FLORIDA INTERNATIONAL UNIVERSITY

Miami, Florida

HPV VACCINATION INTENTIONS IN BLACK YOUNG ADULTS

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by

Kayla N. Mathis-Gamble

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To: Dean Ora Strickland
Nicole Wertheim College of Nursing & Health Sciences

This dissertation, written by Kayla N. Mathis-Gamble, and entitled HPV Vaccination Intentions in Black Young Adults, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this dissertation and recommend that it be approved.

_____
Ora Strickland

_____
Michelle Kameka

_____
Eric Fenkl

_____
Sandra Gracia-Jones, Major Professor

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The dissertation of Kayla N. Mathis-Gamble is approved.

_____
Dean Ora Strickland
Nicole Wertheim College of Nursing & Health Sciences

_____
Andrés G. Gil
Vice President for Research and Economic Development
and Dean of the University Graduate School

Florida International University, 2020

DEDICATION

This is dedicated to every individual that has encouraged me, enlightened my path, and enriched my journey.

To my parents, Hope, Stanley, & Larry your love and guidance nourished me to the person I am today.

To my companion of over 28 years, Stace, thank you for making me smile and keeping me grounded through this experience.

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ABSTRACT OF THE DISSERTATION

HPV VACCINATION INTENTIONS IN BLACK YOUNG ADULTS

by

Kayla N. Mathis-Gamble

Florida International University, 2020

Miami, Florida

Professor Sandra Gracia-Jones, Major Professor

Purpose: The purpose of this quantitative study is to assess perceived: vulnerability, severity, benefits, barriers; and risk behavior factors (trust/mistrust, social influence, and prior sexual behavior) regarding intent to initiate and complete the HPV vaccination series, in HPV vaccine naïve, Black college students aged 18-24, enrolled in a minority serving institution (MSI) and/or historically black college/university (HBCU).

Methodology: After IRB approval was obtained, 158 Black college students were recruited from the MSI/HBCU(s). The study was guided by the Health Belief Model. The participants completed paper and pencil surveys.

Findings: While male gender influenced the intent to be vaccinated in Black college students, age and location did not influence vaccination intent. There was no significant interaction between perceived: vulnerability and benefits and gender in reference to participants' intent to receive the HPV vaccination; yet perceived severity and barriers negatively influenced plan to receive vaccination. Finally, female participants were less likely to plan to receive the vaccination than males; if they perceived more vulnerability and benefits of HPV vaccination. There was no significant interaction between

trust/mistrust, social influence, or prior sexual behavior; although for trust/mistrust and prior sexual behavior had statistical significance, (p=0.033 and p= 0.032) respectively; female participants were less likely to plan to receive the vaccination than males. There was a statistical difference noted regarding the change in dosing of HPV vaccines from three to two doses, Black college students were more likely to intend to become vaccinated (p=0.006).

Conclusion: As depicted in the framework, gender, perceived severity and perceived barriers were predictive of intentions to vaccinate for HPV. However, age, location of college, trust/mistrust, social influence, and prior sexual behavior were not found to have relative contributions to intentions of Black college students to receive the HPV vaccination. Also, it was found that the change in dosing, that is reducing the number of shots in the required HPV series, contributed positively to Black college students receiving the HPV vaccine. The results of this study only provided minimal support for the Health Belief Model as a theoretical framework which could effectively explain the behaviors of Black college students' intention to be vaccinated for HPV.

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Introduction

Genital Human Papilloma virus (HPV) is a sexually transmitted infection (STI) that has been linked to cancer in women and men. HPV- associated cervical cancers affect Black women more than other women (Centers for Disease Control and Prevention [CDC], 2019a). The incidence of HPV-related cancers can be eradicated by over 90%, with the proper utilization of the HPV vaccination (CDC, 2018c). Research has shown that parents in the United States have concerns regarding vaccinations in general and may be hesitant regarding the HPV vaccine (Thomas, Caldera, & Maurer, 2019). Therefore, many young men and women entering college have not received the HPV vaccination. College students can receive health care, such as vaccinations, without the necessity of parental consent. However, studies have shown that college students may not even be aware that there is an HPV vaccine, and that they should get vaccinated. The purpose of this study was to identify the variables that specifically influence Black college students' intentions to vaccinate, in order to help guide interventions aimed at increasing HPV vaccination rates among this high-risk group.

HPV is a virus with over 100 strands (D'Urso, Thompson-Robinson, & Chandler, 2007). The virus can lead to genital warts or anogenital cancers, involving the vulva, vagina, and cervix of females, the penis of males, and the anus and rectum of both genders (CDC, 2015a).

The World Health Organization (WHO) (2016) reports that there are 290 million women globally who have been infected with HPV. HPV can be the precursor to several types of cancer. Cancers caused by HPV have a disparity as well, with cervical cancer

being highest, followed by anal, vaginal, oropharynx, vulvar, and penile cancer (CDC, 2016d). In the United States (U.S.), HPV is responsible for 34,800 cancer diagnoses annually (approximately 24,886 cases in women and 19,113 cases in men) (CDC, 2019a). In 2013, the estimated deaths for cervical cancer in African American women was 720 deaths (American Cancer Society, 2013). To eradicate this epidemic, in 2006 a primary prevention strategy, a 3-dose HPV vaccination series, debuted in the U. S. However, because HPV is a STI, promotion of the vaccine is fraught with negative undertones due to cultural expectations, religious/spiritual beliefs, parental beliefs and perceptions, and regional/societal norms (Thomas, Blumling, & Delaney, 2015). HPV impacts individuals, families, communities, and the health care system. The significance of these facts serves as the impetus for this research looking at the problem HPV has caused in the US, in Black young adults.

Vaccine Debut

The CDC has indicated that six million more Americans become infected with HPV each year (CDC, 2012a). One way to prevent STIs is through the primary prevention strategy of vaccination. The HPV vaccine series is currently recommended for females (age 9-26) and males (age 11-26). Vaccination recommendations for HPV remain controversial because of parental concerns, the intimate nature of the spread of the disease, knowledge and awareness of the disease, and health care barriers (Thomas, 2008).

In the United States, there is a board that is comprised of medical and public health experts that makes recommendation for vaccine utilization called the Advisory Committee on Immunization Practices (ACIP). Although, the ACIP has recommended the utilization

of the HPV vaccine, college age individuals have demonstrated a low uptake of the vaccine (CDC, 2007).

While vaccination is a solution to preventing HPV, other primary prevention strategies are necessary, including knowledge and awareness of HPV prevention and transmission. Researchers have studied and documented that there has been an increase in awareness of HPV and HPV vaccine among college-aged women since the debut of the vaccine in 2006 (Jain et al., 2009; Allen et al., 2009, & Caron, Kispert, & McGrath, 2008); however, vaccine uptake has been low (Ratanasiripong, 2012).

Initially, the HPV vaccine series required 3 doses of the vaccine to complete the vaccine series. Individuals between the ages of 13-17 have only had small growths in vaccine coverage, (males 41.7% and females 60%) in 2014 (CDC, 2015b). Cook et al. (2010) noted that Blacks were 44% less likely than Whites to complete the vaccination series. Males are less likely than females to receive the HPV vaccination (Thomas, Strickland, & Higgins, 2017). Although the HPV vaccine has been added to the recommended vaccine series, geographical locations, legislation, cost, and practicalities of a multiple-dose vaccine series must be considered before a true national adherence to the recommendation will be successfully implemented (CDC, 2007; Outterson, 2009,; United States Census Bureau (USCB), 2012,; & Abiola, Colgrove, & Mello, 2013).

In October 2016, the ACIP voted to recommend that adolescents aged 11-12, receive only 2 doses of the vaccine, compared with the previous recommendation of 3 doses (CDC, 2016a). To date, no research has been published that looks at the intentions of Black vaccine naïve college students to vaccinate now that the series has been changed from 3 doses to 2 doses for young adolescents.

Gender and Racial Disparities

HPV infection causes cancer in more women than men, but gay and bisexual men are also at high risk for some HPV-related health problems (CDC, 2012b). Gender disparity is evident, since about 21,300 females and about 12,100 males have HPV associated cancers (CDC, 2012a). Ratanasiripong (2012) noted that the 18 million U. S. college and university students represent a large portion of the American population that are at risk for developing HPV infection.

In comparison with their White counter parts, Black women had higher rates of HPV-associated vaginal cancer, but lower rates of vulvar and oropharyngeal cancer (CDC, 2019b). When compared with their White counterparts' Black men have higher rates of anal and rectal, but lower rates of penile and oropharyngeal cancer (CDC, 2019b). Black women also have a higher rate of deaths related to cervical cancer (CDC, 2016c). The impact of this disease affects individuals, families, and communities.

Geographic Location

In the world, cervical cancer ranks as the 3rd most frequent cancer among women. In a comparison between the Americas, Africa, Asia, Europe, and Oceania, the Americas ranked second in cervical cancer rates (Bruni et al., 2014). In 2013, it was estimated that there are nearly 42 million African Americans living in the US, and that they do not equally reside throughout the US (USCB, 2012). This is particularly important to note since residential distribution for African Americans is concentrated in New York, California, and the South, with one out of every four African Americans

residing in New York, Florida, or Texas (USCB, 2010). There may be differences in HPV vaccination challenges or barriers for rural versus urban populations (Thomas, Strickland, Di Clemente, Higgins, & Haber, 2012).

Trust/mistrust

Trust can be an underlying factor when an individual is determining their health care regimen, and this includes acceptance or denial of vaccines. This trust issue may be a result of unethical medical experiments conducted in the Black American population. Examples would include the unethical experiments conducted on Black males in the Tuskegee study, or the experimentation on the cancer cells from a Black American woman, without informed consent. While older Black Americans may remember the Tuskegee syphilis experiments, Black American adolescents and young adults may not. Brandon, Isaac, and LaVeist (2005) conducted a study to differentiate between mistrust of medical systems and the medical studies conducted in Tuskegee, Alabama. The researchers found that race played a significant difference in individuals mistrust in medical care, although there was no difference in knowledge about the study by race (Brandon, Isaac, and La Veist, 2005). However, the data revealed that double the number of Black individuals in the study believed that the Tuskegee study participants were purposely infected with syphilis (Brandon, Isaac, and La Veist, 2005). Additionally, the Black participants believed that a similar study could occur in 2018.

Since the inclusion of the HPV vaccine series in the recommended vaccine schedule, several changes have occurred. This includes changes in the gender of

recipients, changes in the number of viruses the vaccine produces immunity too, and changes in the number of vaccination doses. These changes may further fuel the feelings of mistrust of the efficacy of the vaccine and the knowledge of health care providers.

LaVeist, Isaac, and Williams (2009) conducted a study to determine if a relationship existed between mistrust and health care service utilization. The authors found that medical mistrust resulted in a delay to seek medical care, nonadherence, and failure to keep appointments (LaVeist, Isaac, & Williams, 2009). Carpenter et al. (2009) found that, in comparison to their Caucasian counterparts, African American males exhibited a higher distrust in physicians. HPV vaccine acceptance can be influenced by indirect and direct individual experiences (Nan, Zhao, & Briones, 2014). This must be taken into consideration when planning and implementing strategies to increase vaccination in this vulnerable population. Scarinci, Garces-Palacio, & Patridge (2007) noted that African American females were skeptical regarding the HPV vaccine.

Social influence

Individuals are influenced by varying stimuli; this also remains pertinent in the seeking of health care. Numerous studies have recognized the correlation between HPV vaccine uptake and health care provider recommendations (Dorell, Yankey, & Strasser, 2011; Kester et al., 2013). However, the social influences on HPV vaccine uptake have not been well represented in the literature. Rambout, Tashkandi, Hopkins, & Tricco (2014) noted that social norms facilitated HPV vaccination uptake. The proposed study will enhance the literature regarding social influence and HPV vaccine uptake in Black male and female college students.

Previous sexual encounters

The introduction of the HPV vaccine created feelings of concern regarding an increase in sexual initiation and/or in increase in promiscuity (Constatine & Jerman, 2007; Hopkins & Wood, 2013). Bednarczyk, Davis, Ault, Orensteinn, & Omer (2012) found that there was not an increased rate in sexual activity-related outcomes, after HPV vaccinations of 11-12-year olds. Another study found that HPV vaccination did not have an association with being sexually active or with the number of sex partners (Liddon, Leichliter, & Markowitz, 2012). This is promising data, but this study will determine if this remains true in the Black male and female college students.

Change in dosing

Research has been conducted to determine adherence to the three dose HPV vaccine regimen (Widdice, Bernstien, Leonar, Marsolo, & Kahn, 2011). The researchers found that in Black participants the rates for HPV vaccine adherence to schedules and vaccine completion were low (Widdice, Bernstien, Leonar, Marsolo, & Kahn, 2011). Little is known about the new recommendations' effects on Black male and female college students' intention to vaccinate now that the dosing has changed for young adolescents from 3 doses to 2 doses.

Conclusion

One would hypothesize that over the past twelve years the rates of HPV vaccination adherence would have a significant improvement. Although rates are increasing, overall adherence has not reached 50%. The percent of up to date (UTD) HPV vaccine status in adolescents for 2016 was only 43.4 (N=20475) (Walker et al., 2016). Completion rates for ≥ 3 doses (the previous standard for the vaccine series) for all

adolescents was 37.1% (N=20475) in 2016, up from 34.9% (N=21875) in 2015 (Walker et al., 2016). A review of the literature regarding HPV vaccination, Black college students, gender differences, geographic location, perceived vulnerability, perceived severity, perceived benefits, perceived barriers, trust/distrust, social influence, or prior sexual behavior, has found that these variables may affect intent to vaccinate, but further studies are needed to describe the effect of these variables on college-age Black students' and their intent to receive the HPV vaccination series.

Statement of the Problem

Although a 3-dose HPV vaccine series has been available since 2006, rates for completion of the series remain low in the U. S. Research studies conducted with HPV vaccination found that lack of knowledge about HPV, parental and physician discomfort with vaccinating teenagers against STIs, vaccine cost and financing issues, adolescents' health –seeking behaviors, and concerns about vaccines in general, influenced intent to receive the vaccination series (Dempsey & Davis, 2006; Zimet, 2006). Giuliana et al. (2008) noted that male sexual habits affect the rates of HPV infection in female partners, thus a greater understanding of HPV infection in men is an essential component of cervical cancer prevention in women. HPV vaccination rates remain low in the U. S. Although some surveillance data has been published for females, male uptake published data is limited; consequently, monitoring of vaccine uptake in racial and ethnically diverse male and female populations are warranted. Despite the available research on college student's intentions to vaccinate, relatively little is known about impact or effect of variables such as gender differences, geographic location, perceived vulnerability, perceived severity, perceived benefits, perceived barriers, trust/distrust, social influence,

or prior sexual behavior of Black college students aged 18-24, on intent to vaccinate. Consequently, understanding and addressing the variables that specifically influence Black college students' intentions to vaccinate can guide interventions aimed at increasing HPV vaccination rates among this high-risk group. The CDC has recently recommended changing from a 3-dose to a 2-dose HPV vaccine series for young girls, but no studies have yet explored the impact of this practice change on young adults' intent to receive the HPV vaccination series.

Theoretical Framework

Several theories have been utilized in regard to HPV vaccination. The Health Belief Model will guide this study. This model explains individuals' behaviors based on their personal beliefs or perceptions about disease process and the strategies to detour the diseases occurrences (Chambers & Paraska, 2014). This theory was originally composed of four constructs, (perceived: seriousness, susceptibility, benefits, and barriers), but has evolved to include cues to action, motivating variables, and self-efficacy (Chambers & Paraska, 2014). This model also suggest that an individual's preventative health behaviors are dependent on perceived susceptibility to disease, the severity of health outcomes, the benefits of and barrier to behavior engagement, and cues to motivate (Rosenstock, 1974). Perceived seriousness refers to an individual's belief of the severity of a disease, this can be influenced by difficulties the disease would create or the effects of it on the person's life (Chambers & Paraska, 2014). Perceived susceptibility or personal risk looks at how an individual will see/perceive the danger that is involved in a health behavior (Chambers & Paraska, 2014). The constructs of perceived seriousness and perceived susceptibility are combined to determine the individual's perceived threat

(Stretcher & Rosenstock, 1997). The threat must cause the individual to feel they are at a real risk of acquiring a serious illness for behavior to change (Chambers & Paraska, 2014) Perceived benefits are rooted in a person's opinion of the worth of a new behavior in decreasing the risk of disease development (Chambers & Paraska, 2014). Thus, new behavior is dependent upon the individual believing that they will decrease their chance of developing disease (Chambers & Paraska, 2014). Finally, perceived barriers are based on the individual's evaluation of the roadblocks to developing a new behavior (Chambers & Paraska, 2014). New behavior will only be implemented if a person believes that the benefits of the new behavior outweigh the results of the prior behavior (Chambers & Paraska, 2014).

Although this model began with four constructs, they are altered by modifying variables (Chambers & Paraska, 2014). These variables are multi-faceted and vary by individual, examples include but are not limited to: culture, education level, past experiences, skill, and motivation (Chambers & Paraska, 2014). Cues to action are another part of this theory; they are events, people, or things that influence people to modify their behavior (Chambers & Paraska, 2014). Lastly self-efficacy is a driving force in the HBM theory (Rosentock, Strecher, & Becker, 1988). Self-efficacy, as described by Bandura, deals with one's belief that they can achieve something (Bandura, 1977). Overall this model deals with individual perceptions, modifying factors, and the likelihood of action (Chambers & Paraska, 2014). Figure 1 addresses the theory as suggested by the HBM.

The HBM has been used for research with HPV in college students (Hsu et al., 2009; Painter et al., 2008, Bynum et al., 2011; & Thomas et al., 2016). Vaccination rates

for HPV have increased in studies where the HBM was utilized (Hawe et al., 1998 & Larson et al., 1982). Fazekas, Brewer, and Smith (2008) noted that within the context of HPV vaccination, perceived likelihood is rooted in the belief that HPV infection and cervical cancer are likely outcomes. Believing that HPV infection is related to cervical cancer would have serious negative health effects is perceived severity (Fazekas, Brewer, & Smith, 2008). The belief that HPV vaccine will reduce the risk of HPV infection and cervical cancer, is perceived benefit/vaccine effectiveness (Fazekas, Brewer, & Smith, 2008). Vaccine cost could be a perceived barrier, and situational and social factors are cues to action (Fazekas, Brewer, & Smith, 2008).

For this study the theoretical framework, based on the Health Belief Model, is illustrated in figure 2.

Theoretical Assumptions

Chambers and Paraska (2014) noted that the theoretical assumptions for the HBM are as follows: an individual has the desire to avoid illness; an individual has the desire to get well; and that an individual has a belief that a specific health action by that person would prevent illness.

This study is guided by theoretical and research assumptions. The HBM also guides the theoretical assumptions for this study. The theoretical assumptions are:

1. Black college students ages 18-21 will be motivated to receive the HPV vaccination by their individual perceptions and modifying behaviors.
2. Belief that HPV can cause cancer, and that HPV vaccination can prevent cancer, will affect an individual's desire to receive the vaccine (perceived susceptibly and perceived severity).

3. Demographic variables are modifiable and serve as determining the likelihood of taking the recommended preventative behavior, in this case HPV vaccination.

Specific Aims of the Study

The purpose of this quantitative study in HPV vaccine naïve, Black college students aged 18-24, enrolled in a historically black college/university (HBCU) and/or a minority serving institution (MSI), was to assess perceived vulnerability, perceived severity, perceived benefits, perceived barriers, and risk behavior factors (trust/mistrust, social influence, and prior sexual behavior) regarding intent to initiate and complete the HPV vaccination series.

Research Questions/Hypotheses

Questions

The study addressed the following research questions:

1. Is there a difference in demographics (age, gender, geographic location) between Black college students who intend to receive the HPV vaccine and those who do not intend to receive the vaccination?
2. What are the relative contributions of perceived vulnerability, perceived severity, perceived benefits, and perceived barriers to HPV vaccination intention among male and female Black college students?
3. What are the relative contributions of trust/mistrust, social influence, and prior sexual behavior to HPV vaccination intention among male and female Black college students?

4. Has the new practice recommendation to change the HPV vaccination series from a 3-dose to a 2-dose series for young girls caused a difference in intent to vaccinate for college students, and is there a difference between male and female Black college students?

Hypotheses

1. There is a difference in demographics (age, gender, geographic location) in Black college students who intend to vaccinate and those that do not.
2. Higher perceived vulnerability, perceived severity and perceived benefits scores, and lower perceived barriers scores will be associated with increased intentions to receive vaccination in Black college students who intend to vaccinate.
3. Trust, social influence, and prior sexual behavior will have a positive effect on intent of Black college students to receive the HPV vaccination.
4. The decrease in the vaccine series dosing from 3 doses to 2 doses will have a negative effect on Black college student's intentions to vaccinate. Gender will play a role in the decision to vaccinate based on the change in HPV Vaccination policy for the number of doses for young adolescents.

Definition of Terms and Operationalization

TERM	**Conceptual Definition "What it means"**	**Operational Definition "How to measure"**
Black	From African descent, having dark colored	Self-identified

	skin	as Black or deriving from African descent, including African American, African Caribbean, etcetera
College Student	Current enrollment in a HBCU or a MSI	Proof of current student ID, and on the enrollment list provided by the school registrar. Can be full or part time status
Young adults	An individual in the early stage of adult hood	Individuals self-identified as ages 18-24

Gender	Being male or female	Self-identified as male, female, transgender male, or transgender female
Past sexual behavior	Behaviors performed by the individual or received by the individual related to sexual acts: vaginal, anal, oral, masturbation, foreplay	The results of the answers from the Sexual Risk Survey (SRS) Instrument and the Sexual Experience Questionnaire
Social Influence	Individuals or groups that influence behavior	Results from answers from the Perceived Social Influence on Health

		Behavior Instrument (PSI-HB)
Trust/distrust	Believing in something or not believing in something	Measured by the Health Care System Distrust Scale (HCSDS)
Perceived vulnerability	What an individual think about their risk of something	Measured from the SHPVS Instrument questions # 5-9, 11, & 25
Perceived severity	How serious something an individual think something is	Measured from the SHPVS Instrument questions # 10, 12, 13, 15, 16, & 21
Perceived benefits	What an individual think are the positive aspects of something	Measured from the SHPVS Instrument

		questions # 1-4, 14, & 17-20,
Perceived barriers	What an individual think is stopping them	Measured from the SHPVS Instrument questions # 22-24, 26, & 27
Vaccine Naïve	Have not received any dose of HPV vaccine	Self-reported denial of HPV vaccine immunization
Intention	What an individual plan to do	Measured from the SHPVS entire Instrument score and measured in the added question to the Instrument
Rural	"Rural" encompasses all population, housing, and territory not included within an urban	Attending school in

	area. From: https://www.census.gov/geo/reference/urban-rural.html	Tuskegee, Alabama
Urban	The Census Bureau identifies two types of urban areas: • Urbanized Areas (UAs) of 50,000 or more people; • Urban Clusters (UCs) of at least 2,500 and less than 50,000 people. https://www.census.gov/geo/reference/urban-rural.html	Attending school in Miami, Florida

Significance of the Proposed Study

Research that explores the relationship between HPV awareness and vaccine uptake related to ethnicity, knowledge, social influence, and prior sexual behavior, in diverse young adults from various geographic regions, is needed to further expand the body of knowledge for HPV vaccination. In addition to this, research that explores whether the new policy on decreasing HPV dosage from 3 shots to 2 shots in young adolescents will affect individuals' intentions to vaccinate. This increase in understanding will help to better

inform the development of more effective public health interventions programs. These programs can target and eliminate racial, gender, and geographic health disparities in HPV treatment and care.

Assumptions of the Study

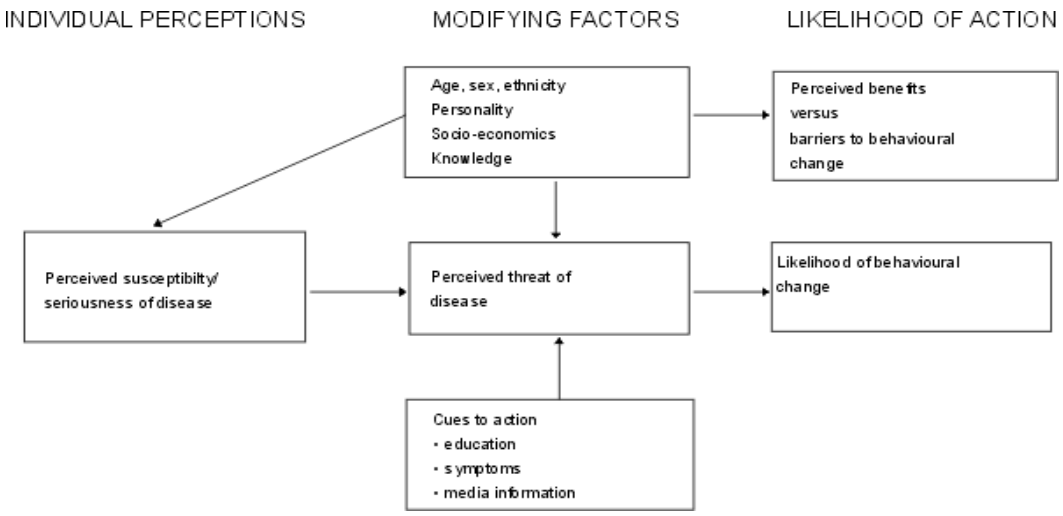
The research assumptions are:

1. The participants in this study can read and understand English.
2. Participants will provide honest answers to the questionnaires.
3. The instruments chosen will measure the respective variables.
4. The Health Belief Model is appropriate to answer the research questions in this study.
5. Analysis of the data results will aid in interpreting the data correctly for the specified population and the results will further knowledge and understanding.

Summary

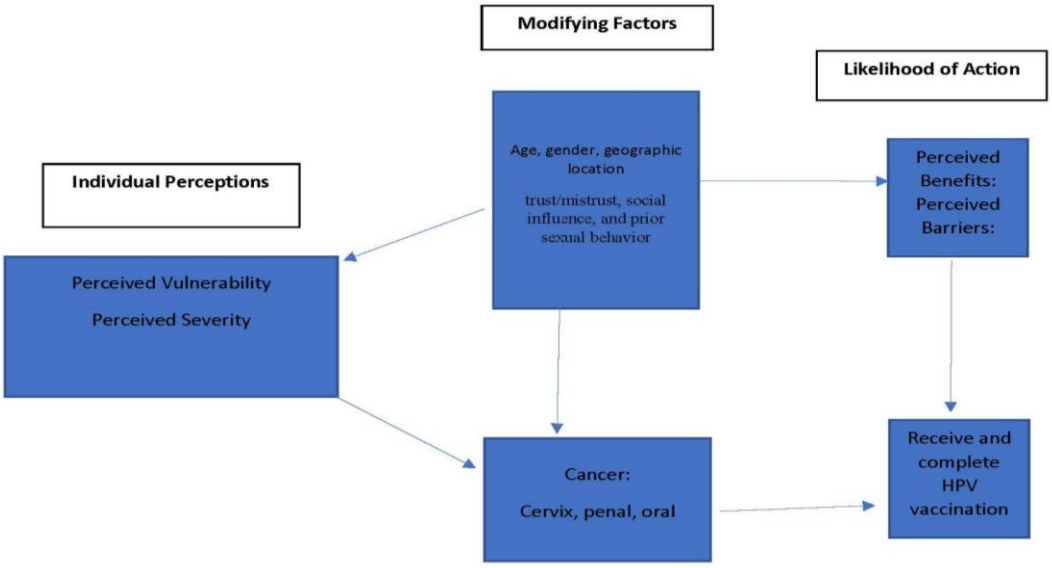
HPV virus can lead to cancer. These cancers effect men and women but is disproportionately dispersed among young Black Americans. This study helps to fill gaps in the current state of science. This research looked at gender, racial, and geographic disparities in HPV infection. This study also assessed the impact of perceived vulnerability, perceived severity, perceived benefits, perceived barriers, and (trust/mistrust, social influence, and prior sexual behavior) on intent to initiate and complete the HPV vaccination series.

Figure 1.



(Glanz et al., 2002)

Figure 2.


Modifying Factors
Likelihood of Action
Individual Perceptions
Age, gender, geographic location
trust/mistrust, social influence, and prior sexual behavior
Perceived Benefits:
Perceived Barriers:
Perceived Vulnerability
Perceived Severity
Cancer:
Cervix, penal, oral
Receive and complete HPV vaccination

Chapter 2: Review of the Literature

Introduction

The incidence of human papilloma virus (HPV) related cancers can be eradicated by over 90%, with the proper utilization of the HPV vaccination (CDC, 2018c). It is estimated that 79 million individuals are infected with human papilloma virus (HPV), while 14 million more Americans become infected each year (CDC, 2017b). The population most effected by the HPV virus are individuals in their late teens and early 20s (CDC, 2017b). HPV is yearly responsible for 33,700 new HPV related cancers diagnosis (CDC, 2018f). In the United States, 19,400 women and 12,100 men are diagnosed with cancers that are caused by HPV (CDC, 2017b). Although these statistics are devastating, decreasing these disturbing statistics by utilization of the HPV vaccine is a difficult task due to: adherence to vaccination recommendations, the intimate nature of the spread of the disease, knowledge and awareness of the disease, and health care barriers (Thomas, Strickland, Diclemente & Higgins, 2013; White, 2014). The HPV vaccination could prevent 32,000 cancer diagnosis (CDC, 2019d). While primary prevention strategies have been the norm for early diagnosis of cervical cancer, each year HPV causes 10,800 new cases of cervical cancer in the United States (CDC, 2018c). Thomas (2008) noted that HPV vaccination would be beneficial to prevent cervical cancer, promote sexual health education, promote reproductive health education, and begin the discussion regarding sexually transmitted infections.

Although the HPV vaccine has been included in the vaccination schedule in the United States since 2006, HPV is a sexually transmitted infection (STI), thus implementation of the vaccine comes with negative undertones for many cultural beliefs,

religious factions, and societal norms. Thus, HPV remains the most prevalent (STI) in males and females in the United States. Jones and Cook (2008) noted that, HPV vaccine could have vast benefits for men and women by decreasing morbidity and mortality associated with cervical, anal, and penile cancers. Jones and Cook (2008) also noted that these benefits to public health can translate into a decrease in economic and emotional costs associated with genital infection. However, if providers are not aware of the current pros and cons of the vaccination administration, they cannot advocate successfully for their clients (Thomas, 2008). White (2014) noted that the overall benefits of vaccination make it paramount that the fight continues to increase immunization rates. If vaccine administration is done along with Papanicolaou smears, female patients will have a better chance of preventing cervical cancer (White, 2014). The healthcare community should utilize a multidisciplinary approach to encouraging HPV vaccination, this would include involving primary care providers and specialist alike (White, 2014).

State of the Science

The Centers for Disease Control and Prevention (CDC) has indicated that fourteen million more Americans become infected with HPV each year (CDC, 2017b). Although these statistics are devastating, the implementation of this vaccine has been difficult; especially since it means admitting that children are at high risk for exposure to a STI. HPV vaccine initiation and dosage completion are pertinent to help prevent HPV related cancers (Thomas, 2016).

Jones and Cook (2008) noted that vaccinations are one of the most successful public health strategies to preventing and controlling infectious disease. The HPV vaccine is currently recommended for females (ages 9-26) and males (ages 9-26). The

CDC recommends that boys and girls that did not receive the vaccine while they were young, receive catch up vaccinations (boys up until age 21, and girls up until age 26 (CDC, 2017c). It is also recommended that gay men, bisexual men, and mean and women with compromised immune systems that did not receive the vaccine while they were younger, receive catch up vaccination through age 26 (CDC, 2017c). In 2018, the HPV vaccine received approved for men and women 27-45 years old (U.S. Department of Health and Human Services (USDHHS), 2018a). Even if exposure to HPV has occurred through sexual contact, the vaccination is still recommended (CDC, 2017c). Since cervical cancer results from persistent and reoccurring exposure to high risk strands of HPV infection, the benefit of protective immunity can still be achieved with vaccination.

Since 2006, there has been an approved vaccination to protect girls and women against four strands of HPV, 6, 11, 16, and 18 (FDA, 2103). This quadrivalent therapy has demonstrated safety and nearly 100% efficacy in preventing HPV 16, 18, 6, and 11 (FDA, 2014). Researchers have studied and documented that there has been an increase in awareness of HPV and HPV vaccine among college-aged women since the debut of the vaccine in 2006 (Jain et al., 2009; Allen et al., 2009, & Caron, Kispert, & McGrath, 2008); however, vaccine uptake has been low (Ratanasiripong, 2012). CDC (2010) reported that among adolescents aged 13-17, 44.3% reported receiving at least 1 dose and 26.7% reported receiving 3 doses of the vaccine. However, the CDC (2018c) noted that among girls and boys aged 13-17, 65% and 56% reported receiving at least 1 dose of the vaccine.

In October 2009, a bivalent vaccine was approved to provide protection against strands 16 and 18 (Dunne et al., 2011). This vaccine was for girls and women aged 10 to

25 (Ratanasiripong, 2012). In 2009, a bivalent vaccine was approved to prevent strands 6 and 11 in boys and men ages (9-26). The administration of the vaccination series is in three injections, over a six-month period. Although the vaccine series was accepted and added to the recommended vaccine series in ages 9-26 for males and females, it has proved a daunting task to increase vaccination implementation in the high-risk vulnerable populations.

In February 2015, the 9-valent HPV vaccine was approved for routine vaccination (CDC, 2015b). It will protect against HPV 6, 11, 16, 18, 31, 33, 45, 52, and 58. The vaccine is recommended for females aged 9-26 and males aged 9-15. This vaccine will again be a catalyst in preventing HPV infection. However, if the vaccine is under prescribed, administered, and utilized like its predecessors, it will not prove beneficial to society.

In October 2016, yet another change occurred, 2 doses of the vaccine were found to have the same efficacy as 3 doses. The vaccine would need to have been administered young adolescents prior to age 15; the individuals must have received the two doses 6-12 months apart to be eligible to complete the 2-dose vaccine regimen (Meites, Kempe, & Markowitz, 2017). In October 2018, the Gardasil 9 vaccine has been approved for men and women 27-45 years old (U.S. Department of Health and Human Services, 2018a)

HPV and College Students

Although the Advisory Committee on Immunization Practices (ACIP) recommended the utilization of the HPV vaccine, college age individuals have demonstrated a less than optimal uptake of the vaccine (Barnard et al., 2017). In studies

conducted by Jain et al. (2009) and Caskey, Lindau, and Alexander (2009), between 9-10% of women aged 18-26 years had initiated the HPV vaccine schedule.

Ratanasiripong (2012) noted that the 18 million United States (US) college and university students represent a large portion of the American population that are at risk for developing HPV infection. Patridge et al. (2007) noted that HPV infection is most prevalent among traditional college-aged young adults. Habel et al. (2018) noted that 73 % (n=885) of the colleges surveyed offered STI diagnosis and treatment on campus for students. In a study conducted by Cavazos-Rehg et al. (2009), it was noted that there was a 10% likelihood that teenage girls' sexual debut would take place by age 14 (2009). This increases their risk for exposure to HPV infection. The development of HPV is multifaceted and included risk factors such as, < 25 years old, first sexual intercourse at an early age, failure to utilize condoms, multiple sex partners, and having partners who have multiple sex partners or have a history of HPV (Ratanasiripong, 2012). Since many college and university age students are living away from home and not supervised by adults the stage is set for engagement in unprotected high-risk sexual behaviors (Ratanasiripong, 2012). It should also be noted that individuals' ages 18-25 years old were not likely to get treatment for STDs, as they feared their anonymity would not be maintained (Leichliter, Copen, and Dittus, 2017). The American College Health Association (ACHA) (2018), reported that only 57% of college students that participated in the survey confirmed receiving the HPV vaccine.

HPV Defined

HPV is a virus. HPV infection involves the skin and replicates in epithelial cells, after the virus is introduced to a host in over 100 strands of the virus (D'Urso,

Thompson-Robinson, & Chandler, 2007). Since there are hundreds of strands of HPV that have been identified, it is important to note that all types are not highly contagious (CDC, 1999). The virus can be spread via oral, anal, or vaginal skin to skin contact if contacted is made with an individual that has an active outbreak (CDC, 1999). The virus can also be spread by oral, anal, or vaginal intercourse. Bruni et al. (2017) noted that the primary route of transmission of genital HPV infection is sexual intercourse. The virus can lead to genital warts or anogenital cancers, involving the vulva, vagina, and cervix of females, the penis of males, and the anus and rectum of both genders (CDC, 2015a). HPV is also linked to causing cancers at the base of tongue and tonsils (CDC, 2019c). While HPV infection is benign and does not cause health problems in most cases, it can have lethal and potentially serious consequences in others. Bendik, Mayo, and Parker (2011) noted that a strong link can be found between genital HPV and cervical cancer.

Strands

The most common cancer-causing strands of HPV are HPV-16 and 18 (Bendik et al., 2011). While the most two common causes of genital warts are HPV-6 and 11 (Bendik et al., 2011). 70% of cervical cancers are caused HPV 16 and 18, and 90% of genital warts infections are caused by HPV 6 and 11 (Bendik et al., 2011). So how can this virus be prevented and eradicated? Like any viral infection, it cannot be cured. Although latex condoms have proven to be a useful instrument in preventing other viral sexually transmitted infections, they are not as effective against the transmission of HPV since all the infected skin may not be covered by a condom (CDC, 2015a).

Transmission/Signs and Symptoms/Detection

The true incidence of HPV infection can be difficult to assess, since the infections clear quickly and infected/exposed individuals may not know they are at risk for infection (Dunne et al., 2007). It is also difficult to diagnose HPV since most people are asymptomatic, and infection is usually cleared or undetectable in the majority of exposed individuals (CDC, 2015a). According to (Association of Reproductive Health Professionals, 2013) detection of HPV is done by looking for precancerous cervical lesions via Pap examination; if high grade precursors of cancer are detected, they are treated. Although this method has proven successful, it has several limitations, anxiety, physical discomfort for the patients, and poor Pap test screening by some ethnic minorities (Adams, Jasani, & Fiander, 2007).

Vaccination with HPV

A study conducted by Jones and Cook (2008), with 340 male and female university students, found several factors associated with the participants' intention to vaccinate. The factors included: ever having been diagnosed with a sexually transmitted infection (STI), having a close friend or relative with HPV, having had more than five sexual partners, greater perceived risk for HPV infection, availability of a free vaccine, and vaccine recommendation from a physician, spouse, partner, or friend. The authors also found there were factors that decreased the participant's intentions to vaccinate; this included age, race, recruitment setting, ever having genital warts, or perceived severity of HPV, and paying $50.00 for the vaccine (Jones & Cook, 2008). The participants in the Jones and Cook study (2008), were male (138) and female (202), mostly white (82.6%) with ages ranging from 18-32 years old that were recruited from the student health center

(Jones & Cook, 2008). The authors also found that males were more likely to intend to become vaccinated if it was communicated to them that the vaccine prevented genital warts as well as cervical cancer, thus wording in recruitment campaigns should be considered.

Patel et al. (2012) conducted a study with 256 female students at a university health clinic. The authors randomly performed an educational intervention or provided standard care for the participants and then they examined the vaccine intent and uptake results. Patel and colleagues found that at baseline 41% of the participants intended to receive the HPV vaccination; than those who had perceived parental approval/perceived vulnerability/and belief in the health benefits of HPV had an increased intent to vaccinate (Patel et al., 2012). While sexual activity and lack of supplemental health insurance lowered the intent to vaccinate (Patel et al., 2012). After this, they noted that HPV vaccine only 5.5% and did not differ by group; and that initial baseline intent significantly affected HPV vaccine uptake (Patel et al., 2012). The majority of the participants in this study were Caucasian, with ages from 18-26 years old. The individuals who wanted the vaccine cited the following reasons: worry about developing cervical cancer or genital warts, health care provider recommendations; while the most common reasons cited for not wanting the vaccine were: safety concerns, side effects, high out of pocket costs or insurance copayments, long-term consequences, and not being at risk for STI or genital warts.

Bendik, Mayo, and Parker (2011) conducted a study with 1,975 female undergraduate student ages 18-23 at a southeastern university, most of the participants (90%) were white. Participant that were more likely to receive the vaccine had parental

approval, partner approval, friend approval, and were white (Bendik, Mayo, & Parker, 2011). Bendik, Mayo, and Parker (2011) also noted that those who had already received the vaccine were as follows: they had perceived importance of HPV, perceived severity of cervical cancer, perceived likelihood of acquiring cervical cancer; other associated factors were age of sexual debut, number of partners, age, and HPV-related knowledge (Bendik, Mayo, & Parker, 2011).

Manhart et al. (2011) conducted a longitudinal study with 428 women, 22 years old in a suburban metropolitan area in Seattle, Washington. The participants were recruited from 10 public schools from 1993-2009. Manhart and colleagues (2011) noted that vaccine initiation was more common younger women in the cohort, attendance in school, utilization of a condom during first intercourse with their current partner, peer approval, perceived susceptibility to acquire HPV, and beliefs about vaccine effectiveness. However, participants who were sexually active within three months of completing the survey, daily smokers, utilized illegal drugs within a year of the survey, and had a lack of knowledge about the vaccine were not initiating the vaccine (Manhart et al., 2011). The researchers also noted that parental approval was not a factor in vaccine initiation (Manhart et al., 2011).

Daley et al. (2010) conducted a study with a convenience sample of 256 ethnically/racially diverse female college students, at a public urban university in the southeastern United States. Many of the participants were white and unmarried/single. Vaccine initiation was more common if information was received from three sources,

health care providers, family, and media sources (Daley et al., 2010). For participants in this study, factors that influenced declination of immunization were the belief that vaccines cause illness and safety concerns (Daley et al., 2010).

Wolwa et al. (2013) conducted a study with 410 college women (217) and women in a community health center (193), aged 18-46, 70% of the college women were ages 18-25 and 43.6% of community women were ≥ 46 years of age; the participants were ethnically/racially diverse. The authors found that women in the college group, were more likely to have received the vaccine, some factors that influenced initiation were perceived seriousness of cervical cancer, and knowledge about HPV; while Pap testing rates did not increase uptake (Wolwa et al., 2013).

Bynum et al. (2011) conducted a study of 363 African American females, ages 18 to 26, enrolled in three historically black colleges/universities in the southeastern US. These researchers found that participants that would accept the vaccine perceived benefit of the vaccine, had more cues to action, had a prior STI diagnosis, and age at first sexual encounter (Bynum et al., 2011). When considering racial pride, it was found that the more pride they had, the less likely they were to vaccinate (Bynum et al., 2011). In this study, perceived susceptibility and severity did not predict vaccine intake; nor did health care distrust or sexual history (Bynum et al., 2011)

Marchand, Glenn, and Bastani (2012) conducted a study with community college women aged 18-26 in Los Angeles, California. The participants in this study were recruited from an ethnically diverse student population with 55% reported as Hispanic/Latino, 30% African American, 7.5% Asian American, and 7% White (Los Angeles Community College District, 2011). The participants in the study were

Hispanic/Latina (59%), African American (31.5%), Asian American (2.2%), White (1.1%), and other (5.6%). The results of this study showed that women who initiated the vaccine were younger in age, had a health-related field of study, perceived that the vaccine was safe, thought that HPV severity was lower, and had a perceived higher social approval for the HPV vaccination than vaccine naïve participants had.

D'Urso, Thompson-Robinson, and Chandler (2007) conducted a study with 351 Black undergraduate students enrolled at a historically black university located in the southeastern United States. This study found that the participants were deficient in their awareness of HPV (64%), learned of HPV once they had already been infected, and gained knowledge about HPV from health care providers or college classes (D'Urso, Thompson-Robinson, and Chandler, 2007). Based on the data gathered in this study, preventative strategies for sexual health were inclusive of practicing monogamy, maintaining an abstinent lifestyle, and utilizing condoms (D'Urso, Thompson-Robinson, and Chandler, 2007). Thus, utilization of vaccination for sexual health was not significantly practiced.

HPV Intention Research in Black College Students

Staples, Wong, and Rimel (2018) conducted a study with African American college studetns at four HBCUs and found that early deection and primary prevention are paramount to preventing disportaiante disparties in cervical cancer incidence and treatment. This study also found that while the students had a 96% rating for knowledge about HPV vaccine, a mere 52% had completed the vaccine (Staples, Wong, and Rimel, 2018). Although 52% of the students had begun the vaccination series, only 42% of the partipants had completed the three vaccine series.

LaJoie, Kerr, Clover, and Harper (2018) conducted a study to predict HPV uptake in US male and female college students, overall, they found that one of the barriers to vaccination was the fact that the participant's partner was not vaccinated. This study also found that uptake of the vaccine was positively influenced by parental influence and no cost vaccination (LaJoie, Kerr, Clover, and Harper, 2018). LaJoie, Kerr, Clover, and Harper (2018) also noted that involving the post adolescent young adult population are crucial to helping to prevent cervical cancer.

In summary, the review of the literature in this section focused on female and male college age students. Some of the factors that increased intention to vaccinate are multifaceted and include: prior diagnosis with STIs, knowing someone with HPV, being sexually experienced, perceived risk and vulnerability, knowing that HPV can help prevent warts and cervical cancer, vaccine cost, parental/health care provider influence, younger age, and perceived the HPV vaccine as safe. The factors that decreased intent to vaccinate were just as interesting and some of the factors included: sexual activity, lack of supplemental health insurance, diagnosis of genital warts, and recruitment settings.

HPV Vaccination Studies with Male and Female Participants

Lee, Lust, Vang, and Desai (2018) conducted a study of male undergraduates found that 54.5% (n=2516) of participants, aged 18-20, completed the HPV vaccination series. This study also found that age and the type of institution attended by the participants had a positive correlation with HPV vaccine uptake (Lee, Lust, Vang, and

Desai, 2018). While previous sexual encounters had not significant effect on vaccine initiation Lee, Lust, Vang, and Desai, 2018). If the participants were enrolled in a 4-year institution they were also more likely to have been vaccinated Lee, Lust, Vang, and Desai, 2018).

Daley et al. (2011) reported that Hispanic and non-Hispanic White males have more knowledge about HPV infection than African American men do. Vaccinating men and women would deter the transmission of the virus between them as well as help to shift the burden of STI prevention to both parties (Jones & Cook, 2008). The gender of the participants in the studies varied, thus the intention for HPV vaccination fluctuated as well. In a study by Ford (2011), young adult women with moderate to high levels of awareness of HPV had low vaccination rates. This study viewed racial and ethnic disparities in HPV awareness and vaccination. The participants in this study were one thousand nineteen women aged 18-24. The women in this study self-identified their ethnicity as Hispanic, non-Hispanic black or non-Hispanic white. This study also noted that socioeconomic and health care barriers were apparent since the participants in the study did not have health insurance and were less educated on HPV if they had not received reproductive medical care (Ford, 2011).

Most of the studies that have been cited have been composed of female participants, and the majority of studies in the HPV body of literature have focused on women.

Widdice and Moscicki (2008) noted that 50% of American adolescents and young women acquire HPV within three years of initiating sexual intercourse. It is reported that the number of college students in the 18-24-year-old group increased over 16% and the

majority of the freshman students were females (Snyder, Dillow, & Hoffman, (2009). These women are at risks for adverse health outcomes, because of exposure to behavioral and psychosocial factors, including unintentional or intentional injuries, unintended pregnancy, and STI infection (CDC, 1996 & Linnehan & Groce, 1999). High risks types of HPV if linked to 95-100% of women with cervical cancer, and those types are estimated to cause 90-98% of cervical cancers worldwide (CDC, 2015a; Bosch & de Sanjose, 2003; Munoz et al., 2003). Burak and Meyer (1997) found that college women are at a higher risk for acquiring STDs than the general population because of the high-risk sexual behaviors.

According to the 2017 National College Health Assessment data (64.3%) of females and 60.9% of males reported in engaging in vaginal, oral, or anal sex within the last 12-month period (American College Health Association, 2018). In the sample of males and females from the National College Health Assessment, condom use for oral sex (5.3% each), vaginal sex (54.9% &46%), and anal sex (35.3% & 21.1%) was reported for the 30 days (American College Health Association, 2018).

In relation to males, men often have more sex partners than women, are not frequently tested for STI infections, and exhibit fewer symptoms of infections; thus, they play a significant role in the transmission of HPV (Hippelainen et al., 1993) In a study, looking at heterosexual sexually active male students in a university, aged 18 to 20, the cumulative incidence of new infection with any genital HPV type was 62.4% over 2 years by (Patridge et al., 2007). So, there is no doubt that boys and men should be vaccinated for HPV. Kim (2011) noted that vaccinating boys and men will have positive health effects in girls and women, because it will reduce the risk of HPV in males, thus

preventing exposure to their partners. The benefits of vaccinating males and females will also help to equalize the burden of protection to both genders and not just females alone (Kim, 2011). Fenkl, Hughes, and Jones (2016) conducted a study at a minority serving institution and found that 60% (n=79 of 131) of the male participants didn't know that the HPV vaccine was available.

Wilson et al. (2017) conducted a study and found that participants were more likely to receive the HPV vaccine if their freiends had also received it. They also found that younger age, not being in a relationship, sexually active, and receivng a Papucaulna screening postively effected the individuals who began the HPV vaccine series (Wilson et al., 2017).

Ultimately the decision to become vaccinated varies between genders; what increases intentions to vaccinate in one population can deter participants' intentions in another study. Intentions to vaccinate were widely diverse as in prevous studies. The studies reviewed here did show that men are in important part of the puzzle to decreasing STI spread (Kim, 2011 and Fenkl, Hughes, and Jones, 2016). A finding that became evident during this review is that the type of institution the students studied at, positivielly correlated with vaccine uptake (Lee, Lust, Vang, and Desai, 2018). Research that explores gender and racial diversity is warranted in future studies involving HPV.

Racial Disparities

Wolwa et al. (2013) noted that HPV infection rates are higher in Hispanic and African American women. Racial disparities also exist, since HPV- associated cervical cancers affect Black women more than other women (CDC, 2018a). Dempsey, Cohn, Dalton, & Ruffin (2011) noted that African American women aged 18-26 years were

more likely than their white peers to initiate the HPV vaccine, but less likely to complete the series. In a study by Ford (2011) 80% of the non-Hispanic Black women reported an awareness of HPV infection and vaccination, but uptake of the vaccine across was only 8%.

African Americans have the disadvantage of having disproportionate distribution of multiple negative aspects of unhealthy lifestyles, economics, family dynamics, and mental illnesses. Numerous studies have found that African Americans distrust of health care professionals has limited their utilization of primary, secondary, and tertiary health benefits. This barrier makes it even more difficult to provide protection to the people who would benefit the most. Scarinci, Garces-Palacio, and Partridge, (2007) found that although African American women accepted the vaccine, they were hesitant to be vaccinated because of family member or partner concerns about promiscuity or unfaithfulness if the vaccine was received. Health care providers must employ strategies to ensure that information provided regarding individuals' cultural attitudes and behaviors are included when providing information about HPV (Thomas, Yarandi, Dalmida, Frados, & Klienert, 2015).

In summary, the health care community must utilize strategies that are ethnically diverse, just like to populations they service. Review of the literature here depicts that the burden of HPV resides in females (CDC, 2018a). The studies here also found that vaccine uptake is positively influenced by the type of institution the students attended.

HPV in the Individual/Family/Community

31,200 cases of cancer each year, could be prevented by HPV vaccination (CDC, 2018f). This finding alone should energize health care providers to continue to educate

families and offer HPV vaccination. Patel et al. (2012) noted that cervical cancer is the second most common cancer among females and in many developing areas in the world it ranks first. As the second most common cancer worldwide, cervical cancer affects half a million women and more than half of the infected individuals die (Parkin, Bray, & Ferlay, 2005 & Cutts et al., 2007). The HPV related cancer most occurring in women is cervical cancer and in men oropharyngeal cancers (CDC, 2018a). HPV types 16 and 18 are associated with 70% of invasive cervical cancer worldwide (Bruni et al., 2017). Thus, the impact of this disease affects individuals, families, and communities.

According to Bruni et al. (2017), in 2012, an estimated 527,624 women were diagnosed with cervical cancer and 265,672 became fatalities from the disease. In the world, cervical cancer ranks as the 4th most frequent cancer among women. In a comparison between the Americas, Africa, Asia, Europe, and Oceania the Americas ranked second in cervical cancer rates (Bruni et al., 2014) Bruni et al. (2014) also indicated that worldwide mortality rates of cervical cancer are substantially lower than incidence, with a ratio of mortality to incidence at 50.3%. Most of these cases are from squamous cell carcinoma, with adenocarcinomas. In a comparison between the Americas, Africa, Asia, Europe, and Oceania the Americas ranked second in cervical cancer rates (Bruni et al., 2014).

In summary, the family unit has continued to be plagued with the result of HPV infection. HPV effects the reproductive organs gastrointestinal system and can be debilitating to the family since HPV is believed to cause 90% of anal and cervical cancers, 50% of vaginal vulvar, and penile cancers, and 60 to 70% of oropharyngeal cancers (CDC, 2018a).

Geographic Location

Health outcomes in rural areas are poorer than urban areas; this is important to note because 462. Million (14.8%) of the total US population reside in rural areas (Matthews et al., 2017). The number of adolescents living in urban areas are being vaccinated with the HPV vaccine more than their counterparts living in rural areas (CDC, 2018b). 39.5 million Americans identified themselves as non-Hispanic Black or African American according to the US Census Bureau estimates from 2014 (American Cancer Society (ACS), 2016). Of the 39.5 reported individuals, the majority of the Black population in the US live in the South, (ACS, 2016). The American Cancer Society (ACS) noted that African Americans have the highest death rates and the shortest survival rates in the US for most cancers (2016). One might hypothesize that this disparity is prevalent because of biological differences, but the truth is quite contrary. There are social and economic disparities that influence this atrocious phenomenon. Some of these inequalities include work, wealth, income, education, housing, and the overall standard of living (ACS, 2013). There are other noteworthy barriers in the African American community which include lower utilization of high-quality cancer prevention, early detection, and treatment services (ACS, 2013).

In 2016, the estimated deaths for cervical cancer in African American women was 750 deaths (ACS, 2016). This is bewildering since it is estimated that 80% of deaths from cervical cancer could be prevented by regular screening, follow up care, and treatment (ACS, 2013). Cook et al. (2010) noted that Blacks were 44% less likely than Whites to complete the vaccination series. While Widdice and colleagues (2011) noted that Black patients were 50% less likely than whites to complete the 3 dose vaccination series.

In a study conducted by Schluterman, Terplan, and Lydecker (2011) a lower vaccination rate of 18% was noted in women, aged 18-26, in an urban hospital. Watson, Saraiya, and Bernard (2008); Saraiya et al. (2007); and Singh, Miller, Hankey, and Edwards (2004) noted that socioeconomic disparities in cervical cancer exists within Black and Hispanic women and women living in areas with greater poverty. These women also experience higher incidence and mortality rates (Watson, Saraiya, & Bernard, 2008; Saraiya et al., 2007; and Singh, Miller, Hankey, and Edwards, 2004). In the National Immunization Survey-Teen (NIS-Teen) it was noted that the three-vaccination series was completed 70% (for Black adolescents, N=1,743), 74.5% for Hispanic adolescents (n=3,882), and 60% for white adolescents, n=13,010 (CDC, 2018d). In a study conducted by Niccolai, Mehta, & Hadler (2011) significant disparities were observed in HPV vaccination by race/ethnicity and poverty, these data suggest that cervical cancer development for those at most risk remain.

The US department of Health and Human services through the Healthy people initiative have set a goal to increase the vaccination coverage level of 2-3 doses of human papillomavirus (HPV) vaccine for females and males aged 13 to 15 years (USDHP, 2018). The adherence to the vaccine schedule has increased from 16.6% in 2008 (3 doses) to 30.0% in 2011 (3 doses) to 45.1% (2-3 doses) in 2016 (for females); and in males the percent of males that received the recommended doses increased from 6.9% (3 doses) in 2012 to 36.4% (2-3 doses), in 2016 (USDHP, 2013b; USDHP, 2018b) Notably, the initiation of the HPV vaccine in African American (56%) adolescent girls was higher than in white girls (48%); but the completion of the series is lower (61% vs. 75%) (CDC, 2011). (CDC, 2010) noted in 2009 US adolescents 13-17 years of age was 44.3, ranging

from 22.9% for Mississippi teens, to 69% in Massachusetts.

In summary, several studies found that there is a clear distinction for health outcomes for individuals living in rural areas. There is also a majority of Black Americans that live in the Southern areas of the United States. This information must be taken into consideration when considering strategies to increase vaccination. Niccolai, Mehta, and Hadler (2011) noted that to reduce disparities and achieve the vaccine's full potential, greater efforts are required to ensure completion of the vaccine series in Blacks and other poor women.

HPV and Economic/Cost Considerations

The cost of HPV to the health care area is for diagnostic and treatment is about $6 billion dollars (Armstrong, 2010). This value could be significantly reduced if this vaccination was adhered to consistently. The American College of Obstetricians and Gynecologists (ACOG) recommends that women that are between the ages of 21-29 have Pap test screening without HPV testing every 3 years: while women aged 30-65 should have a Pap test and HPV test every five years (ACOG, 2017 from: https://www.acog.org/Patients/FAQs/Cervical-Cancer-Screening).

Costs of HPV can be viewed in three categories: costs of cervical cancer screening, cost of HPV associated cancers, and costs of genital warts. In a study by Chesson et al. (2012) annual cost of follow-up for abnormal screenings was estimated to be $1.2 billion dollars; this includes $0.4 billion for follow-up visits and treatments for false positive Pap examinations and $0.8 billion for cervical intraepithelial neoplasia (CIN). In the same study, genital wart cost was estimated to be between $410-$930 per case (Hu & Goldie, 2008; Hoy, Singhal, Wiley, & Insinga, 2009). The estimated costs of

HPV in the US are estimated by Chesson et al. to be $8 billion dollars (2012). Chesson et al. (2012) noted that estimating the direct medical costs of prevention and treatment of HPV associated diseases can help to quantify the economic burden of HPV and demonstrate the potential benefits of HPV vaccination.

Adherence to HPV vaccination adherence is the presumed influence of the pharmaceutical executives on the implementation of the vaccine. If the public perceives profit will be greater than public protection, policy formation and acceptance of the vaccination falters (Abiloa et al., 2013). Implementation of a full series of the HPV vaccination can range from 360-600 dollars (Chesson et al., 2011). Outterson (2009) noted that $360.00 for a three series vaccine series for HPV makes it the most expensive vaccine series in human history.

Armstrong (2010) found that HPV vaccination can be cost effective with incremental cost-effectiveness ratios (ICER) of 100,000 or less per quality-adjusted life-year (QALY) gained if administered to females aged 12 years in context of cervical screening intervals of 1 year. This study also noted that catch-up vaccination through age 21 increases the cost per QALY to more than 100,000 (Armstrong, 2010). It should also be noted that 75% of the costs of cervical cancer is attributed to decreased productivity of the individual, deficiency of future earnings and other related factors (Max, Rice, Sung, Michel, Breuer, & Zang, 2003).

Cost analyses have been conducted to determine vaccination cost effectiveness. Brisson, Van de Velde, & Boily, (2009) noted that HPV vaccination of males and females is not cost effective, but if only one gender, namely females, are being under vaccinated, then the benefits outweigh the cost (Kim, 2011). When a comparison was

conducted between looking at vaccination of both genders versus girls only, costs exceeded $100,000 per quality-adjusted life year (QALY) gained and the value reached as much as $1 million per QALY gained (Brisson, Van de Velde, & Boily, 2009). Consequently, based on the uptake of the vaccination it would be cost effective to vaccinate boys and men (Kim, 2011).

In summary, the cost implication for HPV include considering the cost to individuals, families, and society. Although cost should not be a determinant to live saving vaccination it is. The health of the citizens of a society should not negatively be influenced by monetary factors alone. In order to utilize our resources to improve the health and welfare of US citizens, we have an obligation to efficiently use assets efficiently (Kim, 2011).

HPV Policy Implications

The decision to approve the vaccine in 2006 was a catalyst in the political arena. Law makers were faced with the challenge of implementing and promoting the utilization of the HPV vaccine. Consequently, in 2007 legislation regarding HPV vaccination had been introduced in forty of the fifty states (National Conference of State Legislatures, 2009). Abiola, Colgrove, and Mello noted that politics play a major role in health policy formation, public preferences, interest group involvement, and partisan ideology (2013). In the implementation of this vaccine, this has belief remains prevalent. Although this vaccine has been added to the recommended vaccine series, cost and practicalities of a multiple dose vaccine series must be considered before a true national adherence to the

recommendation will be successfully implemented. The debates continue about utilizing this vaccine, one belief is that administering the vaccine send mixed messages about abstinence and premarital sex; others believe that providing this vaccine give children a "license" to participate in sexual intercourse (Vamos, McDermott, & Daley, 2008).

Currently, there are several strategies that are being implemented on the state level to address the HPV vaccination. According to the study conducted by Abiola et al. (2013) these strategies include: policy mandates, no policy at all, requiring insurance coverage for the vaccination cost, educational strategies that allow parental acceptance or declination, unbiased education coverage of the HPV information, legislative appropriated funds for the promotion of the vaccine, addition of the vaccine to the state immunization program without cost, and formal legislation requiring vaccine adherence for sixth grade enrollment while still allowing parents to opt out.

In summary, economic and cost considerations related to HPV include multiple factors that are inclusive of policy. The implementation of the vaccine can be influenced positively or negatively by policy makers.

Prevention

HPV vaccination can significantly reduce the health and economic burden associated with cancers caused by HPV viruses. Jones and Cook (2008) noted that the HPV vaccine was expected to reduce health care costs, emotional burdens, and embarrassment caused by the diagnoses of genital warts and or abnormal Papanicolau (Pap) results. Yet the vaccine may be inaccessible to those who need it the most secondary to inability to afford the vaccine series (Erdman, 2008). There are numerous studies that

have been published that indicate the implementation of the vaccine in girls is cost-effective and reduces the burden to the public health care system. Chesson et al. noted that vaccine that there is a correlation between implementing vaccine coverage in males and females (2011). They noted that the vaccine coverage in males was dependent on the coverage in females (Chesson et al., 2011). It was also found that it would be more cost effective to increase vaccination in 12-year-old girls than to add male vaccination (Chesson et al., 2011). While vaccination is a solution to preventing HPV, other primary preventions are necessary; knowledge and awareness of HPV prevention and transmission are also paramount.

The Health Belief Model and HPV Intentions

The Health Belief Model (HBM) has been used as the theoretical framework for numerous studies that explored health promotion and health-related behaviors. As discussed in Chapter 1, the HBM explains individuals' behaviors based on their personal beliefs or perceptions about disease process and the strategies to detour the diseases occurrences (Clark & Paraska, 2012). This theory was originally composed of four constructs, (perceived: seriousness, susceptibility, benefits, and barriers), but has evolved to include cues to action, motivating variables, and self-efficacy (Clark & Paraska, 2012). This model also suggest that an individual's preventative health behaviors are dependent on perceived susceptibility to disease, the severity of health outcomes, the benefits of and barrier to behavior engagement, and cues to motivate (Rosenstock, 1974).

HPV and Perceived vulnerability

Social media is a trend that is here to stay, ultimately it influences our decisions regarding almost every aspect of live. Stephens & Thomas (2014) conducted a study and

found that social networks were persuasive to college women, with internet sites, close family, and health care providers being the favored social networks for HPV vaccine information. The male and female participants in the study conducted by Barnard, George, Perryman and Wolff (2017) had a low perception of their risks of contracting the HPV virus. 24.8% of the male students thought they were at risk, while only 21.9% of female students thought they were at risk. This study was conducted at a public univeristy in Missippi, and had a 13.1% response from Black participants.

HPV and Perceived severity

Thompson et al. (2017) utilized the data collected from the National College Helath Assessment Survey II, gathered from US college and university male and female students, to determine if associations existed between demographic characteristics, health status, receipt of health services, college region and size, sexual health information and HPV vaccination status. In female partidcipants they found that ethnic miniorities, students that attended schools located in the Southern areas, and not receiving or unsure of when they last had gynecological services, were less likely to report receiving the HPV vaccine. In male participants it was noted that African Americans, students attending school in Southern or Western areas, and receiving information on STIs were more likely to receive the HPV vaccine.

HPV and Perceived benefits

While, individuals gain knowledge about HPV from varying sources, health care providers continue to play a pivotal role in informing patients about the benefits of vaccination (Jones, Mathis-Gamble, & Fenkl, 2017; Stephens, Tamir, & Thomas, 2016).

Stephens, Tamir and Thomas (2016) also noted that a difference in knowledge regarding HPV vaccine was notable among HPV vaccine naïve females and females that received that HPV vaccine.

HPV and Perceived barriers

Thomas, Stephens, Jonhson-Mallard, and Higgins (2016) noted that cost of the vaccine was would be a barrier to only 24.1% (28/116) of the male participants in their study. Barnett et al. (2016) found that students enrolled at HBCUs have disparities that put them at risk for not receiving health services that offer HPV vaccination or Pap tests. It was found that only 18% of HBCUs compared with 53% of nonHBCUs offered HPV vaccination, and 50% compared to 76% of non HBCUs offered Pap tests. This only marginalizes this community more.

In summary, studies that explore constructs of the HBM in relatin to HPV found that the participants in these studies have a low perceived vulnerabilty to HPV; that the perceived bevefit varied in vaccine naïve individuals and the sourece of knowledge also varied; and finally that a barrier was being a student at a HBCU due to decreased health services, specifically gynecological services.

Other Factors: HPV and Trust/Distrust

Freed et al. (2011) conducted a study to determine how parents trust vaccine information that is provided by varying sources. The researchers found that vaccine information was trusted from physicians, other health care providers, government vaccine officials, and family and friends (Freed et al., 2011). Cuffee et al. (2013), found that trust of medical providers within a sample of African American males and females helped

participants adhere to treatment regimens. In a study conducted by Boulware et al. (2003) it was found that non-Hispanic Black participants were concerned about personal privacy and potential for harmful experiments in hospitals; and trusted their physicians less.

HPV and Social Influence

In a study conducted by Thomas, Bluming, & Delaney (2015) in a rural community, it was found that community churches and faith based approaches would benefit HPV prevention and vaccine uptake of the vaccine. An important implication of this study showed that spirituality, religiosity, and faith based context are important influences for HPV and other health promotion activities (Thomas, Bluming, & Delaney, 2015). Hirth et al. (2018) noted that during their study in college studetns four themes materalized, one of which was social influences. Interestigly, this study found that although participants valued inforamtion from their peers describing their experiences after receiving the vaccine, they did not have faith in their peers opinions.

In a study completed by Barnard, George, Perryman and Wolff (2017) it was found that sources of informtion about HPV and the vaccine came from internet sources and educational settings for male college students, and from educational settings and from health care providers in female college students. This study also found that only 21.6% (n 114) of males, compared with 62.4% (n 269) of females had the HPV vaccine seiress recommended to them by a physician or nurse.

HPV and Past sexual behavior

Since HPV can be spread via sexual contact, it is hypothesized that there would be a relationship between sexual practices and HPV vaccine adherence. In a study of African American women conducted at an HBCU, it was found that 68% (68/100) of the

participants had 1-3 sex partners in the past year, while only 40% (40/100) had received the HPV vaccine (Thomas & Freeman, 2011). The participants in studies conducted by Jones & Cook (2008), Bendik, Mayo, & Parker (2011), and D'Urso, Thompson-Robinson, & Chandler (2007), intentions to vaccinate were higher. Yet in studies by Patel et al. (2012), Manhart et al. (2011), and D'Urso, Thompson-Robinson, & Chandler (2007), participants had lower intentions based on sexual practices. Sexual practices are significant to exposure to HPV, thus data regarding this should be utilized when considering strategies to increase HPV vaccination and decrease HPV exposure. Sexual behaviors of an ethnically and racially diverse group of male and female college students in a study conducted by Thomas et al. (2015) found that in the 12 months prior to the study the majority participants reported having male sex partners, engaging in petting behaviors, oral sex and penile vaginal intercourse. In a study conducted by Oswalt and Wyatt (2013), 49.2% (n7503, N-16,243) of the heterosexual female participants denied receiving the HPV vaccine.

Data collected from the participants in the study by Bynum et al. (2011) revealed that prior STD exposure increased the likelihood of receiving vaccine (Bynum et al., 2011); while an inverse, relationship was noted in the study by Jones and Cook (2008). While the participants in the study conducted by Manhart et al. (2011) had an increase in knowledge with just the risk HPV exposure. This data suggests a wide spectrum of intentions related to STD exposure, thus continuing to explore this variable in future research is valuable. Thomas and Freeman (2011) found that 45% (45/100) of the college women enrolled in a HBCU had a prior diagnosis of and STI.

Conclusion

In conclusion, the review of the literature found a variety of factors that were associated with intent to vaccinate for HPV. Some of the factors that increased intention to vaccinate are multifaceted and include: prior diagnosis with STIs, knowing someone with HPV, being sexually experienced, perceived risk and vulnerability, knowing that HPV can help prevent warts and cervical cancer, vaccine cost, parental/health care provider influence, younger age, and perceived the HPV vaccine as safe. The factors that decreased intent to vaccinate were just as interesting and included: sexual activity, lack of supplemental health insurance, the health care community must utilize strategies that are ethnically diverse, just like to populations they service. The review of the literature also notes that the burden of HPV resides in females (CDC, 2018a). Another finding was that vaccine uptake was positively influenced by the type of institution the students attended. Ultimately the decision to become vaccinated varies between genders; what increases intentions to vaccinate in one population can deter participants' intentions in another study.

When it comes to risky sexual behaviors, STI knowledge is not a protective factor to prevent infection (Younge et al., 2013). In summary, besides studies of HBM constructs, studies have explored other factors that are related to HPV intentions. Students that attend HBCUs represent 25% of the African American college graduates and being a student at an HBCU puts individuals at greater risk for STI infection (Whitehouse, 2013). Research that explores the relationship between HPV awareness and vaccine uptake related to these barriers, in diverse young adults, and that has various geographic regions is needed in this area to further expand the body of knowledge.

Thomas, DiClemente, and Snell (2014), noted that to develop impartial and beneficial health promotion programs, geographic factors must be taken into consideration. This increase in understanding will help to better inform the development of more effective public health interventions programs. If vaccination is to be successful it must become a regular health promotion activity, but in order to do this respect must be a building block of the relationship between health care professionals and their clients (Thomas, 2016). Then, programs can target and eliminate racial, gender, and geographic health disparities in HPV treatment and care.

Chapter 3 Research Design and Methodology

Description of the Research Design

The research study was a descriptive study to determine HPV vaccine intentions in vaccine naïve young Black college students. A non-experimental cross-sectional research design was used. A cross sectional design was chosen because this data was examined at one point in time; the study estimated prevalence of intention to vaccinate in a small representation of young Black college students; and study findings will aid in future public health planning (Levin, 2006).

Setting

The study sample was recruited from minority serving institutions (MSI) of higher education, including historically black colleges and universities (HBCU), in rural and urban geographic locations in the United States.

A cross sectional design was utilized for this study. The convenience sample included participant students recruited from Tuskegee University in rural Tuskegee, Alabama; Florida Memorial University in urban Miami, Miami Dade College in Miami; and Florida International University (FIU) in urban Miami, Florida. Tuskegee University and Florida Memorial University are HBCUs while Miami Dade College and Florida International University are Hispanic-serving MSIs. The sample population included male and female individuals that self-identified as Black/African descent, ages 18-24, enrolled as a student at one of the university systems, self-identified as HPV vaccine naïve, and able to speak and read English. The participants completed a self-administered survey.

Population

As of July 2015, the United States (U.S.) had an estimated population of 321,418,820; and of this number 13.3% of them were Black or African American (United States Department of Commerce, n.d.). However, they have the greatest burdens of STI infection in the United States (CDC, 2015b). HPV is a virus that can cause cancer. Bruni et al. (2015) noted that the primary route of transmission of genital HPV infection is sexual intercourse. The virus can lead to genital warts or anogenital cancers, involving the vulva, vagina, and cervix of females, the penis of males, and the anus and rectum of both genders (CDC, 2015a).

In comparison with their White counter parts, Black women had higher rates of HPV-associated vaginal cancer, but lower rates of vulvar and oropharyngeal cancer (CDC, 2019b). In 2013, the estimated deaths for cervical cancer in African American women was 720 deaths (American Cancer Society (ACS), 2013). Black women also have a higher rate of deaths related to cervical cancer (CDC, 2016c).

Also, 50% of all new STIs in the United States are in young people aged 15-24 (CDC, 2017a). This is of concern since they only account for 25% of sexually experienced population (CDC, 2017a). Within these new cases 49% of them are in young males and 51% in young females; of these, HPV accounts for the majority of the newly acquired STIs (CDC, 2013). Although the HPV vaccine is available, 6 out of 10 girls and 5 out of 10 boys in the United States have initiated vaccination (CDC, 2016b). College students are at an age where they can independently make decisions about their health and receiving vaccinations, such as HPV; thus, they need education and strategies to aid them in their decisions.

Sample

Description of Sample. A convenience sample was used to gather information from a volunteer sample. For this study, this method was chosen because of the intimate nature of the questions and the answers individuals must make regarding their health behaviors. The sample was composed of male and female Black/African descent college students, ages 18-24.

Sample Size and Power Analysis. The major factors involved in sample size are significance level, power, and the magnitude of the difference (effect size) (McCrum-Gardner, 2010).

This study was conducted using nonprobability sampling method, convenience sampling (Polit & Beck, 2004). In this study, the data solicited is about health intentions and past sexual behaviors, thus this sampling method may produce more participants. The sample size for this study was a minimum of 143 students, this is based on medium effect for the error of probability. This analysis was conducted with the G*Power 3.1 software utilizing a chi square test, with a DF of 5, an error probability of 0.30 (medium effect), and power of 0.8 (McCrum-Gardner, 2010). This test was calculated using the small (0.10) and large (0.5) effect size as well. When the small effect is used the recommended sample, size is 1283. When the large effect size is used the recommended sample, size is 52.

Inclusion Criteria. The inclusion criteria for this study were as follows:

1. Self-identified as Black/African descent male or female
2. Self-identified as HPV vaccine naïve
3. Self-identified as an enrolled college student at one of the study sites.
4. Self-identified as an age of 18-24 years old

5. Ability to read, speak, and understand the English language
6. Currently residing in a rural area if they attend an institution located in a rural area
7. Currently residing in a urban area if they attend an institution located in an urban area
8. An undergraduate or graduate student
9. Non-married
10. Willingness to participate

Exclusion Criteria. Participants were excluded from the study if:

1. Failure to self-identity as Black/African descent American
2. Failure to self-identify as vaccine naïve
3. Reports being younger than 18 or older than 24 years old
4. Not currently enrolled at one of the identified institutions
5. Currently reside outside of the rural area if attending a school in a rural location
6. Currently reside outside a urban area if attending a school in a urban location
7. Reporting a married status

Sample Recruitment. The researcher recruited participants by passing out flyers and sending email announcements. At all locations, recruitment was done via word of mouth, posted flyers, class announcements, and email announcements. Recruitment took place 1-2 days before data collection in each perspective site.

Control Variables. There were no control variables in this study.

Procedures

Following institutional review board (IRB) approval from all sites, flyers were posted including study purpose, recruitment information and requirements for the study. The recruitment material included contact information for the interested participants to inquire about the study. Recruitment material were distributed in student congregant areas, residence areas, libraries, and educational buildings. After making arrangements with the appropriate staff at each site, data collection took place at a designated area. This included an area for students to complete the paper and pencil surveys. Upon arrival students received a letter describing the purpose of the study and verbal informed consent was obtained. The participants were given the survey packet and afforded an opportunity to complete it.

As a token of appreciation for their participation in the study, participants were given a $5.00 gift card. Funding for the gift cards came from a research grant that the researcher received.

Instrumentation

The research questions that guided this study were: 1) Is there a difference in demographics (age, gender, geographic location) between Black college students who intend to receive the HPV vaccine and those who do not intend to receive the vaccination? 2) What are the relative contributions of perceived: vulnerability, severity, benefits, and barriers to HPV vaccination intention among male and female Black college students? 3) What are the relative contributions of trust/mistrust, social influence, and prior sexual behavior to HPV vaccination intention among male and female Black college students? 4)

Has the new practice recommendation to change the HPV vaccination series from a 3-dose to a 2-dose series for young girls and boys caused a difference in intent to vaccinate for male and female Black college students?

There were several variables addressed in this study. The dependent variable was intention to vaccinate. The demographic variables/modifiable factors were age, gender, and geographic location. The independent variables were perceived vulnerability, perceived severity, perceived benefits, perceived barriers, trust/distrust, past sexual behavior, social influence, dosing recommendations.

Demographics. A demographic data questionnaire was utilized to accumulate data on the participants: age, gender, level in undergraduate education, race, sexual orientation, religion, dating/relationship status, sexual experience history, place of residence prior to school, health insurance status, reproductive health screenings, location of screenings, prior diagnosis of sexually transmitted infections (STIs), recipient of HPV vaccine, income of participant, and income of guardian/parent.

Student Human Papillomavirus Survey. The student human papillomavirus survey (SHPVS) is a 27-item instrument designed to review students' perceived benefits/barriers to HPV vaccination (Thomas, Dalmida, & Higgins, 2016). This instrument was used to measure the perceived vulnerability, severity, benefits, and barriers for this study. The SHPVS authors collected data with a sample of 527 male and female college students in a large urban university located in the southeastern United States (Thomas, Dalmida, & Higgins, 2016). This 27-item instrument was scored using a 5 choice Likert scale, when the scores are tabulated, they can range from 0-108; with higher scores equating to more knowledge and increased intentions to be vaccinated with

the HPV vaccine (Thomas, Dalmida, & Higgins, 2016). Higher scores indicated that the participants had higher perceived benefits, vulnerability, severity, or barriers related to HPV vaccine (Thomas, Dalmida, & Higgins, 2016). Most of the participants in this study were female 67% (353), ages 17-25, with Hispanic 66.8% (352), Black 14.2% (75), White 12.3% (65), or other 6.7% (35) ethnicity (Thomas, Dalmida, & Higgins, 2016). The overall Cronbach's alpha for this instrument within these participants was 0.74 (Thomas, Dalmida, & Higgins, 2016).

A question was added to the end of this survey to solicit data regarding the intention to receive vaccination now that the dose recommendation for the vaccine series had been modified from 3 doses to 2 doses. The addition of the question resulted in an increase from 27 items that are included in the scale to 28 items.

Health Care System Distrust Scale. The Health Care System Distrust Scale (HCSDS) was created to measure distrust of the health care system (Rose, Peters, Shea, & Armstrong, 2004). This scale was used to measure the variable of trust/distrust. This 10-item scale is scored on a 5-point Likert scale (Rose, Peters, Shea, & Armstrong, 2004). The total score for the instrument is 10-50, with higher scores indicated more distrust.

This instrument was used in a study of 400 male and female participants with 30.4% (156) of them being African American (Rose, Peters, Shea, & Armstrong, 2004). However, this scale has not been used in male and female Black college students. The age of the participants was between 19 and 73 and the sample was recruited from a Municipal Court in Philadelphia (Rose, Peters, Shea, & Armstrong, 2004). The Cronbach's alpha was 0.75 for the entire scale (Rose, Peters, Shea, & Armstrong, 2004).

Sexual Risk Survey. The sexual risk survey (SRS) is a instrument that has 23 items and was designed to assess risky sexual behaviors that individuals have participated in within the past six months prior to completing the survey (Turchik & Garske, 2009). The SRS was used to measure sexual behavior in this study. The items are scored on a scale from 0-4 and the possible total score range for the instrument is 0-92 (Turchik, Walsh, & Marcus, 2015). When the survey score is tabulated, higher scores indicate a greater risk-taking behavior (Turchik, Walsh, & Marcus, 2015). The internal consistency of the total instrument was 0.90, when it was used with 5,496 male and female college students (Turchik, Walsh, & Marcus, 2015). The study sample was derived from 18 distinct archived samples from 16 academic institutions coming from 11 different states within the United States (Turchik, Walsh, & Marcus, 2015). This sample included participants 21 years or older, with 65.2% (3585) female students, 45.9% (2519) identified as ethnic minority, 3.8% (211) identified as a sexual minority, and 25.8% (1420) as Christian (Turchik, Walsh, & Marcus, 2015). In this study, Black participants total SRS score had an internal consistency of 0.90, females total score for internal consistency was 0.89, male score for internal consistency was 0.92, individuals ≤ 20 score for internal consistency was 0.90 and individuals ≥ 21 score for internal consistency was 0.90 (Turchik, Walsh, & Marcus, 2015). In a prior study by Turchik and Garske (2009) with undergraduate male and female college students that were mainly Caucasian, the internal consistency was 0.88 for the total score.

Perceived Social Influence on Health Behavior Instrument. The Perceived Social Influence on Health Behavior Instrument (PSI-HB) was created to assess the perceived role of others in health behavior decisions of individuals (Holt et al., 2010).

This instrument was used to measure social influence in this study. This scale has 10 items that are scored using a 4-point Likert scale (Holt et al., 2010). The total score could range from 10-40, with higher scores being indicative of higher levels of belief that others effect an individual's health behavior (Holt et al., 2010). Although this instrument has not been utilized in a sample with young adult Black males and females, it was tested in African American ≥ 21 years of age (Holt et al., 2010). This sample included 1006 African American participants, 69% (693) female and 31% male (Holt et al., 2010). The internal consistency for this instrument in this population was 0.90 (Holt et al., 2010).

Data Management and Analysis Procedures

Data Management

Data was collected using a demographic instrument and 4 survey questionnaires. The researcher was responsible for ensuring confidentiality and protection of all study materials. The data was collected by the researcher. The researcher was present at the collection sites to clarify information and answer any question that may arise. After the questionnaires were completed and collected, they were stored in a locked box until they were scored. The questionnaires were scored by the researcher. The questionnaires were secured in the lock box when they were not being scored or not being entered into the data base. The lock box was stored in the researcher's primary residence. The researcher entered the data into the SPSS version 24, via a password protected computer and password protected file.

The surveys will be stored in a locked receptacle until such time that they can be destroyed as outlined by the IRB expiration date. Once data entry was completed, the researcher examined the data base for potential errors in data entry or distribution. The

data was stored on a mass storage device and then data analysis ensued. Collected surveys were assigned an alpha numeric code by the researcher. This number was used to differentiate between locations and assist with data entry accurateness.

Analysis Procedure

Descriptive data analysis was completed on the data gathered from the demographic instrument. The scores were tabulated for the SHPVS, including the 4 sub scales, HCSDS, PSI-HB, and SRS.

Research Questions 1: Is there a difference in demographics (age, gender, geographic location) between Black college students who intend to receive the HPV vaccine and those who do not intend to receive the vaccination? The analysis for this section included an independent t-test for the age analysis and chi-square goodness of fit test for homogeneity difference exist the demographics in students that intend to vaccination (Group 1) and students that do not intend to vaccinate (Group 2).

Research Question 2: What are the relative contributions of perceived: vulnerability, severity, benefits, and barriers to HPV vaccination intention among male and female Black college students? Binomial logistic regression was used to examine this question to discover the relative contributions of perceived: vulnerability, severity, benefits, and barriers among males (Group 3) and females (Group 4).

Research Question 3: What are the relative contributions of trust/mistrust, social influence, and prior sexual behavior to HPV vaccination intention among male and female Black college students? Binomial logistic regression was used to examine this question to discover the contributions of trust/mistrust, social influence, and prior sexual behavior among males (Group 3) and females (Group 4).

Research Question 4: Did the new practice recommendation to change the HPV vaccination series from a 3-dose to a 2-dose series for male and females influence intent to vaccinate for Black college students? The analysis for this section was conducted using a binomial logistic regression.

Human Subjects Considerations

1. Subjects involvement and characteristics:

Participant confidentiality was ensured by assigning each participant a code number. The code number was used for all data collection. Names of participants were not used or entered on the data collection instruments.

2. Sources of materials:

All materials used in the study were kept in a locked box in the researcher's private residence.

3. Recruitment and informed consent:

Participants were recruited via posted flyers, word of mouth, and email announcements at the identified institutions. After verbal informed consent was obtained, the participants were given the survey packet. Participants were advised that their participation was for a one-time event, and the process would take less than 60 minutes.

4. Potential risks:

The participants were informed that there was no physical risk involved in this study. However, there is a possibility of emotional uneasiness when they are answering the questions about past sexual behavior. The students were informed that the survey was anonymous and that their information would be kept confidential and reported as aggregate data. They were advised that they did not have to answer any question that they

feel uncomfortable answering. They were advised that their participation would not endanger or benefit their enrollment/grades in the institution where they are enrolled, and that there was not a fee to participate in the study. They were also informed that they can halt participation in the study at any time, and they would still receive a gift card for their participation. The students received the email address for the researcher and were advised that they could contact her if they had any questions or wanted further information regarding the study. The binomial logistic regression students were offered a copy of the informed consent. Finally, students were advised that they could contact the FIU Office of Research and Integrity by telephone at 1-305-348-2494 or by email at ori@fiu.edu for further questions regarding the rights of human subjects or ethical concerns.

5. Protection against risk:

The students in this study were informed that there was no physical risk associated with participation in this study. They were also informed that some of the questions were of a sensitive and sexual manner, and this may cause them to feel uneasy. They were instructed to omit answering any question that they were not comfortable answering. They were reassured that their answers and consent will be kept in confidence. They were also informed that the surveys would be protected by a lock box and would be kept in the researcher's private residence.

6. Benefits:

As a gesture for participating, students received a gift card. This was offered whether they completed all of the survey questionnaires. They were also told that the information gathered from this study will aid researchers in promoting sexual reproductive health of Black college students.

Inclusion of minorities. Black males and females were recruited for this study. The institutions where students were recruited from were identified as HBCUs and/or MSIs. HBCUs have a population consisting of mainly Black students, while MSIs have a large number of minority students.

Inclusion of women and children. Women aged 18-24 years were included in this study. However, no one under the age of 18 years was allowed to participate in this study.

Data and Safety Monitoring Plan. This is not applicable, as the proposed study was not in any phase of a clinical study.

Vertebrate animals. There were no animals involved in this study.

Study Limitations

The study limitations were as follows:

1. Some of the instruments used in this study have not been used in a young Black male and female college student population. However, except for the demographic instrument, all instruments have been used with adult Black or African American males and females.
2. The data obtained from this study may not be applicable to all Black students attending a HBCUs or MSIs or to Black people that do not attend college.

Summary

In summary, the data produced from this study is a fundamental building block for researchers, clinicians, policy makers, and educators, in that it can aid in the implementation of interventions that are timely, culturally relevant, and specific for this population. This study provided insight into intentions of Black college male and female

students, to receive the HPV vaccine, which will ultimately decrease the incidence of cervical cancer.

Chapter 4: Data Analysis

Introduction

This study's purpose was to assess perceived vulnerability, perceived severity, perceived benefits, perceived barriers, and risk behavior factors (trust/mistrust, social influence, and prior sexual behavior) regarding intent to initiate and complete the HPV vaccination series. The study was conducted with HPV vaccine naïve, Black college students aged 18-24. These students were enrolled in a historically black college/university (HBCU) and/or a minority serving institution (MSI). This quantitative descriptive study is non-experimental and has a cross sectional design.

The study addressed the following research questions:

1. Is there a difference in demographics (age, gender, geographic location) between Black college students who intend to receive the HPV vaccine and those who do not intend to receive the vaccination?
2. What are the relative contributions of perceived vulnerability, perceived severity, perceived benefits, and perceived barriers to HPV vaccination intention among male and female Black college students?
3. What are the relative contributions of trust/mistrust, social influence, and prior sexual behavior to HPV vaccination intention among male and female Black college students?
4. Has the new practice recommendation to change the HPV vaccination series from a 3-dose to a 2-dose series for young girls caused a difference in intent to vaccinate for college students, and is there a difference between male and female Black college students?

The hypotheses that guided this study are:

1. There is a difference in demographics (age, gender, geographic location) in Black college students who intend to vaccinate and those that do not.
2. Higher perceived vulnerability, perceived severity and perceived benefits scores, and lower perceived barriers scores will be associated with increased intentions to receive vaccination in Black college students who intend to vaccinate.
3. Trust, social influence, and prior sexual behavior will have a positive effect on intent of Black college students to receive the HPV vaccination.
4. The decrease in the vaccine series dosing from 3 doses to 2 doses will have a negative effect on Black college student's intentions to vaccinate.
5. Gender will play a role in the decision to vaccinate based on the change in HPV Vaccination policy for the number of doses for young adolescents.

Recruitment/Data Collection

After approval from the IRB from all participating institutions, flyers were posted in multiple locations on campuses. Data collection took place in classrooms or designated areas at each site. Students were provided with the consent form, and once verbal consent was received, they were given the hard copy of the survey instruments. The participants completed a self-administered survey. Upon completion of the survey they were given a $5 gift card.

Sample Characteristics

The study sample was recruited from two HBCUs and two MSIs. The HBCUs are in a rural and urban area in the southeastern United States. The MSIs are in an urban area in the southeastern United States.

The sample population included 160 participants. The participants were male and female, ages 18-24, enrolled at one of the university systems during the time of the study, self-identified as Black, self-identified as HPV vaccine naïve, and able to speak and read English.

Data Collection Instrument

A demographic data questionnaire was utilized to accumulate data on the participants including: age, gender, level in undergraduate education, race, sexual orientation, religion, dating/relationship status, sexual experience history, place of residence prior to college attendance, health insurance status, reproductive health screenings, location of screenings, prior diagnosis of sexually transmitted infections (STIs), recipient of HPV vaccine, income of participant, and income of guardian/parent. The independent variables of age, gender, race, and location of university were analyzed to provide summary statistics for demographic information on the sample (Tables 1-3). One hundred percent of the participants in this study identified as Black. The percentage of Black students, based on gender (N=152), who did not intend to vaccinate for HPV was 69.7% (n=106).

Table 1

Number of Participants in each Age Category at the Time of Data Collection (N=160).

Age	n	%
18	35	21.9
19	31	19.4
20	18	11.3
21	23	14.4
22	24	15.0
23	21	13.1
24	8	5.0
Total	160	100.0

Table 2

Gender (N=160).

Gender	n	%
Male	55	34.4
Female	104	65.0
Missing	1	0.6

Table 3

College/University Location

Location	Frequency *n*	Percent %
FLORIDA INTERNATIONAL UNIVERSITY	8	5.0
MIAMI DADE COLLEGE	16	10.0
TUSKEGEE UNIVERSITY	36	22.5
FLORIDA MEMORIAL UNIVERSITY	100	62.5
Total	160	100.0

Research Question 1

Question: Is there a difference in demographic characteristics (age, gender, rural versus urban geographic location) between Black college students who intend to receive the HPV vaccine and those who do not intend to receive the vaccination?

Hypothesis: There is a difference in demographic characteristics (age, gender, rural versus urban geographic location) in Black college students who intend to receive the HPV vaccine and those that do not.

Measurement Instrument: Data were collected using a Demographic Data Questionnaire.

Results for Research Question 1

The percentage of Black students who did not intend to vaccinate for HPV was 69.7%. This indicates that a large majority of Black college students in this study had no intention to vaccinate for HPV.

Age Independent t-test

An independent t-test was calculated to determine whether there was a difference between the age of participants and their intent to receive the HPV vaccination. One hundred and fifty-three students reported their date of birth. Of this group, there were 106 participants that did not intend to receive the vaccination, while 47 participants intended to receive the vaccination. The mean age of participants that did not intend to vaccinate was 21 (M=20.62, SD=1.97). The mean age of participants that intended to vaccinate was 20 (M=20.11, SD=1.76). There was homogeneity of variances for the intent to vaccinate, as assessed by Levene's test for equality of variances (p=0.187) (Table 4). The individuals that did not plan to vaccinate had a score of 0.52, 95% confidence interval (CI) [-0.14 to 1.18] as did the individuals that decided not to vaccinate 0.52, 95% CI [-

0.19 to 1.15]. There was not a significant difference in age and intent to vaccinate in Black college students, *t* (151) =1.54, *p*=0.125, *d*=0.245. There was not a statistically significant difference in the mean age of individuals that intended to vaccinate and those that did not, *t* (97.99) =1.61, p=0.11. Therefore, the null hypothesis is accepted, and the alternative hypothesis was rejected. (See Table 4).

Table 4

Age Independent Samples t-Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	1.756	.187	1.544	151	.125	.51626	.33426	-.14418	1.17670
Equal variances not assumed			1.613	97.987	.110	.51626	.32009	-.11895	1.15146

Gender Chi-square

A chi-square goodness of fit test for homogeneity was calculated comparing the gender of Black college students' in relation to their intent to receive the HPV vaccination. All expected cell counts were greater than five. One-hundred and fifty-two students completed both the gender and intent to vaccinate question. Fifty-two students were male, and one-hundred students were female. Twenty-one males (40.4%) intended to receive the HPV vaccine while, twenty-five females (25%) stated they intended to

receive the vaccine. Overall, only forty-six (30.3%) of the students reported that they would receive the vaccine. When comparing gender in relation to Black college students' intention to vaccinate, there was a significant association between gender and intent to receive the vaccine (p=0.050) (See Table 5), with Black male college students indicating more frequently than Black female students an intent to vaccinate for HPV.

Table 5

Gender Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	3.837[a]	1	.050	.063	.039	
Continuity Correction[b]	3.142	1	.076			
Likelihood Ratio	3.756	1	.053	.063	.039	
Fisher's Exact Test				.063	.039	
Linear-by-Linear Association	3.811[c]	1	.051	.063	.039	.022
N of Valid Cases	152					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 15.74.

b. Computed only for a 2x2 table

c. The standardized statistic is -1.952.

Rural versus Urban Geographic Location Chi-square

A chi-square goodness of fit test for homogeneity was calculated comparing location and Black college students' intent to receive the HPV vaccination. The number of participants responding to this item was one-hundred and fifty-two students (*n*=152). One-hundred and sixteen students (76.3%) were from an urban area, while thirty-six (23.7%) were from a rural area. Forty-seven (30.9. %) students intended to receive the vaccine. When comparing location and Black college students' intention to vaccinate, no

significant difference was found for urban versus rural geographic location in relation to Black college students' intent to receive the HPV vaccination although the probability was close to significance at .055. (See Table 6).

Table 6

Rural versus Urban Geographic Location Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	2.505[a]	3	.474	.483		
Likelihood Ratio	2.618	3	.454	.474		
Fisher's Exact Test	2.450			.488		
Linear-by-Linear Association	.791[b]	1	.374	.426	.218	.055
N of Valid Cases	152					

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 2.47.

b. The standardized statistic is .889.

Summary of Findings for Question 1

More than two-thirds (69.7%) of the sample had no intention to vaccinate for HPV. Overall, only forty-six (30.3%) of the students reported that they would receive the vaccine. A significant difference was not found for age and intent to vaccinate in Black college students, t (151) =1.54, p=0.125, d=0.245. When comparing gender and Black college students' intention to vaccinate, an association was found between gender and intent to vaccinate (p=0.050). Therefore, there was an association between gender and Black college student' intentions to vaccinate with Black males more likely to note an intent to vaccinate than Black females. When considering rural versus urban geographic location, forty-seven (30.9. %) students intended to receive the vaccine. However, no

significant association was found for urban versus rural location for Black college students' intent to receive the HPV vaccination.

Research Question 2

Question: What are the relative contributions of perceived vulnerability, perceived severity, perceived benefits, and perceived barriers to HPV vaccination intention among male and female Black college students?

Hypothesis: Higher perceived vulnerability, perceived severity and perceived benefits scores, and lower perceived barriers scores will be associated with increased intentions to receive vaccination in Black college students who intend to vaccinate.

Measurement Instrument

The student human papillomavirus survey (SHPVS) is a 27-item measure of students' perceived benefits/barriers to HPV vaccination (Thomas, Dalmida, & Higgins, 2016). This instrument measured the perceived vulnerability, severity, benefits, and barriers for this study. This 27-item questionnaire was scored using a 5-choice Likert scale, ranging from 1= disagree to 5 = agree. When the scores are tabulated, they can range from 0-108; with higher scores equating to more knowledge and increased intentions to be vaccinated with the HPV vaccine (Thomas, Dalmida, & Higgins, 2016). Higher scores indicate that the participants had higher perceived benefits, vulnerability, severity, have more positive attitudes toward vaccination while high barriers scores reflect more negative attitudes related to HPV vaccine (Thomas, Dalmida, & Higgins, 2016). For the participants in this study (n=160) scores ranged from 42 to 104, and the mean total score for the SHPVS tool was 75.1, *sd*=9.86. The subscales were tabulated as follows: perceived vulnerability (questions: 5-9, 11, and 25; a total of 7 questions),

severity (questions 10, 12-13, 15-16, and 21; a total of 6 questions), benefits (questions 1-4, 14, 17-20; a total of 9 questions,) and barriers (questions 22-24, 27, and 26; a total of 5 questions). The scores of these subscales were used as the data for the independent variables in the individual analysis.

Statistical Test

Since the research questions seek to determine if there are relative contributions of perceived vulnerability, perceived severity, perceived benefits, and perceived barriers to HPV vaccination intention among male and female Black college students; the binomial logistic regression was used to complete the analysis of the data. The independent variable is ordinal/categorical, and the dependent variable is dichotomous. This type of analysis allowed the researcher to use interactions between independent variables to predict the dependent variable.

Research Question 2 Results

Perceived Vulnerability

A binomial logistic regression analysis was conducted to determine if perceived vulnerability made a contribution on HPV vaccinations intentions in male and female Black college students. The casewise diagnostic table was reviewed and there were no outliers, thus analysis of the results was conducted without any value being removed. First, the data coding was reviewed to ensure that the analysis was run appropriately and that there were enough cases. There were 160 eligible cases, however there were missing data and 8 cases were omitted from the analysis, so the total number of cases analyzed was 152. There were 52 male and 100 female participants for this analysis. The model fit was not significant ($p=0.523$) for the overall statistical significance of the model, thus the

model is not a poor fit. The percentage accuracy in classification (PAC) is 69.7%. This means that adding the perceived vulnerability (independent variable) improved the overall prediction of cases.

The casewise diagnostic table was reviewed and there were no outliers, thus analysis of the results was conducted without any value being removed. The logistic regression model was not statistically significant, $\chi 2(3) = 5.193$, $p=0.158$. The model explained 4.8% (Nagelkerke R2) of the variance in intent to receive the HPV vaccination and correctly classified 69.7% of cases. Sensitivity was 0%, specificity was 100%, positive predictive value was 0% and negative predictive value was 69.74%. Of the two predictor variables only one approached statistical significance: gender (p=.059) (as shown in Table 7). Females had 0.50 times less likely the odds to plan to receive the vaccination than males. There was no significant interaction between perceived vulnerability and gender, in reference to their intent to receive the HPV vaccination (p=0.294) (Table 8).

Table 7

Logistic Regression Predicting Likelihood of HPV Vaccination Intention Based on Gender and Perceived Vulnerability

								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	Gender	-.693	.366	3.576	1	.059	.500	.244	1.026
	Perceived Vulnerability Total Score	-.021	.037	.324	1	.569	.979	.910	1.053
	Constant	.056	.830	.005	1	.946	1.058		

Note: Gender is for female compared to male.

Table 8

Logistic Regression Predicting Likelihood of HPV Vaccination Intention Based on Gender by Perceived Vulnerability Interaction Term

								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	Gender	.979	1.632	.360	1	.549	2.662	.109	65.254
	Perceived Vulnerability Total Score	.019	.053	.129	1	.720	1.019	.919	1.131
	Interaction Term: Gender by Perceived Vulnerability Total Score	-.078	.075	1.101	1	.294	.925	.799	1.070
	Constant	-.793	1.163	.466	1	.495	.452		

Note: Gender is for female compared to male.

Perceived Severity

A binomial logistic regression analysis was conducted to determine if perceived severity made a contribution to HPV vaccinations intentions in male and female Black college students. There were 160 eligible cases for analysis; however, there were missing data and 8 cases were omitted from the analysis. Therefore, the total number of cases analyzed was 152. There were 52 male and 100 female participants cases. The model fit was not significant (p=0.728) for the overall statistical significance of the model, thus the model is not a poor fit. The percentage accuracy in classification (PAC) was 72.4%. This means that adding the perceived severity (independent variable) improved the overall prediction of cases.

The binomial logistic regression model was statistically significant, $\chi 2(3) = 9.692$, p=0.021. The model explained 8.7% (Nagelkerke R2) of the variance for intent to receive the HPV vaccination, and it correctly classified 69.7% of cases.

Sensitivity was 0%, specificity was 100%, positive predictive value was 66.7% and negative predictive value was 72.85%. Of the three predictor variables one was statistically significant total scores for the severity scale (p=0.032) (as shown in Table 9); while the and the interaction variable between perceived severity and intent to vaccinate approached significance (p=0.061). Perceived severity had 1.256 more likely times odds to intend to vaccinate, while the interaction variable had 1.012 times odds to intend to receive vaccination. Gender was not a significant predictor for perceived severity. Although total scores on the severity scale was a significant predictor, severity scores also significantly interacted with intent to receive HPV vaccination indicating intent and severity were associated.

Table 9

Logistic Regression Predicting Likelihood of HPV Vaccination Intention Based on Gender by Perceived Severity Interaction Term

								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	Gender	3.886	2.451	2.515	1	.113	48.732	.400	5941.727
	Perceived Severity Total Score	.228	.106	4.588	1	.032	1.256	1.020	1.547
	Gender by Perceived Severity Total Score	-.259	.138	3.515	1	.061	.772	.589	1.012
	Constant	-4.468	1.953	5.232	1	.022	.011		

Note: Gender is for female compared to male.

Perceived Benefits

A binomial logistic regression analysis was conducted to determine if perceived benefits made a contribution on HPV vaccinations intentions in male and female Black college students. The casewise diagnostic table was reviewed and there were no outliers, thus analysis of the results was conducted without any value being removed. The data coding was reviewed to ensure that the analysis was run appropriately and that there were enough cases. There were 160 eligible cases, and 8 cases with missing data were omitted from the analysis. Hence, the total number of cases analyzed was 152. Data for 52 male and 100 female participants were entered into the model. The model fit was not significant (p=0.909) for the overall statistical significance of the model, thus the model was not a poor fit. The percentage accuracy in classification (PAC) is 69.1%. This means that adding the perceived benefit (independent variable) improved the overall prediction of cases.

The binomial logistic regression model was statistically significant, $\chi 2(2) = 6.460$, p=0.040. The model explained 55.9% (Nagelkerke R2) of the variance in intent to receive the HPV vaccination and correctly classified 69.7% of cases. Sensitivity was 2.2%, specificity was 98.1%, positive predictive value was 33.3% and negative predictive value was 95.41%. Of the two predictor variables only one was statistically significant: gender (p=.041) (as shown in Table 10). Females had 0.468 times lower the odds to plan to receive the vaccination than males. There was no significant interaction between perceived benefits and gender, in reference to their intent to receive the HPV vaccination (p=0.224) (See Table 11). Therefore, females were less likely than males to intend to receive HPV vaccination based on perceived benefits. However, in general perceived benefits did not play a significant role in intent to receive HPV vaccination.

Table 10

Logistic Regression Predicting Likelihood of HPV Vaccination Intention Based on Gender and Perceived Benefit

								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	GENDER	-.759	.371	4.192	1	.041	.468	.226	.968
	Perceived Benefit Total Score	-.070	.043	2.644	1	.104	.932	.857	1.015
	Constant	1.187	1.009	1.384	1	.239	3.277		

Note: Gender is for female compared to male.

Table 11

Logistic Regression Predicting Likelihood of HPV Vaccination Intention Based on Interaction of Gender and Perceived Benefit

								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	Gender	1.565	1.941	.650	1	.420	4.782	.106	214.781
	Total Score Perceived Benefit	-.011	.064	.031	1	.861	.989	.872	1.121
	Gender by Total Score Perceived Benefit	-.106	.087	1.481	1	.224	.900	.759	1.067
	Constant	-.137	1.473	.009	1	.926	.872		

Note: Gender is for female compared to male.

Perceived Barriers

With the interaction term. A binomial logistic regression analysis was conducted to determine if perceived barriers made a contribution on HPV vaccinations intentions in male and female Black college students. The casewise diagnostic table was reviewed and there was one outlier, the standardized residual had a value of -2.230, thus analysis of the results was conducted without any value being removed.

Of the 160 eligible cases, the total number of cases available for analysis was 152 due to missing data. There were 52 male and 100 female participants in this analysis. The model fit was not significant (p=0.096) for the overall statistical significance of the model, thus the model was not a poor fit. The percentage accuracy in classification (PAC) was 73.7%. This means that adding the perceived barriers (independent variable) improved the overall prediction of cases.

The binomial logistic regression model was statistically significant, $\chi 2(3) = 12.008$, p=0.007. The model explained 10.8% (Nagelkerke R2) of the variance in intent to receive the HPV vaccination and correctly classified 73.7% of cases. Sensitivity was 21.7%, specificity was 96.2%, positive predictive value was 71.43% and negative predictive value was 73.91%. Of the three predictor variables one was statistically significant, perceived barriers (*p*=0.018) (as shown in Table 12). Perceived barriers had 0.80 times lower the odds to explain intent to receive the vaccination. There was no significant interaction between perceived barriers and gender, in reference to participants' intent to receive the HPV vaccination (p=0.266) (Table 12). Therefore, perceived barriers was a significantly predictor of intent to receive vaccination regardless of gender.

Table 12

Logistic Regression Predicting Likelihood of HPV Vaccination Intention HPV Vaccination Intention Based on Interaction of Gender and Perceived Barrier

								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	Gender	-2.505	1.518	2.725	1	.099	.082	.004	1.599
	Perceived Barrier Total Score	-.224	.094	5.597	1	.018	.800	.665	.962
	Gender by Perceived Barrier Total Score	.131	.118	1.235	1	.266	1.140	.905	1.436
	Constant	2.498	1.260	3.930	1	.047	12.155		

Note: Gender is for female compared to male.

When the interaction variable is not considered. When not considering the interaction of gender and perceived barriers, the model fit was not significant (p=0.116) for the overall statistical significance of the model, thus the model is not a poor fit. The percentage accuracy in classification (PAC) was 73.0%. This means that adding the

perceived barriers (independent variable) improved the overall prediction of cases. The binomial logistic regression model was statistically significant, $\chi 2(2) = 10.727$, p=0.005. The model explained 9.6% (Nagelkerke R2) of the variance in intent to receive the HPV vaccination and correctly classified 73.0% of cases. Sensitivity was 17.4%, specificity was 97.2%, positive predictive value was 72.73% and negative predictive value was 73.05%. Of the two predictor variables both were statistically significant, gender (p=0.021) and perceived barriers (p=0.010) (as shown in Table 13). For gender females had 0.411 times less likely the odds than males to plan to receive the vaccination. For perceived barriers, participants had 0.867 times lower the odds to plan to receive the vaccination. There was no significant interaction between perceived barriers and gender, in reference to their intent to receive the HPV vaccination (p=0.266).

Table 13

Logistic Regression Predicting Likelihood of HPV Vaccination Intention Based on Gender and Perceived Barrier

								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	GENDER	-.889	.384	5.346	1	.021	.411	.194	.873
	Perceived Barrier Total Score	-.143	.055	6.638	1	.010	.867	.777	.966
	Constant	1.458	.772	3.567	1	.059	4.297		

Note: Gender is for female compared to male.

Summary of Question 2 Results

Binomial logistic regressions were performed to ascertain the effects of perceived vulnerability, severity, benefits, and barriers on HPV vaccinations intentions in male and female Black college students. The hypothesis that guided this question was that: higher

perceived vulnerability, perceived severity and perceived benefits scores, and lower perceived barriers scores will increase intentions to receive vaccination in Black college students who intend to vaccinate. Gender was not a significant predictor of intent to vaccinate based on perceived vulnerability, perceived severity, and perceived barriers. However, females were less likely than males to intend to receive HPV vaccination based on perceived benefits. Total scores on the severity scale was a significant predictor of intent to vaccinate, but severity scores also significantly interacted with intent to receive HPV vaccination indicating intent and severity were associated. Perceived benefits of receiving HPV vaccination was not significant in predicting intent to receive HPV vaccination. Perceived barriers was a significantly predictor of intent to receive HPV vaccination regardless of gender. There was no significant interaction between perceived vulnerability and gender, in reference to participants' intent to receive the HPV vaccination ($p=0.294$). The interaction between perceived severity and gender, in reference to intent to receive the HPV vaccination approached significance ($p=0.061$). There was no significant interaction between perceived benefits and gender, in reference to participants' intent to receive the HPV vaccination ($p=0.224$). There was no significant interaction between perceived barriers and gender, in reference to intent to receive the HPV vaccination ($p=0.266$). Results for the hypothesis were mixed with some results supporting the hypothesis and other results not supporting the hypothesis.

Research Question 3

Question: What are the relative contributions of trust/mistrust, social influence, and prior sexual behavior to HPV vaccination intention among male and female Black college students?

Hypothesis: Trust, social influence, and prior sexual behavior will have a positive effect on intent of Black college students to receive the HPV vaccination.

Research Question 3 Results

Trust/Mistrust Instrument

To measure the variable trust/mistrust the Health Care System Distrust Scale (HCSDS) was utilized. This 10-item scale is scored on a 5-point Likert scale (Rose, Peters, Shea, & Armstrong, 2004). The total score for the instrument ranges from 10 to 50, with higher scores meaning more distrust. For the participants in this study the minimum score was 13, the maximum score was 49, and the mean score was 30.6, *sd*=5.36. The median score of participants in this study suggested that they had a moderate level of distrust. The data from this instrument were tabulated and used in the analysis of Research Question 3.

Trust/Mistrust

A binomial logistic regression analysis was conducted to determine if trust/mistrust made a contribution on HPV vaccinations intentions in male and female Black college students. The casewise diagnostic table was reviewed and there were no outliers, thus analysis of the results was conducted without any value removed.

First, data coding was reviewed to ensure that the analysis was run appropriately and that there were enough cases. There were 160 eligible cases, however some data were

missing, and 10 cases were omitted from the analysis, so the total number of cases analyzed was 150. There were 51 male and 99 female participants in this analysis. The model fit was not significant (p=0.557) for the overall statistical significance of the model, thus the model is not a poor fit. The percentage accuracy in classification (PAC) was 68.7%. This means that adding the trust/mistrust (independent variable) improved the overall prediction of cases.

The binomial logistic regression model approached statistical significance, $\chi 2(2) = 5.821$, p=0.054. The model explained 5.4% (Nagelkerke R2) of the variance of intent to receive the HPV vaccination and correctly classified 68.7% of cases. Sensitivity was 0%, specificity was 99%, positive predictive value was 0% and negative predictive value was 69.13%. Of the two predictor variables only one was statistically significant: gender (p=.033) (as shown in Table 14). Females had 0.45 times less likely the odds to plan to receive the vaccination than males and were less likely to intend to receive HPV vaccination based on trust/mistrust. There was no significant interaction between trust/mistrust and gender, in reference to their intent to receive the HPV vaccination (p=0.771) (Table 15).

Table 14

Logistic Regression Predicting Likelihood of HPV Vaccination Intention Based on Gender and Trust/Mistrust

								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	Gender	-.799	.374	4.569	1	.033	.450	.216	.936
	Trust/Mistrust Total Score	-.047	.035	1.843	1	.175	.954	.892	1.021
	Constant	1.118	1.118	.998	1	.318	3.057		

Note: Gender is for female compared to male.

Table 15

Logistic Regression Predicting Likelihood of HPV Vaccination Intention Based on Gender by Trust/Mistrust Interaction Term

								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	Gender	-.153	2.249	.005	1	.946	.858	.010	70.458
	Trust/Mistrust Total Score	-.033	.058	.326	1	.568	.967	.863	1.084
	Gender by Trust/Mistrust Total Score	-.021	.072	.085	1	.771	.979	.850	1.128
	Constant	.688	1.845	.139	1	.709	1.989		

Note: Gender is for female compared to male.

Social Influence

Health Behavior Instrument

The Perceived Social Influence on Health Behavior Instrument (PSI-HB) instrument was used to measure social influence in this study. This scale has 10 items that are scored using a 4-point Likert scale (Holt et al., 2010). The total score could range from 10-40, with higher scores being indicative of higher levels of belief that others effect an individual's health behavior (Holt et al., 2010). For the participants in this study the minimum score was 10, maximum score 38, and mean score of 21.2, *sd*=21.22=. This means that the average score for participants in this study suggest that they had a moderate belief that others effect an individuals' health behavior. The results of total scores for the instrument were tabulated and used in the analysis. A binomial logistic regression analysis was conducted to determine the if perceived social influence made a

contribution on HPV vaccinations intentions in male and female Black college students. The casewise diagnostic table was reviewed and there were no outliers, thus analysis of the results was conducted without any value being removed.

First, the data coding was reviewed to ensure that the analysis was run appropriately and that there were enough cases. There were 160 eligible cases, however some were missing data and 10 cases were omitted from the analysis, so the total number of cases analyzed was 150. There were 50 and 100 female participants. The model fit was not significant ($p=0.460$) for the overall statistical significance of the model, thus the model is not a poor fit. The percentage accuracy in classification (PAC) is 70.7%. This means that adding the social influence (independent variable) improved the overall prediction of cases.

The binomial logistic regression model was not statistically significant, $\chi2(3) =4.066$, $p=0.254$.

The model explained 3.8% (Nagelkerke R2) of the variance in intent to receive the HPV vaccination and correctly classified 70.7% of cases.

Sensitivity was 2.2%, specificity was 100%, positive predictive value was 100% and negative predictive value was 70.5%. Of the two predictor variables none were statistically significant. There was no significant interaction between social influence and gender, in reference to their intent to receive the HPV vaccination ($p=0.665$) (Table 16).

Table 16

Logistic Regression Predicting Likelihood of HPV Vaccination Intention Based on Gender by Social Influence Interaction Term

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Gender	-.020	1.499	.000	1	.989	.980
	Total Score Social Influence	.037	.051	.522	1	.470	1.038
	Gender by Total Score Social Influence	-.029	.066	.187	1	.665	.972
	Constant	-1.253	1.215	1.064	1	.302	.286

Note: Gender is for female compared to male.

Prior Sexual Behavior

Sexual Risk Survey (SRS) and Sexual Experience Questionnaire

The sexual risk survey (SRS) and sexual experience questionnaire was used to measure the prior sexual behavior variable. The SRS has 23 items that was designed to assess risky sexual behaviors that individuals have participated in within the past six months prior to completing the survey (Turchik & Garske, 2009). The items are scored on a scale from 0-4 and the possible total score range for the instrument is 0-92 (Turchik, Walsh, & Marcus, 2015). When the survey score is tabulated, higher scores indicate greater sexual risk-taking behavior. For the participants in this study the minimum score was 0, maximum score 47, and the mean score was 7.8, *sd*=7.98. For this group of participants, the score suggested that they have low sexual risk-taking behavior. The sexual experience questionnaire has seven questions, of which five elicit "yes/no" answers, one elicits data regarding sexual practices, and one elicits data regarding sexual partners. The "yes" answers were scored as 2, while the "no" answers were scored as 1; for question number 3, the choices were scored as never=1, protect=2, unprotected=3;

and for question 6 the choices were scored as none=0, 1 person=1, 2 people=2, 3 people=3, and 4 or more as 4. The scores could range from 6-16; higher scores indicated more sexual experience. For the participants in this study the minimum score was 2, maximum score 16, and mean score of 10.4, *sd*=2.87. For this group of participants, the score suggest that they have a moderate amount of sexual experience. The scores from each individual instrument were tabulated, and then combined to use as the variable in the analysis.

A binomial logistic regression analysis was conducted to determine if prior sexual behavior made a contribution to HPV vaccinations intentions in male and female Black college students. The casewise diagnostic table was reviewed and there were no outliers, thus analysis of the results was conducted without any value being removed.

First, the data coding was reviewed to ensure that the analysis was run appropriately and that there were enough cases. Of the160 eligible cases, 9 cases were omitted from the analysis due to missing data, so the total number of cases analyzed was 151. There were 51 male and 100 female participants that remained in the analysis. The model fit was not significant (p=0.551) for the overall statistical significance of the model, thus the model is not a poor fit. The percentage accuracy in classification (PAC) was 69.5%. This means that adding the prior sexual behavior (independent variable) improved the overall prediction of cases.

The binomial logistic regression model was not statistically significant, $\chi 2(2) = 4.631$, p=0.099. The model explained 4.3% (Nagelkerke R2) of the variance in intent to receive the HPV vaccination and correctly classified 69.5% of cases. Sensitivity was 0%, specificity was 100%, positive predictive value was 0% and negative predictive value

was 69.54%. Of the two predictor variables only one was statistically significant: gender (p=.032) as shown in Table 17. Female participants had 0.437 times less likely the odds to plan to receive the vaccination than males. Therefore, females were less likely to intend to receive HPV vaccination than males in the analysis of sexual behavior scores. The total prior sexual behavior score was not significant, which indicated no contribution of prior sexual behavior on intent to receive HPV vaccination. There was no significant interaction between prior sexual behavior and gender, in reference to participants' intent to receive the HPV vaccination (p=0.704) (Table 18).

Table 17

Logistic Regression Predicting Likelihood of HPV Vaccination Intention Based on Gender and Prior Sexual Behavior

								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	Gender	-.828	.386	4.611	1	.032	.437	.205	.930
	Total Score Prior Sex	-.013	.018	.543	1	.461	.987	.952	1.023
	Constant	-.057	.494	.013	1	.909	.945		

Note: Gender is for female compared to male.

Table 18

Logistic Regression Predicting Likelihood of HPV Vaccination Intention Based on Gender by Prior Sexual Behavior Interaction Term

							95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	Gender	-.570	.779	.536	1	.464	.565	.123	2.601
	Total Prior Sex	-.008	.024	.108	1	.743	.992	.947	1.039
	Gender by Total Prior Sex	-.014	.037	.145	1	.704	.986	.916	1.061
	Constant	-.184	.596	.095	1	.758	.832		

Note: Gender is for female compared to male.

Summary for Question 3 Results

Binomial logistic regressions were performed to determine if trust/mistrust, social influence, and prior sexual behavior predicted HPV vaccinations intentions in male and female Black college students. In each analysis, the hypothesis was rejected; trust/mistrust, social influence, and prior sexual behavior did not have a positive effect on intent of Black college students to receive the HPV vaccination. However, gender had a significant relationship in determining if trust/mistrust and prior sexual behavior predicted HPV vaccination intentions in male and female Black college students. Female gender had lower odds of predicting intent to receive HPV vaccination than male gender for trust/mistrust and prior sexual behavior, indicating that females were less likely to intend to receive HPV vaccination based on trust/mistrust and prior sexual behavior scores.

Research Question 4

Question: Has the new practice recommendation to change the HPV vaccination series from a 3-dose to a 2-dose series for male and females caused a difference in intent to vaccinate for Black college students?

Hypothesis: The decrease in the vaccine series dosing from 3 doses to 2 doses will have a negative effect on Black college student's intentions to vaccinate. Gender will play a role in the decision to vaccinate based on the change in HPV Vaccination policy for the number of doses for young adolescents.

Student Human Papillomavirus Survey Instrument

The student human papillomavirus survey (SHPVS) is a 27-item instrument designed to review students' perceived benefits/barriers to HPV vaccination (Thomas, Dalmida, & Higgins, 2016). One question was added to the end of this survey to solicit data regarding the intention to receive vaccination now that the dose recommendation for the vaccine series had been modified from 3 doses to 2 doses. The 28-item instrument was scored using a 5 choice Likert scale. The score was tabulated from this question (number 28) and utilized in the regression model.

Research Question 4 Results

A binomial logistic regression analysis was conducted to determine if a change in dosing made a contribution to HPV vaccinations intentions in male and female Black college students. There were two standardized residuals with a value of 3.062 and 3.062 respectively, which were kept in the analysis.

First, the data coding was reviewed to ensure that the analysis was run appropriately and that there were enough cases. There were 160 eligible cases, however

some were missing data and 10 cases were omitted from the analysis, so the total number of cases analyzed was 150. There were 51 male and 99 female participants. The model fit was not significant (p=0.621) for the overall statistical significance of the model, thus the model is not a poor fit. The percentage accuracy in classification (PAC) is 70.0%. This means that adding the change in dosing from 3 doses to 2 doses (independent variable) improved the overall prediction of cases.

The binomial logistic regression model was statistically significant, $\chi 2(2) = 12.404$, p=0.002. The model explained 11.2% (Nagelkerke R2) of the variance in intent to receive the HPV vaccination and correctly classified 70.0% of cases. Sensitivity was 19.6%, specificity was 92.3%, positive predictive value was 52.94% and negative predictive value was 72.18%. Of the two predictor variables only one was statistically significant: Black college students will become more likely to be vaccinated since the dosing has changed from 3 doses to 2 doses (p=.006) (as shown in Table 19). The participants had 1.789 times more likely the odds to plan to receive the vaccination. There was no significant interaction between change in dosing and gender, in reference to their intent to receive the HPV vaccination (p=0.631) (Table 20).

Table 19

Logistic Regression Predicting Likelihood of HPV Vaccination Intention HPV Based on Gender and Change in Dosing

								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	Gender	-.578	.381	2.305	1	.129	.561	.266	1.183
	Change in Dosing	.582	.211	7.571	1	.006	1.789	1.182	2.707
	Constant	-2.242	.752	8.881	1	.003	.106		

Note: Gender is for female compared to male.

Table 20

Logistic Regression Predicting Likelihood of HPV Vaccination Intention Based on Gender by Change in Dosing Interaction Term

								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	Gender	.085	1.434	.004	1	.952	1.089	.066	18.113
	Total Score Change in Dosing	.702	.335	4.388	1	.036	2.018	1.046	3.893
	Gender by Total Score Change in Dosing	-.208	.433	.231	1	.631	.812	.347	1.899
	Constant	-2.637	1.138	5.363	1	.021	.072		

Note: Gender is for female compared to male.

Summary of Research Questions

The research was conducted in pursuit of four aims. For aim one it was found that: for age there was not a statistical difference in age and intent to vaccinate in Black college students, nor was there a difference in the mean age of individuals that intended to vaccinate and those that did not. Gender influenced Black college students' intention to

vaccinate with males intending to vaccinate more than females; but location of college attendance did not have a statistical significance on Black college students' intention to vaccinate. For aim two: For perceived vulnerability gender approached significance, with females being less likely to receive vaccination based on perceived vulnerability. For Perceived severity the total scores had a statistical significance, which indicated a higher likelihood to vaccinate. For perceived benefits, gender had statistical significance, with females being less likely than males to receive vaccination. For perceived barriers total scores significantly indicated a less likely hood to receive the vaccination; the greater the score, the more likely the participants were not to receive vaccination. For aim three there was no relative contributions of trust/mistrust, social influence, or prior sexual behavior on intent to vaccinate. Although, gender had a statistical significance, in trust/mistrust and prior sexual behavior, female participants were less likely to plan to receive the vaccination than males. For aim four, there is a statistical difference noted regarding the change in dosing from three to two doses; Black college students were more likely to intend to become vaccinated. However, it was noted that of the sample of 157 students, 101 of the student participants expressed that they were "unsure" if they would receive the vaccination due to a change in dosing.

Chapter 5: Discussion

Background

Research has shown that parents in the United States have concerns regarding vaccinations in general, and particularly the HPV vaccine. Therefore, many young men and women entering college have not received the HPV vaccination. College students can receive health care, such as vaccinations, without the necessity of parental consent. However, studies have shown that college students may not even be aware that there is an HPV vaccine, and that they should get vaccinated.

A finding from the review of the literature was that the type of institution where the students studied at, positivielly correlated with vaccine uptake (Lee, Lust, Vang, and Desai, 2018). Another finding was that research that explores gender and racial diversity is warranted in future studies involving HPV. Additionally, several studies found that there is a clear distinction for health outcomes for individuals living in rural areas. Many Black Americans live in the Southern areas of the United States. Thomas, DiClemente, and Snell (2014) noted that to develop impartial and beneficial health promotion programs, geographic factors must be taken into consideration.

Purpose of Study

This research study was conducted to determine HPV vaccine intentions in vaccine naïve young Black college students. The study used a non-experimental cross sectional research design. The study addressed four research questions:

1. Is there a difference in demographics (age, gender, geographic location) between Black college students who intend to receive the HPV vaccine and those who do not intend to receive the vaccination?

2. What are the relative contributions of perceived vulnerability, perceived severity, perceived benefits, and perceived barriers to HPV vaccination intention among male and female Black college students?
3. What are the relative contributions of trust/mistrust, social influence, and prior sexual behavior to HPV vaccination intention among male and female Black college students?
4. Has the new practice recommendation to change the HPV vaccination series from a 3-dose to a 2-dose series for young girls caused a difference in intent to vaccinate for college students, and is there a difference between male and female Black college students?

Methodology

Prior to the start of data collection, IRB approval was received from FIU, MDC, TU and FMU. This descriptive study was conducted to determine HPV vaccine intentions in vaccine naïve young Black college students. There was one demographic instrument and four survey questionnaires used in this study. The instruments were combined into a single packet. The surveys used for this study were the Sexual Risk Survey (SRS), Sexual Experience Questionnaire, the Student Human Papillomavirus Survey (SHPVS), the Perceived Social Influence on Health Behavior Instrument (PSI-HB), and the Health Care System Distrust Scale (HCSDS). The convenience sample of male and female students, age 18-24, were recruited from two minority serving institutions (MSIs) of higher education in the southeastern area of the United States, Miami Dade College (MDC) and Florida International University (FIU); and two historically Black colleges and universities (HBCUs), also in the southeastern area of the

United States, Tuskegee University (TU) and Florida Memorial University (FMU). Students were recruited from the four sites. Participants received a survey packet and completed the self-administered questionnaire. As an incentive for participation, after turning in a completed packet, the student received a $5 gift.

Data from the demographic instrument was analyzed using descriptive data analysis procedures. The scores from the different surveys were tabulated and used to run data analysis. The data analysis for question 1 was done with independent t-tests and chi-square goodness of fit test for homogeneity. The data analysis for questions 2 thru 4 were completed with binomial logistical regressions.

Summary of Findings

Question 1

Age. The research question sought to find out if there was a difference in demographics (age, gender, geographic location) between Black college students who intend to receive the HPV vaccine and those who do not intend to receive the vaccination. The mean age of participants in this study was 21. The analysis of this data found that there was not a statistical difference in age and intent to vaccinate in Black college students, nor was there a difference in the mean age of individuals that intended to vaccinate and those that did not. In several studies, it was found that younger women were more likely to receive the vaccination (Manhart et al., 2011; Marchand, Glenn, and Bastani, 2012; Wilson et al., 2017). Similarly, college women age 18-25 were likely to already have received the vaccine (Wolwa et al., 2013). In this study the results were not significant but, this does not negate the data gathered in other studies. Age alone, cannot be a reliable indicator of Black college students' intentions to vaccinate.

Gender. The research question sought to find out if there was a difference in gender, between Black college students who intend to receive the HPV vaccine and those who do not intend to receive the vaccination. There were more females (100, n=152) in this study than males (52, n=152). The data from this analysis noted that gender could influence Black college students' intention to vaccinate. As shown in the chapter, 40.4% (n=52) of males and 25% (n=100) of female participants confirmed that they would receive the HPV vaccination. Since there are 290 million women infected with HPV worldwide, gender should not be overlooked when assessing vaccination intentions (WHO, 2016). Koplas, Braswell, and Smalls (2019) found that females had a higher vaccine uptake in comparison to males, while Fontenot et al. (2014) found that 74% (n=735) of the college male students had not received HPV vaccination. Cooper et al., 2018 conducted a study and found that 71.1% of the male participants did not intend to receive the HPV vaccine. Darensbourg et al., (2019) also found that 68% of the female participants intended to be vaccinated with HPV.

Rural versus Urban Geographic Location. The research question sought to find out if there was a difference in demographics geographic location between Black college students who intend to receive the HPV vaccine and those who do not intend to receive the vaccination. The research in this study did not have a statistical significance in location (rural versus urban) and Black college students' intention to vaccinate (p=0.474). Although, the participants in the urban area intended to receive the vaccine more than those attending college in a rural area. In one study it was found that a lower vaccine rate was seen in patients 18-26 in an urban hospital (Schluterman, Terplan, and Lydecker, 2011). While, Thomas, Caldera, and Maureer (2109) found that rural communities need

to focus on cultural norms when providing HPV vaccine knowledge and this will decrease HPV vaccine hesitancy. Although this research suggested that location of participants did not contribute to the decision to receive vaccination, it is imperative to note that another study found that to reduce the incidence of mortality from HPV related cancers, vaccine access in rural communities should be increased (Vanderpool, Stradtman, and Brandt, 2019).

Question 2

Perceived Vulnerability. The research question sought to find out if there were any relative contributions from perceived vulnerability to HPV vaccination intentions among male and female Black college students. This research found that there was not a significant interaction between perceived vulnerability and gender, in reference to their intent to receive the HPV vaccination. However, female participants had a 0.50 time less likelihood to plan to receive the vaccination than males. HPV is a sexually transmitted disease; thus, unprotected sex makes a person vulnerable to HPV. However, a study conducted by Fontenot et al., (2014) with male participants found that although males were sexually active with low condom usage, 93% (n=735) reported that they were not at risk for STIs. In a study conducted by Patel and colleagues (2012), in female students, it was found that at baseline 41% of the participants intended to receive the HPV vaccination; unlike this study. Bendik, Mayo, & Parker, (2011) found that the female participants in their study had received the vaccine if they perceived that they might get cervical cancer. This data is again contrary to what this study found. However, Bynum et al., (2011) found similar results to what was found in this study and noted that susceptibility to HPV was not a predictive factor for vaccine uptake.

Perceived severity. The research question sought to find out if there were any relative contributions from perceived severity to HPV vaccination intentions among male and female Black college students. This study found that the results for the total score was statically significance while the interaction variable between perceived severity and intent to vaccinate only approached significance. Similarly, Fontenot et al., (2014) conducted a study in college males and found that they had low perceived severity of HPV, and that there was an actual risk of contracting HPV. However, Bynum et al., (2011) found that perceived severity was not a predictor of vaccine intake.

Perceived benefits. The research question sought to find out if there were any relative contributions from perceived benefits to HPV vaccination intentions among male and female Black college students. This study found that there was not a significant interaction between perceived benefits and gender, in reference to their intent to receive the HPV vaccination. However, female participants had 0.41 times less likelihood to plan to receive the vaccination than males. In a study conducted by Darensbourg et al., (2019) with African American college women, a study result was that vaccination intention had a correlation with vaccination being seen as valuable. Unlike this study, a study conducted at a HBCU in the southeastern United States found that participants in that study would initiate the vaccine if the students perceived the benefit of being vaccinated (Bynum et al., 2011).

Perceived barriers. The research question sought to find out if there were any relative contributions from perceived barriers to HPV vaccination intentions among male and female Black college students. This study found that there was not a significant interaction between perceived barriers and gender, in reference to Black college students

intent to receive the HPV vaccination. However, perceived barriers total scores influenced plan to receive vaccination, participants were 0.80 times less likely to intend to receive vaccination. Burke et al., (2010) found that barriers to vaccination were side effects, costs, and lack of knowledge about the vaccine, as related to vaccine intentions. LaJoie, Kerr, Clover, and Harper (2018) found that vaccine uptake was affected by the individuals' partners vaccination status; yet uptake was influenced by parental influence and free vaccines.

Question 3

Trust/mistrust. The research question sought to find out if there were any relative contributions from trust/mistrust to HPV vaccination intentions among male and female Black college students. This study found that there was not a significant interaction between trust/mistrust and gender, in reference to their intent to receive the HPV vaccination ($p=0.771$). However, female participants had a 0.45 time less likelihood to plan to receive the vaccination than males. Conversely, Karafillakis et al., (2019) conducted a literature review and found that participants reported issues with concerns about mistrust of health authorities in relationship to HPV vaccination and new vaccines. Nan et al. (2019) found that low trust in health information from government entities was linked to less favorable intentions toward vaccination. Similar to this study, Nan et al. (2019) found that trust in health care providers did not predict vaccine uptake.

Social Influence. The research question sought to find out if there were any relative contributions from social influence on HPV vaccination intentions among male and female Black college students. This research found that there was not a significant interaction between social influence and gender, in reference to their intent to receive the

HPV vaccination. Conversely Daley et al. (2010) found that participants that received HPV information from family and media sources were more likely to initiate the vaccine. Similarly, Marchant, Glenn, and Bastani (2012) also found that the female participants were likely to receive the vaccine if it had higher social approval.

Prior Sexual Behavior. The research question sought to find out if there were any relative contributions from prior sexual behavior to HPV vaccination intentions among male and female Black college students. This research found that there was not a significant interaction between prior sexual behavior and gender, in reference to their intent to receive the HPV vaccination. However, female participants had a 0.437 time less likelihood to plan to receive the vaccination than males. Cooper et al., (2018) found that Black men were less likely to identify as virgins, and more likely to be sexually active and have an earlier sexual debut age compared to White, Asian, and other men. While, Burke et al., (2010) found that 60.7% (n=856) of the participants in their study of undergraduate college women, reported that they were not sexually active and that they planned to be vaccinated. Researchers should take prior sexual behavior into consideration when deciding interventions to prevent STIs, since HPV is spread via sexual contact.

Question 4

Change in dosing. This research question sought to find out if a change from 3 doses to 2 doses would contribute on HPV vaccinations intentions in male and female Black college students. Black college students did intend to become vaccinated since the doses changed. This information is invaluable for health care providers and individuals providing education regarding HPV vaccination. This research suggests that vaccination

uptake will be positively influenced with the new dosing criteria. Quinn and Lewin (2019) conducted a study at public university to determine family influence on vaccine behavior. This study found that the more comprehensive family communication, the more likely the participants were to have less uncertainty regarding HPV vaccine receipt and greater likelihood of being previously vaccinated (Quinn and Lewin, 2019). LaJoie, Kerr, Clover, and Harper (2018) found that parental influence and vaccinations being provided at no charge were positive factors for vaccine uptake. While research has shown that the intent to vaccinate is multifaceted, at this time, there was no research that looked at vaccination dosage.

Limitations of Study

While this research was conducted quantitatively, qualitative research instruments might helped explain some of the findings in this study. Carefully collected qualitative information could help to explain some of the results that were found in these participants. There were several limitations in this study. As previously mentioned, a limitation was that some of the instruments used in this study had not been used in young Black college student populations. The data obtained from this study may not be applicable to all Black college students or Black people in general given its focus on four colleges in the southeastern United States. General limitations for this study included issues related to measurement and data collection, which relied on self-report instruments. In spite of this limitations the study was designed to minimize data collection limits.

Participant Recruitment and Data Collection

Study participants were part of a convenience sample recruited from four college locations. This method of recruitment can make study findings difficult to apply across the total population. The access to the student populations at each site also became a limitation in this study. The participants in 2 of the 4 sites were recruited from students in a health science major, while the students in the other 2 sites were recruited from the general population of students. The students recruited from the health science majors may have been better informed regarding vaccination information in general.

Data Collection

Data collection by the instrument package was collected by the principal investigator (PI). This was useful when the participants had questions regarding the information being asked. However, some participants did not ask for clarity of questions from the PI, they opted to ask another participant or the individual that told them about the study. Since some of the questions asked for specific time frames for responses to questions, some participants may not have had adequate recall of requested information, thus data obtained were subject to recall error.

Design

Since this study was designed to be cross sectional, it would be difficult to assert if the responses would be the same at different point in time. Therefore, if associations were found between location and intent to vaccinate, there is no way to determine if vaccine intentions would change based on the current place of study. This study did not address the causes of the perceived vulnerability, severity, benefits, and barriers (independent variables) and intent to vaccinate cannot be directly studied using binomial

regression analysis. Also, the cause of trust/mistrust, social influence, and prior sexual and intent to vaccinate cannot be determined given the correlational design of the study.

Variables

The inclusion and exclusion variables (descent, gender, immunization status, college enrollment, age, literacy, and marital status) and college sites (HBCU, MSI, rural or urban location), were selected to help control for confounding variables. Although this was the intention of the researcher, changes in these variables could always occur and influence individual's intent to vaccinate. There could also be some other confounding variables that may not have been identified.

Instruments

Some of the research instruments had language that did not have the same meaning to participants. For example, in the SRS instrument, "hooking up," "friends with benefits,'' ''fuck buddies'' could have varying meanings. As these colloquialisms can change in time, they must be addressed within the participant populations.

Conclusions

Although the data from this study did not provide support for all the aims of this study, the study data revealed the following results:

- Gender influenced Black college students' intention to vaccinate.
- When it comes to perceived vulnerability (individuals' risk of something occurring to them), females did not plan to become vaccinated more than males.
- When it comes to perceived severity (individuals' thoughts on how serious something is), perceived severity had an influence on intention to receive vaccination.

- When it comes to perceived benefits (individuals thinking something has a positive benefit), females did not plan to become vaccinated more than males.
- When it comes to perceived barriers (what individuals believe), perceived barriers have an influence on individuals' intention to receive the vaccine, and higher scores decreased the intentions to vaccinate.
- When it came to trust/mistrust (individuals believing in something or not), females were more likely not to plan to intend to receive vaccination.
- When it comes to prior sexual behavior (an individual's previous sexual activity), females were more likely not to plan to intend to receive vaccination.
- When it comes to the change in dosing from 3 doses to 2 doses, Black college students were influenced by the dosing change.
- Overall, males in this study were more likely than females to plan to intend to become vaccinated.
- Of the 157 participants in this study, 101 of them were "unsure" if they would receive vaccination.
- No significant statistical difference was found in age and location for Black college students' intention to vaccinate.
- No statistical significance was found for the interaction between perceived vulnerability, severity, benefits, or barriers and intention to vaccinate.
- No statistical significance was found for the interaction between trust/mistrust, social influence, or prior sexual behavior and intention to vaccinate.

Based on these outcomes and findings and conclusions the following recommendations are suggested for future clinical practice and research.

Recommendations for Future Research

- The continued prevalence of the Black population being adversely affected by STIs, and HPV reflects the importance of continued research in this population.
- Additional data is needs to assess the factors that influence health decisions in this vulnerable population, that is based on insight from the effected and the affected population.
- Males are underrepresented in the research on HPV vaccination and should be included in research regarding this topic.
- Some qualitative data might provide insight as to why the participants still are "unsure" if they will receive vaccination.
- There is an urgent need to develop and implement interventions to assist this vulnerable population regarding sexual health.
- Further investigation on the factors that influence vaccination uptake in this population is warranted.
- Studies should focus on increasing vaccination rates and educating vulnerable populations.

Recommendations for Clinical Practice

- Clinicians should continue to educate families regarding HPV vaccination.
- Clinicians should screen for sexual risk factors and behavior when doing anticipatory guidance for this population.

- Parents are not the only source of information for impressionable teenagers, and this age group needs relevant information that they can easily understand. Clinicians should step out of the office and be present where the students can assess care and information readily.

Summary

This non-experimental, cross-sectional, descriptive study was executed to determine if differences exist in individual perceptions, modifying factors, and likelihood of action and the influence, if any, in vaccine naïve Black college students, attending college in a rural or urban HBSUs and MSIs, intention to receive HPV vaccination. In addition to this, this research explored rather the new policy on decreasing HPV dosage from 3 shots to 2 shots in young adolescents will affect individuals' intentions to vaccinate. The Health Belief Model provided the theoretical basis for this study. Study outcomes revealed that certain aims were confirmed, while others were not. As depicted in the framework, gender and perceived severity and perceived barriers were predictive of intentions to vaccinate; however, the other variables (age, location of college, trust/mistrust, social influence, and prior sexual behavior) of this study were not found to have relative contributions to intentions to receive the HPV vaccination. Also, it was found that the change is dosing has a relative contribution to Black college students receiving the HPV vaccine. During this study numerous limitations and strengths were noted. While this study only found slight support for the theoretical framework, pertinent suggestions for future clinical practice and research were found.

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VITA

KAYLA MATHIS-GAMBLE, PhD (c), MSN, APRN-BC

1995-1999	BSN, Nursing Tuskegee University Tuskegee, Alabama
2006-2008	MSN, Nursing Florida International University Miami, Florida
2016-2020	Doctoral Candidate Florida International University Miami, Florida
1999-2003	Registered Nurse North Broward Hospital District
2002-2008	Teacher School Board of Broward County
2008-present	Assistant Professor Broward College

Nurses Charitable Trust 2019 $500 research grant recipient; Principal Investigator

PUBLICATIONS AND PRESENTATIONS

Jones, S. G., Mathis-Gamble, K., & Fenkl, E. (2017). Minority college student' HPV knowledge, awareness, and vaccine history. Journal of Nurses in AIDS Care, accepted April 2017

Mathis-Gamble, K., Santana, J. C., Teeson, K., Stanley, L., & Thomas, T. (2008). A pilot study to test the Spanish version of the Thomas HPV Survey to Measure Parents' Knowledge, Attitudes, Beliefs, and Intent to Vaccinate with the New HPV Vaccine. Poster presented at the 2008 Southern Nurses Research Society, Birmingham, AL.

Mathis-Gamble, K., Jones, S.G., & Fenkl, E., Poster: Minority College Students' HPV Knowledge, Awareness, and Vaccination History. Poster Discussion Presentation, 29th Annual Conference, Sigma Theta Tau International 27th International Nursing Research Congress, Cape Town, South Africa, July 21-25 2016

Mathis-Gamble, K., Jones, S.G., Strickland, O., Fenkl, E., & Kameka, M. Poster: HPV Vaccination Intentions in Black Young Adults: Preliminary Data. Poster Discussion Presentation, 29th Annual Conference, Sigma Theta Tau International 30th International Nursing Research Congress, Calgary, Canada, July 25-29 2019

Mathis-Gamble, K., Santana, J. C., Teeson, K., Stanley, L., & Thomas, T. (2008). *A pilot study to test the Spanish version of the Thomas HPV Survey to Measure Parents' Knowledge, Attitudes, Beliefs, and Intent to Vaccinate with the New HPV Vaccine.* Poster presented at the 2008 Southern Nurses Research Society, Birmingham, AL.

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1st place in the Minority Health Research Student category, Mathis-Gamble, K., Jones, S.G., & Fenkl, E., (2015). Poster: Minority College Students' HPV Knowledge, Awareness, and Vaccination History. Podium/Poster Discussion Presentation, 29th Annual Conference, Southern Nursing Research Society, Tampa, FL., February 26-28, 2015