# THE EFFECT OF AN EDUCATIONAL INTERVENTION TO INCREASE HUMAN PAPILLOMAVIRUS VACCINATION CONFIDENCE AND ACCEPTABILITY

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# DEDICATION

For my husband, Cyriacus Dike, and my five children Christine, Nicholas, Nicole, Crystal, and Michael thank you for your unconditional support and love. I appreciate you for being there with me till the end of this difficult journey.

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#### ABSTRACT

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# THE EFFECT OF AN EDUCATIONAL INTERVENTION TO INCREASE HUMAN PAPILLOMAVIRUS VACCINATION CONFIDENCE AND ACCEPTABILITY

# MAY 2022

Despite the burden of Human Papilloma Virus (HPV) related cancers such as cervical cancers, and the effectiveness of the HPV vaccine, African American women are 10% less likely to have received the HPV vaccine than White women (Centers for Disease Control and Prevention [CDC], 2018). The vaccination rate for non-Hispanic Blacks was 38% compared to 44.7% for non-Hispanic White in 2015. An extensive review of literature on African American mothers' perception of HPV vaccination of their daughters identified only four randomized control trials indicating a gap in the literature on randomized controlled trials in this high-risk population. This study aims to examine the effect of an educational intervention to increase HPV vaccination confidence, positive attitudes, and beliefs among non-Hispanic Black mothers of children 9-17 years old. Participants were recruited using social media (Twitter, Facebook, and LinkedIn).

A two-group randomized controlled trial was conducted. The intervention group received two HPV vaccination education sessions that were 1 week apart while the control group received two healthy nutritional education sessions 1 week apart. Data were collected immediately after the second intervention and 4 weeks post-intervention. The analysis of data was performed using two-way repeated measure ANOVA.

The result indicated that participants in the experimental group reported higher HPV vaccination positive attitude and belief (p = .002) and vaccination confidence (p = .049) than the control group. The result indicated that the experimental group reported a higher positive attitude

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and belief score in HPV vaccination than the control group immediately post-intervention and at 4 weeks post-intervention. The experimental group reported a higher vaccine confidence score than the control group at 4 weeks post-intervention than immediately after the intervention. The result of the study showed the effectiveness of HPV vaccination education on mothers' confidence over time. Nurses can play a significant role in improving vaccination confidence and attitude among Black mothers through well-designed cancer prevention education.

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## CHAPTER I

# **INTRODUCTION**

#### **Focus of Study**

Human papillomavirus (HPV) has been identified as a key cause of six cancers: cervical, vulvar, vaginal, anal, penile, and oropharyngeal cancers (American Cancer Society [ACS], 2017). HPV is the most common sexually transmitted viral infection affecting men and women (ACS, 2017). In the United States (US), 14 million new cases of HPV are reported every year, and approximately 80% of people will get an HPV infection in their lifetime (Centers for Disease Control and Prevention [CDC], 2019).

The new HPV vaccine (Gardasil 9) was approved in 2016 by the Advisory Committee on Immunization Practice (ACIP); the immunization covered nine strains of HPV (6, 11, 16, 18, 31, 33, 45, 52, and 58; CDC, 2016). According to the CDC (2019), Gardasil 9 was routinely recommended for males and females 11-12 years of age. It can be administered between 9 to 26 years old. Two doses of Gardasil 9 are required for pre-teens 9-14 years and the doses can be administered at 0 and between 6-12 months each, and teens and young adults 15-26 years can receive three doses of HPV vaccine at 0, 2, and 6 months. In June 2019, the ACIP recommended HPV vaccination to individuals aged 27 through 45 who were not already vaccinated. Reducing the number of doses for preteens 9-14 years may enhance the vaccine series' completion rate.

The HPV vaccine has been effective in preventing cancer-causing infections and precancers (CDC, 2019). The infections with HPV-related cancers and genital warts have reduced by 86% among teen girls and 71% among young adult women (CDC, 2019).

Despite the HPV vaccine's effectiveness, the vaccine rate was below the 80% goal set by Healthy People 20/20 (Townsend et al., 2017). The national rate of initial doses of HPV

vaccinations has increased from 68.1% in 2018 to 71.5% in 2019; however, the national completion rate of the three-dose vaccine series remains low at 51.1% in 2018, and 54.2% in 2019 (CDC, 2020). These HPV vaccination rates are much lower than in other countries, such as Australia, where girls' vaccination rate remains at 79% (Hall et al., 2019).

There have been discussions regarding the importance of the provider recommendations for the HPV vaccine. Provider recommendations for HPV vaccine increased from 27% in 2012 to 49.3% in 2018 but parental lack of intent to start HPV vaccination of their adolescents increased from 50.4% in 2012 to 64% in 2018 (Sonawane et al., 2021). There was a need to identify measures to increase parental confidence and intent to vaccinate their adolescence.

#### **Problem of Study**

African American women have the highest mortality rate compared to other racial/ethnic groups in the US for cancer (ACS, 2019). Black women and especially those from the southern region were associated with higher cervical cancer incidents and mortality (Yoo et al., 2017). The disparities in the incidence and mortality rate of cervical cancer among Black women placed them in a high-risk population. The incidence of cervical cancer is 30% higher in non-Hispanic Black women are 80% more likely to die from cervical cancer than non-Hispanic White women (ACS, 2019). HPV vaccination is effective in the reduction of pre-cancers and cancers related to HPV. There was a 40% reduction in cervical precancers caused by the HPV infection among women vaccinated with the HPV vaccine (CDC, 2019).

Despite the burden of HPV-related cancers such as cervical cancers and the effectiveness of the HPV vaccine, African American women are 10% less likely to have received the HPV

vaccine than White women (CDC, 2018). The vaccination rate for non-Hispanic Blacks was 38% compared to 44.7% for non-Hispanic White in 2015 (CDC, 2018).

Limited knowledge of HPV vaccination was identified as a barrier to HPV vaccination among African American mothers (Cunningham-Erves et al., 2018). Knowledge of the HPV vaccine was among the factors that are associated with HPV vaccine uptake among African American women. Participants with higher knowledge of HPV are more likely to complete the three series of HPV vaccination (Nagpal et al., 2016). Women who reported HPV vaccination uptake had higher knowledge of the HPV vaccine (Bynum et al., 2011).

There were fewer HPV vaccination studies explicitly done for African American mothers (Cuningham-Erves et al., 2018; Strohl et al., 2015; Watkins et al., 2015), compared to studies addressing multiple races and ethnicities (Cipriano et al., 2018; Dixon et al., 2019; Fishman et al., 2014; Gelman et al., 2013; Gottlieb et al., 2009; Griffioen et al., 2012; Joseph et al., 2014; Nagpal et al., 2016). An extensive review of literature on African American mother's perception of HPV vaccination of their daughters identified only four randomized control trials (DiClemente et al., 2015; Dixon et al., 2019; Joseph et al., 2016; Underwood et al., 2016), indicating a gap in the literature on randomized controlled trials in this population.

#### The Rationale for the Study

There is limited knowledge of the HPV vaccine, low HPV vaccine confidence, and distrust of health care professionals among non-Hispanic Black mothers (Bryer, 2014; Dixon et al., 2019; Hamlish et al., 2012; Joseph et al., 2016; Joseph et al., 2014; Perkins at el., 2010). There were not enough quantitative and randomized trials targeting non-Hispanic Black mothers and HPV vaccination of their pre-teens and teens. Thus, there was a need for randomized control trials specifically designed for non-Hispanic Black mothers to examine the effect of educational

interventions to increase HPV vaccination confidence and attitude. An educational intervention program that can highlight the benefit of HPV vaccination, address barriers related to HPV vaccination, and improve parental vaccination attitudes and confidence may improve HPV vaccine intentions and uptake among this high-risk population.

## **Conceptual Framework**

The study was designed using the health belief model (HBM) conceptual framework. The model was derived from a psychological and behavioral theory based on the work of Rosenstock et al. (1988). It was proposed to guide parental perceptions on vaccination and identify primary preventive behaviors related to vaccinations and explore the determinants of health-related behaviors about vaccinating a child. HBM was initially developed as a systematic method to explain and predict preventable health behaviors related to disease prevention and screening. The use of HBM as a framework for cancer prevention is very significant in identifying individuals' beliefs and motivations to participate in cancer prevention initiatives such as HPV vaccinations of pre-teens and teens. The clinical benefits of vaccinating boys and girls against HPV are significant in reducing the risk of cervical, vaginal, anal, oropharyngeal, penile, and other HPV-related cancers (Cassidy et al., 2014).

The HBM has six constructs that were used to guide the research study, and they include: (1) Perceived Susceptibility, (2) Perceived Severity, (3) Perceived Benefit, (4) Perceived Barrier, (5) Cues to Action, and (6) Self-Efficacy (see Figure 1).

 Perceived Susceptibility: the opinion about the possibility of getting HPV infection. If mothers believe their boys and daughters can get HPV infection and cancer, their HPV vaccination intention will be favorable.

- 2. Perceived Severity: how bad a condition like cancer will be without HPV vaccination.
- 3. Perceived Benefit: the belief in the vaccine's efficacy to reduce the risk of cancer.
- 4. Perceived Barrier: the belief about obstacles to HPV vaccination such as the cost, access, and transportation.
- Cues to Action: the prompts that trigger an action, such as strategies to activate vaccination readiness.
- Self-Efficacy: the confidence in one's ability to perform the action such as HPV vaccination of children.

# Figure 1

Health Belief Model



The study utilized two measurement tools: the Vaccination Confidence Scales (VCS) and the Carolina HPV Immunization Attitudes and Beliefs Scale (CHIAS). The VCS by Gilkey et al. (2014) and the CHIAS by McRee et al. (2010) are congruent with the HBM constructs that seek to improve the vaccination confidence of non-Hispanic Black teenage mothers. These two measurement scales were used to examine parental confidence and attitude on the overall vaccination of children using VCS and identify parental confidence and attitude specifically for HPV vaccination of their pre-teens and teens using the CHIAS measurement tool.

Gilkey et al. (2014) used only three constructs of the HBM to develop VCS that measured general confidence about adolescent vaccination, and these three HBM constructs (Perceived Benefits, Perceived Barrier, and Cues to Action) matched VCS subscales (Benefit, Harm, and Trust). The three VCS constructs matched the three HBM constructs as follows: Benefit (Perceived Benefit), Harm (Perceived Barriers), and Trust (Cues to Action).

The CHIAS measurement scale by McRee et al. (2010) has four underlying factors (Harm, Barrier, Effectiveness, and Uncertainty) consistent with three HBM model constructs (Perceived Barrier, Perceived Benefit, and Cues to Action). The four CHIAS factors were matched to three HBM constructs as Harm (Perceived Barrier), Barrier (Perceived Barriers)related to cost and access to a provider, Effectiveness (Perceived Benefit), and Uncertainty (Cues to Action).

#### Assumptions

The HBM asserts that when individuals believe they are susceptible to a health problem with severe consequences, they will more likely conclude that the benefits outweigh the barriers associated with behavior change to prevent health issues (Rosenstock et al., 1988). The assumptions for this study include:

- The non-Hispanic Black mothers completing the research study are the legal mothers of children 9-17 years.
- The non-Hispanic Black mothers will provide accurate and honest information when completing the survey questions.
- The same participants who completed the initial survey will be completing the follow-up survey.
- The participants understood the survey questions.

# **Research Question**

Do non-Hispanic Black mothers of children 9-17 years not yet vaccinated for HPV who received education on the importance of HPV vaccination report increased vaccination confidence and more positive attitude and beliefs regarding the HPV vaccine compared to those who receive education about healthy nutrition?

# **Definition of Terms**

## **Non -Hispanic Black Mothers**

*Conceptual definition:* A biological or legal Black mother who is not from the Hispanic race with at least one child aged 9-17 years who has not received HPV vaccination *Operational definition*: A person who identifies themself as a biological or legal mother as reported in the demographics

# **HPV Vaccination Education**

*Conceptual definition*: Education using the HBM concept (Perceived Benefit, Perceived Barrier) *Operational Definition*: Two 1-hour educational sessions that are 1 week apart on the importance of HPV vaccination.

# **Vaccination Confidence**

*Conceptual definition*: General confidence about adolescent vaccination using HBM constructs (Perceived Benefit, Perceived Barrier, and Cues to Action) *Operational definition*: Measured with a vaccination confidence scale

# Attitude and Belief Regarding HPV

*Conceptual definition*: Consists of three HBM model constructs (Perceived Barrier, Perceived Benefit, and Cues to Action)

Operational definition: Measured with the CHIAS scale

# **Healthy Nutrition Education**

*Conceptual definition*: Consists of healthy nutrition education from grapple institute *Operational definition*: Education is scheduled for two 1-hour sessions 1 week apart

# Limitations

Since the study was done with non-Hispanic Black mothers, the study's findings are limited to non-Hispanic Black mothers and their children, thereby limiting the generalizability of the study. The research study was done to identify the vaccine confidence of the mothers. A long-term longitudinal study would be needed to determine if there was an actual change in the vaccination rate. Future studies will need to capture the mother's vaccination confidence's effectiveness on their children's actual HPV vaccination uptake. Future studies should also evaluate parental vaccination confidence's effectiveness in children younger than 9 years old. Moreover, the evaluation of vaccination confidence of parents should include both mothers and fathers in future studies.

#### Summary

The first chapter explored the study's purpose to examine the effect of HPV vaccination education on the vaccine confidence and attitude score of non-Hispanic Black mothers. HPV infection has been identified as the cause of six different cancers, and the rate of HPV infection is high among sexually active men and women, including adolescents. Despite the dangers of HPV infection, the rate of HPV vaccination with Gardisil 9 remains low, especially among non-Hispanic Blacks compared with Caucasians. Moreover, the death rate from HPV-related cancer, such as cervical cancer, is higher among non-Hispanic Black women than Caucasians. Thus, there is a need for HPV educational intervention to improve the vaccination confidence and attitude in this high-risk population. Three HBM constructs guided the study's conceptual framework (perceived benefit, barriers, and cues to action). Two layers of measurement tools were used, and the VCS measured the overall parental vaccination confidence and attitude. In contrast, CHIAS measures parental confidence and attitude specifically for the HPV vaccine. The primary study was modified based on the pilot study findings, and future studies would be required to address most of the study limitations.

# CHAPTER II

# LITERATURE REVIEW

## A Paper Published in the

# Oncology Nursing Forum, 48(4), 371-389. <u>https://doi.org/10.1188/21</u> Stella Ngozi Dike, MSN and Wyona M. Freysteinson, PhD FACTORS ASSOCIATED WITH AFRICAN AMERICAN MOTHERS PERCEPTIONS OF HUMAN PAPILLOMAVIRUS VACCINATION OF THEIR DAUGHTER: AN INTEGRATED LITERATURE REVIEW

# ABSTRACT

**Problem Identification:** African American women have a higher mortality rate for cervical and other cancers and are 10 percent less likely to have received HPV vaccine than white women. This review examined factors related to African American mother's view of their daughter's vaccination against HPV.

**Literature Search.** The review was conducted by searching literature in PubMed, CINAHL, Science Direct, Medline Ovid, and ProQuest databases. Search was limited to studies conducted in the United States and published in the past fourteen years since the inception of HPV vaccine.

**Data Evaluation**: Of 10,566 publications retrieved, 28 articles were included in the final sample.

**Synthesis:** The factors associated with HPV vaccination were the approval and disapproval of HPV vaccination from doctors, family, and friends, knowledge of HPV vaccination, attitude, and belief, the benefit, and the challenges/barriers of HPV vaccination.

**Implications for Practice:** Understanding factors related to HPV vaccination decisions among African American mothers will inform healthcare professionals the best approach to improving vaccination rates among this high-risk population.

**Knowledge Translation:** Maternal attitude/belief, knowledge of HPV, and the approval or disapproval of HPV vaccination from providers and family affect maternal perceptions of HPV vaccination.

*Keywords*: Human papillomavirus vaccine, HPV, African Americans, mothers, perceptions, and attitude.

# Introduction

Human papillomavirus (HPV) has been identified as a key cause of six cancers: cervical, vulvar, vaginal, anal, penile, and oropharyngeal cancers (American Cancer Society (ACS), 2017). HPV is the most common sexually transmitted viral infection affecting both men and women (ACS, 2017). In the United States (U.S.), 14 million new cases of HPV are reported every year, and approximately 80% of people will get an HPV infection in their lifetime (Centers for Disease Control and prevention (CDC), 2019).

The new HPV vaccine (Gardasil 9) was approved in 2016 by the Advisory Committee on Immunization Practice (ACIP); the immunization covered nine strains of HPV (6, 11, 16, 18, 31, 33, 45, 52, and 58) (CDC, 2016). According to the CDC (2019), Gardasil 9 was routinely recommended for males and females 11-12 years of age, but can be administered between 9 through 26 years old. Two doses of Gardasil 9 are required for preteens 9-14 years scheduled at (0, and between 6-12 months each) and teens and young adults 15-26 years can receive three doses scheduled at (0, 2, and 6 months). In June 2019, the ACIP recommended HPV vaccination to individuals aged 27 through 45 who were not already vaccinated. The reduction in the number of doses for preteens 9-14 years may enhance the vaccine series' completion rate.

The HPV vaccine has been effective in preventing cancer-causing infections and precancers (CDC, 2019). The infections with HPV related cancers and genital warts have reduced by 86% among teen girls and 71% among young adult women (CDC, 2019). There was a 40% reduction in the cervical precancer caused by the HPV infection among women vaccinated with the HPV vaccine (CDC, 2019).

Despite the HPV vaccine's effectiveness, the rate of vaccine remained below 80% of the Healthy People 20/20 target (Townsend et al., 2017). The national rate of initial doses of HPV

vaccinations have increased from 68.1% in 2018 to 71.5% in 2019; however, the national rate of completion of the three-dose vaccine series remains low at 51.1% in 2018 and 54.2% in 2019 (CDC, 2020). African American women are 10 percent less likely to have received the HPV vaccine than white women, and the vaccination rate for non-Hispanic Blacks was 38% compared to 44.7% for non-Hispanics White in 2015 (CDC, 2018). These HPV vaccination rates are much lower than in other countries, such as Australia, where girls' vaccination rate remains at 79% (Hall et al., 2019).

African American women have the highest mortality rate as compared to other racial/ethnic groups in the U.S. for cancer (ACS, 2019). The incidence of cervical cancer is 30% higher in non-Hispanic black women than non-Hispanic white women, In addition, non-Hispanic black women are 80% more likely to die from cervical cancer than non-Hispanic white women (ACS, 2019).

African American mothers play a significant role in the family and have strong relationships with their daughters, and this plays an important role in increasing resilience, which helps to develop effective self-worth, self-esteem, and coping strategies (Everet et al., 2016). This mother-daughter bond may enhance the HPV vaccination rate among this population. Thus, African American mothers are in the best position to discuss HPV vaccination and cervical cancer prevention with their daughters. There is a significant need to improve HPV vaccination uptake among this high-risk population.

#### Purpose

The purpose of this review is to examine factors associated with the maternal perceptions of HPV vaccination among African American daughters in the United States of America.

# Methods

This literature review aims to synthesize factors associated with the maternal perception of HPV vaccination among African American mothers. This information can inform the development of an intervention for this high-risk population and provide direction for future research studies. The PICO question guided the search: "What factors affect African American mother's perception of HPV vaccination of their daughters"? The literature review synthesis was guided by the Health Belief Model (Rosenstock et al., 1988) construct (perceived susceptibility, perceived benefit, perceived barrier, perceived severity, cues to action, and self-efficacy).

The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) methodology was used in this integrative literature review (Moher et al., 2009).

# **Eligibility Criteria**

The qualitative, quantitative, and mixed-method studies of HPV vaccination among African American mothers and daughters published in English language between 2006, when the U.S. Food and Drug Administration approved the first available HPV vaccine for girls, (U.S. Food and Drug Administration, 2019) through the date of the final search (December 30, 2020) were included. Reviews were excluded if the study has African American boys because the focus was on African American mothers and daughters. The Review's primary purpose was to explore the maternal perception of HPV vaccination of their daughters after 14 years of HPV vaccine development for girls. The Review's findings can be used to compare future reviews and interventions for adolescent male vaccinations among this high-risk population. However, research studies were included if the sample had at least 20% African American female in combination with other races such as Hispanics, Haitian, Caribbean, and Caucasian.

Studies were also included with fathers, as long as the sample consisted of more mothers than fathers. Research commentary papers, expert opinion, dissertations, and case studies were excluded.

# **Information Sources and Search**

The Review was guided by Whittemore and Knafl's (2005) methodology, and it consisted of five stages: problem identification, literature search, data evaluation, data analysis, and presentation of findings. The studies were evaluated using the John Hopkins evidence appraisal tool (John Hopkins medicine, 2017). The first author developed search strategies in consultation with a school librarian who is knowledgeable in developing and documenting search strategies and identified keywords using MeSH (Medical Subject Heading) terms. A comprehensive search was conducted using CINAHL, PubMed, Medline Ovid, ProQuest, and Science Direct. The keywords used were human papillomavirus or papillomaviridae, immunization or vaccination, African Americans or black, mothers or parents, perception, and psychology. An ancestry search of the reference list of retrieved articles was manually conducted for additional articles.

#### **Study Selection and Data Collection**

The initial search yielded a total of 10,566 articles: among the articles, 3,075 were from CINAHL, PubMed = 3,628, Science Direct =3,233, Medline Ovid =42, and ProQuest =588. Three additional studies retrieved from ancestry reference lists of selected articles were included, and fourteen duplicates were excluded. A total of 10,555 article titles and abstracts were reviewed to determine whether they met the inclusion criteria, and 10,417 articles were excluded because their foci did not match the necessary criteria. The full-text publications assessed for eligibility were 138. After a closer examination of the articles, 110 publications were excluded

because they were not related to HPV vaccination among African American mothers and their daughters. Twenty-eight publications were screened for eligibility and were included for the final synthesis (see Figure 2) for PRISMA diagram. Studies were appraised and evaluated for quality and level of evidence using John Hopkins evidence appraisal tool (see Table 1)

# Results

# **Characteristics of the Findings**

The parents in this review were predominantly mothers ages 18 to 80 years and daughters ages 9 to 26. The participants in three studies were only mothers (Cuningham-Erves et al., 2018; Strohl et al., 2015; and Watkins et al., 2015). Two studies consisted of daughters only (Bynum et al., 2011; DiClemente et al., 2015), and four studies examined factors associated with both daughters and mothers in HPV vaccination uptake (Galbraith et al., 2017; Hamlish et al., 2012; Hull et al., 2014; Joseph et al., 2016). Although seven publications examine parental beliefs and intention for HPV vaccination, the participants were predominantly mothers (Bryer et al., 2014; Fu et al., 2019; Galbraith et al., 2018; Nan et al., 2016 & 2019; Thompson et al., 2012 & 2011). Participants in twelve studies had over 20% of African American females (Cipriano et al., 2018; Dixon et al., 2019; Fishman et al., 2014; Gelman et al., 2013; Griffioen et al., 2012; Gottlieb et al., 2009; Joseph et al., 2014; Nagpal et al., 2016; Perkins at el., 2010; Read et al., 2010; Rosenthal et al., 2008; Underwood et al., 2016).

Most studies included were four randomized controlled trials (DiClemente et al. 2015; Dixon et al., 2019; Joseph et al., 2016; Underwood et al., 2016), fourteen quantitative publications (Bryer, 2014; Bynum, et al., 2011; Cipriano et al., 2018; Fishman et al., 2014; Fu et al., 2019; Gelman et al., 2013; Nagpal et al., 2016; Nan et al., 2016 and 2019; Read et al., 2010; Rosenthal et al., 2008; Strohl et al., 2015; Thompson et al., 2011; Watkins et al., 2015) nine

qualitative (Thompson et al., 2012; Perkins at el., 2010; Joseph et al., 2014; Hull et al., 2014; Hamlish et al., 2012; Gottlieb et al., 2009; Galbraith et al. 2017 and Galbraith et al. 18; Griffioen et al., 2012) and one mixed study, (Cunningham-Erves, 2018).

# Factors Associated with HPV Vaccination of African American Mothers and Daughters

The factors identified in the review that affected HPV vaccination of African American mothers were summarized in five groups: the approval and disapproval of HPV vaccination from doctors, family, and friends, knowledge of HPV and HPV vaccination, attitude and belief, the benefit of the HPV vaccine, the challenges, and barriers of HPV vaccination.

# Approval and Disapproval of HPV Vaccination from Doctors, Family, and Friends

African American mothers and daughter's HPV vaccination decision was associated with approval or disapproval of health care providers, family, and friends. The majority of mothers trusted their providers to initiate the discussion of HPV immunization (Hamlish et al., 2012). Mothers rely on HPV vaccination approval or disapproval from their daughters' pediatrician. The physicians' recommendation was independently associated with HPV vaccination (Gottlieb et al., 2009), and most participants verbalized the likelihood of accepting HPV vaccination if offered by a physician (Joseph et al., 2014). The vaccination status of adolescents was significantly affected by whether a pediatrician had recommended the vaccine (p<0.001) (Thompson et al., 2011). The majority of mothers indicated the influence of physician recommendation on HPV vaccination of their daughters (Thompson et al., 2012),

Source of information should be vital in HPV vaccination uptake. Most mothers rely on HPV vaccination information from the provider. The maternal source of information about HPV vaccine was associated with attitude, and attitude was associated with vaccine uptake among adolescents (Underwood et al., 2016). Low trust in health information from other sources such as government health agencies were associated with less favorable parental attitudes and intentions for HPV vaccination; however, trust in health information from doctor or health professionals did not predict vaccine acceptance (Nan et al., 2019).

The perceived social pressure from friends, family, and providers were also significant predictors of maternal HPV vaccination intentions (p=.001) (Cunningham-Erves, 2018). Mothers trusted family members and friend's advice regarding HPV vaccination. Perceived high exposure of mothers to anti-HPV vaccine viewpoints and low exposure to pro-HPV vaccine viewpoints were associated with HPV vaccine refusal (Fu et al., 2019). Negative information from media affects HPV vaccination acceptance (Galbraith et al., 2017). Factors associated with HPV vaccination uptake among mothers include interactions with clinicians, friends, family members, and media reports/marketing (Griffioen et al., 2012).

# Knowledge of HPV and HPV Vaccination

Knowledge of HPV and HPV vaccination were among the factors associated with HPV vaccination uptake among African American mothers. A positive relationship existed between maternal attitude and knowledge of HPV (Cipriano et al., 2018). Most women with higher knowledge of HPV vaccination reported significantly higher HPV vaccination uptake (Bynum, et al., 2011). Mothers with an increased understanding of HPV vaccinations were significantly(p=.04) more likely to complete the 3-dose series earlier than those with low to moderate knowledge of HPV vaccinations (Nagpal et al., 2016). Those mothers who received HPV vaccination educational interventions had a 3-times greater odd of receiving a dose of HPV vaccine (p=.003) (Dixon et al., 2019). Mothers reported limited information and lack of knowledge about the HPV vaccine as the reason for not initiating HPV vaccination (Gottlieb et al., 2009). Women who were younger, had history of cancer, less spiritual, and higher education

had better awareness of HPV vaccine (Watkins et al., 2015). Also, the educational level, household income, and having a child who have been offered HPV vaccination were associated with adequate knowledge of HPV vaccine (Strohl et al., 2015).

However, in some studies, knowledge was not associated with adolescent vaccination (Fishman et al., 2014). Increase in knowledge scores post intervention in a study by Joseph et al., (2016) were not associated with initiation and completion of vaccinations. Knowledge of HPV vaccine alone did not necessarily lead to vaccinations (Thompson et al., 2011).

#### Attitude and Belief

Positive and negative attitudes influence mother's HPV vaccination of their adolescent daughters. Positive attitudes towards HPV vaccination were related to cancer prevention benefit and protection against infectious disease (Galbraith et al. 2017). There was a relationship between vaccine behavioral beliefs and HPV attitudes, and attitude was related to vaccination intention (Bryer, 2014). The intention to vaccinate daughters against HPV correlates with vaccine uptake (Perkins at el., 2010). The factors influencing mothers' decisions to vaccinate their daughters are beliefs and experiences (Griffioen et al., 2012). Those mothers who believe they were at risk of getting HPV infection and at risk of developing cervical cancer were more likely to get HPV vaccine (DiClemente et al. 2015). The mother's opinion about getting HPV infection was a significant predictor of maternal HPV vaccination intention (p=.044) (Cunningham-Erves, 2018). A study by Galbraith et al. (2018) noted that both mothers and daughters perceived low risk of getting HPV infection and mothers believed in their ability to decide on HPV vaccination for their daughters. Mothers with less than a high school education, and history of a sexually transmitted disease were more likely to accept HPV vaccination if their daughters are willing to receive three doses of HPV vaccination (Rosenthal et al., 2008)

Mothers with negative attitudes believed that the HPV vaccine was too new, their daughters were too young, and that the vaccine was not a one-size-fits-all intervention (Galbraith et al. 2017). The mother's reasons for not initiating the HPV vaccine include: the daughter was too young, not yet sexually active, and has not been to the doctor yet (Gottlieb et al., 2009). Mothers anticipated their daughter's sexual debut due to HPV vaccination and advocated for health care provider intervention to protect them (Hamlish et al., 2012). There have been discussions regarding religious belief and HPV vaccination uptake. Studies by Galbraith et al. (2017); Thompson et al., (2012) noted that religious doctrine did not hinder vaccination decisions among African American mothers.

#### The Benefit of the HPV Vaccine

Understanding the benefit of HPV vaccination is vital in the uptake of the vaccine. HPV vaccination education offered to undecided mothers and daughters should be focused on the vaccine as cancer prevention (Hull et al., 2014). In a study by Galbraith et al. (2018), the mothers and daughters perceived that HPV vaccine was beneficial against genital warts and cervical cancer. Mothers with cervical dysplasia or cancer were strongly motivated to vaccinate their daughters (Hamlish et al., 2012). Most mothers focused on the potential for cancer prevention when making decision for HPV vaccination of their daughters (Perkins at el., 2010). A daughter's knowledge of HPV vaccination and its association with cervical cancer prevention was significantly related to her interest in accepting the HPV vaccine (p<0.001) (Read et al., 2010). Mothers responded more positively to the benefit of doing a task such as HPV vaccination acceptance with a focus on the distant future than the cost of not doing a job such as HPV vaccination with a focus on the immediate future (Nan et al., 2016). Limited knowledge of the connection of HPV to cancer reduces the medical benefits of the vaccine (Hamlish et al., 2012).

#### Challenges/ Barriers to HPV Vaccination

Perceived barriers such as limited knowledge, daughters' age, mistrust of pharmaceutical companies and physicians affect maternal HPV vaccination intention (p<.001) (Cunningham-Erves, 2018). Barriers among mothers and daughters include policies and politics related to HPV vaccination, unknown side effects, and the safety of the HPV vaccine (Galbraith et al., 2018). Attitude and social environmental factors such as cost of vaccination, lack of insurance, and fear of early sexual activity affect HPV vaccination uptake among African American mothers (Thompson et al., 2012). There were significant ethical and racial disparities related to HPV vaccination; African Americans are less likely to initiate HPV vaccination than white (p<.001) (Gelman et al., 2013)

# Discussion

The synthesis of the literature review findings was guided by Health Belief Model (HBM) to understand better the factors associated with HPV vaccination among African American mothers and their daughters. The HBM was developed to identify primary preventive behaviors related to vaccinations and explore the determinants of health-related behaviors pertaining to vaccinating a child (Rosenstock et al., 1988). Four HBM items were associated with four of the categories identified in the result section above, and they include: Perceived susceptibility, Perceived benefit, Perceived barrier, Cues to action.

# The Approval or Disapproval of Provider, Family, and Friends (Cues to Action)

Cues to action refer to the strategies to activate vaccination readiness through information from provider, media, friends, and relatives. Among the factors affecting HPV vaccination, the approval for vaccination from a provider was the most frequently identified factors in HPV vaccination intensions.

Provider recommendation was significantly associated with HPV vaccination intentions and uptake among African American mothers and daughters. Seven articles (Gottlieb et al., 2009; Hamlish et al., 2012; Nan et al., 2019; Underwood et al., 2016; Thompson et al., 2011; Thompson et al., 2012; Joseph et al., 2014) explored the influence of provider recommendation on HPV vaccination acceptance and uptake. A study by Hamlish et al., (2012) was performed to identify motivations and barriers to HPV vaccination and meaningful opportunity for vaccine promotion among African American mothers and daughters. The findings noted that mothers trusted the providers to initiate a discussion about HPV immunization. There is an association between HPV vaccination and doctors' recommendations. Most mothers would accept HPV vaccination for their daughters if the provider recommended the vaccine (Gottlieb et al., 2009; Joseph et al., 2014; Thompson et al., 2012). The daughter's vaccination status was significantly associated with physician recommendation(p<0.001) (Thompson et al., 2011). Distributing health information related to HPV vaccination in the pediatrician's office will be essential since mothers' source of information about HPV was associated with attitude and vaccine uptake (Underwood et al., 2016). Although mothers trusted health information from physicians and health professionals, the HPV information does not predict vaccine acceptance (Nan et al., 2019). Future studies will be needed to identify reasons related to unfavorable attitudes with information from government health agencies.

Maternal strategy to activate readiness to HPV vaccination depends on interaction with friends and relatives. Mothers consider the viewpoint of their friends and relatives as it relates to immunization. Being around other mothers who were against HPV vaccination was associated with vaccine refusal (Fu et al., 2019). Moreover, negative information from media (Galbraith et al. 2017), clinicians, friends, and family members, including exposure to media

reports/marketing affects HPV vaccination acceptance (Griffioen et al., 2012). Interventions to improve HPV vaccination should include strategies to connect pro-vaccination mothers with mothers who have not decided to vaccinate their adolescent daughter against HPV.

# **Attitude and Belief (Perceived Susceptibility)**

The maternal decision for HPV vaccination was associated with perceived susceptibility, which means one's opinion about getting HPV infection. If mothers believe their daughters can get HPV infection and cancer, their HPV vaccination intention will be favorable. Most of the studies reviewed indicated that positive beliefs and attitudes in HPV vaccination intentions increased vaccine acceptance while negative attitudes increased vaccine refusal. Bryer et al., (2014) examined the determinants of black mothers' intentions to vaccinate their daughters against HPV. The findings indicated a significant relationship between HPV vaccine behavioral beliefs and HPV vaccine attitudes among black mothers (r=0.239, p<.001), mothers' attitude was significantly related to vaccine intensions (r=0.865, p<.001). The intention to vaccinate daughters correlates with vaccine uptake (Perkins at el., 2010). Identifying factors influencing African American mothers' decisions to vaccinate is essential in developing strategies to promote HPV vaccination uptake. Mother's decisions to vaccinate were based on their belief and experiences (Griffioen et al., 2012). The positive attitude to HPV vaccination was related to the vaccine's benefit in preventing infections and cancer (Galbraith et al., 2017). A study by Cunningham-Erves, (2018) to investigate psychological and cultural factors associated with mothers' intentions to vaccinate their daughters against HPV noted that mothers' perceived risk of developing HPV infections were significant predictors of maternal HPV vaccination intentions (p=.044). There is a significant need for educational interventions that focused on presenting the HPV vaccine as a cancer prevention vaccination. Mothers who believe they are at

risk of getting HPV and developing cervical cancer are more likely to get the HPV vaccine (DiClemente et al. 2015).

Negative attitudes and beliefs affect both mother's and daughter's HPV vaccination intentions. A study by Gottlieb et al., (2009) to assess HPV vaccination of adolescent girls living in areas with elevated cervical cancer rates identified the mother's reason for not initiating HPV vaccination as the belief that daughter was too young and not yet sexually active. Thus, there is a need for educational interventions on HPV and HPV vaccination, focusing on the need for vaccinating daughters at an early age before they initiate sexual activity. Although mothers anticipate the sexual debut of their daughters due to HPV vaccination (Hamlish et al., 2012), the decision about HPV vaccination was not related to their sexual values or daughter's sexual behavior (Rosenthal et al., 2008). Educational interventions to improve HPV vaccination uptake should include the effectiveness and safety of the vaccine fourteen years since inception. To address maternal concerns about daughters' sexuality and age for vaccination, educational interventions to African American mothers should emphasize the point that there was not relationship between HPV vaccination and an increase in sexual activities (Madhivanan et al., 2016). Creating awareness of the importance of vaccinating children early at age nine to prevent HPV infection before they start exposure to sexual activities would be ideal (CDC, 2019) to addressing parental concerns about the age of vaccination. This suggestion was like vaccinating children against measles and chickenpox before exposure to the disease.

Although much has been said regarding the impact of religious belief on HPV vaccination (Thompson et al., 2012), however, African American mothers and daughters stated that religion would not interfere with their vaccination decisions (Gabriath et al., 2017; Thompson et al., 2012).

# The Benefit and Barriers of HPV Vaccination

The benefit of HPV vaccinations and the challenges of HPV vaccination influences African American mothers' decisions on HPV vaccination. Based on the HBM concept, the perceived benefit of vaccination is one's belief of the vaccine's efficacy to reduce the risk of cancer, and the perceived barrier is one's opinion of the cost, access, transportation, and selfefficacy related to HPV vaccination. The HBM claim that if an individual believes he has the risk of getting an infection, he will more likely conclude that the benefits outweigh the barriers associated with behavior change to prevent the health issue (Rosenstock et al., 1988).

The review identified the relationship between the benefit of HPV vaccination as a cancer prevention vaccine and vaccination intent and uptake. Mothers with cervical dysplasia or cancer of the cervix were motivated to participate in cancer prevention activities for their children and had a strong commitment to vaccinate their daughters (Hamlish, et al., 2012). The benefit of the HPV vaccine was related to cancer prevention. In a study by Read et al., (2010) about 55.8% of daughter's knowledge of HPV vaccination and its association with cervical cancer prevention was significantly related to interest to accept HPV vaccine (p<0.001), most mothers wanted the vaccine for its role in preventing cancer (Read et al., 2010; Perkins at el., 2010). HPV vaccination discussion with mothers that have not decided to accept HPV vaccination should focus on cancer prevention (Hull et al., 2014). Intervention studies to increase HPV vaccination should include emphases on the benefit of HPV vaccine in cancer prevention because limited knowledge of HPV connection to cancer reduces the vaccine's medical benefits (Hamlish et al., 2012).

Barriers identified by both mothers and daughters related to HPV vaccination include unknown side effects, safety, and effectiveness (Galbraith et al., 2018). In a qualitative study by
Thompson et al., (2012) using a structured interview to describe attitudes and social environmental factors that affect African American mothers' intent to vaccinate their daughters against HPV identified the barriers to HPV vaccination as the cost of immunization, lack of insurance, and fear of early sexual activity. Immunization cost and lack of insurance can be addressed by referral of eligible mothers to the Vaccine for Children Program (VFC). This federally funded program provides vaccines at no cost to low-income families (CDC, 2019). Mothers identified limited knowledge, daughter's age, mistrust of pharmaceutical companies and physicians as factors affecting maternal HPV vaccination intention (p<.001) (Cunningham-Erves, 2018). Another barrier to HPV vaccination among African American daughters was ethical and racial disparities. There were a significant ethical and racial disparities on HPV vaccination among this population. African Americans were less likely to initiate HPV vaccination than whites (p<.001) (Gelman et al., 2013).

#### **Knowledge of HPV and HPV Vaccination**

Among the factors affecting HPV vaccination among African American mothers is inadequate knowledge of HPV and HPV vaccination. Having sufficient knowledge of HPV vaccination was associated with HPV vaccination intentions and uptake. A study by Bynum, et al., (2011) assessed factors associated with HPV vaccine uptake among young African American women. The findings reported significantly higher knowledge among women with HPV vaccine acceptance (p< .05). The completion of HPV vaccination series was very essential in protecting daughters against HPV infection and HPV related cancers. Most mothers with higher knowledge of HPV vaccine are three times more likely to accept a dose of HPV vaccine (Dixon et al., 2019) and significantly more likely to complete the three-dose series of HPV vaccination (Nagpal et al., 2016). HPV vaccine knowledge was associated with higher education, history of cancer, and younger mothers (Watkins et al., 2015) and educational level, household income, and having a child who has been offered HPV vaccination (Strohl et al., 2015). Mothers' attitude was associated with HPV vaccine knowledge. A study by Cipriano et al. (2018) to evaluate parental attitude towards general vaccination protocol and increase knowledge of HPV vaccine indicated that a moderate positive relationship exists between parental attitude and knowledge of HPV (rs=.552, p<.001) (Cipriano et al., 2018).

There were some studies where knowledge of HPV vaccination was not positively related to vaccination acceptance and uptake. A randomized control pilot study by Joseph et al. (2016) to examine facilitators and barriers of HPV uptake among African American mothers and daughters reported increased knowledge score post-intervention was not significant with the initiation and completion of HPV vaccine. Having adequate knowledge of HPV and HPV vaccine alone did not necessarily lead to HPV vaccination uptake among African Americans (Thompson et al., 2011). Moreover, previous knowledge of mothers and their daughters was not associated with HPV vaccination prediction (Fishman et al., 2014). More research studies are needed to examine the educational interventions and their relationship with intentions to vaccinate.

#### **Implications for Nursing Practice**

Understanding factors related to HPV vaccination decisions among African American mothers will inform healthcare professionals and researchers the best approach to improving vaccination rate among this high-risk population.

In all the studies reviewed, major factors associated with HPV vaccination were depicted. Attitude and belief were among the significant factors associated with maternal decisions to vaccinate daughters. Addressing African American mother's attitudes and beliefs towards HPV

vaccination may be challenging. Nurses should play a significant role in providing HPV and HPV vaccination education that focus on HPV vaccine as a cancer prevention vaccination. Since mothers rely on provider information and recommendations, nurses should minimize missed opportunities in pediatric clinics and offer HPV vaccination information, including flyers to mothers during clinic visits. In collaboration with other multidisciplinary teams, nurses can design and provide HPV vaccination interventions that can further assess the implications of the factors identified in this review. Also, design strategies to improve HPV vaccination uptake among this high-risk population.

#### Limitations

The level of evidence and quality rating was limited because there were only four randomized control trials. The rest of the articles were qualitative and quantitative, with one mixed study. Most studies indicated a small sample size and convenient samples, indicating a need for more clinical trials in this underrepresented population. There were a limited number of HPV related studies designed for only African American mothers. Twelve studies were done with other racial groups, with over 20% of African American participants. These combinations may not depict the specific perception of factors affecting African American mothers on vaccinating their daughters. The findings were limited to articles obtained since the last search date; additional factors may have emerged from recent studies. The search was limited to HPV vaccination alone, and the factors affecting vaccination of adolescents, in general, may be missing.

#### Conclusion

In summary, the articles synthesized depicts factors associated with HPV vaccination among African American mothers and daughters, including attitude and belief, effects of friends,

relatives, and provider approval or disapproval of HPV vaccination, knowledge of HPV vaccine, the benefit, and barriers of HPV vaccination. Among the factors identified, attitude and belief play a significant role in the mothers' decision to vaccinate their daughters. Although mothers decide based on the approval of friends and relatives, provider recommendation was the most significant predictor for intention to vaccinate against HPV. The knowledge of HPV as cancer prevention and the benefit of HPV vaccine in cancer prevention was strongly associated with vaccine intentions and uptake. The factors identified in the review would inform interventions that may improve vaccination uptake and decrease barriers to HPV vaccination among this highrisk population. Future research is needed to design more quantitative and randomized control trials to depict more factors affecting African American mothers' perception of HPV vaccination. Including strategies to improve positive attitude and belief in HPV vaccination among this highrisk population.

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## Table 1

# Selected Articles for Integrative Review

Author/ year	Purpose	Design	Population	Sample	Variables	Results	Level of evidence/ quality rating	Limitations
Bryer, 2014	Examine the determina nts of black parents' intention to have their daughters receive the HPV vaccine	Descriptive correlational	Black parents from Northeaster n public college and three educational opportunity centers in the same area.	262 parents of daughters (ages 9 to 17) 219 Mothers 43 Fathers Parents (ages 26 to 55)	The HPV vaccine, attitude, intention,	HPV parental attitude was significantly related to vaccine intention (r=.865, p<.001) Significant relationship exists between HPV vaccine behavioral belief and HPV vaccine attitude	Level 3 B	-Decreased generalizabili ty, sample limited to black mothers only -Parents are more educated -New instrument used only on a set of black mothers

						among black parents (r= .239, p < .001)		
Bynum et al., 2011	The purpose of this study was to assess factors associated with HPV vaccine uptake among young African American women	Survey study	Young African American Women from three historically black universities in South Carolina	363 young women (Ages 18 to 26)	HPV vaccine uptake, age, knowledge, perceived severity, barrier, and cues to action	Women who reported uptake had significantly higher HPV knowledge, lower perceived barriers to vaccination, and were younger (all p<.05)	Level 3 B	-Non- probability sample of historically black college female -May not be representativ e of the entire population -Recall for bias due to self-report not validated with HER -Cross- sectional measuring beliefs and behaviors

concurrently

Cipriano et al., 2018	To evaluate parental attitude towards general vaccinatio n protocol and increase parental knowledg e HPV vaccine	Pre-/posttest study design	Black White Hispanic Asian Other In pediatric office South New Jersey	Parents- 75 Black-19 White- 29 Hispanic- 19 Asian-1 Other - 7 Adolesce nt age (11-16) Participa nts are mainly female parents.	Attitude HPV Vaccinatio n knowledge	HPV knowledge post score was greater than pre score ( $p=-$ 10.585, p<.001). Parental attitude module and HPV knowledge pre-test showed positive moderate relation ( $rs=.552$ , p<.001)	Level 3 B	-Small sample size -Only those who can read and write, English and Hispanic, and computer tablet proficiency was included. -7 Hispanics participants drop off the study-unable to complete Spanish survey
Cunningh am- Erves, 2018	Investigat e the psychosoc ial and cultural factors associated with mothers' intentions	Sequential, explanatory mixed methods design	African American/B lack mothers. Community site (church, pediatric clinic,	237 mothers with girls (ages 9 to 12) Mothers (ages 19 to over 40)	Knowledge of HPV vaccines, experience, and source, intension to vaccinate daughters against HPV	Perceived susceptibilit y(p=.044), perceived barriers (p<.001), and subjective norms (p=.001)	Level 3 B	-Small sample size -Results limited to only African Americans may not be generalized.

	to vaccinate their daughters against HPV		children's sports event) in Alabama			were significant predictors of maternal HPV vaccination intension. Barriers include knowledge, daughters age, mistrust of pharmaceuti cal companies and physicians		
DiCleme nte et al. 2015	Examine an innovative culturally tailored, computer- delivered media- based strategy to promote HPV	Randomized control clinical trial	African American girls seeking service in family planning and STI public health clinic in Atlanta	216 girls (ages 14– 18)	HPV/cervi cal cancer knowledge, HPV vaccine acceptabilit y, and severity of cervical cancer, perception	The intervention group believed they are at risk of getting HPV and developing cervical cancer than the	Level 2 A	-Limited sample size -Unable to track vaccine doses received outside study participating clinics -Having a comparison education

	vaccine uptake.				about vaccines in general and HPV vaccines, normative beliefs	comparison group (p<.05). The intervention group also worried about getting cervical cancer (p= .05) and more likely to get HPV vaccine than the control group (p=.01)		video should have been better than one -Result may have influenced by patient- provider interaction
Dixon et al., 2019	Effect of digital HPV vaccine education al interventi on to improve HPV vaccinatio n	A Randomized cluster trial	Parents of Adolescents African American White Others in urban health clinic	1596 Parents of Adolesce nce 11- 12yrs, 870- African American 141- White 585- Others	HPV education HPV vaccination uptake	A change in vaccine status was higher on the parent who attended the intervention clinic (64.8%) versus the control clinic	Level 2 B	-The study was done on a single urban health clinic, may not be generalized to other clinics. -Intervention should have been broader than just the

						(50.1%) p<.001. a patient who watched the video had a 3-times greater odd of receiving a dose of HPV vaccine (p=.003)		patients who received tablets -Intervention may have shown an effect on vaccine initiation or completion since each participant watched a different video.
Fishman et al., 2014	Examine the strength of the relationshi p of HPV vaccinatio n uptake among high-risk adolescent and their parent's previous	Longitudinal cohort study using a questionnaire	Predominan tly African American Hispanic/La tino	149- Parents 211- Adolesce nt- (140)- African American parents (194) African American adolescen ce	Vaccinatio n uptake, HPV Knowledge	Neither parental nor adolescent knowledge was associated with or predictive of adolescent vaccination. Parents and adolescents answered slightly less	Level 3 B	-Participants are mainly female. -Finding may not be generalized among male adolescents

	knowledg e			(4) Hispanic parent (11)- Hispanic adolescen ce		than 50% of knowledge items correctly. Within 12 months 20 of 149(13.4%) of parent's daughters received HPV vaccination, and 32 of 211(15.2%) of other adolescent sample did so		
Fu et al., 2019	To examine the associatio n of social process with HPV vaccine refusal among	Cross- sectional survey	African American parents of children in Washington DC	353 parents (332- mothers) (21- fathers) Parents average age 37 years) Children	Social process (contacts), vaccine advice, HPV vaccine refusal, and acceptance,	1.Slightly over 80% of participants trusted family members and friends. 2.Perceived high exposure to anti-HPV	Level 3 B	-Report of network members' viewpoint came from participants and not from the network members themselves.

African parents

10-12years old vaccine viewpoints and low exposure to pro-HPV vaccine viewpoint were both associated to HPV vaccine refusal (adjusted odds ratio= 1.5, 95% confidence interval=1.0 1, 2.3, and adjusted odds ratio=1.7, 95% confidence interval=1.2 , 2.6, respectively ).

Generalizabl e is limited because study participants were from a single urban academic center. -Participants were limited to parents who brought their children to the clinic during the period of study.

caloraith et al. 2018	increase understan ding about the health beliefs toward HPV infection and HPV vaccine acceptanc e	Grounded theory	Arrican American parents and their daughters in Guilford County NC, and New York City	30 parents (mean age 42.9), 34 daughters (ages 12- 17) Parents 28 mothers 2 fathers	l otal HPV dosage received, belief towards HPV and HPV vaccine acceptance, knowledge of HPV infection and HPV vaccine	1.Mothers and daughters perceived low susceptibilit y to HPV infection. 2.Both perceived the HPV vaccine as beneficial against genital warts and cervical cancer. 3.Barriers among mothers and daughters include: the politicizatio n of the HPV vaccine by government officials, unknown side effects,	Level 3 B	Researchers did not mention any limitations to this study.
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						safety, the effectivenes s of the HPV vaccine. 4.Self- efficacy higher among mothers		
Galbraith et al. 2017	To explore the influence of culture on African American mothers' and daughters' HPV vaccine acceptanc e using the PEN- 3, a culturally centered	Grounded theory	African American mothers and their daughters in Guilford County NC, and New York City	28 Mothers (mean age 42.6) 34 Daughter s (ages 12-17)	Knowledge , attitude, culture, religious belief, HCP recommen dation, media messages, mother- daughter communica tion, HPV vaccination	-Positive attitude towards HPV vaccination relates to Cancer prevention benefits and vaccines in general protected against infectious disease. -Negatives attitude stemmed from the	Level 3 B	-Limited generalizatio n -Study was guided by PEN-3 and may have restricted attitude of culture related to attitude and belief

	conceptua l framewor k.					belief that the HPV vaccine is too new, not effective, daughters were too young, vaccine not a one-size- fits-all intervention -Religious doctrine did not impede vaccination decision -Negative information from media		
Gelman et al., 2013	To examine the associatio n between race/ethni city and HPV vaccine initiation and how	National survey	White US-born Hispanics, Foreign- born Hispanics African American From a national	2,168 - females 1110- White 405 - Hispanics (the U.S. born) 149- Hispanics	Race/ethni city, access to care, HPV vaccine initiation	There were significant racial/ethnic disparities in HPV vaccination: -U.S. and foreign-born Hispanics and African American	Level 3 B	Lower rates of HPV vaccination among African American females may not be due to access to care.

	to access influence this relationshi p		survey of family growth	(Foreign- born) 504- African American Ages 15- 24		were less likely to initiate vaccination than white (p<.001) -African American remain less likely than white to have initiated vaccine (AOR, .49, 95%CL, .3668)		Further research was needed to identify factors contributing to HPV vaccination among the African American population.
Griffioen et al., 2012	To explore the factors influencin g mother's decision to vaccinate 11-12- year-old daughters against	Qualitative with a semi structured interview	Black White Multiracial from two Suburban's and one urban hospital- based clinic.	Black- 45% White- 49% Multiraci al-6% Mothers- 32 Girls-33 (Girl's age-11- 12)	HPV vaccination , factors influencing mother's decision.	The primary factors influencing mothers' decisions to vaccinate daughters against HPV include (a) mother's beliefs and experiences.	Level 3 B	-Finding is limited to daughters in a specific clinic. -Study was done in a clinic setting and may not be applicable in other locations like school-based

HPV; and the mothers and daughters' perspectiv e about HPV vaccine- related decision making	(Mothers age-27- 41)	(b) interactions with clinicians, friends, and family members; and (c) exposure to media reports/mar keting *Most daughters believed the decision to be vaccinated was a mutual one, although most mothers believed the	health centers. Study findings were from participants who have received the HPV vaccine; thus, the study's relevance was limited to mothers who have not vaccinated their daughters.
		decision	

was theirs.

Gottlieb et al., 2009	To assess HPV vaccinatio n of adolescent girls living with elevated cervical cancer rates	Interviews	Parents from North Carolina counties	889- Parents 624- White (52%) 206- Blacks (38%) 28- Hispanics (5%) 28- others (5%)	HPV vaccination initiation, females, living in the elevated cervical cancer community	-Factors independent ly associated with vaccination are the older age of daughters and doctor's recommend ation -Reason for not initiating HPV vaccination (need more information, never heard about the vaccine, belief daughter is too young, not yet sexually active, have not been to the doctor	Level 3 B	-Study was done soon after the development of the vaccine, so the HPV vaccine is too new. -More studies are needed to identify parent's intentions to vaccinate. -Findings may not be generalized because the focus was on cervical cancer elevated counties in the southeastern United States. -Vaccination
						yet)		record was

						ONLY .5% cited likely to have sex as the reason for not vaccinating daughter 62% of participants report probably or definitely will vaccinate their daughters while 10% stated they wouldn't get the child vaccinated in the next year.		not obtained from the doctor, and parents reported the vaccinations.
Hamlish et al., 2012	To identify motivatio ns and barriers to HPV	Qualitative exploratory design	African American mothers and their daughters in	19 Mothers (ages not given) 19 Daughter	Knowledge of HPV and HPV vaccination , prior	-Mother's cervical dysplasia/ca ncer motivated a strong	Level 3 B	Snowball recruiting and possible that most mothers had an interest in

vaccinatio n and culturally relevant and meaningf ul opportunit y for vaccine promotion among African American mothers and adolescent daughters.	Chicago	s (ages 9- 17)	vaccine experience, relationshi p with a physician, the experience of cervical cancer or dysplasia	commitmen t to vaccinate the daughter -Limited knowledge of HPV connection to cancer reduces the medical benefits of the vaccine -Mothers anticipate the sexual debut of their daughter and advocate for health care intervention to protect them. -Mothers trusted providers to initiate discussion of HPV	HPV vaccination based on previous experience with cervical cancer/dyspl asia
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### immunizati on.

Hull et al. 2014	To generate recommen dations for framing messages to promote HPV vaccinatio n,	A qualitative study with a Cross- sectional observational design	African American mothers and their daughters in Tennessee	31 Mothers (ages 30 to over 40) 34 girls (ages 11- 18)	The benefit of HPV, Perceived barriers, the decision about HPV vaccination , disseminati ng messages and promoting HPV vaccination	HPV vaccines should be presented to "Undecided " mothers and adolescents as a routine vaccine, just like other vaccines that help prevent cancer.	Level 3 B	The study relied on parent's self- report of daughter's vaccination status. Convenience sample limited by selection bias
Joseph et al., 2016	To evaluate the impact of client- centered behavioral interventi on on	A pilot randomized control trial	African American and Haitian American mothers and daughters from a large	200 mothers (100 - African American mothers/ daughter 50 dyads)	Brief Negotiated interviewin g, knowledge of HPV. Increase	(a)Interventi on group demonstrate d increased knowledge score about HPV (pre/postme	Level 2 A	-Small sample size design as a pilot study. -The pilot study was powered to identify the

	mother's HPV vaccine knowledg e and vaccinatio n initiation for their adolescent daughter		urban hospital	(100- Haitian American mothers/ daughter 50 dyads) Daughter s aged 11-15.	HPV vaccination initiation and completion	an (score of 5 to 10 out of 11; p<.001) and significantly higher mean scores (10 vs. 6, p<.001). (b)Initiation and completion of HPV vaccine was not significant between groups		difference in initiation rates.
Joseph et al., 2014	To examine facilitator s and barriers to HPV uptake in African America, Haitian, Latina, and white	Qualitative using semi structured interview	African American, Haitian, Latina, and white women	132 participa nts 45- African American , 47- Haitian, 20-	HPV Vaccine barriers, facilitators, Knowledge of HPV vaccine, HPV vaccine uptake	90% of participants stated the likelihood of accepting HPV vaccination if offered by a physician. Despite low knowledge, participants	Level 3 B	The interview was limited to study participants only. Others may have different perspectives on HPV vaccination. Limit missed

	women aged 18- 22 and determine vaccinatio n rates among participan ts over 5 years			Latina, 20-White		trusted the physician. Only 51% initiated the vaccine over the next 5years. More white participants completed the 3 doses of the vaccine than other races 42%- African American. 33%- Haitian 63%- Latina 65%-white		opportunities during a clinic visit to increase HPV vaccine uptake. Increase provider recommendat ions in clinics
Nagpal et al., 2016	To examine the associatio n of knowledg e about HPV on the timely	Survey	Female in New York City	<ul> <li>135- female</li> <li>73- Hispanics</li> <li>46- African</li> <li>American</li> <li>15-Other</li> </ul>	Knowledge , HPV vaccine series completion	Participants with high knowledge (top quartile) were significantly more likely to complete	Level 3 B	-Sample size is low from the medical free clinic, generalizatio n is limited -Selection bias may have

	completio n of the 3- dose quadrivale nt vaccine series in the inner- city populatio n of adolescent female			Age-14- 20		the 3-dose series earlier than those with low to moderate knowledge (bottom 3 quartile). -Knowledge is associated with a shorter time to complete the 3-series of the HPV vaccine.		occurred from subjects who withdraw from the study.
Nan et al., 2016	To evaluate education al materials about HPV vaccinatio n (pre/post- test vs. HPV vaccinatio	Survey	African American parents from community outlets in Maryland suburb outside Washington DC	211 parents 73% mothers 27% fathers Childs age (9- 17). Parents age - (22- 71)	Support for mandating HPV vaccination , policy advocacy, message framing	Parents responded more positively to gain- frames (benefit of doing a task) if they focused on distance future and loss-frame (cost of not	Level 3 B	-Study was performed on only African Americans in Washington DC Findings were limited to the African American race only.

	n pamphlet framed gain or loss)					doing the task) if they focus on immediate future.		
Nan et al., 2019	Examines how/why health informatio n from health care profession als and governme nt agencies predicts acceptanc e of HPV vaccinatio n of children among African American parents	survey	African American parents from community venues	124 African American parents 95 females 29male Parents age (23- 71) Children' s age (9- 17)	Health informatio n, Healthcare professiona ls/governm ent agencies, HPV vaccination uptake.	(a)Low trust in health information from government health agencies was associated with less favorable parent's attitudes and intentions toward HPV vaccination of their children. It was partially mediated by perceived vaccine efficacy.	Level 3 B	Limited sample size Study findings were only on the African American population and may not be generalized.

						(b)Trust in health information from doctor or health professional did not predict vaccine acceptance		
Perkins et al., 2010	Explore low- income minority parent's attitudes, intentions, and actions to vaccinate their daughters against HPV.	Qualitative with Semi structured interview conducted in English and Spanish	African American, Latino, and Caucasian from urban medical center and community health center.	67 parents Mostly mothers 43%- African American s 28%- Latino 26%Cauc asian	Parent's attitude, intention, and actions. HPV vaccination	(a)Intension correlates with vaccine uptake; (b)91% of parents intended to vaccinate their daughters against HPV (c)89% of the girls received vaccination within 12 months.	Level 3 B	-Small sample size in a medical center and Non- randomized study- limits generalizabili ty -Parents have access to medical care- other parents who did not participate may not have access to care. -Unable to assess

						(d)Analysis revealed that most parents focused on the potential for cancer		vaccine completion. -Intervention was not provided to the parents
						Concerns about side effects, promotion of unsafe sex did not hinder vaccine acceptance in most cases.		
Read et al., 2010	To describe attitude and perception towards acceptabil ity of HPV vaccinatio n among	Survey with questionnaire	African American and Caribbean girls and their parents From the Urban adolescent clinic	175- Adolesce nts girls 85- African American (50.6%) 66- Caribbea n (39.3%)	Attitude and perceptions , HPV acceptabilit y, cervical cancer	55.8% of girls have knowledge of HPV- which was significantly associated with knowing that most cervical	Level 3 B	The population is with a convenient sample of girls and mothers in a clinic setting, limiting generalizatio n.

inner-city Caribbean and African American parents 17-Hispanics (10.1%) Age 13-19

74parents

cancers were caused by HPV(p<0.0)01) and with interest in receiving HPV vaccine (p<0.001). -less than half are interested in receiving the HPV vaccine compare with only 37.5% of parents. There was no significant influence in parental acceptance of the vaccine based on age, ethnicity,

-Information is self-report, and that may affect the validity of the study. -There may be selection bias due to convent sampling

						educational level, insurance, and living condition. Most parents wanted the vaccine for its role in preventing cancer. Only a minority of parents were concerned with promoting sexual activity		
Rosenthal et al., 2008	To examine the relationshi p of demograp hics, parenting, and	Questionnaire	Mothers with daughters 11-17years from a university- based primary	153 - mothers 39%- African American 34%- Non- Hispanic	Demograp hics, parenting, vaccine attitude, HPV vaccination acceptance,	-Mothers with less than a high school degree, history of the sexually transmitted disease,	Level 3 B	-Convenient sample from primary university clinic with large vaccine clinic. -The clinic provides
	vaccine attitudes with HPV acceptanc e and intent to vaccinate in the next 12months.		clinic	Caucasia n, 20%- Hispanics 7%- others Mothers age 27-77	and intent	supervised daughter more when she is with peers, daughters did not mind receiving 3- doses of vaccine accept their daughters being vaccinated. -Parental decision about vaccination was not related to their sexual values or daughter's sexual behavior		information on vaccine safety and the dangers of misinformati on -Small sample size -Intention to vaccinate may not be followed with vaccination
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Strohl et al., 2015	To assess knowledg e of the human	Quantitative cross- sectional	African American Women in a community	215 women (ages 18- 70)	Knowledge regarding HPV, cervical	The mean knowledge score was 12.3 with a	Level 3 B	A convenience sample of urban

	n the knowledge portion of the survey. Education level $(p=.007)$ , household income $(p=.010)$ , and having a child who has been offered the HPV vaccine $(p=.041)$ were associated with an adequate knowledge score.
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n et al., 2012	This study describes attitudes and social and environm ental factors that affect African American parents' intent to vaccinate their daughters against human papilloma virus	A qualitative design using a structured interview	African American parents and daughters in St Louis metropolita n statistical area	30 parents of daughters (age 9- 17) Parents (ages 26- 60) 25 mothers 5 fathers	Intent to vaccinate, perception of community norms, vaccination before or after initiation of sexual activity	Reoccurring theme includes -Influence of physician recommend ations -Vaccine cost and lack of insurance -Fear of early sexuality due to vaccination was limited - Participants stated that religious belief would not interfere with HPV vaccination	Level 3 B	Lack of diversity among interviewers resulted in participants producing socially desirable comments. -There was a greater number of individuals with healthcare and physician relationships. -The interviews were developed before the approval of Cervarix and before Gardasil was approved for men.
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Thompso n et al., 2011	The current study sought to determine the knowledg e about HPV, HPV vaccinatio n and their relationshi p to cancer; assess acceptabil ity of and intent to vaccinate; and describe the individual characteri stics, cultural attitudes, social and environm	Survey study	African American parents of daughters in St Louis metropolita n statistical area	200 parents with daughter (age 9- 17) Parents mean age (40 years) 137 mothers 61 fathers 2 (not identified as mother or father)	Knowledge of HPV, HPV vaccination and its relationshi p to cancer, acceptabilit y, and intent to vaccinate, spirituality/ religion, medical mistrust, and cultural attitude	-2/3 of participants are aware of HPV, and HPV vaccination, knowledgea ble about - HPV, but knowledge alone did not necessarily lead to vaccination, - Vaccination status was significantly affected by whether a pediatrician has recommend ed the vaccine(p<0 .001) -Parents of vaccinated children were	Level 3 B	- Convenience sample and is not generalizable -Cultural issues may not be salient, and they may consider the more traditional issue and variables that influence vaccination utilization
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	ental factors that affect African American parents' intent to vaccinate.					worried about STI		
Underwo od et al., 2016	Describe how the parental source of informatio n about HPV vaccinatio n is associated with adolescent HPV uptake. Understan d the relationshi p between the source of informatio n, vaccine	3-arm randomized control trial	Most of the sample was African American, White, Hispanic From George	360- Parent (267) African American , (59) White, (6) Hispanic (8) other 84%Mot her 9%father	Source of informatio n, HPV vaccination uptake, parents' attitude	(a)53% of parents reported their adolescence received one dose of the HPV vaccine, (b)Top source of information was a doctor or medical professional (80%) and Television (64%) (c) The source of information about HPV	Level 2 A	Participants are from one county in George, and the sample was mainly African American, so the result may not be generalizable Consent return was slow due to parental signature There may be response bias from parents who

	uptake, and parents' attitude					vaccine is associated with parental attitude and attitude associated with vaccine uptake among adolescents.		have vaccinated a child and with a favorable attitude than those that have not.
Watkins et al., 2015	To assess correlates of human papilloma virus (HPV) awareness , knowledg e, and attitudes	longitudinal cohort study	Older, church- going African American women in Houston, Texas	759 women (age 40- 80)	Awareness, knowledge, and attitude	Younger age, higher education, history of cancer, and less spirituality were associated with HPV awareness individually and when considered jointly in a single model (p	Level 3 B	-HPV knowledge and attitude items were only administered to women that responded positively to the HPV awareness item. -Participants who are not parents were asked to

values  $\leq .038$ ). Higher education was related to HPV knowledge (p = .006). consider a hypothetical daughter -High percentage of intent to vaccinate may not be actual vaccine initiation and completion

## Figure 2





## CHAPTER III

## METHODOLOGY

A Paper to be Submitted for Publication in the Oncology Nursing Forum Stella Ngozi Dike, MSN Sandra Cesario, PhD Ann Malecha, PhD Rachelle Nurse, PhD

The Effect of an Educational Intervention to Increase Human Papillomavirus (HPV) Vaccination Confidence and Acceptability Among Non-Hispanic Black Mothers.

## ABSTRACT

**Objective**: To examine the effect of an educational intervention to increase Human Papillomavirus (HPV) vaccination confidence, positive attitudes, and beliefs among non-Hispanic Black mothers of children 9-17 years old.

Sample and Setting: 63 non-Hispanic Black mothers of children ages 9-17 who have not received HPV vaccination were recruited using social media (Twitter, Facebook, and LinkedIn). Methods and Variables: A two-group, randomized controlled trial was used. The intervention group received two HPV vaccination education 1 week apart, while the control group received two healthy nutrition education 1 week apart. Data were collected immediately after the second intervention and four weeks post-intervention. Data were analyzed using two-way repeated measure ANOVA.

**Results:** Participants, randomized into two groups, experimental (n = 37) and control (n = 26) completed the intervention and data collection. The report indicated that participants in the

experimental group reported more positive HPV vaccination attitudes and beliefs (p = .002) and greater vaccination confidence (p = .049) than the control group.

**Implications for Nursing:** Nurses can significantly improve HPV vaccination confidence, attitude, and beliefs among non-Hispanic Black mothers through HPV vaccination education. *Keywords*: Human papillomavirus vaccination, educational intervention, confidence and belief.

### Introduction

Human papillomavirus (HPV) has been identified as a causative factor of six types of cancers: cervical, vulvar, vaginal, anal, penile, and oropharyngeal cancers. HPV infection is common among men and women (American Cancer Society [ACS], 2017). Every year, about 14 million new cases are reported in the USA, and over 80% of people will be affected with HPV infection in their lifetime (Center for Disease Control and Prevention [CDC], 2019). The HPV vaccine has effectively prevented HPV-related cancers and genital warts, with a reduction of 86% noted among teen girls, 71% among young adult women, and a 40% reduction in cervical precancer among women vaccinated against HPV infection (CDC, 2019).

Despite the effectiveness of HPV vaccination, the national vaccination rate remains low, with the initial dose at 71.5% and the completion rate at 54.2% in 2019 (CDC, 2020). There is a need to improve HPV vaccination among non-Hispanic Blacks because African American women are 10% less likely to be vaccinated against HPV than White women. The vaccination rate among non-Hispanic Blacks was 38% compared to 44.7% for non-Hispanic White (CDC, 2018). The incidence of cervical cancer is 30% higher, and the mortality rate is 80% higher among non-Hispanic Blacks than non-Hispanic White women (ACS, 2019).

A comprehensive literature review conducted by the authors in a previous publication identified the benefit and barriers of HPV vaccination, approval and disapproval of providers, friends, and relatives, including attitude and beliefs of parents as factors affecting HPV vaccination among African American mothers (Dike & Freysteinson, 2021). There were limited quantitative and randomized controlled trial studies on HPV vaccination done specifically for non-Hispanic Blacks. Only four randomized control trials were identified in the literature review of African American mothers' perception of HPV vaccination of their daughters (DiClemente et

al., 2015; Dixon et al., 2019; Joseph et al., 2016; Underwood et al., 2016), indicating a gap in the literature on randomized controlled trials in this high-risk population. Thus, there is a need for randomized control trials designed explicitly for non-Hispanic Black mothers to examine the effect of educational interventions to increase HPV vaccination confidence and attitude.

#### Objective

The objective of this study was to examine the effect of an educational intervention to increase HPV vaccination confidence, positive attitudes, and beliefs among non-Hispanic Black mothers. The authors hypothesized that an educational intervention program that highlights the benefit of HPV vaccination as cancer prevention addresses barriers related to HPV vaccination and the trust of healthcare providers could improve parental vaccination attitudes and confidence among this high-risk population. The current study contributed significantly to the importance of a well-designed HPV vaccination education to increase vaccination confidence and intentions among underrepresented minorities such non-Hispanic Black population.

## Methods

## Design

The study was a randomized controlled trial with a two-group design that consisted of HPV vaccination education for the experimental group and healthy nutrition education for the control group. The HPV vaccination education program and healthy nutritional education were conducted for two 1-hour sessions 1 week apart. The intervention's effectiveness was assessed immediately following the second intervention and 4 weeks post-interventions. The intervention and data collection were done via an online platform using PsychData. The virtual educational sessions were presented via a Zoom platform, and a meeting link with a password was sent to the participant's emails.

## Setting

The study setting was via online platforms using three social media platforms: LinkedIn, Facebook, and Twitter. The online environment eliminates on-site social gatherings due to COVID-19 precautions and broadens the research study's scope by providing an opportunity to reach more participants through social media. The study flyer was posted on LinkedIn, Facebook, and Twitter. The researcher followed predominantly non-Hispanic Black organizations, health clinics, community centers, and churches on social media to provide more comprehensive advertisements for eligible participants.

### Sample

Study participants were non-Hispanic Black mothers of children 9-17 years old. The number of participants required for the study was determined using a moderate effect size of 0.25 (f) in repeated measures ANOVA (2 groups x 2-time points). An 80% power with an alpha of .05 yields a total sample size of 46 mothers (23 in each group). A sample of 54 participants was recruited at the study's beginning considering a 15% attrition rate. Inclusion criteria were non-Hispanic Black mothers of children 9 to 17 years old who were not vaccinated against HPV, 18 years of age and older, able to speak and write English, and residing in the United States of America. A \$25-dollar electronic gift card was sent to participants who completed the study.

## Recruitment

Eligible participants were recruited through social media (Twitter, Facebook, and Linkedln) by networking with professional organizations, community centers, health clinics, churches, and sorority organizations with predominantly non-Hispanic Black mothers in the United States. Some participants were recruited through snowball sampling strategies. Study flyers were posted online after Texas Woman's University Institutional Review Board (IRB)

approval. Approximately 250 participants interested in the study responded to the flyer posted on social media and were screened for eligibility using a screening questionnaire. Participants (n =110) who met the eligibility criteria and signed the consent were randomly assigned to the experimental group (n = 55) and control group (n = 55), respectively, using computer software (Graphpad, 2022). The random assignment was done in batches of 20-40 participants to the experimental group (10-20) and the attention control group (10-20) based on the number of participants recruited within a period of up to 4 weeks. Electronic consent was sent to participants who met the eligibility criteria using a DocuSign e-signature. Some of the eligible participants did not complete the consent- experimental group (n = 2) and control group (n = 9), and some declined to participate after signing consent due to a series of intervention and data collection process-experimental group (n = 12) and control group (n = 14). Participants who dropped off during the intervention reported time as a reason for dropping off from the study experimental group (n = 3) and control group (n = 4). A total of 66 participants completed the study—experimental group (n = 38) and control group (n = 28). Three participants were discarded due to duplicate and incomplete data—experimental group (n = 1) and control group (n = 1)= 2) respectively. Data analysis was completed on 63 participants: 37 in the experimental group and 26 in the control group. The randomization flow diagram showed in Figure 3.1.

### **Experimental Group Treatment Intervention**

The experimental group was assigned to two 1-hour virtual educational sessions 1 week apart on the importance of HPV vaccination. A Zoom educational schedule session was developed and sent via email to participants to sign up based on their availability. Two Zoom presentation options were available twice a week (Tuesdays and Fridays) in the morning at 11:30 am and evening at 5:30 pm for both interventions and data collection sessions. A Saturday option was added at 9:30 am for those who were not available on weekdays, making it a total of five sessions in a week to accommodate participants' schedule conflicts. The participants also have the flexibility to be scheduled on any other day of their choice to accommodate varied work schedules.

The study's total time commitment was about 3 hours, including surveys, consent, and instructions. Verbal and written instructions were provided, explaining both the intervention and data collection process. A reminder email and text were sent to participants 2 days before the intervention and 2 hours before the presentation and data collection.

The Zoom presentation invitation link was sent to participants based on the date and time of their scheduled class. The Zoom platform's security features were enabled to prevent Zoom bombing and unwanted intruders and improve participants' confidentiality. The Zoom meeting link was sent to participants with a password to enter the meeting, and they were placed in the waiting room for the researcher to let them into the class. Before the presentation, clear instructions were provided to keep participants engaged during the intervention and data collection process. Each session of the Zoom class accommodated 5-15 participants.

The student researcher developed the presentation using HPV and HPV vaccination information from the CDC website. Included in the presentation were three short video links for Week 1: one video link on Black women advocating for HPV vaccination and two video links of Black women that were cervical cancer survivors stating the importance of HPV vaccination. A video link for the Week 2 presentation was on a Black female pediatrician discussing the importance of HPV vaccination. The content was presented via the Zoom platform using a PowerPoint. The HPV prevention educational content was focused on cancer prevention, the benefit of HPV vaccination, barriers to HPV vaccination, and provider recommendations for the

HPV vaccine. Experimental group intervention is explained in Table 3.1. Participants had an opportunity to ask questions and engage in discussions. An attendance roster was kept, and participants who missed a scheduled intervention or data collection were rescheduled.

## **Control Group Intervention**

Participants for the control group were assigned to a virtual two 1-hour educational sessions 1 week apart on healthy nutrition. An educational schedule was sent to participants' emails to sign up for presentations based on their availability. Two Zoom presentation options were available twice a week on Mondays and Thursdays in the morning at 11:30 am and evenings at 5:30 pm for both interventions and data collections. A Saturday option was added at 5:30 pm for those not available on weekdays, making it a total of five sessions in a week to accommodate participants' schedule conflicts. The participants also have the flexibility to be scheduled on any other day of their choice to accommodate varied work schedules.

The Zoom meeting link was sent to participants with a password to enter the meeting, and they were placed in the waiting room for the researcher to let them into the class. Clear instructions were provided before the presentation to keep participants engaged during the intervention and data collection process. Each session of the Zoom class accommodated 5-15 participants. A reminder email and text were sent to participants 2 days before the intervention and 2 hours before the presentation and data collection.

The educational content for healthy nutrition was a link to five modules from Graples institute with permission from Dr. Stephen Devries. Three module links covering the power of healthy nutrition, dietary fat, and carbohydrate were used for Week 1. Two module links covering protein/calcium/sodium and simple strategies for healthy eating were used for Week 2.

Time was made available for questions and comments, and the educational activity was very interactive.

At the end of the study, participants interested in learning about HPV vaccination education were instructed to sign up for an optional abbreviated 1-hour HPV vaccination education session via Zoom. Among 10 participants that were interested in abbreviated HPV vaccination education, only four women participated in the abbreviated HPV education session. Most mothers said time was an issue for not participating in the abbreviated HPV education session.

## **Data Collection**

The data for both the experimental and control group were collected immediately after the second intervention and 4 weeks post the second intervention using an online survey link through PsychData. The demographic survey data for the experimental and control group was completed after the first intervention via Zoom. The first data collection was done via Zoom immediately after the second intervention, and participants signed up for the second data collection after the second intervention. The participant identification number was sent as a private chat during Zoom sessions. The second data were collected 4 weeks post second intervention via Zoom. A survey link for data collection and participant identification number was sent via email to participants who could not attend the second Zoom sessions. The surveys took approximately 15 minutes, and the researcher was available in the Zoom sessions during data collection to provide instructions and answer questions. Reminder emails and texts were sent to participants 2 days before the second data collection and two hours before the data collection.

#### Measurement

The study was measured using the Vaccination Confidence Scale (VCS) and the Carolina HPV Immunization Attitudes and Beliefs Scale (CHIAS). These two measurement scales captured general vaccination confidence and HPV vaccination attitude and belief among non-Hispanic Black mothers. The study measurement was in two layers; the first layer examined the overall parental vaccine confidence using VCS subscales (Benefit, Harm, and Trust; Gilkey et al., 2014). The second layer explored HPV-specific parental confidence and attitude using CHIAS subscales (Harm, Barrier, Effectiveness, and Uncertainty; McRee et al., 2010).

The VCS developed by Gilkey et al. (2014) has three subscales: Benefit with 4 response items, Harm with 2 items, and Trust with 2 items, respectively, adding to a total of 8 points response scale. The Parent's 8-item vaccination confidence and belief survey have a response scale that ranges from 0 (*strongly disagree*) to 10 (*strongly agree*). A verbatim response with answers equal to or greater than 7 indicates parents are more likely to agree, and parent with response equal to or less than 6 is more likely to disagree. Items with negative correlations were reverse-coded. The VCS survey was shown in previous research that supported the VCS one-factor scale known as "General Confidence," with a positive parental attitude to vaccination coefficient alpha of 0.77. The one-factor scale's construct validity for a confirmatory factor analysis showed high overall confidence (M = 8.15, SE = 0.02).

The CHIAS tool developed by McRee et al. (2010) examines the extent to which attitudes and beliefs were associated with parents' intention to vaccinate their adolescent child against HPV. It was believed to be the first scale measuring parental attitude and beliefs towards HPV vaccination. The 16-items in the HPV vaccine attitude survey questions were formed using the four subscales of CHIAS. The measurement tool has a 4-point response scale that ranges

from 1 (*strongly disagree*) to 4 (*strongly agree*) with a response of *do not know* recorded as the variable's mean. High values were an indication of stronger agreement with the statement. Items with barrier questions are rescaled, so the higher values indicate a more significant barrier. Items with negative correlations were reverse-coded. With previous research study, the internal consistency of all the four factors were acceptable with Cronbach's alpha: perceived vaccination harms ( $\alpha = 0.69$ ), perceived barrier ( $\alpha = 0.69$ ), perceived vaccination effectiveness ( $\alpha = 0.61$ ), and uncertainty about the vaccine ( $\alpha = 0.66$ ).

The internal consistency reliability of the current study variables was (VCF = 0.87) and (CHIAS = 0.86; see Table 3.2). These constructs from VCS and CHIAS formed the intervention's education content to increase the non-Hispanic Black mothers' confidence and attitude in securing their children's HPV vaccination.

#### **Data Analysis**

Study data were analyzed using IBM, the Statistical Package for the Social Sciences (SPSS) version 25. A descriptive statistic was conducted to communicate information regarding the sample's demographic characteristics. The level of the two measurements for the dependent variable (VCS) and (CHIAS) was the Ordinal scale because the scales were measured in the order of 0 to 10 scale ( $0 = strongly \ disagree$ ;  $10 = strongly \ agree$ ) and 1-4 scale ( $1 = strongly \ disagree$  and  $4 = strongly \ agree$ ), respectively. A two-way between-groups ANOVA was used to compare the VCS scores and CHIAS scores for the control and treatment groups using repeated measures.

#### Results

Of the 73 mothers that started the intervention and data collection, seven participants dropped off due to lack of time (experimental, n = 3) and (control group, n = 4). A total of 66

mothers completed the study, the experimental group (n = 38) and the control group (n = 28). The attrition analysis was conducted only for loss during the intervention and data collection (n = 7), approximately 11%. The demographic characteristics showed that 64.3 % of children were 9-12 years and 35.7% were 13-17 years, 80% were female, and 20% were male. Mothers mostly identified themselves as African American (67.1%) and mothers from Africa residing in the USA (31.4%). The remaining 1.4% identified self as 'other' but did not specify. No participants in the study self-identified as Caribbean or Haitian. Over half of the mothers resided in Texas (54.3%), followed by Virginia (11.4%), Georgia (10%), and New York (10%). More than half of the participants had a college degree (67.1%), and 18.6% had a high school diploma. The annual income of participants over \$80,000 (37.1%), \$60,000 - \$80,000 (15.7%), and \$40,000-\$59,000 (17.1%). Most of the participants were married (84.3%), 77.1% were insured, 82.9% were up to date with vaccination history, 92% were aware of the HPV vaccine, and 94.3% were religious or spiritual. Demographic characteristics of participants are described in Table 3.3.

#### **Repeated Measure ANOVA Analysis**

An analysis was done to compare HPV vaccination confidence, attitude, and belief scores on the experimental and control group immediately post-intervention and 4 weeks postintervention. The effect of HPV vaccination education on Black mothers' confidence, positive attitude, and beliefs score changes was examined over time and between groups using the two measurement tools, the CHIAS and VCS. The result of the study indicated that non-Hispanic Black women who received HPV vaccination education reported higher attitudes and beliefs scores in HPV vaccination than the control. There was a statistically significant interaction between the experimental and control groups (p = .002). The Post hoc analysis revealed a statistically significant difference in the attitudes and beliefs score between the experimental and

control group immediately post-intervention (p = .001) and 4 weeks post-intervention (p = .024). Post hoc analysis showed that the mean difference in the experimental group's positive attitude and beliefs score was .438 greater than the control group immediately post-intervention and .345 greater than the control group at 4 weeks post-intervention. The mean scores of participants' positive attitudes and beliefs immediately post-intervention were higher for the experimental group (M = 3.40, SD = .44) than for the control group (M = 2.96, SD = .56), and the mean scores at 4 weeks post-intervention for the experimental group was higher (M = 3.35, SD = .48) than the control group (M = 3.00, SD = .68; see Table 3.4).

The result indicated that the experimental group reported a higher positive attitude and belief score in HPV vaccination than the control group immediately post-intervention and 4 weeks post-intervention. Non-Hispanic Black mothers had higher vaccination confidence among the experimental group than the control group. There was a statistically significant difference in vaccination confidence scores between the experimental and control group (p = .049). The Post hoc analysis indicated a statistically significant difference in the experimental and control groups at 4 weeks post-intervention (p = .041) and none immediately post-intervention (p = .140). The mean difference of the experimental group is .837 greater than the control group at 4 weeks post-intervention. The result showed that the experimental group reported a higher vaccine confidence score than the control group at 4 weeks post-intervention than immediately after the intervention. Non-Hispanic Black mothers in the experimental group gained HPV vaccination confidence 4 weeks post-intervention.

#### Discussion

The current study determined the effectiveness of HPV vaccination education intervention to increase vaccination confidence, attitude, and belief of non-Hispanic Black mothers with children 9-17 years old who have not received HPV vaccination. The authors identified higher confidence, more positive attitude, and belief in HPV vaccination among participants randomized to the importance of HPV vaccination education group. The attitude and belief score remained high immediately post-intervention and at 4 weeks post-intervention, while high vaccination confidence was noted at 4 weeks post-intervention. Thus, the result indicated that participants in the experimental group gained HPV vaccination confidence over time after HPV vaccination education.

The result of the study was consistent with other studies that indicated a positive relationship between parental attitude and knowledge of HPV ( $r_s = .552$ , p < .001; Cipriano et al., 2018). Higher confidence and more positive attitude and belief in HPV vaccination noted in the current study are consistent with other studies that indicated African American mothers' attitude toward HPV vaccination was significantly related to vaccine intentions, and vaccine intentions correlate with vaccine uptake (r = 0.865, p < .001; Bryer, 2014; Perkins at el., 2010). Although the current study did not last long enough to measure vaccination uptake, other studies support that mother who received HPV vaccination educational intervention had 3-times greater odds of receiving a dose of HPV vaccinations were significantly (p = .04) more likely to complete the 3-dose series earlier than those with low to moderate knowledge of HPV vaccine uptake.

The result of the current study was based on the effectiveness of the educational intervention that focused on the benefit of HPV vaccination as cancer prevention, the barriers of HPV vaccination such as side effects and cost of vaccination, and the trust of the provider. Other

studies supported the current study that mothers wanted the HPV vaccine for its role in preventing cancer (Perkins et al., 2010; Read et al., 2010), and the positive attitude to HPV vaccination was related to the vaccine's benefit in preventing infections and cancer (Galbraith-Gyan et al., 2017).

The demographic data supports other studies that educational level and household income were associated with adequate knowledge of the HPV vaccine (Strohl et al., 2015). Most participants in the current study have a college degree (67%), have an annual income of over \$80,000 (37%), and have health insurance (77.1%). The intended participants with lower socioeconomic status were not reached due to the online setting as the result of the COVID-19 pandemic. Although 94% of the participants reported being spiritual or religious, the experimental group showed higher confidence and a more positive attitude and belief in HPV vaccination. This was supported by other studies that African American mothers and daughters stated that religion would not interfere with their vaccination decisions (Galbraith-Gyan et al., 2017; Thompson et al., 2012). An extensive review of literature on African American mothers' perception of HPV vaccination of their daughters identified only four randomized control trials (DiClemente et al., 2015; Dixon et al., 2019; Joseph et al., 2016; Underwood et al., 2016). The current study has contributed to closing the gap in the limited literature on randomized controlled trials in this population

The current study was performed during the COVID-19 pandemic involving social isolation and lockdowns, leading to virtual intervention and data collection. The online intervention offered a better opportunity for more educated participants with higher financial status and who could afford laptops and computers to participate in the study. The new COVID-19 vaccine discussion was a hot topic in the news, with mixed reactions of some people in favor

of the vaccine and others against it. Hence, it was unclear whether the COVID-19 pandemic with the new vaccine enhanced or decreased non-Hispanic Black mothers' participation and findings in the current study.

### **Implications for Nursing**

Oncology nurses play a significant role in administering cancer treatment, managing side effects of treatment, and providing patient/caregiver education in the hospital setting. There is a need for nurses to participate in cancer prevention initiatives in the community, especially among the low socioeconomic population. HPV vaccination education that focuses on the benefit of HPV vaccination as a cancer prevention vaccine with short videos of cancer survivors emphasizing the importance of HPV vaccination was beneficial in increasing Black mothers' attitude and belief in HPV vaccination. The findings from the current study indicated that nurses could play a significant role in the community by developing and implementing HPV vaccination education programs among low socioeconomic populations such as non-Hispanic Black mothers. Such a program would be beneficial in improving parental vaccination attitudes and confidence with subsequent improvement in HPV vaccine intentions and uptake among this high-risk population.

### Limitations

The current study was limited to non-Hispanic Black mothers. Additional studies with diverse populations are needed to identify the effect of HPV vaccination education on vaccination confidence and belief for men and women from other ethnic groups. The intervention was focused on the importance of HPV vaccination alone, and the result may not be the same with vaccination in general. The study intervention and data collection were performed using laptops, computers, and smartphones; most participants had college and high school

degrees, thus limiting the participation of those with lower socioeconomic and educational status without computers and laptops. Further studies should target a low socioeconomic population of non-Hispanic Black mothers. The COVID-19 restrictions limited the on-site participation in predominantly non-Hispanic Black churches and organizations with active face-to-face involvement and socialization among this high-risk population. The study was not long enough to measure the effect of HPV vaccination education on the actual rate of HPV vaccination. Further studies should focus on the vaccination rate among participants who received HPV vaccination, including the effect of HPV education on non-Hispanic Black mothers with lower socioeconomic status.

#### **Knowledge Translation**

Nurses can be instrumental in cancer prevention in the community through HPV vaccination education targeting high-risk populations such as non-Hispanic Blacks. Nurses should be encouraged to embrace randomized control trials to increase the number of HPV vaccination control trials available in the literature, especially among the non-Hispanic Black population. A well-designed educational program on the importance of HPV vaccination education focused on the benefit of the HPV vaccine as cancer prevention, the barriers to vaccination, and the trust of providers should be encouraged to enhance vaccination confidence and uptake among this high-risk population.

#### Conclusion

HPV vaccination is effective in preventing pre-cancers and cancers of the oropharynges, anus, penis, cervix, vulvar, and vagina. Prevention of HPV infection is paramount among the non-Hispanic black population because they have the highest cancer mortality rate. A literature review identified limited knowledge, trust of healthcare providers, benefits, and barriers to HPV

vaccination as significant factors affecting HPV vaccination uptake among this high-risk population. The current study focused on the factors affecting HPV vaccination among the non-Hispanic Black population effectively increased HPV vaccination confidence, attitude, and belief. Nurses can play a significant role in providing cancer prevention education in the community. Future studies should focus on HPV vaccination uptake among this high-risk population.

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## Figure 3.1

Randomization Flow Diagram



## Experimental Group Intervention Table

WEEK (1) one hour	WEEK (2) one hour
Benefits of HPV Vaccines	Barriers to HPV Vaccine (Harms)
<ul> <li>Why HPV vaccination topic?</li> <li>What are the literature findings? African American women have the highest death rate from cervical cancer</li> <li>Definition of HPV infection</li> <li>Benefits of the vaccine with a focus on cancer prevention</li> <li>The vaccine prevents HPV disease and spread of disease to others</li> <li>Safety and effectiveness of the vaccine</li> <li>A short video of Non-Hispanic Black women advocating for HPV vaccination https://www.youtube.com/watch?v=U XFoc4wKECs</li> <li>A short video of a patient diagnosed with HPV related cervical cancers (Permission letter will be obtained for the short video). https://www.youtube.com/watch?v=Ico UUnOyEgU</li> <li>A short video of a patient diagnosed with HPV related cervical cancers. Permission was obtained. https://www.youtube.com/watch?v=Oz ACE58qTFw</li> </ul>	<ul> <li>Definitions of HPV vaccine</li> <li>Low vaccination rate and limited number of doses of the vaccine.</li> <li>Importance of dose completion</li> <li>Access to vaccination sites</li> <li>Side effects of vaccination</li> <li>HPV vaccination costFree vaccine through Vaccine for Children (VFC) program for uninsured and Medicaid eligible children. The VFC can be received from most pediatrician's clinic and county health clinics</li> <li>The Trust of Providers (Cues to Action)</li> <li>Provider recommendation of HPV vaccination.</li> <li>Relationship with the pediatrician</li> <li>Parents should discuss with their pediatrician about HPV vaccination of their children</li> <li>Shot video of a physician recommending HPV vaccination. https://www.youtube.com/watch?v=Y 2SB0yr1fhY</li> <li>Discussions, questions, and answers</li> </ul>

• Discussions, questions, and answers

Variable	Number of	Reliability	Scales or items
	items		
Vaccine Confidence	8	0.87	Scale of 0 to 10 (0- strongly
Scale (VCS)			disagree and 10- strongly agree).
The Carolina HPV	16	0.86	Scale of 1 to 4 (1- strongly
Immunization			disagree and 4- strongly agree).
Attitudes and			
<b>Beliefs Scale</b>			
(CHIAS)			

Internal Consistency Reliability of the Study

Demographic Characteristics of Participants

Characteristic	n	(%)
Child Age(years)		(·-)
9-12	45	64.3
13-17	25	35.7
Child's Gender		
Female	56	80
Male	14	20
Race/ethnicity		
Mother's Race/ethnicity		
(Non-Hispanic Black)		
African American	47	67.1
African women residing in	22	31.4
the USA		
Caribbean	0	0
Haitian	0	0
Other (Specify)	1	1.4
State of residence in the		
USA		
California	6	8.6
Georgia	7	10
Illinois	1	1.4
Indiana	1	1.4
Minnesota	1	1.4
Mississippi	1	1.4
New York	7	10
Texas	38	54.3
Virginia	8	11.4
Total	100	100
Vaccines for Children		
Eligibility		
Yes	54	77.1
No	16	22.9
Not reported	0	0
Child's Vaccination		
History up to Date		
Yes	58	82.9
No	12	17.1
Marital status		
(Mother/female guardian)		

Characteristic	п	(%)
Married /living with a	59	84.3
partner		
Single/divorced	11	15.7
<b>Mothers' Educational</b>		
status		
Less than high school	1	1.4
High school/Diploma	13	18.6
College Degree	47	67.1
Others (Please specify)	9	12.9
Household income		
Less than \$30,0000	15	21.4
\$30,000 - \$39,000	3	4.3
\$40,000 - \$59,000	12	17.1
\$60,000 - \$80,000	11	15.7
Over \$80,000	26	37.1
Not reported	3	4.3
Health insurance status		
insured	54	77.1
Uninsured	16	22.9
<b>Religious or spiritual</b>		
Yes	66	94.3
No	4	5.7
Awareness of HPV		
vaccine		
Yes	65	92.9
No	5	7.1

Means and Standard Deviations of the Carolina HPV Immunization Attitudes and Beliefs Scale (CHIAS) and Vaccination Confidence Scales (VCS) Scores

Scales	Experimental	Control	Total	Statistic
CHIAS	( <i>n</i> = 37)	( <i>n</i> = 25)	( <i>N</i> = 62)	
Post second intervention	3.40 (0.44)	2.96 (0.57)	3.22 (0.54)	<i>p</i> = .001
4 weeks post second intervention	3.35 (0.49)	3.01 (0.68)	3.21 (0.60)	<i>p</i> = .024
VCS	( <i>n</i> = 37)	( <i>n</i> = 26)	( <i>N</i> = 63)	
Post second intervention	9.51 (1.41)	8.93 (1.65)	9.27 (1.53)	<i>p</i> = .140
4 weeks post second intervention	9.43 (1.42)	8.59 (1.76)	9.08 (1.61)	<i>p</i> = .041

*Note.* "*p* values were the statistics to compare two groups at each time point".
### CHAPTER IV

### CONCLUSION

### Introduction

The dissertation study explored the low rate of HPV vaccination among non-Hispanic Black mothers despite the effectiveness of HPV vaccination. There was a need to improve HPV vaccination among Black mothers due to the high mortality rate of cervical cancer among this high-risk population. A comprehensive literature review was performed to understand factors related to HPV vaccination decisions among Black mothers showed that maternal attitude/belief and knowledge of HPV and HPV vaccination are important in HPV vaccination decisions among this population. A two-group randomized control trial with HPV vaccination education offered to the experimental group indicated positive HPV vaccination attitude and beliefs and improved vaccination confidence among non-Hispanic Black mothers.

This chapter captures information not covered in previous chapters. Additional discussion of the protection of human subjects, the measurement tools, and modifications based on the pilot study are covered in this chapter. The setting for the study was via online platforms using social media platforms (LinkedIn, Facebook, and Twitter). The online environment was used to prevent social gatherings due to COVID-19 precautions. The study flyer was posted on LinkedIn, Facebook, and Twitter, and the researcher followed predominantly non-Hispanic Black organizations, health clinics, and community centers (see Appendix A). Measures to protect human subject was applied using the IRB.

### **Protection of Human Subjects**

The permission to conduct the study was obtained from the IRB at Texas Woman's University Houston (see Appendix B). Participants were screened using the eligibility criteria form (see Appendix C). The study's informed consent was reviewed, approved, and stamped by the IRB (see Appendix D). The consent was sent to eligible participants via email, and they signed and returned the consent form using DocuSign e-signature. The DocuSign features prompted participants to complete the electronic consent form, apply e-signatures, initials, and dates, then click the send button to return the document. There was no need for the participants to print or download a consent copy.

The study consent had a detailed explanation of the research process, such as the length of the study, the onset of the research study, the expected end of the study, the number of educational sessions, and the number of times the survey will be given. Participants were informed of their right to stop participating in the study at any time during the study. The participants' privacy was maintained; no identifying information was collected in the survey, and the researcher coded the survey forms before the data collection.

An explicit instruction was given to participants on how to reach the researcher. The researcher's email address and phone number were made available to the participants. Alternate contact information for the study chair was available to the participants if they could not reach the researcher at any time. Questions related to a participant's right should be forwarded to the Texas Woman's University's Office of Research and Sponsored Programs via the phone number and email address provided.

The online survey was stored in the researcher's password-protected cloud-based storage to maintain subjects' confidentiality. Copies of the signed consent will be submitted to the IRB after the study completion close request is submitted. The signed consent will be stored for 3 years after study completion and deleted from the cloud-based storage.

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The participants were informed of the study's potential risk, and steps to minimize the risks were explained.

## The Potential Risk of the Study Included:

- Possible risk of discomfort when discussing sensitive information about teen or pre-teen's reproductive health during the class presentation.
- Risk of loss of confidentiality related to personal identifying information. Confidentiality was protected to the extent that is allowed by law.
- Potential risk of loss of confidentiality in all email, downloading, electronic meetings, and internet transactions.
- Risk of loss of confidentiality through Zoom bombing and unwanted intruders during meetings.
- Risk of exposure to COVID-19 if the participant has to make a physical appearance on-site for any study activities.
- Risk of loss of time for participating in the research study. The participants received a \$25 gift card for participating in the study.

## The Steps to Minimize the Risks Included:

- Strategies to minimize the possible risk of discomfort: Participants were
  instructed to stop participation at any time if they became tired or uncomfortable.
  The researcher encouraged the participant to talk to a professional about any
  emotional discomfort. The list of professionals with contact information was
  made available to the participants if needed.
- Confidentiality was protected to the extent that was allowed by law. However, anonymity cannot be guaranteed. The participant did not provide a name or any

personal identification on the survey. A code was assigned to each participant instead of using the participant's name in the survey and demographic information to maintain confidentiality. A roster was compiled with a code that linked each participant's eligibility form to their survey and demographic information. Only the researcher and her study chair had access to the study information. Study paper copy materials were locked up in the researcher's home, and only she had access to the key, and online records were stored under password-protected cloud storage. Records will be destroyed 3 years after the study is closed. The study results will be reported in scientific magazines or journals, but the participants' names or other identifying information will not be included.

- To minimize the potential risk of loss of confidentiality in all email, downloading, electronic meetings, and internet transactions. The participants were instructed to develop passwords with adequate strength and avoid sharing emails password with other people.
- The loss of confidentiality through Zoom bombing and unwanted intruders was minimized by sending Zoom meeting links to participants with a password to enter the meeting and placing participants in the waiting room for the researcher to let them in the class.
- The study intervention classes and surveys were offered entirely online through Zoom. There was no need for any participant to come to any site to meet the researcher for any reason. COVID-19 precautions would be used by requiring face covering with a mask and social distancing if any meeting were scheduled with the researcher for any reason.

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• For loss of time, each participant received a \$25 electronic gift card after the study completion, and \$25 Amazon electronic gift cards were sent to the participant's email address.

### Instruments

A more detailed discussion of the study instrument is presented in this chapter, including the validity and reliability of the instrument. The study was measured using two instruments: the VCS and the CHIAS. Two measurement scales were used to capture general vaccination confidence and HPV vaccination attitude and confidence among non-Hispanic black mothers. The measurement was in two layers; the first layer examined the overall parental vaccine confidence and attitude using VCS subscales (Benefit, Harm, and Trust; see Appendix E). The second layer explored HPV-specific parental attitudes and beliefs using CHIAS subscales (Harm, Barrier, Effectiveness, and Uncertainty; see Appendix F).

The VCS developed by Gilkey et al. (2014) used only three constructs of the HBM, including the Perceived Benefit, Perceived Barrier, and Cues to Action. These three constructs matched the VCS subscales (Benefit, Harm, and Trust) used to develop 8 of the 11-points response scale items of the parental attitude model. Gilkey et al. (2014) deleted three items from the 11-points response scale after exploratory factor analysis because they did not load in any of the factors meaningfully. These three VCS constructs were matched to the three HBM constructs as a Benefit (Perceived Benefit) with 4 response items, Harm (Perceived Barriers) with 2 items, and Trust (Cues to Action) with 2 items, adding to a total of 8-points response scale as shown below in (see Figure 4.1).

### Figure 4.1

### Vaccine Confidence Scale (VCS) Items



The Parent's 8-item vaccination belief survey has a response scale that ranged from 0 (*strongly disagree*) to 10 (*strongly agree*). A verbatim response with answers equals to or greater than 7 indicates parents are more likely to agree, and parent with response equal to or less than 6 is more likely to disagree.

### **Reliability for VCS**

A confirmatory analysis performed by Gilkey et al. (2014) for the one-factor scale and three-factor scale showed the one-factor scale known as "General Confidence," which revealed a positive parental attitude to vaccination with a coefficient alpha of 0.77. A three-factor analysis has more specific information covering the three constructs: (1) Benefit with alpha = 0.78, (2) Harm with alpha = 0.49, and (3) Trust with alpha = 0.51. The three-factor scale showed a good fit with a comparative fit index of 0.97.

### Validity for VCS

The type of construct validity used for the study scale was convergence validity. The confirmatory factor analysis for the one-factor scale-showed overall confidence was high, M = 8.15, SE = 0.02. The three-factor scale indicated that parents generally gave high ratings to Benefits and Trust (M = 8.45, SE = 0.03; and M = 9.04, SE = 0.02), respectively. The three-factor scale was found to be an efficient way to measure parental confidence in adolescent vaccination.

The CHIAS developed by McRee et al. (2010) examines the extent to which attitudes and beliefs were associated with parents' intention to vaccinate their adolescent child against HPV. It was believed to be the first scale measuring parental attitude and beliefs towards HPV vaccination. CHIAS measurement tool has four subscales, which include (Harm, Barrier, Effectiveness, and Uncertainty). These constructs matched with the three HBM items as follows: Perceived Barrier (Harm), Perceived Barrier (Barrier), Perceived Benefit (Effectiveness), and Cues to Action (Uncertainty about HPV vaccine).

The CHIAS constructs were used to develop 16 of the 18-item surveys from the Carolina HPV Immunization Measurement and Evaluation (CHIME) designed to investigate HPV vaccine decisions on women with high-risk cervical cancer. An exploratory factor analysis of the 18 items was done using principal components analysis with direct oblimin rotation, allowing the factors to correlate using baseline data. A confirmatory factor analysis was done, and four factors solution was developed after factor loading because it was meaningful. Two items were deleted from the analysis because they did not load adequately into any factor.

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The 16 items in the HPV vaccine attitude survey questions were formed using the four subscales of CHIAS. The measurement tool has a 4-point response scale that ranged from 1 (*strongly disagree*) to 4 (*strongly agree*) with a response of *do not know* recorded as the variable's mean. High values are an indication of stronger agreement with the statement. Items with barrier questions are rescaled, so the higher values indicate a more significant barrier. Items with negative correlations will be reverse-coded.

### **Reliability for CHIAS**

The possible range for the result of factor scores was 1.0 - 4.0. The internal consistency of all the four factors were acceptable with Cronbach's alpha: perceived vaccination harms ( $\alpha = 0.69$ ), perceived barrier ( $\alpha = 0.69$ ), perceived vaccination effectiveness ( $\alpha = 0.61$ ), and uncertainty about the vaccine ( $\alpha = 0.66$ ). The confirmatory factor analysis showed that four factors fit the data well with a general acceptability fit index of (CFI = 0.949; RMSEA = 0.042;  $\chi 2 = 231.8$ , df = 98, p < 0.001; relative  $\chi 2 = 2.265$ ).

The 1-year follow-up measurement with three CHIAS factors showed good internal consistency with (Harms,  $\alpha = 0.73$ ; Effectiveness,  $\alpha = 0.69$ ; Uncertainty,  $\alpha = 0.59$ ). The scores showed good test-retest reliability with moderate size correlation of the baseline and follow up scores (Harms, r = 0.66, p < 0.001; Effectiveness, r = 0.42, p < 0.001; Uncertainty, r = 0.44, p < 0.001). Parents perceived few vaccine harms and had less uncertainty about HPV vaccine compared to baseline.

### Validity for CHIAS

The convergent construct validity was used. The study showed that overall, parents perceived the HPV vaccine to be moderately effective (M = 2.42, SD = 0.60), many parents have uncertainty about the vaccine (M = 2.90, SD = 0.76), and are concerned about potential

harm (M = 2.21, SD = 0.53). Although parents perceived some barriers to vaccination, most parents have the intention to vaccinate their daughters in the next year.

These constructs from VCS and CHIAS formed the intervention's education content to increase the non-Hispanic Black mothers' confidence and attitude in securing their children's HPV vaccination.

### Modification of the Study Based on Pilot Study

The sample size was small in the pilot study. A larger sample size was a critical recommendation for the main study. An effort was made to increase the population sample due to a 30% attrition rate. Participants' recruitment was performed through social media to reach and engage more participants instead of using a few church sites. Participants were recruited through social media such as Twitter, Facebook, and Linkedln. Also, snowball recruitment strategies were used. Flyers were distributed through social media platforms, including Twitter, Facebook, and LinkedIn to non-Hispanic Black organizations, community groups, churches, health clinics, and sorority organizations with predominantly non-Hispanic Blacks. The researcher identified ways to reduce attrition by offering gift cards and consistent connections with participants through phone calls, texts, and emails.

A second measurement scale called CHIAS was added to the study to measure HPVspecific attitudes and beliefs about parental vaccination of adolescents since VCS was designed to measure parental vaccination confidence in general.

### Summary

This chapter provided a summary of the study and discussed other study content not covered in previous chapters. The measures to protect human subjects were discussed, including the risk of loss of confidentiality, time, COVID-19 restrictions, and measures to mitigate the

risks. The modification of the study based on the pilot study was discussed, including participants' recruitment via social media and the addition of an HPV-specific measurement tool called CHIAS to capture non-Hispanic Black mothers' attitudes and beliefs in HPV vaccination of their children. The significance of the combination of the two measurement tools (CHIAS and VCS) was discussed in detail in this chapter, including the validity and reliability of the measurement tools. The pilot study results provided an opportunity for a better recruitment setting via an online platform and the addition of HPV-specific measurement scale (CHIAS). The study findings identified higher confidence, more positive attitude, and belief in HPV vaccination among participants randomized to the importance of HPV vaccination education group.

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## APPENDIX A

## STUDY FLYER

# Volunteers Wanted for Research Study

Are you interested in learning about Human Papillomavirus (HPV) vaccination? Do you have questions about vaccinating your child against HPV?

### **Eligibility:**

- Non-Hispanic Black mother?
- 18 years or older?
- Able to speak and read English?
- Child between 9 to 17 who have not received HPV vaccination?
- Resides in the United States of America

\* If you answered yes, you may be eligible to participate in a research study



### **Study Purpose**

• To understand the effect of HPV vaccination education.

# Participants will be Asked to Participate in:

- 2 one-hour educational sessions one week apart.
- 2 survey collection sessions
- Total time for the entire study will be 3 hours

### Participants will Receive

- A **\$25** gift card will be given to those who complete the study
- All study presentations are done virtually using Zoom
- This study is being conducted at Texas Woman's University in Houston Texas.

For participation and for more information about your eligibility for the study, please call or email

Stella Dike; Sdike1@twu.edu : 713-319-8413

## APPENDIX B

## INSTITUTIONAL REVIEW BOARD APPROVAL LETTER

September 9, 2020

Stella Dike Nursing - Houston

Re: Initial - IRB-FY2020-327 The effect of an educational intervention to increase Human Papillomavirus (HPV) vaccination confidence and acceptability among Non-Hispanic Black mothers of children 9-17 years.

Dear Stella Dike,

The above referenced study has been reviewed and approved using expedited review procedures on September 7, 2020, by the TWU IRB - Houston operating under FWA00000178. If you are using a signed informed consent form, the approved form has been stamped by the IRB and uploaded to the Attachments tab under the Study Details section. This stamped version of the consent must be used when enrolling subjects in your study.

Note that any modifications to this study must be submitted for IRB review prior to their implementation, including the submission of any agency approval letters, changes in research personnel, and any changes in study procedures or instruments. Additionally, the IRB must be notified immediately of any adverse events or unanticipated problems. All modification requests, incident reports, and requests to close the file must be submitted through Cayuse.

Approval for this study will expire on December 31, 2021. A reminder of the study expiration will be sent 45 days prior to the expiration. If the study is ongoing, you will be required to submit a renewal request. When the study is complete, a close request may be submitted to close the study file.

If you have any questions or need additional information, please contact the IRB analyst indicated on your application in Cayuse or refer to the IRB website at http://www.twu.edu/institutional-review-board-irb/.

Sincerely,

TWU IRB - Houston

# APPENDIX C

## ELIGIBILITY CRITERIA QUESTIONNAIRE

Name.....

Participant #.....

Phone number .....

Email address .....

Date .....

Eligibility Questions	yes	No	Ages of the children	Age of the mother
Do you have any child between the age of 9-17? If yes, please state the age of your				
child between 9-17.				
Have the children above received				
any dose of HPV vaccination?				
How old are you? Please state				
your age				
Can you speak English?				
Can you read English?				
Do you reside in the United States				

### APPENDIX D

### INFORMED CONSENT

### TEXAS WOMAN'S UNIVERSITY (TWU) CONSENT TO PARTICIPATE IN RESEARCH

The Effect of an Educational Intervention to Increase Human Papillomavirus (HPV) Vaccination Confidence and Acceptability Among Non-Hispanic Black Mothers of Children 9-17 years.

Principal Investigator:	Stella Dike, MSN, OCN	. sdike l@twu.edu	713/319-8413
Faculty Advisor:	Sandra Cesario, PhD	.SCesario@twu.edu	713/794-2110

### Summary and Key Information about the Study

You are being asked to participate in a research study for Ms. Stella Dike's dissertation at Texas Woman's University. The purpose of this study is to understand the effect of HPV vaccination education on Non-Hispanic Black mother's confidence in HPV vaccination of their pre-teens and teens. Findings from this study will inform healthcare providers about the best method of providing HPV vaccination education. You have been invited to participate in this study because you are a Non-Hispanic Black mother, and you have a child between the age of 9-17 years who have not been vaccinated against HPV. As a participant in this study, you will be asked to attend two 1-hour classes on either HPV vaccination or healthy nutrition. You will be assigned to one of these groups. You will also complete two surveys. The classes and the surveys will be conducted online using Zoom to reduce the risk of COVID-19 exposure. The total time commitment for this study will be about three hours. A \$25 gift card will be given to each person that completed the two classes and two surveys at the end of the study. The greatest risks of this study include the potential loss of confidentiality, emotional discomfort, and possible exposure to coronavirus (COVID-19) if you have to go to the classroom on-site for any study activities. We will discuss these risks and the rest of the study procedures in greater detail below.

Your participation in this study is completely voluntary. If you are interested in learning more about this study, please review this consent form carefully and take your time deciding whether or not you want to participate. Please feel free to ask the researcher any questions you have about the study at any time.

### Description of Procedures

As a participant in this study, you will be asked to attend two 1-hour classes on either HPV vaccination or healthy nutrition. The researcher will assign you to one of these groups. If you are placed in the nutrition group, you will be offered the opportunity to participate in 1-hour HPV presentation after the study has been completed. The researcher will also ask you to complete two surveys. The first one will be completed immediately after the second class, and the second survey will be conducted at four weeks later. The total time commitment for this study will be about three hours, including time for instructions, surveys, and consents. The presentations and the surveys will be offered online using the Zoom to reduce the risk of exposure to coronavirus (COVID-19). To participate in this study, you must be 18years of age or older, able to speak and read English, and have a child between 9-17 years who have not been vaccinated against HPV.

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#### Potential Risks

The rescarcher may present some sensitive information about the reproductive health of your teen or pre-teen in the class. A possible risk in this study is discomfort with the discussion of these topics. If you become tired or uncomfortable, you may stop your participation at any time. If you feel you need to talk to a professional about your discomfort, the researcher will provide you with a list of resources.

Another risk in this study is a loss of confidentiality. Confidentiality will be protected to the extent that is allowed by law. A code name, not your real name, will be used to record the data collected in this study. Only the researcher and her advisor will have access to the study information. Study materials will be locked up in researcher's home, and only she will have access to the key; records will be destroyed three years after the study is closed. The results of the study will be reported in scientific magazines or journals, but your name or any other identifying information will not be included.

There is a potential risk of loss of confidentiality in all emails, downloading, electronic meetings, and internet transactions. This can be minimized by using passwords and avoid sharing email password with other people. Also, there is a risk of loss of confidentiality through Zoom bombing and unwanted intruders. This risk can be minimized by sending the Zoom meeting link to participants, use of a password to enter the meeting, and placing participants in the waiting room for the researcher to let them in the meeting.

Also, there may be a risk of exposure to COVID-19 if you have to go to the classroom on-site for any study activities. We prefer to offer all classes and surveys online through Zoom, but if you have to go to the site for any reason, COVID-19 prevention precautions will be used by requiring face covering with a mask, social distancing, and wiping equipment (chair, table, laptops, mouse) with sanitizers before and after use. Hand sanitizers will be available in the classroom. You will be asked some screening questions regarding exposure to COVID-19, and the researcher may take your temperature upon arrival before the class.

There will be a risk for loss of time by participating in the research. You will receive a \$25 gift card for participating in the study.

Your personal information collected for this study will not be used or distributed for future research even after the researchers remove your personal or identifiable information such as your name, date of birth, and contact information.

The researcher will try to prevent any problem that could happen because of this research. You should let the researchers know at once if there is a problem, and they will help you. However, TWU does not provide medical services or financial assistance for any injuries that might happen because you are taking part in this research.

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### Participation and Benefits

Your involvement in this study is entirely voluntary, and you may withdraw from the study at any time. Following the completion of the study, you will receive a \$25 gift card for your participation. If you would like to know the results of this study, we will email or mail them to you.\*

### Questions Regarding the Study

You will be given a copy of this signed and dated consent form to keep. If you have any questions about the research study, you should ask the researchers; their contact information is at the top of this form. If you have questions about your rights as a participant in this research or the way this study has been conducted, you may contact the TWU Office of Research and Sponsored Programs at 713-794-2480 or via email at irb@twu.edu.

Signature of Participant

Date

\*If you would like to know the results of this study tell us where you want them to be sent: Email: \_\_\_\_\_\_ or Address: \_\_\_\_\_\_



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# APPENDIX E

# VACCINATION CONFIDENCE SCALE (VCS)

The Vaccination Confidence Scale Survey											
Please rate the items below on a scale of 0 to 10 (0- strongly disagree and 10- strongly agree).											
1. Vaccines are necessary to protect the health of children											
	strongly disagree						strongly agree				
	0	1	2	3	4	5	6	7	8	9	10
2.	Vaccin	ies do a g	good job	in preve	enting th	e disease	s they ar	re intend	ed to pr	event	
	strongly disagree strongly agree										
	0	1	2	3	4	5	6	7	8	9	10
3.	Vaccin	ies are sa	ıfe								
	strongly disagree strongly agree										
	0	1	2	3	4	5	6	7	8	9	10
4.	If I do	not vacc	inate my	y child, h	ie/she ma	ay get a d	lisease s	uch as m	easles		
	strongly disagree strongly agree										
	0	1	2	3	4	5	6	7	8	9	10
5.	Children receive too many vaccines										
	strong	ly disagr	ee					str	ongly ag	gree	
	0	1	2	3	4	5	6	7	8	9	10
6.	If I vaccinate my child, he/she may have serious side effects										
	strongly disagree strongly agree										
	0	1	2	3	4	5	6	7	8	9	10
7.	In general, medical professionals in charge of vaccinations have my child's best										
	interes	t at hear	·t.								
	strong	strongly disagree strongly agree									
	0	1	2	3	4	5	6	7	8	9	10
8.	I have	a good r	elationsl	hip with	my child	l's health	ı care pr	ovider.			
	strong	ly disagr	ee					S	trongly	agree	
	0	1	2	3	4	5	6	7	8	9	10

# APPENDIX F

## THE CAROLINA HPV IMMUNIZATION ATTITUDES AND BELIEFS SCALE (CHIAS)

	Please rate the items below on a scale of	Do	Strongly	Disagree	Agree	Strongly
	1 to 4 (1- strongly disagree and 4-	not	Disagree			Agree
	strongly agree).	know	1	2	3	4
1	The HPV vaccine might cause short-term					
	problems, like fever or discomfort?					
2	The HPV vaccine is being pushed to make					
	money for drug companies?					
3	The HPV vaccine might cause lasting					
	health problems?					
4	If a teenage girl gets the HPV vaccine, she					
	may be more likely to have sex?					
5	I think the HPV vaccine is unsafe?					
6	My child is too young to get a vaccine for					
	a sexually transmitted infection like HPV?					
7	How hard do you think it would be to find					
	a provider or clinic where you can afford					
	the vaccine?					
8	How hard do you think it would be to find					
	a provider or clinic that is easy to get to					
9	How hard do you think it would be to find					
	a provider or clinic that has the vaccine					
10	available					
10	I am concerned that the HPV vaccine					
11	costs more than I can pay					
11	How hard do you think it would be to find					
	a provider or clinic where you don't have					
10	to wait long to get an appointment?					
12	How effective do you think the HPV					
12	How offootive do you think the HDV					
15	vaccine is in preventing cervical cancer?					
14	I don't have enough information about the					
14	HPV vaccine to decide whether to give it					
	to my child					
15	The HPV vaccine is so new that I want to					
15	wait a while before deciding if my					
	daughter should get it					
16	Other parents in my community are					
	getting their daughters the HPV vaccine					
1						