IMPROVING HUMAN PAPILLOMAVIRUS VACCINATION COMPLIANCE IN ADULT PATIENTS AGES 18-26 THROUGH A PROVIDER INFORMATIONAL SESSION

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INFORMATIONAL SESSION TO IMPROVE HPV VACCINE COMPLIANCE

Background and Significance

According to the Centers for Disease Control (CDC) (2021a), there were roughly 42.5 million cases of human papillomavirus (HPV) infection in the United States in 2018, with 13 million of these active cases being new infections. In addition, the CDC (2022c) estimates that 46,143 HPV-related cancers occur in the United States each year. The Advisory Committee on Immunization Practices (ACIP) recommends vaccination for all individuals ages nine to 26, with adequate vaccination estimated to prevent 90% of all HPV related cancers (Meites et al., 2019; NCI, 2021). However, rates of HPV vaccine series completion, especially in the adult population, remain low as only 52.8% of women and 26.3% of men ages 19 to 26 in the U.S have received at least one dose of the HPV vaccine (Lu et al., 2018). From June to August 2023, only 3.9% of 18–26-year-old patients seen with the family practice department of the clinical project site had received at least one dose of the HPV vaccine. Provider led education and recommendation for HPV vaccination have shown to be two of the most critical factors in increasing HPV vaccine uptake, yet many providers recommend the vaccine inconsistently (Gilkey et al., 2015; Rosenthal et al., 2011).

Statement of Purpose

The purpose of this quality improvement project was to evaluate the effects of an HPV-related informational session for family practice providers, on rates of HPV vaccine uptake in adult patients ages 18 to 26 who are being seen in a family practice clinic in central Missouri. Project objectives relate to the following PICOT question: In adult patients ages 18 to 26 (P), how will a family practice provider informational session (I), compared to current practice (C), affect HPV vaccination rates (O), from September to November 2023 (T1) and from December 2023 to February 2024 (T2)? The primary objective was a 2% increase in HPV vaccination rates. Further objectives include a 5% increase in rates of provider-led discussions regarding HPV vaccination documented within the health record, and a 1% overall increase in vaccine series completion rates.

Review of Literature

A review of literature identified the following themes: barriers to vaccine uptake, methods to overcome barriers, and interventions to improve patient outcomes.

Barriers to Vaccine Uptake

Zheng et al., (2021) and Kamineni et al. (2021), reported barriers to HPV vaccine series completion included limited knowledge regarding HPV and the vaccine (84.6%), returning for additional doses (31%), not being informed of the need for additional doses (10.3%) and forgetting about additional doses (10.3%). VanderVeen et al. (2020), discovered that only 50% of individuals in their study who were unvaccinated reported receiving a recommendation to vaccinate from their healthcare provider, while 74% of patients who had started but not completed the vaccine series reported that their provider had not advised them about future vaccines in the series. These findings demonstrated a lack of provider-led education; and thus, a lack of patient knowledge as key barriers to vaccination.

Methods to Overcome Barriers

Zheng et al. (2021) concluded that trust regarding the safety and effectiveness of the HPV vaccine and positive recommendations from a healthcare provider served as facilitators for vaccine uptake. Wilson et al. (2016) found that variables associated with HPV vaccine series initiation included knowledge regarding how HPV spreads, the connection between HPV and cancer, belief in the importance of preventative vaccination, and the strength of physician recommendation ($OR = 6.29; 3.90; 2.45$; and $1.86$ respectively). Finally, Gerend et al. (2016),
found that of the 53% of participants in their study who received a recommendation from their healthcare provider to vaccinate, 45% received at least one dose of the HPV vaccine. This finding demonstrated that participants who received a recommendation from a healthcare provider were more than 35 times more likely than those who had not received a recommendation to have received at least one dose of the HPV vaccine ($OR = 35.61$, 95% CI [15.58, 81.40], $p < .001$).

**Interventions to Improve Outcomes**

Singh (2022) concluded that implementation of an educational intervention, including educational brochures sent to patients and discussions regarding HPV and vaccination with a healthcare provider, increased rates of vaccination amongst eligible patients from 2.5% to 46.6%. McClean et al. (2017), reported that a multifaceted intervention which included repeated educational sessions for providers and vaccine reminder notices increased rates of vaccination amongst eligible children from 40.6% to 59.3% in departments that received the intervention. This change was significantly greater than the change seen in the control departments (31.9% - 44.5%, $p = .0002$), which demonstrated the efficacy of a multi-intervention approach.

**Methods**

The design of this QI project included implementation of an intervention along with follow-up chart reviews for the evaluation of outcomes at two timepoints; September to November 2023 (T1) and December 2023 to February 2024 (T2).

**Intervention**

The intervention in this project included a singular informational session for all family practice physicians and nurse practitioners that was delivered via a PowerPoint presentation. In addition to the informational session, informational flyers were posted in each patient examination room along with informational brochures available for patient review. Email reminders about the project were sent to providers every few weeks during the implementation period to encourage participation.

**Measurement Tools and Data Analysis**

Using a confidence interval of 95%, a 5% margin of error, and a population size of 150, a minimum of 109 charts were required for review at each timepoint (Raosoft, 2004). To ensure an unbiased representation of the sample, 109 charts were selected using simple random sampling, as less than 218 charts were available for review at each time point. The primary outcome variable was the total number of HPV vaccines administered at the end of T1 and T2. Secondary outcome variables included number of discussions primary care providers conducted with patients regarding HPV vaccination and vaccine series completion rates from T1 to T2. Descriptive statistics were utilized to provide an overview of the project sample. Nominal level data were analyzed with the Chi-square Test of Independence and the phi coefficient was used as an index to describe the magnitude of the effect from the intervention with values .10, .30, .50 corresponding with small, medium, and large respectively. IBM SPSS Statistic version 24 (Chicago, IL) was used for statistical analysis. Statistical significance was defined as $p \leq .05$.

**Results**

**Demographics**

There were 218 total patients in the sample, 109 in T1 and 109 in T2, with the 18-22 and 23-26 age groups containing equal numbers of participants (50%, $n = 109$). The sample was predominately female (69.7%, $n = 152$) with 66 males (20.3%). The sample was predominately White (62.4%, $n = 136$), followed by 19.7% Black or African American ($n = 43$), 13.3% did not disclose their race ($n = 29$), 3.7% two or more races ($n = 8$), 5% Asian ($n = 1$), and .5%
American Indian or Alaskan Native (n = 1). The majority of patients had less than a high school diploma/general education development (GED) or did not disclose their educational level attained (64.7%, n = 141), 22.5% had a high school diploma or GED (n = 49), and 12.8% had attained above a high school diploma or GED (n = 28). Most patients did not disclose their socioeconomic status (SES) (42.7%, n = 93), while 29.8% had an SES that was 139% or more of the federal poverty line (n = 65), and 27.5% had an SES that was 138% or less of the federal poverty line (n = 60). The primary insurance payer was Medicaid (43.6%, n = 95), with others including commercial insurance (33.5%, n = 73), and self-pay (22.9%, n = 50). There was no statistically significant difference between groups for age (p = .22), gender (p = .14), race (p = .40), education level (p = .78), SES (p = .27), or insurance payer (p = .80).

**Vaccination Rates**

Of the 218 patients, 97.2% (n = 112) did not receive the HPV vaccine, while 2.8% (n = 6) did receive the vaccine. Of the six patients who did receive the vaccine, 50% (n = 3) were vaccinated in T1 and 50% (n = 3) were vaccinated in T2. There was no statistically significant difference in HPV vaccination rates between groups (p = 1.00).

**Disparities in Care.** No disparities in care amongst groups were noted in T1 or T2 as both females (n = 4) and males (n = 2) were vaccinated of various races (White n = 2, Black or African American n = 2, two or more races n = 1, and did not disclose n = 1) and SES statuses. All individual's (n = 6) vaccinated during T1 and T2 had obtained less than a high school diploma or GED or did not disclose their educational level attained. Finally, insurance payors of those vaccinated included Medicaid (n = 4), self-pay (n = 1), and commercial insurance (n = 1).

**Provider Led Discussions**

Provider led discussions were tracked utilizing the documentation of specific ICD-10 codes; Z23.0 encounter for immunization, Z28.01 immunization not carried out because of acute illness of patient, Z28.04 immunization not carried out because of patient allergy to vaccine or component, Z28.20 immunization not carried out because of patient decision for unspecified reason, and Z28.21 immunization not carried out due to patient refusal.

**Z23.0.** Of the 218 patient encounters, 2.8% (n = 6) had documentation of ICD-10 code Z23.0. Of the six encounters that contained documentation of ICD-10 code Z23.0, 50% (n = 3) occurred in T1 and 50% (n = 3) occurred in T2. There was no statistically significant difference in documentation of ICD-10 code Z23.0 between groups (p = 1.00).

**Z28.01, Z28.04, and Z28.20.** Of the 218 patient counters, 100% (n = 218) had no documentation of ICD-10 codes Z28.01, Z28.04, or Z28.20.

**Z28.21.** Of the 218 patient encounters, 2.3% (n = 5) had documentation of ICD-10 code Z28.21. Of the five encounters that had documentation of code Z28.21, 20% (n = 1) occurred in T1 and 80% (n = 4) occurred in T2. While not statistically significant, there was a small increase in the documentation of ICD-10 code Z28.21 from T1 to T2 (p = .18, ϕ = .10). Providers in T2 were approximately one and half times more likely to document code Z28.21 than in T1 (OR = 1.6, 95% CI [1.03, 2.57]). This finding is clinically significant as it demonstrates increasing number of provider-led discussions regarding the vaccine.

**Vaccine Series Completion Rates**

Two doses of the HPV vaccine are required if the first dose in the series is administered prior to the 15th birthday (CDC, 2021b). However, if the first dose is administered on or after the 15th birthday, three doses are required (CDC, 2021b). Of the three individuals vaccinated within T1, two completed their vaccine series. Of the three individuals vaccinated within T2, one completed their vaccine series.
Dose in Series Administered. Of the 218 patients, 97.2% \((n = 212)\) did not receive a dose of the HPV vaccine, 0.5% \((n = 1)\) received the first dose in the vaccine series, 1.8% \((n = 4)\) received the second dose in the vaccine series, and .5% \((n = 1)\) received the third dose in the vaccine series. There was no statistically significant difference between groups in regard to the dose in the vaccine series that was administered \((p = .40)\).

Conclusion

The purpose of this project was to evaluate the effectiveness of an HPV vaccine informational session presented to family practice providers at the Community Health Center of Central Missouri. The first project objective of a 2% increase in HPV vaccination rates was not met as vaccination rates were the same in T1 and T2. The second project objective of a 5% increase in provider-led discussions regarding the HPV vaccine was met as there was a 75% increase in documentation of specific ICD-10 codes from T1 to T2. The third project objective of a 1% increase in HPV vaccine series completion rates was not met as there was a 50% decrease in HPV vaccine series completion rates from T1 to T2. However, the vaccine series completion rates in both time points were small, with two individuals completing the series in T1 and one completing the series in T2. Findings are consistent with current literature in that provider recommendation for HPV vaccination is one of the most critical factors in increasing HPV vaccine uptake, yet many providers recommend the vaccine inconsistently.

Stakeholder Recommendations

Overall rates of HPV vaccination as well as rates of provider-led discussions regarding vaccination were low, as only 2.8% of individuals seen within T1 and T2 received a vaccination, and only 5% of individuals had documentation of an ICD-10 code that indicated a discussion regarding vaccination occurred. In conducting the review of charts, it was noted that many patients included in the study did not have any vaccinations documented within their vaccine record in the clinic’s electronic medical record (EMR). In addition, the clinic EMR does not provide an alert that a patient is due for an HPV vaccination unless at least one prior dose of the vaccination has been documented. Thus, while working in a busy primary care clinic, providers and nurses alike do not have access to patients’ complete vaccination records and also do not receive a reminder to ask patients about their HPV vaccination status, resulting in many missed opportunities to vaccinate.

It is recommended that the clinic implement a “past due” alert into the vaccine record within the EHR to alert both providers and nurses of a patient’s eligibility for HPV vaccination. In addition, it is recommended that providers discuss with each of their nurses the importance of reviewing the patient’s vaccine record at every visit, notifying the provider of any vaccinations that are due, and helping patients to attain these records if they are not available. Implementation of this review of vaccine records at every visit as well as a “past-due” alert could cut down on missed opportunities to vaccinate and have great positive impact on the number of provider-led discussions that occur regarding vaccination and vaccination rates.

Strengths and Limitations

Strengths of the project included demonstration of the achievement of one outcome and the number of available patients that met inclusion criteria. Limitations include the use of convenience sampling and the use of a singular informational session for providers only, which allows for decreased motivation over time. Future research should focus on implementation of repeated informational sessions for providers and clinic nurses which could help to sustain change over time, as well as developing a better understanding of factors that influence providers to make a strong recommendation for HPV vaccination.
References


Centers for Disease Control and Prevention. (2022c, October 3.) *How many cancers are linked with HPV each year?* https://www.cdc.gov/cancer/hpv/statistics/cases.htm.


