COLLEGE STUDENTS' HPV KNOWLEDGE AND INTENTION TO BE HPV VACCINATED

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CHAPTER 1

INTRODUCTION

Background of the Problem

Recent data from the Centers for Disease Control and Prevention (CDC) reveal increasing rates of serious diseases in men diagnosed with the human papillomavirus (HPV). In 2010, HPV caused penile cancer in over 800 men, anal cancer in roughly 1,100, men and 5,700 men were diagnosed with either head or neck cancers resulting from HPV (CDC, 2010b). Transmission of HPV among men can occur through vaginal, oral or anal sex; however, men who have sex with men are 17 times more likely to contract HPV-related diseases than those who engage in heterosexual intercourse only (CDC, 2010b).

Combating HPV infection in males is a significant public health issue. In addition to the number of HPV-related cancers that develop each year, Palefsky (2007) reported that "HPV infection of men is of great importance given that sexual transmission is the primary mode of spread to women" (p. 261). In recent years, the development of the HPV vaccine has spurred controversy over whether or not males as well as females should obtain the vaccine against this disease. Giuliano et al. (2011b) reported that studies regarding the impact of HPV on males indicate that, in general, males have a similar rate of HPV infection when compared to women (0.29 to 0.39 per 1,000 person-months); however, immune responses of men and women are different.

The gender difference in immune responses indicate that a larger proportion of females are HPV-seropositive (17.9%, vs. 7.9% of males), and females have higher titers of antibodies. The lower immune response to natural infection in males, Giuliano et al. (2011b) reported, "May partially explain the higher prevalence of HPV infections as compared with the prevalence

among females, and the constant prevalence and incidence of HPV infection across a wide age range in males" (p. 402). Given the prevalence of the virus in males and the lower immune response in this population, Giuliano et al. (2011b) noted that some public health officials have advocated for HPV vaccination in males.

Despite growing evidence that HPV vaccination improves health outcomes among males by reducing their risks for certain types of cancer and decreasing the rates of transmission among women, questions on the efficacy of HPV vaccination in males remain. The U.S. Food and Drug Administration (FDA) approved the Gardasil® HPV vaccine for use in men and women. Gardasil® is effective in preventing the transmission of HPV strains 6, 11, 16, and 18 in women and men (Giuliano et al., 2011a). However, Cervarix® is only available for women and prevents the transmission of HPV strains 16 and 18.

There is ample evidence supporting the efficacy and use of the HPV vaccine in women, but the efficacy and effectiveness of the vaccine in men is only now being explored. Giuliano et al. (2011b) suggested that the HPV vaccine could be effective for reducing genital warts in males between the ages of 16 and 26 years old. However, Gao et al. (2010) indicated that the literature has not definitively established the use of the HPV vaccine for reducing the incidence of anal, penile, neck and head cancers.

The paucity of empirical data linking the HPV vaccine to the prevention of HPV-related cancers in men clearly has notable implications for decision-making towards promoting vaccination in young males. In an effort to illustrate this point, research conducted by Jones and Cook (2008) regarding the intent to receive HPV vaccination among university men and women indicated how vaccine outcomes may influence decision-making. Jones and Cook (2008) evaluated the intent to be HPV vaccinated under the following conditions: vaccine prevents the

spread of all HPV; vaccine prevents cervical cancer, but not genital warts; vaccine prevents genital warts, but not cervical cancer; and vaccine prevents both genital warts and cervical cancer. The results demonstrated that women, in all circumstances, were more likely to seek HPV vaccination than their male counterparts. Moreover, "Men were less willing to receive a vaccine that prevents cervical cancer alone than they were to receive one that prevents cervical cancer and genital warts" (Jones & Cook, 2008, p. 23).

Crosby, Benitez and Young (2008) examined the intent of young males to be HPV vaccinated. A sample of 115 males between 18 and 23 years of age provided information regarding their intentions to receive the HPV vaccination. The results of the investigation revealed that 37% of males had no intention to be HPV vaccinated, most likely, due to the lack of awareness of the serious health implications HPV had for them personally. These results reinforced the limited data on the lack of intent towards HPV vaccination among males.

Need for the Study

The HPV vaccination reduces rates of transmission of genital warts and certain HPV-related cancers in males as well as reducing the incidence of cervical cancer in women. Even so, empirical studies to date have found men are less likely to seek vaccination against HPV. Research regarding this lack of intention has focused on assessing men's attitudes in relation to the outcomes of being vaccinated (Jones & Cook, 2008) and what contextual factors give rise to men being HPV vaccinated (Crosby et al., 2008). There is a paucity of data that considers males' individual motivation, and attitudes towards and acceptance of HPV vaccination.

The intention to receive HPV vaccination is a subject that has received significant attention in the literature with regard to female patients (Zimet, Weiss, Rosenthal, Good & Vichnin, 2010). In particular, Zimet et al. (2010) found that the intent to receive HPV

vaccination among women often stemmed from the willingness of women to ask their healthcare providers about vaccination and to seek more information regarding the vaccine online. Women also were more likely to receive the vaccination if they were sexually active and their health insurance covered the cost of the vaccine. While efforts to evaluate intentions for HPV vaccination have proliferated among females, similar studies concentrating on males lack a strong presence in the literature. As such, speculation regarding acceptance of the vaccine and intent to receive vaccination remains a pressing challenge for researchers investigating males that may be impacted by HPV.

Due to the fact that gay, bisexual, and HIV-positive men are at a higher risk of getting HPV and developing anal cancer than any other segment of the society (Schottenfeld & Winawer, 1996), negative attitudes toward HPV vaccination may exist among heterosexual males. This assertion supports research provided by Hollander (2010), which suggests that gay and bisexual males between the ages of 18 and 26 were almost three times more likely to support and request HPV vaccination from their healthcare providers when compared with their heterosexual counterparts.

Given this assertion, the necessity for further studies lies in the need to understand male acceptance of HPV vaccination so that healthcare providers can determine the specific supports and resources needed to promote HPV vaccination within this group. Research provided by Hutchinson and Klein (2008) indicates that HPV is present in 99.7% of cervical cancers worldwide. In addition, 74% of all HPV infections occur in men and women between the ages of 14 and 24 years old. Thus, determining the specific underlying motivations that shape health behavior for males with regard to HPV vaccination will have notable implications for shaping outcomes for both male and female reproductive health. In addition, exploring HPV vaccination

acceptance among males will provide a foundation upon which to promote HPV vaccination among young males.

Purpose of the Study

The purpose of this study was to examine male college students' knowledge and intention to be HPV vaccinated.

Research Questions

The following research questions were explored in this study:

1. What are the levels of HPV knowledge among male college students?
2. What are the self-reported attitudes, subjective norms, and perceived behavioral control about HPV vaccination among male college students?
3. To what extent can the self-reported attitudes, subjective norms, and perceived behavioral control predict male college students' behavioral intention to be HPV vaccinated?
4. Is there a relationship between male college students' HPV knowledge and their behavioral intention to be HPV vaccinated?

Significance to Health Education

In 2009, the FDA approved Gardasil® for men (Kim, 2011). As a result, it is important to understand what men know about HPV and their predisposition towards being vaccinated against the disease. Health educators may use these results to develop relevant and informative educational materials specifically for young men in order to reduce the spread of the disease. Information gained through this research may also aid the development of targeted, specific, instructional enhancements to increase the knowledge and acceptance of HPV vaccination among males.

Data acquired from this investigation also may have implications for public health officials and healthcare providers by expanding their understanding of the issues related to male's acceptance of HPV vaccination which may lead to the development of programs that could increase the rate of HPV vaccination among young men. By understanding the specific issues which shape acceptance (or rejection) of HPV vaccination among males, healthcare providers can create effective teaching protocols that will advance practitioners' awareness on the acceptance of HPV vaccination in this group. The results of this investigation will add to the limited body of empirical research regarding the knowledge and intentions of male college students to be HPV vaccinated and assist future researchers in examining this issue among young men.

Research Design

Cross-sectional, descriptive correlational and predictive correlational designs were used in this study. Descriptive research designs are often used to gather information in areas with limited empirical evidence (Burns & Grove, 2005). Burns and Grove (2005) noted that "through descriptive research, concepts are described and potential relationships provide a basis for additional research" (p. 44). Ary, Jacobs and Razavieh (2009) indicated that correlational research "produces indexes that show both the direct and strength of the relationship among variables, taking into account the entire range of these variables" (p. 350). Ary et al. (2009) added that caution must be taken when reviewing the results of correlational research designs as there is not enough evidence to determine the cause of the relationship between the variables. The use of a correlational framework for this investigation was appropriate given the research questions posed and the focus of the investigation being on the absence of a treatment condition. Surveys are useful for descriptive purposes and one of the best methods used to collect data for a

population too large to directly observe (Babbie, 2010).

Study Sample

The population for this study was male college students over the age of 18,enrolled at a public, four-year degree granting institution in the Southeastern region of the United States. A convenience sample was used to obtain the participants for this project, with eligible students enrolled in core curriculum courses in health and physical education. The researcher sought to gain an insight into the behavioral intent regarding HPV vaccination among young males. Therefore, the use of the aforementioned sampling method was both appropriate and cost-effective (Babbie, 2010).

Data Collection

Once official approval was granted by the SIUC Institutional Review Board at the researcher's institution and the Institutional Review Board Human Rights in Research Committee at the proposed study site, data collection procedures began. A questionnaire was developed then pilot tested to gather information on the reliability and validity of the measure.

Data collection involved all instructors teaching health and physical education classes in the 2013 fall semester. The researcher asked instructors for permission for the researcher to distribute the questionnaire to students in their classes. Each student was provided a questionnaire packet that included a cover letter and consent form to review and sign if they agreed to participate. Students who return signed consent forms were given the questionnaire and instructed to return it to the researcher when they were done. Upon completing the questionnaire, students had the option to enter their e-mail address in a drawing for a chance to win one of ten $10.00 iTunes gift cards. If a student chose to enter the drawing, they were instructed to fill out a raffle ticket with their preferred email address, detach it, and place it into a separate

envelope/box from the questionnaires. Once data collection was completed, the e-mails of ten students were randomly chosen and they were contacted by e-mail with an iTunes card number. Once all completed surveys were obtained, formal data collection ended and the process to enter and clean the data for final analysis commenced.

Data Analysis

Data was analyzed using the Statistical Package for the Social Sciences version 19.0. Frequencies, percentages, mean scores and standard deviations were calculated for all questionnaire items. Pearson correlations were used to determine if there was a relationship between knowledge and behavioral intention. Multiple regression analysis was used to determine which variable was most predictive of behavioral intention to be vaccinated against HPV. An alpha level of .05 was set to determine statistical significance.

Assumptions

In this study, the following assumptions were made:

1. Subjects would be willing to participate in the current study regarding HPV vaccination.
2. Subjects participating in the study would understand the questions posed on the subject of HPV vaccination.
3. Subjects would answer questionnaire items honestly.
4. Survey items accurately measured the intended Theory of Planned Behavior construct(s).
5. The questionnaire would accurately measure the constructs that it was designed to measure.

Limitations

The following limitations may have existed in this study:

1. The use of a convenience sample may have limited the overall size and composition of the participant group. This had implications for the generalizability of the results.
2. Participant acceptance of HPV vaccination may have been influenced by variables other than those identified under the Theory of Planned Behavior.
3. Students attending the university may have had values or beliefs that are different from those of young males in the general population.
4. Students enrolled in the health and physical education courses may have had different values and beliefs than other students.

Delimitations

Recognizing that this study focused on a limited context, the following delimitations influenced the current investigation:

1. This study was limited to male college students 18 years or older, enrolled in health and physical education course at time of data collection.
2. Questionnaire was limited to asking questions about the Theory of Planned Behavior; therefore other factors that may have been influential were not being measured.
3. Limited to only the students in the fall semester.

Definition of Key Terms

The following definitions are provided to ensure uniformity and understanding of these terms throughout the study.

Anogenital. This refers to the area around the anus and genitals (CDC, 2012).

Attitude. According to the Theory of Planned Behavior (TpB), an attitude toward a behavior is defined as a person's positive or negative evaluation of performing the behavior in question (Ajzen, 2012).

Behavior. According to the TpB, behavior is defined as "an action that is carried out at a specified time and is described in terms of the action itself, its target and the context" (Francis et al., 2004, p. 32).

Human Papillomavirus. The most common sexually transmitted virus in the United States. There are more than 40 types of HPV that can infect the genital areas of males and females (CDC, 2012).

Intention. According to the TpB, intention is defined as an indication of a person's readiness to perform a certain behavior (Ajzen, 2012).

Knowledge. One's awareness and understanding of HPV, the HPV vaccine, cervical cancer, and the relationship between the two (i.e., knowing how HPV is transmitted, diagnosed, and treated and that HPV is a precursor to cervical cancer, etc.) (Jones & Cook, 2008).

Neoplasia. Abnormal and uncontrolled cell growth (CDC, 2012b).

Oropharyngeal Cancer. A disease in which malignant cancer cells form in the tissues of the oropharynx. Oropharyngeal Cancer is also known as mouth and throat cancer.

Perceived behavioral control. According to the TpB, this construct is an individual's "perceptions about how easy or difficult it is to perform the behavior" (Francis, 2004, p. 33).

Subjective norm. According to the TpB, subjective norms are an individual's "perceived social pressure to perform a behavior" (Francis, 2004, p. 32).

Summary

HPV vaccination among males is an important public health issue with implications for both male and female health. However, males' acceptance of HPV vaccination has not been as widely examined in the literature as it has in female populations. Because 74% of all HPV infections occur in men and women between the ages of 14 and 24 (Hutchinson & Klein, 2008), evaluating acceptance among male college students for HPV vaccination should provide valuable insight for the supports and resources needed to improve HPV vaccination rates in this particular group.

Chapter 2 provides a detailed description of HPV and related diseases known to occur in both men and women. The two vaccines are explored in relation to their efficacy and the issues surrounding mandatory vaccination in children. The vaccination rates among college students are provided, with an emphasis on issues specific to men. Finally, details on the Theory of Planned Behavior are provided, with justification for its use as the guiding model upon which the study is based. Chapter 3 presents the plan for gathering the data for this study, including the sample, research design and process used for the instrument development. Reliability and validity of the questionnaire are elaborated through the use of a pilot test and statistical procedures intended to validate the use of the measure in this study. The data collection procedures are followed by the use of the sample data, with each research question and statistical test proposed to adequately answer the question.

CHAPTER 2

LITERATURE REVIEW

Overview

In order to provide a foundation for empirical investigation of the topic, it was pertinent to present a thorough review of the literature regarding the following subjects: Overview of HPV, Types of HPV-related Infections, Cutaneous HPV-related Infections, Mucosal HPV-related Infections, Screening for HPV-related Cervical Cancer, Cervical Screening Guideline Update, Updated HPV Terminology, HPV and Cancer, HPV-related Cancer and Men, HPV Vaccination, Vaccine Controversy, HPV in Men, HPV-related Diseases in Men, HPV Vaccination in Men, HPV Vaccination Attitudes of Males and Females, HPV Among College Students, Theoretical Foundations of the Theory of Planned Behavior and the Use of Planned Behavior in Understanding Population Health Behaviors. Through a comprehensive review of the literature on these subjects, it was possible to identify foundations for the present study and gaps in the literature that the current study sought to fill.

Purpose of the Study

The purpose of this study was to examine male college students' knowledge and intention to be HPV vaccinated.

Overview of HPV

The human papillomavirus (HPV) is a group of DNA viruses. There are over 100 known sub-types of HPV, each uniquely numbered according to slight differences in their genetic structure (American Society of Colposcopy and Cervical Pathology [ASCCP], 2012). HPV was first identified in the early 20th century, when it was shown that warts or *papillomas* could be transmitted in humans through direct physical contact. At first, the course of infection in people

was unclear, but later the group of viruses was referred to as human papillomaviruses, or HPV (American Cancer Society [ACS], 2012; ASCCP, 2012).

Unlike other viruses (e.g. HIV), HPV cannot survive in blood or other bodily fluids, but is limited to infecting the epithelial cells of the body (Winer et al., 2003). The skin is made up of epithelial cells, with multiple layers forming the protective covering of the body. These cells also form the mucous membranes in the body, which line all the major organs and openings exposed to air. These membranes serve as a barrier, protecting the internal organs against infections and diseases (ACS, 2012).

Transmission occurs when the infected cells of an individual come in contact with a small cut or abrasion on the surface of these barriers of an uninfected person. This exposure to the virus may result in some type of infection forming on the surface of the skin or mucosal areas (Schiffman & Kjaer, 2003). Certain strains of the virus only invade the epithelial cells of the skin, resulting in cutaneous HPV-related infections. These types of the virus are different from those that affect the mucous membranes, with the majority of mucosal infections occurring in the anogenital region of the body (Koutsky & Kiviat, 1999; Schiffman & Kjaer, 2003). Other mucosal areas of the body that can be infected with HPV that are nongenital include the openings of the nasal passage, around the eyes, and in the mouth (Atkinson, Wolfe, & Hamborsky, 2012).

While the course of infection is determined primarily by the type of HPV (Atkinson et al., 2012; Crow, 2012), other factors contribute to the likelihood of serious infections or even cancer. Atkinson et al. (2012) indicated that while studies are mixed on what factors are significant, “young age at sexual initiation, inconsistent condom use, number of pregnancies, genetic factors, smoking, lack of circumcision of male partner, and oral contraceptive use” (p. 142) were reported as reasons one may develop symptoms of an infection. Poor hygiene also has

been noted as a risk factor for HPV-related infections. Bleeker et al. (2009) indicated that circumcision would improve the personal hygiene and reduce subsequent risk of HPV-related infections and diseases in men.

The primary deterrent for developing HPV-related infections is the natural immune reaction to fight off any signs of the virus. Most people with healthy immune systems clear the virus from their body before any signs or symptoms of infection take place. Persons with weakened immune systems, however, caused by other diseases or conditions are more susceptible to developing persistent HPV-related infections. These include men and women that are HIV positive as well as organ transplant recipients who take medication to stop their body from rejecting the new organ (Bleeker et al., 2009; Brown & White, 2010; Hariri, Dunne, Saraiya, Unger, & Markowitz, 2011; Hutchinson & Klein, 2008; National Cancer Institute, 2012c; Saslow et al., 2012; Schiffman et al., 2011; Sulak, 2006). The only way HPV infection can be confirmed is through specific DNA testing, with most people learning they are infected after symptoms (e.g. warts) have developed (ASCCP, 2012; Stanley, 2010). Since there is no cure for HPV, medical interventions focus on detecting and treating the symptoms of infection (ACS, 2012; ASCCP, 2012; Spealman, 2008).

Types of HPV-related Infections

The classification of symptoms and diseases caused by HPV are based on the type of virus causing the infection. As certain strains only infect the layers of the skin, the diseases associated with these HPV types are noted as cutaneous infections. The other types that affect the mucous membranes on the body are reported as mucosal HPV-related infections. While some mucosal infections can take place outside the genital area, the lesions and risk for developing cancer are based on the HPV types and not the location. The following sections elaborate on

these HPV-related infections, and include the most recent update on the course of infection and appropriate terminology.

Cutaneous HPV-related Infections

Over 100 known sub-types of HPV have been identified by researchers; 60 types are limited to infections on the skin, and are collectively referred to as nongenital HPV-related diseases. Nongenital cutaneous infections may cause noncancerous warts to form at or near the site of exposure (Bacelieri & Johnson, 2005). Any area of exposed skin that is injured can become infected with these HPVs. However, the most common symptom is warts that typically grow on the hands or feet (Loo & Tang, 2010). The most common diseases and HPV strains that are nongenital cutaneous are listed in Table 1.

Table 1

Nongenital Cutaneous HPV-related Diseases and Associated HPV Types.

Nongenital Cutaneous Disease	HPV Type
Common warts	1, 2, 4, 27, 57, 63
Plantar warts	1, 2, 27, 57, 60
Flat warts	3, 10, 28, 41

Note. Source: James, W. D., Berger, T. G., &Elston, D. M. (2011). *Andrews diseases of the skin: Clinical dermatology* (11th ed., Chapter 19: Viral diseases). Philadelphia, PA: Saunders Elseveir.

The nongenital cutaneous HPV types are the primary cause of common skin warts. These warts are most likely to form on the hands and feet, but also can grow in other areas like the elbows or knees. Common warts usually go away on their own within a few months of exposure, yet some infections may last longer, depending on the health status of the person infected (James, Berger, & Elston, 2011).

Plantar warts are small lesions that form on or around the soles of the foot, causing increased sensitivity in the heel of an infected person. While these warts may appear as corns or

calluses, the main difference is the pain that occurs when pressure is applied on the site of infection (James et al., 2011). Flat warts are most known for the lesions found on children and young adults, appearing in groups of raised flesh-colored bumps on the face, neck, backside of the hands, wrists, elbows or knees. Each type of wart and treatment varies in part on the age of the person, with most infections clearing within 2-3 months depending on the extent of the infection (James et al., 2011).

Mucosal HPV-related Infections

Approximately 40 HPV types infect the mucous membranes of the anogenital tract and other nongenital mucosal sites on the body. Mucosal cells are made up of epithelial cells and tissue, which accounts for their susceptibility to HPV infections upon exposure. Minor abrasions or small cuts in these areas are the primary entry mode of transmission, with the infected cells of one person coming in direct contact with similar cells of another susceptible individual (ACS, 2012; ASCCP, 2012; Atkinson et al., 2012; Hariri et al., 2011; Marrazzo, Koutsky, Kiviat, Kuypers, & Stine, 2001; Winer et al., 2003).

Mucosal infections can produce a wide range of symptoms and diseases, with most exposures resulting in infections that are latent or asymptomatic (Franco et al., 1999; Hillard & Kahn, 2005;Molano et al., 2003). One reason for these types of infections may be the exposure to low doses of HPV, rendering the virus unable to invade the body and cause further damage (ASCCP, 2012; Stanley, 2010). The lack of symptoms, however, does not guarantee the absence of infection, as the virus can lie dormant in some people for several weeks to months or even years (Hariri et al., 2011). This silent or hidden characteristic of HPV is what makes it so dangerous, as infected persons continue to spread the virus without knowing (Schiffman & Kjaer, 2003; Stanley, 2010).

The virus is separated into high or low risk types, depending on their association with (or lack of) cancer. Infections with low-risk HPV types may go away on their own, cause benign warts or lesions to develop or cause low-grade cellular changes that are not considered life-threatening (Atkinson et al., 2012; NCI, 2004). Infections with high-risk HPV types may cause either low or high-grade cellular changes that if untreated over time may cause cancer (Brown et al., 2005; Clifford, Smith, Plummer, Munoz, & Franceschi, 2003; Handsfield, 1990; Munoz et al., 2004; NCI, 2004; Partridge & Koutsky, 2006; Schiffman et al., 2011; Trottier & Franco, 2006).

Moscicki et al. (2006) indicated that among the significant factors impacting the course of disease, are the HPV type and persistent nature of the individual's infection. These authors added:

> When a specific HPV type is found consecutively, it is very likely to represent the same variant as well, thus suggesting true persistence and not sequential infections….[however] a major determinant of HPV persistence is how long the infection has already lasted—the longer an HPV infection lasts, the more likely it is to last even longer. (p. S3/44)

However, the *most important determinant* of the type of infection following exposure to HPV is the particular strain of the virus that an individual contracts. While persistent infections are commonly reported as being necessary for more serious diseases, low-risk strains of the virus also can cause infections that last for extended periods of time. Although how long the infection lasts is important, the type of virus is what determines the chances of an individual developing cancer (Atkinson et al., 2012; Clifford et al., 2003; Handsfield, 1990; Moscicki et al., 2006).

HPV-related infections that take place in the mucosal cells of the genitals are the most

common sexually transmitted infection of HPV in the United States. Estimates of over 6 million men and women become newly infected with HPV each year (ACS, 2012; ASCCP, 2012; Brown & White, 2010; Clifford et al., 2003; Hutchinson & Klein, 2008; Koutsky & Kiviat, 1999; Nandwani, 2010; Schiffman et al., 2011). Genital HPV is predominantly transmitted through penetrative vaginal or anal intercourse. However, transmission through genital contact without sexual intercourse is possible, with oral-genital and hand-genital transmission of some HPV types reported (ACS, 2012; Marrazzo et al., 2001; Winer et al., 2003). According to Fedrizzi (2012), "HPV infection can also occur in approximately 8% of women who are not yet sexually active and approximately 20% in women who have had sexual activity with women only" (p. 96).

The types of HPV that are considered low-risk are the cause of genital warts (also known as *Condyloma acuminate*), the most common clinical manifestation of HPV-related infections. HPV types 6 and 11 in particular account for roughly 90% of all lesions that grow in the anogenital areas of men and women (ASCCP, 2012; Conway et al., 2012; Ghazal-Aswad, 2008; Hariri et al., 2011). The primary mode of transmission is skin-to-skin contact with the infected cells in the genital region of another person. Genital warts appear most often in areas where friction occurs during intercourse, with lesions in men commonly found on the penis, scrotum, urethral meatus and perianal area. Women may develop warts in the vagina, vulva, perineum, and perianal areas as well. Genital warts on the cervix or on the internal walls of the vagina do occur but rarely (Atkinson et al., 2012)

In some cases exposure to low-risk HPV causes warts to develop in the mouth or throat of a person who has had oral sex with a HPV infected person. The size of genital warts varies, with some so small that they are not visible with the naked eye, and may appear as flat and flesh-

colored or in groups that resemble cauliflower. While some people experience itching, burning, and discomfort from their lesions, it is also possible that warts may never appear (ASCCP, 2012; Atkinson et al., 2012; Ghazal-Aswad, 2008; Hariri et al., 2011).

Some people with low-risk HPV infections develop Recurrent Respiratory Papillomatosis (RRP), a rare disease that is "characterized by the growth of tumors in the respiratory tract caused by the human papillomavirus (HPV)" (RRP Foundation, 2004, para. 1). Hariri et al. (2011) added:

> There are juvenile onset and adult onset forms. The Juvenile Onset Recurrent Respiratory Papillomatosis (JORRP) form is believed to result from HPV infection transmitted perinatally from a mother to her baby during delivery. Estimates of the incidence of JORRP are relatively imprecise but range from 0.12 to 2.1 cases per 100,000 children aged <18 years. Even less is known about the incidence of the adult form of RRP. (p. 5-1)

While the warts that form are not cancerous, they are often difficult to treat, reappearing even after the course of treatment has been completed (Lee & Smith, 2005; Reeves et al., 2003). HPV types 6 and 11 are the cause of RRP, affecting an estimated 1.8 per 100,000 adults (RRP Foundation, 2004).

Children born to mothers with genital warts are at risk for developing JORRP (Moscicki, 2005), with the reported relative risk of approximately 7 in 1000 births" (Lee & Smith, 2005, p. 354). Cesarean deliveries have been proposed as a way of eliminating this mode of infection, but studies noting the low incidence of JORRP and increased risks to the mother through surgery have all but eliminated this as a likely option (Hariri et al., 2011; Lee & Smith, 2005).

Figure 1 illustrates the two ways that HPV infects the body (cutaneous or mucosal) and associated HPV types and diseases caused by each (Atkinson et al., 2012) (See Figure 1).

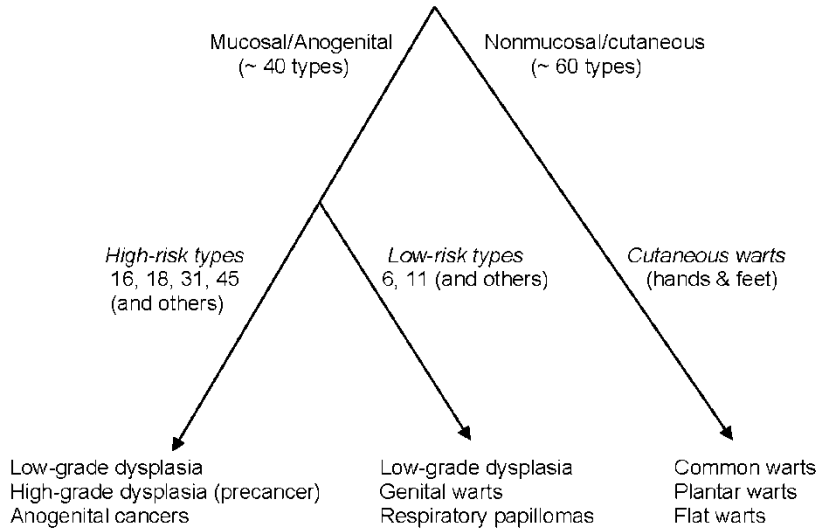


Figure 1. HPV diseases and associated subtypes. Adapted from Atkinson, W. Wolfe, S., &Hamborsky, J. (Eds.). (2012). *Epidemiology and prevention of vaccine-preventable diseases* (12th ed., pp. 139-150). Washington, DC: Public Health Foundation.

Screening for HPV-related Cervical Cancer

Screening of patients for early signs of cancer or HPV symptoms is aimed at increasing the likelihood they will not occur. A screening test is even better if it can detect precancerous or pre-invasive cells or changes, which can then be removed, preventing the development of invasive cancer. For example, the detection and elimination of precancerous changes in the cervix has led to a steady decline in the incidence of cervical cancer in the developed world over the last 40 years (University of California, San Francisco, 2009).

For cervical cancer, there are currently two types of screening available that use either a cytology-based test or HPV DNA/RNA testing. Since the 1940s, cervical screenings have centered on the technologies introduced with the Papanicolaou (Pap) test. The Pap test involves smearing cervical cells on a glass slide and then analyzing them under a special microscope to identify the presence of abnormalities, and the extent of abnormalities. The National Cancer Institute (2012b) indicated that:

> The main purpose of screening with the Pap test is to detect abnormal cells that may develop into cancer if left untreated. The Pap test can also find noncancerous conditions, such as infections and inflammation….in regularly screened populations, the Pap test identifies most abnormal cells before they become cancer. (para. 6)

Researchers with the National Cancer Institute (2012) indicated that "death from cervical cancer is rare in women younger than 30 years and in women of any age who have regular screenings with the Pap test" (para. 2). Since the progression of most abnormal cells to precancerous lesions is gradual, this type of screening has been an effective method towards preventing cervical cancer worldwide (Schiffman et al., 2011).

At present, however, the traditional method of Pap testing (or smear) is being replaced with an automated liquid-based cytology test in the United States. Pap testing is the examination of cells from the surface of the cervix, performed to screen for cervical cancer or the changes that are understood to be forewarning to cervical cancer. These forewarnings are called cervical high-grade squamous intraepithelial lesions (HSIL), or cervical intraepithelial neoplasia 2 or 3 (CIN 2 or CIN 3), also known as moderate or severe dysplasia. The automated liquid-based cytology test is performed by gently scraping cells off the surface of the cervix with a small brush or swab and dispersing them in a liquid medium. Both the traditional method and automated liquid-based tests are spread onto a glass slide, stained and examined under the microscope by a pathologist. Data regarding both methods have shown similar rates of detecting abnormal cytology. However, a noted advantage of the liquid-based testing is that one cell sample can be *co-tested* or used with HPV DNA tests to detect high-risk HPV types (Schiffman et al., 2011).

The introduction of HPV DNA testing has advanced the sensitivity of cervical screening as abnormal changes at the cellular level may be hard to detect histologically (Benevolo et al.,

2011). There is now increasing evidence from randomized clinical trials that carcinogenic HPV DNA screening is more sensitive than cytological screening for detecting histological CIN 3. However, two major considerations currently exist regarding DNA tests: (a) ability of the test to accurately detect the presence of infection (or lack of), and (b) whether the HPV types are able to be detected by the test.

The first refers to the issues surrounding sensitivity or specificity of a test. Sensitive tests yield positive results, which in turn, accurately reflect those infected with HPV. Highly sensitive tests are considered useful for population screening, as individuals with an infection are unlikely to be missed (Chang et al., 2010). Specificity, however, is the ability of a test to confirm a true negative result. Therefore a negative result from highly specific test means there is no presence of infection. A highly specific test is noted as more useful as a confirmatory test, in particular when a positive diagnosis may lead to harmful interventions (Chang et al., 2010).

On the other hand, the ability of an individual who is HPV infected or not, to receive accurate results regarding his or her status is an important consideration with the use of these tests. More specifically, if a person infected with HPV gets a positive test result confirming his or her infection, that test is noted as having a high positive predictive value (PPV). The higher the PPV, the more confident clinicians can be in the course of action to take based on the positive result. Conversely, when someone is not HPV positive and receives confirmatory negative test results, the test is said to have a negative predictive value (NPV). The higher the NPV, the lower the probability of being infected at the time of the test. Therefore, the higher NPV of a test increases the confidence of course of actions (or lack thereof) based on a negative test.

Schiffman et al. (2011) wrote that, “although a single negative high-quality Papanicolaou

test does indicate a substantially lowered risk of cervical cancer lasting multiple years, stronger reassurance of safety (i.e., a high negative predictive value) requires repeated rounds of screening to detect growing CIN3 lesions…[a] high negative predictive value permits safe and cost-effective lengthening of the cervical screening interval when HPV testing is used" (p. 372).

Saslow et al. (2012) reported that, "several U.S. Food and Drug Administration (FDA)-approved HPV tests are commercially available, although none is yet approved for primary or stand-alone screening" (p. 520). The *digene* HPV Test (QIAGEN, 2012) was the first FDA-approved HPV test in the United States that indicates if a woman had one or more of the following 13 high-risk HPV types (16,18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59 and 68). The *digene* HPV Test does not, however, identify the specific high-risk strains of HPV present. In 2009, the FDA-approved Hybrid Capture 2 assay (HC2) (Qiagen Corporation, Gaithersburg, MD), which targeted the 13 HR-HPV genotypes and cross-reacts with HPV66.

The cobas HPV test (cobas; Roche Molecular Systems, Pleasanton, CA) is another DNA test that has been approved by the FDA and identifies HPV 16 and HPV 18 separately as well as detecting a group of 11 HR-HPV types (31, 33, 35, 39, 45, 51, 52, 56, 58, 59, and 68) and HPV type 66. In March 2009, the FDA announced approval for clinical use in the United States of two new HPV DNA tests. One test is marketed under the name Cervista™ HPV HR. The other test was designed to specifically detect HPV types 16 and 18 and is marketed under the name Cervista™ HPV 16/18.

Information from the Qiagen© website revealed a list of recommendations based on the outcomes of one's HPV DNA test as follows:

- If the HPV test shows you have a high-risk type of the HPV virus, but your Pap is normal, then the expert guidelines recommend that both tests be repeated in 12

months. If your HPV infection is still active at that time, and/or if your Pap is now abnormal, another exam called a colposcopy is needed to help determine if any "bad cells" are present. If abnormal cells are found early, before they become cancerous, treatment is highly effective.

- If the HPV test shows you have a high-risk type of HPV, and your Pap result is abnormal or inconclusive ("ASC-US"), the expert guidelines say you should have a colposcopy exam right away.

Note that if the HPV test shows you do not have HPV, but your Pap looks abnormal, it is less likely that you have cervical disease. The presence of a high-risk type of HPV is necessary for cancer to develop. However, just to be sure, the guidelines recommend that you get a colposcopy exam of your cervix. And if you do not have HPV but your Pap results are unclear or inconclusive ("ASC-US"), both the HPV and Pap tests should be repeated in a year. (para. 1-3)

Cervical Screening Guideline Update

Schiffman et al. (2011) noted that throughout the United States:

Clinical guidelines from professional medical organizations provide recommendations for cervical cancer screening, the management of women with an abnormal screening test, and treatment. These recommendations are usually developed through consensus meetings that review the evidence and, when possible, develop evidence-based guidelines…[however] cervical cancer screening is often viewed as a clinician–"patient" decision, not as a public program as it is in some other countries. (p. 378)

The existing ACS guidelines for cervical cancer screening in the United States were recently updated "to address age-appropriate screening protocols, post-screening follow-up

procedures and future considerations regarding HPV testing alone as a primary screening approach, and screening strategies for women vaccinated against HPV16 and HPV18 infections" (Saslow et al., 2012, p. 516). A summary of these recommendations is listed in Table 2.

Table 2

American Cancer Society 2012 Clinical Screening Guidelines for Prevention and Early Detection of Cervical Cancer

Age/Condition	Recommended Screening	Follow-up based on Results
Under 21	No screening	
21-29	Pap testing (cytology) every 3 yrs	If (-) rescreen every 3 yrs. If (+), follow ASCCP guidelines
30-65	HPV DNA & cytology (co-testing) every 5 yrs.	
Over 65	No screening after a negative screening result	
Hysterectomy	No screening necessary	

Note. Source: Saslow, D., Solomon, D., Lawson, H. W., Killackey, M., Kulasingam, S. L., Cain, J.,…Myers, E. R. (2012). American Cancer Society, American Society for Colposcopy and Cervical Pathology, and American Society for Clinical Pathology screening guidelines for the prevention and early detection of cervical cancer. American Journal of Clinical Pathology, 137, 516-542.doi:10.1309/AJCPTGD94EVRSJCG

Saslow et al. (2012) reported that the clinical screening outcomes included consideration of both the benefits and harm, the various methods of testing, and appropriate ages for their use. A notable change was that women should no longer be screened every year, regardless of their age or method of screening employed. Women would now be recommended to start screening at the age of 21, regardless of how old they were when they first had sexual intercourse. Support for this change was evidenced by the fact that yearly screenings only slightly decreased the detection and treatment of cervical cancer. With these low rates and associated costs lacking the

justification of annual testing, the recommended intervals for screening were based on the age and history of each woman (Saslow et al., 2012).

For women between 21 to 29 years old, Pap testing every three years was deemed clinically sound. Committee members consisting of individuals from the U.S. Preventive Services Task Force (USPSTF), the ACS, and the American College of Obstetricians and Gynecologists (ACOG) approved the Pap testing, noting that HPV testing by itself or as a co-test (with the Pap test), should not be used at any time for women in this age group. For women ages 30-65, the recommendation for co-testing with HPV DNA and cytology testing was indicated as the preferred screening method. However, the Pap test alone every five years was noted as acceptable. The use of a Pap test without DNA testing for women between these ages was appropriate only for women with consistent negative cytology results. The HPV DNA/cytology co-testing was extended to five years (from three) as studies increasingly show little significant difference in the rates of detection of advanced dysplasia (CIN-3) and cancers attributed to the use of these tests together. And while other countries are considering the use of HPV DNA testing as the primary method of screening (e.g. Netherlands) this was not recommended by the panel within the United States (Saslow et al., 2012).

The recommendation that women 65 years and older no long need to be screened was maintained only if they had "3 consecutive negative cytology results or 2 consecutive negative co-tests within the 10 years before ceasing screening" (pp. 529-530). Once women of this age were released from screening, they would never have to resume, even if (as noted by the committee) "they have a new sexual partner" (Saslow et al., 2012, p. 530).

Screening for women after being HPV vaccinated was considered by the committee with no changes made to the current screening protocols. However, the growing efficacy of the

approved vaccines (as described in the next section) may challenge the traditional models of testing and be unsuitable in the near future. As women who are currently being HPV vaccinated reach screening age, cell abnormalities typically detected by the Pap test will decrease substantially. This will negatively impact the Pap tests positive predictive value and decrease the cost-effectiveness associated with this test. This is also a potential problem for the FDA approved DNA tests and a leading reason why efforts should continue to advance the science of these tests (Saslow et al., 2012; Schiffman et al., 2011).

Updated HPV Terminology

Additional recommendations were recently made to change the current system used to describe the range and extent of mucosal HPV-related infections (Darragh et al., 2012). The existing system has changed to reflect the advances in understanding the progression of HPV infections in both men and women. As researchers have confirmed the course of diseases in both genders, the field of medical practitioners and specialists has expanded accordingly. This has caused a problem however, as there has been no established reference for the extent of infections limiting the interaction about the nature of diseases across disciplines. Darragh et al. (2012) explained that in order:

> To optimize this communication, diagnostic terms should be consistent across body sites that share disease commonalities, and convey meaning, grounded in science, that allows for appropriate patient management. This is of particular importance for the pathologists detecting diseases, as the terms and indicators regarding the viral infections are unique to their field. (p. 207)

The history of HPV-related infections and classification of diseases began with the examination of the role of HPV in cervical cancer. One of the first methods for identifying the

extent of infections was based on the abnormal cervical cell growth or dysplasia. The level of dysplasia was reported as mild, moderate or severe, with cervical cancer the result of the most severe infections (Darragh et al., 2012; International Agency for Research on Cancer [IARC], 2007).

This system, however, was "particularly difficult for pathologists to distinguish between severe dysplasia and cervical cancer…resulting in the introduction of the term cervical intraepithelial neoplasia (CIN) to designate the spectrum of cervical diseases that were thought to play a role in cervical cancer" (IARC, 2007, pp. 136-137). This system of classification was based both on the *degree of dysplasia* in the individual cells and *how far below* the surface of epithelium the dysplasia goes. The deeper the virus was detected the more serious the infection was considered, with the extent of new cell growth that was abnormal more accurately referred to as neoplasia.

Mild infections with HPV detected closer to the surface became commonly referred to as cervical intraepithelial neoplasia (CIN) 1. The virus found deeper in the layers of the cells indicated a moderate infection and was reported as CIN 2. HPV that was detected throughout the entire area of the cell was considered severe and changed to CIN 3 (Darragh et al., 2012; IARC, 2007; Sulak, 2006).

Over time the classification system was revised to a graded level of changes, (either high or low-grade), but the reference was still limited to HPV infections of the cervix. This restricted the use of this system to other parts of the body as researchers discovered similarities in the progression of infection. However, recent efforts to change the system have been led by a team of researchers with the Lower Anogenital Squamous Terminology (LAST) project, an interdisciplinary project led by the College of American Pathologists (CAP) and the ASCCP.

Darragh et al. (2012) revealed "the ultimate goal of a unified and scientifically based terminology is to optimize clinical management by improving communication between pathologists and clinicians" (p. 216). The changes would allow pathologists across multiple disciplines to classify and discuss the range of HPV-associated lesions the same way (Darragh et al., 2012).

In June of 2012, the panel released its recommendations which included the use of the generic term *intraepithelial neoplasia (IN)* for all HPV-related anogenital infections that presented dysplasia. The three levels of infection were included to reflect the progression of changes, with the reference to the anatomical site now placed before the letters IN. Darragh et al. (2012) used the following example to illustrate the new system, "for an –IN 3 lesion: cervix = CIN 3, vagina = VaIN 3, vulva = VIN 3, anus = AIN 3, perianus= PAIN 3, and penis = PeIN 3" (p. 210). This system provides a better understanding of HPV infections across disciplines, and simplifies the description of mucosal HPV-related infections for both women and men (Darragh et al., 2012).

Figure 2 presents the progression of HPV incorporating the standardized reference for infections, with the course of infection progressing over time resulting in intraepithelial neoplasia (IN) 1, 2, or 3 (Darragh et al., 2012).

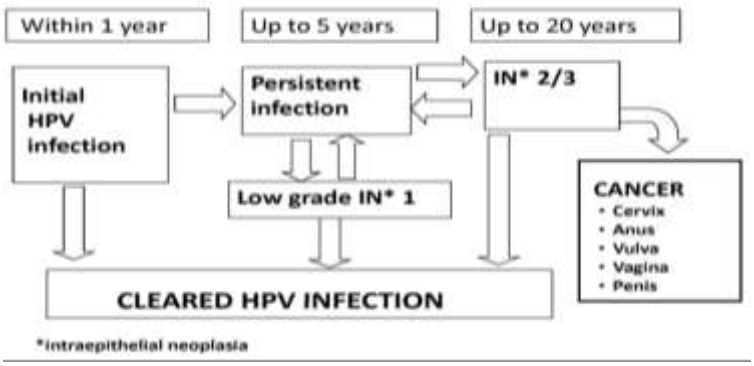


*Figure 2.*Natural history of HPV infection. Updated natural progression of HPV-related infections and diseases.

While the progression of persistent infections results in cellular changes from mild to severe, not all persistent infections that are 2/3 will become cancer. This is because many questions remain unanswered about the natural history of HPV, including which types of infections persist to the point of becoming cancerous (Fernandes & Fernandes, 2012).

HPV and Cancer

The primary goal of clinical management is to identify and treat high-grade HPV-related infections in order to diminish the risk of developing invasive cancer. Persistent infections with high-risk HPVs cause almost all cervical cancers and many vulvar, vaginal, penile, anal cancers in both men and women (IARC, 2007; Partridge & Koutsky, 2006). The most recent World Health Organization/International Agency for Research Cancer (WHO/IARC) Summary Report (2010) revealed that HPV types 16 and 18 were found in nearly all cases of HPV-related cancers. The report included evidence that the following HPV types (31, 33, 35, 39, 45, 51, 52, 56, 58, and 59) were increasingly associated with cancers caused by the virus. HPV type 33 was of particular interest as it has been linked with cancer of the vulva, as well as anal cancer in both males and females (WHO/IARC, 2010). Recent data from the National Cancer Institute revealed that HPV was the underlying cause of roughly 5% of all cancers worldwide (NCI, 2012a).

Even though there is variability in the exact number of HPV-related cancers in the United States each year, the data confirm the virus is linked to most cancers of the genital region. Multiple studies have shown HPV contributed to anal (90%–93%), oropharyngeal (12%-63%), penile (36%-46.9%), vaginal (40%-64%) and vulvar cancers (40%-51%) (Castellsagué et al., 2002; Gillison, 2008; Giuliano et al., 2008; Giuliano et al., 2011a; Miralles-Guri et al., 2009).

Figure 3 illustrates the annual rates of HPV DNA found in cancer for each anatomical site.

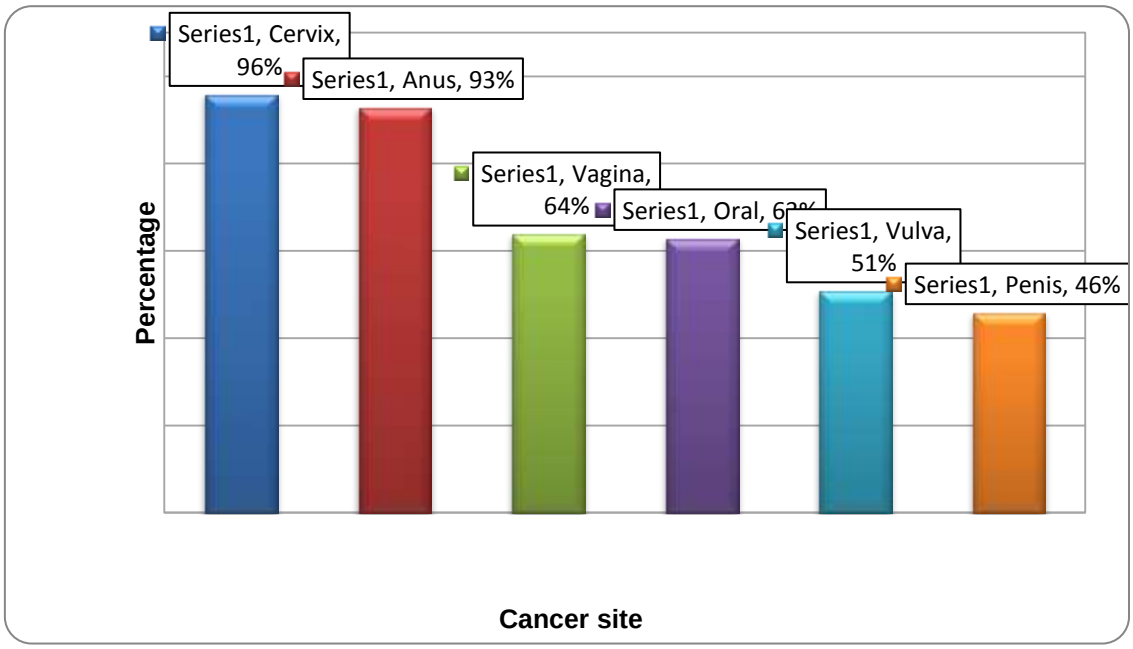


Figure 3. Annual rates of HPV DNA found in cancer for each anatomical site. HPV DNA prevalence among cases of cancer.

With the increasing prevalence of HPV-related infections and subsequent diseases, researchers with the CDC (2012) conducted a study examining the most recent cancer data in the United States. The authors of the report noted that, "population-based cancer registries are important surveillance tools to measure the impact of cancer rates on public health interventions such as vaccination and screening" (CDC, 2012b, para. 1). The goal was to identify the role of HPV in the reported cases of cancer between 2004-2008. The most prominent cancer registries in the nation were used to obtain data for cancers of the cervix, vulva, vagina, penis, anus, and oropharynx (CDC, 2012b; Gillison, Chaturvedi, & Lowy, 2008).

The results revealed that an average of 33,369 HPV-associated cancers were diagnosed annually, of which 21,290 were females and 12,080 were males. The highest number of cancers related to HPV was among women, with 96% of all cervical cancers caused by the virus. A total of 4,767 cases of anal cancer were reported between 2004-2008, with the results indicating that

93% (n = 4,500) were attributed to HPV. Oral cancers linked to HPV were relatively high, with 63% of all estimated cases each year caused by the virus. The report noted other contributing factors to oral cancer included factors like smoking or alcohol consumption (Gillison et al., 2008).

The researchers revealed that a total 3,136 cases of vulvar cancer were reported per year, yet only 51% (n = 1,600) were found to be HPV-related. Darragh et al. (2012) indicated that the low number may be due to limited empirical studies reporting the number of vulvar cancers each year. The researchers found that 46% of the annual cases of penile cancers were attributed to HPV. While penile cancer rates are overall low in the United States, it is unclear exactly what role HPV has with this cancer. More data and published studies were recommended for nearly all of the non-cervical HPV-related cancers, as the longitudinal data does not exist like it does for cancers of the cervix (CDC, 2012b).

Regarding age, the CDC indicated that, "Cervical cancer is usually diagnosed at younger ages than other HPV-associated cancers…with anal and oropharyngeal cancers generally diagnosed at slightly younger ages in men than in women" (para. 1). The CDC data (2012b) revealed that the median age for diagnosis of HPV-related cancers (which is the middle age at which 50% of all patients are either younger or older) was:

- 48 years for HPV-associated cervical cancer.
- 66 for HPV-associated vulvar cancer.
- 69 for HPV-associated vaginal cancer.
- 68 for HPV-associated penile cancer.
- 60 among women and 56 among men for HPV-associated anal cancer.
- 61 among women and 58 among men for HPV-associated oropharyngeal cancers.

(para. 2)

The median age for anal cancer in women was 60 years old, with men slightly lower being diagnosed at 56 years of age. Cancer of the oropharynx was notably different between men and women, with the median age for men 58 years old and 69 years of age for women.

Each type of cancer had varying rates for the assigned age groups, with the results presented in Table 3.

Table 3

Estimated Annual Cases of HPV-related Cancers in the U. S by Age Group: 2004-2008.

Age group	Cervical	Oral	Anal	Vulvar	Penile	Vaginal
0-19	15	0	0	0	0	0
20-29	650	24	12	17	5	0
30-39	2,525	209	182	144	33	21
40-49	3,000	1,831	933	461	97	74
50-59	2,411	4,209	1383	573	182	132
60-69	1,589	3,184	1018	536	261	147
70-79	975	1,656	735	623	262	167
>80	602	613	503	781	205	184
TOTAL	11,767	11,726	4,766	3,135	1,045	725

Note. Source: Centers for Disease Control and Prevention (CDC). (2012). Human papilloma virus-associated cancers - United States, 2004–2008.*MMWR,61*(15), 258–261.

Women between 30-39 years old had the highest number of HPV-related cancers compared to any other types of cancer for people this age. The majority of cancers showed a notable increase around the age of 50, with women over the age of 80 representing the highest rates of vulvar cancer (24.9%) (CDC, 2012b).

The authors (CDC, 2012b) noted that:

> The results of this analysis determined that an estimated average of 21,290 HPV-associated cancers occurred among females each year during 2004–2008, making these cancers combined more common than ovarian cancers and nearly as common as melanoma among females. The combined burden among men was smaller, with an average of 12,080 cases per year, roughly equivalent to the number of invasive brain cancers occurring annually among men. (p.446)

HPV-related Cancer and Men

One of the primary challenges associated with HPV-related diseases in men is their latency, as they may be infected with the virus without any overt symptoms or signs (Palefsky, 2007). Palefsky (2007) maintains that without any outward signs of disease or infection, patients delay treatment, posing a challenge for providing a proper diagnosis. Adding to the complexity of this situation is that penile and anal cancers are relatively rare in North America (Palefsky, 2007). As a result of this, symptoms that do develop because of HPV may not be immediately identified as such (Palefsky, 2007).

On top of the challenges regarding the detection, diagnosis and treatment of HPV infection and related diseases in men, Bleeker et al. (2009) noted that prevalence rates of HPV-related cancers do not provide the impetus for researchers to seek additional insight into the disease. For example, the CDC (2012a) reported:

> Cancers of the penis, anus and oropharynx are uncommon, and only a subset of these cancers are actually related to HPV, [yet] each year in the U.S. there are about:
>
> - 400 men who get HPV-related cancer of the penis,
> - 1,500 men who get HPV-related cancer of the anus,

- 5,600 men who get cancers of the oropharynx (back of throat), but many of these cancers are related to tobacco and alcohol use, not HPV. (p. 1)

Anal cancer. According to researchers at the University of California – San Francisco (UCSF, 2009), anal cancer is similar to cancer of the cervix:

> The principal cause of anal cancer is human papillomavirus (HPV), a common virus that causes changes in the skin. Anal HPV infection is most commonly acquired through anal intercourse, but it can also be acquired from other genital areas that are infected, particularly from the vulva in women, or from the penis in men. (para. 2)

The National Cancer Institute (2012a) recently revealed that roughly 85% of all cases of anal cancer are caused by high-risk HPV 16 with types 16 and 18 the most common cause of HPV-related anal cancer. This is notable as these same two high-risk types (16 and 18) account for roughly 70% of all cervical cancers (ACS, 2012). According to the ACS (2012), risk factors for anal cancer include:

- Being infected with human papillomavirus (HPV),
- Being over 50,
- Having multiple sexual partners,
- Engaging in anal intercourse, and
- Frequent anal redness or soreness.

The incidence of anal cancer is approximately 1.5/100,000 in the general population (Jemal et al., 2009; Siegel et al., 2011), with Palefsky et al. (2011) reporting that, "the incidence is increasing by approximately 2% per year among both men and women in the general population" (p. 1577). According to the CDC, men who have sex with men (MSM) are roughly 17 times more likely to develop anal cancer (CDC, 2012a) with Palefsky et al. (2011) reporting

that other high risk groups included, "men and women infected with the human immunodeficiency virus (HIV), women with cervical or vulvar cancer, and persons receiving immunosuppressive treatment to prevent solid organ graft rejection" (p. 1577).

Misdiagnosis of anal cancer is common, as the CDC (2012a) indicated:

- Sometimes there are no signs or symptoms, [or there may be]
- Anal bleeding, pain, itching, or discharge.
- Swollen lymph nodes in the anal or groin area, or
- Changes in bowel habits or the shape of your stool. (p. 1)

Presently, much of the information about anal cancer was derived from what is known about cervical cancer. This is due, in part, to the similarities between the types of the tissues involved in these two areas (De Sousa & Duraes, 2012). Just as cervical cancer is preceded by high-grade cervical intraepithelial neoplasia (CIN 2 or 3), anal cancer is preceded by high-grade anal intraepithelial neoplasia (AIN 2 or 3) (Scholefield, Castle, Watson, 2005; Watson, Smith, Whitehead, Sykes, & Frizelle, 2006). While research is limited confirming the progression of an AIN 2-3 lesion to anal cancer, patients with these advanced infections are considered at high risk of developing cancer due to the similarity with lesions in the cervix (Watson et al., 2006).

Anal cancer is often missed or misdiagnosed, many times, as hemorrhoids. According to University of California San Francisco's anal cancer website, the possibility of cancer is often overlooked and symptomatic patients are told that they are suffering from hemorrhoids and are not examined with a simple digital anorectal exam (DARE). A DARE exam is conducted when a health professional examines the anus and rectum for abnormalities indicating signs of cancer. De Sousa and Duraes (2012) indicated this exam is useful as "The lesions would be palpable, even in the absence of clinical symptoms" (p. 148). However this test is rarely used even though

it is the least expensive (De Sousa & Duraes, 2012).

To date there have been limited clinical trials carried out to validate the effectiveness of any type of screening process for anal cancer (Darragh & Winkler, 2011). According to Darragh and Winkler (2011) the "clinical approaches to the diagnosis of anal intraepithelial neoplasia (AIN), borrow from the cervical cancer model and include the application of colposcopy to evaluate the anal canal and perianal region" (p. 6). The Pap smear has been established as an effective way to detect cervical dysplasia and has decreased the rates of cervical cancer in women worldwide. Taking into account the similarity between anal and cervical cancer, there are proposals for comparable population screenings to detect anal cancer (Darragh & Winkler, 2011). De Sousa and Duraes (2012) noted that the adoption of such programs "is limited by little evidence that such interventions alter the natural history of HPV infection and progression to anal cancer" (p. 148), that is only worsened by the lack of empirical studies necessary to validate a particular method (De Sousa & Duraes, 2012).

While no official recommendations exist regarding anal cancer screening, more and more doctors are employing tests modeled after the Pap testing and cytology. Like the Pap smear, the anal cells are examined by a pathologist to identify abnormalities or dysplasia, that if present are examined further to identify the nature of infection in the anus and lower rectum (Darragh & Winkler, 2011). The abnormalities discovered through the anal cytology are followed by a high resolution anoscopy (HRA), with a biopsy taken when an abnormality is confirmed.

The problem lies with limited experience in interpreting the anal cell samples, as anal cytology is relatively new to the field of pathology (Darragh & Winkler, 2011). Moreover, this process requires specific training and equipment that few primary care clinicians have undergone, even though the techniques and tools have been part of most obstetrical,

gynecological, colorectal, surgical, and gastrointestinal practices, and training programs (Darragh & Winkler, 2011).

Goldstone (2005) reported that:

> If we are to assume that anal dysplasia is similar to cervical dysplasia in its natural history and pathogenesis, compounded by the seemingly high prevalence and incidence of HSIL [AIN 2/3] in certain populations, the suggestion that anal cytology screenings may play an invaluable role in detecting high grade dysplastic lesions is merited. (p. 14)

Goldstone (2005) added that:

> Groups who should be considered for screening include: women with cervical cancer or high-grade vulvar disease/cancer; all HIV-positive men and women, regardless of sexual orientation; individuals with perianal condylomaacuminata; and other immune-compromised individuals such as transplant recipients. (p. 14)

Treatment for anal cancer is determined by many factors that include the location, type and stage of cancerous tumor in the anus. Additional considerations are the individual's age, and overall health with the final decision determined between patients and their physician (Darragh & Winkler, 2011). Goldstone added "If anal intraepithelial neoplasia is the anal squamous-cell carcinoma precursor…[surgically removing AIN 2/3] will hopefully will prevent progression to cancer" (p. 15).

Penile Cancer. Backes, Kurman, Pimenta and Smith (2009) evaluated the development of HPV infection that results in cancer in both women and men noting the following observations: "The incidence of penile cancer is lower compared to that of cervical cancer, likely due to the lower susceptibility of the penis to malignant transformation as compared to the cervix" (p. 449). Backes et al. (2009) reported that research regarding penile cancer has not

considered the specific etiology of the disease. In short, research offers less information about the genesis and development of penile cancer when compared with cervical cancer.

Palefsky (2007) revealed that, “Unlike sampling a moist surface such as the cervix, reliable sampling of the dry, keratinized surface of the penis to obtain adequate numbers of cells has been difficult and poorly reproducible” (p. 261-2). Palefsky also noted that once penile cancer has developed, challenges exist with regard to diagnosing the lesions that develop as there are currently no standardized methods for testing for HPV-related cancers in men.

The data on penile cancer indicates that the disease is most commonly found in older men over the age of 60 (Bleeker et al., 2009). While the disease is sometimes reported in young men, Bleeker et al. (2009) asserted that the rates of penile cancer in this group have remained relatively stable over time and have even declined in the United States over the last several years. Bleeker et al. revealed that in the United States, “age-standardized incidence rates range from 0.3 to 1.0 per 100,000, accounting for 0.4–0.6% of all malignancies in this part of the world” (p. 142).

Although HPV-related penile cancer is rare in the United States, the rate of disease is much higher in developing nations. Bleeker et al. (2009) found that, “The disease can constitute up to 10% of malignant disease in men in some African, Asian, and South American countries, with incidence rates of 4.2 and 4.4 per 100,000 in Paraguay and Uganda, respectively” (p. 142). Bleeker et al. (2009) added that “penile cancer is predominantly seen in men who have not been circumcised shortly after birth, and is very rare in populations who routinely practice circumcision during the neonatal or childhood period” (p. 142). Poor hygiene is also a predominant risk factor for the development of HPV-related infections and diseases. Palefsky (2010) also reported that, “The incidence of penile cancer is low relative to cervical cancer,

particularly in developed countries. This may, in part, reflect different rates of circumcision, which is known to be a protective factor for penile cancer" (p. S-13).

Treatment of penile cancer may be invasive and painful for the patient with the least harm caused when cancer is early (stage I) and local excision of the tumor is possible (Palefsky, 2007). Palefsky (2007) noted, however, that in later stages of the disease treatment may include: "penectomy, lymph node removal on both sides of the groin, radiation therapy and chemotherapy may be required" (p. 266).

HPV Vaccination

While Pap smears once provided the most valuable protection for women against the development of HPV infection and cervical cancer, the development of the HPV vaccine has further improved opportunities for healthcare providers to effectively combat this disease (Ghazal-Aswad, 2008). Presently, there are two vaccines marketed in the United States that can protect against the sexually transmitted infection of HPV. They are Gardasil® and Cervarix®. According to Merck & Co. Inc. (2012):

> Gardasil® is a vaccine indicated for females 9 through 26 years of age for the prevention of cervical, vulvar, and vaginal cancers and for males and females 9 through 26 years of age for the prevention of anal cancer, precancerous or *dysplastic* lesions, and genital warts caused by human papillomavirus (HPV) Types 6, 11, 16, and 18. (para. 1)

Gardasil® is commonly referred to as HPV 4, as it is the only vaccine that protects against four types of HPV. The vaccine was first approved in 2006 by the U. S. Food and Drug Administration (FDA) for use with girls; however, males 9-26 years of age were added in 2009 to protect them from developing genital warts. Other key dates associated with Gardasil®'s release include December 22, 2010, when the FDA expanded Gardasil® approval to preventing

anal cancer in both men and women 9-26 years old. The FDA based their approval on data that showed the vaccine was effective in preventing pre-cancerous anal lesions caused by HPV types 16 and 18 (Palefsky, 2010). On October 25, 2011, the Advisory Committee on Immunization Practices (ACIP) recommended the routine use of Gardasil® in males as young as nine years old, with boys 13-21 years old eligible for the vaccine if they had not been vaccinated or completed the three shot series. The committee also added that males 22-26 years old, could elect to receive the HPV 4 vaccination (CDC, 2012b).

Ghazal-Aswad (2008) explained that Gardasil® was not an infectious vaccine, as it contained virus-like particles (VLP) rather than the actual virus. Gardasil® also contains an additive commonly used in immunizations that helps improve the body's acceptance of the vaccine (Hull & Caplan, 2009). The vaccinations are administered in three doses over six months, with the most protection provided to those who receive all three shots (Ghazal-Aswad, 2008).

According to Merck & Co., Inc. (2012), the most common side effects to Gardasil® include, (a) pain, swelling, itching, bruising, and redness at the injection site, (b) headache, (c) fever, (d) nausea, (e) dizziness, (f) vomiting, and (g) fainting (Gardasil Side Effects, para. 2). Ideally the vaccine should be administered before there is any contact with the relevant HPV types, in order to fully protect the individual against infection. What is more, Gardasil® was designed as method of *prevention*, with Merck Inc., & Co. (2012) reporting it was not meant to treat existing cases of "external genital lesions; cervical, vulvar, vaginal, and anal cancers; or cervical intraepithelial neoplasia (CIN), vulvar intraepithelial neoplasia (VIN), vaginal intraepithelial neoplasia (VaIN), or anal intraepithelial neoplasia (AIN)" (para. 3).

According to the CDC (2010a), "On October 16, 2009, the FDA licensed bivalent human

papillomavirus vaccine (HPV 2; Cervarix®, GlaxoSmithKline) for use in females aged 10 through 25 years" (p. 626). Cervarix® is a bivalent vaccine as it protects against two HPV types (16 and 18) preventing women against CIN 1-3 as well as cervical cancer. The vaccine has been approved for use in females 9-26 years old, with ACIP recommending a catch-up vaccination for females ages 13 to 26 who did not receive all three doses of the vaccine when they were younger. If a woman reaches the age of 26 before completing the three-dose series, ACIP noted these women were still eligible to receive the remaining doses (Ghazal-Aswad, 2008).

Vaccine Controversy

The advent of a vaccine for the prevention of cervical cancer in women has been viewed as a watershed event for improving women's health (Schwartz, Caplan, Faden & Sugarman, 2007). According to Schwartz et al. (2007), the vaccine provides an important opportunity to combat HPV infection worldwide and reduce the number of cases of this disease in developing nations. Presently, eighty-two of all new cervical cancer cases in developing nations worldwide, occur in areas without rigorous prevention programs in place, such as, Pap testing. Therefore, the routine use of the HPV-vaccine in these countries would reduce unnecessary deaths and strengthen the public health system (Schwartz et al., 2007).

Despite the fact that some view the HPV vaccine as a watershed event for improving women's health, "controversy is grounded in moral, religious, political, economic, and sociocultural arguments" (Vamos et al., 2008, p. 308). Vamos et al. (2008) reported that the controversy surrounding the HPV vaccine has centered around two primary issues, "(1) vaccinating adolescent girls against a sexually transmitted virus and (2) determining whether the HPV vaccine should be mandatory for all girls of school age" (p. 303).

The first issue addresses the inability of young adults to fully understand that the vaccine

does not protect them against all sexually transmitted infections. Vamos et al. (2008) noted that:

> Adolescents may not fully comprehend the utility of the HPV vaccine and may over generalize the vaccine to include "protection" against other sexually transmitted infections (STIs) such as human immunodeficiency virus/acquired immunodeficiency syndrome, as well as those with less lethal potential. In addition, a worrisome repercussion of the HPV vaccine is that it will promote premarital sex and give children tacit permission to engage in risky sexual behaviors. (p. 304)

The only 100% effective way to protect against STIs is abstinence, and therefore opponents believe a mixed message is sent to young people through the promotion of the vaccine. Vamos et al. (2008) wrote that, "advocates of this position argue that children should receive clear and consistent messages that abstinence is the only responsible, effective, and supported behavior concerning protecting one's sexual health" (p. 304).

The inherent right of parents to make the decisions about their children's sexual health was noted as another reason for opposing mandatory HPV-vaccination (Vamos et al., 2008). Each family has a unique set of personal values and spiritual beliefs that opponents argue are not represented by the companies manufacturing the vaccines. Added to this was the fact that these large corporations funded many clinical trials run by the federal government, and lobbyists spent considerable time and money securing support for these mandates. Colgrove, Abiola, and Mello, (2007) wrote that, "although Merck's lobbying was a key catalyst in the initial push for mandates, many stakeholders came to view the company's efforts as a liability" (p. 789). Their involvement overshadowed the underlying health benefits intended by the legislation, resulting in the mandate viewed as a way for the company to make money (Colgrove et al., 2007).

Vamos et al. (2008) indicated that by mandating the vaccine, a new health disparity

would be created, as questions were raised on “how underserved, hard-to-reach, and uninsured women (the most vulnerable population of women with respect to cervical cancer) would receive the required 3 doses over a 6-month period and who would be responsible for incurring the cost?” (p. 305). Therefore, HPV-vaccination would most likely be obtained by women who have routine screenings, with access to health care placing them outside of the high-risk category for developing cervical cancer. Those women who needed the vaccine the most were those who did not have the same medical access, with Vamos et al. noting, “paradoxically the circumstances of the vaccine would contribute unfavorably to existing health disparities rather than overcome them” (p. 305).

Another criticism against the vaccine reported by Vamos et al. (2008) were “logistical uncertainties” (p. 305) with many unknown issues questioning the support of the vaccine in abstinence only campaigns. These included limited data regarding the long-term effectiveness of the vaccine and that all of the potential side effects of the vaccine have not been established. Furthermore, it is unclear if the vaccine has any long-term negative impact on fertility or plans for pregnancy in the future. The final reason noted against mandatory vaccination, was the development of new vaccines that provide more protection against the virus (Vamos et al., 2008). Vamos et al. (2008) concluded that “the issue of mandatory HPV vaccination was a premature action, given the range of unanswered questions and the prospect of new or divergent results from clinical trials that are not yet completed” (p. 305).

Proponents of mandatory HPV vaccination often refer to the “severity of cervical cancer and the efficacy of the vaccine as primary motivations for wanting to ensure that all girls were vaccinated,” adding that the mandatory nature of HPV-vaccination, would ensure those children whose parents were against it still received the protection they deserved (Colgrove et al., 2007,p.

785). Vamos et al. (2008) noted that proponents of vaccination argue that the decision to be vaccinated motivates women to become more proactive in their health and health decision-making.

HPV in Men

With a basic review of HPV in women provided, it is now possible to look more closely at HPV infection in males. Research regarding HPV infections in males suggests that the etiology and pathophysiology of the infection in males is much different than it is in females. Backes et al. (2009) evaluated the development of HPV infection that results in cancer in both women and men noting the following observations: "The incidence of penile cancer is lower compared to that of cervical cancer, likely due to the lower susceptibility of the penis to malignant transformation as compared to the cervix" (p. 449). Backes et al. (2009) go on to report that research regarding penile cancer has not considered the specific etiology of the disease. In short, research offers less information about the genesis and development of penile cancer when compared with cervical cancer.

Likewise, Palefsky (2007) also reviewed the challenges associated with understanding the etiology and pathophysiology of HPV infection and HPV-related diseases in men. As reported by this author, the challenges associated with studying HPV infection and related diseases in men are unique and restrict the ability of researchers to fully examine disease progression. One reason may be that it is difficult to obtain an adequate number of cells from the surface of the penis (p. 261-2). Palefsky (2007) also notes that once penile cancer has developed, challenges exist with regard to diagnosing the lesions that develop. According to Palefsky (2007), there are currently no standardized methods for testing for HPV-related cancers in men.

Other challenges associated with HPV-related cancers in men include their latency. In many instances, HPV-related diseases will be present in men without any overt symptoms or signs (Palefsky, 2007). Palefsky (2007) maintains that without any outward signs of disease or infection, patients delay treatment posing a challenge for providing a proper diagnosis of the patient. Adding to the complexity of this situation is that penile and anal cancers are relatively rare in North America (Palefsky, 2007). As a result of this, symptoms that do develop because of HPV-infection or related cancer may not be immediately identified as such (Palefsky, 2007). Treatment of HPV-related cancers in the genitals can be invasive and painful for the patient (Palefsky, 2007). For example, in later stages, removal of the penis or lymph nodes or even radiation or chemotherapy may be necessary (Palefsky, 2007, p. 266).

In addition to the challenges reported with detection, diagnosis and treatment of HPV infection and related diseases in men, Bleeker et al. (2009) note that prevalence rates of HPV-related cancers do not provide the impetus for researchers to seek additional insight into the disease. Research regarding penile cancer indicates that the disease is most commonly found in elderly men over the age of 60. While the disease is sometimes reported in young men, Bleeker et al. (2009) asserted that the rates of penile cancer in this group have remained relatively stable over time and have even declined in the U. S. over the last several years. In the United States, "age-standardized incidence rates range from 0.3 to 1.0 per 100,000, accounting for 0.4–0.6% of all malignancies in this part of the world" (Bleeker et al., 2009, p. 142).

HPV-related Diseases in Men

The statistical association between HPV and its relationship to cancers in men is provided in Table 4. It is evident that these statistics run almost parallel to the statistics of cervical cancer cases that occur in women in the United States annually. These facts alone change the

perception that only women are at risk from HPV.

Table 4

Approximate Number of New Cases of HPV-related Diseases in U.S. Males Annually

Diseases	# of new cases/year	% with detectable HPV	Number of new HPV-related cases
Recurrent respiratory papillamatosis	Approximately 3,300	100%	All 3,300/year
Genital warts	Approximately 500,000	100%	All 500,000 cases/year
Cancer of mouth and throat (Head and neck cancers)	25,830	27%	6,948/year
Anal cancers	1,910	90%	1,719/year
Penile cancers	1,530	50%	765/year
Total number of new HPV-related cancers			9,432/year

Note. Source American Cancer Society, 2012

Mouth and throat cancers are linked to oral sex. Despite the correlation between the decline in the rates of cigarette smoking after the 1960s and the reduction in the overall rates of head and neck cancers, the rates of throat cancers, particularly those of the tonsils, base of the tongue and back of the throat did not decline and actually appeared to be gradually rising. The missing link was eventually found in HPV infections, specifically infections caused by HPV16 strain, which partially negated the overall reduction in head and neck cancers that was gained from the decline in tobacco use.

HPV Vaccination in Men

Not surprisingly, the development of the HPV vaccine for women prompted debate over whether or not young men should receive the same vaccine (Kim, 2011). Kim (2011) provides

an overview of data regarding HPV and related cancers in men and women noting that HPV infections contribute to 20,000 cases of invasive cancer in the United States annually. Of these cancers less than 25% occur in men. Kim (2011) asserts that while 99.7% of cervical cancers in women can be attributed to HPV infection only, about 90% of anal cancers stem from HPV infection. Smaller portions of remaining cancers (penile, neck and head) may be attributable to HPV infection. Given that there is a specific link between HPV and penile, anal, head and neck cancers found in men, widespread HPV vaccination does not appear to receive a lot of support for this group. Kim (2011) maintains that HPV-related cancers, which are more frequently reported in men who have sex with men, should prompt guidelines for the development of vaccination protocols based on risk classification for the individual.

Although Kim (2011) argues that there is no real public health impetus for utilizing HPV vaccination for males, studies examining the efficacy of HPV vaccination in this group do suggest that vaccination may have some value (Giuliano et al., 2011a). Specifically, Giuliano et al. (2011a) evaluated use of the HPV vaccine to reduce genital lesions in boys and men. The research included 4,065 male subjects between the ages of 16 and 26 years from 18 different countries. The study employed a randomized, placebo-controlled, double-blind trial to evaluate the efficacy of the vaccination. The results of the investigation demonstrated that 36 external genital lesions were seen in the vaccine group as compared with 89 in the placebo group, for an observed efficacy of 60.2% (p. 402). Based on these findings, the authors concluded that the vaccine can be effective for reducing genital warts caused by HPV infections in men.

In particular, Luedtke (2008) stated that some research suggests that the immunization of males against HPV would be cost effective for preventing the spread of the infection in females and the subsequent development of cervical cancer. Despite this potential, Luedtke (2008)

asserts that there is a paucity of support for making HPV vaccination mandatory for men. "It appears that HPV vaccination would remain a gender specific requirement for immunization, despite potential advantages to women if men were also immunized" (Luedtke, 2008, p. 2151).

Other scholars examining the issue of vaccinating males against HPV have made similar observations to those reported by Luedtke (Hollander, 2010). Specifically, Hollander (2010) notes a study in which physicians were surveyed about HPV vaccination of males. A majority of physicians surveyed believed that HPV vaccination should be made available for males arguing that "vaccinating males would be important not only because it would prevent disease in males, but also as a strategy for protecting females from the risk of HPV infection and its consequences" (p. 277). Hollander (2010) goes on to report that there was little support for the idea that female vaccination for HPV negated the need for males to be vaccinated as well. Most physicians surveyed (96) believed that policies regarding HPV vaccination should be gender neutral to provide a comprehensive approach to combating HPV infections and related diseases.

Scholars examining HPV vaccination of males also have focused on the general social and public health benefits that could be achieved through male vaccination (Hull & Caplan, 2009). According to Hull and Caplan (2009), the basic tenets of herd theory and immunity suggest that the best means for controlling the spread of a disease is by providing wide-scale population intervention. This includes vaccination of both males and females to prevent and restrict the spread of disease. Although this theory continues to dominate the development of vaccination protocols in the United States, Hull and Caplan (2009) note that with regard to HPV vaccination this has not been the case. Initial efforts to increase HPV vaccination have focused primarily on women because "they bear the bulk of disease burden" (p. 363). Continued use of HPV vaccination in this manner is unethical and, according to Hull and Caplan (2009), will

continue to perpetuate gender inequalities in healthcare.

HPV Vaccination Attitudes of Males and Females

Despite the fact that there is considerable evidence that suggests that HPV vaccination is useful and warranted for males, mandates for such vaccination have not been established by governing health bodies (e.g., CDC, FDA, etc.). As a result of a lack of direct policy regarding HPV vaccination in males, the issue has not been widely examined in the literature. Would men voluntarily seek HPV vaccination? Answering this question proves challenging. However, some research has been conducted to examine male attitudes toward HPV vaccination (Sandfort & Pleasant, 2009). For instance, Sandfort and Pleasant (2009) examined male and female college student attitudes toward HPV vaccination. The decision not to be vaccinated was based on a lack of knowledge regarding HPV and negative stigma associated with the condition. Men in the study were less likely than women to be vaccinated against HPV. This attitude toward vaccination was associated with lower levels of HPV knowledge in men and higher levels of reported stigma associated with the disease.

Jones and Cook (2008) also considered the attitudes of college males and females with regard to their intent to receive HPV vaccination under specific conditions. Subjects enrolled in this study were asked to rate their willingness to receive vaccination under the following conditions: vaccine prevents the spread of all HPV; vaccine prevents cervical cancer but not genital warts; vaccine prevents genital warts but not cervical cancer; and vaccine prevents both genital warts and cervical cancer. Data collected by Cook and Jones (2008) demonstrated that "Men were less willing to receive a vaccine that prevents cervical cancer alone than they were to receive one that prevents cervical cancer and genital warts" (p. 23).

Efforts to evaluate intent to be vaccinated against HPV in males have also been examined

by Crosby et al. (2008). Crosby et al. (2008) evaluated the intention of 115 males between the ages of 18 and 23 years of age to acquire HPV vaccination. The sample was drawn from rural and urban populations for comparison. Overall, 35.7%of those participating in the study reported a negative intent for HPV vaccination. Variables that contributed to negative intent for males included: not having penile-vaginal intercourse in the last 12 months, lack of knowledge regarding HPV and/or living in a rural versus urban area. Crosby et al. (2008) asserted that the findings of this research should be used as a starting point for determining barriers to HPV vaccination among males.

The research reviewed here with regard to male intention for HPV vaccination represents the limited scope of research that has been undertaken on this subject. A cursory overview of the literature regarding HPV vaccination indicates that more extensive efforts have been made to evaluate female attitudes, acceptance and intent to receive HPV vaccination (Daley et al., 2010). For instance, Conroy et al. (2009) examined predictors and barriers to HPV vaccination among women. Utilizing a sample of 189 girls between the ages of 13 and 26, Conroy et al. (2009) evaluated the specific conditions under which young women would seek HPV vaccination. Variables identified as contributing to HPV vaccination included: endorsement of the vaccine by family, physicians or sexual partners; history of an abnormal Pap smear; and being offered the vaccine by their healthcare provider. Based on findings, Conroy et al. (2009) asserted that it is possible to utilize information for the development of programs to reduce barriers to HPV vaccination and encourage increased intention to vaccinate among women.

Attitudes regarding HPV vaccination in young women have also been examined by Kahn, Rosenthal, Hamann and Bernstein (2003). Specifically, these authors surveyed 52 women between the ages of 18 and 30 to determine the specific variables that contribute to positive

attitudes toward HPV vaccination and intent to vaccinate. The results of this investigation suggest that knowledge regarding HPV and its health consequences, "personal beliefs about vaccination, belief that others would approve of vaccination and a higher number of sexual partners" all contributed to positive attitudes toward HPV vaccination and intention to vaccinate (Kahn et al., 2003, p. 300). Kahn et al. (2003) assert the understanding of the particular variables that contribute to positive attitudes toward HPV vaccination is important for directing public health efforts to increase the HPV vaccination rates.

Generally speaking, the research undertaken regarding women's attitudes toward and intent to receive HPV vaccination is more extensive and in-depth. While efforts have been made in the literature to evaluate HPV vaccination intention among males, extensive efforts have not been made to evaluate male attitudes toward HPV vaccination. This dearth of research is reflective of the reality for HPV vaccination. Although HPV vaccination for males has been recommended and supported in the literature, public health officials have not created mandates for HPV vaccination in this population.

In 2006, ACIP recommendations were for the vaccine to be routinely given to girls starting at 11 or 12 years of age, before they become sexually active. This recommendation set off an outbreak of state-level policymaking. Following these recommendations, within a year's time, 41 states had projected intended measures to increase vaccine uptake, including state insurance-coverage requirements, educational campaigns and programs (National Conference of State Legislatures, 2012). Even though these recommendations were made by ACIP, school vaccination requirements are decided mostly by state legislators. Legislation is needed to provide funding, regardless of some state legislatures granting regulatory bodies such as the Health Department the power to require vaccines (National Conference of State Legislatures,

2012).

The most debatable proposals were those to make the vaccine requirements mandatory for school age girls, which are determined by individual states. Presently, there are no school mandates for boys to receive the vaccine, even though Gardasil® was approved in 2009 for boys ages 9-26. Bills to approve HPV vaccination requirements were introduced in 24 states, and only one state governor imposed a school mandate by executive order (Colgrove et al., 2007).

Policymakers argued about the HPV vaccine school mandate requirement idea from 2006 to 2008. As of February 2010, only Virginia and Washington, D.C., had enacted school HPV vaccine mandates, and Virginia's legislation included an opt-out provision so broad that it may be a misnomer to refer to the law as a mandate (Wynia, 2007).

Most states are pushing for further discussion and debate about whether or not to require the vaccine because of the cost of the drug, safety, parents' rights to refuse, moral objections, coverage by insurance plans and financing for the uninsured. The CDC announced that the HPV vaccine is available through the federal Vaccines for Children (VFC) program in all 50 states. VFC provides vaccines for children ages nine to 18 who are covered by Medicaid, Alaskan-Native or Native American children, and some underinsured or uninsured children.

HPV Among College Students

Research has demonstrated that there is a low level of awareness among college students regarding risk factors and symptoms of STIs that most threaten them, including HPV (Eisenberg, 2001; Gately, 2003; Yacobi, Tennant, Ferrante, & Roetzheim, 1999). Male college students are not as knowledgeable about HPV as female college students across different ethnic groups (D'Urso, Thompson-Robinson, & Chandler, 2007; Gerend & Magloire, 2008). Despite the high prevalence rate of HPV in the U.S. female college student population, studies have proven that

they have a low awareness and knowledge of this viral infection (D'Urso et al., 2007; Lambert, 2001; Ramsum, Marion, & Mathias, 1993; Vail-Smith & White, 1992; Yacobi et. al., 1999).

Daley et al. (2008) found that women were confused about the true meaning of an HPV diagnosis. The main causes of cervical cancer are from specific types of HPV, which has posed a serious public health concern for women (Kiviat, Koutsky, & Paavonen, 1999; Montero, Larkin, Houston, & Toney, 1999; Munoz & Bosch, 1996; National Institutes of Health, 1996).

A group of CDC scientists and physicians looked at 40 different publications regarding the prevalence of HPV infections in men, in order to better understand the high prevalence rate of HPV infections in the male population (Dunne, Nielson, Stone, Markowitz, & Giuliano, 2006). They concluded that more than half of American men will be infected with HPV at some point in their lives.

Among sexually active college men, the overall prevalence rate of HPV infections is high. The University of Washington conducted a study of 240 heterosexual active college men ranging between the ages of 18 and 20 which showed that nearly 66% of these men developed HPV within two years of initiating sexual activity. HPV 16 was one of the most commonly detected types that were found in men; surprisingly HPV 16 is the type that causes more than 50% of cervical cancers in women. HPV types were found in a variety of locations on the male genital area, including the penile shaft, the tip of the penis, and the scrotum. The association factors which increase the risk for male college students were young age, unprotected sex, higher number of sex partners, high frequency of sexual intercourse, and cigarette smoking.

It has further been studied and shown that the rate of infection in men, when compared to women, is more constant among men in all age groups. In women, the highest rates of infection are seen in their twenties, with rates then decreasing in their thirties and surging again in their

forties and fifties, either due to reactivation of dormant infections or reinfection from men. Presently, there are not many studies that exist between the association of men and HPV-related diseases, but there are numerous theories and myths about HPV and men. Scientific research developed so far has helped our society better understand the overall prevalence rates of HPV in men.

Theory of Planned Behavior

Ajzen's (1985) Theory of Planned Behavior (TpB) will provide the theoretical framework for this study. According to Francis et al. (2004) the TpB "proposes a model about how human action is guided. It predicts the occurrence of a specific behavior provided that the behavior is intentional" (p. 2). Francis et al. (2004) revealed that in order to predict the intentions of another person:

We need to know:

- Whether the person is in favor of doing it ('attitude')
- How much the person feels social pressure to do it ('subjective norm'), and
- Whether the person feels in control of the action in question (perceived behavioral control). (p. 1).

Figure 4 illustrates the relationship between these variables suggested by Ajzen (1991) as the best predictors of another person's intention to perform a desired behavior.

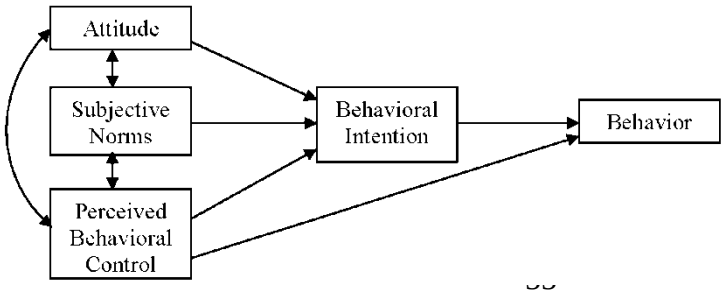


Figure 4. Theory of Planned Behavior.Constructs and proposed interaction according to Ajzen's Theory of Planned Behavior (Ajzen, 1991).

Francis et al. (2004) reported that while there is no "perfect relationship between behavioral intention and actual behavior, intention can be used as a proximal measure of behavior" (p. 8). Ajzen (2002) wrote that:

> As a general rule, the more favorable the attitude and subjective norm, and the greater the perceived control, the stronger should be the person's intention to perform the behavior in question…[and that] given a sufficient degree of *actual* control over the behavior, people are expected to carry out their intentions when the opportunity arises. [Therefore] intention is assumed to be the immediate antecedent of behavior. (p. 1)

Since behavioral intentions are considered highly predictive of whether or not a behavior is carried out (Ajzen, 1985) this study assessed the intentions of male college students to be HPV vaccinated according to the underlying principles of this theory.

A review of the TpB suggests that this model has been widely employed to evaluate health behavior and individual intention (Norman & Conner, 2006). Norman and Conner (2006) provided a review of the TpB noting that the most important determinant of behavior for the individual was one's *intention* to engage in the behavior. Norman and Connor (2006) noted that intention was defined and determined by three constructs:

> First is the individual's attitude towards the behavior, which reflects an overall positive or negative evaluation of the behavior. Second is the individual's perception of the social pressure from important others to perform or not perform the behavior (i.e. subjective norm). Third is the individual's perception of the ease or difficulty of performing the behavior (i.e. perceived behavioral control), which is seen to cover the influence of both

internal (e.g. skills) and external (e.g. constraints) control factors. (p. 56)

Attitudes

Attitudes and behavioral beliefs are two constructs that represent the attitude variable within the TpB model. A positive or negative evaluation of the behavior refers to an individual's attitude towards the behavior, while behavioral beliefs focus on the perceived consequences of engaging in a certain behavior. Research has demonstrated a correlation between parental attitudes towards HPV and the willingness for young male children to be vaccinated. Reiter, McRee, Kadis and Brewer (2011) found that parents had numerous negative attitudes (e.g., unsafe) towards the Gardasil® vaccination that were significant predictors of intentions towards vaccinating one's child. A study by Allen and colleagues (2009) reported males being apprehensive towards Gardasil® in regards to side effects and safety fears. These strong predictors of uncertainty seem to be common/present in all research reports.

Subjective Norms

Subjective norms represent an individual's perception of how relevant one perceives the beliefs of important others to be regarding a certain behavior. Several studies have reported a variety of ways that subjective norms influence the willingness to be HPV vaccinated. Reiter and colleagues (2011) reported that young males who perceived one's peers acceptability of them getting the vaccine later regretted not getting the HPV vaccine and perceived themselves as high-risk for getting HPV were more willing to receive the Gardasil® vaccine. Results showed peer acceptance predictors were more significant of all predictors. Parental attitudes are associated with more significant predictors of the willingness for young males to receive the HPV vaccine. Not only are parental attitudes strong predictors of acceptance of the HPV vaccine, but also approval from powerful others (e.g., parents, siblings, doctors) is a strong predictor (Boehner et

al., 2003; Ferris et al., 2008, 2009; Hollander, 2010).

Perceived Behavioral Control

Perceived behavioral control (PBC) construct is a strong predictor in the TpB model. This construct represents an individual's perception of the ease or difficulty in engaging in a particular behavior. PBC directly predicts a certain behavior, as well as the intent to engage in the behavior itself (Ajzen, 2002). Ajzen (2002) states that perceived self-efficacy and perceived controllability are two factors of PBC. Past research measured self-efficacy to explain PBC. No studies have examined PBC in relation to males receiving the HPV vaccine, but some have focused on predictive power. In an effort to illustrate this point, research conducted by Crosby et al. (2011) found that self-efficacy to be HPV vaccinated is not predictive of intentions to receive the vaccine. As the Gardasil® vaccine becomes more prevalent among males, future research with newer data will provide more useful information on the intentions of males to be HPV vaccinated in regards to the PBC construct.

Use of the Theory of Planned Behavior

Because the TpB will be used as a foundation for the development of the proposed investigation, it is pertinent to examine how the theory has been applied in the research. Griva, Anagnostopoulos and Madoglou (2009) consider the use of the TpB to evaluate women's decision to utilize mammography screening to prevent breast cancer. As reported by Griva et al. (2009), the TpB provided additional insight into what motivated women to obtain a mammography. Based on the findings of the research Griva et al. (2009) maintained that it would be easier for health officials to develop policies for practice that reduce barriers against mammography use, increase motivation for screening and improve attitudes toward the test. As such, the TpB can provide important insight into the attitudes, motivations and beliefs of

individuals when it comes to engaging in specific health behaviors.

Andrykowski, Beacham, Schmidt and Harper (2006) considered the TpB to understand the intentions of cancer patients to receive physical and psychosocial support following their diagnosis. Andrykowski et al. (2006) argued that a diagnosis of cancer carries with it a host of physical and psychosocial implications. Although supports are available to help patients newly diagnosed with cancer, many patients do not take advantage of these services. Given the importance of these supports, Andrykowski et al. (2006) sought to understand the intentions of patients to engage with these services. Examination of patient intentions was used as a foundation for determining the specific supports needed to ensure that patients are able to access services when diagnosed with cancer.

The TpB was employed by Blanchard et al. (2008) to evaluate the intention to engage in physical activity between African American and Caucasian college students. Blanchard et al. (2008) contended that physical activity among all college students has steadily declined with roughly 15 to 30% of students engaging in some type of daily exercise. What is more, Blanchard et al. (2008) asserted that African American students were less likely than their Caucasian counterparts to take part in a routine exercise program. Utilization of this theory was based on the assumption that "an individual's intention to engage in [physical activity] is the immediate predictor of [physical activity]" (p. 341). It was found that attitudes were a significant unique predictor of intention for both African American and Caucasian college students. Most importantly, it was noted that practitioners may need to consider ethnicity when developing physical activity interventions for college students based on the TpB.

Generally speaking, the TpB has been used in health-related research to understand intentions and attitudes of subjects toward specific health-related actions. The central foundation

for utilizing this theory was that by understanding attitude and intention, it would be possible to provide supports that would improve attitude and intention to direct the engagement of the individual in self-directed health-related behaviors. By creating the environment and conditions needed for encouraging individual health-related behavior, health professionals and public health officials will be able to have a better impact on health outcomes for both the individual and the population as a whole. In the context of the current research, the TpB should provide additional insight into HPV vaccination among males, creating a foundation for healthcare practice that will encourage and support this health-related behavior for males.

Summary

HPV infections and related diseases are significant issues for both men and women. However, the research provided here indicates that because women bear the highest burden for the disease (i.e. through the development of cervical cancer), efforts to prevent, diagnose, and treat HPV infection have focused primarily on women. The advent of the HPV vaccination has prompted consideration of the use of the vaccine in men. In addition to the fact that research now indicates that the vaccine may be useful for reducing the incidence of genital warts in men, there is widespread support for vaccination as a means to help reduce health disparities between men and women and to help prevent the spread of HPV infections that cause cervical cancer. Even though support for HPV vaccination in men is quite high, there is a paucity of research evaluating male intention and attitudes toward vaccination.

In an effort to fill this current gap in the literature, the TpB was proposed as a framework for investigation as it appeared to have notable relevance for investigating male attitudes toward HPV vaccination. The TpB has been widely utilized for investigating health beliefs, attitudes and intentions to engage in health-related behaviors. Based on findings from research conducted

using the TpB, scholars have been able to identify supports and barriers to specific health-promotion behaviors. Application of Ajzen's TpB to HPV vaccination in males should provide the needed insight to better understand men's attitudes toward vaccination and the specific barriers and supports that exist for fostering further acceptance of HPV vaccination.

CHAPTER 3

METHODS

Overview

The purpose of this chapter is to highlight the methodology proposed for this study including the purpose of the study, research questions, research design, sampling, instrumentation, pilot study, data collection and analysis.

Purpose of the Study

The purpose of this study was to examine male college students' knowledge and intention to be HPV vaccinated.

Research Questions

The following research questions were explored in this study:

1. What are the levels of HPV knowledge among male college students?
2. What are the self-reported attitudes, subjective norms, and perceived behavioral control about HPV vaccination among male college students?
3. To what extent can self-reported attitudes, subjective norms, and perceived behavioral control predict male college students' behavioral intention to be HPV vaccinated?
4. Is there a relationship between male college students' HPV knowledge and their perceived behavioral intention to be HPV vaccinated?

Research Design

The proposed study employed cross-sectional, descriptive correlational and predictive correlational research designs using survey methodology. The research design provided the foundation of the project and directed what strategies were used to investigate the problem under study (Rajasekar, Philominathan, & Chinnathambi, 2006). Cross-sectional research is commonly

used to collect self-reported data from a particular group or population at the same time or within close proximity (Lavrakas, 2008). Descriptive correlational designs are often used to gather information in areas with limited empirical evidence (Burns & Grove, 2005). Burns and Grove (2005) noted that "through descriptive research, concepts are described and potential relationships provide a basis for additional research" (p. 44).

Johnson (2001) explained that in cross-sectional research:

> The data are collected from research participants at a single point in time or during a single, relatively brief time period (called contemporaneous measurement), the data directly apply to each case at that single time period, and comparisons are made across the variables of interest. (p. 10)

Benefits of descriptive designs include the development of a foundation for subject matter like HPV vaccination among males which to date has had little empirical research studies done. What is more, the examination of the potential relationship and predictive nature of the study variables provided further insight into what factors, if any, significantly influence male students' willingness to be HPV vaccinated. While the focus of this study was men, women were also given the same questionnaire to offer comparison data.

Sample

The sample for this investigation was a convenience sample, a group of individuals that is ready and available, because the researcher was employed at the proposed data collection site. The population included male college students, who were 18 or older, attending a Southeastern region university. The institution was a mid-sized, four-year university located in the Southeastern region of the United States. The fall 2013 enrollment was approximately 6,179. Of these, 4,311 (70%) were female and 1,868 (30%) were male (Fact Book, 2013-2014). Potential

participants in the study sample were delimited to male students over 18 years of age and enrolled in at least one health or physical education course at the time data was collected. With the permission of 12 health and physical education instructors teaching a total of 40 courses, the researcher had access to nearly 362 male participants for this study.

An online sample size calculator was used to obtain the requisite number of participants (Creative Research Systems, 2012). Figure 5 indicates the data needed to calculate the number of students needed in the final sample based on the Creative Research Systems.

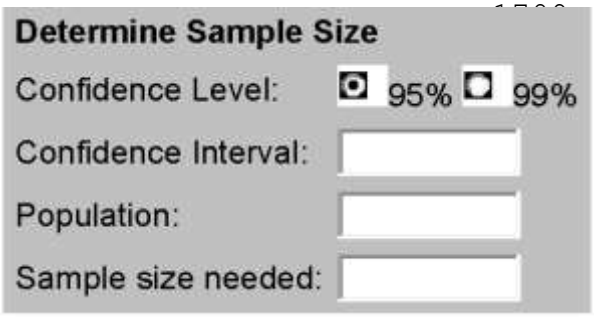


Figure 5. Sample size online calculator. Required information for determining sample size using an online calculator. Copyright 2007-2010 by Creative Research Systems. Reprinted with permission.

The confidence level (also referred to as *alpha*)"represents the researcher's willingness to accept making a Type I Error, which is the risk of rejecting the null hypothesis when it is, in fact, a true statement" (Tuckman, 1999, p. 284). The standard confidence level in education research is .05 (or 95%) and therefore was used for this study (Tuckman, 1999). The confidence interval or acceptable margin of error was based on a normal distribution. A 95% confidence interval is said to capture 47.5% (or .475) of the sample data above and below the mean under the normal curve. With the confidence level of 95%, a confidence interval of 5is considered standard and was used for this study (Tuckman, 1999). Based on these data, the minimum sample was 208 male students with oversampling being employed to maximize the data collected. Oversampling

also was done to account for students who may have been already HPV vaccinated and any potential missing data. Missing data, also known as item non-response, occurs when respondents do not complete all survey items, which can introduce bias (Fink, 1995). This study followed an operational definition of non-response: respondents who answered less than 2/3 of the survey items were not included in data analysis.

Instrumentation

The variables in this study were measured through group administered questionnaires soliciting male college students' HPV knowledge and intention to be HPV vaccinated. An extensive review of the existing literature regarding the application of the TpB constructs and male college students' intention to be HPV vaccinated revealed no survey instrument. As a result, the researcher developed a questionnaire soliciting students' responses for each of these constructs. The proposed draft instrument (Appendix A) consisted of 33 items, which were reviewed by an expert panel and then piloted in order to establish the reliability of the scales. Details regarding the analyses are explained further in the pilot test section.

Knowledge

Fifteen questions solicited participants' knowledge of HPV. The items were listed as statements with three response options: true, false or unsure. All correct answers were given one point each. All other answers were given a value of zero, indicating the respondent did not have knowledge regarding that item. A maximum score of 15 represented the most knowledgeable about HPV, with scores lower than seven indicating little or limited HPV knowledge. The total scores for all participants were added and the group average was computed and used in the final data analysis for this study.

TpB Constructs

Items to measure male college students' intention to be HPV vaccinated were developed following the recommendations in Ajzen's (2002) article "*Constructing a TpB Questionnaire: Conceptual and Methodological Considerations"* and Frances' et al. (2004) "*Constructing a Questionnaire Based on the Theory of Planned Behaviour: A Manual for Health Services Researchers.*" According to the theory, the ability to predict future behavior is based on the intention to perform the particular behavior. In this study, intention was identified as male students' decision to be HPV vaccinated; however, their intention was determined by their attitude toward getting the vaccine, their subjective norms or concerns with the social pressures to be vaccinated, and perceived behavioral control or extent to which they believed they were capable of getting it (Francis et al., 2004; Janousek, 2010). As a result, this study examined whether the TpB was useful for predicting the potential participants' future behavior of being vaccinated against HPV.

A direct measure TpB questionnaire was developed to measure factors involved with students' intention. Francis et al. (2004) reported that, "With the exception of behaviour, the variables in the TPB model are psychological (internal) constructs…[therefore] each predictor variable may be measured directly e.g. by asking respondents about their overall attitude" (p. 9).

The first step in designing the items was an extensive review of the HPV and TpB literature to accurately define the target behavior (i.e., being vaccinated against HPV). According to Francis et al. (2004):

> The target behavior should be defined carefully in terms of its Target, Action, Context and Time (TACT). For example, consider the behavior, 'referring patients with back pain for a lumbo-sacral spine x-ray'. Here the target is the patient, the action is the referral, the

context is the clinical condition (back pain) and the time is (implicitly) during the consultation. (p. 8)

The targets for this study were male college students and the action was intent to be HPV vaccinated. The context was the protection against certain HPV types by being vaccinated and the time was set within the subsequent six months. This was used as it is the required number of months following data collection that students would need to receive all three doses of the vaccine.

Behavioral intention. The first scale addressed in Francis et al. (2004) was behavioral intention, particularly information indicating measuring one's generalized intention. Francis et al. (2004) explained that, "in the TPB literature, where most research has been about individual's own health-related behaviour (e.g. smoking, exercise), Generalised Intention is most commonly used" (p. 11). Three items were presented in the manual with a statement of the desired behavior preceded by "I expect", "I want" and "I intend," representing generalized intention. A seven-point semantic differential scale with strongly disagree/strongly agree at opposite ends is noted as the typical method of assessing this construct. Ajzen and Fishbein (2008) recommended that a 7-point bi-polar scale be used to solicit students' responses, therefore, this format was followed for each of the scales measuring the TpB constructs.

Three items assessing students' behavioral intention were included in the proposed survey with participants identifying the extent to which they agree-disagree that they (a) *want,* (b) *will,* and, (c) *plan* to be HPV vaccinated within the next six months. Participants' scores could range from 3 to 21, with higher scores indicating a more favorable intention to be HPV vaccinated. The average intention score was calculated for the sample in this study and used within the statistical analysis computations.

Attitudes. Procedures for developing a direct measure of students' attitudes towards HPV vaccination involve bipolar adjectives that are identified as evaluative and instrumental. Two evaluative items were included with good/bad and beneficial/harmful representing the pairs of adjectives. Two additional items that were instrumental in nature which represented whether the behavior achieved something that were included were worthless/valuable and important/unimportant. Scores for these items ranged from 4 to 28, with higher numbers reflecting a positive attitude towards HPV vaccination. Francis et al. (2004) indicated that it was important to have high internal consistency among these items, with recommendations to remove any items that do not correlate to increase the strength of the scale. Average attitudes scores for the sample were computed and used in the final analysis.

Subjective norms. Direct measures of subjective norms involve the use of questions referring to the opinions of important people in general. Ajzen (2002) recommends that "Several different questions should be formulated to obtain a direct measure of subjective norm" (p. 5). Questions measuring the respondent's subjective norms towards HPV vaccination included a statement regarding their thought about whether people who are important to them would be supportive if they were vaccinated against HPV in the next six months. An additional item regarding their own subjective norms asked whether the people who are important to them would be disappointed or pleased with them being HPV vaccinated in the next six months. Two additional questions were added to the instrument to address the descriptive norms among "others" for the participants. The first item asked the participant to indicate the extent to which the statement was unrealistic or realistic that the important people in their lives would consider being vaccinated against HPV. The second question asked whether most people who are important to them would likely or unlikely consider their own vaccination within the next six

months. These followed the recommendations put forth by Ajzen (2002) who also added that this scale, like the others, must be tested and then revised in order to obtain a high level of internal consistency. This resulted in four items on the instrument addressing the subjective norms of students towards HPV vaccination within the next six months. The response options were designed so that both positive and negative adjectives were varied for these items. For analysis, those questions requiring reverse coding were carried out so that higher scores on these items represent a positive response. The average score for this construct was computed and used as part of the final data analysis for this project.

Perceived behavioral control. Items measuring participants' perceived behavioral control towards being HPV vaccinated were designed to reflect their "confidence that they are capable of performing the target behaviour" (Francis et al., 2004, p. 21). Ajzen (2002) indicated that items of this type address the level of difficulty involved with performing a particular behavior, or the chances that the individual can actually carry out the task. Francis et al (2004) added that this can be accomplished by measuring the self-efficacy and degree of control about the behavior.

Three items measured students' perceived behavioral control towards being HPV vaccinated within the next six months. Two questions addressed self-efficacy among student perceived behavioral control. The first self-efficacy question asked students to identify the level of difficulty (from easy to difficult) regarding being HPV vaccinated in the next six months. The second question determined the extent to which they were confident that HPV vaccination is realistic in the next six months.

Students were also asked their level of control towards being HPV vaccinated within the six-month period. Response options remained on the 7-point adjective scale with manageable

and unmanageable at opposite ends of the scale. According to Ajzen's (2002) TpB questionnaire manual for researchers, the items with negative endpoints opposite of the scale will be recoded so that higher scores will reflect a greater sense of control over the behavior being HPV vaccinated. The average score from respondents was computed and used in the data analysis process. A summary of each of the scales in the survey and range of potential scores for each are presented in Table 5.

Table 5

Subscales, Corresponding Items and Range of Scores for Proposed Instrument

Scale/Construct	Survey Items	Range
Knowledge	12-26	0-15
Attitudes	27 (a-d)	4-28
Perceived behavioral control	28 (a-c)	3-21
Generalized intentions	29-31	3-21
Subjective norms	32 (a-b), 33 (a-b)	4-28

Questionnaire Development

Upon approval from the Human Subjects Committee at Southern Illinois University Carbondale, the steps involved with the pilot study began. Burns and Grove (2005) noted that pilot studies are considered a "smaller version of a proposed study conducted to refine the methodology" (p. 42), and are typically designed using similar subjects, treatments and setting.

The first part of the pilot test consisted of a professional review of the prospective instrument to determine evidence of content validity along with any improvements to facilitate completion. The draft questionnaire was sent to three experts, two HPV experts and one expert in

survey development and design, for review. The expert panel was e-mailed an expert panel letter (Appendix B) and asked to evaluate each item by rating it using the following, 1- accept, no corrections, 2- accept with modifications, or 3- reject and replace on the drafted instrument for expert panel reviewers questionnaire (Appendix C). There was a section for the expert panel to also add items to the questionnaire on the pilot expert panel evaluation form (Appendix D). Based on feedback from the panel, the questionnaire was revised and submitted for final review and approval.

Each member of the panel received a packet containing a copy of the cover letter, proposed instrument for this study and the directions for questionnaire administration intended for the course instructors in the final study. A document was included that contained several questions regarding this process in order to obtain written feedback for reference after their review.

The panel was asked to read and comment on the layout and content of the cover letter and whether it adequately provided potential participants with the necessary information. Feedback was solicited on the proposed questionnaire, in part regarding the directions and any difficulties they felt may hinder students' completion of the instrument. The panel was given a deadline to complete their review, at which time the researcher contacted them and made arrangements to obtain any comments or suggestions they had. No items were deleted from the questionnaire, however, abbreviations were spelled out the first time used and a demographic item included based on the panel members' recommendations. For instance, instead of the abbreviations "HPV" and "STI", the panel recommended the use of "Human Papillomavirus" and "Sexual Transmitted Infection. The questionnaire was edited to include the word "Transgender" in the demographics. Upon review of the suggestions and/or recommended

changes made by the panel, the survey was revised as needed and prepared for the data collection phase of the pilot test. During the instrument review by the panel of experts, the researcher initiated contact with the potential site for the pilot testing.

Pilot Study

Students attending a Southeastern region university served as potential participants to help further validate the final instrument. Permission was sought from the administrators of the university to select supportive faculty members that would allow the researcher to enter their classroom to administer the questionnaire to male participants over 18 years of age. As part of the request process, the administrators and faculty received copies of the cover letter (Appendix E), consent form (Appendix F), and questionnaire for consideration and any additional documents or discussions needed to obtain formal permission.

Gerrish and Lacey (2010) indicated that a general rule for determining the size of the pilot sample is 10% of the desired population. Based on the fall 2013 enrollment data, 362 males represented the potential sample resulting in a recommended minimum of 36 completed questionnaires for adequate analyses. Fifty students attending a core health course during the beginning of spring 2014 participated in the pilot study. One of the primary uses of the pilot data is to determine the reliability of the items developed by the researcher soliciting students' intentions to be HPV vaccinated. Statistically, the larger the dataset, the more accurate the reliability analyses will be, which supports the goal of obtaining the maximum number of completed surveys during that time. Reliability refers to the consistency and stability of measurement (Isaac & Michael, 1995; Litwin, 1995). Internal consistency reliability was measured on the summative scale (knowledge) by calculating a statistic known as the Cronbach's Alpha coefficient. "Each of these procedures measures the degree to which the items

are related to each other" (McDermott & Sarvela, 1999, p. 139). The scores were highly correlated with one another based on the Cronbach's Alpha score, which concluded that the instrument was reliable (Table 6).

Table 6

Internal Consistency Reliability Statistics

Variables	Cronbach's Alpha	n of Items
Level of HPV knowledge	0.85	15
Attitude	0.89	4
Perceived Behavioral Control	0.80	3
Behavioral Intention	0.90	3
Subjective Norms	0.79	4

In addition, according to McDermott and Sarvela (1999), to check for accuracy in coding data, a 10% sample of data was checked by comparing what is recorded in the computer data file with the original questionnaire. Questionnaires were randomly selected and checked for intra-rater reliability. Lastly, the readability level of the instrument was also assessed using the SMOG readability formula. (McDermott & Sarvela, 1999). The SMOG readability formula results estimated the questionnaire was written at a seventh grade level, which was appropriate for the proposed sample. The pilot study participants recommended no changes. The same questionnaire was used for the research after the pilot study. After the pilot study, the questionnaire and procedures were revised as needed and resubmitted to the two IRB committees before full data collection commenced.

The proposed dates for pilot data collection were determined when all the requisite documentation and details were confirmed with the university. Based on the recommendations of the administration, the pilot data was collected within the timeframes established. The data were uploaded into SPSS v. 19.0. The items and coding for each of the variables are provided in Table

7.

Table 7

Coding Scheme for Final Instrument

Survey Item(s)	Coded as:	Response Coding	Scale
1. Date of Birth	Age	Manually enter the number	Ratio
2. Your Gender	Gender	1=Male 2=Female	Nominal
3. What is your race?	Race	1=Caucasian 2=Hispanic 3=Native Indian/Alaskan Native 4=African American 5=Asian/Pacific Islander 6=Other	Nominal
3 a. What is your race-Other.	Race-Other	Manually enter response if noted	Nominal
4. What is your current rank?	Rank	1=Freshman 2=Sophomore 3=Junior 4=Senior 5=Graduate Student 6=Non-degree seeking	Nominal
5. Before today heard about HPV?	HPV	1=Yes 2=No	Nominal
6. Before today heard about HPV?-name	HPV-name	Manually enter response if noted	Nominal
7. Before today heard about HPV vaccine?	HPV vaccine	1=Yes 2=No	Nominal
8. Before today heard about HPV vaccine?-name	HPV vaccine-name	Manually enter response if noted	Nominal
9. Do you have HPV?	HPV status	1=Yes 2=No	Nominal
10. Have you been vaccinated against HPV? - 3 doses	Vaccinated-3 doses	1=Yes 2=No	Nominal
11. Are you in the process of being vaccinated ?- Received 1 or 2 doses	Vaccinated-1 or 2 doses	1=Yes 2=No	Nominal
12-26. Knowledge Scale Range 0-15	Knowledge	1=Correct 0=Incorrect 0=Unsure	Ratio

Table 7 (Continued)

Coding Scheme for Final Instrument

27. Attitude subscale (4 item, 27 a-d)	Attitude	1-7 item response range 4-24 Total scale range 27b. and c. reverse coded	Ratio
28. Perceived behavioral control subscale (3 items, 28 a-c)	PCB	1-7 response range 3-21 Total scale range 28a. reverse coded	Ratio
29-31. Generalized intention (3 items)	G-Intention	1-7 =response range 3-21=Total scale range	Ratio
32-33. Subjective norms (4 items, 32a-b-33 a-b)	SujNorm	1-7 response range 4-28=Total scale range 32b and 33a reverse coded	Ratio

Data Collection

Once Human Subjects approval was granted at the university the researcher was attending and the proposed institution for data collection, the selected health and physical education class instructors, 12, were asked to participate in the study. With the approval of the instructors, the researcher scheduled a date and time to administer the questionnaire during the class period of each course. Due to the fact that female students would be present in each class, questionnaires were collected from females but were only used for comparison to the males.

Upon agreement to participate, the researcher arrived during the instructor's regularly scheduled class time and provided an overview of the study, invited students to participate, gave out the cover letter and informed consent form, and informed participants of approximately how long the survey would take to complete. The researcher distributed the survey instruments and remained in the classroom in case questions arose. After all surveys were completed, participants placed them in a collection box away from the researcher and then students had the choice to enter a drawing for a chance to win 1 out of 10 iTunes cards, valued at $10 each. Participation

involved the students writing their e-mail address on the entry form and placing it in a separate collection box. After all surveys had been collected, the researcher randomly selected 10 tickets and contacted all winners to arrange pick-up of their prize. As required by the SIU Human Subjects Committee, all data and any relevant files were locked away safely to be held for three years, after which the researcher will destroy it.

Data Preparation

The questionnaire data was entered into SPSS v. 19.0, and coded for each of the variables in a way that was meaningful to the researcher. In order to prepare the data for the proposed statistical analysis, an initial review of the results included an examination of the distribution of the data and a reliability analysis (Cronbach Alpha) to evaluate the internal consistency of the responses. An important aspect of the "description" of a variable is the shape of its distribution, which tells the frequency of values from different ranges of the variable and how well the distribution can be approximated by the normal distribution. Simple descriptive statistics provide some information relevant to this issue and were computed including the frequency, mean, standard deviation, skewness and kurtosis for each survey item and subscale.

The standard deviation reveals the extent to which the data deviates significantly around the average scores for the sample. The larger the standard deviation, the greater variability is among the final data indicating the results are not normally distributed. The skewness measures the deviation of the distribution from symmetry, with a value of zero indicating the distribution is perfectly symmetrical. If the results are significantly different from zero, then the distribution is asymmetrical with +/- 1 the acceptable range. If the kurtosis (which measures the peakedness of the distribution) is clearly different from zero, then the distribution is either flatter or more peaked than normal, with a value at or close to zero indicating the results approximate a normal

distribution. The range of +/- 1 is noted as acceptable for sample data; however, it is common practice to examine the histograms for each item as this illustrates the variability of the results confirming whether the data are adequate for the proposed statistics (Statsoft, 2010). In addition, reliability and item analyses were computed to confirm the internal consistency for the summative scales measuring the level of knowledge, attitudes, subjective norms and perceived behavioral control regarding participants' intention to be HPV vaccinated.

Data Analysis by Research Question

Research questions one and two were descriptive in nature and were answered reporting the frequencies and percentages, along with the means and standard deviations for the sample's HPV knowledge and each of the subscales measuring the TpB constructs. Research question three was designed to determine which variable, (attitudes, subjective norms, perceived behavioral control) was most predictive of male college students' behavioral intention to be HPV vaccinated. Multiple regression analyses were computed to assess whether these constructs were significant predictors of students' intention to be vaccinated. The dependent variable was students' intention and the independent variables were the average scores for the attitudes, subjective norms and perceived behavioral control scales. Research question four examined the relationship between total knowledge score and behavioral intention among male college students to be vaccinated.

Table 8

Data Analysis Summary

Research Question	Items	Analyses
1. What are the levels of HPV knowledge among male college students?	Knowledge Subscale Items 12-26	Descriptive statistics (frequencies, percentages, Mean, SD)

2. What are the self-reported attitudes, subjective norms, perceived behavioral control about HPV vaccination among male college students?	Attitude Subscale Items 27 a-d PCB Subscale Items 28 a-c Intention Subscale Items 29-31 Subjective Norms Subscale Items 32 a-b,33 a-b	Descriptive statistics (N, percent, Mean, SD)
3. To what extent can the self-reported attitudes, subjective norms, perceived behavioral control predict male college students' behavioral intention to be HPV vaccinated?	Attitude Subscale Items 27 a-d PCB Subscale Items 28 a-c Intention Subscale Items 29-30 Subjective Norms Subscale Items 32 a-b,33 a-b	Multiple Regression: DV = Intention IVs = Attitudes, Subjective norms, Perceived behavioral control
4. Is there a relationship between male college students HPV knowledge and their behavioral intention to be HPV vaccinated?	Knowledge Subscale Items 12-26 Intention Subscale Items 29-31	Pearson Product Moment Correlation Behavioral Intention Total Knowledge Score

*Note.**DV=Dependent Variable
*IVS=Independent Variables

Summary

The purpose of this chapter was to describe the protocol that was implemented for this study, focusing on the study's purpose, research questions, research design, sample, instrumentation, pilot study, data collection, data preparation and data analyses. The purpose of this study was to examine male college students' intention to be HPV vaccinated and their HPV knowledge, attitudes, subjective norms, and perceived behavioral control towards the vaccination. A descriptive, correlational, cross-sectioned research design was employed within this study. Male students at a mid-sized public university were solicited to complete an in-class survey.

CHAPTER 4

RESULTS AND ANALYSIS

Introduction

The purpose of this quantitative research study was to examine male college students' knowledge and intention to be HPV vaccinated. Four research questions were formulated to guide the analysis.

Research Questions

1. What are the levels of HPV knowledge among male college students?
2. What are the self-reported attitude, subjective norms, behavioral intention and perceived behavioral control about HPV vaccination among male college students?
3. To what extent can self-reported attitude, subjective norms, and perceived behavioral control predict male college students' behavioral intention to be HPV vaccinated?
4. Is there a relationship between male college students' HPV knowledge and their perceived behavioral intention to be HPV vaccinated?

This chapter begins with the discussion of frequency tables to summarize the demographic information for the sample of male college students. This is followed by normality testing for the data of the study variables. Then, the internal consistencies of the subscales of the surveys are presented. The descriptive statistics of the data for level of HPV knowledge, attitudes, subjective norms, perceived behavioral control, and behavioral intention regarding participants' intention to be HPV vaccinated are presented to address research questions one and

two. Following that, results of the multiple linear regression and Pearson correlation tests are presented to address research questions three and four, respectively.

Findings

Demographics of the Sample

During spring 2014, a total of 304 surveys were distributed in 40 health and physical education classes at a public, four-year degree granting institution in the Southeastern region of the United States. Of the 304 surveys, 96 were not included in the analyses because either the respondents were already HPV vaccinated or the surveys were incomplete. The resulting sample of respondents consisted of 208 male college students. The demographic breakdowns of the sample are summarized in Table 9.

As shown in Table 9, the age range of the male college students was between 18 and 24 years old. Most of the students were aged 18 (40; 19.2%), 19 (55; 26.4%), 20 (33; 15.9%), 21 (37; 17.8%), or 22 (23; 11.1%) years old. In terms of race, the majority of the 208 respondents were African American (153; 73.6%). The class rank of the male college students was variable, with 67 (32.2%) freshmen, 59 (28.4%) sophomores, 60 (28.8%) juniors, and 22 (10.6%) seniors. Most of the sample participants (116; 55.8%) had not heard about HPV before being part of the study, and 91 (43.8%)out of the 208 male college students had heard about HPV. Of those91male college students, 39 (18.8%) had heard of HPV from health class. Also, 121 (58.2%) had not heard of HPV vaccines before participating in the study, and 86 (41.3%) had heard of HPV vaccines.. Among these 86 male college students, they had heard of HPV vaccines from various sources, including health class (24; 11.5%), their doctor (10; 4.8%), and from their mother (9; 4.3%).The vast majority of the male college students (204; 98.1%) did not have HPV. None of the 208 male college students had been vaccinated against HPV and none were in the

process of receiving vaccination of HPV at the time of data collection.

Table 9

Frequency and Percentage of Responses on Demographic Survey

Characteristic	n	%
Age		
18	40	19.2
19	55	26.4
20	33	15.9
21	37	17.8
22	23	11.1
23	11	5.3
24	9	4.3
Race		
African American	153	73.6
Caucasian	31	14.9
Hispanic	18	8.7
Other	5	2.4
Native Indian/Alaskan Native	1	0.5
Rank		
Freshman	67	32.2
Sophomore	59	28.4
Junior	60	28.8
Senior	22	10.6
Before today heard about HPV		
No	116	55.8
Yes	91	43.8
Missing	1	0.5
Heard HPV from whom		
Health Class	39	18.8
Doctor	4	1.9
Health Programs-Seminar	4	1.9
Clinic	3	1.4
Mother	2	1.0
TV Commercials	2	1.0
Family Member	1	0.5
Friend	1	0.5
News	1	0.5
Brochure	1	0.5
Student Health Services	1	0.5
Coach	1	0.5
Missing	148	71.2

Table 9 (Continued)

Frequency and Percentage of Responses on Demographic Survey

Characteristic	n	%
Before today, heard about HPV vaccines		
No	121	58.2
Yes	86	41.3
Missing	1	0.5
Heard HPV vaccines from whom		
Missing	154	74.1
Health Class	24	11.5
Doctor	10	4.8
Mother	9	4.3
TV Commercials	4	1.9
Seminar-Speaker	3	1.4
Someone Talking	1	0.5
News	1	0.5
Friend	1	0.5
Student Health Services	1	0.5
Do you have HPV		
No	204	98.1
Have you been vaccinated against HPV (3 doses)		
No	208	100
Are you in process of vaccination (Received 1 or 2 doses)		
No	208	100

Comparison of Demographics between HPV Vaccinated and Not Vaccinated

Simply for informational purposes, a comparison was made between those who had been HPV vaccinated and those who had not. Table 10 reveals the results of this comparison. There were 208 students that were classified as not HPV vaccinated and 79 that were HPV vaccinated. The comparison of age showed that the majority of both students that had been HPV vaccinated and those that had not been HPV vaccinated had the same age range of 18 to 23 years old. In terms of race, the majority of the students that had been HPV vaccinated (58 out of 79) and those that had not been HPV vaccinated (165 out of 208) were African Americans; few were Caucasians. For the class rank of the male college students, both students that had been HPV

vaccinated and those that had not been HPV vaccinated were almost equally spread among freshman, sophomore, and junior ranks.

Many of the male college students that had been HPV vaccinated had heard about HPV (68 out of 79) before being part of this study, while half of those that had not been HPV vaccinated had not heard about HPV (122 out of 208 before being part of this study. The majority of all students, whether they had been vaccinated or not, had heard of HPV either from their doctor or health class; additionally, students that were HPV vaccinated also heard about HPV vaccines from the military. Many of the male college students that had been HPV vaccinated had heard about HPV vaccines (70 out of 79) before being part of this study, while the majority of those that had not been HPV vaccinated had not heard about HPV vaccines (125 out of 208) before being part of this study. Both student groups that were not HPV vaccinated and that were HPV vaccinated heard about HPV vaccines from their doctor, their mother, or health class; additionally, students that were HPV vaccinated also heard about HPV vaccines from the military. The majority of both student groups that had and had not been HPV vaccinated did not have HPV and was not in the process of being vaccinated at the time of data collection.

Table 10

Frequency and Percentage of Responses on Demographic Survey between Students Vaccinated and Not Vaccinated against HPV

	Not HPV Vaccinated		HPV Vaccinated		Total	
Characteristic	n	%	n	%	n	%
Age						
18	40	19.2	17	21.5	57	19.9
19	55	26.4	18	22.8	73	25.4
20	33	15.9	9	11.4	42	14.6
21	37	17.8	8	10.1	45	15.7
22	23	11.1	5	6.3	28	9.8
23	11	5.3	10	12.7	21	7.3
24	9	4.3	12	15.2	21	7.3
Gender						
Male	208	100.0	79	100.0	287	100.0
Race						
African American	153	73.6	58	73.4	211	73.5
Caucasian	31	14.9	21	26.6	52	18.1
Hispanic	18	8.7	0	0.0	18	6.3
Native Indian/Alaskan Native	1	0.5	0	0.0	1	0.3
Other	5	2.4	0	0.0	5	1.7
Rank						
Freshman	67	32.2	29	36.7	96	33.4
Sophomore	59	28.4	17	21.5	76	26.5
Junior	60	28.8	22	27.8	82	28.6
Senior	22	10.6	11	13.9	33	11.5
Total	208	100.0	79	100.0	287	100.0

Table 10 (Continued)

Frequency and Percentage of Responses on Demographic Survey between Students Vaccinated and Not Vaccinated against HPV

	Not HPV Vaccinated		HPV Vaccinated		Total	
Characteristic	n	%	n	%	n	%
Before today, heard about HPV						
No	116	55.8	11	13.9	127	44.2
Yes	91	43.8	68	86.1	159	55.4
Missing	1	0.5	0	0.0	1	0.3
Heard about HPV from whom						
Health Class	39	65.0	13	23.2	52	44.8
Doctor	4	6.7	15	26.8	19	16.4
Military	0	0.0	13	23.2	13	11.2
Mother	2	3.3	6	10.7	8	6.9
Clinic	3	5.0	2	3.6	5	4.3
TV Commercials	2	3.3	3	5.4	5	4.3
Health Programs-Seminar	4	6.7	1	1.8	5	4.3
Health Department	0	0.0	2	3.6	2	1.7
Streets	0	0.0	0	0.0	0	0.0
Family Member	1	1.7	0	0.0	1	0.9
Friend	1	1.7	0	0.0	1	0.9
News	1	1.7	0	0.0	1	0.9
Brochure	1	1.7	0	0.0	1	0.9
Student Health Services	1	1.7	0	0.0	1	0.9
Coach	1	1.7	0	0.0	1	0.9
Guidance Counselor	0	0.0	1	1.8	1	0.9
Psychology Class	0	0.0	0	0.0	0	0.0
Total	208	100.0	79	100.0	287	100.0

Table 10 (Continued)

Frequency and Percentage of Responses on Demographic Survey between Students Vaccinated and Not Vaccinated against HPV

	Not HPV Vaccinated		HPV Vaccinated		Total	
Characteristic	n	%	n	%	n	%
Before today, heard about HPV vaccines						
No	121	58.2	9	11.4	130	45.3
Yes	86	41.3	70	88.6	156	54.4
Missing	1					
Heard HPV vaccines from whom						
Doctor	10	4.8	22	27.8	32	11.1
Health Class	24	11.5	6	7.6	30	10.5
Mother	9	4.3	5	6.3	14	4.9
Military	0	0.0	13	16.5	13	4.5
TV Commercials	4	1.9	3	3.8	7	2.4
Seminar-Speaker	3	1.4	1	1.3	4	1.4
Health Department	0	0.0	2	2.5	2	0.7
Someone Talking	1	0.5	1	1.3	2	0.7
News	1	0.5	1	1.3	2	0.7
Internet	0	0.0	1	1.3	1	0.3
Friend	1	0.5	0	0.0	1	0.3
Student Health Services	1	0.5	0	0.0	1	0.3
Nursing Class	0	0.0	1	1.3	1	0.3
Do you have HPV?						
No	208	98.1	74	93.7	278	96.9
Are you in process of vaccination? (Received or 2 doses)						
No	208	74.3	72	25.7	280	92.4
Total	208	100.0	79	100.0	287	100.0

Test for Normality

Prior to conducting the statistical analysis of multiple linear regression and Pearson's correlation test to address the research questions of the study, preliminary screening of the data was conducted to ensure that the data set for each study variable exhibited the required assumption of normal distribution. Normal distribution of the data is a required assumption of

parametric tests such as multiple linear regression and Pearson's correlation test.

The test of normality was conducted on the study variables of level of knowledge, attitudes, subjective norms, perceived behavioral control, and behavioral intention regarding participants' intention to be HPV vaccinated. First, the skewness and kurtosis statistics of the data for each study variable were obtained. The skewness and kurtosis statistics of each study variable are summarized in Table 11. Statsoft (2010) suggested that the acceptable range of values for both skewness and kurtosis statistics was+/- 1 to show that the data followed normal distribution. The +/- 1 tolerance range showed that the curve of the graph still exhibited the bell-shaped curve of a normal distribution plot.

Looking at Table 11, the skewness statistic values of the study variables enumerated ranged between -0.33 and 0.24, while the kurtosis values ranged between -0.74 and 0.08. The skewness and kurtosis statistics of all study variables fell within the criteria established by Statsoft (2010), indicating that all the data of the study variables were normally distributed. Both the multiple linear regression analysis and the Pearson correlation test were then conducted since the data of the study variables exhibited normal distribution.

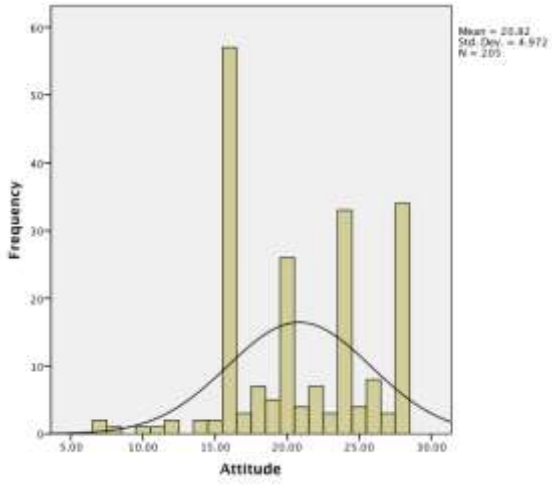
Table 11

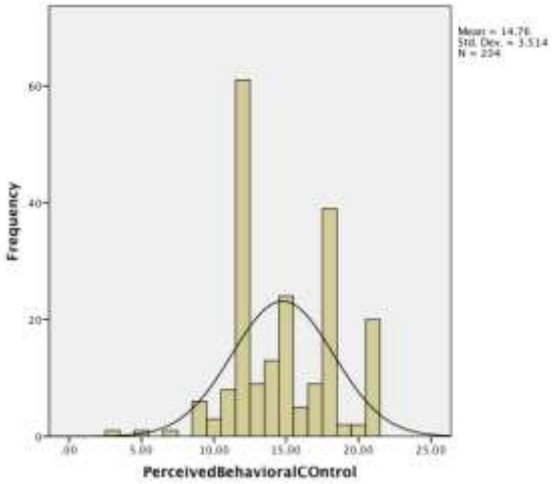
Skewness and Kurtosis Statistics of Study Variables

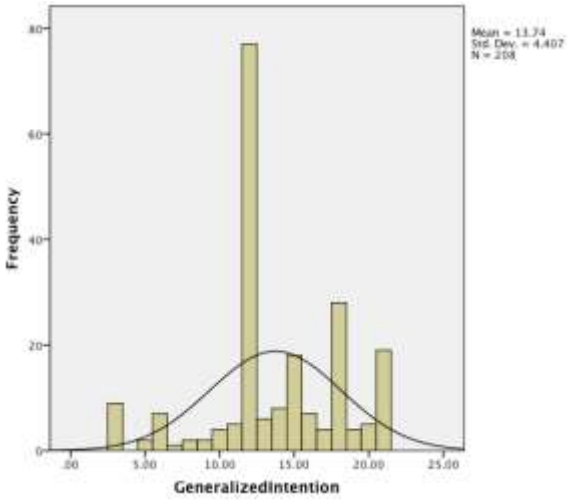
	N		Skewness		Kurtosis	
Variables	Statistic	Std. Deviation	Statistic	Std. Error	Statistic	Std. Error
Attitude	205	4.97	-0.12	0.17	-0.74	0.34
Perceived Behavioral Control	204	3.51	0.06	0.17	-0.31	0.34
Behavioral Intention	208	4.41	-0.33	0.17	0.08	0.34
Subjective Norms	204	4.63	0.24	0.17	-0.21	0.34

Histograms of the data of the study variables are presented in Figure 6. They revealed

that the spread of the study variables (level of knowledge, attitudes, subjective norms, perceived behavioral control, and behavioral intention regarding participants' intention to be HPV vaccinated) deviated from the bell-shaped curve pattern of a normal distribution. But, this was acceptable since the skewness and kurtosis statistics of the data of all study variables fell within the criteria enumerated by Statsoft (2010), indicating that the data sets did not violate the required assumption of normal distribution. It was also observed for all study variables that the values were high relative to the maximum value, since the histograms were skewed to the right, the upper range of values.







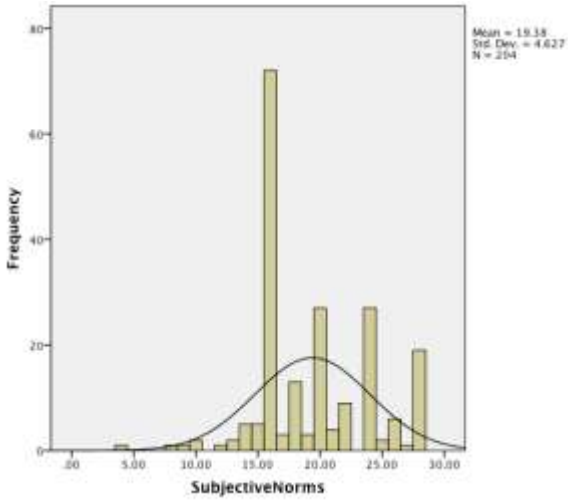


Figure 6. Histograms of Study Variables for Graphical Representation of Normal Distribution

Internal Consistency of Level of Knowledge, Attitudes, Subjective Norms, Perceived Behavioral Control, and Behavioral Intention

The reliability, in terms of internal consistency, of the results of the summative scales measuring the levels of knowledge, attitudes, subjective norms, perceived behavioral control, and behavioral intention regarding participants' intention to be HPV vaccinated were also tested. Reliability was tested through the internal consistency of the responses among the sample of 208 male college students. Internal consistency was measured using the Cronbach's Alpha reliability statistic for each of the subscales. Table 12 summarizes the Cronbach's Alpha reliability coefficients for level of knowledge, attitudes, subjective norms and perceived behavioral control regarding participants' intention to be HPV vaccinated.

Table 12

Cronbach's Alpha Reliability Statistics

Variables	Cronbach's Alpha	n of Items
Level of HPV knowledge	0.88	15
Attitude	0.91	4
Perceived Behavioral Control	0.84	3
Behavioral Intention	0.94	3
Subjective Norms	0.81	4

Level of knowledge ($\alpha = 0.88$), attitudes ($\alpha = 0.91$), subjective norms ($\alpha = 0.81$), perceived behavioral control ($\alpha = 0.84$), and behavioral intention ($\alpha = 0.94$) all had Cronbach's Alpha coefficients greater than 0.7, indicating that the subscales have acceptable internal consistency. Further, the Cronbach's Alpha measures for all subscales were above 0.80, indicating very good internal consistency, and some have values of greater than 0.9, which is an indication of excellent internal consistency. According to Cronbach (1975), who created the

Cronbach's Alpha measure, Cronbach's Alpha value greater than 0.7 indicates an acceptable level of internal consistency, while values equal to or greater than 0.9 indicate an excellent level of internal consistency.

Analysis of Research Questions

Research Question #1: What are the levels of HPV knowledge among male college students?

The descriptive statistics of the study variable of levels of HPV knowledge among male college students are presented in this section. The descriptive statistics include the mean and standard deviation and are summarized in Table 13.

Table 13

Mean and Standard Deviation of HPV Knowledge

	N	Minimum	Maximum	Mean	Std. Deviation
Level of HPV Knowledge	205	0	15	7.65	3.36

Level of HPV Knowledge of the Participants

For level of HPV knowledge, the mean score was 7.65 with a minimum and maximum number of correct items of 0 and 15, respectively. The mean value was in the middle of the 0 to 15 range of possible scores, indicating that the 208 male college students answered half of the 15 question (7.65 out of 15) items correctly. The standard deviation was 3.36.

Summary of Correct Responses on HPV Knowledge Level Questions

The frequency and percentage of correct responses for each of the questions were also examined and are summarized in Table 14. Over 75% of the sample had correct responses on question items 8 "HPV is a virus" (173; 83.2%) and 15 "You can have HPV without knowing it" (162; 77.9%). Participants had the highest number of correct responses in these two items. Additionally, more than half of the male college students had correct responses on question items

5 “HPV is transmitted through sex” (154; 74.0%),7 “HPV vaccine consists of a three shot series” (148; 71.2%), and 10 “Only men get HPV” (118; 56.7%). The fewest correct responses were given to question item 2 “HPV can be cured with the HPV Vaccine” (33; 15.9%).Less than half of the 208 respondents gave correct responses for the remaining question items; these included question items 1, 2, 3, 4, 6, 9, 11, 12, 13 and 14.

Table 14

Frequency and Percentage Summary of Correct Responses per HPV Knowledge Level Question

Question #	Question	n	%
1	HPV is the most common STI in the US.	99	47.6
2	HPV can be cured with the HPV Vaccine.	33	15.9
3	HPV is the cause of Genital Warts.	99	47.6
4	HPV is the cause of anal cancer.	92	44.2
5	HPV is transmitted through sex.	154	74.0
6	HPV vaccine can protect against other STI's like HIV.	83	39.9
7	HPV vaccine consists of a three shot series.	148	71.2
8	HPV is a virus.	173	83.2
9	HPV is a bacterial infection.	102	49.0
10	Only men get HPV.	118	56.7
11	Antibiotics can cure HPV.	60	28.8
12	Some types of HPV cause cervical cancer.	101	48.6
13	Pap Test is a test for cervical cancer.	102	49.0
14	HPV causes herpes.	66	31.7
15	You can have HPV without knowing it.	162	77.9

Research Question #2: What are the self-reported attitude, subjective norms, behavioral intention and perceived behavioral control about HPV vaccination among male college students?

The descriptive statistics for the study variables of self-reported attitude, perceived behavioral control about HPV vaccination, behavioral intention to be HPV vaccinated among male college students, and subjective norms are presented in this section. Means and standard

deviations for the total scores of self-reported attitude, subjective norms, perceived behavioral control about HPV vaccination, and behavioral intention to be HPV vaccinated are summarized in Table 15.

Table 15

Descriptive Statistics of Self-Reported Attitude, Perceived Behavioral Control, Behavioral Intention, and Subjective Norms

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Attitude	205	7	28	20.82	4.97
Perceived Behavioral Control	204	3	21	14.76	3.51
Behavioral Intention	208	3	21	13.74	4.41
Subjective Norms	204	4	28	19.38	4.63

Self-Reported Attitude towards HPV Vaccination of the Participants

For self-reported attitude towards HPV vaccination, the mean score was 20.82, with minimum and maximum scores of 7 and 28, respectively. The mean value was a high number and in the upper range of the possible scores of 7 to 28, which indicated that the male college students had positive attitudes towards HPV vaccination.

Perceived Behavioral Control about HPV Vaccination of the Participants

The mean score for perceived behavioral control about HPV vaccination was 14.76, with a range of 3 to 21. The mean value was above 50% of the possible scores of 3 to 21, which indicated that the male college students had greater sense of control over the behavior of being HPV vaccinated.

Behavioral Intention to be HPV Vaccinated of the Participants

The mean score for behavioral intention to be HPV vaccinated was 13.74, with minimum and maximum scores of the respondents of 3 and 21, respectively. The mean value was above50% of the possible scores of 3 to 21, which indicated that the male college students had

favorable behavioral intention to be HPV vaccinated.

Subjective Norms of the Participants

For subjective norms, the mean score was 19.38, with a range of 4to 28. The mean value was in the upper range of the possible scores of 4 to 28, which indicated that the male college students had a positive attitude about being HPV vaccinated.

Summary of Response on Question Items Measuring Self-Reported Attitudes, Perceived Behavioral Control, Behavioral Intentions, and Subjective Norms

The frequency and percentage summary of the responses on the four question items for self-reported attitudes are summarized in Table 16. For the question item "I think my being vaccinated against HPV in the next 6 months would be," the majority of the respondents said that it was beneficial, wherein 37 (17.8%) said it was slightly beneficial, 53 (25.5%) said it was quite beneficial, and 49 (23.6%) said it was extremely beneficial. For the question item "I think my being vaccinated against HPV in the next 6 months would be" the majority of the respondents said that it was important, there were32 (15.4%) respondents that said it was slightly important, 44 (23.1%) said it was quite important, and 48 (23.1%) said it was extremely important. For the question item "I think my being vaccinated against HPV in the next 6 months would be" the majority of the respondents said that it was valuable, wherein 28 (13.5%) said it was slightly valuable, 51 (24.5%) said it was quite valuable, and 44 (21.2%) said it was extremely valuable. For the question item "I think my being vaccinated against HPV in the next 6 months would be" the majority of the respondents said that it was good, wherein 33 (15.9%) said it was slightly good, 51 (24.5%) said it was quite good, and 47 (22.6%) said it was extremely good.

Table 16

Frequency and Percentage Summary of Question Items for Attitudes

	n	%
I think my being vaccinated against HPV in the next 6 months would be		
Extremely Harmful	6	2.9
Quite Harmful	3	1.4
Slightly Harmful	3	1.4
Neutral	56	26.9
Slightly Beneficial	37	17.8
Quite Beneficial	53	25.5
Extremely Beneficial	49	23.6
Missing	1	0.5
I think my being vaccinated against HPV in the next 6 months would be		
Extremely Unimportant	3	1.4
Quite Unimportant	9	4.3
Slightly Unimportant	8	3.8
Neutral	61	29.3
Slightly Important	32	15.4
Quite Important	44	21.2
Extremely Important	48	23.1
Missing	3	1.4
I think my being vaccinated against HPV in the next 6 months would be		
Extremely Worthless	4	1.9
Quite Worthless	8	3.8
Slightly Worthless	8	3.8
Neutral	63	30.3
Slightly Valuable	28	13.5
Quite Valuable	51	24.5
Extremely Valuable	44	21.2
Missing	2	1.0
I think my being vaccinated against HPV in the next 6 months would be		
Extremely Bad	1	0.5
Quite Bad	7	3.4
Slightly Bad	3	1.4
Neutral	64	30.8
Slightly Good	33	15.9
Quite Good	51	24.5
Extremely Good	47	22.6
Missing	2	1.0

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The frequency and percentage summary of the responses on the three question items for perceived behavior control are summarized in Table 17. For the question item “I think my being vaccinated against HPV in the next 6 months would be” the majority of the respondents said that it was easy, wherein 29 (13.9%) said it was slightly easy, 46 (22.1%) said it was quite easy, and 27 (13%) said it was extremely easy. For the question item “I think my being vaccinated against HPV in the next 6 months would be” the majority of the respondents said that it is realistic, wherein 34 (16.3%) said it was slightly realistic, 58 (27.9%) said it was quite realistic, and 28 (13.5%) said it was extremely realistic. For the question item “I think my being vaccinated against HPV in the next 6 months would be” the majority of the respondents said that it was manageable, wherein 39 (18.8%) said it was slightly manageable, 55 (26.4%) said it was quite manageable, and 27 (13%) said it was extremely manageable.

Table 17

Frequency and Percentage Summary of Question Items for Perceived Behavior Control

	n	%
I think my being vaccinated against HPV in the next 6 months would be		
Extremely Difficult	6	2.9
Quite Difficult	4	1.9
Slightly Difficult	15	7.2
Neutral	78	37.5
Slightly Easy	29	13.9
Quite Easy	46	22.1
Extremely Easy	27	13.0
Missing	3	1.4
I think my being vaccinated against HPV in the next 6 months would be		
Extremely Unrealistic	3	1.4
Quite Unrealistic	4	1.9
Slightly Unrealistic	8	3.8
Neutral	70	33.7
Slightly Realistic	34	16.3
Quite Realistic	58	27.9
Extremely Realistic	28	13.5
Missing	3	1.4
I think my being vaccinated against HPV in the next 6 months would be		
Extremely Unmanageable	4	1.9
Quite Unmanageable	4	1.9
Slightly Unmanageable	7	3.4
Neutral	72	34.6
Slightly Manageable	39	18.8
Quite Manageable	55	26.4
Extremely Manageable	27	13.0

The frequency and percentage summary of the responses on the three question items for behavioral intention are summarized in Table 18. For the question item "I want to be vaccinated against HPV within the next 6 months," the majority of the respondents agreed with the statement, wherein 28 (13.5%) slightly agreed, 44 (21.2%) somewhat agreed, and 32 (15.4%) strongly agreed. For the question item "I will be vaccinated against HPV in the next 6 months," the majority of the respondents agreed with the statement, wherein 29 (13.9%) slightly agreed, 37 (17.8%) somewhat agreed, and 22 (10.6%) strongly agreed. For the question item "I plan to

be HPV Vaccinated in the next 6 months," the majority of the respondents agreed with the statement, wherein 23 (11.1%) slightly agreed, 37 (17.8%) somewhat agreed, and 24 (11.5%) strongly agreed.

Table 18

Frequency and Percentage Summary of Question Items for Behavioral Intention

	N	%
I want to be vaccinated against HPV within the next 6 months		
Strongly Disagree	11	5.3
Somewhat Disagree	5	2.4
Slightly Disagree	3	1.4
Neutral	85	40.9
Slightly Agree	28	13.5
Somewhat Agree	44	21.2
Strongly Agree	32	15.4
I will be vaccinated against HPV in the next 6 months		
Strongly Disagree	17	8.2
Somewhat Disagree	7	3.4
Slightly Disagree	10	4.8
Neutral	86	41.3
Slightly Agree	29	13.9
Somewhat Agree	37	17.8
Strongly Agree	22	10.6
I plan to be HPV Vaccinated in the next 6 months		
Strongly disagree	14	6.7
Somewhat Disagree	7	3.4
Slightly Disagree	11	5.3
Neutral	92	44.2
Slightly Agree	23	11.1
Somewhat Agree	37	17.8
Strongly Agree	24	11.5

The frequency and percentage summary of the responses on the four question items for subjective norms are summarized in Table 19. For the question item "I think if I were vaccinated against HPV in the next 6 months, people who are important to me would be," the majority of the respondents said they were supportive, wherein 32 (15.4%) were slightly supportive, 43

(20.7%) were quite supportive, and 48 (23.1%) were extremely supportive. For the question item "I think if I were vaccinated against HPV in the next 6 months, people who are important to me would be," the majority of the respondents said they were pleased, wherein 30 (14.4%) were slightly supportive, 41 (19.7%) were quite pleased, and 41 (19.7%) were extremely pleased. For the question item "Most people who are important to me would consider their own HPV vaccination in the next 6 months," the majority of the respondents said that it was realistic, wherein 26 (12.5%) said it was slightly realistic, 44 (21.2%) said it was quite realistic, and 21 (10.1%) said it was extremely realistic. For the question item "Most people who are important to me would consider their own HPV vaccination in the next 6 months," the majority of the respondents said that it was likely, wherein 29 (13.9%) said it was slightly likely, 41 (19.7%) said it was quite likely, and 24 (11.5%) said it was extremely likely.

Table 19

Frequency and Percentage Summary of Question Items for Subjective Norms

	n	%
I think if I were vaccinated against HPV in the next 6 months, people who are important to me would be		
Extremely Against it	3	1.4
Quite Against it	5	2.4
Slightly Against it	1	0.5
Neutral	76	36.5
Slightly Supportive	32	15.4
Quite Supportive	43	20.7
Extremely Supportive	48	23.1
I think if I were vaccinated against HPV in the next 6 months, people who are important to me would be		
Extremely Disappointed	3	1.4
Quite Disappointed	5	2.4
Slightly Disappointed	9	4.3
Neutral	77	37.0
Slightly Pleased	30	14.4
Quite Pleased	41	19.7
Extremely Pleased	41	19.7
Missing	2	1.0
Most people who are important to me would consider their own HPV vaccination in the next 6 months		
Extremely Unrealistic	10	4.8
Quite Unrealistic	12	5.8
Slightly Unrealistic	12	5.8
Neutral	81	38.9
Slightly Realistic	26	12.5
Quite Realistic	44	21.2
Extremely Realistic	21	10.1
Missing	2	1.0
Most people who are important to me would consider their own HPV vaccination in the next 6 months		
Extremely Unlikely	7	3.4
Quite Unlikely	11	5.3
Slightly Unlikely	9	4.3
Neutral	85	40.9
Slightly Likely	29	13.9
Quite Likely	41	19.7
Extremely Likely	24	11.5
Missing	2	1.0

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Research Question #3: To what extent can self-reported attitude, subjective norms, and perceived behavioral control predict male college students' behavioral intention to be HPV vaccinated?

A multiple linear regression model was created to determine which independent variables (attitudes, subjective norms, and perceived behavioral control) were significant predictors of the dependent variable (behavioral intention to be HPV vaccinated). The regression results addressed research question three. A level of significance of 0.05 was set for the regression analysis. The results are presented in Table 20.

Table 20

Regression Results of Attitudes, Subjective Norms, and Perceived Behavioral Control as Predictors of Male College Students' Behavioral Intention to be HPV Vaccinated

	Unstandardized Coefficients		Standardized Coefficients		
Model	*B*	Std. Error	*B*	t	Sig.
(Constant)	0.62	1.21		0.51	0.61
Attitude	0.11	0.07	0.12	1.49	0.14
Subjective Norms	0.39	0.07	0.41	5.65	0.00
Perceived Behavioral Control	0.23	0.10	0.18	2.28	0.02

Note. F (3,199) = 42.42, Sig. = 0.00, *R Square* (R^2) = 0.39, N = 202. Dependent Variable: Behavioral Intention. Predictors: (Constant), Attitude, Subjective Norms, Perceived Behavioral Control

First, the model fit in terms of R^2 of the generated linear regression model was analyzed. The R^2, or the coefficient of determination, is the indicator of how well the model fits the data in terms of the variance accounted for by the three independent variables (attitudes, subjective norms, perceived behavioral control) in the dependent variable (male college students' behavioral intention to be HPV vaccinated). R^2 is one minus the ratio of residual variability. An R^2value that is closer to one is better, since this would mean that the independent variables were

accurate predictors of the dependent variable. The regression model has a R^2 of 0.39. This value indicated that the independent variables of attitudes, subjective norms, perceived behavioral control accounted for 39% of the variance in male college students' behavioral intention to be HPV vaccinated, which equates to a medium effect size (Cohen, 1988).

Next, the overall significance of the regression model was analyzed. This statistical test examined the null hypothesis that there is a no linear relationship between any of the independent variables to the dependent variable. As shown in Table 20, the probability value computed from the F-test indicated that the regression involving the attitudes, subjective norms, and perceived behavioral control as the predictor variables of male college students' behavioral intention to be HPV vaccinated was significant (F (3, 199) = 42.42; p = 0.00). Therefore, the null hypothesis was rejected in favor of the alternative hypothesis, as there is a linear relationship existing between the three independent variables of attitudes, subjective norms, perceived behavioral control and the dependent variable of behavioral intention to be HPV vaccinated.

Table 20 also presents the linear regression equation estimates, including the intercept and the probability value of significance of the constant of the regression model and each of the independent variables of the attitudes, subjective norms, and perceived behavioral control to the dependent variable of male college students' behavioral intention to be HPV vaccinated. During this part of the analysis, each independent variable was investigated to determine the best predictor of behavioral intention to be HPV vaccinated. The p-value of significance was first investigated to determine which independent variables were significant predictors of the dependent variable. Next, the beta coefficient was investigated to determine which among the independent variables were the best predictors. The independent variables of subjective norms (t (199)= 5.65, p <0.01) and perceived behavioral control (t (199)= 2.28, p = 0.02) were significant

predictors and had a linear relationship to the dependent variable of male college students' behavioral intention to be HPV vaccinated. The independent variable of attitude (t (199)= 1.49, p = 0.14) did not have any significant impact on the dependent variable.

The standardized beta coefficients were examined to determine the independent contribution and the relative importance of the significant independent variables in predicting the dependent variable. The standardized coefficient value (beta) of subjective norms was 0.41, which suggested that subjective norms had a positive contribution to the model in predicting the male college students' behavioral intention to be HPV vaccinated. In other words, male college students' behavioral intention to be HPV vaccinated became higher when their subjective norms became more positive. Each time the score value of the subjective norms increases by one standard deviation, it is predicted that male college students' behavioral intention to be HPV vaccinated will increase by 0.41 standard deviations.

The standardized beta coefficient of perceived behavioral control was 0.18, which suggested that the perceived behavioral control had a positive contribution to the model in predicting the male college students' behavioral intention to be HPV vaccinated. Male college students' behavioral intention to be HPV vaccinated became higher when their perceived behavioral control towards being vaccinated against HPV in the next 6 months was more positive or they felt more confident that they were capable of being vaccinated. Each time the score value of the perceived behavioral control increases by one standard deviation, it is predicted that male college students' behavioral intention to be HPV vaccinated will increase by 0.18 standard deviations.

Based on the comparison of the beta coefficient, subjective norms was the best predictor of the behavioral intention to be HPV vaccinated. This was because the beta coefficient of

subjective norms was greater than the beta coefficient of perceived behavioral control, indicating that subjective norm had greater influence in the model in predicting behavioral intention to be HPV vaccinated.

Research Question #4: Is there a relationship between male college students' HPV knowledge and their perceived behavioral intention to be HPV vaccinated?

Pearson's correlation test was conducted to determine the relationship between HPV knowledge and behavioral intention to be HPV vaccinated. A level of significance of 0.05 was set. The Pearson's correlation test also reveals the degree of the correlation (positive or negative). The results of the Pearson's correlation test are presented in Table 21. The results indicated that male college students' level of HPV knowledge was not significantly correlated to their behavioral intention to be HPV vaccinated ($p = 0.43$, $r = 0.06$).

Table 21

Pearson's Correlation Test Result of Relationship of HPV Knowledge and Behavioral Intention to be HPV Vaccinated

		HPV Knowledge Level
Behavioral intention to be HPV vaccinated	Pearson Correlation	0.06
	Sig. (2-tailed)	0.43
	N	208

Note. Correlation is significant at the 0.05 level (2-tailed).

Summary

Chapter 4 presented the results of the study to determine male college students' knowledge and intention to be HPV vaccinated. The results of the descriptive statistics showed that, on average, the sample of 208 male college students had correct responses on only half of the 15 questions regarding knowledge about HPV based on the mean scores, positive attitudes towards HPV vaccination, greater sense of control over the behavior of being HPV vaccinated,

more favorable intention to be HPV vaccinated, and positive responses about being HPV vaccinated. The multiple linear regression results showed that subjective norms and perceived behavioral control were significant predictors of male college students' behavioral intention to be HPV vaccinated. Subjective norms and perceived behavioral control had a positive influence to male college students' behavioral intention to be HPV vaccinated. Lastly, the Pearson correlation test results showed that male college students' level of HPV knowledge was not significantly correlated to their behavioral intention to be HPV vaccinated. Two-tailed tests were used for both the multiple linear regression and the Pearson correlation test, since there was no directional limitation in the hypothesis. Both multiple linear regression and the Pearson correlation test aims to determine if there is either positive or negative relationship between variables.

CHAPTER 5

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

Purpose of the Study

This quantitative cross-sectional, descriptive correlational and predictive correlational research was undertaken to determine if the average scores for the attitudes, subjective norms, and perceived behavioral control scales significantly influenced male students' willingness to be HPV vaccinated. The purpose of this study was to provide health educators and researchers with greater knowledge about male college students' knowledge of and intention to be HPV vaccinated. The current study was conducted utilizing a questionnaire developed by the researcher. The questionnaire was aligned with the constructs of the Theory of Planned Behavior (TpB) by Ajzen (1985). The participants of this study consisted of 208 male college students, enrolled at a public, four-year degree granting institution in the Southeastern region of the United States. Using a correlational research design, the following research questions were answered:

1. What are the levels of HPV knowledge among male college students?
2. What are the self-reported attitude, subjective norms, behavioral intention and perceived behavioral control about HPV vaccination among male college students?
3. To what extent can self-reported attitude, subjective norms, and perceived behavioral control predict male college students' behavioral intention to be HPV vaccinated?
4. Is there a relationship between male college students' HPV knowledge and their perceived behavioral intention to be HPV vaccinated?

Summary of the Study

The descriptive and predictive correlations between male students' willingness to be HPV vaccinated and their average scores for the attitudes, subjective norms, and perceived behavioral control scales provided answers to the research questions of this study. Chapter 5 encompasses the summary of findings, discussion of the results, conclusions generated, and implications for health education, as well as the limitations and recommendations for future research and health education practice. This chapter is concluded by a summary of important points discussed in the preceding sections.

Summary of the Findings

The demographic data collected included age, race, class rank, and level of knowledge about HPV. Of the 208 respondents, age ranged from 18 to 24 years old. The majority of the respondents were African American (73.6%). The participants of the study consisted of 67 (32.2%) freshmen, 59 (28.4%) sophomores, 60 (28.8%) juniors, and 22 (10.6%) seniors. Moreover, less than half (91, 43.8%) of the respondents had heard about HPV vaccination. With this level of knowledge, it was revealed that 98.1% of the 208 respondents did not have HPV. However, it was found that none of the 208 respondents were HPV vaccinated and none were in the process of receiving the HPV vaccine.

The descriptive statistics included the statistics of mean and standard deviation. This data analysis provided answers to research questions 1 and 2, which revealed the level of knowledge about HPV vaccination, self-reported attitudes, subjective norms, and perceived behavioral control about HPV. The results of the descriptive statistics indicated that male college students had correct responses for only half of the 15 questions regarding the knowledge about HPV based on the mean scores, positive attitudes towards HPV vaccination, greater sense of control

over the behavior being HPV vaccinated, more favorable intention to be HPV vaccinated, and had positive reactions about being HPV vaccinated.

To determine the predictive power of self-reported attitudes, subjective norms, and perceived behavioral control about HPV, multiple linear regression analysis was conducted. Results revealed that subjective norms and perceived behavioral control were significant predictors of male college students' behavioral intention to be HPV vaccinated. Moreover, subjective norms and perceived behavioral control had a positive influence on the male college students' behavioral intention to be HPV vaccinated. Furthermore, to determine the relationships between HPV knowledge and their behavioral intention to be HPV vaccinated, Pearson correlation was conducted. Test results of the statistical test revealed that male college students' level of HPV knowledge was not significantly correlated to their behavioral intention to be HPV vaccinated.

Conclusion

This quantitative cross-sectional, descriptive correlational and predictive correlational research sought to determine if the average scores for the attitudes, subjective norms, and perceived behavioral control scales significantly influenced male students' willingness to be HPV vaccinated. The following are conclusions of this study:

1. Male college students have positive attitudes towards HPV vaccination. This finding was in line with findings of similar researchers in existing body of literatures.
2. Male college students have great sense of control over the behavior of being HPV vaccinated. This means that the male college students were likely to be HPV vaccinated when they have positive attitudes towards HPV vaccination.
3. Male college students have favorable intention to be HPV vaccinated.

4. Subjective norms and perceived behavioral control were significant predictors of male college students' behavioral intention to be HPV vaccinated.
5. Subjective norms and perceived behavioral control positively influenced behavioral intention of male college students to be HPV vaccinated. This finding was also in line with existing researches on the same body of literatures.
6. These findings can be used by health practitioners, health educators and researchers to understand the level of knowledge, attitudes, perceived control, and subjective norms about HPV vaccination in males and they can use the findings to develop health programs suitable for male college students.
7. Having adequate knowledge about HPV is not enough to cause HPV vaccination among male college students. Many factors govern the lifestyle of college students which health practitioners, health educators and researchers need to consider before influencing male college students to receive the HPV vaccine.

Discussion

. In this section, the alignment of the findings with respect to existing literature will be examined. Ghazal-Aswad (2008) purported that the development of the HPV vaccine had been a milestone in combating the disease. Moreover, Schwartz et al. (2007) posited that the introduction of the HPV vaccine has improved women's health. Despite the benefits derived from the utilization of the HPV virus, there have been public concerns surrounding the HPV vaccine. These concerns are grounded to "moral, religious, political, economic, and sociocultural arguments" (Vamos et al., 2008, p. 308). With these assertions about the impact of the HPV vaccine on women, it is easier to determine its impact on men.

Backes et al. (2009) posited that there is less information about the impacts of HPV

disease to men as compared to women. Some studies (e.g. Sandfort & Pleasant, 2009; Jones & Cook, 2008) have focused on male attitudes toward HPV vaccination. These studies revealed that men are less likely to be HPV vaccinated as compared to women. Moreover, it was revealed that men had negative perceptions towards HPV vaccination, which made them have lesser intention to be HPV vaccinated. Although there has been considerable evidence that proved that HPV vaccination was useful for males, such vaccination has not been established by governing health bodies (e.g., CDC, FDA) to be a mandatory vaccine among children. Furthermore, there was lack of direct policy regarding HPV vaccination in males. Thus, the public concern had not been extensively studied in the literature.

To address the limited body of knowledge about HPV vaccination in men, the current study was intended to describe the level of knowledge, attitudes, subjective norms, behavioral intention and perceived behavioral control of behavior of male college students. It was determined that the male college students had correct responses on only half of the 15 questions regarding their knowledge about HPV vaccination. Getting correct answers on only half of the questionnaire was considered having low levels of knowledge. This finding was similar to the results of the study of Sandfort and Pleasant (2009). Sandfort and Pleasant (2009) reported that men had lower levels of knowledge about HPV vaccination, which resulted in lower HPV vaccination rates among them. Previous studies (D'Urso et al., 2007; Gerend & Magloire, 2008) concluded that male college students are not as knowledgeable about HPV as female college students across different ethnic groups. The study of Kester, Shedd-Steele, Dotson-Roberts, Smith, and Zimet (2014) involving 131 male and female respondents from Indiana, ranging in age from 18 to 26 years old, concluded that despite the recommendation to vaccinate young females and males with HPV vaccines, the level of education about HPV remained low and thus,

resulted in low HPV vaccination rates. This result was congruent with the current study.

The results of the analysis showed that male college students had positive attitudes towards HPV vaccination. This result was similar to the findings of Daley et al. (2011), that also revealed that male college students had positive attitudes towards HPV vaccination. The study of Zimet and Rosenthal (2010) also supported this result. Zimet and Rosenthal (2010) posited that adolescent and adult males had positive attitudes towards receiving the HPV vaccine.

Another finding was that male college students had greater sense of control over the behavior being HPV vaccinated. There was limited knowledge on the influence of a person's perceived control on behaviors towards HPV vaccination to his/her intention to be HPV vaccinated. Francis et al. (2004) discussed that perceived control pertains to the "confidence that they are capable of performing the target behavior" (p. 21). Moreover, Francis et al. (2004) added that perceived control could be measured through self-efficacy and the degree of control about the behavior. Furthermore, based on the TpB by Ajzen (2002), greater perceived control was associated to more favorable attitudes and subjected norms, which resulted in stronger intention to perform the specific behavior. This finding in the current study was aligned to the explanation of Ajzen (2002) about the positive relationship between attitude and perceived control. Since it was revealed that male college students had positive attitudes towards HPV vaccination, it was more likely that they had greater sense of control on their behaviors towards HPV vaccination. Thus, the male college students were more likely to be HPV vaccinated when they had positive attitudes toward HPV vaccination.

The results of the analysis in the current study showed that male college students had more favorable intention to be HPV vaccinated. Forster, Marlow, Wardle, Stephenson, and Waller (2012) supported this finding. They utilized 528 boys, ranging in age from 16 to 18 years

old, to complete a questionnaire. Forster et al. (2012) concluded that HPV vaccination was generally accepted by young males. Alternatively, this finding of the current study opposed previous research of Crosby et al. (2008). Of the 115 male students in their study, 35.7% of the students reported negative intention to HPV vaccination (Crosby et al., 2008). Crosby et al. (2008) also found factors related to negative intention to be HPV vaccinated; they reported that not having penile-vaginal intercourse in the last 12 months, lack of knowledge regarding HPV and/or living in a rural versus urban area contributed to the negative intention of the participants towards HPV vaccination.

Moreover, the results from the multiple regression analysis of the current study showed that subjective norms and perceived behavioral control were significant predictors of male college students' behavioral intention to be HPV vaccinated. Specifically, it was determined that subjective norms and perceived behavioral control positively influenced behavioral intention of male college students to be HPV vaccinated. In this current study, subjective norm was defined as the "perceived social pressure to perform a behavior" (Francis, 2004, p. 32). With this definition, social pressure is characterized by the induced pressure from the important people surrounding an individual. In the study of Reiter et al. (2011), it was revealed that peer acceptance played a major role in the intention of young males to receive the HPV vaccine. Moreover, parental attitudes were associated with more significant predictors of the willingness for young males to receive the HPV vaccine (Reiter et al., 2011). Previous studies (Boehner et al., 2003; Ferris et al., 2008, 2009; Hollander, 2010) supported the finding of the current study by reporting that approval from powerful others (e.g., parents, siblings, doctors) was a strong predictor of behavioral intentions of men to receive HPV vaccines. Attitude toward HPV vaccination did not significantly predict behavioral intention to be HPV vaccinated, based on the

regression results.

Implications for Health Education

Bleeker et al.,(2009)revealed that diseases triggered by HPV were commonly found in elderly men over the age of 60 years. This finding has resulted in debates regarding the need to vaccinate young men with the HPV vaccine (Kim, 2011). However, the ACS (2012) revealed that the association of HPV to the occurrence of penile cancer was parallel to the occurrence of cervical cancer in women. This report changed the perception that only women were at high risk of cancer from HPV. Kim (2011) argued that while there was no clinical evidence that the administration of the HPV vaccine totally prevented HPV diseases, studies (e.g. Giuliano et al., 2011a) suggested that HPV vaccination may have had some value. Specifically, Giuliano et al. (2011a) concluded that the vaccine could be effective for reducing genital warts caused by HPV infections in men.

Focusing on the clinical aspect of HPV vaccination, Hollander (2010) posited that the majority of physicians examined believed that HPV vaccination should be made readily available for males. HPV vaccine will not only prevent HPV-related diseases in males, but it can also reduce the risk of HPV infection in females. Hollander (2010) further elaborated that there was little support for the idea that female vaccination for HPV invalidates the need for males to be vaccinated as well. Furthermore, these assertions had been supported by the study of Hull and Caplan (2009). Hull and Caplan (2009) posited that, in general, there have been social and public health benefits that could be derived from male vaccination of HPV; they concluded that vaccination of HPV in both males and females was essential to extensively combat HPV-related diseases. These conclusions were based on clinical implications that revealed the equal importance of HPV vaccination in males, as it was in females, which had been the impetus to the

current study.

The findings of the current study are relevant to health practitioners, health educators and researchers focusing on understanding the level of knowledge, attitudes, perceived control, and subjective norms about HPV vaccination in males. The findings in this current study contribute to the existing body of knowledge about HPV through statistical analysis among the selected variables. These findings can be utilized by health practitioners and health educators in developing health programs suitable for male college students. The predictive power of subjective norms and perceived control of behavior that was revealed can be used by future scholars as a guide to achieve full understanding of the impact of HPV vaccination in males. The findings that the subjective norms and perceived behavioral control positively influenced behavioral intention of male college students to be HPV vaccinated should be used as inputs in developing health programs. Health practitioners and health educators should be able to develop health programs geared toward developing positive subjective norms and positive perceived behavioral control towards being vaccinated against HPV or the feeling of becoming more confident of being vaccinated in order to increase the likelihood of male college students' to have higher intention to be HPV vaccinated. Health practitioners and health educators can focus more on developing positive subjective norms as opposed to developing positive perceived behavioral control toward being vaccinated against HPV of male college students, since it has greater effect on the intent to be HPV vaccinated, based on the regression results. Lastly, health practitioners and health educators should not focus on improving the HPV knowledge of male college students in order to increase their intention to be HPV vaccinated, since the analysis showed that there was no significant relationship between these two variables.

Limitations

The current study had several limitations. In the technical validity aspect, the use of a convenience sampling method may have limited the representativeness of the sample with respect to the entire population. Limiting the sample size and composition may have affected the generalizability of the results in that the sample did not represent the entire general population. The male students attending the university who participated in this study may have had characteristics that were different from those of young males in the general population. Also, respondents who were enrolled in health and physical education courses may have had different characteristics as compared to students enrolled in other courses.

Another limitation of the current study was the potential effect of confounding variables on individual's intention to receive HPV vaccines. Demographic characteristics were some of the possible factors that may have confounded the results. These limitations influenced the technical validity of the findings that this study has revealed.

Recommendations for Future Research

The following are recommendations for future research, based on this study:

1. The use of a convenience sampling method may have limited the representativeness of the sample with respect to the entire population. Thus, in order to address this issue, it is recommended that future studies utilize random sampling method. Random sampling method increases the validity of the selected sample. In addition, different characteristics of the sample can be considered using random sampling.
2. It is also recommended that this study be extended, replicating the study in several ways.

a. In replication, the researcher may consider samples from different schools in order to obtain different stratified characteristics, in terms of different demographic characteristics, of the population being investigated.
b. Alternatively, the researcher could utilize qualitative methods in order to dig deeper on the experiences and perceptions of respondents with regards to HPV vaccination. Specifically, it is recommended that this study's objective be addressed using phenomenological research method in order to determine how factors such as subjective norms and perceived behavioral control influenced male college students' behavioral intention to be HPV vaccinated. Through face-to-face interviews, the lived experiences of young males could reveal how the factors influence their intention to be vaccinated by the HPV vaccine.
c. Also, the quantitative method could then be used to determine why the newly determined factors could influence the intentions of respondents to receive vaccination. Moreover, the description of the explanation of the degree of relationships among the newly determined factors could be determined through the quantitative method. With all these modifications, more specific conclusions could be generated, which could be used by various stakeholders (parents, students, school administrators, health practitioners, health educators and researchers) in understanding the impact of HPV vaccination to young males.

Recommendations for Health Education Practice

The following recommendations are based on findings from this study:

1. Most of the findings of the current study are in opposition of the existing body of knowledge on HPV vaccination in young males. Overall, the results implied negative results about the level of knowledge, positive attitudes, positive perceived control, and positive subjective norms about HPV vaccination in young males. Aside from these descriptive findings, it was revealed that only subjective norms and perceived control over one's behavior have significant predictive power with respect to young males' intentions to be vaccinated by HPV. Thus, it is recommended that in the future, health practitioners and health educators should focus on developing these two factors in order to increase male college students' intention to be vaccinated by HPV.
2. Increasing knowledge about HPV and HPV vaccine is a potentially important way to increase vaccination rates, yet few health education programs or education inventions have addressed these topics. Health educators can emphasize that education interventions represent a simple yet potentially effective strategy for increasing HPV vaccination and garnering stronger support for school-based vaccination clinics.
3. It is critical that key stakeholders possess adequate knowledge about HPV and the vaccine. Knowledge is important in the early stages of behavior change according to multiple frameworks that characterize the stages of adoption of health behaviors. Furthermore, health educators and healthcare providers could serve as public health advocates whose adequate knowledge would be a prerequisite for making informed decisions about vaccination and vaccine policies. For this reason, providing information (to improve knowledge) is a common component of behavioral interventions to encourage college students to receive full benefits from the HPV vaccination. It is necessary to incorporate information about the HPV vaccination in

health education classes taken by students, especially for first and second year college students.

Summary

In this chapter, a summary of the study, followed by findings generated from the current study, were discussed. The alignment of the current findings and the existing body of knowledge was discussed. It was found that male college students have low levels of knowledge about HPV vaccination. Moreover, it was revealed that male college students have positive attitudes towards HPV vaccination. Greater sense of control over the behavior towards HPV vaccination was also found among the participants. Additionally, there was more favorable intention to be HPV vaccinated among male college students. Finally, the respondents had positive responses about HPV vaccination in general.

Presentation of the conclusions generated in this study, together with the previous literature, the clinical implications were discussed. Next, the limitations of the current research were presented in this chapter. Recommendations for future research were provided, as well as recommendations for health education practice.

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APPENDICES

APPENDIX A

Questionnaire

HUMAN PAPILLOMAVIRUS (HPV) ASSESSMENT

DIRECTIONS: Below you will find several sections with questions or statements for you to review and fill in ONE circle corresponding with your answer. DO NOT write your name anywhere on this form. Return the completed questionnaire to the survey administrator when you are done. *NOTE:* If you make a mistake place an "X" through the WRONG answer and fill in the circle for the correct answer like the example. Thank you!

Correct answer → ● Corrected mistake → ⊗ ●

1. Age:_____

2. Your Gender? ○ Male ○ Female ○ Transgender

3. Fill in the circle for ONE response that best represents your race?
   - ○ Caucasian
   - ○ African American
   - ○ Hispanic
   - ○ Asian/Pacific Islander
   - ○ Native Indian/Alaskan Native
   - ○ Other (please specify)_____

4. What is your current rank/year in school? (Choose only ONE)
   - ○ Freshman
   - ○ Junior
   - ○ Graduate Student
   - ○ Sophomore
   - ○ Senior
   - ○ Non-degree seeking

5. Before today have you ever heard of Human Papillomavirus? ○ Yes ○ No
6. If you answered yes, please specify where_____
7. Before today have you ever heard of HPV vaccine? ○ Yes ○ No
8. If you answered yes, please specify where_____
9. Do you have HPV? ○ Yes ○ No
10. Have you been vaccinated against the HPV (all 3 doses)? ○ Yes ○ No
11. Are you in the process of being vaccinated (have received 1st or 2nd dose already)? ○ Yes ○ No

DIRECTIONS: Read each statement and fill in the circle for EITHER True OR False.

12. HPV is the most common Sexual Transmitted Infection (STI) in the United States.	○ True	○ False	○ Unsure
13. HPV can be cured with the HPV vaccine.	○ True	○ False	○ Unsure
14. HPV is the cause of genital warts.	○ True	○ False	○ Unsure
15. The HPV is the cause of anal cancer.	○ True	○ False	○ Unsure
16. HPV is transmitted through sex.	○ True	○ False	○ Unsure
17. The HPV vaccine can protect against other STI's like HIV.	○ True	○ False	○ Unsure
18. The HPV consists of a three shot series.	○ True	○ False	○ Unsure
19. The HPV is a virus.	○ True	○ False	○ Unsure
20. HPV is a bacterial infection.	○ True	○ False	○ Unsure
21. Only men get HPV.	○ True	○ False	○ Unsure
22. Antibiotics can cure HPV.	○ True	○ False	○ Unsure
23. Some types of HPV cause cervical cancer.	○ True	○ False	○ Unsure
24. The Pap test is a test for cervical cancer.	○ True	○ False	○ Unsure
25. HPV causes herpes.	○ True	○ False	○ Unsure
26. You can have HPV without knowing it.	○ True	○ False	○ Unsure

Please turn over and continue on the back side.

HPV ASSESSMENT

DIRECTIONS: Below you will find several statements followed by several sets of words placed at opposite ends of the scale. Please read each statement and fill in ONE (1) circle that represents your answer.

27. I think my being vaccinated against HPV in the next 6 months would be:

		Extremely	Quite	Slightly	Neutral	Slightly	Quite	Extremely	
a.	BENEFICIAL	○	○	○	○	○	○	○	HARMFUL
b.	UNIMPORTANT	○	○	○	○	○	○	○	IMPORTANT
c.	WORTHLESS	○	○	○	○	○	○	○	VALUABLE
d.	GOOD	○	○	○	○	○	○	○	BAD

28. I think my being vaccinated against HPV in the next 6 months would be:

		Extremely	Quite	Slightly	Neutral	Slightly	Quite	Extremely	
a.	DIFFICULT	○	○	○	○	○	○	○	EASY
b.	REALISTIC	○	○	○	○	○	○	○	UNREALISTIC
c.	MANAGEABLE	○	○	○	○	○	○	○	UNMANAGEABLE

29. I want to be vaccinated against HPV within the next 6 months.

	Strongly	Somewhat	Slightly	Neutral	Slightly	Somewhat	Strongly	
AGREE	○	○	○	○	○	○	○	DISAGREE

30. I will be vaccinated against HPV in the next 6 months.

	Strongly	Somewhat	Slightly	Neutral	Slightly	Somewhat	Strongly	
AGREE	○	○	○	○	○	○	○	DISAGREE

31. I plan to be HPV vaccinated in the next 6 months.

	Strongly	Somewhat	Slightly	Neutral	Slightly	Somewhat	Strongly	
AGREE	○	○	○	○	○	○	○	DISAGREE

32. I think if I were vaccinated against HPV in the next 6 months, people who are important to me would be:

		Extremely	Quite	Slightly	Neutral	Slightly	Quite	Extremely	
a.	SUPPORTIVE	○	○	○	○	○	○	○	AGAINST IT
b.	DISAPPOINTED	○	○	○	○	○	○	○	PLEASED

33. Most people who are important to me would consider their own HPV vaccination in the next 6 months:

		Extremely	Quite	Slightly	Neutral	Slightly	Quite	Extremely	
a.	UNREALISTIC	○	○	○	○	○	○	○	REALISTIC
b.	LIKELY	○	○	○	○	○	○	○	UNLIKELY

APPENDIX B

Expert Panel Letter

[Insert Date]

[Insert Contact Information]

Dear [Expert Panel Member Name],

Thank you for agreeing to be an expert panel member for my dissertation questionnaire development. The purpose of this form is to serve as a guide in reviewing the questionnaire for this project. Please look through the questionnaire and refer to these questions for directions. This is being asked as part of the process of validating a questionnaire that Chandrika Johnson has designed as part of her dissertation research project. Enclosed are the forms (i.e., original questionnaire, questionnaire items comment sheet, pilot evaluation form, and Theory of Planned Behavior(TpB) manual that was used to develop the direct measure TpB questionnaire) needed to complete the review. The intent or purpose of the questionnaire is to gather information about knowledge and perceptions of the human papillomavirus (HPV), a sexually transmitted infection, and the vaccination developed for this disease. The sample for this study is currently enrolled undergraduate male students over the age of 18.

The purpose of this study is to examine college students' knowledge of the human papillomavirus and their intention to be HPV vaccinated using the Theory of Planned Behavior. More specifically, the relationship between male students' attitudes, subjective norms, perceived behavioral control, and behavioral intentions will be examined to assess their willingness to be HPV vaccinated. Please provide comments after each of the questions below.

Thank you for taking the time to assist me in this research. Please return the forms to me by October 20, 2013. If you have any questions please contact me at (910-583-2197) or e-mail (drika@siu.edu).

Sincerely,

Chandrika Johnson

Chandrika Johnson, MPH
Doctoral Candidate in Health Education
Department of Health Education and Recreation
Pulliam Hall-MC 4632
Southern Illinois University Carbondale
Carbondale, IL 62901

APPENDIX C

Instrument for Expert Panel Reviewers

HUMAN PAPILLOMAVIRUS (HPV) ASSESSMENT

DIRECTIONS: Below you will find several sections with questions or statements for you to review and fill in ONCE circle corresponding with your answer. DO NOT write your name anywhere on this form. Return the completed questionnaire to the survey administrator when you are done. *NOTE:* If you make a mistake place an "X" through the WRONG answer and fill in the circle for the correct answer like the example. Thank you!

Correct answer = ● Corrected mistake = ○ ○ ⊗ ●

1. Age:_____
2. Your Gender? ○ Male ○ Female ○ Transgender
3. Fill in the circle for ONE response that best represents your race?
   ○ Caucasian ○ African American
   ○ Hispanic ○ Asian/Pacific Islander
   ○ Native Indian/Alaskan Native ○ Other (please specify) _____
4. What is your current rank/year in school? (Choose only ONE)
   ○ Freshman ○ Junior ○ Graduate Student
   ○ Sophomore ○ Senior ○ Non-degree seeking
5. Before today have you ever heard of Human Papillomavirus? ○ Yes ○ No
6. If you answered yes, please specify where_____
7. Before today have you ever heard of HPV vaccine? ○ Yes ○ No
8. If you answered yes, please specify where_____
9. Do you have HPV? ○ Yes ○ No
10. Have you been vaccinated against the HPV (all 3 doses)? ○ Yes ○ No
11. Are you in the process of being vaccinated (have received 1st or 2nd dose already)? ○ Yes ○ No

DIRECTIONS: Read each statement and fill in the circle for EITHER True OR False.

12. HPV is the most common Sexual Transmitted Infection (STI) in the United States. **accept, no corrections accept with modifications reject and replace** **Comments:**	○ True	○ False	○ Unsure
13. HPV can be cured with the HPV vaccine. **accept, no corrections accept with modifications reject and replace** **Comments:**	○ True	○ False	○ Unsure
14. HPV is the cause of genital warts. **accept, no corrections accept with modifications reject and replace** **Comments:**	○ True	○ False	○ Unsure
15. The HPV is the cause of anal cancer. **accept, no corrections accept with modifications reject and replace** **Comments:**	○ True	○ False	○ Unsure
16. HPV is transmitted through sex. **accept, no corrections accept with modifications reject and replace** **Comments:**	○ True	○ False	○ Unsure
17. The HPV vaccine can protect against other STI's like HIV. **accept, no corrections accept with modifications reject and replace**	○ True	○ False	○ Unsure

18. The HPV consists of a three shot series. **accept, no corrections accept with modifications reject and replace** **Comments:**	○ True	○ False	○ Unsure
19. The HPV is a virus. **accept, no corrections accept with modifications reject and replace** **Comments:**	○ True	○ False	○ Unsure
20. HPV is a bacterial infection. **accept, no corrections accept with modifications reject and replace** **Comments:**	○ True	○ False	○ Unsure
21. Only men get HPV. **accept, no corrections accept with modifications reject and replace** **Comments:**	○ True	○ False	○ Unsure
22. Antibiotics can cure HPV. **accept, no corrections accept with modifications reject and replace** **Comments:**	○ True	○ False	○ Unsure
23. Some types of HPV cause cervical cancer. **accept, no corrections accept with modifications reject and replace** **Comments:**	○ True	○ False	○ Unsure
24. The Pap test is a test for cervical cancer. **accept, no corrections accept with modifications reject and replace** **Comments:**	○ True	○ False	○ Unsure
25. HPV causes herpes. **accept, no corrections accept with modifications reject and replace** **Comments:**	○ True	○ False	○ Unsure
26. You can have HPV without knowing it. **accept, no corrections accept with modifications reject and replace** **Comments:**	○ True	○ False	○ Unsure

HPV ASSESSMENT

DIRECTIONS: Below you will find several statements followed by several sets of words placed at opposite ends of the scale. Please read each statement and fill in ONE (1) circle that represents your answer.

27. I think my being vaccinated against HPV in the next 6 months would be:

		Extremely	Quite	Slightly	Neutral	Slightly	Quite	Extremely	
a.	BENEFICIAL	○	○	○	○	○	○	○	HARMFUL
b.	UNIMPORTANT	○	○	○	○	○	○	○	IMPORTANT
c.	WORTHLESS	○	○	○	○	○	○	○	VALUABLE
d.	GOOD	○	○	○	○	○	○	○	BAD

accept, no corrections accept with modifications reject and replace

Comments:

28. I think my being vaccinated against HPV in the next 6 months would be:

		Extremely	Quite	Slightly	Neutral	Slightly	Quite	Extremely	
a.	DIFFICULT	O	O	O	O	O	O	O	EASY
b.	REALISTIC	O	O	O	O	O	O	O	UNREALISTIC
c.	MANAGEABLE	O	O	O	O	O	O	O	UNMANAGEABLE

accept, no corrections accept with modifications reject and replace

Comments:

29. I want to be vaccinated against HPV within the next 6 months.

	Strongly	Somewhat	Slightly	Neutral	Slightly	Somewhat	Strongly	
AGREE	O	O	O	O	O	O	O	DISAGREE

accept, no corrections accept with modifications reject and replace

Comments:

30. I will be vaccinated against HPV in the next 6 months.

	Strongly	Somewhat	Slightly	Neutral	Slightly	Somewhat	Strongly	
AGREE	O	O	O	O	O	O	O	DISAGREE

accept, no corrections accept with modifications reject and replace

Comments:

31. I plan to be HPV vaccinated in the next 6 months.

	Strongly	Somewhat	Slightly	Neutral	Slightly	Somewhat	Strongly	
AGREE	O	O	O	O	O	O	O	DISAGREE

accept, no corrections accept with modifications reject and replace

Comments:

32. I think if I were vaccinated against HPV in the next 6 months, people who are important to me would be:

		Extremely	Quite	Slightly	Neutral	Slightly	Quite	Extremely	
a.	SUPPORTIVE	O	O	O	O	O	O	O	AGAINST IT
b.	DISAPPOINTED	O	O	O	O	O	O	O	PLEASED

3133 accept, no corrections accept with modifications reject and replace

Comments:

33. Most people who are important to me would consider their own HPV vaccination in the next 6 months:

		Extremely	Quite	Slightly	Neutral	Slightly	Quite	Extremely	
a.	UNREALISTIC	○	○	○	○	○	○	○	REALISTIC
b.	LIKELY	○	○	○	○	○	○	○	UNLIKELY

accept, no corrections **accept with modifications** **reject and replace**

Comments:

3134

APPENDIX D

Pilot Expert Evaluation Form

1. Are the directions clear and concise? If not please write alternatives or suggestions here.

2. Are the questions easy to understand?

3. Is the layout clear and easy to use for answering the questions?

4. Please provide any additional comments or suggestions here.

APPENDIX E

Questionnaire Cover Letter

Dear Student:

My name is Chandrika Johnson and I am a graduate student seeking my Doctoral degree in the Department of Health Education and Recreation at Southern Illinois University Carbondale.

The purpose of this questionnaire is to gather information about your knowledge and perceptions of the human papillomavirus (HPV), a sexually transmitted infection, and the vaccination developed for this disease. Your feedback is very important as most research has been on female college students. Recently, however, doctors have found serious medical conditions in men infected with this disease. The questions on this survey are for all males and females regardless of whether you are or have been sexually active.

You were selected to participate in this study because you are a student, currently enrolled at this institution and over the age of 18. The questionnaire will take approximately 20 to 30 minutes to complete. All your responses will be kept confidential within reasonable limits. Only people directly involved with this project will have access to the questionnaires with the data securely stored in a sealed box. Your confidentiality is very importance to this study; therefore the responses you provide will not be connected to your name in any way. Participation in this study is completely voluntary and you can choose to withdraw at anytime without any negative consequences.

Completion and return of the consent form and questionnaire indicate voluntary consent to participate in this study. Please use the return envelope/box provided.

Questions about this study can be directed to me, my supervising professor, Dr.Roberta Ogletree, Department of Health Education and Recreation, SIUC, Carbondale, IL 62901-4632. Phone (618) 453-2777, or Dr. Theodore Kaniuka, Chair Human Rights and Research Committee, FSU, Fayetteville, NC 28301. Phone (910) 672-1636.I canbereached 910-583-2197 or drika@siu.edu.

Thank you for taking the time to assist me in this research.

Chandrika Johnson
(910) 583-2197
drika@siu.edu

This project has been reviewed and approved by the SIUC Human Subjects Committee. Questions concerning your rights as a participant in this research may be addressed to the Committee Chairperson, Office of Sponsored Projects Administration, SIUC, Carbondale, IL 62901-4709. Phone (618) 453-4533. E-mail: siuhsc@siu.edu

This project has been approved by the Fayetteville State University Institutional Review Board Human Rights in Research Committee (Phone: 910-672-1569)

APPENDIX F

Oral Consent Form

College Students 'HPV Knowledge and Intention to HPV Vaccinated- IRB Study #: SIUC 13345

You are invited to participate in a study to examine college students' knowledge and intention to be HPV vaccinated.

My name is Chandrika Johnson, and I am a graduate student at Southern Illinois University and faculty member at Fayetteville State University, Department of Middle Grades, Secondary and Specialized Subjects. I hope to gain a better understanding about college students' knowledge and perceptions of human papillomavirus and the vaccination developed for this disease. You will be one of 400participants, 18 and over, chosen to participate in this study.

Participation is voluntary. If you choose to participate in the study, it will take approximately 20 minutes of your time. You will be given a cover letter and consent form to review and sign if you agree to participate. After you sign the consent form you will be given the questionnaire and instructed to return them to the researcher when you are done. You may decide not to participate in any task or you may decide to not answer any questions on the questionnaire that make you feel uncomfortable or embarrassed; you may stop your participation at any time during the study. There is no monetary compensation. I will make all reasonable efforts to accommodate your schedule and time constraints.

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. Completed questionnaires, journals, and scores on inventories will be kept under lock and key. At no time will your name or institution be identified in reports, papers, or publications.

Your decision whether or not to participate will not affect your future relations with Fayetteville State University. If you decide to participate, you are free to discontinue participation at any time.

You are making a decision whether or not to participate. Your signature indicates that you have read the information provided above and that you have decided to participate. You may withdraw at any time after signing this form, should you choose to discontinue your participation in this study.

If you have questions, please ask me. If you have additional questions later, I will be happy to answer them. You can reach me or my supervising professor, Dr.Roberta Ogletree, Department of Health Education and Recreation, SIUC, Carbondale, IL 62901-4632. Phone (618) 453-2777. I can be reached at 910-583-2197 or drika@siu.edu. If you have questions or concerns, at any time during this study, about your rights as a research subject you may contact:
Dr. Theodore Kaniuka, Chair Human Rights and Research Committee
Fayetteville State University
Fayetteville, NC 28301-4298
(910) 672-1636

You may keep a blank copy of this form for your records.

____ I am 18 or older (By checking this line, I am agreeing that I was told in person and writing that I must be 18 or older to participate in this study.)

Signature of Participant	Date	Signature of Investigator	Date

This project has been reviewed and approved by the SIUC Human Subjects Committee. Questions concerning your rights as a participant in this research may be addressed to the Committee Chairperson, Office of Sponsored Projects Administration, SIUC, Carbondale, IL 62901-4709. Phone (618) 453-4533. E-mail: siuhsc@siu.edu

This project has been approved by the Fayetteville State University Institutional Review Board Human Rights in Research Committee (Phone: 910-672-1569)