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Improving Human Papillomavirus Vaccination Rates Through Evidence-Based Interventions

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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Walden University
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Abstract

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MS, Alcorn State University, 2014

BS, Excelsior College, 2011

Project Submitted in Partial Fulfillment

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Doctor of Nursing Practice

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Abstract

Cervical cancer is the most common human papilloma virus (HPV) -associated cancer and is the second leading cause of death in the world. Vaccination against HPV is essential to reduce the incidence of HPV and subsequent morbidity and mortality. According to the Centers for Disease Control and Prevention (CDC), approximately 79 million Americans are currently infected with HPV. The site for this DNP project was a 163-bed facility with inpatient and outpatient services in the southern United States. The vaccination rate at the site was 48%. The facility lacked educational interventions to prepare and remind providers to offer HPV vaccine. The purpose of this DNP project was to address a significant gap by increasing clinician knowledge through the development of educational materials, the design and implementation of training sessions for staff, and the development of protocols that require providers to offer the vaccine to every eligible patient and to call the patient and remind them of appointments for vaccine injections. The academic center for evidence-based practice star model was used to translate knowledge into nursing practice to improve outcomes change. For this project, a panel of 10 experts from the facility was formed to conduct a formative and summative evaluation of the educational materials and protocols. The findings of the study showed an acceptance of the plan suggesting the importance of the educational materials and the educational process to increase HPV vaccination rates, which can thereby reduce death and disease associated with HPV through the empowerment of the clinicians to provide necessary and appropriate care.

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Dedication

This project is dedicated to my daughter, Lizzie Grace Thompson, who has served as a constant source of motivation as I reach for success in my endeavors.

Acknowledgments

I thank God for His guidance as I continue to strive to find and fulfill my purpose. I extend gratitude to my parents, Percy and Liz Thompson. Thank you for your love and support throughout my career. I also extend thanks to Dr. Marisa Wilson for her guidance throughout this academic journey.

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Section 1: Nature of the Project

Introduction

The human papillomavirus (HPV) is the most common sexually transmitted infection. There are more than 40 types of HPV that can infect the genital area, mouth, and throat. More than 50% of sexually active individuals will be diagnosed with genital HPV at some point in their lives (Dunne et al., 2014). Studies show that 66% of cervical cancers, 55% of vaginal cancers, 79% of anal cancers, and 62% of oropharyngeal cancers are attributable to HPV Types 16 or 18 (Dunne et al., 2014). Cervical cancer is the second leading cause of cancer deaths among women around the world (Petrosky et al., 2015). The Advisory Committee on Immunization Practices (ACIP) of the Centers for Disease Control (CDC) recommend that routine HPV vaccination be initiated at ages 11 or 12 years. However, the vaccination series can be started as early as age 9 years. Females aged 13 through 26 years and males aged 13 through 21 years who have not already received the vaccine or completed the three-dose series should also be vaccinated. Males aged 22 through 26 years, particularly those who are high risk, can also receive the vaccine (Petrosky et al., 2015). Although vaccines are available, the HPV vaccination rate remains low. The vaccination rate at the project facility was 48%, which is below the Healthy People 2020 goal of 80% (Hariri et al., 2014). Developing interventions to improve HPV vaccination at this facility can decrease the risk for HPV, associated cancers, and death.

The U.S. Food and Drug Administration (FDA) approved Gardasil in 2006 to prevent HPV Types 6, 11, 16, and 18. These HPV types can cause cervical cancer, anal cancer, and genital warts. At that time, the Gardasil vaccine was recommended for use in females ages 9 to 26 years and was not recommended for males (FDA, 2015b). In 2009, the FDA approved Gardasil for use in males ages 9 to 26 years to prevent genital warts caused by HPV Types 6 and 11 (FDA, 2015b). The FDA approved Cervarix in 2009 for females 10 to 25 years of age for the prevention of HPV types 16 and 18 (FDA, 2015a). In 2014, Gardasil 9 was approved for females ages 9 to 26 years and males ages 9 to 15 years for the prevention of cervical, vulvar, vaginal, and anal cancers caused by HPV Types 16, 18, 31, 33, 45, 52, and 58. The five additional HPV types covered by Gardasil 9 are not covered by the previously approved vaccines (FDA, 2014). HPV vaccination consists of three injections administered in the course of 6 months (CDC, 2015).

The project location was the women's clinic at a 163-bed medical center in the southern United States. The medical center provides primary, secondary, and tertiary medical, neurological, and mental health inpatient care as well as a variety of specialized outpatient services. Female veterans have access to comprehensive health care through the clinic and that includes cervical and breast cancer screenings and HPV vaccine (U.S. Department of Veterans Affairs, 2015). The target population for this project was clinicians caring for female veterans ages 18 to 26 years at the facility. HPV is most common in individuals in their late teens and early 20s. Most men who contract

HPV never have symptoms and most cases usually resolve without intervention (CDC, 2015). Costs, a perception that the vaccine is not beneficial, fear, side effects, and recommendation of a health care provider can affect vaccine acceptance (Rambout et al., 2014).

Problem Statement

Although HPV vaccines are available, vaccination rates remain low. According to the CDC (2013), individuals are not receiving HPV vaccine when they receive other recommended vaccines. In 2009, a national immunization survey administered by the CDC revealed that HPV vaccination coverage among females ages 18 to 26 years was 17.1% (CDC, 2011). In 2013, girls ages 13 to 17 years who received at least one dose of HPV vaccine was 57.3%, whereas 91.3% of girls age 13 years would have received at least one dose of HPV vaccine had they received it at the same time they received other recommended vaccines (CDC, 2013). The target population for this project was clinicians caring for female veterans ages 18 to 26 years at the VA facility. The vaccination rate at the Jackson VAMC was 48%. Eligible patients at the facility were not accepting the vaccine. Healthy People 2020 goals include 80% coverage of three doses of HPV vaccines for females by ages 13 to 15 years and to reduce the death rate from cancer of uterine cervix below a target of 2.2 deaths per 100,000 females from a baseline of 2.4 deaths per 100,000 females in 2007. There is also a goal to increase the number of women who receive cervical cancer screening with a target of 0% of women ages 21 to 65 years from a baseline of 84.5% in 2008 (Hariri et al., 2014). Vaccination before exposure to HPV will optimize the vaccine's effectiveness (CDC, 2014).

The problem that I addressed in this project was the lack of education related to HPV and its vaccines at the site. The significance of this DNP project was the development of evidence-based protocols and interventions to increase clinician

education and thereby increase vaccine acceptance among patients.

Purpose Statement

The purpose of this evidence-based project (EBP) was to develop interventions that would increase HPV awareness among patients and clinicians and thereby reduce the morbidity and mortality associated with HPV.

Project Objectives

The objectives for this project are as follows:

Objective 1: Develop evidence- based educational materials for patients and clinicians concerning HPV and vaccination.

Objective 2: Design and implement training sessions to prepare providers and nurses to offer HPV vaccine.

Objective 3: Develop a protocol that requires providers to offer HPV vaccine during every encounter to eligible patients who have not received the vaccine.

Objective 4: Develop a protocol that requires staff to call patients to remind them of appointments for follow-up vaccine injections.

Nature of Doctoral Project

The nature of the project was to address the low HPV vaccine acceptance rate. I developed evidence-based educational materials, training sessions, and protocols that would increase awareness and knowledge of HPV and vaccines. An expert panel

completed a formative evaluation on the educational interventions and provided feedback. The feedback improved the content validity and efficacy of the educational materials, training sessions, and protocols. I gave these materials to the facility for future use.

Evidence-Based Significance of the Project

HPV vaccination has proven effective in preventing HPV infections in women as well as cancers associated with it. Knowledge can affect HPV vaccine acceptance. Provider recommendation has been found to be one of the strongest predictors of vaccination (Conroy et al., 2009). According to Cates et al. (2009), low intention to accept HPV vaccine among African Americans was associated with lower levels of knowledge about HPV and cervical cancer. Women were also found to have limited knowledge about HPV and vaccination (Kwan et al., 2009). Developing evidence-based interventions to educate health care professionals and establish protocols can increase knowledge of HPV and available vaccines among providers and thereby increase vaccination and reduce the death and disease associated with it (CDC, 2014). Preventing HPV and cancers will also reduce costs associated with follow-up procedures and treatments (ACOG, 2015).

Implications for Social Change in Practice

Walden University defines *positive social change* as "a deliberate process of creating and applying ideas, strategies, and actions to promote the worth, dignity, and development of individuals, communities, organizations, institutions, cultures, and societies" (Walden University, 2014, p.1). The interventions in this project were

designed to raise awareness and provide education for health care providers concerning HPV and available vaccines. This increased knowledge can be used to educate patients and increase their likelihood of accepting HPV vaccine, thereby reducing the burden associated with HPV. Male and female patients at risk for HPV will benefit from this research through the evidence-based guidelines designed to improve acceptance of HPV vaccine. Vaccinated male and female patients will have a reduced likelihood of contracting HPV thereby increasing their opportunities for longer, healthier lives. They will also avoid costs associated with treatment of HPV-associated conditions. These healthy individuals can contribute to society through the development of self and working in their organizations and communities. I also designed this project to increase the ability of the organization to sustain changes in practice and continue to identify and address practice problems.

Definitions of Terms

An a*ttitude* is a way of thinking or perception that makes one behave in a certain way (Merriam-Webster, 2018a).

A *barrier* is an object, real or perceived, which can prevent one from performing a behavior (Rosentsock, 1974).

Education is the action or process of gaining knowledge and skill from study or training (Merriam-Webster, 2018b).

Human Papillomavirus is a group of more than 150 viruses that can cause warts or cancer. There are more than 40 types of HPV. It is the most commonly sexually transmitted infection and is spread through intimate skin-to-skin contact (CDC, 2015).

HPV vaccination is a vaccination given to protect against HPV and the potential health problems associated with HPV infection (CDC, 2015).

Perception is the way in which one understands someone or something

(Merriam-Webster, 2018c).

Seriousness is the possibility of being dangerous (Merriam-Webster, 2018d).

Susceptibility is the state of being affected or hurt by something (Merriam-Webster, 2018e).

Assumptions and Limitations

The major assumption that I made in this study was that stakeholders would want to implement the project plan and sustain it after the project was complete. I also assumed that the rate of HPV vaccine acceptance would increase among young adult women ages 18 to 26 years who are eligible to receive the vaccine. An additional assumption was that after educating nurses and providers, they would offer the vaccine to each eligible patient, identify potential and actual barriers, and develop a plan to reduce or eliminate those barriers.

One can furthermore assume that education and knowledge can lead to behavior change. A limitation of this study was that the results may not be generalizable to other locations or populations. Only health care providers at the women's clinic at the project facility received education, training, and protocols. The study did not include adult males or adolescent males or females.

Summary

HPV affects millions worldwide, increasing their risk for cervical cancer. HPV vaccine acceptance rates remain low, despite available vaccines. It is essential to vaccinate individuals before exposure so that immunity to HPV can be developed. The purpose of this EBP was to effectively design interventions and protocols aimed at increasing the knowledge of HPV and available vaccines among health care providers.

Section 2: Background and Context

Introduction

HPV is the most common sexually transmitted infection and is associated with several types of cancer. Although vaccines to protect against HPV are available, vaccine acceptance remains low. The purpose of this EBP was to raise awareness of HPV and vaccines among patients and clinicians and to develop measures that will increase HPV vaccine acceptance among females ages 18 to 26 years. I will also explain the theoretical framework that I used to guide this project. The HPV vaccination rate at the project site was 48% which is significantly below the Healthy People 2020 goal of 80% (Hariri et al., 2014). Low vaccination rates have been associated with various barriers, which include a lack of provider and patient knowledge, side effects, costs, lack of time, and a belief that the vaccine is not needed by individuals who are not sexually active (Al-Dubai et al., 2010; Downs et al., 2010; Paul, LaMontagne, & Le, 2012; Rose, Lanumata, & Lawton, 2011). Research shows that motivators to receiving HPV vaccine include education from a credible source and advice from individuals who had received the vaccine (Downs et al., 2010). Developing interventions to improve HPV vaccination at this facility can decrease the risk for HPV, associated cancers, and death.

The evidence-based interventions that I designed for this project were based on the health belief model (HBM). Interventions designed to increase knowledge concerning HPV and available vaccines among health care providers can better equip them to assess and address a patient's perceived seriousness of HPV, perceived susceptibility to HPV, perceived benefits of HPV vaccination, and perceived barriers to HPV vaccination, which can increase the acceptance of HPV vaccine among veterans and thereby decrease the morbidity and mortality associated with it.

Conceptual Model and Theoretical Framework

I used the academic center for evidence-based practice (ACE) star model as a framework for developing the interventions and protocols that will translate knowledge into nursing practice to improve outcomes (Appendix D). The model consists of five steps: finding new knowledge, summary of evidence, incorporating evidence into practice, implementation of practice change, and evaluation of the effects of practice change (Schaffer, Sandau, & Diedrick, 2013). The HBM is based on the concept that health behavior is determined by personal beliefs, perceptions about a disease, and measures to decrease its occurrence (Appendix E). Originally developed in the 1950s by social psychologists Hochbaum, Rosenstock, and Kegels to determine the reason for unsuccessful medical screening programs offered by the U.S. Public Health Service, the HBM is the most commonly used theory in health education and health promotion (Rosenstock, 1966). The model is composed of four main perceptions: perceived seriousness, perceived susceptibility, perceived benefits, and perceived barriers (Rosenstock, 1966). Each perception can be used either individually or in combination to explain health behavior such as the acceptance of the HPV vaccination (Sharma & Romas, 2012). I could not find studies that cited the title by Rosenstock, Hochbaum, or Kegels until Rosenstock's 1966 work (Rosenstock, 1966). A perceived barrier is the most significant construct determining human behavior change (Janz & Becker, 1984). In the HBM, perceived barriers and benefits of a behavior influence one's likelihood of taking recommended action (Sharma & Romas, 2012).

Relevance to Nursing Practice

Health care providers, media, and other sources can influence an individual's hesitancy towards vaccination. Hesitancy is a concern or doubt about the benefit or safety of vaccine. Lack of knowledge and trust can play a role in vaccination attitudes (Yaqub

et al., 2014). Head, Vanderpool, and Mills (2013) conducted a study to explore the perspectives of health care providers in Appalachian Kentucky on barriers and facilitators to HPV vaccination and their recommendations for improving vaccination rates. Previous research in Appalachian Kentucky had revealed a low uptake and adherence to HPV vaccination among females ages 18 to 26 years, even though the vaccine was offered at no cost. The results revealed that poor communication and a lack of HPV vaccine education were the primary reasons for low acceptance. The researchers concluded that more targeted education efforts and patient-centered reminder systems could prove beneficial in increasing vaccine acceptance and adherence.

Wong et al. (2013) conducted a study among primary care physicians in Hong Kong to assess knowledge toward, attitude toward, practices of, and barriers to recommending HPV vaccines. They found that knowledge of HPV infection was low among physicians and concluded that educational initiatives should target physicians (Wong et al., 2013). Research has also shown that individuals are more likely to accept HPV vaccine if a clinician recommended the vaccine to them (Kang & Moneyham, 2010). Studies have also shown that vaccine recall and reminder systems have proven effective in increasing vaccine acceptance rates (Conroy et al., 2009).

The evidence-based interventions that I designed for this project were based on the HBM, which is composed of four main concepts: perceived seriousness, perceived susceptibility, perceived benefits, and perceived barriers; these concepts can explain health behaviors, such as the acceptance of the HPV vaccination (Gerend & Shepherd, 2012). Interventions that were designed to increase knowledge concerning HPV and available vaccines among VA health care providers can better equip them to assess and address a patient's perceived seriousness of HPV, perceived susceptibility to HPV, perceived benefits of HPV vaccination, and perceived barriers to HPV vaccination,

which can increase the acceptance of HPV vaccine among veterans and thereby decrease the morbidity and mortality associated with it.

Local Background and Context

A lack of awareness of HPV and available vaccines among clinicians at the project facility was a barrier to HPV vaccine acceptance among patients. It was therefore essential to develop educational materials and protocols. The target population for this project was clinicians caring for female veterans ages 18 to 26 years at the VA project facility. The HPV vaccination rate was 48%. It is essential that clinicians have evidence-based guidelines for their practice so that they can educate patients. The evidence-based education materials in this project reflected CDC standards.

Role of the DNP Student

As a DNP student, my role in this project was to provide the facility with evidence-based educational materials, training session plan, protocols, and a long-term evaluation method for future use when the items were implemented. I designed the educational materials to increase the staff's knowledge of HPV and available vaccines. Furthermore, I developed the materials to teach staff how to identify and minimize or eliminate potential barriers to vaccination. The protocols that I developed require staff to call and remind patients of follow-up appointments. Other protocols require providers to offer the vaccine to every eligible patient. As a student, I developed educational materials, training plans, and protocols. I also developed a panel of experts for a formative evaluation of the educational materials, training session plans, and protocols to increase validity.

Summary

Research has shown that HPV can cause several types of cancers, including cervical cancer. HPV vaccines can protect against certain types of HPV and thereby

reduce one's risk for the cancers associated with this disease. The HBM was the framework that I used to guide this project and develop interventions and a protocol that would raise awareness of HPV and vaccines to increase vaccine acceptance, and thereby decrease the morbidity and mortality associated with HPV.

Section 3: Collection and Analysis of Evidence

Introduction

I conducted an exhaustive review of the literature through the Walden University online library using Thoreau Multi-Database, CINAHL Plus with Full Text, and MEDLINE with Full Text. The following key terms in the search were *HPV*, *vaccination*, *acceptance*, *cervical cancer*, *facilitators*, *attitudes*, and *barriers*. Exclusion criteria included articles greater than 10 years old and those written in a language other than English. Inclusion criteria included the terms *HPV*, *vaccine*, and *education*. The review included studies concerning barriers to and attitudes towards HPV vaccination. This section outlines specific and general literature related to HPV and vaccines designed to protect it as well as measures that have proven effective in increasing vaccine acceptance.

Practice-Focused Question

The PICO format—patient population, intervention, comparison intervention or group, and outcome—served as a guideline for the development of an appropriate, relevant project question (Malhotra, 2013). The question for this project was as follows: Will evidence-based education and protocols increase HPV vaccine acceptance among young women ages 18 to 26 years?

Sources of Evidence

Specific Literature

Researchers have suggested that the HPV vaccine remains effective for at least 10 years, and there has been no evidence to suggest that HPV vaccine loses its ability to protect against HPV with time. HPV vaccine is continuously monitored for safety and effectiveness. According to the CDC (2014), clinical trials have shown the vaccines provide 100% protection against precancers and genital warts. Since the approval and recommendation of vaccines in 2006, HPV infections have declined by 56% in teenage girls in the United States. The incidence of genital warts has also decreased. In countries, such as Australia, that have greater HPV vaccination coverage, there has been a reduced incidence of precancers of the cervix among women in the country (CDC, 2014).

Education, which can eliminate barriers while promoting vaccination, is an important part of health care. It is therefore essential that providers are educated and trained so that they can offer vaccines to eligible patients. Barriers to vaccination include cost, a perception that the vaccine is not necessary, and concerns about vaccine safety and side effects. Facilitators to vaccination include perceived benefit of vaccination, recommendation of a health care provider, and social norms (Rambout et al., 2014). Gorin and Westhoff (2009) identified specific level barriers. Provider level barriers are physician knowledge about HPV and physician recommendation that can have a strong influence on HPV vaccine acceptance. Some providers find it challenging to discuss

sexually transmitted infections, and others are reluctant to store a vaccine that is less often requested. Policy level barriers are access to health care, insurance coverage, vaccine availability, limited knowledge of HPV vaccine, and media coverage with stigmatizing effects. At the patient level, barriers include limited awareness of the vaccine; socioeconomic status; perception of risk based on sexual history; fear of vaccine safety; and socio-cultural, economic, and religious factors. Both providers and patients can benefit from further education on ways to effectively discuss sexually transmitted infections such as HPV and offer vaccinations (Gorin & Westhoff, 2009).

Attitudes, beliefs, and behaviors related to HPV can also affect the acceptance of HPV vaccine. Bendik, Mayo, and Parker (2011) found a positive correlation between having received HPV vaccine and knowledge score. The researchers found that among those who had not received the vaccine, 35.4% revealed that "my doctor tells me to get it" would be a motivating factor, followed by "I find a way to pay for the vaccine" (19.5%), "my parents tell me to get it" (16.4%), "I become sexually active" (14%), and "I start having sex with more partners" (9.6%). Recommendations from parents and doctors in addition to perceiving HPV as severe were prevalent and strongly associated with previous vaccination. Results suggest that increased education about the vaccine and the importance of physician recommendation will prove beneficial in increasing vaccine acceptance (Bendik et al., 2011). Conroy et al. (2009) conducted a similar study to assess HPV vaccine uptake, predictors of vaccination, and barriers to vaccination among females ages 13 to 26 years at an urban clinic. The researchers concluded that

interventions to increase HPV vaccination rates should target costs, promote HPV vaccination as routine, and establish clinic-based systems to ensure that the vaccine is offered to eligible individuals (Conroy et al., 2009). Reminder/recall (R/R) messages have proven beneficial in increasing vaccination rates. Half of the parents of young children ages 19 to 35 months who participated in a study favored an R/R message with mail being the preferred method (Saville et al., 2014). Assigning a dedicated staff member to deliver R/R messages improves the likelihood of success (Saville et al., 2011)

General Literature

Electronic-derived immunization prompts have proven to increase vaccine uptake. Clinical decision support tools can serve as reminders for overdue immunizations. In a study conducted by Bundy et al. (2013), these prompts resulted in the highest rates for completion of HPV vaccination series in four of five quarters (Bundy et al., 2013). Protocols should be in place to guide providers to offer the vaccine to eligible patients. A study among young men ages 18 to 22 years from African American, Haitian, Caucasian, and Latino racial groups revealed perceived benefits as protection from anal and oral cancer, good health, and the prevention of disease transmission. These men were more likely to accept HPV vaccine when their concerns were addressed honestly during a doctor's appointment. Perceived barriers to vaccination included lack of knowledge, side effects, fear of needles, and cost. Side effects such as bleeding and insanity were some of the concerns voiced by participants which highlighted the lack of knowledge among men

in these racial groups.

Culturally competent education could prove beneficial in reducing the ethnic differences in attitudes, beliefs, and behaviors concerning vaccination among young men (Pierre et al., 2014). Other studies have confirmed that barriers to vaccination include a lack of awareness, fear of needles, fear of social stigma, lack of time, costs, inconvenience, and a belief that the vaccine is not needed if one is not sexually active (Al-Dubai et al., 2010; Downs et al., 2010; Paul et al., 2012; Rose et al., 2011). Downs et al. (2010) discovered that motivators for HPV vaccine acceptance among African American women were education, affordable prices, good results with the vaccine, and knowledge of individuals who had received HPV vaccine. Motivators among Latinas included having more than one credible source of information such as educational talks, doctor's office, television, churches, and advice from women who had received the vaccine. Knowledge of perceived barriers to HPV vaccination is essential to the development of educational initiatives that will decrease existing disparities in cervical cancer incidence and mortality.

Bastani et al. (2011) explored the low HPV vaccine acceptance rates in low-income, ethnic minority, and immigrant populations in the United States. Between January 2009 and November 2009, 490 telephone interviews were conducted in six languages among mothers of vaccine-eligible girls ages 9 to 18 years using the Los Angeles County Department of Public Health, Office of Women's Health service referral hotline. HPV and vaccine awareness, knowledge, beliefs, barriers, and daughters' vaccine receipts were assessed. Only 29% of daughters initiated the vaccine

and 11% received all three doses. No ethnic differences were observed in initiation or completion rates. Ethnic differences were observed in HPV awareness, perceived risk, and other vaccine-related beliefs. Vaccine awareness was the strongest predictor of initiation (Bastani et al., 2011). For the barrier "need more information to make a decision," 64% of the Latina population rated this as a barrier, whereas 81% of the Chinese, 66% of the Korean, and 41% of the African American populations also rated this as a barrier. A total of the 74% of the population rated "do not know where to go to get the vaccine" as a barrier, with 68% of the Latina, 84% of the Chinese, 81% of the Korean, and 68% of the African American populations agreeing with this statement. The barrier "thinks HPV vaccine may cause problems getting pregnant in the future" was noted by 17% of the total population, including 16% of the Latina, 19% of the Chinese, 4% of the Korean, and 56% of the African American population. "Thinks HPV vaccine may cause health problems in the future" was rated as a barrier by 15% of the total participants. It was rated as a barrier by 11% of Latinas, 24% of Chinese, 4% of Koreans, and 44% of African Americans. Of the total mothers, 13% believed their daughters may think it is okay to have sex after getting the HPV vaccine; 11% of Latina mothers noted this barrier as significant, as did 15% of Chinese mothers, 0% of Korean mothers, and 11% of African American mothers (Bastani et al., 2011). This study suggests that adequately trained health care professionals and established protocols that guide professionals to offer the vaccine can reduce barriers associated with HPV vaccine acceptance.

Analysis and Synthesis

The purpose of this proposed project was to develop an educational intervention and protocol that would raise awareness of HPV and available vaccines among providers and establish protocols that will increase HPV vaccine acceptance among females ages 18 to 26 years. I conducted a literature review. The evidence supported the development of a quality improvement project consisting of educational materials, a training session, protocols, and a long-term evaluation plan that will help providers and nurses offer HPV vaccine to every patient. I also formed a panel of experts to conduct a formative and summative evaluation of the educational materials and protocols. After obtaining institutional review board (IRB) approval, I presented the quality improvement project components to the expert panel in a classroom setting using a face-to-face approach and PowerPoint presentation (Appendix A). The director of the women's clinic provided contact information for health care professionals working in the women's clinic. Each professional was notified via e-mail and informed of the problem identified in the women's clinic. The 10 participants who volunteered to participate in the project were notified of the date, time, and location for the formative evaluation of the educational materials, training session, and protocols. I emailed the presentation agenda 1 week prior to the presentation.

Population and Sampling

The population for this study was a 10-member expert panel consisting of clinicians in the women's clinic at the facility. The sample included one doctor who

was medical director of the women's clinic, two advanced practice nurses, six registered nurses, and one nurse educator. This sample was effective because I focused on education for health care providers. The panel conducted a formative evaluation. Analysis of the answers provided by the respondents led to development of descriptive statistics that answers research questions. The formative and summative groups conducted a two-step process to evaluate the quality of the guideline prior to finalization of the guideline.

Protection of Human Subjects

For the protection of human subjects, I submitted the necessary paperwork to obtain approval from VA facility prior to developing educational interventions and protocols to improve HPV vaccination rates. Walden University IRB also granted approval.

Project Evaluation Plan

The expert panel reviewed the materials for the Formative and Summative assessment. Data collection was done using a tool based on the ADDIE. The University of Texas Medical Branch at Galveston granted permission to use an adapted version of this tool (Appendix B). The validated ADDIE tool is both a quantitative and qualitative formative evaluation tool that provides data on the efficacy and content validity of projects. The survey contains 14 closed-ended questions

followed by an open-ended comment section. The practice site received the results first. An expert panel conducted a formative evaluation of the educational materials and protocols that I developed and provided recommendations (Appendix C). I revised the materials and protocols based on the feedback. The expert panel conducted a final summative evaluation. The facility may choose to conduct a long-term evaluation, which will include facility data extracted from the electronic health record concerning HPV vaccination acceptance by women ages 18 to 26 years.

Summary

Reducing the burden associated with HPV will require unique interventions aimed at educating health care providers and establishing protocols to ensure that eligible patients are offered the vaccine and reminded of appointments. In this section, I addressed how this project will be developed and implemented in addition to measures that will be taken to evaluate effectiveness.

Section 4: Findings and Recommendations

Introduction

Data analysis leads to clear findings that answer research questions. The data collection tools influenced the nature of data that I used in this research. The findings are essential in reduction of the burden associated with HPV. In this section, I address the findings and implications from the collected data.

Findings and Implications

In the summative evaluation, all members of the committee approved the plan. The 10 respondents also conducted the formative evaluation. The target population for this project was clinicians caring for female veterans ages 18 to 26 years in a women's clinic at a VA facility. The formative evaluation form is an indicator of the level of agreement. Each of the questions in the formative evaluation form had the same response for all the 10 respondents. The responses in this case were all in agreement. Formative evaluation involved evaluation of educational materials and protocols to improve HPV vaccination rates. Table 1 shows the responses in the formative evaluation.

Table 1

Formative Group Questionnaire

Question	Response	Number of participants
Q1: Is the target audience clearly identified?	Yes	10
Q2: Is the educational level and job description of the participants aligned with the educational materials?	Yes	10
Q3: Is the job description of the participants aligned with the educational materials?	Yes	10
Q4: Is the educational material appropriate for the learner's personal background (e.g., age, nationality, previous experiences, interests, cultural background)?	Yes	10
Q5: Does the educational material identify what the learner needs to accomplish at the end of the program?	Yes	10
Q6: Can you identify the desired outcomes to be achieved through this protocol?	Yes	10
Q7: Does this educational material address aspects of current practices that need to be improved upon?	Yes	10
Q8: Can you identify the instructional goals and target objectives for this program?	Yes	10
Q9: Will the described environment in which the program is to be conducted be a conductive learning environment?	Yes	10
Q10: Are there limiting factors that must be considered with regards to resources, technical support, time, technical skills, financial factors, and supporting factors that are needed to make this program successful?	Yes	10
Q11: Is the proposed educational media appropriate for the target audience?	Yes	10
Q12: Is the proposed time frame for the educational program appropriate?	Yes	10
Q13: Is the method to determine acquisition of acquired competencies appropriate?	Yes	10
Q14: Is the mechanism that will be used to obtain learners' feedback on material learned appropriate?	Yes	10

Each of the 10 members responded to all 14 questions. The questions asked were aligned with the objectives of the study. The answers of all respondents for all questions are similar. There was a 100% positive response for each question in evaluation of educational materials and protocols to improve HPV vaccination rates. The responses can generate descriptive statistics for each question to yield a conclusion. Evaluation of the information given by the formative group reveals a clear conclusion that there is agreement that the educational materials and protocols would greatly improve HPV vaccination rates. The percentage of agreement is at 100% meaning that the sample population is of the point of view that the educational materials would have a significant effect on HPV vaccination rate. The formative group provided recommendations for the development of educational materials in the comment boxes of the evaluation (Appendix B). The summative group responses outlined in Table 2 also show 100% agreement.

Table 2
Summative Group Questionnaire

Question	Response	Number of participants
Q1: Is the target audience clearly identified?	Yes	10
Q2: Is the educational level and job description of the participants aligned with the educational materials?	Yes	10
Q3: Is the job description of the participants aligned with the educational materials?	Yes	10
Q4: Is the educational material appropriate for the learner's personal background (e.g., age, nationality, previous experiences, interests, cultural background)?	Yes	10
Q5: Does the educational material identify what the learner needs to accomplish at the end of the program?	Yes	10

Q6: Can you identify the desired outcomes to be achieved through this protocol?	Yes	10
Q7: Does this educational material address aspects of current practices that need to be improved upon?	Yes	10
Q8: Can you identify the instructional goals and target objectives for this program?	Yes	10
Q9: Will the described environment in which the program is to be conducted be a conductive learning environment?	Yes	10
Q10: Are there limiting factors that must be considered with regards to resources, technical support, time, technical skills, financial factors, and supporting factors that are needed to make this program successful?	Yes	10
Q11: Is the proposed educational media appropriate for the target audience?	Yes	10
Q12: Is the proposed time frame for the educational program appropriate?	Yes	10
Q13: Is the method to determine acquisition of acquired competencies appropriate?	Yes	10
Q14: Is the mechanism that will be used to obtain learners' feedback on material learned appropriate?	Yes	10

The findings of the study additionally show that HPV is the most common sexually transmitted infection and has been associated with several cancers. The research shows hesitancy toward vaccination and a low vaccination rate. Cervical cancer is the second leading cause of death in the world. Research suggests that there is need to improve HPV vaccination rates. Gardasil and Cervarix are among the available vaccines for the HPV virus. The potential barriers to HPV vaccination include the cost, limited awareness, and concerns about safety and side effects. The research shows that ways to minimize these barriers include routinely promoting HPV vaccination, exploring cost with insurance, and educating providers and patients about HPV. Summative and formative assessment suggests strong agreement that education material would improve

HPV vaccination rates by raising awareness. The summative evaluation had individuals who all agreed. All the individuals are care givers.

Recommendations

Educational protocols and interventions can prove beneficial in increasing vaccine acceptance. There is need to increase awareness on HPV vaccination. Reducing the burden associated with HPV requires unique interventions aimed at educating health care providers and establishing protocols to ensure that eligible patients are offered the vaccine and reminded of appointments. I recommend that clinicians in the project facility implement the educational materials and protocols into their practice and develop a long-term evaluation plan to measure effectiveness.

Project Strengths and Limitations

My study has strengths and limitations. The methodology of the study is among the strengths. A limitation, however, is in the sample population being limited to clinicians in the women's clinic who care for individuals of a specific age and gender. The target population for this project is clinicians caring for female veterans ages 18 to 26 years at the VA facility. A limitation of this study is that the results may not be generalizable to other locations or populations. Only health care providers at the women's clinic at the VA facility received education, training, and protocols. I did not include adult males or adolescent males or females in my study. The selected participants in the formative group are professionals. All the participants in the formative and summative groups returned their evaluations. Generalizability of a research is important in making it useful in different areas. There are aspects of the study that may be limitations or strengths depending on the point of view.

Section 5: Dissemination Plan

Analysis of Self

In my opinion, I did a thorough job with the project. My work remained objective and without bias. During the project, I received constructive criticism and used it to make improvements under the guidance of my committee. The 100% agreement by the summative group is an indicator of the effectiveness of the education material. I was satisfied with the presentation and gained new knowledge and skills from this research process. I will apply the knowledge and skills learned to improve in my role as a clinician. This project helped me to identify real and potential problems in practice, conduct a literature review, implement interventions based on evidence, and evaluate the effectiveness of those interventions before finally reaching a conclusion.

Dissemination Plan

The results of this DNP project will be presented during the National Research Week, a symposium where various clinicians present research projects completed at the facility. I will use a poster presentation to present the findings. A PowerPoint presentation of the results will be delivered during a monthly meeting of the project facility's Evidence-Based Research Committee. The results will also be published in the *Federal Practitioner*, which is a peer-reviewed journal for health care professionals of the VA. I also plan to present the results in a poster presentation at the Mississippi Nurses Association state conference and the American Association of Nurse Practitioners national conference.

Summary and Conclusions

HPV is the most common sexually transmitted infection and has been associated with various types of cancer. Although vaccines to protect against HPV are available, vaccination rates remain low. The purpose of this project was to develop interventions and protocols based on evidence that will improve clinician knowledge of HPV and its vaccines. This improvement in education and knowledge can improve vaccine acceptance and thereby reduce the death and disease caused by the cancers associated with HPV. Trained clinicians who have been educated can identify eligible patients and offer the vaccine effectively. They can also identify and reduce or eliminate potential barriers to vaccination. Their actions will likely improve HPV vaccine acceptance and in turn reduce the incidence of HPV. In this project, I provided a short-term plan to improve knowledge of HPV and its vaccine. I also plan to assist with the development of a long-term evaluation plan, which will involve an extraction of data from the charts to measure any changes in the HPV vaccination rate at the VA facility. Dissemination of the results of this project will include professionals at the local, state, and national levels.

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Appendix A: PowerPoint Presentation

Improving Human Papillomavirus Vaccination Rates through Evidence-Based Interventions

Deidra Thompson, MSN, FNP-C, PMHNP-BC

Objectives

- At the end of this presentation, participants should be able to complete the following tasks:
  - Discuss human papillomavirus (HPV)
  - Identify potential complications of HPV
  - Identify available vaccines to protect against HPV
  - List at least 3 potential barriers to vaccination.
  - List at least 3 ways to minimize or eliminate barriers to vaccination.

Purpose

- The purpose of this evidence-based project (EBP) is to raise awareness of HPV and available vaccines among clinicians and develop interventions that will increase HPV vaccine acceptance among females aged 18-26 years and thereby reduce the morbidity and mortality associated with HPV.

Problem

- Human papillomavirus (HPV) is the most common sexually transmitted infection and has been associated with several cancers. Cervical cancer is the most common HPV-associated cancer and is the second leading cause of death in the world (Centers for Disease Control and Prevention, 2015a).
- Although vaccines are available, vaccination rates remain low. The vaccination rate at the G.V. (Sonny) Montgomery Jackson Veterans Affairs Medical Center is 48% which is below the Healthy People 2020 goal of 80% (Hariri et al., 2014). Developing interventions to improve HPV vaccination at this facility can decrease the risk for HPV, associated cancers and death.

Target Population

- The target population for this project is clinicians caring for female veterans aged 18-26 years at the Jackson VAMC.

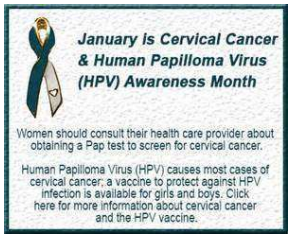
Problem

- According to Yaqub et al. (2014), hesitant attitudes to vaccination are prevalent. Hesitancy is a concern or doubt about the benefit or safety of vaccination. Hesitant attitudes can be influenced by health care professionals and other sources. Vaccination attitudes are often the result of a lack of awareness and mistrust.

Impact of the Problem

- Approximately 79 million Americans are currently infected with HPV and there are 14 million new cases of HPV annually (CDC, 2014).
- Studies show that 66% of cervical cancers, 55% of vaginal cancers, 79% of vaginal cancers, and 62% of oropharyngeal cancers are attributable to HPV types 16 or 18 (Dunne et al., 2014).
- A patient who is positive for HPV may require a follow-up procedure, such as a colposcopy, biopsy, or more frequent Pap smears which can be costly (CDC, 2015b).

Strategies for Resolution



Quality Improvement

- Vaccination before exposure to HPV will optimize the vaccine's effectiveness in its prevention of HPV and reduce the morbidity and mortality associated with this infection (Centers for Disease Control and Prevention, 2014). Preventing HPV and cancers will also reduce costs associated with follow-up procedures and treatment.

Strategies for Resolution

- Ensure continuity of care by scheduling each patient's routine appointments with the same provider. This will aid in a provider's development of trust and rapport with patients. Vaccination attitudes are often the result of mistrust (Yaqub et al., 2014).
- Recognize importance of receiving all 3 injections in the HPV vaccine series. Develop and implement a policy requiring staff to call patients to remind them of appointments for injections.

Strategies for Resolution

- Develop evidence-based educational materials on HPV and available vaccines for patients.
- Raise awareness about HPV and its role in cancer prevention among staff and patients by launching a campaign.
- Mandatory training for providers and nurses to show them how to effectively deliver strong recommendations for HPV vaccine during every encounter to each eligible patient.

Nursing Informatics

- A prompt should be created in the electronic health record to remind each clinician to offer HPV vaccine to each eligible patient. This should include both inpatient and outpatient encounters. If a nurse is completing the reminder and a patient is eligible, a provider should be consulted to order the vaccine.
  - Is the patient a female under the age of 26 or a male under the age of 21? Has he or she received HPV vaccine? When? Is he/she interested in discussing vaccination with a provider?

Nursing Informatics

- There should be a way electronically track the percentage of individuals who have received the vaccination as well as those have not received it. Patients who are eligible but have not received the vaccine should be contacted and invited to attend an educational session concerning vaccination.

Staff Education

- Training sessions should be conducted every 6 months for staff concerning HPV, available vaccines, and ways to overcome potential barriers when offering the vaccine to each patient. New guidelines should be reviewed.

Patient Education

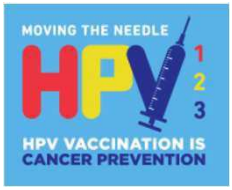
- Patients who present to the clinic for appointments should be asked to complete a health intake form with questions designed to determine their eligibility for HPV vaccine. The form should also ask about real or potential barriers to vaccination. If eligible, these patients should receive education from the PCP about HPV and available vaccines as well as a recommendation for the vaccine. Education should include information about HPV, how it is spread, and potential complications.
- Education should also be provided on HPV vaccine, what it protects, potential side effects, and costs. The PCP should address any barriers listed on the intake form. Patients who consent to HPV vaccine, should be administered their first injection that day if feasible. Follow-up appointments should be made for the 2nd and 3rd injections. A reminder phone call should be made to these patients 1 week and 2 days prior to appointments. These follow-up reminders should be documented in CPRS.

Vaccines

- The U.S. Food and Drug Administration (FDA) approved Gardasil in 2006 to prevent HPV types 6, 11, 16, and 18. These HPV types can cause cervical cancer, anal cancer, and genital warts. At that time, the Gardasil vaccine was recommended for use in females aged 9 to 26 and was not recommended for males (FDA, 2015b). In 2009, the FDA approved Gardasil for use in males aged 9-26 years to prevent genital warts caused by HPV types 6 and 11 (FDA, 2015b).
- The FDA approved Cervarix in 2009 for females 10 to 25 years of age for the prevention of HPV types 16 and 18 (FDA, 2015a).
- In 2014, Gardasil 9 was approved for females aged 9-26 years and males aged 9-15 years for the prevention of cervical, vulvar, vaginal, and anal cancers caused by HPV types 16, 18, 31, 33, 45, 52, and 58. The five additional HPV types covered by Gardasil 9 are not covered by the previously approved vaccines (FDA, 2014).

Awareness

- Pamphlets and posters raising awareness of HPV and available vaccines should be displayed in primary care clinics around the Jackson VAMC.



Potential Barriers to Vaccination

- Cost
- A perception that the vaccine is not necessary
- Concerns about vaccine safety and side effects
- Provider level barriers are physician knowledge about HPV and physician recommendation that can have a strong influence on HPV vaccine acceptance. Some providers find it challenging to discuss sexually transmitted infections and others are reluctant to store a vaccine that is less often requested.
- Policy level barriers are access to health care, insurance coverage, vaccine availability, limited knowledge of HPV vaccine, and media coverage with stigmatizing effects.
- At the patient level, barriers include limited awareness of the vaccine, socioeconomic status, perception of risk based on sexual history, fear of vaccine safety, socio-cultural, economic, and religious factors (Gorin & Westhoff, 2009).

Facilitators to Vaccination

- Facilitators to vaccination include perceived benefit of vaccination, recommendation of a health care provider, and social norms (Rambout et al., 2014).
- Vaccine awareness is the strongest predictor of initiation (Bastani et al., 2011).
- Both providers and patients can benefit from further education on ways to effectively discuss sexually transmitted infections such as HPV and offer vaccinations (Gorin & Westhoff, 2009).

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Minimize and Eliminate Barriers

- EDUCATION IS ESSENTIAL
  - Discuss HPV, potential complications, and benefits of vaccination
- Target costs – explore costs with insurance and any available assistance
- Promote HPV vaccination as routine – offer it when offering vaccines for influenza
- Establish clinic-based systems to ensure that the vaccine is offered to eligible individuals (Conroy et al., 2009).

Patient Safety

- HPV vaccines have proven to be safe. After more than 60 million doses of HPV vaccine distribution, there are no data to suggest adverse effects or reactions caused by vaccination (ACOG, 2015).

Appendix B: Evaluation of Educational Materials and Protocols to Improve HPV Vaccination Rates

1. Is the target audience clearly identified?

Yes____
No ____

Comment:

2. Is the educational level and job description of the participants aligned with the educational materials?

Yes____
No ____

Comment:

3. Is the job description of the participants aligned with the educational materials?

Yes____
No ____

Comment:

4. Is the educational material appropriate for the learner's personal background (e.g., age, nationality, previous experiences, interests, cultural background)?

Yes____
No ____

Comment:

5. Does the educational material identify what the learner needs to accomplish at the end of the program?

Yes____
No ____

Comment:

6. Can you identify the desired outcomes to be achieved through this protocol?

Yes____
No ____

Comment:

7. Does this educational material address aspects of current practices that need to be improved upon?

Yes____
No ____

Comment:

8. Can you identify the instructional goals and target objectives for this program?

Yes____
No ____

Comment:

9. Will the described environment in which the program is to be conducted be a conductive learning environment?

Yes____
No ____

Comment:

10. Are there limiting factors that must be considered with regards to resources, technical support, time, technical skills, financial factors, and supporting factors that are needed to make this program successful?
    Yes____
    No ____

Comment:

11. Is the proposed educational media appropriate for the target audience?

Yes____
No____

Comment:

12. Is the proposed time frame for the educational program appropriate?

Yes____
No ____

Comment:

13. Is the method to determine acquisition of acquired competencies appropriate?

Yes____
No ____

Comment:

14. Is the mechanism that will be used to obtain learners' feedback on material learned appropriate?

Yes
No ___

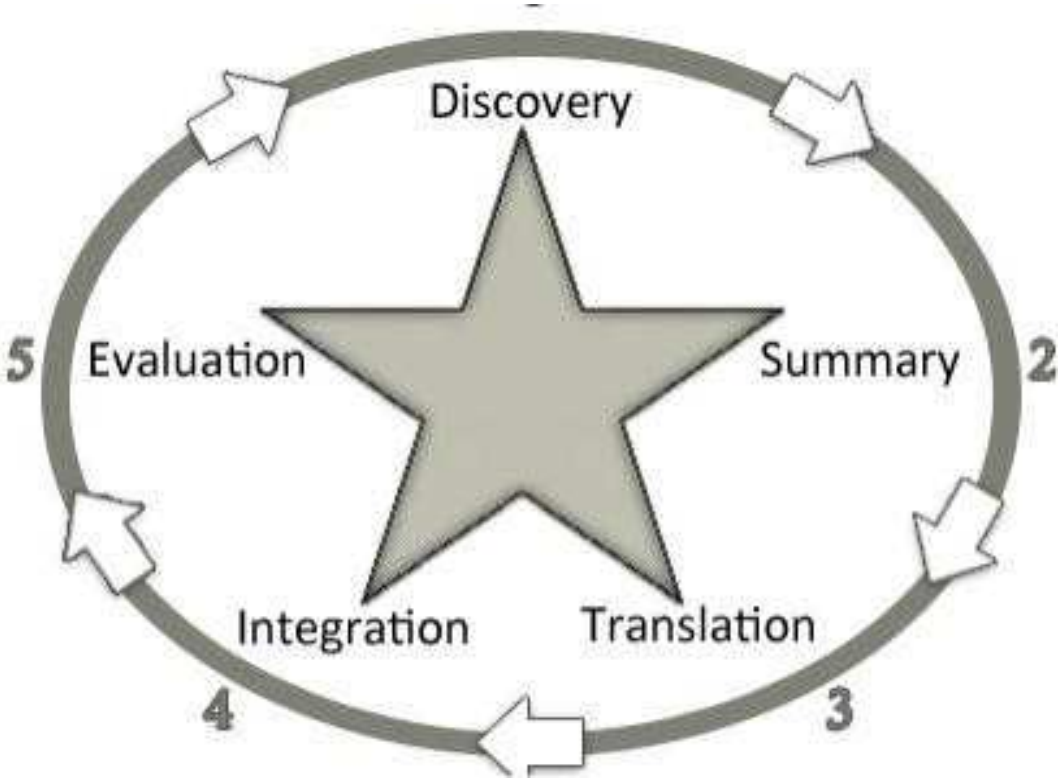
Comment:

Adapted from: ***pedi.edtech*** *– a faculty development program of the University of Texas Medical Brach and Galveston, with support from the US Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions.*

Appendix C: Recommendations for Development of Education Material for Both Providers and Patients

- **Use simple wording and cartoon illustrations. This involves using language that can be understood by laymen.**
- **Address common misconceptions and myths about HPV and HPV vaccination. Using evidence-based approaches can eliminate myths. Myths may negatively influence vaccine acceptance.**
- **Use of visual aids and demonstrations as applicable.**
- **Adopting modern technology as part of the education strategy is essential, for example the use of social media.**

Appendix D: The ACE Star Model



Appendix E: Health Belief Model