Increasing Human Papillomavirus Knowledge in Rural Patients

Jayne Graben Turner, DNP, RN, CRNP[1]

Haley Franklin Townsend, EdD, RN, FNP-BC[2*]

[1]Assistant Professor, University of Alabama, Capstone College of Nursing,

jkgraben@crimson.ua.edu

[2]Clinical Assistant Professor, University of Alabama, Capstone College of Nursing,

hmfranklin@ua.edu

[*]Correspondence: Haley Franklin Townsend

Abstract

Purpose: The purpose of this quality improvement (QI) project was to implement and evaluate a consistent Human Papillomavirus (HPV) vaccine education program in a family planning clinic serving rural residents as a part of a doctoral nursing scholarly project.

Sample: Female patients aged 18 to 26 years who had not received prior HPV vaccination

Method: Demographic and survey data were collected from participants to assess the change in knowledge about HPV and HPV vaccination. McNemar's Chi-square analysis was used measure the effectiveness of the education program.

Findings: Six of the 13 survey items had statistically significant differences in pre- and post-survey scores. There was increased knowledge about HPV and HPV vaccination among all participants.

Conclusions: Based on the results of this quality improvement project, education can improve knowledge about HPV, its health outcomes, and the vaccination. Increased knowledge can increase the uptake of the HPV vaccine, thus reducing rates of related negative health outcomes.

Keywords: Human Papillomavirus, Health education, Vaccine hesitancy, Rural providers

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Human Papillomavirus (HPV) is the most prevalent viral sexually transmitted infection (STI) in the United States (Centers for Disease Control and Prevention [CDC], 2024a). More than 42 million Americans are infected with HPV, which is known to cause disease, with 13 million new cases each year (CDC, 2024a). The virus is typically cleared by the body without cause for concern. However, some cases of HPV lead to negative health outcomes such as cervical, anal, and throat cancer as well as anogenital warts (Joura et al., 2015). In addition to physical outcomes, individuals with HPV may experience stress from the concern of transmitting the viral infection to sexual partners (Alabama Department of Public Health, n.d.).

Vaccination has been shown to be highly effective for the prevention of many strains of HPV, including the most virulent strains causing multiple forms of cancers and anogenital warts (CDC, n.d.). Gardasil 9 is the current vaccine offered in the United States and is most effective when administered prior to HPV exposure (CDC, n.d.). Current HPV vaccination recommendations are for youth as young as nine years old but are approved for those up to 26 years of age. The vaccine schedule requires only two doses if completed prior to 15 years of age and three doses if completed after 15 years of age. Additionally, the vaccine is approved by the Food and Drug Administration (FDA) to be administered to adults up to 45 years of age based off clinical shared decision making and risk factors (CDC, n.d.).

Background

Despite the proven safety and efficacy, HPV vaccination rates remain low in the United States. As of 2021, only 58.5% of youth 13 to 15 years of age had received two doses of the HPV vaccination based on current recommendations (National Cancer Institute, n.d.). Those in rural

areas are being vaccinated against HPV at even lower rates at about 15 percentage points lower than their urban counterparts (CDC, 2024b). Literature reveals that lack of knowledge surrounding HPV, the vaccine, and the associated risk of cervical cancer (Mohammed et al., 2018), fear of subsequent risky sexual behaviors in children (Ogilvie et al., 2018), and religious and moral beliefs (Ogilvie, et al., 2018) are contributing factors to low vaccination rates. Those in rural settings experience additional barriers to HPV vaccination including access to clinics in their own communities as well as lack of transportation to travel to more urbanized areas for care (Rural Health Information Hub, n.d.a). In addition, social stigma or privacy issues contributed to living in small communities can deter the use of sexual health services (Rural Health Information Hub, n.d.b). In addition to access barriers, those in rural communities report fewer instances of HPV vaccine recommendations and education from their healthcare provider (CDC, 2024b). In some states, HPV vaccines are not regularly stocked in clinic settings that serve rural populations and individuals were uninformed of the services provided by their clinics (Alabama Department of Public Health, n.d.). Providers should regularly promote HPV vaccination and instruction in rural settings as well as advocate for a regular supply of the vaccine to individuals.

A limited number of studies have been conducted concerning changes in HPV and vaccination recall and knowledge. Lecture based HPV education was provided to large numbers of undergraduate students with increased knowledge and increased reports of vaccination willingness in one cross-sectional study (Chang et al., 2013). Brochure based education followed-up with psychosocial interventions targeting different components of HPV knowledge have proven effective (Harper et al., 2023). Literature also reveals that multimedia messaging can also increase knowledge among individuals eligible for the HPV vaccine (Tu et al., 2019). Additionally, it has been found that culturally relevant video interventions can be utilized with favorable outcomes in

HPV knowledge and intent to vaccinate (Redd et al., 2024). Community forums have also shown promise to increase perceived knowledge and vaccine intent among African American communities (Teteh et al., 2019). Although there is an abundance of literature revealing increases in knowledge regarding innovative ways to educate clients, there are fewer studies that address simple education from the provider coupled with motivational interviewing and time spent with the client. This project aimed to return to the basics of client instruction and utilized simple instructional aids to reach rural females visiting a family planning clinic.

A quality improvement project was implemented in a public health family planning clinic serving female patients from multiple surrounding rural counties. This clinic was chosen as the investigator served the clinic in the role of nurse practitioner. For the purposes of this quality improvement (QI) project, rural was defined as a territory not included in an urbanized area of 50,000 or more people (Alabama Rural Health Association, n.d.). The aim of this project was to provide intentional instruction concerning the HPV vaccine using evidence-based materials to increase recall of HPV information in the patient population of the family planning clinic.

Methods

The purpose of this quality improvement project was to implement and evaluate consistent HPV vaccine instruction in a family planning clinic serving rural residents for female patients aged 18 to 26 years who had not received prior HPV vaccination. Changes in HPV and vaccination recall were analyzed for each patient receiving instruction.

Sample and Design

The sample consisted of female patients between the ages of 18 and 26 years, due to HPV vaccine recommendation guidelines. One nurse practitioner delivered instruction and was the primary investigator for the project. The QI project was implemented as a doctoral-level nursing

project in a public health clinic in Alabama serving six rural communities. The public health clinic is in an urbanized area; however, individuals travel long distances for care due to lack of access in their rural communities. To ensure representation of those in rural counties, each project participant must have resided in a rural area of less than 50,000 individuals.

Institutional Review Board (IRB) approval was obtained from the sponsoring academic institution as well as the participating public health clinic. Rolling recruitment occurred for six weeks by identifying interested individuals through informed consent who wished to receive the instructional offering and had not received the HPV vaccine prior to the visit. The primary investigator obtained informed consent through explanation of risks and benefits of the study and the participant signed a paper consent form. After consent was provided, the instructional intervention consisted of a pre-intervention survey, the HPV Knowledge Questionnaire (HPV-KQ). In addition, demographic data were collected from participants. The data garnered from the HPV-KQ helped gauge willingness to participate in instruction about the virus and vaccine. Instruction was provided by the nurse practitioner guided by the HPV Vaccine Information Sheet (VIS). This information sheet, developed by the CDC covers information related to HPV, including its ability to cause anogenital warts as well as cancer. In addition, it covers how HPV is spread and how the vaccine prevents HPV and its dosing schedule. Last, the VIS covers risks of the vaccine and steps the patient should take if any adverse reactions occur after receiving the vaccine. After explanation of the VIS, each participant underwent motivational interviewing to help them understand HPV and related health outcomes. Immediately following instruction, the HPV-KQ was provided as a post-test to determine change in knowledge. The intervention aimed to standardize the process for screening individuals for prior HPV vaccination and providing evidence-based instruction regarding the virus and prevention.

Data Collection and Analysis

Demographic information and knowledge about HPV and the vaccine was captured using a paper version of the HPV-KQ. The survey's internal reliability has been established using a Cronbach's alpha, which was .80 (Harrison et al., 2021). The survey contained 13 items to determine participants' knowledge about HPV and the vaccine using the answers true, false and I don't know (Table 2). The investigator compiled the data and stored it an Excel document in a password protected online cloud storage account.

Participant survey responses from the pre- and post-instruction were compared using McNemar's Chi-square analysis with an α=.05 to measure the effectiveness of the instructional intervention for each individual question from the HPV-KQ. The analyses were performed to determine differences in knowledge prior to and after instruction about HPV and the vaccine were provided to participants. To begin this process, the investigator entered all answers from each pre- and post-test into Excel. All answers were then coded using 1 for true and 0 for false. The answer I don't know was coded with a 1 or 0, depending on which answer was incorrect for the particular question.

Findings

Participant Characteristics

Out of the 250 potential participants recruited, only 32 met inclusion criteria and provided consent to participate in the study. All participants lived in one of the surrounding rural counties. All 32 participants completed the pre- and post- survey as well as received the HPV instruction (see Table 1). Most participants were African American (87.5%) and the remainder were Caucasian (12.5%). The majority of participants were 24-26 years of age (47%), while those 18-

20 years of age comprised 38% of the participant population, and those 21-23 years of age comprised 16% of the participant population.

Table 1

Participant Demographics

Variable	Survey Results
Age	n (%)
18 years	4 (13%)
19 years	5 (16%)
20 years	3 (9%)
21 years	0 (0%)
22 years	1 (3%)
23 years	4 (13%)
24 years	4 (13%)
25 years	3 (9%)
26 years	8 (25%)
Race/Ethnicity	n (%)
Black/African American	28 (87.5%)
White/Caucasian	4 (12.5%)
Hispanic	0 (0%)

Human Papillomavirus and Vaccine Knowledge

Six of the 13 scored survey items had significant differences in pre- and post- HPV-KQ survey scores, using McNemar's Chi-square analysis (Table 2). Increased correct answers were noted on items about the types of cancer HPV can cause, genital warts and HPV, the transmission route of HPV, HPV risk and the number of sexual partners, HPV infection rates and the effectiveness and timing of the HPV vaccine.

Table 2

Pre- and Post- HPV Instruction Survey Reponses Analyzed using McNemar's Testing

Item	α	$\chi 2$	Critical Value	p-value
Only women can get infected with HPV	.05	0	3.841	1
HPV can cause cervical cancer in women	.05	2.25	3.841	.133

Item	α	χ2	Critical Value	p-value
HPV can cause cancers of the head or neck	.05	6.66	3.841	.009
HPV causes cancer only in women	.05	0.5	3.841	.479
HPV can cause genital warts	.05	5.81	3.841	.015
A person can have HPV for years without knowing it	.05	0.1	3.841	.751
HPV is transmitted through sex	.05	4.9	3.841	.026
Most people have signs or symptoms of HPV	.05	1.45	3.841	.227
The risk of HPV increases with the number of sexual partners	.05	5.14	3.841	.023
Nearly all sexually active people will contract HPV	.05	11.07	3.841	.0008
The HPV vaccine is only recommended for girls	.05	0.25	3.841	.617
Full protection against HPV requires more than one dose of the vaccine	.05	2.5	3.841	.113
The HPV vaccine is most effective before having sex	.05	4.9	3.841	.026

Discussion

After this instructional intervention, participants who were patients at a public health clinic serving a rural population gained increased recall about HPV, health outcomes of the virus and the vaccination using the CDC VIS and provider guidance. Based on the literature, many individuals in rural settings are not receiving instruction or HPV vaccination recommendations from the provider. In order to overcome low vaccination rates and improve long term outcomes, individuals must be equipped with accurate knowledge in order to make informed decisions about vaccination. Due to transportation length barriers from rural settings, all appointments should be utilized to

assess and provide knowledge related to preventative health topics like HPV vaccination. Although tailored to a rural population in this project, these ideas the results can be generalized to individuals in all settings.

This QI project implemented evidence-based instruction in a standardized format in a public health clinic serving rural residents to address barriers listed in the literature. Six of the 13 survey items had statistically significant differences in the pre- and post- survey scores on the HPV-KQ. All survey items showed improvement in recall from some survey participants, although not all were statistically significant. The format of the intervention also encouraged open communication and questioning with the nurse practitioner regarding information presented from the CDC Vaccine Information Sheet.

A major limitation of this project is the potential for bias resulting from the investigator recruiting participants, implementing the intervention and collecting and analyzing the data. Due to the investigator serving in the role of doctoral student and nurse practitioner in the clinic with few support staff, they were responsible for all steps of the project. Other limitations to this study include the small sample size due to time constraints being a part of a doctoral nursing scholarly project. Time constraints also added to the potential limitation in only assessing for short-term recall, rather than long-term knowledge of information concerning HPV. In addition, the sample size only included females and those ages 18-26 years due to the access of a sample by the investigator, who was a doctoral nursing student working in the setting. A larger, more diverse sample could offer more power with results. Another limitation is that the investigator did not document whether the participant received the vaccine at the end of the visit, so this study can only inform whether the intervention increased recall of HPV information.

It is important for all patients and families eligible for the HPV vaccination to gain awareness of the virus, its potential health outcomes, and prevention methods including the vaccine. The need to implement standardized, evidence-based instruction by providers is highlighted by sub-optimal vaccine uptake rates, and continued cases of preventable cervical and other related cancers.

Conclusions

HPV is a highly prevalent STI with multiple health outcomes that is preventable by vaccination. All providers, particularly those serving rural settings, should understand the importance of the influence that standardized instruction has on the decision-making surrounding HPV for patients. Historically, those in rural settings receive less instruction and vaccine recommendations than their urban counterparts (CDC, 2024b). Based on the results of this quality improvement project, instruction can improve recall and potential knowledge about HPV, its health outcomes, and the vaccination. Increased knowledge has the potential to increase the uptake of the HPV vaccine, thus reducing rates of related negative health outcomes. Additional work should be done to determine long-term retention of HPV knowledge as well as intent to vaccinate from simple provider instruction and motivational interviewing. In addition, all providers should be afforded the time and resources in their clinic settings to offer instruction and education to their patients.

Conflicts of Interest

The authors have no conflicts of interest to declare.

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