most common sexually transmitted infection, not knowing HPV can cause cancer, not knowing HPV can cause genital warts, thinking that condom use can prevent HPV transmission, not knowing that males can get HPV, not knowing the HPV vaccine can prevent cervical cancer, believing HPV is a female problem, believing that men who have sex with men do not need the HPV vaccine, confusing HPV with genital herpes, and believing the HPV vaccine is only for women (Garcia Jones, 2017; Poggio D'Errico et al., 2020; Fontenot et al., 2014; Barnard et al., 2017).

Additionally, college students may not know they can get the HPV vaccine until age 26, or that the vaccine is offered at their campus clinic, nearby retail pharmacies and youth-friendly clinics (Kellogg et al., 2019). Surveyed college students also mention not being offered the HPV

vaccine, the inconvenience of making an appointment, time constraints, fear of side effects, cost, lack of insurance coverage, and their primary care clinician being in another town as reasons not to get the HPV vaccine or finish their immunization series once started (Fontenot et al., 2014; Ragan et al., 2018). In one survey, 27% of women and 2% of men reported not getting the HPV vaccine because their parents won't allow them (Ragan et al., 2018).

Studies have found that recommendation from a clinician is associated with higher rates of HPV vaccine uptake (Holman et al., 2014; Lau, 2012; Reiter, 2013). Parents and clinicians have a strong influence in college students' decisions regarding HPV vaccination, as in one study 94% of students who were encouraged by their parents got vaccinated, and almost 96% of those encouraged by both parents and clinicians got the HPV vaccine (Ragan et al., 2018). Additionally, in one survey 65% of respondents indicated they would get all HPV vaccine doses if offered free of charge (LaJoie, 2018). LaJoie et al. also found that respondents to their survey indicated vaccine recommendations by the CDC, having a HPV awareness program on campus, and messages focusing on cancer prevention rather than prevention of genital warts as a positive influence on getting the HPV vaccine.

Consistent with Weinstein's (1988) precaution adoption process model, young adults who believe are susceptible to HPV infection, believe the HPV vaccine effectively prevents cancer and who are not deterred by side effects are more likely to have received the HPV vaccine (Poggio D'Errico, 2020). Additionally, in a survey of adults aged 18 - 26 in Minnesota, it was found that participants with higher HPV literacy were more likely to have initiated or completed their HPV vaccination (Lee et al., 2017).

Educational interventions in college campuses have improved students' knowledge of HPV (Preston & Darrow, 2019; Staples et al., 2018). Preston & Darrow's (2019) study also

demonstrated that the HPV knowledge gap between Hispanics and non-Hispanics present at baseline disappeared after their educational intervention was implemented.

Although the precaution adoption process model states that reminders can sometimes be helpful in helping individuals act on their intentions to adopt health behaviors, studies on reminder/recall systems have found mixed results regarding improvement in HPV vaccine uptake or completion, with most studies finding no significant difference in completion rates between those who received reminders and those who did not (Kharbanda, 2011; Richman et al., 2016; Richman et al., 2019; Szilagyi et al., 2020).

In summary, HPV vaccine uptake is well below Healthy People 2030 goals, young adults and adolescents have gaps in their HPV knowledge, educational interventions successfully increase knowledge of HPV and the HPV vaccine in young adults, and recommendation by a clinician increases the likelihood of HPV vaccine uptake.

Considering the findings of this literature review and the predictions of the precaution adoption process model, an educational video was produced to inform Seattle University (SU) students about HPV and the HPV vaccine, with the intention of increasing HPV knowledge and prompting unvaccinated students to get their HPV vaccines. Related aims of this project were to evaluate the effectiveness of the video in increasing HPV knowledge and in increasing the self-reported likelihood of vaccine uptake among unvaccinated students. Additionally, participants' baseline knowledge of HPV and HPV vaccine uptake were measured and compared between males and females as well as nursing and non-nursing students. An attempt was made to determine unvaccinated participants' stage along the precaution adoption process.

Methods

The Intervention

A nine-minute educational video on HPV was made in the form of an interview between a young obstetrics & gynecology physician and the principal investigator (PI) in the role of a registered nurse. The physician would answer questions pertaining to the following key messages aimed at college students:

- HPV is the most common sexually transmitted infection (STI) in the United States.
- HPV can cause cancers of the throat, mouth, cervix, vulva, penis, and anus, as well as genital warts.
- Both men and women are susceptible to HPV and its related cancers.
- Any skin-to-skin or mucosal contact can transmit HPV.
- Each new sex partner increases the risk of getting HPV.
- HPV infections are often asymptomatic, and a person could be spreading the disease without knowing it.
- The HPV vaccine is safe and decreases the risk of getting HPV.
- Men and women aged 11 – 26 should get vaccinated.
- The HPV vaccine is only one preventive measure to protect health. People need to use birth control to prevent pregnancy, and condoms to prevent other STIs such as HIV.
- Women who are vaccinated against HPV still need to screen for cervical cancer starting at age 21.
- The HPV vaccine protects against the nine most common HPV types that cause cancers and genital warts.

After the interview, the principal investigator summarized the key messages from the interview and provided information on where to obtain the HPV vaccine. English subtitles were added to the video, which can be viewed at https://youtu.be/HQGD9mwVr2E.

Evaluation of the intervention

The evaluation of the intervention aimed to answer two main questions: 1) Does viewers' knowledge about HPV and the HPV vaccine change after viewing the video? and 2) Among unvaccinated viewers, does self-reported likelihood to vaccinate change after viewing the video? Additionally, an attempt was made to compare post-intervention changes in likelihood to vaccinate between groups at different stages of the precaution adoption process.

To evaluate changes in HPV knowledge and likelihood to vaccinate, the video was placed in the middle of an online anonymous survey. Appendix 1 lists the survey questions in detail. The first 25 questions of the survey (pre-video quiz) tested participants' knowledge about HPV and the HPV vaccine. There were three answer options for the quiz question: True, false, and I don't know. Next there were questions about participants' gender, sex at birth, field of study (nursing or non-nursing), HPV vaccination status, and participants' likelihood to vaccinate against HPV. The answer options for likelihood to vaccinate were in the form of Likert scale, with the options "very likely," "likely," "undecided," "unlikely" and "very unlikely."

Demographics questions were kept to a minimum in order to make the survey as brief as possible and increase the likelihood that participants finish the survey once they start. The questions regarding gender, sex at bitrth, and whether participants are nursing students were included because it was anticipated that female students and nursing students would differ in their vaccination rate and knowledge of HPV from male and non-nursing students, respectively.

The last question before the video asked participants' stage of decision-making about HPV vaccination, as described by the precaution adoption process model (Weinstein, 1988), that is, whether they are unaware of the issue (stage 1), unengaged (stage 2), deciding (stage 3), decided not to vaccinate (stage 4), decided to vaccinate (stage 5), acting on the issue (stage 6), or in maintenance (stage 7). Figure 1 describes the stages of the precaution adoption process model as it pertains to vaccinating against HPV. The answer options for this question, which was borrowed from a survey composed by Barnard et al. (2017), were:

- I never seriously thought about getting the HPV vaccine
- I have seriously thought about getting the HPV vaccine, but decided not to get it
- I have seriously thought about getting the HPV vaccine, but have not thought about it in the last 6 months
- I am seriously thinking about getting the HPV vaccine sometime within the next 6 months
- I plan to get the HPV vaccine within the next month

After this question, the online survey would direct participants to watch the video. A timer was programmed in the survey to ensure participants watch the entire video before moving on to the next question. Unfortunately, this was done after several participants had taken the survey and it came to the attention of the PI that a few participants had completed the survey in extremely short amounts of time, suggesting they had skipped the video.

After the video, participants would see the same 25 HPV knowledge questions they answered before viewing the video, followed by one question on their likelihood to get the HPV vaccine/finishing their immunization series (answer choices were "extremely likely," "somewhat

likely," "uncertain," "somewhat unlikely" and "extremely unlikely"), and an additional question asking how much they thought they had learned about HPV from the video.

The survey questions came from two sources. The HPV and HPV vaccine knowledge questions were borrowed from a validated survey composed by Perez et al. (2016), who in turn included 16 questions from Waller et al.'s (2013) scale. Questions pertaining to likelihood of getting the vaccine and stage in the precaution adoption process were from an instrument composed by Barnard et al. (2017), which was not validated at the time of this writing.

The online survey was published using Qualtrics, the preferred online survey platform at Seattle University. A website containing information about this project was made, and a link to the survey was included in the website. The website's URL was shared with potential participants. Survey data was stored in secure Qualtrics servers and deleted once analysis was complete. The survey was available online from January to March 2021.

Setting

The project was implemented at Seattle University (SU), a small private university in the Capitol Hill neighborhood of Seattle, WA. SU draws students from the entire United States as well as international students. SU has both graduate and undergraduate students, some of whom live on campus, and some of whom get their healthcare at the university's clinic. Full time undergraduate students are required to have health insurance. Seattle University offers two health-related programs for undergraduate students, nursing and diagnostic ultrasound.

Ethical requirements and informed consent

This project was reviewed by the Institutional Review Board (IRB) of Seattle University; it was deemed to be "Not Human Subjects Research" (NHSR), and thus exempt from IRB

review. Upon clicking on the link to the survey, participants would see the informed consent question, and in order to see the survey questions they would need to indicate they voluntarily choose to participate in the survey. IRB documentation is included in appendix 2.

Recruitment and Participants

Any SU student aged 18 - 26 was eligible to participate in the survey. The URL of the project's website was posted on the website of SU's Student Health Center. To attract more participants, the Dean of the College of Nursing was asked to distribute the survey link to all 804 graduate and undergraduate nursing students enrolled in Winter 2021. Additionally, instructors of undergraduate classes in physics, criminal justice, history, Japanese language, accounting, geography, psychology and political science were asked to distribute the survey link to their 354 students. As an incentive, participants who finished the survey had the option of entering a raffle to win a $25 Amazon gift card. Some of the instructors who were contacted offered extra credit points to students who completed the survey.

Stakeholders in this project included the survey participants, SU Student Health Center clinicians and staff, College of Nursing Dean and faculty, instructors who distributed the survey link to their students, and the principal investigator, who conducted this project as a graduation requirement.

Measures

The measures evaluated in the survey included:

- HPV and HPV vaccine knowledge, scored by assigning one point to each question answered correctly in the pre-video and post-video quizzes, which were identical. A maximum of 25 points was possible in each quiz.

- Self-reported likelihood to get HPV vaccine (for unvaccinated respondents) prior to watching the video, measured with a Likert scale including very unlikely, unlikely, undecided, likely, and very likely.
- Self-reported likelihood to get the remainder doses of HPV immunization (for those who had incomplete HPV immunization) prior to watching the video, measured with a Likert scale.
- Self-reported likelihood to find out HPV immunization status and get vaccinated (for those who did not know their immunization status) prior to watching the video, measured with a Likert scale.
- Self-reported likelihood to get the HPV immunization or finish the series after watching the video, measured with a Likert scale.

Statistical analysis

To maximize the use of data obtained, two main statistical analyses were made. In the first analysis, the baseline analysis, descriptive statistics were used to obtain the average baseline HPV knowledge score and the proportion of respondents who were fully vaccinated against HPV as well as those who had received at least one dose of the vaccine. This analysis included all responses that were complete at least up to the video. Surveys that were completed in an unreasonably short amount of time (less than one minute for those complete only up to the video, and less than 11 minutes for those completed entirely, i.e., less than two minutes spent responding to questions, assuming the nine-minute video was viewed entirely) were excluded from analysis.

The second analysis included only surveys that were completed entirely in at least 11 minutes (two minutes spent responding to questions, assuming the video was viewed entirely).

This analysis replicated that of an interventional study by Staples et al. (2018). The authors of this study implemented an educational intervention at four different colleges and administered pre- and post-intervention surveys, much like in this project, with the difference that the intervention and the surveys were done in person. Also, Staples et al. tested statistical significance with paired t-tests, whereas in this study the Wilcoxon signed rank test, a more conservative test, was used. Unlike paired t-tests, the Wilcoxon signed rank test can be applied to small samples that are not distributed normally (Marin & Hamadani, 2018). The pre-video and post-video HPV knowledge scores were compared and statistical significance was tested with the Wilcoxon sign rank test. Additionally, the percentage of correct responses for each HPV knowledge question was compared between the pre- and post-video questionnaires.

Pre- and post-video intention to vaccinate, intention to complete HPV immunization series, and intention to find out immunization status and take action were combined into a single measure, because each of the measures applied to small mutually exclusive subgroups in the sample. Thus, a single measure, the "intention to act on the issue" measure was created, which included one relatively large subgroup of the total sample, composed of respondents who were either unvaccinated, partially vaccinated, or uncertain of their vaccination status. The pre-video "intention to act on the issue" measure was compared to the post-video "intention to act on the issue" measure and statistical significance was tested with the sign test. The sign test (which unlike the Wilcoxon sign rank test ignores the magnitude of each respondent's change) was used here because unlike quiz scores, which lie on an interval scale, likert items lie on an ordinal scale (Kumar, 2019). Rather than using the numbers assigned to likert items to estimate the exact probability of a respondent to get the vaccine, the numbers in likert scales are used to estimate respondents' intentions toward vaccination as favorable or unfavorable. Thus, the sign test in this

case tests the statistical significance of the sample's observed change in either direction (more likely to get vaccinated or less likely to get vaccinated), but there is no way to tell how much more likely or how much less likely.

Finally, the pre- and post-video "intention to act on the issue" measures were compared within subgroups at different stages of the precaution adoption process as determined by answers to the question, "Please indicate which statement best indicates your thoughts about HPV vaccination today." Microsoft Excel was used for descriptive statistical analysis and IBM SPSS 26 was used for statistical significance tests.

Results

One hundred fourteen surveys were started. Of these, 15 were excluded because the pre-video questions were not answered. Twenty surveys were completed up to the video, with a minimum completion time of 82 seconds, thus none of these was excluded from the baseline analysis. There were 81 one surveys that were completed entirely. Of these, 13 were excluded from analysis because they were completed in less than 11 minutes. Thus, the first analysis included 20 surveys that were completed up to the video and 68 surveys that were completed entirely. The second analysis contained only the 68 surveys that were completed entirely.

The results of the baseline analysis are shown in table 1. The average pre-video quiz score was 15.09 (out of 25) for the entire sample, 16.64 for nursing students, 14.46 for non-nursing students, 15.46 for cis-female respondents, 13.92 for cis-male respondents, and 13.43 for non-traditional gender students. Sixty-three percent of the sample had received at least one dose of the HPV vaccine, and 51% was fully vaccinated. Among nursing students, 72% had initiated HPV vaccination and 68% were fully vaccinated. Among non-nursing students, 59% had initiated HPV vaccination and 44% were fully vaccinated. Among cis-female respondents, 67%

had initiated HPV vaccination, and 54% were fully vaccinated. Among cis-male students, 33% had initiated HPV vaccination and 25% had completed HPV vaccination. Among non-traditional gender students, 71% were fully vaccinated and 29% were unvaccinated.

Pre-video HPV knowledge scores ranged from 1/25 to 24/25, with a mean of 15.40. Post-video HPV knowledge scores ranged from 7/25 to 25/25, with a mean of 22.21. Sixty respondents had a higher score in their post-video questionnaire, six had the same scores in both questionnaires and two scored lower in the post-video questionnaire. The improvement in post-video HPV knowledge scores was statistically significant with $p < 0.001$ (two-tailed). These results are summarized in table 2.

Table 3 shows the percentage of respondents who correctly answered the HPV knowledge questions in the pre- and post-video quizzes. All the knowledge questions had a higher percentage of correct answers in the post-video quiz. In the pre-video quiz only three questions were answered correctly by 90% or more of the respondents, whereas in the post-video quiz 18 questions were answered correctly by 90% or more of the respondents. There was visible improvement in most questions regarding HPV transmission mode, but 34% of respondents incorrectly believed that a person with no symptoms cannot transmit HPV infection after viewing the video. Thirty two percent and 50% believed that HPV can cause AIDS and herpes, respectively, after viewing the video. Only 79% and 60% of respondents correctly answered that the HPV vaccine prevents most cervical cancers and that the HPV vaccine prevents genital warts, respectively. Knowledge of HPV's link with cervical and non-cervical cancers visibly improved.

Of the 68 respondents who finished the survey, 31 were either unvaccinated, partially vaccinated, or uncertain of their vaccination status, and thus were asked about their likelihood to

act on the issue of HPV vaccination, i.e., get the vaccine, finish their immunizations, or find out their status. In the pre-video questionnaire, two respondents (both unvaccinated) reported being very unlikely to get vaccinated, three were unlikely to act on the issue, five were undecided, 11 were likely to act on the issue, and 10 were very likely to act on the issue. In the post-video questionnaire, the two respondents who were very unlikely to get vaccinated before viewing the video reported being extremely unlikely to get vaccinated after viewing the video. Two respondents were undecided after viewing the video, seven were somewhat likely to act on the issue, and 19 were extremely likely to act on the issue. No respondent chose the "somewhat unlikely option after viewing the video. One participant did not answer the post-video question regarding intention to act on the issue. Before viewing the video, 21 respondents were either likely or very likely to act on the issue, whereas after viewing the video 26 respondents were either somewhat likely or extremely likely to act on the issue. These results are summarized in table 4. (There was a minor flaw in the wording of the answer options for the questions on likelihood to act on the issue. Participants who were partially vaccinated and those who did not know their vaccination status saw the options "very unlikely," "unlikely," "undecided," "likely" and "very likely" in this question before viewing the video, whereas unvaccinated participants saw the options "extremely unlikely," "somewhat unlikely," "undecided," "somewhat likely" and "extremely likely." In the post-video questionnaire, all the respondents saw the options "extremely unlikely," "somewhat unlikely," "uncertain," "somewhat likely" and "extremely likely." In the statistical analysis the questions were coded from 0 to 4, with 0 being least likely, 2 neutral, and 4 most likely).

Of the 31 respondents who were asked about likelihood to act on the issue of HPV vaccination, one was less likely to act after viewing the video, 15 were more likely to act after

viewing the video, and 14 were just as likely to act before and after the video. This result was statistically significant based on a p value of 0.001 after application of a two-tailed sign test.

Of the 68 respondents who finished the survey, 26 (11 who were unvaccinated, 11 who did not know if they had ever got an HPV immunization, and four who were vaccinated but did not know how many doses they've had) were asked about their stage in the precaution adoption process with the question, "please indicate which statement best indicates your thoughts about HPV vaccination today" (see Q33, appendix 1). Unfortunately, because of a flaw in the survey, respondents who were partially vaccinated and knew how many vaccine doses they had received were not asked about their stage in the precaution adoption process. Sixteen respondents had never seriously thought about getting the HPV vaccine, one had seriously thought about it but decided not to get it, three had seriously thought about the HPV vaccine sometime, but not in the last six months, five were seriously thinking about getting the HPV vaccine within six months, and one was planning to get the vaccine within one month. These results are summarized in table 5.

The determination of a respondent's stage in the precaution adoption process based on his answer choice can be difficult. According to Barnard et al., a respondent who never seriously thought about getting the HPV vaccine is either unaware (stage 1) or unengaged (stage 2), and a respondent who has seriously thought about the HPV vaccine in the past but not in the last six months is deciding about getting the vaccine (stage 3). However, one can argue that such respondents could have forgotten about the issue and thus returned to stage 2 (unengaged). Barnard et al. interpret the answer choice "I am seriously thinking about getting the HPV vaccine sometime within the next six months" as an indicator of having decided to act (stage 5), but this could well be interpreted as still being undecided. Barnard et al. would classify a respondent who

plans to get the HPV vaccine within the next month as someone transitioning from stage 5 to stage 6 (acting). Based on the language used in these answer choices, in this analysis the answer choice "I never seriously thought about getting the HPV vaccine" is interpreted as the respondent being in either stage 1 or stage 2, and the answer choice "I have seriously thought about getting the HPV vaccination but decided not to get it" is interpreted as the respondent being in stage 4. But no attempt is made at equating any of the other answer choices to a particular stage in the precaution adoption process because there are many possible interpretations. Therefore, the only interpretation that can be made with confidence is that 16 respondents were either unaware or unengaged by the issue of HPV vaccination, and one had decided against getting the HPV vaccination.

Of the sixteen respondents who were in stages 1 and 2, eight had a positive change in their likelihood to act on the issue of HPV vaccination after viewing the video, seven had no change in their likelihood to act on the issue, and one had a negative change in likelihood to act on the issue. After viewing the video, 13 respondents were either somewhat likely or extremely likely to act on the issue after viewing the video, compared to 10 before viewing the video. Not surprisingly, the one respondent who had decided against getting the HPV vaccine was very unlikely to get the vaccine both before and after viewing the video. In fact, according to Weinstein (1988) those who are unaware or unengaged have a more open mind regarding the issue, whereas those who have decided against acting may have difficulty in changing their stage.

Of the three participants who had not thought about HPV vaccination in the last six months, one went from unlikely to act on the issue to extremely likely to act on the issue, one did

not change his original answer (likely to act on the issue), and one changed his answer from undecided to somewhat likely.

Of the five participants who had seriously thought about getting the HPV vaccine within the next six months, three changed their answers from likely to extremely likely, one was very likely to act on the issue but did not answer the post-video question, and one did not change his original answer (very likely). The one participant who was planning on getting the HPV vaccine within the next month also answered very likely in the pre- and post-video question regarding likelihood to act on the issue.

Discussion

Results from the baseline analysis were consistent with those from other studies that have found overall HPV vaccine uptake below the Healthy People 2030 target of 80%, with lower rates among males than females (Barnard et al., 2017; Koplas et al., 2019; LaJoie et al., 2018; Ragan et al., 2018).

Results from analysis of the individual quiz questions (table 3) revealed knowledge deficits similar to those found in other surveys, namely, confusing HPV with herpes, not knowing that HPV can cause non-cervical cancers, not knowing that the HPV vaccine can prevent most cervical cancers, and not knowing that people can get the HPV vaccine until age 26 (Barnard et al., 2017; Fenkl et al., 2016; Garcia Jones, 2017; Poggio D'Errico et al., 2020; Fontenot et al., 2014; McBride & Singh, 2018; Kellogg et al., 2019).

Overall, participants' knowledge in several areas of HPV knowledge improved after viewing the video. Improvements were seen in knowledge of modes of HPV transmission, outcomes of HPV infection (genital warts and cancer), susceptibility to HPV infection, the need to screen for cervical cancer even after immunization against HPV, number of doses required for

full immunization, and age eligibility to get the HPV vaccine. However, several knowledge deficits remained in a significant portion of respondents after viewing the video, namely, confusion between HPV, HIV and herpes, not knowing that asymptomatic individuals can transmit HPV infection, and not knowing that the HPV vaccine can protect against cervical cancer and genital warts. These points need to be emphasized in future educational interventions.

Most participants were more likely to act on the issue of HPV vaccination after viewing the video, a considerable portion were just as likely as before, and very few were less likely to act after viewing the video. Consistent with the precaution adoption process model, participants who were unaware or unengaged with the issue had a relatively high tendency to change their likelihood to act in a favorable direction.

The intervention and its evaluation had several limitations. Because the project was implemented at a private university, the intervention did not reach out to a representative sample of young adults eligible for catch-up HPV immunization. Moreover, the intervention was not preceded by an assessment of the knowledge needs and educational preferences of the target audience, and several knowledge deficits remained in a significant portion of participants even after viewing the video.

In evaluating the intervention, important demographic characteristics were not assessed, and thus possible disparities in HPV knowledge and HPV immunization within the community of SU students were not assessed. Additionally, the results must be interpreted with caution, especially those pertaining to stages of the precaution adoption process and participants' likelihood to act on the issue. As Weinstein (1988) notes, an intention to act does not necessarily translate into a tendency to act, so it is difficult to know whether those who had a favorable change in their likelihood to act will in fact get their HPV immunization. Additionally, as

mentioned above (see pp. 24-25), the determination of a respondent's stage in the precaution adoption process based on the answer choices to the question "please indicate which statement best indicates your thoughts about the HPV vaccine today" depends largely on interpretation.

Because the survey was anonymous, the age and eligibility of participants was not verified. Self-report can favor biased responses, some participants may have been inattentive to the video, and some may have carelessly answered at least some of the survey questions.

Nevertheless, the results of this analysis were promising in that most knowledge items were answered correctly after participants viewed the video, which suggests that at least some doubts and misperceptions about HPV and the HPV vaccine may have been clarified for most respondents. It was particularly reassuring that the proportion of correct answers to the question regarding vaccine eligibility increased from 56% to 96%, indicating that most viewers now know they are eligible for catch-up HPV immunization, and this may prompt them to get vaccinated.

Implications for practice and recommendations for future work

As the precaution adoption process model asserts, and as it has been found in prior studies (Preston & Darrow, 2019; Staples et al., 2018) as well as this one, educational interventions can have a positive influence on individuals' knowledge of vaccines and intentions to get vaccinated. Therefore, efforts must be made by clinicians to inform young adult patients about HPV and the HPV vaccine. Education about HPV should be carried out both in public health interventions to reach out to groups and in clinicians' offices to reach out to individual patients. Just as college campuses are a convenient place to find young adults eligible for catch-up HPV immunization, so are, for instance, youth homeless shelters. In addition to reaching out to young adults in as many settings as possible, multiple channels of information sharing must be employed. A college clinic can, for instance, send a reminder email with information on HPV to

new students each year. Informational posters can be placed in college clinic waiting rooms, libraries, and hang-out places.

As other studies have found (Holman et al., 2014; Lau, 2012; Reiter, 2013), a clinician's recommendation can have a significant influence in patients' decision to vaccinate, and therefore, clinicians should continue their efforts in recommending HPV—or any other—vaccine to eligible individuals.

In order to clarify misperceptions about HPV found in this and other surveys (Barnard et al., 2017; Fenkl et al., 2016; Garcia Jones, 2017; Poggio D'Errico et al., 2020; Fontenot et al., 2014; McBride & Singh, 2018; Kellogg et al., 2019), and to increase young adults' confidence in the HPV vaccine, future educational interventions should emphasize the following teaching points:

- Men, women, non-binary, gender-fluid, cis and trans individuals are susceptible to HPV infection regardless of sexual orientation.
- HPV can cause cervical cancer as well as cancers of the mouth, throat, penis and anus
- If not vaccinated, most sexually active people will be infected with HPV at some time in their lives
- An asymptomatic individual can transmit HPV infection
- HPV can be transmitted through any skin-to-skin or mucosal contact
- HPV, HIV, and herpes are different diseases caused by different viruses
- The HPV vaccine protects against genital warts, most cervical cancers, and non-cervical HPV-associated cancers
- HPV infection cannot be cured with vaccination against HPV
- Even after vaccination, women must screen for cervical cancer

- Ideally, one should get the HPV vaccine before sexual debut, but there is time to catch up until age 26; and, depending on individual risk factors, individuals as old as 45 can vaccinate against HPV according to ACIP recommendations (Meites et al., 2019).

While information sharing and education can play an important role in helping young adults catch-up with HPV immunization, these efforts need to be coordinated with other interventions that facilitate vaccine uptake in young adults. College clinics can, for instance, set up pop-up vaccination clinics at the beginning of each term, when students are not yet overwhelmed with final exams and more likely to pay attention to non-academic matters.

Each of the interventions suggested above can be implemented and evaluated at a college campus. Future interventions and evaluations should take into account demographic factors such as race and ethnicity in order to identify and mitigate disparities in HPV knowledge and vaccine uptake. Qualitative evaluations may be more helpful in identifying young adults' stages in the precaution adoption process, their reasons not to get vaccinated, and barriers to vaccine uptake. Interventions informed by a more thorough assessment of the target populations can be more effective in helping young adults overcome their specific barriers—real or perceived—to HPV vaccine uptake, or any other health behavior.

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Tables

Table 1. Baseline HPV knowledge average scores (out of 25) and percentage of vaccinated respondents among those who completed the pre-video questions.

Characteristics	Total N = 88	Unvaccinated, n (%)	Unknown, n (%)	Started series, n (%)	Fully vaccinated, n (%)	Average score (out of 25)
Major						
Nursing	25	6 (24%)	1 (4%)	18 (72%)	17 (68%)	16.640
Non-nursing	63	10 (15.87%)	16 (25.40%)	37 (58.73%)	28 (44.44%)	14.476
Gender						
Cis-female	69	13 (18.84%)	10 (14.49%)	46 (66.67%)	37 (53.62%)	15.464
Cis-male	12	3 (25%)	5 (41.67%)	4 (33.33%)	3 (25%)	13.917
Non-binary or gender-fluid	7	0	2 (28.57%)	5 (71.43%)	5 (71.43%)	13.429
Total	88	16 (18.18%)	17 (19.32%)	55 (62.5%)	45 (51.14%)	15.091

Table 2. Knowledge scores in pre-video and post-video questionnaires; $p < 0.001$ as determined by two-tailed Wilcoxon sign test.

Questionnaire	Number of respondents	Mean	Median	Standard deviation	Minimum	Maximum
Pre-video	68	15.40	16.5	5.53	1	24
Post-video	68	22.21	23	2.93	7	25

Table 3. Percentage of respondents who answered correctly each question in the pre- and post-video quizzes.

Question	Percent correct pre-video	Percent correct post-video
Human papillomavirus (HPV) can cause cervical cancer - True	69	99
HPV can be transmitted through genital skin-to-skin contact - True	74	94
There are many types of HPV - True	66	99
HPV can cause HIV/AIDS - False	49	68
HPV can be passed on during sexual intercourse - True	91	99
HPV can cause genital warts - True	68	96
Men can get HPV - True	90	97
Having many sexual partners increases the risk of getting HPV - True	91	100
Most sexually active people will get HPV at some point in their lives - True	26	82
A person could have HPV for many years without knowing it - True	81	97
HPV can cause anal cancer - True	31	94
HPV can be transmitted through oral sex - True	66	97
HPV can cause cancer of the penis - True	35	94
HPV can cause herpes - False	34	50
HPV can be transmitted through anal sex - True	71	96
HPV can cause throat and mouth cancer - True	35	93

Table 3 continued. Percentage of respondents who answered correctly each question in the pre- and post-video quizzes.

Question	Percent correct pre-video	Percent correct post-video
A person with no symptoms cannot transmit the HPV infection - False	65	66
The HPV vaccine requires only one dose - False	56	96
The HPV vaccine protects against all sexually transmitted infections - False	84	97
The HPV vaccine protects against most cervical cancers - True	53	79
The HPV vaccine protects against genital warts - True	29	60
Women who have had the HPV vaccine do not need to screen for cervical cancer - False	85	97
The HPV vaccine protects you from every type of HPV - False	51	90
You can cure HPV by getting the HPV vaccine - False	84	87
According to CDC guidelines, persons aged 18 - 26 are still on time to get the HPV vaccine - True	56	96

Table 4. Number of respondents who chose each of the options from least likely to most likely in the questions regarding intention to act on the issue of HPV vaccination, i.e., get vaccinated, get their remaining doses of the HPV vaccine, or find out their immunization status. In the statistical analysis, answer options were coded from 0 to 4, with 0 being most unlikely, 2 neutral, and 4 most likely.

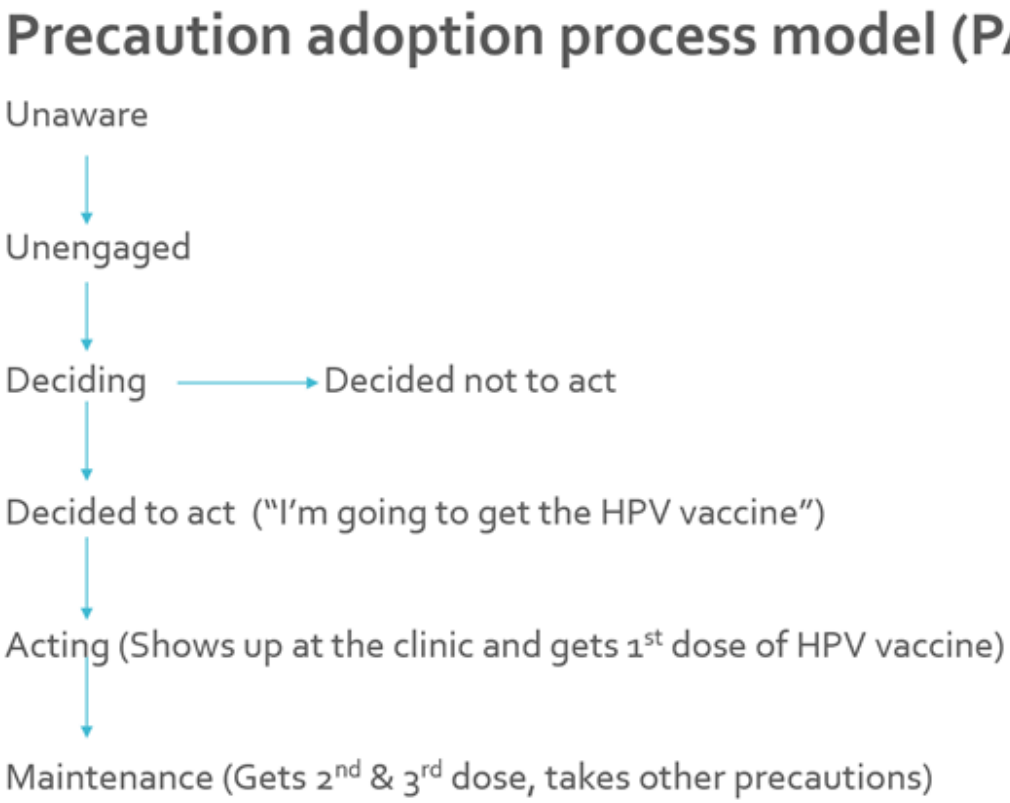
Answer choice to pre- and post-video question regarding intention to act	Number of respondents who chose each answer before viewing video	Number of respondents who chose each answer after viewing video
Most unlikely (0)	2	2
Somewhat unlikely (1)	3	0
Neutral (2)	5	2
Somewhat likely (1)	11	7
Most likely (4)	10	19
Total number of respondents	31	30

Table 5. Number of respondents who indicated each answer choice to the question regarding stage in the precaution adoption process. Stages corresponding to each answer choice are according to Bernard et al.'s (2017) interpretation.

Please indicate which statement best indicates your thoughts about HPV vaccination today	Number of Respondents
I never seriously thought about getting the HPV vaccine (Stages 1 & 2)	16
I have seriously thought about getting the HPV vaccine, but decided not to get it (Stage 4)	1
I have seriously thought about getting the HPV vaccine, but have not thought about it in the past 6 months (Stage 3)	3
I am seriously thinking about getting the HPV vaccine sometime within the next 6 months (Stage 5)	5
I plan to get the HPV vaccine within the next month (transitioning from stage 5 to 6)	1

Figures

Figure 1. Precaution adoption process model.



Appendix 1. Survey.

Q0 Seattle UniversityConsent to Participate in Survey

Project Title - Catching up with HPV immunization: An educational video for college students

Principal Investigator: Behrooz R. Soleimani, RN – Seattle University College of NursingFaculty Advisor: Colleen Woolsey, PhD, ARNP – Seattle University College of Nursing

You are being invited to participate in a survey to evaluate an educational video about human papillomavirus (HPV) for college students. You will be asked to complete a survey with 60 questions and view a 10-minute video in the following order:

- 25 True/False questions on HPV knowledge
- 5 – 8 demographic and vaccination questions
- View 10-minute video
- The 25 True/False questions on HPV knowledge will be asked again to see if the video was helpful in clarifying key points about HPV
- 1 or 2 additional questions

Who can participate?

All Seattle University students age 18 – 26.

How much time will the survey take?

Depending on your pace, this survey may take up to one hour to complete (video included). Because surveys are anonymous, there is no way to save the data and resume the survey at a later time, **so I ask participants that they please complete the survey in one session.** This study is being performed as partial fulfillment of the requirements for the Doctor of Nursing Practice

(DNP) degree at Seattle University, i.e., this is my graduation project.

Participation in this survey is completely voluntary, and you may stop at any time without any consequences. I will not ask about any direct identifiers but will be asking your age range (not your exact age), sex at birth, gender, college major, and HPV vaccination status. I am asking about these data because HPV education benefits all people regardless of sex or gender, but some groups may be more informed about HPV than others.

RISKS

· You may find some questions personal or upsetting. You can skip any questions you don't want to answer or stop the survey entirely.

· Whenever you provide information online, your data could be intercepted (hacked). I am using a secure system to collect this data, but this risk cannot be completely eliminated.

· To minimize the risk of your data being seen by anyone who shouldn't, I will make sure:- Data is anonymous.

- I will store all electronic data on the secure servers for the online survey software (Qualtrics). The data will be kept until May 30, 2021, when the analysis is finalized. After that, the data will be deleted.

BENEFITS:

Benefits to survey participants include learning about HPV and how to prevent it. The results of this survey will be used to improve educational materials about HPV for young adult college students.

PARTICIPATION IN SURVEY AND RAFFLE

Participation in the survey will require no monetary cost to you. You will have the option of entering a raffle to win one of eight $25 Amazon gift cards. To enter the raffle, participants must

finish the survey. At the end of the survey, you will be redirected to a separate survey where you will provide your seattleu.edu email to enter the raffle. Because you will enter your email in a separate survey, it cannot be connected to your responses in the original survey. Participants who drop out of the survey before finishing will not be able to enter the raffle. Because surveys are anonymous, there is no way to save the data and resume the survey at a later time, so if you would like to enter the raffle, you need to complete the survey in one session. The survey will be available until March 12, 2021, and the raffle will be held on March 13. Winners of the $25 Amazon gift cards will be notified after the raffle.

Only I will have access to the information you provide as well as Dr. Colleen Woolsey, my faculty advisor at the college of nursing, Ms. Katie Harrison, ARNP, my clinical advisor at the Seattle University Student Health Center, and Mr. Chris Fiorello, director of Seattle University Wellness & Health Promotion. If we share our findings in publications or presentations, the results will be in aggregate (grouped) data, with no individual results. If you have any questions about this project, contact Behrooz Soleimani, RN, by email at soleiman@seattleu.edu or by phone at (425) 318-9809. If you have any questions about your rights as a survey participant, contact the SU Institutional Review Board at 206-296-2585 / irb@seattleu.edu

Remember, your participation is completely voluntary, and you are free to withdraw at any time. You can participate in the survey if you are:

- **at least 18 years old**
- **at most 26 years old**
- **a Seattle University student.**

By participating in this survey you indicate you have read and understood this

informed consent document, that you are at least 18 years old, you voluntarily choose to participate in this survey, and you agree with the conditions outlined in this document. Do you consent to participate in this survey?

Yes, I voluntarily choose to participate in this survey (1) → Go to Q1

No, I do not wish to participate in this survey (2) → End of survey

Q1 Human papillomavirus (HPV) can cause cervical cancer

True False I Don't know

Q2 HPV can be transmitted through genital skin-to-skin contact

True False I Don't know

Q3 There are many types of HPV

True False I Don't know

Q4 HPV can cause HIV/AIDS

True False I Don't know

Q5 HPV can be passed on during sexual intercourse

True False I Don't know

Q6 HPV can cause genital warts

True False I Don't know

Q7 Men can get HPV

True False I Don't know

Q8 Having many sexual partners increases the risk of getting HPV

True False I Don't know

Q9 Most sexually active people will get HPV at some point in their lives

True False I Don't know

Q10 A person could have HPV for many years without knowing it

True False I Don't know

Q11 HPV can cause anal cancer

True False I Don't know

Q12 HPV can be transmitted through oral sex

True False I Don't know

Q13 HPV can cause cancer of the penis

True False I Don't know

Q14 HPV can cause herpes

True False I Don't know

Q15 HPV can be transmitted through anal sex

True False I Don't know

Q16 HPV can cause throat and mouth cancer

True False I Don't know

Q17 A person with no symptoms cannot transmit the HPV infection

True False I Don't know

Q18 The HPV vaccine requires only one dose

True False I Don't know

Q19 The HPV vaccine protects against all sexually transmitted infections

True False I Don't know

Q20 The HPV vaccine protects against most cervical cancers

True False I Don't know

Q21 The HPV vaccine protects against genital warts

True False I Don't know

Q22 Women who have had the HPV vaccine do not need to screen for cervical cancer

True False I Don't know

Q23 The HPV vaccine protects you from every type of HPV

True False I Don't know

Q24 You can cure HPV by getting the HPV vaccine

True False I Don't know

Q25 According to CDC guidelines, persons aged 18 - 26 are still on time to get the HPV vaccine

True False I Don't know

Q26 Please indicate your gender

Male

Female

Non-binary / third gender

Gender-fluid

No gender

I'm not sure

Other

Prefer not to answer

Q27 Please indicate your sex assigned at birth

Male Female

Q28 Are you a nursing student?

Yes No

Q29 Have you been vaccinated for HPV?

Yes → Go to Q30

No → Go to Q32

I don't know → Go to 31u

Q30 How many of the HPV vaccine shots have you received?

One (You need two more shots) → Go to Q31

Two shots before age 15 (You have competed the HPV vaccine series) → Go to video

Two shots after age 15 (You need one more shot) → Go to Q31

Three shots after age 15 (You have completed the HPV vaccine series) → Go to video

I don't know → Go to Q31u

Q31 How likely are you to get the remaining shots to finish the vaccine series?

Very unlikely

Unlikely

Undecided

Likely

Very likely

ALL ANSWER CHOICES: GO TO VIDEO

Q31u If you don't know your HPV vaccination status, you can do one of two things:

1. Find out your vaccination status from your parents/doctor/medical records and get the remaining vaccine doses

2. Start the vaccination shots from the beginning

How likely are you to pursue either of these options?

Very likely

Likely

Undecided

Unlikely

Very unlikely

ALL ANSWERS: SKIP TO QUESTION 33

Q32 How likely are you to get the HPV vaccine? (Question seen by participants who responded "no" to question "Have you been vaccinated against HPV?")

Extremely likely

Somewhat likely

Undecided

Somewhat unlikely

Extremely unlikely

ALL ANSWER CHOICES: GO TO Q33

Q33 Please indicate which statement best indicates your thoughts about HPV vaccination today

I never seriously thought about getting the HPV vaccine

I have seriously thought about getting the HPV vaccine, but decided not to get it

I have seriously thought about getting the HPV vaccine, but have not thought about it in the past 6 months

I am seriously thinking about getting the HPV vaccine sometime within the next 6 months

I plan to get the HPV vaccine within the next month

ALL ANSWER CHOICES: GO TO VIDEO

Video. Please watch the following video completely. You will be able to advance to the next question once nine minutes have elapsed since you arrived at this question (that is, after having watched the video one time). Do not refresh this page; if you do, you will be redirected to the beginning of the survey.

If the video is not displaying properly below, please open a new tab on your browser and copy the link https://youtu.be/HQGD9mwVr2E on the address bar to watch the video on YouTube. Once you have finished watching the video, return to the survey tab.

Q34 HPV can cause cervical cancer

True False I Don't know

Q35 HPV can be transmitted through genital skin-to-skin contact

True False I Don't know

Q36 There are many types of HPV

True False I Don't know

Q37 HPV can cause HIV/AIDS

True False I Don't know

Q38 HPV can be passed on during sexual intercourse

True False I Don't know

Q39 HPV can cause genital warts

True False I Don't know

Q40 Men can get HPV

True False I Don't know

Q41 Having many sexual partners increases the risk of getting HPV

True False I Don't know

Q42 Most sexually active people will get HPV at some point in their lives

True False I Don't know

Q43 A person could have HPV for many years without knowing it

True False I Don't know

Q44 HPV can cause anal cancer

True False I Don't know

Q45 HPV can be transmitted through oral sex

True False I Don't know

Q46 HPV can cause cancer of the penis

True False I Don't know

Q47 HPV can cause herpes

True False I Don't know

Q48 HPV can be transmitted through anal sex

True False I Don't know

Q49 HPV can cause throat and mouth cancer

True False I Don't know

Q50 A person with no symptoms cannot transmit the HPV infection

True False I Don't know

Q51 The HPV vaccine requires only one dose

True False I Don't know

Q52 The HPV vaccine protects against all sexually transmitted infections

True False I Don't know

Q53 The HPV vaccine protects against most cervical cancers

True False I Don't know

Q54 The HPV vaccine protects against genital warts

True False I Don't know

Q55 Women who have had the HPV vaccine do not need to screen for cervical cancer

True False I Don't know

Q56 The HPV vaccine protects you from every type of HPV

True False I Don't know

Q57 You can cure HPV by getting the HPV vaccine

True False I Don't know

Q58 According to CDC guidelines, persons aged 18 - 26 are still on time to get the HPV vaccine

True False I Don't know

Display Q59:

If How many of the HPV vaccine shots have you received? = One IS SELECTED

Or How many of the HPV vaccine shots have you received? = Two shots after age 15 IS SELECTED

Or How many of the HPV vaccine shots have you received? = I don't know IS SELECTED

Or Have you been vaccinated for HPV? = Yes IS NOT SELECTED

Q59 Having watched the video on HPV and HPV vaccination, how likely are you to get your HPV vaccination or get your remaining vaccine doses?

Extremely likely

Somewhat likely

Uncertain

Somewhat unlikely

Extremely unlikely

Q60 How much new information did you learn from watching the video on HPV?

I did not learn anything new about HPV from the video (4)

I learned some new information about HPV from the video (5)

I learned a lot of new information about HPV from the video (6)

Appendix 2. IRB documentation.

December 14, 2020

Behrooz Soleimani
College of Nursing
Seattle University

Dear Behrooz,

As I indicated in my December 11 email, your application for the DNP project **Catching up with HPV immunization: An educational video for college students** meets criteria as "Not Human Subjects Research" (NHSR), because activities will involve

- An online, anonymous student health educational intervention.

Given the nature of these activities, this project does not meet the federal regulatory definition of human subjects research, and you do not need to go through further IRB review and approval process.

Note that this determination does **not** indicate IRB "approval." *Do not include statements for publication or otherwise that the SU IRB has "reviewed and approved" this study*; rather, say the SU IRB has identified the study as "Not Human Subjects Research (NHSR)." Please retain this letter with your study files.

If your project alters in nature or scope, contact the IRB right away. If I can assist you further, please let me know.

Best wishes,

Andrea McDowell, PhD
IRB Administrator

Email: irb@seattleu.edu
Phone: (206) 296-2585

cc: Dr. Colleen Woolsey, Faculty Adviser

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