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Los Angeles

Educating College Students About Human Papillomavirus

A dissertation submitted in partial satisfaction of the
requirements for the degree
Doctor of Nursing Practice
In Nursing

by

Pamela Carter Bryant

2021

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ABSTRACT OF THE DISSERTATION

Educating College Students About Human Papillomavirus

by

Pamela Carter Bryant

Doctor of Nursing Practice

University of California, Los Angeles

Professor Mary-Lynn Brecht, Co-Chair

Professor Felicia Hodge, Co-Chair

Background: Human Papillomavirus (HPV) infection is the most common sexually transmitted infection in the US affecting almost 60% of college women ages 20 to 24 years. Many community college students both male and female were not aware of the HPV vaccine catch up recommendation through age 26 years. **Objectives:** This aim of this project is to determine if an evidence-based online educational video about HPV and HPV vaccine would increase knowledge of HPV and intent to receive the vaccine among community college students enrolled in urban and suburban community colleges in Southern California. Measured outcomes of interest included HPV knowledge and intent to receive HPV vaccine. **Methods:** A quasi-

experimental, one-group pre-posttest design was used to determine the effect of the HPV educational video on a sample of 24 gender and ethnically diverse community college students ages 18 through 26 years. Knowledge changes were measured using an online Student HPV-Knowledge Assessment immediately before and after video education. Statistical analysis included descriptive statistics, paired *t*-test, and the McNemar chi-square test for paired dichotomous variables. **Results:** Study results revealed all participants were aware of HPV and a majority was aware of the vaccine. Findings confirmed increased knowledge of HPV, perception of risk, and increased intent to get HPV vaccine in participants who were previously aware of disease following the intervention. These results support the utility of an online educational intervention to increase knowledge of HPV and intent of HPV vaccine uptake. **Conclusion:** HPV infection is common. Awareness of vaccines as protection from disease is increased during the pandemic, providing opportunity for influence of increased HPV vaccine uptake. The impact of HPV vaccine education through an educational video may be an effective method to reach young college students to heighten awareness and increase knowledge of HPV leading to increased HPV vaccine uptake. Future studies may examine if widespread education on vaccination as disease prevention during pandemic conditions could have impact on other vaccine uptake, specifically HPV vaccine, or if perception of risk from HPV infection might be overshadowed by perception of risk for COVID-19 and thus affect vaccine interest.

Keywords: college students, human papillomavirus, HPV vaccines, recommendations

The dissertation of Pamela Carter Bryant is approved.

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2021

This dissertation is dedicated to my parents who fostered lifelong learning in me. In loving memory of my mother, Dr. Jacquelyn W. Carter who encouraged my love of learning and to my father, Addison Carter who taught me to always ask “what if?”

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TABLE OF CONTENTS

Contents	
CHAPTER ONE: INTRODUCTION.....	1
Problem Statement	3
PICOT Question	4
Purpose and Objectives	4
CHAPTER TWO: THEORETICAL FRAMEWORK.....	6
CHAPTER THREE: REVIEW OF LITERATURE.....	8
Synthesis of Literature Review	14
CHAPTER FOUR: METHODS.....	19
Project Design	19
Ethics.....	19
Population and Setting	19
Sample.....	20
Intervention	21
Instruments	21
Procedure.....	22
Analysis.....	24
CHAPTER FIVE: RESULTS.....	26
Description: Demographics.....	26
Description: HPV Awareness.....	27
Description: HPV Knowledge.....	28
Change in Knowledge Pre to Post Intervention	29
Change in Intent to Receive HPV Vaccine	31
CHAPTER SIX: DISCUSSION.....	33

Limitations	34
Implications for Practice and Research	35
CONCLUSION	36
APPENDICES.....	37
Appendix A: PRISMA Flow Diagram of Literature Review Process for HPV Education.....	38
Appendix B: Permission from Creator to use Educational Video.....	39
Appendix C: Knowledge and Awareness Health Survey.....	40
Appendix D: Permission from Author to Use HPV Knowledge Questionnaire	42
Appendix E: Human Papillomavirus (HPV) Knowledge Questionnaire	43
TABLE OF EVIDENCE	44
REFERENCES.....	55

List of Figures

Figure 1: <i>Health Belief and Theory of Planned Behavior Model Integration for Vaccine</i>	7
Figure 2: <i>Participant Gender Distribution</i>	26
Figure 3: <i>Participant Race/Ethnicity Distribution</i>	27

List of Tables

Table 1: <i>HPV Knowledge Correct Responses</i>	28
Table 2: <i>Vaccine Intent</i>	31

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VITA

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Pamela currently serves on Boards of Directors for the South Bay Chapter of California Association of Nurse Practitioners (CANP), Nurses Pub Inc., and Southern California Cares Community Clinic and joined AARP Nurse Advisory Board in 2020.

CHAPTER ONE: INTRODUCTION

Human Papillomavirus (HPV) infections are the most prevalent sexually transmitted infection (STI) in the United States, occurring frequently in the college population with over 50% of women aged 20-24 years having genital HPV infection (Hernandez et al., 2019). Many individuals with HPV are asymptomatic and clear the infection on their own within two years, the World Health Organization (WHO) notes that two of the more than 100 HPV types, HPV 16 and 18, are responsible for cervical cancers in women and are linked to other reproductive system cancers in both men and women. These include cancers of the vulva and vagina in women, penile cancer in men, and cancers of the oropharynx and anus in both men and women (WHO, 2019). Vaccination for HPV is an important measure in prevention of HPV infection with the nonvalent vaccine offering protection for up to nine HPV types, including HPV16 and 18, providing over 90% efficacy against cervical, vaginal, vulvar and HPV related anogenital cancers (Toh et al., 2019). Advisory Committee in Immunization Practices (ACIP) recommended vaccine intervals for individuals older than 15 years of age is three doses starting with the initial dose, a second dose at a 4-week minimum interval from first dose and 12 weeks minimum interval before the third dose (Meites et al., August 16th, 2019). Vaccine indication has recently been expanded to include individuals through age 45 by the United States Food and Drug Administration (FDA), as a shared decision-making approach between providers and patients (D'Errico et al., 2020). The vaccine is known to prevent many types of HPV, including those known to cause cancer, the CDC (2019) estimates that HPV is attributed to an average of 34,800 cancers each year. Immunization schedules from the CDC affirm that interruption in the vaccine schedule does not necessitate repeating the series if minimum intervals between doses are met (Centers for Disease Control and Prevention [CDC], 2020). The vaccine for women combined

with cervical cancer screening makes cervical cancer among the most preventable cancers (Centers for Disease Control and Prevention [CDC], 2019, August 22).

Young adults in the college age group tend to be curious about their role in their own health, but up until this stage in their development, may have relied on decisions made by parents. They are entering a period that Piaget describes as formal operational thinking where cognitive thinking and decision making includes deductive reasoning and concrete ideas (Braungart & Braungart, 2018). Young adults are now at the age of consent, and they may be unsure of making decisions for themselves, but given the appropriate information, this group is ready and willing to have an active role in their health-determination.

Advanced Practice Registered Nurse Practitioners (NP) providers in student health centers are often a student's source of health information, providing guidance that can influence health choices. Doctor of Nursing Practice (DNP) education founded in biophysical and psychosocial knowledge, guides the NP's clinical treatment, while knowledge of the application of nursing theories along with ethical, analytical, and organizational underpinnings of DNP Essential I (American Association of Colleges of Nursing [AACN], 2006) allows a broader perspective for providing evidence-based practices outside of standard outpatient settings. Campus health centers are micro health systems for students, yet they function as sub systems of college campus operations. The health of the student is important in academic success and campus priorities may not always include health promotion and prevention goals thus health center NP's knowledge of organizational systems, as evidenced by AACN (2006) DNP Essential II, creates a pathway to advocacy for prevention interventions. Leadership skills and the ability to work successfully within the college academic structure are necessary to implement education interventions to promote HPV education and improve student health outcomes. The combination

of theory and practice knowledge yields improved outcomes in clinical practice, and Eldridge (2017) notes that while medicine focuses on treating illness and disease, nursing practice addresses the response of the person, adding another dimension to providing care. The DNP Nurse Practitioner provider's understanding of medical science provides a foundation from which sound health teaching for disease prevention is based while the use of nursing science and theories facilitates a broader approach in addressing all aspects of the student's response to health and wellness.

Problem Statement

College students have many misconceptions about the prevalence of HPV infection and their risk of becoming infected (Albright & Allen, 2018; Barnard et al., 2019). Health centers on college campuses are easily accessible sources for health information and treatment for student health concerns yet college students do not typically visit unless there is a specific complaint. The CDC (2020, September 3) published a statement that non-oncogenic types of HPV infections can present clinically as painless genital warts in both males and females leading affected individuals to seek medical care, however there may also be no clinical symptom of infection. Genital warts can usually be managed with topical medications, cautery, or freezing, but the virus is not eradicated. Persistent and untreated HPV infections can progress causing the most common HPV related cancers including about 90% of cervical cancers in women and up to 70% of oropharyngeal cancers in men (Centers for Disease Control and Prevention [CDC], 2019). Recommendations from ACIP suggest HPV vaccine for males and females ages 18 through 26 years as a catch-up series for those who have not been previously vaccinated (Meites et al., August 16th, 2019), making college students an ideal group on which to focus.

College students are at risk for acquiring HPV and they can also make the choice to be protected from the virus through vaccination. The study done by Kasymova et al. (2019) found that college students had gaps in knowledge of HPV with over 95% of students surveyed aware of the existence of HPV, but greatly underestimating their own risk of infection. Literature examining student awareness was consistent finding gaps in knowledge about the vaccine and recommendations for their age group, but inconsistent in findings related to awareness of disease and risk (Albright & Allen, 2018; Hirth et al., 2018; Kim et al., 2019). Kasymova et al. (2019) noted a need for continued health education to promote better knowledge of HPV as well as methods for prevention of infection, including barrier protection and the availability of the vaccine.

PICOT Question

The PICOT question will examine this clinical problem: In community college students ages 18 through 26 years, does APRN implementation of an evidence-based HPV educational intervention conducted by video, improve students' knowledge of HPV and its health-related problems and of the HPV vaccine thereby increasing HPV knowledge and does the education increase intent in getting HPV vaccine following the intervention?

Purpose and Objectives

The purpose of this DNP scholarly project was to determine if 1) An evidence-based educational intervention to college students ages 18 through 26 years improved student knowledge of HPV and its related health problems and of the HPV vaccine and 2) If that knowledge led to increased intent in getting the HPV vaccination.

NP's providing care to students in college health centers have an opportunity with each student encounter to assess HPV vaccination status as part of their clinical prevention and address knowledge gaps surrounding HPV and the HPV vaccine. Screening and education align with DNP Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health (Schadewald & Pfeiffer, 2017), fostering participation in decision making for immunization as part of clinical preventive services and a health promotion framework in preventing illness for college populations. It is important that students are knowledgeable about risks of infection and the HPV vaccine to make informed decisions as this population assumes responsibility for their health.

CHAPTER TWO: THEORETICAL FRAMEWORK

The theoretical frameworks used to guide processes for addressing the clinical issue provide support for HPV educational intervention for college students. The Health Belief Model developed by social psychologists from the United States Public Health Service, posits that the perceptions individuals hold, or the belief of susceptibility of disease, along with the perceived benefit of taking an action or response to cues for taking an action, will influence the likelihood of taking that action (Glanz et al., 2018; Luquis & Kensinger, 2019).

The Theory of Planned Behavior (TPB) presumes that an individual's beliefs and motivations are key to their health decision making, providing explanation of intentions behind the behaviors and actions taken (Glanz et al., 2018). TPB was used by LaMorte (2019) to predict behaviors and intentions related to health, their perceived norms, based on how others who are well regarded, such as family or health care providers would view their choices. Findings from Stout et al. (2020), revealed that HPV vaccination advocacy from college health providers and parents had greater influence in perceived norms of college students than peer support, further promoting HPV education interventions for students from college health providers.

Foundational constructs of the Health Belief Model can be integrated with the Theory of Planned Behavior to achieve a desired outcome according to LaMorte (2019), with three components of health-related behavior predicting behavior change.

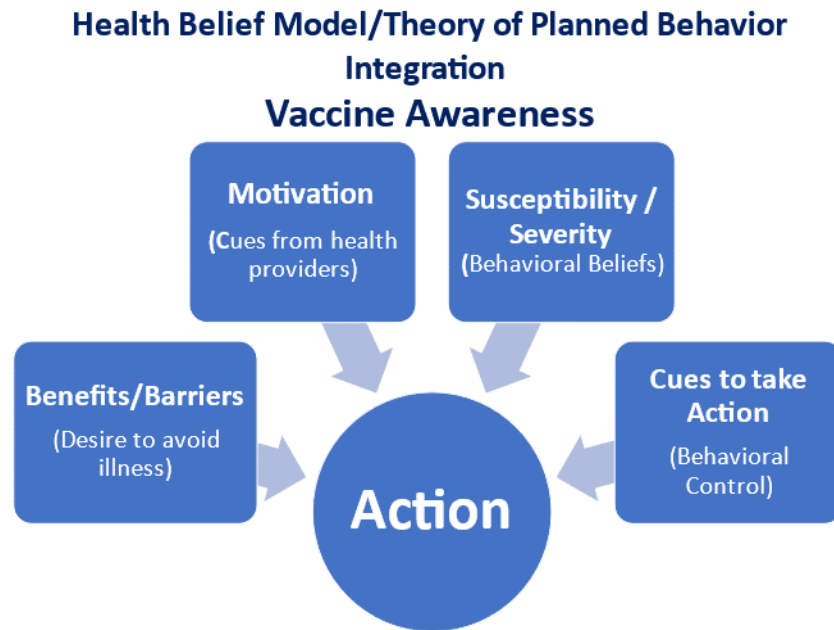


Figure 1: *Health Belief and Theory of Planned Behavior Model Integration for Vaccine*

Perceived susceptibility and severity are behavioral beliefs and include 1) The desire to avoid illness or get well if already ill; attitudes about vaccination as a perceived benefit demonstrate that 2) A specific health-related action will improve health; and perceived behavioral control 3) health motivation by reinforcement of the action with timely cues or reminders and guidance from health providers (see Figure 1). The increase in awareness and knowledge will lead to an increased interest in taking a health-related action. The examination of the decision making of college students regarding HPV, MacArthur (2017), found that health beliefs surrounding risk of infection and vaccine efficacy have strong correlations of intent to get HPV vaccine demonstrating their motivation to carry out a health-related action.

CHAPTER THREE: REVIEW OF LITERATURE

The literature search was conducted using multi-databases including PubMed, Embase and CINAHL (Appendix A). The key words ‘HPV’, ‘college student’ and ‘education’ were included in the initial search criteria yielding 304 articles. The first search included filters using publication dates within the last five years, peer review, and full text articles resulting in 92 articles with 20 being duplicates. Medical Subject Headings (MeSH) terms included ‘knowledge’, ‘awareness’, and ‘risk perception’. Individual search was conducted using key words and phrases of ‘HPV education’, ‘intervention’, ‘student health’, ‘student health centers’, and ‘community college student health’. Titles and subject headings were reviewed and articles focusing on international, adolescent, or pediatric populations or settings that did not include colleges or college students were excluded. Grey literature was used to provide timely information related to the review of evidence. Eleven articles were selected for review after examining general descriptions of the study, characteristics of the samples and study themes using a rapid critical appraisal (RCA) approach for review of the studies. RCA evaluation of peer-reviewed literature included articles with a focus on college age or young adult populations, and a Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) methodology was followed for appraising systematic reviews. Selected articles included seven peer reviewed journal articles and three systematic reviews. A table of evidence (TOE) summarizes study information from the seven single studies including study purpose, study samples and settings, the methods used for the interventions, and study results with discussion of findings (see Table of Evidence).

A systematic review study by Barnard et al. (2019) of eight randomized controlled trials (RCT) and one single arm pre-post study examined different education interventions designed to

increase HPV vaccination rates in college students. Sample populations included 18 to 26-year-old university students who were either undergraduate or graduate students and had not been vaccinated for HPV, or who were initiating the first dose. Participants were randomized to receive the education intervention or control intervention. Education was delivered electronically in four of the RCT studies while control groups received reminder letters for vaccine or a vaccine information statement or health information. One study had video messages presented by either a peer and provider, by peer only, or by provider only with control group receiving information only. Another education intervention consisted of printed materials emphasizing protection from cervical cancer or protection from cervical cancer and genital warts, while another intervention was an auditory message focusing on risk of HPV for college women or risk of HPV for women in general. A different study sent electronic messages monthly for seven months or a card reminder for next appointment date for vaccine, and the single arm study used an in-person peer to peer model to deliver the vaccine education. The research focused on the effectiveness of the educational interventions in increasing the vaccine uptake. Systematic review findings noted that while all education delivery modes were effective, peer and provider message demonstrated the most significant increases in vaccination rates (21.8%) when compared to provider alone at 6% or peer alone at 17.8% (Barnard et al., 2019). The systematic review suggests that with college students, in-person engagement for messaging has a greater impact on decision making than when there is no personal contact.

Priest & Knowlden (2015) conducted a systematic review of twelve studies analyzing HPV primary prevention interventions directed to college students. The theoretical frameworks of the education interventions were indicated in seven of the twelve studies with two citing Bandura's social cognitive theory, two designed using the Theory of Planned Behavior and three

designed using the Health Belief Model. The review analyzed nine studies of primary prevention interventions for HPV that included college students in the United States, Australia, China, and Canada examining changes in participant knowledge, perception of HPV, and intent to vaccinate as outcomes of education interventions. The interventions in the reviewed studies were conducted in a variety of settings including classrooms, student health center, through the mail and web based. HPV knowledge was shown to increase from baseline to post-intervention with ($p < .001$) in three studies and ($p < .01$) in two studies compared to the control groups. Two of the studies did not demonstrate any significant difference in pre and post intervention knowledge and two did not report alpha levels although there were reported knowledge increases in the intervention outcomes (Priest & Knowlden, 2015).

The systematic review conducted by Gönenç et al. (2019) appraised 50 articles that used questionnaires to examine the attitudes and level of knowledge about cervical cancer and HPV vaccination in young adults throughout the world. The literature was selected from more than 100 articles retrieved from PubMed, Scopus, Web of Science, and Google Scholar and was reflective of studies published before March 2018 examining the level of knowledge and attitudes about cervical cancer and HPV vaccination in young adults throughout the world. Their review of the literature found that knowledge gaps regarding HPV infection were consistent in the age group that includes college students in both developed and developing countries along with low levels of understanding of cancer risk with HPV (Gönenç et al., 2019). The review concluded in general that poor understanding of the protections of HPV vaccination or methods of HPV prevention is pervasive in the young adult population.

Albright & Allen (2018) conducted a study of HPV knowledge and awareness through survey via an online platform with 360 college students. Knowledge data was collected through a

validated true-false questionnaire that was found to have high reliability and consistency with an international sample and health literacy was assessed using a Health Literacy questionnaire comprised of 44 questions. Study findings confirmed that misconceptions about HPV along with higher-risk sexual behavior made the college age population much more likely to acquire HPV infection than the general population and higher health literacy correlated positively with knowledge (Albright & Allen, 2018).

Kellogg et al. (2019) conducted a cross-sectional study obtaining data through in-person peer-to-peer interviews examining HPV awareness of students in an urban area university. A multiple-choice knowledge survey revealed lack of awareness with almost 25% of student participants not knowing their HPV vaccination status and 76% did not think they were at risk for infection (Kellogg et al., 2019). Survey findings linked demographic variables as predictors for HPV vaccination with Kellogg et al. (2019) reporting significant differences between races suggesting that minority populations, like community college campuses are more at risk.

Hirth et al. (2018) conducted a study using a semi-structured qualitative face-to face interview examining HPV awareness of college students in an urban area university in the South-Central United States. The study found lack of awareness to be a barrier to getting HPV vaccine with some students not knowing the recommendations for age or number of doses required, and some did not think they were at risk for infection because they were not sexually active. Hirth et al. (2018) conducted in-person interviews with community college students and categorized attitudes, motivators, and barriers to vaccination by themes. Equal proportions of male and female students participated with generally favorable attitudes surrounding vaccination. Students felt that easy access to HPV vaccine on campus would be a motivator as would reminders about appointments and influence of health care providers. Hirth et al. (2018) identified access and

financial limitations as main barriers as many community colleges have limited health center resources and students do not carry health insurance since it is not mandated. Urban area community colleges in the Western United States, such as the one for this proposed study, have the diverse population and similar barriers that present challenges to vaccine uptake.

Kim et al., (2019) conducted an experimental study for HPV knowledge with an intervention for college women designed to be culturally relevant for Korean American students which they cited as having less awareness of HPV. Their HPV knowledge assessment tool used in the study included a response choice of *don't know* that researchers believed increased accuracy in responses instead of forcing a choice between *yes* and *no* with topics related to sexual behavior. Study findings indicated that more than half of the students were not familiar with HPV vaccine and cultural barriers exist with Asian populations who may not be as aware of HPV because discomfort in speaking of sexual matters (Kim et al., 2019). Cultural and ethnic differences for minority populations need to be considered when educational interventions are implemented however, efforts focused on any single group are limiting.

D'Errico et al. (2020) conducted a quantitative study at a U.S. public university with college students examining barriers impacting HPV vaccination and the person most influential to recommend vaccination. The study concluded that participants felt a recommendation for HPV vaccine from health care providers had the greatest influence in their decision to vaccinate and not having that recommendation was a significant barrier, but also felt that recommendations from parents or partners, including spouses would be significant (D'Errico et al., 2020). This reinforces the importance of the role of NP providers in health education and prevention with college students, substantiating provider education for vaccine outreach.

Kasymova et al. (2019) used Health Belief Model as a framework for study design researching behaviors related to HPV in southern U.S. college students and found that gaps in knowledge limit student's understanding of the risk and severity of infection. The study cited predictors of knowledge related to vaccine status, gender and race finding that white females had higher overall knowledge and were more likely to be vaccinated (Kasymova et al., 2019). The researchers found that shame related to diagnosis was a significant stigma associated with HPV and could pose a barrier to get cervical cancer screening (Kasymova et al., 2019).

LaJoie et al. (2018) examined factors predicting HPV vaccination and found that college students with limited knowledge about the vaccine were less likely to have been vaccinated. Participants made some associations with HPV and cervical cancer but there was overall low perception of risk of infection. The recommendation for vaccine was least influenced by physician's input this study but showed that partner vaccination was a strong motivator of vaccine uptake and obtaining the vaccine on the campus at no cost was an influence (LaJoie et al., 2018).

Community college age students are a more vulnerable population due to their economic disparities and are often uninsured or underinsured. Students attending community college are more likely to come from homes where the annual household income is under \$60,000 and the highest education level in the family is less than a college degree (Kellogg et al., 2019). The majority of these college students often do not have health insurance if they have aged out of parental coverage. State funded programs such as Family PACT provide coverage for reproductive health related services, but the coverage is not comprehensive and does not cover the HPV vaccine, which can cost as much as \$135.00 for each of the three required doses (Henry J. Kaiser Family Foundation [KFF], n.d.).

Synthesis of Literature Review

The understanding of factors contributing to low vaccine uptake in college students must be identified to impact the problem. The knowledge that the benefits of vaccination in prevention of disease alone, has not been enough of a motivator to ensure high compliance with HPV vaccination. Knowledge deficits compounded with risk perceptions, and both personal and societal attitudes surrounding vaccination are important and influential factors relevant to Theory of Planned Behavior's proposal that social norms also are associated with intent. Literature demonstrated that many factors influence vaccinating behavior and should be considered when planning intervention strategies.

The review of literature by Barnard et al. (2019) found that increasing student knowledge of HPV including benefits of vaccination and access to vaccine, there was increased uptake of vaccine demonstrating their motivation to carry out health related action. The survey tool developed by Kasymova et al., (2019) and used in their study to assess knowledge of HPV and awareness of HPV vaccine, identified knowledge gaps and showed a strong internal consistency with $\alpha = .79$, while the survey tool developed by Kim et al., (2019) based on qualitative studies of Korean women to ensure cultural relevance and demonstrated $\alpha = .91$. Baseline data collected from tools assessing HPV knowledge, awareness and HPV vaccine determined limited knowledge associated with low vaccination rates including lack of knowledge of HPV and risks of infection, lack of awareness of HPV vaccine, and the age recommendations for the vaccine (Kasymova et al., 2019; Kellogg et al., 2019; Kim et al., 2019; LaJoie et al., 2018).

Priest & Knowlden (2015) found that educational interventions designed using theoretical frameworks provide a focus from which to look at outcomes, and support gains in knowledge. Kasymova et al., (2019) and Kellogg et al. (2019) supported these findings by the development

of questions to measure perceptions using the Health Belief Model to measure perception of severity of infection and their perceived vulnerability to disease while identifying barriers yet Hirth et al., (2018) used Planned Behavior Theory. These studies suggest education interventions for college age students can be improved when designed to change behavior, although the frameworks are not consistently addressed in literature.

Prior to initiating interventions designed to improve student awareness of HPV and perception of risk, pre-intervention surveys tools to assess student knowledge and perceptions of HPV establish a starting point from which gains in knowledge and awareness of risk are determined and provide a framework for gaps in knowledge that should be addressed. The number of questions asked on each tool ranged from 18 items (Kasymova et al., 2019) to 44 items (Kim et al., 2019) and items were grouped into content specific sections including demographics, assessment of attitudes and behaviors, assessment of HPV knowledge, HPV vaccine behavior and influences. Questions regarding HPV and cervical cancer addressed in five tools (D'Errico et al., 2020; Kasymova et al., 2019; Kellogg et al., 2019; Kim et al., 2019; LaJoie et al., 2018), demonstrating behavior change in all but one study (LaJoie et al, 2018). These findings demonstrate that campus-based interventions encouraging behavioral actions along with readily available vaccine could not only impact HPV infection but offer cancer prevention as a long-term outcome.

HPV-baseline assessment tools described in the literature reflected the attitudes and barriers that college students face, that they perceived as preventing them from getting the vaccine (D'Errico et al., 2020; Hirth et al., 2018; Kasymova et al., 2019; Kellogg et al., 2019; Kim et al., 2019; LaJoie et al., 2018). Research has differentiated the barriers to HPV vaccination students face based on attitudes and perceptions cited by participants (D'Errico et al., 2020; Hirth

et al., 2018; Kasymova et al., 2019; Kim et al., 2019; LaJoie et al., 2018), versus actual impediments, such as lack of transportation or cost (D'Errico et al., 2020; Hirth et al., (2018). The most frequently cited attitudinal barriers to HPV vaccines in literature included no recommendation from a health care provider (D'Errico et al., 2020; Hirth et al., 2018; Kasymova et al., 2019; Kim et al., 2019). LaJoie et al., (2018) found recommendations from parents to be strongest influence while those from providers were the least effective, yet Hirth et al., (2018) acknowledged student preference for providers to recommend. The lack of knowledge and awareness of HPV disease risk as well as not knowing where to get the vaccine are factors that have an impact on the decision to receive the vaccine (D'Errico et al., 2020; Hirth et al., 2018; Kim et al., 2019). Cost considerations were found to be barriers for students (Hirth et al., 2018; Kellogg et al., 2019; LaJoie et al., 2018) with findings of greater interest in getting the vaccine if it were free. The focus on student's perceptions offers valuable data to guide the development of interventions that will result in higher vaccine uptake.

The most pervasive finding in literature for the prevalence of non-vaccination for HPV infection in the college age group was gaps in knowledge with higher-risk sexual behavior as contributing to the high rate of infection (Kasymova et al., 2019; Kellogg et al., 2019; Priest & Knowlden, 2015). Gaps in knowledge identified in studies by Kasymova et al. (2019) were inconsistent with findings by D'Errico et al. (2020) of a low perception of risk but reinforced by findings in the review from Gönenç et al. (2019). Lack of knowledge and lack of perception of risk of HPV infection often drive their higher-risk behaviors and were consistent determinants for initiating interventions designed to improve HPV vaccination uptake on college campuses (D'Errico et al., 2020; Hirth et al., 2018; Kasymova et al., 2019; and Kellogg et al., 2019).

Education in safer behavior practices including vaccine protection along, with education about HPV risk should aim to change perception to the reality that contracting HPV is significant.

The examination of poor HPV vaccination uptake in the college age population, student attitudes about HPV as well as effects of the education interventions on HPV vaccination initiation provide recommendations for increasing efficacy on the interventions. The literature provided best evidence-based evaluations of education tools and interventions used to assess knowledge and perceptions about HPV and provide education about HPV and HPV vaccine that were designed to prepare students to make informed choices for vaccine uptake.

Methods of collecting baseline data for interventions varied from study to study but were consistent throughout the literature including in-person interview, paper-pencil survey, or link to online survey (Hirth et al., 2018; Kasymova et al., 2019; Kellogg et al., 2019; Kim et al., 2019). Kasymova et al., (2019) utilized pencil paper surveys in classroom settings to document knowledge, experiences and awareness of HPV and the HPV vaccine and documented gaps in awareness by gender, race, and ethnicity. Studies found that student's lack of knowledge and decreased perception of risk of HPV infection often drives their higher-risk behaviors and are determinants for initiating campus-based interventions designed to improve HPV vaccination uptake (Albright & Allen, 2018; D'Errico et al., 2020; Hirth et al., 2018; Kasymova et al., 2019; Kellogg et al., 2019).

Some researchers found that women had greater knowledge of HPV than men (Kasymova et al., 2019; Kellogg et al., 2019) while others found that participants identifying as minority were less likely to know about the vaccine than Caucasian students (D'Errico et al., 2020; Hirth et al., 2018; Kasymova et al., 2019; Kellogg et al., 2019). Kim et al., 2019 limited their study to Korean American women so knowledge findings were only relevant to that

subgroup. Studies by Kasymova et al. (2019) and Kellogg et al. (2019) concluded that there is a need for college health centers to provide knowledge of HPV to students in the college setting, but Kellogg et al. (2019) noted that student health centers often lack the data showing the knowledge deficits of students. The addressing of cultural and socioeconomic variables within the studies and utilizing health belief theory-based approaches when developing interventions mitigates the impact those variables have on the interventions and helps many of the most at-risk students get information needed to make health decisions.

Post-intervention surveys measured the effectiveness of the intervention and change in knowledge and intent to vaccinate. Barnard et al. (2019), provided meta-analysis of the literature evaluating the education tools and interventions that were used on college campuses finding in half of the studies with educational interventions, there were reported increases in students receiving at least one dose of the vaccine. These studies demonstrate the need for NPs in health centers to work with campus administrations to further address the lack of perceived risk of contracting HPV and knowledge gaps of unvaccinated students, recognizing that gaps remain in how best to intervene. Variations in the type of educational approaches and small sample sizes in different geographic settings account for limitations in reported findings. The determination of the best methods to deliver information to students remains a challenge however encouraging behavior change principles of health belief theory and planned behavior theory provide evidence-based foundation for education, offering a more effective intervention and thus influencing the focus of this study.

CHAPTER FOUR: METHODS

Project Design

A quasi-experimental one-group pre-posttest design with sample drawn from two community college sites in southern California was used to examine the effect of an evidence-based HPV educational video reinforcing HPV knowledge and awareness of HPV vaccine, on a sample of college students aged 18 to 26 years enrolled in an Associate Degree Nursing program (ADN). Measured outcomes of interest included HPV knowledge and intent to receive the HPV vaccine.

Ethics

The project was reviewed and was determined to not meet the definition of human subjects' research as defined by federal regulations for human subject protections (45 CFR 46.102(d)). No certification of exemption or approval of the project activities was required from UCLA Institutional Review Board (IRB). Health Insurance Portability and Accountability Act (HIPAA) protocols for medical information were followed and all survey information was de-identified. Notification of no IRB certification of exemption or approval was received. Participation in the study was voluntary, and students had the opportunity to get participation credit at the conclusion of the project for completing the survey. Their nursing program course grades were not affected by participation or non-participation.

Population and Setting

A west coast urban community college campus and a suburban community college campus were chosen in the Southern California area for the intervention sites. Both campuses offer a 2-year ADN program with in-person didactic learning and clinical hours conducted in hospital inpatient settings. COVID-19 stay-at-home restrictions required that didactic courses

were conducted remotely using Zoom and students were in their homes with online platform access for class thus investigator had no control over setting. Settings during intervention participation were determined by each student's living situation. Nursing faculty determined whether to use class time to complete the intervention.

The urban west coast community college has a population reflective of the average west coast, metropolitan community college student body. The ethnic breakdown of the urban college campus includes 45% Hispanic, 23% African American, 15% White non-Hispanic, 5% Asian, 4% Multi-Ethnicity and 7% unknown. Thirty-one percent of the student body are between the ages of 20 and 24, 24% age 19 or less, and 18% between 25 and 29 years. This urban sample resembled participant samples from interventions implemented in other metropolitan area campuses (Community College Review, 2020; Kellogg et al., 2019). The suburban college campus includes 54% Hispanic, 9% African American, 12% White, 17% Asian, and 1% American Indian/Alaskan (Community College Review, 2020).

Sample

Participants were obtained using convenience sampling of males and females recruited from enrolled students in the Associate Degree Nursing (ADN) program in two urban area community colleges which were considered one site, and a suburban area community college during the spring term of the 2020-2021 school year.

The target sample size was calculated using G*Power version 3.1.9.6. (Buchner et al., 2020). The sample size of 90 subjects was calculated using paired *t*-test with 2 tails, an effect size of .3 and the alpha of .05 allowing detection of a moderate effect size to achieve a power of 0.80 (Buchner et al., 2020). The intended sample size was not attained, the actual sample size $N=19$ was sufficient to detect medium-to-large effect of $d=.61$.

Eligibility for the intervention group (IG) was determined from participants' ages 18 through 26 years whose survey responses indicated that they had not received the HPV vaccine or were not sure. Students under 18 years or over 27 years, and those who self-reported as having the HPV vaccine were excluded from the study. The sample fell within the recommended age range for the catch-up vaccine without requiring parental consent. Young adults under the age of 27 years are still able to get the vaccine covered by insurance (Henry J. Kaiser Family Foundation [KFF], n.d.).

Intervention

The HPV education intervention consisted of an 8-and-a-half-minute whiteboard educational doodle video entitled *Should You Get the HVP Vaccine?* (Evans, 2012). The video was created in live action animation with the author creating illustrations with narration explaining risks of HPV infections and HPV-related cancers and prevention methods including HPV vaccination. Content included specific information about the HPV vaccine as a method for HPV-related cancer prevention. The video is in the public domain and accessed through YouTube. Permission to use the video in the education intervention was obtained from the creator (Appendix B).

Instruments

Data collection instruments included demographic information collected from a multiple choice 'Knowledge and Awareness Health Survey' (Appendix C) adapted from Kasymova et al. (2019), describing the sample. The Permission from said author was granted (Appendix D). Information included age, gender, race/ethnicity, knowledge of HPV and HPV vaccine, source of HPV information, intent to receive vaccine and self-reporting of HPV vaccine status. This instrument determined the eligible participant sample for the educational intervention. Additional

information regarding type of health insurance, sexual identity and contacts was collected as part of the survey and was not used for this study.

A *Human Papillomavirus (HPV) Knowledge Questionnaire* adapted from Kasymova et al. (2019) (Appendix E), that assessed HPV knowledge, risk of infection, and HPV prevention and screening was taken prior to the education intervention and consisted of 18 True/False items. Items were scored one point for each accurate answer for a maximum score of 18. Mean responses were summarized for overall knowledge. The same questionnaire taken immediately following the educational video assessed HPV knowledge, perceived risk of HPV infection, HPV prevention and screening, and included an item assessing intention to initiate the vaccine series, and if not, reason for not initiating was recorded. The questionnaire was shown to be a reliable instrument in a previous study and demonstrated validity with $\alpha = .79$ (Kasymova et al., 2019).

Procedure

Data collection through online educational survey began the last week of January 2021 for the beginning of spring semester of the 2020/2021 school year. Data collection concluded the end of March 2021 and analysis of data was initiated. The project was concluded in May 2021.

The project was presented to Southern California community college nursing students by the investigator via a visit to their virtual classroom through Zoom due to COVID-19 restrictions. This accommodation was made in response to the closure of the Community College campus health center during COVID-related stay at home orders. The opportunity to participate in a nursing study and educational intervention was explained to the students by the investigator and the participants were informed that the intervention would take approximately 15 minutes to complete. Course instructors were provided a Project Information Sheet along with a flyer

containing a QR code and survey link to the study during the first week of the nursing class. The study was accessed through a link to a Survey Monkey on the flyer and a Participant Information Sheet was included as part of the welcome page. The participants could take the Survey using their laptops, tablets, or smart phones.

Data collection for this project proceeded as follows:

1. Investigator invited to visit nursing class via Zoom as guest during the class time to introduce the project and answer any questions students had at that time. Contact information for investigator was provided to participants on project flyer and on Participant Information Sheet in Survey Monkey.
2. All students were provided a QR code and URL link to a Survey Monkey questionnaire that was provided to the class on a flyer by the course instructors.
3. A *Knowledge and Awareness Survey* collected demographic information and a baseline assessment of HPV from all participants who connected via the link.
4. Participants who self-reported not having received the HPV vaccine or were unsure of their vaccine status, were directed to watch the evidence-based educational video entitled, *Should You Get the HPV Vaccine?* (Evans, 2012), through a YouTube link in the survey. These eligible participants became the study sample.
5. Participants were directed to complete the 18-question True/False *HPV Knowledge Questionnaire* adapted from Kasymova et al. (2019) prior to the education intervention.
6. At the conclusion of the video, the participants were directed to complete the same *HPV Knowledge Questionnaire* again post intervention with two additional qualitative questions about intent to get vaccine.

7. Participants were directed to screen thanking them for their participation, which could be screen shot to give to instructors who offered participation credit.

Analysis

Raw data were numerically coded and entered in Excel version 2103 (Microsoft, 2021). Data were carefully examined for data entry errors and missing values; any questionnaires with missing data were excluded from analysis.

Descriptive statistics appropriate to each variables level of measurement were used to describe and summarize sample characteristics and to answer project questions. Normality was assessed for knowledge scores. All analyses were tested for significance at alpha .05 unless otherwise specified. The study sample was one group with two locations in urban and suburban sites.

Demographic variables were analyzed with Descriptive statistics. A paired t-test was used to evaluate changes in knowledge and perceived risks of HPV before and after a video intervention to answer the following clinical question:

Does the educational intervention increase knowledge about the HPV vaccine?

The McNemar chi-square test was chosen to evaluate change in intent to get the HPV vaccine before and after the video intervention the study because participants constituted a paired sample, there were two variables to be compared, and the two measures were nominal or ordinal. The null hypothesis is rejected when the chi-square test statistics is greater than or equal to the chi-square critical value, and we fail to reject the null hypothesis when the test statistic is less than the critical value. The McNemar chi-square test was used to analyze the difference in intent to be vaccinated in paired samples of all participants before and after an educational video to answer the following question:

Does the educational intervention change participant's intent to be vaccinated with the HPV vaccine following the intervention?

CHAPTER FIVE: RESULTS

Participant responses collected in Survey Monkey that were downloaded to Excel yielded 77 unique responses. A total of 77 individuals responded to the *Knowledge and Awareness Survey*, 19 met the inclusion criteria for the intervention; of these $N=19$ participants, nine attended the City of Los Angeles urban community colleges and 10 attended the Orange County suburban community college.

Description: Demographics

Demographic data were obtained from responses to the Knowledge and Awareness Survey at the beginning of the intervention (Figure 2 and Figure 3). Nineteen respondents completed the educational intervention.

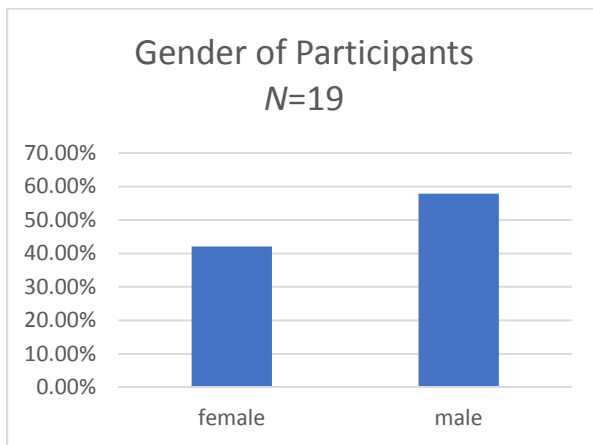


Figure 2: *Participant Gender Distribution*

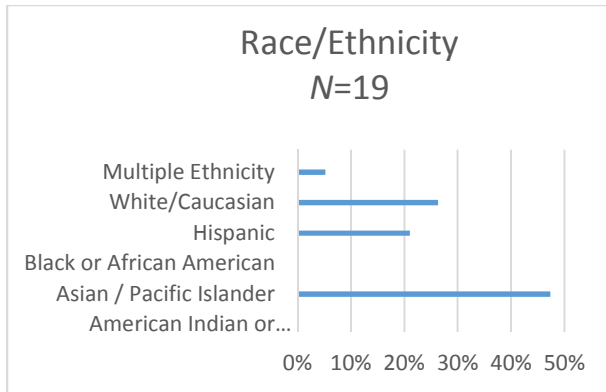


Figure 3: *Participant Race/Ethnicity Distribution*

The age range of the 19 respondents was 20 to 26 years with the median age of 24 years. Eight identified as female and 11 as male (Figure 2). There were nine participants who identified as Asian/Pacific Islander, five as Hispanic, and five as White/Caucasian (Figure 3). Eighteen participants indicated that their sexual identity was Heterosexual, and one identified as other.

The demographic differences were examined between the urban and suburban sites. The age range of the nine participants from the urban community colleges was 20 to 24 years with the median age of 22 years. Two identified as female and seven as male. There were three responders who identified as Asian/Pacific Islander, three as Hispanic, and three as White/Caucasian. All nine respondents identified as Heterosexual. The age range of the 10 suburban community college respondents was 21 to 26 years with a median age of 24 years. Six identified as female and four as male. Six respondents identified as Asian/Pacific Islander, two as Hispanic, and two as White. Nine participants identified as Heterosexual, and one identified as Other.

Description: HPV Awareness

The respondents ($N=19$), all had heard of HPV prior to the intervention and 15 had heard about the HPV vaccine; four had not. All respondents were asked if a healthcare provider had

recommended the HPV vaccine for them nine respondents answered yes, eight answered no, and two answered *I don't know*. When asked about their intention to get the HPV vaccine two answered yes, nine answered no, and eight answered *I don't know*. The last item asked if they thought they were at risk for HPV with five yes and 14 no responses recorded.

In the urban community college site ($n=9$), seven of nine had heard of HPV vaccine and two had not. Four responded that a healthcare provider or physician had recommended HPV vaccine, three responded that no recommendation was made, and two responded *I don't know*. When asked about their intention to receive the vaccine, five responded no and four responded *I don't know*. Only one respondent answered yes to the item asking if they thought they were at risk for HPV infection and eight no responses were recorded.

All respondents ($n=10$) at the suburban community college site had heard of HPV prior to participating in the intervention and eight of the 10 had heard about the HPV vaccine; two had not. Five responded that a healthcare provider or physician had recommended HPV vaccine and five responded that no recommendation had been made. When asked about their intention to receive the HPV vaccine, two responded yes, four responded no, and four responded *I don't know*. Four respondents answered yes to the item asking if they thought they were at risk for HPV infection and six answered no.

Description: HPV Knowledge

The results of the HPV Knowledge Questionnaire responses were examined as one sample before and after the educational video and correct knowledge responses results were summarized in Table 1.

Table 1: *HPV Knowledge Correct Responses*

Item #	HPV Knowledge Questionnaire Item #	Pre-Intervention		Post-Intervention		Change Pre to Post
		# correct	% correct	# correct	% correct	
1	HPV is sexually transmitted infection.	18	94.74%	19	100%	+
2	There is no cure for HPV.	16	84.21%	18	94.74%	+
3	Having one type means you cannot get new types.	18	94.74%	15	78.95%	(-)
4	There is screening commonly used to test males for HPV.	7	36.84%	11	57.89%	+
5	An abnormal PAP may indicate that a woman has HPV.	18	94.74%	17	89.47%	(-)
6	Most genital HPV infections do not clear up on their own.	5	26.32%	8	42.11%	+
7	A person usually has symptoms when infected with HPV.	13	68.42%	16	84.21%	+
8	HPV is not a very common virus.	17	89.74%	16	84.21%	(-)
9	HPV infection can cause genital warts.	18	94.74%	18	94.74%	No change
10	HPV infection can cause genital herpes.	3	15.79%	8	42.11%	+
11	Certain types of HPV can lead to cervical cancer in women.	18	94.74%	19	100%	+
12	HPV can lay dormant in the body for years without symptoms.	18	94.74%	18	94.74%	No change
13	Chances of getting HPV increase with number of sexual partners.	19	100%	18	94.74%	(-)
14	Most people with HPV have visible signs or symptoms of infection.	14	73.68%	15	78.95%	+
15	Genital warts can cause cancer.	6	31.58%	10	52.63%	+
16	Condoms are not effective in preventing HPV.	14	73.68%	17	89.47%	+
17	HPV can cause penile cancer.	12	63.16%	16	84.21%	+
18	Nearly all sexually active men and women will get HPV at some point.	8	42.11%	14	73.68%	+

Change in Knowledge Pre to Post Intervention

Knowledge variables were normally distributed, although the sample was not randomly selected and there were not 30 pairs. The paired *t*-test was used to test the hypothesis of no difference between scores in the HPV Knowledge Questionnaire pre-intervention and post intervention for all participants. The study sample HPV Knowledge test scores were significantly

higher after the video education ($M=14.32$, $SD=2.36$) than before ($M=12.74$, $SD=1.97$) as shown in t-test results $t(18)=2.911$, $p=.009$. A medium-to-large effect size of $d=.67$ was found. The frequency of participant correct knowledge scores increased after the intervention shown in Table 2.

Each community college separately showed improved scores for both colleges but change in knowledge was significant only for the urban community college. The urban community college scores improved from ($M=13.00$, $SD=2.18$) to ($M=15.44$, $SD=2.51$), as shown in significant t-test results ($t(8)=2.408$, $p=.043$) with a large effect size $d=.80$. The average score for the suburban community college increased from ($M=12.50$, $SD=1.84$) to ($M=13.30$, $SD=1.77$) with a medium-to-large effect size of $d=.65$, however t-test results were not statistically significant ($t(9)=2.058$, $p=.070$).

The small sample size allowed for a sensitivity analysis to be applied. The Wilcoxon Signed Rank test (LaMorte, 2017, May 4th) performed on the full sample ($N=19$); results were consistent with the paired t-test previously reported. The Wilcoxon Signed Rank test (W) also revealed that test scores were significantly higher after the video education ($N=19$, $Median=14$) as compared to the preintervention test scores ($N=19$, $Median=13$), with $p=.010$ for a two-tailed test.

G*Power 3.1.9.6 (Buchner et al., 2020) was used to perform a post hoc power analysis. The post hoc power analysis was performed for a two-tailed Wilcoxon Signed Rank test for a sample size of 19, a calculated effect size of .72, and an alpha of .80. The power of the two-tailed test was determined to be .83.

A change in knowledge was observed in two-thirds of the items on the *HPV Knowledge Questionnaire* from the pre survey to the post survey questionnaire responses. This is a

significant change in knowledge with video education. Six of the items did not have a positive change in post scores, four items had a lower number of correct responses in the post survey questionnaire. Item number five, addressing the correlation of HPV with abnormal PAP tests in women, one respondent answered incorrectly on the post survey although there were 100% correct responses on the item correlating HPV to cervical cancer in women. All three items addressing correlation of HPV with cancer showed higher correct post intervention responses. Items three, eight, and 13 addressed risk of infection and transmission and higher incorrect post intervention responses suggested that further clarification in the education in these areas may be necessary. Items three and eight were worded in the negative and information presented in this style may be confusing to the respondent and might not be optimal. Two items had no change in response from pre to post result and suggested previous knowledge of this information. These results are descriptive only and there were no statistical tests done to support these findings.

Change in Intent to Receive HPV Vaccine

A McNemar chi-square was conducted to evaluate change in intent to get the HPV vaccine before and after the video intervention. The intent to receive the HPV vaccine increased significantly, $X^2(1, N=19) = 12.07$ with $p < .001$ (X^2 critical value 10.83) with two (10.53%) of 19 participants intending to receive the HPV vaccine pre-educational intervention and 16 (84.21%) of 19 participants intending to receive the HPV vaccine post intervention as summarized in Table 2.

Table 2: *Vaccine Intent*

ID	Pre	Pre	Post	Post	Pre-Yes / Post-Yes
	Intervention Yes	Intervention No	Intervention Yes	Intervention No	
1	0	1	0	1	0
2	0	1	1	0	-1
3	0	1	1	0	-1
4	0	1	1	0	-1

<i>ID</i>	<i>Pre</i>	<i>Pre</i>	<i>Post</i>	<i>Post</i>	<i>Pre-Yes /</i> <i>Post-Yes</i>
	<i>Intervention</i> <i>Yes</i>	<i>Intervention</i> <i>No</i>	<i>Intervention</i> <i>Yes</i>	<i>Intervention</i> <i>No</i>	
5	0	1	1	0	-1
6	0	1	1	0	-1
7	0	1	0	1	0
8	0	1	1	0	-1
9	0	1	1	0	-1
10	0	1	1	0	-1
11	0	1	1	0	-1
12	1	0	1	0	0
13	0	1	1	0	-1
14	0	1	1	0	-1
15	0	1	0	1	0
16	1	0	1	0	0
17	0	1	1	0	-1
18	0	1	1	0	-1
19	0	1	1	0	-1
<i>Total</i>	2	17	16	3	-14
<i>%</i>	10.52	89.47	84.21	15.78	

Key: No = 0 Yes =1

Similar increases in intent to receive HPV vaccine were seen for each community college. The urban community college subsample ($n=9$) had seven respondents that indicated intent to receive HPV vaccine following the video whereas none indicated intent prior to the video ($X^2 = 5.143, df=1, p=.023$). The suburban community college subsample ($N=10$), intention increased from two to nine ($X^2 = 5.143, df=1, p=.023$).

CHAPTER SIX: DISCUSSION

D'Errico et al., (2020) and Kasymova et al., (2019) demonstrated in literature, the opportunity that NP providers have during each health center encounter to increase student knowledge of disease risk and improve HPV vaccine uptake by the development and implementation of effective evidence-based interventions that are convenient and accessible to student populations. This study demonstrated how the use of an evidence-based animated video less than nine minutes in length and accessible through public domain provides an efficient means to increase HPV knowledge and awareness of vaccination. The average four-point increase in knowledge scores was observed in the participants whose scores increased. Improvement in incorrect responses was seen for the majority of items on the knowledge test although there were some items which did not show improvement. Further examination of items that did not show improvement may identify areas of future improvement in the educational materials. The intent to obtain the HPV vaccine improved significantly, but the study did not follow students in the long term to examine whether the intent translated to a health-related action. This study also demonstrated how health center NP driven education encounters provide an efficient means to increase HPV knowledge and awareness of vaccination to prevent HPV infection and improve HPV cancer prevention outcomes.

The original intent of this project to deliver in person implementation of HPV education to the general community college student body could not be implemented pursuant to restricted campus access for students and health center staff. One-to-one education efforts during COVID-19 vaccination campaigns was not feasible as health centers on community college campuses were closed. Education delivery via an online method was used as a means of access for this

study. The use of an online platform for education delivery can reach a broader audience than education efforts limited to visitors to the student health center. Education efforts during COVID-19 vaccination campaigns may have gotten more attention with messages associating vaccination with disease prevention.

Limitations

The study included a sample of students in nursing programs who may have more health literacy than students in the general community college population. The results represented the findings from community college students in a nursing program but may not represent the broader community college population. A large sample size was difficult to obtain due to the limited time frame in which the project was conducted and limited access to a broader representation of students due to remote learning and closed college campuses. The racial composition and ethnicity of the sample did not reflect the college demographic profile of either the urban or suburban community college and the findings cannot generalize beyond the ethnic diversity of the sample. It is not known whether the racial and ethnic composition of the nursing programs is reflective of the campus. Cultural considerations for educational interventions may decrease disparities in reaching students, although this study had limited outreach with just community college nursing student participants.

The sample size in this study was small however the results showed a statistically significant increase in knowledge with education with a medium-to-large effect size. Self-reporting of vaccination status may have encouraged students to want to conform and indicate that they had the vaccine when they received their other childhood immunizations.

The influence of media surrounding the importance of vaccines in disease prevention has been greatly increased during the COVID-19 pandemic and should not be underscored. The

information is not specific to HPV vaccine, yet the prevalence of information provides exposure to vaccines in general and may have influenced perception of norms of vaccine and attitudes towards vaccination. Social activity was limited during the timeframe of this study due to mandatory stay-at-home orders; limited activity may have influenced participation in this study as a diversion from regular classroom activities or other social diversions. Vaccine awareness was greatly increased with the COVID-19 pandemic and opportunity exists to build on community awareness of vaccination with other vaccine campaigns.

Implications for Practice and Research

The results of this study support use of video for HPV vaccine education with a change in both HPV knowledge and intent to get HPV vaccine. The use of an evidence-based online intervention that is available in the public domain provides a low-cost method for reaching a wider scope of students making it easily replicable for NP providers in smaller health centers and those with limited budgets, however, personal interaction with students is lost. Professional collaboration with college administration and faculty can increase student access and broaden outreach efforts when there is limited access for in-person education. Considerations for sustainability should ensure that video education content is updated to include the most current vaccine guidelines and information.

The examination of reasons for not initiating vaccine after HPV vaccine education may provide data for future studies aimed at improving HPV vaccine uptake and can explore health literacy as a consideration. The review of HPV vaccination status along with the other required vaccines should be part of the regular immunization assessment and a part of young adult preventive health visits in college health centers. Continued research is needed to address the types of interventions and best delivery methods for presenting HPV vaccine education.

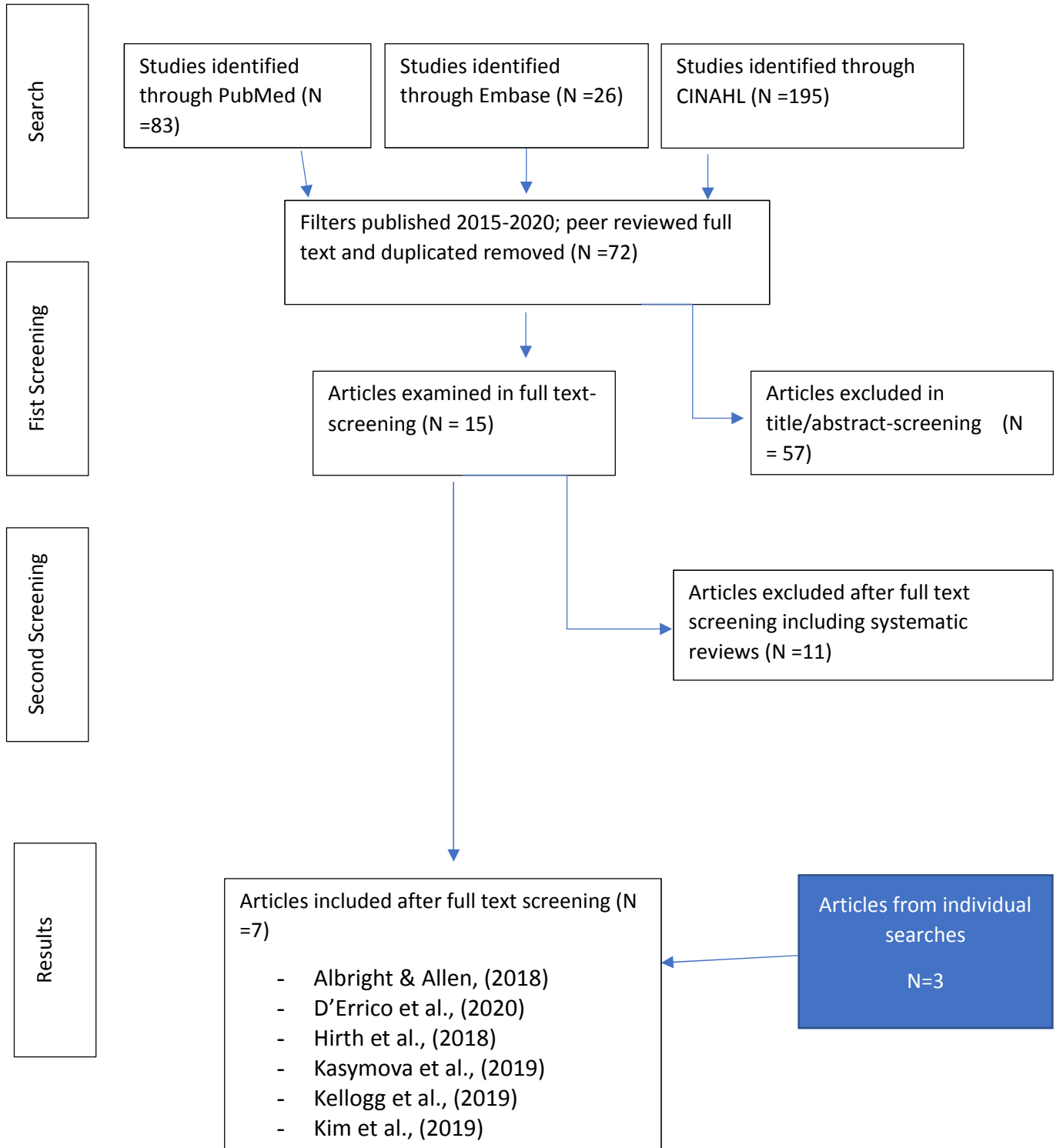
Consistent and current evidence-based education from health centers provides students the information for prevention of HPV infection and in doing so, the prevention of HPV related cancers.

CONCLUSION

College health NP's can offer students consistent and accessible information to aid in their vaccine decision making. The results of this study support what is in the current literature, which establishes the importance of the NP's role in educating college students in campus health centers by providing recommendation for the HPV vaccine, opportunity, and access to a population for which the vaccine is indicated. The availability of having the HPV vaccine in the health center eliminates an additional barrier of access. Urban and suburban area community colleges in the Western United States, such as those used for this study, have diverse populations and similar barriers that present challenges to vaccine uptake. Future research looking at feasibility of social media and internet interventions for dissemination of HPV information vs traditional methods is of value when considering the college student population. The DNP prepared health center provider can create educational interventions and use interdisciplinary collaboration with other campus departments to improve the delivery of vital educational information to this targeted population to continue to improve their health outcomes.

APPENDICES

Appendix A: PRISMA Flow Diagram of Literature Review Process for HPV Education



Appendix B: Permission from Creator to use Educational Video

meredith@reframehealthlab.com

Mon 11/23/2020 2:21 PM

?

•
•
•

To: 'PAMELA BRYANT'

Cc: You

Hi Pamela,

You're welcome to use the video for education purposes so long as it's played directly from our YouTube channel. We don't allow any downloading or offline use.

Best,

Meredith

From: PAMELA BRYANT [mailto:XXXXXXXXX]

Sent: November 21, 2020 7:07 PM

To: info@reframehealthlab.com

Subject: HPV Video

Hello Dr. Evans,

My name is Pamela Bryant and I am a Nurse Practitioner working in a college health center and a student at UCLA in the Doctor of Nursing Practice (DNP) Program. My doctoral project is an education intervention for community college students who are unvaccinated for HPV and examines the influence of HPV education on the decision to get the HPV vaccine.

I came across your video Should You Get the HPV Vaccine on You Tube. The video is evidence-based, informative and appeals to my target audience. I would like permission to use the video for my education intervention project. The effects of the pandemic have impacted my project with the closure of the college campus to students so I was very interested in your video for the education piece. I would be sure to cite your work in my project.

Please let me know if this is possible.

I look forward to your response.

Best Regards,

Pamela Bryant

DNP Student

University of California at Los Angeles

School of Nursing

Appendix C: Knowledge and Awareness Health Survey

Please answer the following anonymous questions to the best of your ability.

1. What is your gender?

- Female
- Male
- Transgender
- Prefer not to answer

2. What is your age?

_____ years old.

3. What race do you identify with?

- American Indian or Alaskan Native
- Asian/Pacific Islander
- Black or African American
- Hispanic
- White/Caucasian
- Multiple ethnicity/ Other: _____

4. Which of the following best represents how you think of yourself?

- Heterosexual (straight)
- Gay or Lesbian
- Bisexual
- Other
- Not Sure

5. Do you have health insurance?

- Yes
- No
- I don't know

6. What type of health insurance do you have?

- PPO
- HMO
- Medi-Cal
- None
- Other

7. During your life, with whom have you had sexual contact?

- I have never had sexual contact
- Females
- Males
- Both females and males.

8. Before today, had you ever heard of *Human Papillomavirus (HPV)*?

- Yes
- No
- I don't know

9. Where have you learned about HPV? (Please check all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Health care provider | <input type="checkbox"/> Radio/TV |
| <input type="checkbox"/> Friend | <input type="checkbox"/> CDC STD Hotline |
| <input type="checkbox"/> Family Member | <input type="checkbox"/> Internet |
| <input type="checkbox"/> School Health Education class | <input type="checkbox"/> Magazine/Newspaper |
| <input type="checkbox"/> Community Health Program | <input type="checkbox"/> Other (please specify) _____ |

10. Before today, had you ever heard of the HPV Vaccine?

- Yes
- No
- I don't know

11. Has any health care provider ever recommended that you get the HPV vaccine?

- Yes
- No
- I don't know

12. Have you received *at least one dose* of the HPV vaccine?

- Yes
- No
- I don't know

13. Do you intend to get the HPV vaccine within the next month?

- Yes
- No
- I don't know

14. Do you think you are at risk for HPV Infection?

- Yes
- No
- I don't know

Appendix D: Permission from Author to Use HPV Knowledge Questionnaire

To: PAMELA BRYANT < >

HARRISON, SAYWARD <HARRI764@mailbox.sc.edu>

Mon, Jul 27, 2020 at
8:17 AM

Dear Pamela,

Thanks, so much for your interest in using the HPV-KQ 18 in your research. You have my permission, as long as you cite the original paper:
Kasymova, S., Harrison, S.E., & Pascal, C. (2019). Knowledge and awareness of human papillomavirus among college students in South Carolina. *Infectious Diseases: Research and Treatment*, 12, 1-9. <https://doi.org/10.1177/117863371885077>

I am attaching word docs of the the measures that we used in that paper. The first one has the HPV-KQ 18 with the correct answers in it (see p 3). The second one has the answers removed. Please let me know if you need anything else.

Thanks again and best of luck,
Sayward

—

Sayward Harrison, Ph.D.
Assistant Professor

803-777-8907
harri764@mailbox.sc.edu
Department of Psychology
College of Arts and Sciences
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Appendix E: Human Papillomavirus (HPV) Knowledge Questionnaire

(administered pre and post-intervention)

For each statement, please circle "True" (T), "False" (F), or "Don't know" (DK).

**If you do not know, please do not guess; please circle "DK."

	True	False	Don't Know
1. HPV is a sexually transmitted infection.	T	F	DK
2. There is a cure for HPV.	T	F	DK
3. Having one type of HPV means that you cannot get new types.	T	F	DK
4. There is a screening commonly used to test males for HPV.	T	F	DK
5. An abnormal Pap smear may indicate that a woman has HPV.	T	F	DK
6. Most genital HPV infections do not clear up on their own.	T	F	DK
7. A person usually has symptoms when infected with HPV.	T	F	DK
8. HPV is not a very common virus.	T	F	DK
9. HPV infection can cause genital warts.	T	F	DK
10. HPV infection can cause genital herpes.	T	F	DK
11. Certain types of HPV can lead to cervical cancer in women.	T	F	DK
12. HPV can lay dormant in the body for years without symptoms.	T	F	DK
13. A person's chances of getting HPV increase with the number of sexual partners they have.	T	F	DK
14. Most people with HPV have visible signs or symptoms of the infection.	T	F	DK
15. Genital warts can cause cervical cancer.	T	F	DK
16. Condoms are not effective in preventing HPV.	T	F	DK
17. HPV can cause penile cancer.	T	F	DK
18. Nearly all sexually active men and women will contract HPV at some point.	T	F	DK

TABLE OF EVIDENCE

CITATION	PURPOSE	SAMPLE/ SETTING	METHODS (Design, Interventions, Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATIONS
<p>Albright, A. E., & Allen, R. S. (2018). HPV misconceptions among college students: the role of health literacy. <i>Journal of Community Health, 43</i>, 1192–1200. https://doi.org/10.1007/s10900-018-0539-4</p>	<p>To evaluate Health Literacy and awareness and knowledge of HPV</p>	<p>College students currently enrolled, age 18 and over (N=360) Male- 41.9%/female- 58.1% Non-Hispanic white (NHW)- 82.7%, no other ethnic breakdown given</p> <p>Setting: University in southeast United States</p>	<p>Online survey with random attention check questions throughout survey Survey completed via Qualtrics 44 question Health Literacy Questionnaire Health literacy measurement- Newest Vital Sign (NVS) scores 0-1=highly likely for limited health literacy 2-3= possible limited health literacy 4+=adequate health literacy</p> <p>16- question true/false HPV knowledge and awareness questionnaire. Validated tool demonstrated high internal consistency and reliability using international sample.</p>	<p>Analysis- Chi squares ANOVA for analysis between groups Chi square for gender on awareness of HPV Females > males for awareness of HPV 67.8% aware of HPV vaccine 44% females had all 3 doses of HPV vaccine 11.4% males had 3 doses Females>males finished the series n=186 p<.01</p> <p>Multivariate ANOVA- no difference in knowledge scores between vaccinated and unvaccinated No correlation between vaccination status, gender or race or income Maximum score=16</p>	<p>College students more aware of HPV but there are misconceptions about risk No differences between vaccinated and unvaccinated health literacy showed positive relationship to vaccine knowledge and HPV</p> <p>Limitations: single university sample Responses exclusively online therefore could not assure participants did not use additional sources for information Sample not ethnically diverse findings reflective of mostly white students Future: role of health literacy should be part of HPV communication</p>

			IRB Approved; Incentive: received research course credit for participation	Mean score =11.75 with SD= 1.90	
D’Errico, M., Tung, W.-C., Lu, M., & D’Errico, R. (2020). Barriers and recommendations associated with human papillomavirus vaccination among college students. <i>The Journal for Nurse Practitioners</i> , 16(7), 533–537. https://doi.org/10.1016/j.nurpra.2020.04.011	To evaluate barriers that are perceived to impede vaccination To assess the which person recommendi ng the vaccine that participants felt were most effective to getting HPV vaccine	Age 18-57 years; English speaking/writin g and college student N=627 Gender- male/female (215/398) Ethnicity- white 244 Asian/Pac. Island-188 Latino-111 Black-62 Native Am-14 Middle Eastern- 6 Unknown-2 Diagnosis Setting: student health center at US public university Timeframe:	Quantitative Cross sectional/ descriptive study design True/False 16-question Survey completed in 3 sections 1.Demographics-age, length of US residency, vaccine status 2.Knowledge and attitudes about HPV and vaccine including HPV cancers and screening- Scoring:1 point for correct answers with higher score= better knowledge 5- point Likert scale for attitudes from adapted tool with permission of author 3. 1 question about barriers (13 choices) preventing them from getting or finishing HPV vaccine and naming person most likely to influence the	SPSS for statistical analysis of demographics, barriers and influence of recommendation for HPV vaccine Multiple regression w/95% CI to study correlations between characteristics and barriers (significance level of P<.05 Multivariate analysis for factors associated with barriers Results: Demographics 97% did paper survey Mean age=24.80 yrs Ave residency-20.46 yrs Female-64% White-39% Knowledge scores- mean 48.39	Most important influence involved provider recommendation. Health center NP’s can have significant role in college setting. NP should offer vaccine at each visit if not vaccinated. Lack of perceived risk is concerning- education is needed Limitations-cross sectional design is applicable to that sample. Cannot generalize to all US college students Self-reporting can cause bias or inaccuracies Did not determine which provider recommendation was most effective (NP or MD) Future: Look at immunization records as part of study design

		February 2019	<p>recommendation about HPV vaccination</p> <p>Completed paper pencil or online through Survey Monkey</p> <p>IRB approval from the university was obtained and all participants gave informed consent.</p>	<p>Attitude score 3.69 (SD=0.63 with range 1.57-5)</p> <p>35.9% not vaccinated for HPV</p> <p>Barriers-multivariate analysis</p> <p>No recommendation from provider- n=443</p> <p>Odds Ratio (OR)=2.10 p=.032</p> <p>Unsure where to get vaccine- n=62</p> <p>Odds Ratio (OR)=2.94 p=.003</p> <p>Did not feel at risk- n=61</p> <p>OR=2.00, p=.039</p> <p>Not sexually active- n=49</p> <p>No provider- n=44</p> <p>Cost- n=42</p> <p>Most influential in recommending vaccine n=627</p> <p>Felt recommendation from provider most important- n=443</p> <p>Parent - n=250</p> <p>Partner - n=165</p> <p>Friend - n=135</p> <p>Instructor/professor -</p>	
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				n=137 Spouse -n=109	
Hirth, J.M., Batuuka, D. N., Gross, T. T., Cofie, L., & Berenson, A. B. (2018). Human papillomavirus vaccine motivators and barriers among community college students: Considerations for development of a successful vaccination program. <i>Vaccine</i> , 36(8), 1032–1037. https://doi.org/10.1016/j.vaccine.2018.01.037	Interview to evaluate what motivated or created barriers for HPV vaccine in communit y college students 1. Knowled ge/Awaren ess 2. Barriers 3. Interventi on Preferences	N=19 students Age 18-26 years Unvaccinated or not completed HPV vaccination series Male/female students enrolled FT or PT Setting: Community College in Texas Recruited with flyers and campus television Timeframe- April-December 2015	Semi structured qualitative interview conducted in one sitting lasting maximum 1 hour Questions designed using Theory of Planned Behavior Data collected by 4 female interviewers Interviews were audio recorded and transcribed word for word and checked for accuracy. Coded responses were categorized by researchers IRB approved Incentive: gift with value of \$21 to \$23 to compensate for time spent in interview	Data analyzed by themes which were coded and applied to all responses Interviews avg 30 mins n=19 18 did not participate- after being recruited; 10 due to time and 8 missed appointment 9 participants were unvaccinated; 3 had 1 dose, 7 completed all doses >50% were FT students >50% had health insurance/Medicaid Lack of awareness was barrier to HPV vaccine Lack of awareness of age recommendations or number of doses in series Other reasons for not vaccinating Vaccine too new Afraid of needles Too many side	Biggest barriers -lack of awareness/knowledge Fear of needles Fear of side effects Time and/or transportation Did not know where to get vaccine Preferences- to get information about vaccines from provider Intervention preferences discussed were health fairs on campus or a mobile vaccine unit Reduced or no cost vaccine clinics Got recommendations from family or health care providers for vaccine but preferred provider Partner influence important Unaware of HPV related cancers Limitations: Participants self-selected; may have more positive attitudes or want the incentives Not representative of their campus Limited sample size and

				effects Question effectiveness	limited response rate Only one site used so not generalized to all community colleges. Intervention at community college would be different at a university. Costs, transportation, and access not regularly addressed with interventions this community college setting. Future: offer education in seminars and free vaccine
Kasymova, S., Harrison, S. E., & Pascal, C. (2019). Knowledge and awareness of human papillomavirus among college students in South Carolina. <i>Infectious Diseases: Research and Treatment</i> , 12, 1–9. https://doi.org/10.1177/117863371885077	To examine awareness and knowledge and attitudes and experiences about HPV vaccination and to identify information sources for HPV in college	Nonprobability sample of undergraduate students at university in South Carolina. Recruited from courses at School of Public Health and College of Arts and Sciences N=256 Male/female 49/207 18 to 31 years Race: White- 201	Demographics: age gender, race/ethnicity, sexual orientation, sexual contacts, year in school, major and state of residence 18 question- Yes/No/ I don't know (DK) HPV knowledge tool using Health Belief Model created by researcher to assess knowledge of HPV infection, related HPV outcomes, HPV screening and	Descriptive statistics. Chi square test used to examine differences in HPV awareness Mean age 19.1 yrs SD=1.7 81% female, 78.5% white 96% heterosexual 84% sexually active 50% from South Carolina Predictor of HPV Knowledge Heard of HPV Y-244 N-12 DK-12 Females 97%>	Results of study consistent with other recent studies finding increase in HPV awareness 9 of 10 aware of HPV and Vaccine Gaps in knowledge- consistent with research Not aware of prevalence of HPV and thought own risk of infection was low Most would feel shame with HPV diagnosis which may be barrier to cervical cancer screening Most students got information from providers

	<p>students in the deep south (South Carolina) of the United States</p>	<p>Black- 31 Latino-8 Asian- 13 American Indian/Alaskan Native-2 Other-2</p> <p>Freshman-72 Sophomore- 62 Junior-62 Senior-58 Other-1 Not reported-1</p> <p>Setting: Classroom setting on campus with data collection between September and October 2017</p>	<p>HPV prevention 2 questions about perceived risk with Likert scale responses</p> <p>Researcher validated items from existing published tools. Tool had strong internal consistency with alpha=.79</p> <p>IRB waiver for written documentation of informed consent obtained</p> <p>Incentive: drawing of 6 \$25 incentives</p>	<p>awareness than males 88%</p> <p>Heard of HPV vaccine Females 95%/ males 76%</p> <p>Y-232/ N-23/ DK-1</p> <p>Whites had slightly higher results</p> <p>Total HPV knowledge 8.9/18 points</p> <p>Likert scale responses with higher scores indicated greater risk/shame</p> <p>T tests compared knowledge differences on sources of information</p> <p>Sources of knowledge Provider-68% preferred females >males</p> <p>Health ed class- 64% Internet- 50%</p> <p>Multivariate regression analysis for testing demographic</p>	<p>Health centers have role in providing sexual health knowledge</p> <p>Limitations: Most participants born when cohort first eligible for vaccine in 2006 Data self-reported</p> <p>Future studies needed to determine culturally appropriate methods to decrease disparities related to HPV</p>
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				variables and higher HPV knowledge found 3 significant variables- Gender (F), HPV vaccination status, being white	
<p>Kellogg, C., Shu, J., Arroyo, A., Dinh, N., Wade, N., Sanchez, E., & Equils, O. (2019). A significant portion of college students are not aware of hpv disease and hpv vaccine recommendations . <i>Human Vaccines & Immunotherapeutics</i>, 15(7-8), 1760–1766. https://doi.org/10.1080/21645515.2019.1627819</p>	<p>To examine college student awareness of HPV, vaccination status and knowledge of where to get HPV vaccine</p>	<p>Cross sectional study Convenience sampling study College students 18 and over N=212 10 excluded for missing information Vaccinated students n=100 Unvaccinated students N=102</p> <p>Setting: State university campus in Southern California conducted on campus between</p>	<p>Demographics were coded and stratified by vaccination status 31 question multiple choice Knowledge survey based on Health Belief Model and Neuman’s systems Model Data collected reflected demographics, sexual history, HPV vaccination status, awareness of HPV related conditions and knowledge of CDC recommendations</p> <p>Survey was administered electronically with online link or paper pencil followed by HPV information and information on where</p>	<p>Average age=21 yrs +/- 2.4 yrs 60% female 43% Latino 91.6% heterosexual 46% highest education level for family=some college 59% family income between \$60 - \$100,000</p> <p>86% sexually active 19% of females/2.5% males have received treatment for STI’s income between \$60 -\$100,000</p> <p>Chi square statistics-examine relationships between HPV vaccination status and demographics, actual and self-reported knowledge,</p>	<p>Income was a predictor for vaccination Vaccination rates< for Latino and Black women compared with White Black males had highest rates for infection and cancer HPV knowledge- Black women< White Latino and Black women less aware of HPV and vaccine than white Most students not aware of indication to 26 years.; two thirds of males and half of females (46%) did not know they could get vaccine at school health center</p> <p>Limitations: Small sample size One geographic location Self-reporting of responses</p>

		February and April of 2018	<p>to get vaccine Study conducted peer to peer with trained students. Demographics were coded and stratified by vaccination status.</p> <p>IRB approval was granted</p>	<p>and provider recommendation. P<.001 for all questions Not heard of HPV associated with no vaccine p<.05 76.2 % females knew vaccine recommended for both genders One third students not vaccinated for HPV and 25% did not know vaccine status Multivariate logistic regression was done for 20 of the questions using p< 0.25 and p<0.05 likelihood ratio tests. To see which model worked better Analysis- R 3.4.3 Odds ratio, 95% confidence level for findings</p>	<p>Future: Need for better communication of health status for young adults Communication of age range for vaccine</p>
Kim, M., Lee, H., Kiang, P., Aronowitz, T., Sheldon, L. K.,	To assess knowledge , awareness	Current female undergrad or graduate students self-	Qualitative study targeting Korean American women n=104	Mean age=21.7(SD=2.3) 77.9% born in South Korea	Having “don’t know” as response option was way study investigators minimized bias of forcing responses with

<p>Shi, L., Kim, S., & Allison, J. (2019). HPV vaccination and Korean American college women: cultural factors, knowledge, and attitudes in cervical cancer prevention. <i>Journal of Community Health</i>, 44, 646–655. https://doi.org/10.1007/s10900-019-00634-9</p>	<p>and attitudes about HPV vaccination in Korean American women</p>	<p>identifying as Korean American 18-26 years living in Northeastern US and able to speak or read English. Self-reporting non vaccinated for HPV</p> <p>recruitment was word of mouth through Korean American student associations and communities, churches, and social media platforms in Northeastern US</p> <p>Setting: Survey link sent to participants through email</p>	<p>Study conducted through Qualtrics and consisted of eligibility screening survey. If eligible a survey link was sent by email. Baseline survey completed (10-15 minutes) and</p> <p>Culturally relevant survey -16 item tool for knowledge and awareness of HPV yielded alpha = .91</p> <p>Scoring 1point for correct responses, 0 for I don't know or wrong answers Positive responses towards getting vaccine = 1point</p> <p>Ethical approval granted from University of Massachusetts Boston IRB</p> <p>\$20 Amazon gift card for their time</p>	<p>38.5% international students 52.9% speak English/Korean equally N=104 48.1% heard of HPV</p> <p>Heard of Vaccine (known as cervical cancer vaccine n=69, 66.3%) 26.1% had not heard of vaccine 50% worried about side effects of vaccine 34% expressed intention of getting vaccine associated with years in US 48.5% too busy to get vaccine (Chi square (2) =7.873, p=.02) Heard of vaccine (Chi square (1) =9.088, p=.003) Heard of cervical cancer vaccine (Chi square (2) =12.53, p=0.000 HPV</p>	<p>population that does not have much knowledge of HPV. Survey culturally sensitive Most Korean American women not aware of HPV vaccine Low knowledge of infection, vaccine, and cervical cancer risk More aware of “cervical cancer vaccine” than HPV vaccine False assumption that college students have greater knowledge of health-related issues</p> <p>Study recommended that health care providers should be target of HPV education efforts to increase vaccination rates Korean American women not born in U.S. less likely to have had vaccination than US born women Limitations: Small size Restriction of results to inclusion criteria Future: Need for interventions considering different</p>
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				recommendation by provider- 22% (Chi square (2)-6.57, p.012)	generations and cultural barriers. Specific for Korean Americans
LaJoie, A., Kerr, J. C., Clover, R. D., & Harper, D. M. (2018). Influencers and preference predictors of hpv vaccine uptake among us male and female young adult college students. Papillomavirus Research, 5, 114–121. https://doi.org/10.1016/j.pvr.2018.03.007	To evaluate knowledge levels of HPV vaccine and related diseases, HPV vaccine and attitudes and beliefs about HPV vaccine in college students as predictors of HPV vaccine uptake	Convenience sample Gender (male - 122 and female- 432) Ethnicity White-451 Black-64 Hispanic-3 Asian-35 Other-1 Heterosexual-495 Gay/lesbian-13 Bisexual-36 Questioning-9 1200 eligible students Undergraduate students enrolled in psychology course during spring and fall semesters N=645 with 585 completing survey	No signed consent forms Survey hosted online by Qualtrics and could be completed on computer or mobile device 30 items with 4 sections 1.Demographics 2.Knowledge of HPV and Vaccine 3.Attitudes related to HPV (protection, safety of vaccine 4. behaviors including HPV vaccination Students were able to get course credit for participation of .5 credit hours	Data analyzed with SPSS V24 and Dell Statistics v13 Descriptive statistics, Chi square and binomial logistic regression established significant differences and multivariate logistic regression was used to predict vaccine uptake 2.Knowledge of HPV related diseases Genital warts-66% Most incorrectly answered ovarian cancer caused by HPV-93% 3. beliefs that vaccine is safe (Odds ratio 1.70 with 95% confidence interval 1.12, 2.59)	Larger study about knowledge of HPV associated diseases Vaccination rates are higher in Kentucky than nation Knowledge and beliefs about HPV infection and cancers is low and not predictor of HPV vaccine Strong finding of preference for partner to be vaccinated Parental recommendation was greatest influence Doctor recommendation alone had the least influence of getting vaccine Great influence to get vaccine if it were free Limitations: Number of doses not addressed for vaccine series Convenience sample Not generalized to other college age populations Future: Research needs to determine how to reach young adults not in college setting

		Setting: Research University in Kentucky		4. Getting vaccine if no cost (Odds ratio=2.07 with 95% confidence interval 1.38, 3.11)	
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