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Using the Health Belief Model to assess Undergraduate College Students Knowledge and
Perceptions of Human Papillomavirus in Order to Better Understand Vaccine Intentions

By

Kelly McMahon

A Thesis Submitted in Partial Fulfillment of the
Requirements for the Degree of
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Mankato Minnesota

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By

Kelly McMahon

This thesis has been examined and approved by the following members of the Student's committee.

Dr. Marge Murray-Davis

Dr. Joseph Visker

Dr. Autumn Hamilton

Abstract

Using the Health Belief Model to assess Undergraduate College Students Knowledge and Perceptions of Human Papillomavirus in Order to Better Understand Vaccine Intentions

By Kelly McMahon

Master of Science in School Health

Minnesota State University, Mankato, 2018

According to the Centers for Disease control and Prevention (CDC)(2016b), Human Papillomavirus (HPV) is the most commonly sexually transmitted infection in the United States. HPV is so prevalent that nearly all sexually active people will obtain a strain of HPV at some point in their lives (CDC, 2016d). Approximately one in four Americans are currently infected in the United States with HPV, and approximately 14 million new infections of HPV spread each year in the United States (CDC, 2016b).

Ultimately the HPV vaccination is a form of cancer prevention. With the vaccination uptake, the burden of HPV related health problems could be eliminated. The purpose of this study is to better understand whether college students intend to receive the HPV vaccine or not. By developing a better understanding of college student vaccine intentions, health care professionals will be able to develop appropriate interventions designed to increase the uptake of the HPV vaccine among college students. This will in turn create a reduction of infections and cancers caused by HPV.

There was a significant relationship between participants perceived barriers and their intentions to receive the HPV vaccine. The respondents who had already received

the HPV vaccine had fewer perceived barriers than those who did not intend to receive the HPV vaccine and those who do intend to receive the HPV vaccine in the future. There was a significant relationship between the participants' perceived self-efficacy and their intentions to receive the HPV vaccine. The respondents who have already received the HPV vaccine have higher perceptions of self-efficacy than those who did not intend to receive the HPV vaccine and those who do intend to receive the HPV vaccine in the future.

Education will be a key component to break down barriers that prevent college students from receiving the HPV vaccine. Further research should include how to improve self-efficacy as it pertains to the uptake of the HPV vaccine.

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Chapter I: Statement of The Problem

Introduction

According to the Centers for Disease control and Prevention (CDC)(2016b), Human Papillomavirus (HPV) is the most commonly sexually transmitted infection in the United States. HPV is so prevalent that nearly all sexually active people will obtain a strain of HPV at some point in their lives (CDC, 2016c). Approximately one in four Americans are currently infected in the United States with HPV, and approximately 14 million new infections of HPV spread each year in the United States (CDC, 2016c).

The CDC (2016), describes HPV as a group of over 150 related viruses, each given a number to describe the HPV type. Not only can certain strains of HPV cause warts (papilloma's), but also some HPV strains can lead to cancer. Of the 150 known strains of HPV, 75% are considered cutaneous because they cause warts on the skin (American Cancer Society [ACS], 2016). The other type of HPV is considered mucosal, and this refers to the body's mucous membranes. Mucosal HPV, or genital HPV, affects the anal and genital area, this type of HPV accounts for the other 25% of HPV infections (ACS, 2016).

Of the 150 strains there are low-risk genital HPV types, and high-risk genital HPV types. The 75% of HPV strains that are considered cutaneous are considered low-risk genital HPV types (ACS, 2016). The American Cancer Society (2016) explains that HPV types that tend to cause warts and not cancer are called low-risk types and the other 25% of HPV strains that are mucosal are considered high-risk genital HPV. High-risk HPV strains can lead to cancer in both men and women. These types of HPV cause cell changes and therefore are more likely to develop into cancer (ACS, 2016).

HPV transmission happens through skin-to-skin contact, more specifically having intimate contact through oral, vaginal, or anal sex with someone who has the virus (CDC, 2016d). According to the CDC (2016b), HPV can be passed from one person to another even when there are no symptoms present, and symptoms can develop years after being infected. In most cases, HPV can go away on its own and does not cause any health problems, but in cases that the virus does not go away on its own it can cause health problems like genital warts and cancer (CDC, 2016b).

Unfortunately, because HPV does not always have symptoms, it is difficult to diagnose and that is why prevention is key when trying to decrease the occurrence of HPV. Prevention includes using a condom the correct way every time you engage in sex, which can lower chances of getting HPV but will not guarantee prevention because HPV can infect areas that are not covered by a condom (CDC, 2016b). Another prevention strategy suggested by the CDC (2016b) is to be in a monogamous relationship. Lastly the CDC (2016b) recommends vaccination in order to prevent certain cancers and genital warts caused by HPV. According to the CDC (2016e) “all HPV vaccines have been found to have high efficacy (close to 100%)” (para. 3). The CDC (2016c) vaccine recommendations suggest that routine vaccination for adolescent boys and girls at age 11 or 12 years and even as early at the age of nine. It is also recommended for female’s ages 13 through 26 years and males 13 through 21 years who were not adequately vaccinated when they were younger (CDC, 2016c).

There are currently three types of HPV vaccinations approved by the Food and Drug Administration; these include Bivalent/2vHPV (Cervarix), Quadrivalent/4vHPV (Gardasil), and 9-valent/9vHPV (Gardasil 9) (CDC, 2016c). According to the CDC (2016c) Bivalent/2vHPV introduced in 2009 for females protects against HPV-16 and HPV-18. These two types of HPV

are considered high-risk. The Quadrivalent/4vHPV, which was introduced in 2006 for females and 2009 for males, protects against HPV-6, HPV-11 and HPV- 16, and HPV-18. Again HPV-16, 18 are considered high-risk HPV strains and account for 66% of cervical cancers, and HPV-6, 11 are considered low-risk and account for 90% of genital warts (CDC, 2016c). The 9-valent/9vHPV produced in 2014 for males and females protects against HPV-6 and HPV-11 (low-risk), HPV-16, HPV-18, HPV-31, HPV-33, HPV-45, HPV-52, and HPV-58. The additional 5 strains protected by the 9-valent accounts for another 15% of cervical cancers (CDC, 2016c). According to the National Center for Immunization and Respiratory Diseases after the end of 2016, only the 9-valent HPV will be available in the United States.

Statement of the Problem

College students lack the appropriate knowledge regarding HPV and HPV vaccines in order to make an informed decision whether or not to receive the HPV vaccination (Manhart et al., 2011). College student's perceptions regarding HPV and the HPV vaccine is also influencing their decision whether or not to receive the HPV vaccination (Dillard & Spear, 2010). Although studies have shown that students may be aware of HPV, they lack important knowledge regarding the infection, students knew common facts regarding HPV but there are still crucial misunderstandings regarding HPV including both risk and protective factors (Barnard, George, Peryman, & Wolff, 2017). The misunderstanding regarding HPV is a problem for college students because previous research indicates in female college students that the more knowledge they had regarding HPV the more likely they would be willing to receive the vaccine (Barnard et al., 2017).

Even though the HPV vaccine is safe and effective, the vaccination rates are still low. According to the CDC's(2017c) Sexually Transmitted Disease Surveillance the vaccine uptake

in the United States remains below the Healthy People of 2020 goal of 80% coverage. A CDC (2017c) national survey done in 2015 discovered that only 42% of girls aged 13-17 years had received the recommended doses of the HPV vaccine series and only 28% of boys aged 13-17 years had received the recommended doses of the HPV vaccine.

In a study designed to determine college students awareness of HPV and the HPV vaccine it was also determined that college students both male and female have high levels of awareness of HPV, but male college students have low levels of awareness of the HPV vaccine, and have low perceptions of vaccine safety (Beshers, Murphy, & Mahoney, 2015). Female college students indicated high levels of HPV vaccine awareness, along with reporting having discussions with their health care providers, and also showed high perceptions of vaccine safety, in contrast, the male population had low levels of discussions with health care providers, and lower levels of awareness of the HPV vaccination (Beshers et al., 2015). Low levels of awareness of the HPV vaccine from the male population is concerning because research is indicating higher rates of HPV-related cancers among men in the United States (Beshers et al., 2015).

Sandfort and Pleasant (2009) explain that college students are considered a high-risk population when it comes to sexual behavior and sexually transmitted diseases. Sandfort and Pleasant (2009) conducted a study to determine college student's knowledge regarding HPV and it was determined that although there was a moderate level of knowledge surrounding HPV, but the information that the students did not understand was often the most important information to know about the sexually transmitted infection. For example the students lacked knowledge of transmission and prevalence (Sandfort & Pleasant, 2009). It was also determined that 22% of students reported not being aware of the HPV vaccine (Sandfort & Pleasant, 2009).

Significance of the Problem

According to the CDC (2016c), HPV types 6 and 11 are responsible for about 90% of genital warts. Genital warts, which appear on the genital area as small bumps. The CDC (2016e) describes genital warts as small or large, raised or flat, or shaped like a cauliflower. Data provided by the CDC (2016b) indicates that before the HPV vaccine was introduced approximately 340,000 to 360,000 were affected by genital warts caused by HPV each year. Genital warts can be treated by a health care provider or with a prescription medication. The Sexually Transmitted Diseases Surveillance indicates that HPV types 16 and 18 account for approximately 66% of cervical cancers in the United States and approximately 25% of low-grade and 50% of high-grade cervical intraepithelial lesions, or dysplasia (2017c). The CDC's HPV-Associated Cancer Statistics (2017b), based on data from 2009-2013 indicates that approximately 39,800 HPV associated cancer occurs in the United States each year with 23,300 women affected, and 16,500 men affected. The most common HPV-associated cancer for women is cervical cancer and the most common HPV-associated cancer in men is oropharyngeal cancer with 9,100 of men diagnosed each year (CDC, 2017a). As of 2014, there were 12,578 women in the United States diagnosed with cervical cancer, and 4,115 women in the United States that died from cervical cancer (CDC, 2017a). Data from the CDC (2017b) shows that HPV is responsible for more than 90% of anal and cervical cancer, 70% of vaginal and vulvar cancers, and more than 60% of penile cancers.

According to the CDC (2016a) “nearly half of the 20 million new sexually transmitted diseases (STDs) diagnosed each year are among young people aged 15-24 years” (para. 4). Engaging in sexual contact puts you at risk for being infected with HPV; therefore, many college students will find themselves at risk for being infected with HPV.

Ultimately the HPV vaccination is a form of cancer prevention. With the vaccination uptake, the burden of HPV related health problems could be eliminated. The purpose of this study is to better understand whether college students intend to receive the HPV vaccine or not. By developing a better understanding of college student vaccine intentions, health care professionals will be able to develop appropriate interventions designed to increase the uptake of the HPV vaccine among college students. This will in turn create a reduction of infections and cancers caused by HPV.

Research Questions

1. What is the difference between the participants' knowledge level about HPV and intention to receive HPV vaccine?
2. What is the difference between the participants' perceived susceptibility and their intention to receive the HPV vaccination?
3. What is the difference between the participants' perceived severity and their intention to receive the HPV vaccination?
4. What is the difference between the participants' perceived benefits and their intentions to receive the HPV vaccine?
5. What is the difference between the participants' perceived barriers and their intentions to receive the HPV vaccine?
6. What is the difference between the participants' perceived cues to action and their intentions to receive the HPV vaccine?
7. What is the difference between the participants' perceived self-efficacy and their intentions to receive the HPV vaccine?

Limitations:

One limitation is that students are self-reporting. Because students are answering sexual health questions about themselves they may not be completely honest and may over estimate some answers. Because volunteers only filled out the survey, the survey will not represent the opinion of those who chose not to fill out the survey. Another limitation is participants who did not complete the whole survey. Nonresponses within the survey will not be included in the study. Lastly the participants were selected through convenience sampling.

Delimitations:

This study is restricted to college undergraduate students. Because this study will be conducted within a college setting, the results will not represent the general population. This study was also restricted to student's aged 18-26 due to the fact that the HPV vaccine can be administered to men up until the age of 21 and women up until the age of 26. This study was also restricted to participants from a large Midwestern University. Another delimitation is that all participants were recruited from Health Science courses to participate in the survey. Student's knowledge level regarding HPV may differ from one University to the next. Therefore, the results of this data cannot represent all undergraduate students within the United States.

Assumptions

One assumption is that the sampled university students are similar to other students within other university institutions. Another assumption is that the participants will answer the survey questions honestly. The last assumption is that the knowledge questions in the survey will accurately assess the participants HPV knowledge levels.

Definitions of Terms

1. Cervical cancer- "...a type of cancer that occurs in the cells of the cervix — the lower part of the uterus that connects to the vagina" (Mayo Clinic, 2017, para. 1).
2. Cues to action- "Strategies to activate readiness" (Glanz, Rimer, & Viswanath, 2008, p. 48)
3. Genital warts- "Like warts that appear elsewhere on your body, genital warts are caused by the human papillomavirus (HPV). Some strains of genital HPV can cause genital warts, while others can cause cancer" (Mayo Clinic, 2016, para. 3).
4. Health Belief Model- "The HBM contains several primary concepts that predict why people will take action to prevent, to screen for, or to control illness conditions; these include susceptibility, seriousness, benefits and barriers to a behavior, cues to action and most recently self-efficacy" (Glanz et al. 2008, p.46).
5. High-risk human papillomavirus- "HPV types that tend to cause cancer are called high-risk types" (ACS, 2016, para. 10).
6. Human papillomavirus (HPV)- "HPVs are a group of more than 150 related viruses. Each HPV virus in the group is given a number, which is called an *HPV type*. HPVs are called *papilloma viruses* because some of the HPV types cause warts or papillomas, which are non-cancerous tumors. But some types of HPV are known for causing cancer, especially of the cervix (the base of the womb at the top of the vagina)" (ACS, 2016, para. 4).
7. Low-risk human papillomavirus (HPV)- "HPV types that tend to cause warts and not cancer are called low-risk types" (ACS, 2016, para.9).
8. Perceived Barriers- "Belief about the tangible and psychological costs of the advised action" (Glanz et al. 2008, p.48).

9. Perceived Benefits- “Belief in efficacy of the advised action to reduce risk of seriousness of impact” (Glanz et al. 2008, p.48).

10. Perceived severity- “Belief about how serious a condition and its sequelae are” (Glanz et al. 2008, p.48).

11. Perceived susceptibility- “Belief about the chances of experiencing a risk or getting condition or disease” (Glanz et al. 2008, p.48).

12. Self-Efficacy- “Confidence in one’s ability to take action” (Glanz et al. 2008, p.48).

13. Undergraduate student- a student in a university or college who has not received a first degree

Chapter II: Review of Literature

Introduction

This chapter will review college student's knowledge and perceptions regarding HPV and the HPV vaccine. This chapter will discuss the relationship between HPV and cancer and how the HPV vaccine can allow for protection against cancers caused by HPV. This chapter will also review the Health Belief Model and how it will be used in order to determine student's perceptions of HPV and the HPV vaccine.

Human Papillomavirus

Human Papillomavirus is the most common sexually transmitted infection in the United States (CDC, 2016b). The HPV infection is necessary in order to cause cervical cancer; therefore almost 100% of cervical cancers are caused by HPV (Chaturvedi, 2010). Not only does HPV cause cervical cancer but it also causes a number of other types of non-cervical cancers including, "90%-93% of anal cancers, 12%-63% of oropharyngeal cancers, 36%-40% of penile cancers, 40%-64% of vaginal cancers, and 40%-51% of vulvar cancers" (Chaturvedi, 2010, para. 5).

According to Markowitz et al. (2014) there are more than 150 different strains of HPV that can lead to low risk types (genital warts, low grade cervical cell changes, recurrent respiratory papillomatosis) and high-risk types of HPV (low-grade cell abnormalities, high-grade cell abnormalities, precursors to cancer, and cancer).

Markowitz et al. (2014) researched HPV associated cancers in the United states, and discovered the prevalence of HPV related cancers, "From 2006 to 2010, on average, 33,160 HPV-associated cancers were diagnosed in the United States, including 20,589 (62%) among

females and 12,571 (38%) among males. Approximately 26,900 new cancers at these body sites were attributable to HPV, including 17,600 (65%) among females and 9,300 (35%) among males” (para. 19). Cervical cancer is the most common form of cancer developed by women who are infected with HPV and cervical cancer is one of the most predominant gynecological malignancies worldwide (Donaldiki, 2014). Markowitz et al. (2014) also indicated that cervical and oropharyngeal cancers are the most common types of cancer developed from HPV “estimated 10,400 cervical cancers in women and 9,000 oropharyngeal cancers (7,200 [80%] among men and 1,800 [20%] among women)” (para.19).

Human Papillomavirus Vaccination

The HPV vaccine allows for protection from most cancers caused by HPV, and provides for an opportunity to lessen the consequences caused by HPV, including cervical cancer, other anogenital cancers, and genital warts within the United States (Markowitz et al. 2014). Although the HPV vaccine is very effective, the success of the vaccine relies on the improvement of uptake within the United States. In order to do this, there needs to be an improvement in HPV awareness and an improvement of physician recommendation (Beshers et al., 2015). In a study that examined college student awareness of HPV and the HPV vaccine, it was discovered that the male population had low levels of discussion with health care providers, lower levels of awareness of the HPV vaccination and low perceptions of vaccine safety (Beshers et al., 2015). Low levels of awareness of the HPV vaccine from the male population is concerning because research is indicating higher rates of HPV-related cancers among men in the United States (Beshers et al., 2015).

A study conducted by Barnard, George, Perryman and Wolff (2017) discovered that 47.3% of female students were vaccinated and only 15.8% of male students were vaccinated. It

was also determined that 90% of males never thought about getting the vaccination, as well as 62.9% of females never seriously considered getting the vaccination (Barnard et al., 2017).

Barnard et al. (2017) also determined that vaccination intention was low for both males (51.7%) and females (52.2%).

Even though the HPV vaccine is an effective way to protect against cancers caused by HPV, college students are still deciding against the vaccination. Donaldiki et al. (2014) conducted research in order to determine why female university students are refusing the HPV vaccine “common barriers include lack of information and knowledge about HPV vaccine, poor perceived risk of acquiring the HPV infection, misconceptions about safety, and the cost of HPV vaccination” (Donaldiki et al., 2014, p. 271).

Another study concluded that not enough college students are getting vaccinated against HPV (Bernard et al., 2017). Because it was determined that the strongest influence on vaccination uptake within this sample was recommendation by a health care provider, college campus health centers can provide this recommendation and offer the HPV vaccination to all of the unvaccinated students (Barnard et al., 2017). Implications to increase vaccination uptake include providing information regarding HPV susceptibility, and providing information regarding vaccine availability (Barnard et al., 2017).

Although HPV vaccines are most effective when administered before any exposure to HPV the Advisory Committee on Immunization Practices recommend HPV vaccination if it was not received at the routine age “vaccination also is recommended for females aged 13 through 26 years and for males aged 13 through 21 years, who have not been vaccinated previously or who have not completed the 3-dose series. Male’s aged 22 through 26 years may be vaccinated” (Markowitz et al., 2014, para. 102). Because catch-up vaccinations are recommended through the

age of 21 for males and 26 for females, developing a better understanding why college students make the decision to get or refuse the vaccine becomes very important for public health and reducing of the prevalence of HPV.

Human Papillomavirus and College Students

College students show particular vulnerability when it comes to HPV (Ratanasiripong, 2014). According to Markowitz et al. (2014) HPV prevalence is highest among those aged 20-24. There are approximately 20 million American's within the ages of 15 and 49 who are currently infected with HPV, with another 6 million newly infected people each year, of those infections, approximately 74% occur within the ages 15-24 (Ratanasiripong, 2014).

Risk factors for HPV, especially for the 18 million students enrolled in United States colleges and universities include, "younger age (<25 years), first sexual intercourse at an early age, lack of condom use, multiple sexual partners, and having partners, who have multiple sex partners or have a history of HPV" (Ratanasiripong, 2014, p. 461). Because many college students are living away from home with no adult supervision for the first time, they will find themselves in an environment where they will be more likely to engage in unprotected and higher risk sexual behaviors (Ratanasiripong, 2014).

An important factor that is a strong predictor of contracting the infection is the number of sex partners "HPV prevalence among women aged 18–25 years is 14.3% for those with one lifetime sex partner, 22.3% for those with two lifetime partners, and 31.5% for those with three or more lifetime partners. Additional risk factors include sexual behavior of the partner and immune status. Transmission is very common between sex partners, and likely more frequent from females to males than from males to females" (Markowitz et al., 2014, para. 15).

College is considered a time when health behavior and decision-making processes are developed and is also considered a critical time to develop an understanding about long term risks from HPV and how preventative health behaviors such as getting the catch-up HPV vaccination in the collegiate years is a necessity (Barnard et al., 2017). College is also a new environment where students have the opportunity to make their own decision “This new environment provides them with opportunities to make a variety of health decisions for themselves. One such decision is whether to be vaccinated against the human papillomavirus (HPV)” (Richards, 2016, p. 342). Because college students are able to make their own health decisions, entering college may provide the opportunity to break down some barriers when it comes to vaccination intentions “From both a health care and a student affairs perspective, most college students are able to make their own care decisions privately, potentially removing barriers related to perceptions associated with sexual activity” (Barnard et al., 2017, para. 3).

Ultimately this population will decide for themselves whether or not they will receive the catch-up vaccination. It will become important for researchers to develop a better understanding as to why some college students decide to get the vaccine and some do not because it is this population that will make the decision for them whether or not they receive the HPV vaccination. These students will then in turn decide if their future children receive the HPV vaccine or not.

College Students Knowledge level of HPV and HPV Vaccine

A study conducted by Bernard et al. (2017) examined college student knowledge levels, attitudes, and perceptions related to HPV and the HPV vaccine. Barnard et al., (2017) indicated that most students both male (82.9%) and female (92.4%) had heard of HPV. Barnard et al. (2017) also indicated that more females were aware of the HPV vaccine compared to males (75.8% vs. 56.2%). Although there are disparities between males and females within those two

topics, there was no significant difference between the two sexes when looking at knowledge levels of HPV “approximately 90% of respondents were aware that HPV is sexually transmitted, can be transmitted even when asymptomatic, and infects both men and women” (Bernard et al., 2017, para. 9).

One study focused on male college students and their knowledge levels regarding HPV and the HPV vaccine. There was a large amount of men who admitted that they have never heard of HPV and did not know about the HPV vaccine (Fontenot et al., 2014). Participants were expressing that they would not be receiving the HPV vaccine because they had never heard of the vaccine, and they weren't aware of other people receiving the vaccination (Fontenot et al., 2014). One participant did explain that if his doctor suggested he should get the vaccine then he would. There were also strong misunderstandings regarding the disease, common statements were the awareness that it could potentially cause cancer in women (Fontenot et al., 2014). Barnard et al. (2017) had a similar discovery looking at the population of male college students. Even though the students showed higher levels of knowledge regarding HPV, they showed less knowledge regarding the HPV vaccine, especially the male population, “this study found that most male college students were not even aware that a vaccine was available and few had been offered the vaccine by health care providers” (Bernard et al., 2017, para. 17).

The results from another study conducted by Dillard and Spear (2010) concluded that although HPV awareness is at an all-time high, there are still overwhelming misconceptions regarding the disease and how it can be acquired. When asked if the students had heard of HPV, 96% of the participants responded affirmatively, and 98% of the participants indicated that they were aware of the vaccination. Dillard and Spear (2010) indicate that although there was higher awareness of HPV there were low levels of knowledge in certain areas. Dillard and Spear (2010)

acknowledged that participants were very unaware that HPV is the only known cause of cervical cancer. It also became clear that participants had low levels of understanding regarding the relationship of HPV, the vaccine, and genital warts (Dillard & Spear, 2010). It was also indicated that approximately half of the participants understood that HPV is the most common sexually transmitted disease in the United States (Dillard & Spear, 2010).

In another study designed to determine college students awareness of HPV and the HPV vaccine, results were similar to other studies determining that both male and female college students have high levels of awareness of HPV, but male college students have low levels of awareness of the HPV vaccine, and have low perceptions of vaccine safety (Beshers et al., 2015).

These studies indicate that college students have high levels of knowledge in some areas of HPV and low levels of knowledge in other critical areas of HPV. One prospective study indicates that students have particularly low levels of knowledge regarding the HPV vaccine (Barnard et al., 2017). Barnard et al. (2017) concluded that there is not enough vaccine coverage in college students in the United States.

Human Papillomavirus Vaccine Intentions

A study conducted by Thompson et al. (2017) identified characteristics that could enhance HPV vaccination rates among college students in the United States. This study found that women were reported less likely to receive the HPV vaccination when they were not receiving routine gynecological care, and those who were unsure of when they last received gynecological care (Thompson et al., 2017). This same study also discovered that men were reported more likely to receive the HPV vaccine when they were receiving sexually transmitted infection information (Thompson et al., 2017).

Another important component to vaccine intention is participant knowledge level (Fontenot et al., 2014). One study focused on male college students and their knowledge levels regarding HPV and the HPV vaccine. There was a large amount of men who admitted that they never heard of HPV and did not know about the HPV vaccine (Fontenot et al., 2014). Participants were expressing that they would not be receiving the HPV vaccine because they had never heard of the vaccine, and they weren't aware of other people receiving the vaccination (Fontenot et al., 2014). One participant did explain that if his doctor suggested he should get the vaccine then he would. There were also strong misunderstandings regarding the disease, common statements were the lack of awareness that it could potentially cause cancer in women (Fontenot et al., 2014).

Another study conducted by Richards (2016) discovered that gender was not a significant factor when looking at influence to receive the HPV vaccine; a stronger indication of intention was sexual experience. Because gender was not an indication on influence of intentions within this sample, it will become important to create a message that impacts both males and females regarding HPV (Richards, 2016). Richards (2016) also discovered that the influence of norms had a positive direct effect on student's intention to receive the HPV vaccine. If the participants felt support from their friends to get the vaccine, they were more likely to get it. It was also discovered that the more contact to health information the participant had, the more likely they would be to receive the HPV vaccine (Richards, 2016). Thompson et al. (2017) also concluded that college health information and Campus health practitioners can help improve the rates of HPV vaccination uptake.

Application of Health Belief Model to HPV Vaccination

Glanz, Rimer, and Viswanath (2008) state “The HBM contains several primary concepts that predict why people will take action to prevent, to screen for, or to control illness conditions; these include susceptibility, seriousness, benefits and barriers to a behavior, cues to action and most recently self-efficacy” (p. 47). Using these constructs within this study will predict why people take action to prevent HPV by getting the HPV vaccine.

Using the Health Belief Model (HBM) is beneficial for predicting intention of the undergraduate students receiving the HPV vaccination or not. The Health Belief model will also predict the undergraduate students perceptions and knowledge regarding the risks of HPV. There are six constructs used within this theory they include: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self efficacy.

Donadiki et al. (2014) conducted research using the HBM in order to determine why female university students refuse the human papillomavirus vaccine. Using the HBM constructs this study highlighted common barriers in regards to the HPV vaccine which included lack of information and knowledge levels regarding the HPV vaccine, low perceived risk of acquiring the infection, misconceptions about safety, and the cost of the HPV vaccine (Donaldiki et al., 2014) This study will use the HBM in order to understand why some college students choose to get the HPV vaccine and some do not by looking at knowledge and perceptions of HPV and the HPV vaccine.

Perceived Susceptibility

Perceived susceptibility is the belief of how likely you are to contract a disease. Perceived susceptibility of HPV is the belief that you could be infected. An example of a

question used to determine perceived susceptibility is, “how likely do you think it is that you will get HPV” (Manhart et al., 2011, para. 8).

A longitudinal study conducted by Manhart et al. (2011) examined why HPV vaccination rates are low even though there is a high efficacy of the HPV vaccine. The women within the study who did not intend to get the vaccine did not believe they were at risk of being infected with HPV “the majority of women not considering vaccination did not believe they were susceptible to HPV (55%), and were less likely to believe the vaccine was effective” (Manhart et al., 2011, para. 21). Manhart et al., (2011) concluded that there needs to be continued efforts to increase knowledge surrounding the susceptibility and overall nature of HPV. It was also discovered within the study conducted by Manhart et al. (2011) students with multiple sexual partners believed that they were more susceptible to getting HPV.

Perceived Severity

Perceived severity is the belief about how serious a condition is and how serious its consequences are (Glanz et al. 2008). Perceived severity for HPV is the seriousness of developing genital warts or cervical cancer. An example of a question used to determine perceived severity is, “if you got HPV, how bad do you think it would be for your health” (Manhart et al., 2011, para. 8).

Many students lack the appropriate knowledge regarding HPV when deciding whether or not to get the HPV vaccine (Dillard & Spear, 2010). A study conducted by Dillard and Spear (2010) highlight the issue of perceived severity when they discovered that only one third of their sample of students from Penn State understood that HPV causes genital warts. Ratanasiripong (2012) also discovered that women had a very low risk perception of obtaining HPV and therefore did not feel obligated to be vaccinated.

Perceived Benefits

A perceived benefit is the belief that the action will reduce the risk of serious consequences (Glanz et al. 2008). Perceived benefits for HPV are that the uptake of the HPV vaccine will lessen the risk of contracting the HPV infection. An example of a question that will determine perceived benefits is, “How effective do you think the HPV vaccine is in protecting women from getting HPV” (Manhart et al., 2011, para. 8).

In a study looking at female college students and why they may refuse the HPV vaccine, it was determined that participants who scored high “no general benefits” which is general perceptions about the vaccination, and “no specific benefits” which is the safety and efficacy of the HPV vaccination, were less likely to be vaccinated (Donaldiki et al., 2014).

Perceived Barriers

Perceived barriers are the implications of an advised action both physical and psychological (Glanz et al. 2008). Perceived barriers for HPV are cost for the vaccination, norms, parental acceptance, and lack of knowledge. An example of a question used to determine perceived barriers is, “Why have you not gotten the HPV vaccine” (Manhart et al., 2011, para. 8).

Dillard and Spear (2010) looked at 10 perceived barriers indicated by the participants and it was determined that they were relevant to the participants decisions not to obtain the vaccine. Participants showed concern regarding the state of the research of the vaccine. Dillard and Spear (2010) explained other barriers to receive the vaccination had to do with factual misconceptions. For example “I am not sexually active, so I don’t need to get the vaccine” or “I only have sex with one person so I don’t need to get the vaccine”, these are indications that students lack the

appropriate knowledge levels when deciding whether or not to receive the HPV vaccination. Other barriers include financial concern as well as parental approval.

Manhart et al. (2011) discussed the barriers that were associated with no intentions to receive the vaccine which included not understanding what the vaccine was for, the cost of the vaccine, and the lack of time to get the vaccine (Manhart et al., 2011). Another study examining male college students reported perceived barriers such as time constraints and student lifestyles (Fontenot et al., 2014). Participants explained their concerns regarding their lack of time, and the safety of the vaccine, or the pain the vaccine may cause, or their fear of needles in general (Fontenot et al., 2014).

Manhart et al. (2011) concluded that knowledge of the HPV vaccine within this population was low and one of the primary barriers against vaccination was the lack of understanding of the overall purpose of the HPV vaccine. Lack of information regarding the HPV vaccine continues to be a barrier when looking at vaccine utilization. It was discovered that participants with a high score for “perceived general barriers” such as lack of information about the vaccine, were more likely to refuse the vaccine (Donaldiki et al., 2014). Another barrier for the HPV vaccine is cost. Participants were less likely to get the vaccine if they had to pay for it (Donaldiki et al., 2014). Similarly, Fontenot et al. (2014) also discovered a significant barrier was the cost of the vaccination, and the lack of coverage by the participants university insurances (Fontenot et al., 2014). Other real barriers included access to care, or that they had never been offered the vaccine by their physicians (Fontenot et al., 2014). Another study indicated barriers such as cost, and lack of insurance coverage were preventing college women from getting the vaccine.

Cues to Action

Cues to action are strategies to activate willingness to complete advised action (Glanz et al. 2008). Cues to action for HPV are what may influence or motivate people to get the HPV vaccination.

Dillard and Spear (2010) revealed that only one third of participants understood that HPV causes genital warts. This presents an opportunity to increase vaccination behavior, “whereas cancer is a distal consequence and, therefore less likely to influence immediate behavior, genital warts may manifest much earlier in a woman’s life” (Dillard & Spear, 2010, p. 189). Because perceived risk is associated with higher vaccination intentions, the possibility of contracting genital warts, a more immediate health threat, has the potential to motivate vaccination.

When Bernard et al. (2017) explored vaccine concerns, it was discovered that the most significant concern was related to family and friends discovering that the student had gotten vaccinated.

The influence of norms had a positive direct effect on student’s intention to receive the HPV vaccine (Richards, 2016). If the participants felt support from their friends to get the vaccine, they were more likely to get it. Richards (2016) also discovered that the more that the participant had contact to health information the more likely they would be to receive the HPV vaccine. Lastly, not only does fear and vulnerability effect decisions to get the HPV vaccine but also contact with health information and communication with others will ultimately influence decisions to get the HPV vaccine (Richards, 2016).

Donaldiki et al. (2014) also determined that a common influence on the decision to get the vaccine is the health care provider. If the health care provider provides a strong recommendation, this can change intentions to receive the vaccine. Fontenot et al. (2014) had

similar results, one participant did explain that if his doctor suggested he should get the vaccine then he would.

Self-efficacy

Self-efficacy is the confidence in ones self to achieve recommended action. Self-efficacy for HPV is the confidence in one self and the ability to go out and get the HPV vaccination.

There is little research regarding the specifics of self-efficacy and HPV vaccination uptake, but vaccination intentions will explain what motivates students to get the HPV vaccination. For example numerous studies indicate that a greater perception of risk will increase the likelihood for students to get the vaccination.

Summary

HPV is the most common sexually transmitted infection that can cause genital warts, and can develop into a number of different types of cancer (CDC, 2016b). Because HPV does not always have symptoms it is difficult to diagnose and because of this prevention becomes key when trying to decrease the prevalence of HPV. The CDC (2016b) recommends the HPV vaccination in order to prevent genital warts, and cancers caused by HPV. According to the CDC (2016e) all HPV vaccines are found to have high efficacy that is close to 100% effective. Understanding why people intend to receive the HPV vaccine or not can help health care professionals increase the HPV vaccination rate in order to decrease the rate of the HPV infection.

This study will help identify college student's knowledge and perceptions regarding HPV and the HPV vaccination, and how those perceptions may influence their decisions whether or not to receive the HPV vaccination. Using the HBM this study will identify main constructs that related back to intentions to receive the HPV vaccine. This study will ultimately provide the

appropriate information to design interventions in order to increase HPV vaccination rates and in turn decrease HPV infection and cervical cancer.

Chapter III: Methodology

Introduction

This chapter will discuss the Health Belief Model and its application to this study in order to examine college student's perceptions of the HPV vaccination and to understand why some college students receive the catch-up HPV vaccination and why some do not. This chapter will also discuss the convenience sampling technique that will be used, and the selection criteria used to recruit the participants. Lastly this chapter will review how the data will be collected, and analyzed. This study is aimed to answer the following research questions:

1. What is the difference between the participants' knowledge level about HPV and intention to receive HPV vaccine?
2. What is the difference between the participants' perceived susceptibility and their intention to receive the HPV vaccination?
3. What is the difference between the participants' perceived severity and their intention to receive the HPV vaccination?
4. What is the difference between the participants' perceived benefits and their intentions to receive the HPV vaccine?
5. What is the difference between the participants' perceived barriers and their intentions to receive the HPV vaccine?
6. What is the difference between the participants' perceived cues to action and their intentions to receive the HPV vaccine?
7. What is the difference between the participants' perceived self-efficacy and their intentions to receive the HPV vaccine?

Theoretical Framework

The Health Belief Model (HBM) is the theoretical framework that is used within this study. Developed in the 1950s by psychologists in the United States, the HBM was used to explain why people failed to participate in programs that detected and prevented diseases (Glanz et al. 2008). The HBM continues to be used as a way to determine why people may accept preventative health services, and why they do or do not obey other types of health care regimens (Glanz et al. 2008). Within this study the HBM constructs will be used in order to predict why college students will take action to prevent HPV by getting the HPV vaccination. The HBM constructs include susceptibility, seriousness, benefits and barriers to a behavior, cues to action, and self-efficacy (Glanz et al. 2008).

Participants

The participants within the population are undergraduate college students at a large, mid-western university. The study is targeting undergraduate college students to gather data regarding their knowledge and perceptions of HPV and how it influences their decision to receive the HPV vaccine. The type of sampling technique that will be used for this study is convenience sampling. Salkind (2012) defines convenience sampling as “when a group of participants from whom a sample will be drawn is easily accessible and easy to select” (p. 74). The students at the large mid-western University are conveniently available to participate in the study.

The participants will be recruited from entry level, general education undergraduate classes from the large mid-western university. The undergraduate classes have been selected based on the size of the course and the course level. All of these classes contain a large amount of students; this is beneficial when using convenience sampling. All of these courses are entry-level courses and will typically contain students within the ages of 18-26. Because the HPV

vaccine can be given to males up to the age of 21 and females up to the age of 26, undergraduate college students aged 18-21 (male) and 18-26 (females) will be targeted (CDC, 2016c).

Instrumentation

The survey is a seven-page, self-report instrument that the participants will complete. The survey starts with five true and false questions to assess participants' knowledge levels regarding HPV. The survey then utilizes the Likert-type format with the option to select Strongly Disagree, Disagree, Neither Agree Nor Disagree, Agree, and Strongly Agree. There are 65 questions total with five questions to measure the participants knowledge levels, three questions to measure participants perceived susceptibility, twelve questions to measure perceived severity, five questions to measure participants perceived benefits, twelve questions to measure participants perceived barriers, ten questions to measure cues to action, twelve questions to measure participants self efficacy, and lastly 6 demographic questions.

The demographic portion of the survey will determine the participant's status such as, age, race, intention to get vaccine, and status of HPV vaccination. Any survey that has type of missing response will not be used in the final results. The survey also contains an informed consent letter that will include a summary of the research, any risks of completing the study, contact information for participants to use if they have any questions, and lastly an informed consent statement.

This survey uses the health belief model to frame questions in order to determine the participants' perceptions of HPV and how those perceptions influence their decisions to receive the HPV vaccine. Perceived susceptibility will capture the participants perceptions of the risk of being infected with HPV. Perceived severity will capture the participant's perceptions and concerns of how serious the outcome is when infected by HPV. Perceived benefits will capture

the participants positive perceptions regarding the uptake of the HPV vaccine. Perceived barriers will capture the participants obstacles of getting the HPV vaccine. Cues to action will capture the action that is needed for the participants to get the HPV vaccine. Self-efficacy will capture the participants ability to take action and go out to get the HPV vaccination.

He (2016) describes the instrument used in the study as “a cross-sectional study focusing on the relationship between the Health Belief Model (HBM) constructs and HPV vaccine intention among Eastern Michigan University female undergraduates” (p. 23). The instrument used within this study will be the same as the one used in the study conducted by He (2016) because this study is also assessing college students’ intentions to receive the HPV vaccine using the HBM.

Champion used the Health Belief Model constructs to study Breast Cancer, and updated the instruments many times. It is also known that the instrument developers used reliability and validity tests. He (2016) used Champions work to develop the instrument for the HPV study on vaccine intention. Although He (2016) did not run valid and reliable tests on their survey, Champions work did undergo many alterations to the instruments, and did undergo valid and reliable testing. He (2016) used the existing instrument with minor changes in order to adjust to the topic of HPV. For example a question used in Champion’s survey included “It is likely that I will get breast cancer” was adjusted to “It is likely that I will get HPV” in the study done by He (2016).

Data Collection Procedure

Data collection will happen within the undergraduate classes at Minnesota State Mankato. The professors will be asked permission to take 15 minutes of their time to have the students complete the survey after a brief explanation. It will be explained to the students that a

study is being conducted regarding undergraduate student knowledge and perceptions of HPV and how it may influence their decisions to receive the HPV vaccine. At the beginning of the survey there will be a section in order to receive informed consent from the student participating. There are currently 13,269 undergraduate students at Minnesota State Mankato University. Using Krejcie and Morgan's (1970) table for determining sample size from a given population, I will need approximately 297 participants for an appropriate sample size.

Data Analysis

Statistical Package for the Social Sciences (SPSS) will be used to analyze the data. The ANOVA test will be used to determine the difference in a scale-level dependent variable between the participants' knowledge levels/perceptions and their intentions to receive the HPV vaccination, or if they have already received the HPV vaccine.

1. What is the difference between the participants' knowledge level about HPV and intention to receive HPV vaccine?

To answer research question one the nominal data will be assessed from survey questions 1-5, and analyzed using ANOVA.

2. What is the difference between the participants' perceived susceptibility and their intention to receive the HPV vaccination?

To answer research question number two the ordinal data will be assessed from survey questions 6-8, and analyzed using ANOVA.

3. What is the difference between the participants' perceived severity and their intention to receive the HPV vaccination?

To answer research question number three the ordinal data will be assessed from survey questions 9-20, and analyzed using ANOVA.

4. What is the difference between the participants' perceived benefits and their intentions to receive the HPV vaccine?

To answer research question number four the ordinal data will be assessed from survey questions 21-25, and analyzed using ANOVA.

5. What is the difference between the participants' perceived barriers and their intentions to receive the HPV vaccine?

To answer research question number five the ordinal data will be assessed from survey questions 26-37, and analyzed using ANOVA.

6. What is the difference between the participants' perceived cues to action and their intentions to receive the HPV vaccine?

To answer research question number six the ordinal data will be assessed from survey questions 38-47, and analyzed using ANOVA.

7. What is the difference between the participants' perceived self-efficacy and their intentions to receive the HPV vaccine?

To answer research question number seven the ordinal data will be assessed from survey questions 48-59, and analyzed using ANOVA.

Table 1
Table of Specifications

Research Question	Survey Items	Level of Data	Analysis
1. What is the difference between the participants' knowledge level about HPV and intention to receive HPV vaccine?	Survey questions 1-5	Interval/Ratio	ANOVA Descriptive Statistics Pearson r Correlation

2. What is the difference between the participants' perceived susceptibility and their intention to receive the HPV vaccination?	Survey questions 6-8	Ordinal	ANOVA Descriptive Statistics Pearson r Correlation
3. What is the difference between the participants' perceived severity and their intention to receive the HPV vaccination?	Survey Questions 9-20	Ordinal	ANOVA Descriptive Statistics Pearson r Correlation
4. What is the difference between the participants' perceived benefits and their intentions to receive the HPV vaccine?	Survey Questions 21-25	Ordinal	ANOVA Descriptive Statistics Pearson r Correlation
5. What is the difference between the participants' perceived barriers and their intentions to receive the HPV vaccine?	Survey Questions 26-37	Ordinal	ANOVA Descriptive Statistics Pearson r Correlation
6. What is the difference between the participants' perceived cues to action and their intentions to receive the HPV vaccine?	Survey Questions 38-47	Ordinal	ANOVA Descriptive Statistics Pearson r Correlation
7. What is the difference between the participants' perceived self-efficacy and their intentions to receive the HPV vaccine?	Survey Questions 48-59	Ordinal	ANOVA Descriptive Statistics Pearson r Correlation

Summary

Participants from a large-Midwestern university will complete a 65-question survey with questions that will assess their knowledge and perceptions of HPV and the HPV vaccination. The

study design will analyze any significant differences between participants knowledge levels/perceptions of HPV, and their intentions to receive the HPV vaccine or if they have already received the HPV vaccine. Any significant differences will be exposed after using the ANOVA analysis through SPSS.

Chapter Four: Results

Introduction

The purpose of this research was to determine undergraduate college student's knowledge and perceptions of HPV and the HPV vaccine. The study attempted to answer the following research questions.

1. What is the difference between the participants' knowledge level about HPV and intention to receive HPV vaccine?
2. What is the difference between the participants' perceived susceptibility and their intention to receive the HPV vaccination?
3. What is the difference between the participants' perceived severity and their intention to receive the HPV vaccination?
4. What is the difference between the participants' perceived benefits and their intentions to receive the HPV vaccine?
5. What is the difference between the participants' perceived barriers and their intentions to receive the HPV vaccine?
6. What is the difference between the participants' perceived cues to action and their intentions to receive the HPV vaccine?
7. What is the difference between the participants' perceived self-efficacy and their intentions to receive the HPV vaccine?

Data for this research study was collected in person using a 63-item printed survey. This chapter will discuss the findings that were obtained from the quantitative analysis. The findings are organized in alignment with each research question

Analysis and Interpretation of the Data

The findings of the study include data from undergraduate college students enrolled at a large Mid-Western university. A total of 291 surveys were distributed through the process.

Demographics results

Table 2 represents the demographic characteristics of participants that participated in the research study. Participants included both traditional and non-traditional undergraduate students. Table 2 shows 291 undergraduate students participants were analyzed for this survey. Of the participants 78.4% were aged 18-20, 19.5% were aged 21-24 and 2.10% were 25-30 years old. Of the participants 76.7% were female and 23.3% were male. The ethnicity distribution of the sample consisted of 75.9% white (n=221), 9.6% black (n= 28), 4.5% Asian-American (n=13), .3% Native-American (n=1), and 3.3% Hispanic (n=9).

Table 2
Demographic Characteristics of Participants

Characteristics	n	%
Gender	287	
Female	220	76.7%
Male	67	23.3%
Age	287	
18	74	25.8%
19	98	34.1%
20	53	18.5%
21	31	10.8%
22	8	2.8%
23	11	3.8%

24	6	2.1%
25	0	0%
26	1	.3%
27	2	.7%
28	0	0
29	1	.3%
30	2	.7%
Ethnicity	272	
White	221	81.3%
Black	28	10.3%
Asian American	13	4.8%
Native-American	1	.4%
Hispanic	9	3.3%
Vaccine Intentions	282	
Yes	83	29.4%
No	69	24.5%
I already got the vaccine	130	46.1%

Findings Related to Research Questions

The following section describes the findings of the study related to the research questions.

Research Question One: What is the difference between the participants' knowledge level about HPV and intention to receive HPV vaccine? Participants were asked to answer

five true and false questions that measured their knowledge levels of HPV and the HPV vaccine, with a correct answer for each question. Table three represents the questions that were correctly and incorrectly answered by the participants.

In order to determine the difference between the participants' knowledge level and the student's intentions to receive the HPV vaccination a One Way ANOVA test was conducted. There was no significant difference between the participants' knowledge levels about HPV and the intentions to receive the HPV vaccine.

Table 3
Knowledge Levels

Question	Correctly Answered (%)	Incorrectly Answered (%)
1. HPV is the most common sexually transmitted infection in the United States.	60.4%	39.6%
2. If you are not currently sexually active you do not need to get the HPV vaccine.	90.7%	8.9%
3. The HPV vaccine prevents cervical cancer and genital warts.	64.6%	35.4%
4. The HPV vaccination can cure someone who is already infected.	92.4%	7.3%
5. Only women need to get the HPV vaccination.	93.8%	5.9%

Research Question Two: What is the difference between the participants' perceived susceptibility and their intention to receive the HPV vaccination? Participants were asked to answer three questions in the Likert-type format regarding perceived susceptibility. A frequencies distribution with mean scores and standard deviation was computed. The highest score participants could score for perceived susceptibility is 15 and the lowest score is 3.

Respondents had a mean score of 6.93 (SD=9.73). This mean score indicates that the majority of participants had low perceptions of severity.

In order to determine the difference between the participants' perceived susceptibility and their intentions to receive the HPV vaccine an ANOVA test was conducted. There was no significant difference between the participants' perceived susceptibility and their intentions to receive the HPV vaccination.

Research Question Three: What is the difference between the participants' perceived severity and their intention to receive the HPV vaccination? Participants were asked to answer 12 questions in the Likert-Type format regarding perceived severity. A frequencies distribution with mean scores and standard deviation was computed. The highest score participants could score for perceived severity is 60 and the lowest score is 12.

Respondents had a mean score of 45.37 (SD=13.12). This mean score indicates that the majority of the participants had higher perceptions of severity.

In order to determine the difference between the participants' perceived severity and their intentions to receive the HPV vaccination an ANOVA test was conducted. There was no significant difference between the participants' perceived severity and their intentions to receive the HPV vaccination.

Research Question Four: What is the difference between the participants' perceived benefits and their intention to receive the HPV vaccination? Participants were asked to answer five questions in the Likert-Type format regarding perceived severity. A frequencies distribution with mean scores and standard deviation was computed. The highest score participants could score for perceived severity is 25 and the lowest score is five Respondents had

a mean score of 19.59 (SD=7.31). This mean score indicates that participants have higher perceptions of perceived benefits.

In order to determine the difference between the participants' perceived benefits and their intention to receive the HPV vaccination an ANOVA test was conducted. There was no significant difference between the participants' perceived benefits and their intentions to receive the HPV vaccination.

Research Question Five: What is the difference between the participants' perceived barriers and their intention to receive the HPV vaccination? The participants were asked to answer 12 questions in the Likert-Type format regarding perceived barriers. A frequencies distribution with mean scores and standard deviation was computed. The highest score participants could score for perceived barriers is 60 and the lowest score is 12. Respondents had a mean score of 30.57 (SD= 17.73). Table 4 shows the mean scores within each group.

In order to determine the difference between the participants' perceived barriers and their intention to receive the HPV vaccination an ANOVA test was conducted. There was a significant difference between the participants' perceived barriers and their intentions to receive the HPV vaccination with $F= 6.401$ and $p= .002$.

Table 4
Perception of Barriers Scores

Vaccine intentions	N	Mean Scores
I already received the vaccine	130	26.4308
No	69	32.3333
Yes	83	34.6145

Research Question Six: What is the difference between the participants' perceived cues to action and their intention to receive the HPV vaccination? The participants were

asked to answer 10 questions in the Likert-Type format regarding perceived cues to action. A frequencies distribution with mean scores and standard deviation was computed. The highest score participants could score for perceived cues to action is 50 and the lowest score 10.

Respondents had a mean score of 36.07 (SD=15.64).

In order to determine the difference between the participants' perceived cues to action and their intention to receive the HPV vaccination an ANOVA test was conducted. There was no significant difference between the participants' perceived cues to action and their intentions to receive the HPV vaccination.

Research Question Seven: What is the difference between the participants' perceived self-efficacy and their intention to receive the HPV vaccination?

The participants were asked 11 questions in the Likert-Type format regarding perceived self-efficacy. A frequencies distribution with mean scores and standard deviation was computed. The highest score participants could score for perceived self-efficacy is 55 and the lowest score is 11. Respondents had a mean score of 44.46 (SD= 9.63). Table 5 shows the mean scores within each group. This mean score indicates that the participants had high levels of self-efficacy.

In order to determine the difference between the participants' perceived self-efficacy and their intention to receive the HPV vaccination an ANOVA test was conducted. There was a significance difference between the participants' perceived self-efficacy with $F= 17.954$ and $p=.000$.

Table 5
Perception of Self-Efficacy Scores

HPV vaccine intentions	N	Mean Scores
I already received the Vaccine	130	47.2154
No	69	40.8551

Yes	83	41.9639
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Other Information

A Pearson Correlation was computed to analyze the relationship between knowledge, perception of susceptibility, perceptions of severity, perceptions of benefits, perceptions of barriers, perceptions of cues to action, and perceptions of self-efficacy. The findings are shown in Table 3.

Table 6
Correlations

Correlation	r- value	p- value
Knowledge and Action	.151**	.010
Severity and Action	.028*	.129
Benefits and Self-Efficacy	.335**	.000
Action and Benefits	.180**	.002
Barriers and Action	.125*	.003
Barriers and Self-Efficacy	-.167**	.004

Summary

The purpose of this study was to identify college students' knowledge and perceptions of HPV and the HPV vaccine using the Health Belief Model. The researcher examined the difference between participants who have already received the HPV vaccine, those who intend to receive the HPV vaccine, and those who do not intend to receive the HPV vaccine. In addition the researcher also examined the relationship between knowledge, perception of susceptibility, perceptions of severity, perceptions of benefits, perceptions of barriers, perceptions of action, and perceptions of self-efficacy.

Respondents had high knowledge levels but there was no significant relationship between knowledge levels and student intention to receive the HPV vaccine.

There was a significant relationship between participants perceived barriers and their intentions to receive the HPV vaccine. The respondents who had already received the HPV vaccine had fewer perceived barriers than those who did not intend to receive the HPV vaccine and those who do intend to receive the HPV vaccine in the future.

There was a significant relationship between the participants perceived self-efficacy their intentions to receive the HPV vaccine. The respondents who have already received the HPV vaccine have higher perceptions of self-efficacy than those who did not intend to receive the HPV vaccine and those who do intend to receive the HPV vaccine in the future.

After reviewing the relationships between the constructs, when the participants scored higher knowledge level scores their perceived cues to action score increased. As participants' perceptions of severity scores increased, their perceived cues to action scores also increased. When participants had high levels of perceived benefits their perceived self-efficacy scores also increased. As participants' perceived cues to action scores increased so did their perceived benefits scores. As the participants' perceived barriers scores increased, the participants' perceived cues to action also increased. Lastly, as the participants' perceived barriers scores increased the participants' perceived self-efficacy scores decreased.

Chapter Five: Results

Summary

The purpose of the HPV vaccination is to provide protection from cancers caused by HPV, and to provide an opportunity to decrease the consequences caused by HPV. Even though the HPV vaccine is safe and effective, the success of the vaccine is dependent on the improvement of uptake within the United States.

College students are particularly vulnerable when it comes to HPV transmissions (Ratanasiripong, 2014). According to Markowitz et al. (2014) HPV prevalence is highest among those aged 20-24 years of age. College is considered a time when health behavior and decision-making processes are developed, a time when they form an understanding about long term risks, and a time where they make a variety of health decisions for themselves (Barnard et al., 2017). For this reason it is so important to form a better understanding why college students vaccine intentions.

In this study college students were asked to answer questions that assessed their knowledge and perceptions of HPV and the HPV vaccine using the HBM. In this study frequencies of correct and incorrect answers were analyzed and participants had high levels of knowledge regarding HPV and the HPV vaccine. As knowledge scores increased, so did the participants cues to action scores. Previous studies indicate that lack of information and lack of knowledge of HPV and the HPV vaccine act as common barriers (Donaldiki et al., 2014). In this study the participants' perceptions of HPV and the HPV vaccine were also assessed using the HBM model, which suggests that the probability of a person practicing a health-related behavior is dependent on their perceptions to of practicing such behavior. In this study that behavior is uptake of the HPV vaccine.

Conclusions

In this study the participants who have already received the HPV vaccine had fewer perceived barrier than those who intend to get the vaccine in the future, and fewer perceived barriers than those who do not intend to get the vaccine at all.

This study also indicated that participants who have already received the HPV vaccine scored higher perceptions of self-efficacy than those who intend to get the vaccine in the future, higher perceptions of self-efficacy than those who do not intend to get the vaccine at all.

Recommendations for Addressing Perceived Barriers

Misconceptions surrounding HPV and the HPV vaccine pose as a barrier for vaccine uptake. Previous research indicates that common barriers for vaccine uptake include; lack of information and knowledge about HPV vaccine, poor perceived risk of acquiring the HPV infection, misconceptions about the safety of the vaccine, and the cost of the vaccine (Donaldiki et al., 2014). This study exemplifies that the participants who do not intend to get vaccinated and those who intend to get vaccinated in the future have higher perceived barriers than those who have already received the vaccine.

Earlier education on this topic will be beneficial in eliminating misconceptions regarding HPV, which pose as barriers that prevent the uptake of the vaccination. It is recommended that the vaccine be administered in the two-dose form at the age of 9-12, but this does not always happen. As exemplified in this study only 44.67% of the students had already been vaccinated. By breaking down barriers such as “I don’t know how to go about receiving the HPV vaccination”, and “I am afraid to receive the HPV vaccination because I don’t understand the three-dose procedure” through education then we can increase the participants willingness to receive the HPV vaccine.

Another strong indicator that a college student would be willing to receive the HPV vaccine is through a physician recommendation (Fontenot et al., 2014). If the health care physicians and health care professionals could not only provide the student with the appropriate information about the vaccine and its three-dose procedure, but also provide the recommendation to receive it, the student will have fewer barriers to overcome.

Recommendations for Addressing Self-Efficacy

Self-efficacy for HPV is the confidence in one self and the ability to go out and get the HPV vaccination. There needs to be an improvement of confidence within the college students who have not received the HPV vaccination.

College campuses need to provide the appropriate resources in order to help the student's perceptions of their self-efficacy as it pertains to the uptake of the HPV vaccine. College campuses should provide more information regarding sexually transmitted diseases, and information regarding the HPV and the HPV vaccine because students are more likely to get the vaccine if they have more contact to health information and a better understanding of sexually transmitted infections (Thompson et al., 2017).

College campuses can also provide information regarding the availability of the vaccine at the school, and the availability of vaccine at other health care services near campus. College campuses should also offer information regarding health insurance and the coverage of the vaccine, and how to make an appointment to receive the HPV vaccine. By providing this information to the college students they will have more confidence in their ability to go out and get the vaccine.

Recommendations for Future Research

Previous studies exploring vaccine uptake among college students determined that the HPV vaccine uptake within this population is still low. In this study, less than half of the participants (44.67%) have already received the vaccine with 29.4% who intend to receive the HPV vaccine in the future and 24.5% of participants who have no intentions to receive the HPV vaccine. Further research should continue to identify predictors of vaccine intention among college students.

Modifying the knowledge section of the survey instrument in order to seek out further knowledge gaps would benefit education programs and information regarding the misconceptions of HPV and HPV vaccine.

Future research should examine how to improve self-efficacy as it pertains to the catch-up HPV vaccination. In this study the participants who have not received the vaccine yet scored lower on the perceived self-efficacy scores than the participants who have already received the HPV vaccine. Future research should examine how to improve student's confidence to go out and get vaccinated. This study has shown that self-efficacy is an influencing factor when it comes to intentions of health behaviors; therefore there is a significant opportunity for further research on this specific area of vaccine intention.

There is a significant opportunity for continued research on this up and coming health topic. The more that is understood about vaccine intention among college students, the more opportunities there will be to improve vaccine uptake with this population.

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Appendices

Appendix A
Institutional Review Board Letter of Approval



February 2, 2018

Dear Marge Murray-Davis:

Re: IRB Proposal entitled "[1184505-2] Using the Health Belief Model to Assess Undergraduate Student Knowledge and Perceptions of the Human Papillomavirus in order to Better Understand Vaccine Intentions"

Review Level: Level [I]

Your IRB Proposal has been approved as of February 2, 2018. On behalf of the Minnesota State University, Mankato IRB, we wish you success with your study. Remember that you must seek approval for any changes in your study, its design, funding source, consent process, or any part of the study that may affect participants in the study (see <https://grad.mnsu.edu/irb/revision.html>). Should any of the participants in your study suffer a research-related injury or other harmful outcome, you are required to report them to the Associate Vice-President of Research and Dean of Graduate Studies immediately.

When you complete your data collection or should you discontinue your study, you must submit a Closure request (see <https://grad.mnsu.edu/irb/closure.html>). All documents related to this research must be stored for a minimum of three years following the date on your Closure request. Please include your IRBNet ID number with any correspondence with the IRB.

Sincerely,

A handwritten signature in cursive script that reads "Mary Hadley".

Mary Hadley, Ph.D.
IRB Coordinator

A handwritten signature in cursive script that reads "Jeffrey Buchanan".

Jeffrey Buchanan, PhD
IRB Co-Chair

A handwritten signature in cursive script that reads "Julie A. Carlson".

Julie Carlson, Ed.D.
IRB Co-Chair

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Minnesota State University, Mankato IRB's records.

Appendix B
Survey Consent Form

Title: Using the Health Belief Model to assess Undergraduate College Students Knowledge and Perceptions of Human Papillomavirus in Order to Better Understand Vaccine Intentions

Faculty Advisor: Dr. Murray-Davis, Department of Health, Science, Minnesota State University, Mankato;

Student Investigator: Kelly McMahon

IRBNet #: 1184505

What is the purpose of the study?

You are being invited to take part in a survey research study designed to assess knowledge and perceptions of the Human Papillomavirus and the Human Papillomavirus vaccine and your intentions to receive the HPV vaccine or not.

What is the purpose of this form?

This consent form gives you the information you will need to help you decide whether to be in the study or not. Please read the form carefully. You may ask any questions about the research, the possible risks and benefits, your rights as a volunteer, and anything else that is not clear. When all of your questions have been answered, you can decide if you want to be in this study or not.

Why am I being invited to participate?

You are being invited to take part in this study because you are a student at Minnesota State University, Mankato. Participation is voluntary. If you choose not to take the survey or are not eligible, you need not proceed through the survey. You may turn it in blank. Only individuals ages 18 years of age and above are permitted to take the survey.

What will happen during this study and how long will it take?

If you agree to take part in this study, your involvement will last for approximately 15minutes. You are being asked to complete a survey that will assess your knowledge and perceptions of HPV and the HPV vaccination and your intentions of receiving the HPV vaccine. Your completion of the survey marks the end of participation in this study.

What are the risks of this study?

There are few reasonably foreseeable risks in completing the survey. However, while the risk is extremely low, when collecting demographic data (such as age and race) there is a minute probability of a breach in confidentiality/anonymity. You are free to skip ANY question you do not feel comfortable answering. Please also do not put your names or any other identifying marks on the survey. Your responses will remain anonymous.

What are the benefits of this study?

There are no benefits to you the participant for completing this study. However, it is hoped that the information gained from this study will allow health professionals to better understand college student intentions whether or not to receive the HPV vaccine or not.

Who will see the information?

The information you provide during this research study will be kept confidential. To help protect your confidentiality, we will ensure that only the Principle Investigator and student investigators will have access to the completed surveys. Your name will NOT be attached to the survey nor will any other information capable of personally identifying you. Surveys will be stored in a secure location and all surveys will be destroyed within 5 years of completion of this study. The study will be completed by April 30, 2018. We will

take all reasonable steps to protect your identity. If the results of this project are published your identity will not be made public.

Do I have a choice to take part in this study?

If you decide to take part in the study, it should be because you really want to volunteer. You will not lose any benefits or rights you would normally have if you choose not to volunteer. You can stop at any time during the study and still keep the benefits and rights you had before volunteering. You will not be treated differently if you decide to stop taking part in the study. The decision whether or not to participate will not affect your relationship with Minnesota State University, Mankato, and refusal to participate will involve no penalty or loss of benefits. If you have any questions about this research study, contact Kelly McMahon at kelly.mcmahon@mnsu.edu who is working under the supervision of Dr. Murray-Davis (Primary Investigator). If you have any questions about participants' rights and for research-related injuries, please contact the Administrator of the Institutional Review Board at (507) 389-1242.

All participants have the right to a copy of the consent form. You have been provided a copy for your records. Thank you for your time and if you have any questions or concerns, please free to contact the Minnesota State University, Mankato Institutional Review Board or Dr. Murray-Davis (Primary Investigator).

Handing in a survey with responses on it indicates that you are at least 18 years of age and consent to participate in the research.

Kelly McMahon
Minnesota State University, Mankato
Email: kelly.mcmahon@mnsu.edu

Marge Murray-Davis, PHD, MCHES
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MSU IRBNet ID #1184505
Date of MSU IRB Approval: 02/02/2018

Appendix C

HPV Vaccination Belief Survey

<i>Knowledge Levels</i>	T	F
1. HPV is the most common sexually transmitted infection in the United States.		
2. If you are not currently sexually active you do not need to get the HPV vaccine.		
3. The HPV vaccine prevents cervical cancer and genital warts.		
4. The HPV vaccination can cure someone who is already infected.		
5. Only women need to get the HPV vaccination.		

<i>Perceived Susceptibility</i>	Strongly Agree (5)	Agree (4)	Neither Agree nor Disagree (3)	Disagree (2)	Strongly Disagree (1)
6. It is likely that I will get HPV.					
7. My chances of getting HPV in the next few years are great.					
8. I feel I will get HPV sometime in my life.					
<i>Perceived Severity</i>	Strongly Agree (5)	Agree (4)	Neither Agree nor Disagree (3)	Disagree (2)	Strongly Disagree (1)
9. The thought of genital warts or cervical cancer scares me.					
10. When I think about genital warts or cervical cancer I feel nauseous.					
11. If I had genital warts or cervical cancer my academics and career would be endangered.					
12. When I think about genital warts or cervical cancer my heart beats faster.					

	Strongly Agree (5)	Agree (4)	Neither Agree nor Disagree (3)	Disagree (2)	Strongly Disagree (1)
13. Genital warts or cervical cancer would endanger my love relationships.					
14. Cervical cancer is a hopeless disease.					
15. My feelings about myself would change if I got cervical cancer.					
16. I am afraid to even think about cervical cancer.					
17. My financial security would be endangered if I got cervical cancer.					
18. Problems I would experience from cervical cancer would last a long time.					
19. If I got cervical cancer, it would be more serious than other diseases.					
20. If I got cervical cancer, it would be more serious than other diseases.					
<i>Perceived Benefits</i>	Strongly Agree (5)	Agree (4)	Neither Agree nor Disagree (3)	Disagree (2)	Strongly Disagree (1)
21. If I receive the HPV vaccine, I would not worry as much about cervical cancer.					
22. Receiving vaccinations will help me prevent diseases.					
23. If I receive the HPV vaccine, my treatment for HPV may not be as bad.					
24. Having the HPV vaccination is the best way for me to prevent HPV and cervical cancer.					
25. Having the HPV vaccination will decrease my chances of dying from cervical cancer.					

<i>Perceived Barriers</i>	Strongly Agree (5)	Agree (4)	Neither Agree nor Disagree (3)	Disagree (2)	Strongly Disagree (1)
26. I am afraid to receive the HPV vaccination because I might find out I'm carrying HPV already.					
27. I am afraid to receive the HPV vaccination because I don't understand the three-dose procedure.					
28. I don't know how to go about receiving the HPV vaccination.					
29. Receiving the HPV vaccination is too embarrassing because it is STD related.					
30. Receiving the HPV vaccination takes too much time.					
31. Receiving the HPV vaccination is too painful.					
32. Receiving the HPV vaccination is too expensive.					
33. Receiving the HPV vaccination can cause reactions.					
34. I cannot remember to schedule the HPV vaccination.					
35. I am afraid to receive the HPV vaccination because I don't think HPV vaccine is effective.					
36. I am afraid to receive the HPV vaccination because I don't think HPV vaccine is safe.					
37. I do not know if I already had the HPV vaccination.					
<i>Cues to Action</i>	Strongly Agree (5)	Agree (4)	Neither Agree nor Disagree (3)	Disagree (2)	Strongly Disagree (1)
38. I have a stable relationship.					
39. I have visited a physician about my sexual health.					

	Strongly Agree (5)	Agree (4)	Neither Agree nor Disagree (3)	Disagree (2)	Strongly Disagree (1)
40. I am currently employed.					
41. I make sure a condom is used each time I have anal, oral, vaginal sex.					
42. I frequently do thinks to improve my health.					
43. I received HPV related information.					
44. I received HPV vaccination related information.					
45. My friends have suggested I get the HPV vaccine.					
46. My doctor has suggested I get the HPV vaccine.					
47. My parents have suggested I get the HPV vaccine.					
<i>Self-Efficacy</i>	Strongly Agree (5)	Agree (4)	Neither Agree nor Disagree (3)	Disagree (2)	Strongly Disagree (1)
49. I can arrange other things in my life to receive the HPV vaccination.					
50. I can talk to a professional about my concerns.					
51. I can receive the HPV vaccination even if I'm worried.					
52. I can receive the HPV vaccination even if I don't know what to expect.					
53. I can find a way to pay for the HPV vaccination.					
54. I can make an appointment for the HPV vaccination.					
55. I know for sure I can get the HPV vaccination if I really want					

	Strongly Agree (5)	Agree (4)	Neither Agree nor Disagree (3)	Disagree (2)	Strongly Disagree (1)
56. I know how to go about getting the HPV vaccination.					
57. I can find a place to get the HPV vaccination.					
58. I can get the HPV vaccine even if I did not get all of it when I was younger.					
59. I can get the HPV vaccine if I am 26 years old (female), or 21 years old (male).					

Demographics

Are you an undergraduate student?	Yes
	No
Age (please write your age)	_____
How do you describe or identify yourself	White
	Black
	Asian-American
	Native-American
	Hispanic
Do you intend to get the HPV vaccine in the future?	Yes
(Check only 1 answer)	No
	I already got the vaccine
What is your sex?	Male
	Female
	Other

Survey adapted from:

He, C. (2016). *Use of the health belief model to understand HPV vaccine behavior in female undergraduates* (Order No. 10130679). Available from ProQuest Dissertations & Theses Global. (1801941443). Retrieved from <http://ezproxy.mnsu.edu/login?url=https://search-proquest-com.ezproxy.mnsu.edu/docview/1801941443?accountid=12259>