A Multidisciplinary Approach to Increasing the Discussion of the Human Papilloma Virus and the Human Papillomavirus Vaccination in the Dental Care Setting

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**Abstract**

The Human Papilloma Virus (HPV) vaccine was developed to prevent cervical and other cancers of the reproductive system (Center for Disease Control and Prevention [CDC], 2020). According to The American Academy of Pediatrics (AAP), 54.2% of teens were fully vaccinated for HPV in 2019; 56.8% of girls and 53.7% of boys (Jenco, 2020). HPV also plays a major role in oral head and neck cancer. HPV knowledge among providers remains low, educational interventions to improve knowledge and communication appear to be effective (Shuk et al., 2019). Dentist and dental hygienist have the unique opportunity to discuss and recommend the HPV vaccination to patients every six months during regularly scheduled visits. Dental care providers express concern regarding discussion of the topic related to knowledge deficit, reliable sources of information, and comfort of discussing the topic. At the University of Detroit Mercy, 246 people participated in an educational session on HPV and the HPV vaccination. This included dental students, dental hygiene students and faculty. Analysis of the pre- and post- test results suggested the educational session increased and enhanced the participants’ knowledge and comfort of discussing HPV and the HPV vaccination. Continued work includes Integrating increased education of HPV into the dental provider curriculum which addresses current knowledge gaps and increases the dental providers comfort and role in discussing and recommending the HPV vaccine.

*Keywords: Human papillomavirus, Center for Disease Control and Prevention, Vaccination, Dental care providers.*

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**A Multidisciplinary Approach to Increasing the Discussion of the Human Papilloma Virus and the Human Papilloma Virus Vaccination in the Dental Care Setting**

Cancers of the head and neck, specifically the oropharynx, and base of tongue are steadily rising, secondary to infection from HPV. Cancers from traditional risk factors of smoking and drinking have declined in recent years yet remain more deadly with a worse prognosis. Vaccination with the HPV vaccine has proven to have long-lasting effects of preventing HPV infection and cancers caused by HPV (About HPV Vaccines, 2021).

**Background**

In 1983 it was confirmed that HPV type 16 and 18 are a carcinogen for cervical cancer and is it is widely known clinically that HPV is the cause of almost all cervical cancer. In 1983, a study by Durst and colleagues confirmed the carcinogenicity of HPV 16 by cloning it from cervical carcinoma (Kobayashi et al., 2018). Kobayashi et al. (2018) reports that HPV is the predominant cause of more than 90% of head and neck cancers that are HPV Deoxyribonucleic acid (DNA) positive. HPV is a DNA that infects the skin and the mucous membranes. Oropharyngeal cancer is now the leading site for HPV associated cancers in humans. This statistic is alarming as well as is the population affected. The patient population with HPV positive oral cancer are younger and healthier, which does lend to a better prognosis for survival. The deadliest cause of head and neck cancer remains cigarette smoking and alcohol consumption. The prognosis for a patient with recurrent or metastatic disease remains extremely poor. Patients face surgical resection, radiation and the possibility of chemoradiotherapy. This leaves the patient with life-long post-treatment decreased quality of life. Many suffer dysphagia (difficulty swallowing), xerostomia (dry mouth, this is caused from radiation damaging salivary glands), less than required caloric/nutrition intake with difficulty chewing, voice difficulty, and a multitude of social issues and isolation from family, friends, and social situations secondary to changes in appearance and function (Henry & Zeitouni, 2019). In 2006, the Gardasil vaccine was approved for girls and women age 9 to 26 for reproductive associated HPV cancers. In 2009 that was expanded to include males. In June of 2020, the recommendation was again expanded to not only include reproductive HPV associated cancers but also oropharyngeal cancer (U.S. Food & Drug Administration [FDA], 2020). In June of 2020 the FDA approved the vaccine to be used for the indication of preventing HPV associated pharyngeal and oral pharyngeal cancer (OPC). It received accelerated approval based on clinical evidence. (American Dental Association [ADA], 2020) Gardasil 9 is the only vaccine currently utilized in the United States (US) for HPV vaccination. Many people infected with HPV are asymptomatic and shed the virus spontaneously within the first two years without ever getting ill. Greater than 70% of pharyngeal and oropharyngeal cancers are caused by HPV infection. (Kobayashi et al., 2018) A study by the National Cancer Institute (NCI) of 2,600 young adults in the United States found that the prevalence of oral infection with HPV was 88% lower in those who reported receiving at least one dose of an HPV Vaccine than in those who said they had not received any doses (National Institute of Health [NIH], 2017). Vaccinating is the best way to prevent the development of cancers caused by the HPV virus. Oropharyngeal cancer is the most common HPV-associated cancer in the united states. The incidence of HPV related oropharyngeal cancer has steadily been on the rise. The HPV vaccine could prevent 90 percent or 31,200 new cases of oropharyngeal cancers from developing in the US each year (CDC Newsroom, 2018). It is important to vaccinate at an early age, as young as 9 years old. The vaccine is most effective if given prior to any exposure to HPV. The most common age to begin is 11 to 12 years and is a series of two vaccinations given 6 to 12 months apart. Three doses are recommended if started at 15 years of age to 26 years of age. There is some indication for vaccination in the 26 to 45 age range. The vaccine prevents new HPV infections but does not treat existing infection or disease (HPV Vaccine Recommendations, 2020). Due to the long interval between HPV infection and the development of cancer, vaccination is so very important. The significance to health care is education of dentist and hygienist in the importance of having the discussion with patients and patient’s parents regarding the role of HPV in oral cancer and that the vaccination prevents this form of cancer. Discussing a vaccination with a parent that is associated with a sexually transmitted disease can be uncomfortable for some providers. The disease development occurs many years after exposure, which can also make providers less likely to feel the need to discuss this with patients. Discussion of vaccination for HPV most commonly occurs in the pediatrician’s office or the primary care provider. The dental practice is another opportunity to have a discussion recommending the vaccination.

**Significance of the Problem**

Improving HPV vaccination coverage in the United States can only be accomplished by increasing healthcare providers’ effectiveness in recommending the vaccine. According to the World Health Organization (WHO), HPV is the most common sexually transmitted infection worldwide” (HPV and cancer, 2019). Head and Neck Cancers rank as the sixth most common cancer worldwide (Morbini & Benazzo, 2016). HPV vaccination in the United States lags behind other developed countries. Educational interventions are primarily directed at patients and parents rather than educating healthcare providers (Shuk et al., 2019). The HPV vaccine is a form of primary prevention related to HPV and cancer. Dental professionals have historically limited their role in HPV to secondary prevention through oral head and neck examinations (Vazquez-ortero et al., 2018). The ADA and the American Academy of Pediatric Dentistry (AAPD) guidelines suggest an expanded role for dental professionals, stating they should strongly and clearly recommend the HPV vaccination to all age-eligible patients (Walker et al, USA Dental health providers' role in HPV vaccine communication and HPV-OPC protection: a systematic review, 2019).

**Problem Statement**

Knowledge of HPV and its role in being the causal agent for head and neck cancer as well as the HPV vaccination efficacy for decreasing cancers caused by HPV remains low among health care providers. Education to improve knowledge regarding both has proven effective. More than 80% of men and woman acquire HPV by the age of 45 years. The HPV vaccine prevents head and neck cancers caused by HPV. To be most effective with a robust response the HPV vaccination must be given between ages 9-11, when exposure to HPV has not occurred. The target population is the dental office, consisting of the dentist and the dental hygienist, as well as faculty at the University of Detroit Mercy (Detroit Mercy).

**Literature Review**

The ADA and the AAPD state that dental care providers, both dentist and dental hygienist should ensure they educate themselves and their patients about HPV and the role it plays in oropharyngeal cancer, and further that they should “strongly and clearly recommend HPV vaccination to all age-eligible patients” (Walker et al., USA dental health providers' role in HPV vaccine communication and HPV)OPC protection: a systematic review, 2019)

The CDC list 5 ways to boost HPV vaccination rates; 1. Bundle your recommendations 2. Ensure a consistent message 3. Use every opportunity to vaccinate 4. Provide personal examples 5. Effectively answer questions (Human Papillomavirus (HPV) 5 ways to boost your HPV vaccnation rates, 2019). Healthy People 2030 lists reducing infections of HPV types prevented by the vaccine in young adults as a major initiative. Many cancers affecting the cervix, penis, rectum and oropharynx are preventable with vaccination (Healthy People 2030, 2022).

The Food and Drug Administration (FDA) approved a request to add prevention of oropharyngeal cancer to the indication for HPV vaccination on June 12, 2022. “The request to add oropharyngeal cancer prevention received accelerated approval, meaning the FDA approved it based on clinical evidence that the vaccine prevents oral HPV infections,” (Cersaci, 2020). Many other structures in the head and neck are also affected by cancer and specifically HPV related cancer for example 23.5% of oral cavity cancer, 24% of laryngeal cancer 23% of tonsillar cancer which would strongly indicate adding these to the FDA list of approval for the vaccine (Kobayashi et al., 2018). The 5-year survival rate for those diagnosed with localized disease that has not spread is 83%, that drops to 36% in patients with metastasis at diagnosis (Oral Health, 2020). Many studies have shown that smoking and alcohol are considered the main risk factors for oral head and neck cancer. One study reported the incidence of oropharyngeal and oral cancer is growing both in young non-smokers and young non-drinkers. It also compared sexual risk factors for HPV positive and negative oral cancer and found; HPV positive risk factors of sexual practices and cofactor of marijuana immunosuppression were common in the younger patient while the HPV negative oral cancer patient was older with tobacco, alcohol for risk and cofactors of diet and hygiene (Westra, 2013). The information regarding treatment as well as life altering changes secondary to treatment are important to inform the public that this is a serious disease with significant morbidity and mortality which can be prevented with the vaccine. In the US, the CDC site 35,000 cases of HPV-related cancers annually of which 13,500 cases are head and neck cancer (Herper, 2020). The increase in the number of HPV-positive oral cancers has been steadily on the rise. It increased 225% between 1988 and 2004. While HPV-negative cancers (caused most commonly from smoking and or drinking) decreased by 50%. The US CDC estimates that up to 75% of the US population that is of reproductive age has been exposed to HPV. The HPV infection is harbored in the oral cavity and oropharynx. In a prospective study of 253 newly diagnosed or recurrent Head and Neck cancer patients, 25% had a tissue diagnosis positive for HPV. Head and neck cancer are now diagnosed on final tissue pathology reports as HPV-p16 positive or HPV-p16 negative. “In a phase III study involving 400 oropharyngeal carcinomas, the 2-year progression free survival rates for HPV-positive and HPV-negative cancer were 72% vs 51% and the 2-year overall survival rates were 88% vs 67% (Kobayashi et al., 2018). Due to the differences in prognosis the WHO recommended Immunostaining for HPV tissue sample,” (Kobayashi et al., 2018). Since 90% of oropharyngeal cancers are caused by HPV it is expected that the vaccination will have a marked disease-suppressing effect. One limit to the vaccination and where further research is indicated is the need for booster vaccinations and at what time frame. “In order for the vaccination to be effective in preventing oropharyngeal cancer, the protective effect must last for 2 decades, and ongoing studies have shown no warning of systemic antibodies at 8 years after vaccination,” (Kobayashi et al., 2018). Currently booster doses are recommended for females at age 26 and males at age 21. As of 2017 49%, less than half of adolescents in the US were up to date on the HPV vaccine, and 66% of adolescents ages 13-17 years had received the first dose in the series. Vaccine rates are increasing but still more than half of the adolescent population has not been vaccinated (Understanding HPV Coverage, 2018). The percentage had a slight increase in 2018 with 51.1% of adolescents ages 13 to 17 being fully vaccinated and the percent of teens receiving at least one dose rose from 66% to 68.1%. Females continue to be vaccinated more frequently than males with 53.7% of females vaccinated and 48.7 % of males (CDC: Teens' HPV vaccination rates improves slightly, 2019). Ethnicity is also an important factor for HPV vaccination; 400 African American parents of children ages 10-12 years who were offered HPV vaccine by their health care providers to assess sociodemographic factors, vaccine belief, trust in health care provider and HPV vaccine recommendation received. Results showed having a parent with “a lot of trust” in their health care provider versus none was associated with over twice the odds of receiving HPV vaccination. African Americans on average have a greater mistrust in the healthcare system (Fu et al., 2017). Dentists and Hygienists are in a very unique position to educate and influence patient and patients parents about the HPV vaccination, they typically see their patients every six months and can have very long relationships with their patients. Children are more likely to be vaccinated if a healthcare professional recommends it to the parent or guardian. Research shows that patients are four to five times more likely to receive a vaccine if strongly recommended by a health care provider (Stinchfield, 2018). The inference is that dentist and hygienist discussing and recommending the HPV vaccine will increase the rate of HPV vaccination.

**Organizational Assessment**

The proposed project fits into the mission, values and vision of the Detroit Mercy’s College of Health Professions (CHP) and the School of Dentistry (SOD). The CHP’s mission statement reads: The College of Health Profession, in the Mercy and Jesuit traditions, prepares professionals to lead individuals’ families, and communities to optimal health and well-being (College of Health Professions & McAuley School of Nursing, 2022). The vision goes on to add: The College of Health Professionals is an Urban Center of academic excellence that prepares graduates to lead and serve the complex health care needs of our local and global communities and will be recognized for leadership and innovation in higher education. Several guiding principles are utilized which exemplify living the mission and vision (College of Health Professions & McAuley School of Nursing, 2022). The academic faculty at Detroit Mercy were supportive of this project and the unique proposal of a Doctor of Nursing Practice project being presenting as an innovation to the dental school. The dental and hygiene programs at Detroit Mercy are fully accredited by the Commission on Dental Accreditation (CODA). This project is in alignment with the values of the dental program which include excellence, service, respect, life-long learning, and integrity (Detroit Mercy Dental, 2022). The faculty at the dental school supported this proposal. This innovation aligns with the mission and values of each program. Gaps and weakness that took time and energy to move through were, the Internal Review Board (IRB) process, and scheduling the date and time for presenting. The setting for this innovation was time consuming and had multiple delays and changes over the course of several weeks. Many programs are still holding virtual class because of the Covid pandemic. The dental school had very recently returned to on campus learning. There is not a large cost associated with this innovation. The main factor was time of the presenter (myself) to prepare, copy, distribute and collect the questionnaire. Also gaining the time during dental and hygienist classroom for the educational presentation proved difficult to schedule.

**Rationale**

Educating providers and increasing vaccination rates for HPV will be most successful with a multidisciplinary approach. The Healthy People goal for 2030 for HPV vaccination rates was 80% (Healthy People 2030, 2022) as previously pointed out we are greatly failing that mark. A national survey of 1495 parents of children ages 11-17 demonstrated that high-quality recommendations by a health care provider increase HPV vaccination initiation by 3-fold and completion by 9-fold (Goel & Vasudevan, 2021).

**Theoretical Framework, Defining the Project**

Two models were utilized together as the framework for this project. The first model that was used is the Donabedian model. The Donabedian model assisted in the evaluation of the structure, process and outcomes of this quality improvement project. The structure measure assisted in capturing dental students, hygienist, and faculty with regard to their knowledge and comfort level of the topic and the likelihood of recommending that patients receive the HPV vaccination. The process looked at the teaching tool to be utilized and talking points recommended. The outcome reflected the impact this project had on affecting practice change (Science of Improvement: Testing Changes, 2021). This quality improvement project looked at the interaction of the patient or the patient’s parents during their dental visit to include the discussion of the HPV vaccination from the dentist and the hygienist. The second model that was used is the Plan-Do-Study-Act (PDSA) cycle. Portions of the (PDSA) cycle were utilized. The PDSA is utilized for action-oriented learning (Improvement, 2021). The PDSA cycle was discussed during the presentation for the audience to utilize as a tool to assess comfort and ease of discussing HPV and HPV vaccination. The talking points hand out is a tool a dental provider (the students and faculty) can use to become more comfortable with discussing this topic, this method can be used to evaluate if this will work in their desired environment. It can help guide the providers thinking process into small steps and evaluating increase in knowledge and comfort.

**Project Purpose Statement**

The goal of this quality improvement project was to increase dental care providers’ discussion and recommendation of the HPV vaccination to patients, and to the parents of patients. This was conducted at the Detroit Mercy dental school with dental students, hygiene students, and faculty. The dental providers’ office has a very unique opportunity in that they see patients every six months from a very young age and this project can assist to expand the depth of that relationship.

The objectives of the project are:

1. Survey providers prior to education process in their understanding and comfort with the subject and perhaps if they are currently discussing.
2. Provide educational session in relation to needed components of the discussion.
3. Provide one-page informational summary of HPV and guide/talking points to assist with patient and parent interaction.
4. Complete Post-survey/educational presentation questionnaire.

**Evaluation Methods/Inclusion Criteria**

The response to each question was scored either correct or incorrect. The pre-education scores were compared to the post-education scores with McNemar’s tests of agreement for each question to see how responses have changed. The change in the HPV questions and the HPV vaccine questions were summarized separately and those changes examined also with a sign test on the normality of differences. See appendix A for demographic information. See appendix B, appendix C, and appendix D for pre- and post-questions HPV and HPV vaccine questions and questions for perceived willingness to discuss HPV and the vaccine. See appendix E for talking points hand out. Inclusion criteria for participation was; must be a faculty member of the Detroit Mercy SOD, a dental student or dental hygiene student of any year; enrolled at Detroit Mercy SOD.

**Results and Statistical Analysis**

Table 1

Participant demographics

|  |
| --- |
| **Position** |
| Faculty 19 7.76% |
| Dental Students 196 80.00% |
| Dental Hygiene students 30 12.24% |

Table 2

Student year

|  |
| --- |
| **Student Year** |
| Year One 1 0.47% |
| Year two 20 9.39% |
| Year Three 113 53.05% |
| Year Four 79 37.09% |

Table 3

Student Gender

|  |
| --- |
| **Gender** |
| Females 144 59.26% |
| Males 99 40.74% |
| Missing 4 |

Table 5

Race

|  |
| --- |
| **Race** |
| White 142 59.17% |
| Black 14 5.83% |
| Asian 56 23.33% |
| Other 28 11.67% |
| Others listed race as: |
| Arab 6 28.57% |
| Middle Eastern 7 33.33% |
| Indian 3 14.26% |
| Egyptian 2 9.52% |
| Biracial 1 4.76% |
| Latino 1 4.76% |
| Chaldean 1 4.76% |

Table 6

HPV vaccine received by participants

|  |
| --- |
| **Have you had the HPV vaccine?** |
| Yes 157 66.53% |
| No 79 33.47% |
| **If not vaccinated were you offered the vaccine?** |
| Yes 51 75% |
| No 17 25% |

B. Questions on HPV and HPV-OPC Pre-education

Correct answers are in **BOLD**

|  |  |  |
| --- | --- | --- |
| 1. There are many types of HPV? **True** | | |
| False | 2 | 0.82% |
| **True** | **241** | **99.18%**  Frequency missing 4 |
| 2. HPV is a bacterial infection? **False** | | |
| **False** | **232** | **94.69%** |
| true | 13 | 5.31%  Frequency missing 2 |
| 3. A person can be infected with HPV without knowing it? **True** | | |
| False | 3 | 1.22% |
| **True** | **242** | **98.78%**  Frequency missing 2 |
| 4. In most cases HPV infections go away without causing any health problems? **True** | | |
| False | 118 | 49.17% |
| **True** | 122 | 50.83%  Frequency missing 7 |
| 5. HPV can be transmitted via sexual contact? **True** | | |
| False | 3 | 1.23% |
| **True** | **241** | **98.77%**  Frequency missing 3 |
| 6. Some types of HPV are associated with greater than 70% of OPC? **True** | | |
| False | 16 | 6.64% |
| **True** | **225** | **93.36%**  Frequency missing 6 |
| 7. The same types of HPV that infect the genital areas can infect the mouth and throat? **True** | | |
| False | 19 | 7.82% |
| **True** | **224** | **92.15%**  Frequency missing 4 |
| 8. Antibiotics can cure HPV? **False** | | |
| **False** | **233** | **95.49%** |
| True | 11 | 4.51%  Frequency missing 3 |
| 9. OPC caused by smoking is more deadly than OPC cause by HPV? **True** | | |
| False | 155 | 64.85% |
| **True** | **84** | **35.15%**  Frequency missing 8 |
| 10. Early stages of HPV OPC are often asymptomatic? **True** | | |
| False | 10 | 4.10% |
| **True** | **234** | **95.90%**  Frequency missing 3 |

C. Questions on HPV Vaccine Pre-education

Correct answers are in **BOLD**

|  |  |  |
| --- | --- | --- |
| 1. there are vaccines that provide immunity against certain types of HPV? **True** | | |
| False | 4 | 1.65% |
| **True** | **238** | **98.35%**  Frequency missing 5 |
| 2. HPV vaccines lead to long lasting immunity? **True** | | |
| False | 33 | 13.69% |
| **True** | **208** | **86.31%**  Frequency missing 6 |
| 3. HPV vaccine protects men and woman against OPC? **True** | | |
| False | 37 | 15.35% |
| **True** | **204** | **84.65%**  Frequency missing 6 |
| 4. HPV vaccines are covered by most insurances? **True** | | |
| False | 41 | 17.08% |
| **True** | **199** | **82.92%**  Frequency missing 7 |
| 5. HPV vaccines may cause serious side effects: **False** | | |
| **False** | **186** | **77.50%** |
| True | 54 | 22.50%  Frequency missing 7 |
| 6. HPV Vaccine is administered in one dose? **False** | | |
| **False** | **166** | **69.17%** |
| True | 74 | 30.83%  Frequency missing 7 |
| 7. The recommended age for HPV vaccination in youths is 11 to 12 years? **True** | | |
| False | 31 | 12.81% |
| **True** | **206** | **85.83%**  Frequency missing 7 |
| 8. HPV vaccine prevents greater than 90% of individuals from getting genital warts? **True** | | |
| False | 31 | 12.81% |
| **True** | **206** | **85.83%**  Frequency missing 7 |
| 9. People who have been diagnosed with HPV should not receive the HPV Vaccine? **False** | | |
| **False** | **158** | **65.56%** |
| true | 83 | 34.44%  Frequency missing 6 |
| 10. The centers for Disease and Prevention (CDC) recommends that the HPV vaccine should be administered to both males and females? **True** | | |
| False | 11 | 4.55% |
| **True** | **231** | **95.45%**  Frequency missing 5 |

B. Questions on HPV and HPV-OPC Post Education

Correct answers are in **BOLD**

|  |  |  |
| --- | --- | --- |
| 1. There are many types of HPV? **True** | | |
| False | 8 | 3.43% |
| **True** | **225** | **96.57%**  Frequency missing 14 |
| 2. HPV is a bacterial infection? **False** | | |
| **False** | **210** | **89.74%** |
| True | 24 | 10.26%  Frequency missing 13 |
| 3. A person can be infected with HPV without knowing it? **True** | | |
| False | 4 | 1.71% |
| **True** | **230** | **98.29%**  Frequency missing 13 |
| 4. In most cases HPV infections go away without causing any health problems? **True** | | |
| False | 56 | 24.35% |
| **True** | **174** | **75.65%**  Frequency missing 17 |
| 5. HPV can be transmitted via sexual contact? **True** | | |
| False | 4 | 1.75% |
| **True** | **225** | **98.25%**  Frequency missing 18 |
| 6. Some types of HPV are associated with greater than 70% of OPC? **True** | | |
| False | 9 | 3.91% |
| **True** | **221** | **98.25%**  Frequency missing 17 |
| 7. The same types of HP that infect the genital areas can infect the mouth and throat? **True** | | |
| False | 20 | 8.77% |
| **True** | **208** | **91.23%**  Frequency missing 19 |
| 8. Antibiotics can cure HPV? **False** | | |
| **False** | **216** | **93.91%** |
| True | 14 | 6.09%  Frequency missing 17 |
| 9. OPC caused by smoking is more deadly than OPC caused by HPV? **True** | | |
| False | 144 | 63.72% |
| **True** | **82** | **36.28%**  Frequency missing 21 |
| 10. Early stages of HPV OPC are often asymptomatic? **True** | | |
| False | 3 | 1.31% |
| **True** | **226** | **98.69%**  Frequency missing 18 |

C. Questions on HPV Vaccine post-education

Correct answers are in **BOLD**

|  |  |  |
| --- | --- | --- |
| 1. There are vaccines that provide immunity against certain types of HPV? **True** | | |
| False | 7 | 3.07% |
| **True** | **221** | **96.93%**  Frequency missing 19 |
| 2. HPV vaccines lead to long lasting immunity? **True** | | |
| False | 27 | 11.84% |
| **True** | **201** | **88.16%**  Frequency missing 19 |
| 3. HPV vaccine protects men and woman against OPC? **True** | | |
| False | 11 | 4.82% |
| **True** | **217** | **95.18%**  Frequency missing 19 |
| 4. HPV vaccines are covered by most insurances? **True** | | |
| False | 18 | 7.89% |
| **True** | **210** | **92.11%**  Frequency missing 19 |
| 5. HPV vaccines may cause serious side effects? **False** | | |
| **False** | **159** | **69.74%** |
| True | 69 | 30.26%  Frequency missing 19 |
| 6. HPV vaccine is administered in one dose? **False** | | |
| **False** | **191** | **83.77%** |
| True | 37 | 16.23%  Frequency missing 19 |
| 7. The recommended age for HPV vaccination is 11 to 12 years? **True** | | |
| False | 20 | 8.81% |
| **True** | **207** | **91.19%**  Frequency missing 20 |
| 8. HPV vaccine prevents greater than 90% of individuals from getting genital warts? **true** | | |
| False | 27 | 11.89% |
| **True** | **200** | **88.11%**  Frequency missing 20 |
| 9. People who have been diagnosed with HPV should not receive the HPV vaccine? **False** | | |
| **False** | **126** | **56.50%** |
| True | 97 | 43.50%  Frequency missing 24 |
| 10. The centers for Disease and Prevention (CDC) recommends that the HPV vaccine should be administered to both males and females? **True** | | |
| False | 2 | 0.91% |
| **True** | **217** | **99.09%**  Frequency missing 28 |

**Analysis/Results**

There was a statistically significant difference between overall number correct between pre education questions on HPV and HPV-OPC and the post education. A sign test of the difference was not a 0 p= 0.0002. The means and the median do not really reflect this although the change variable does.

There was statistically significant difference between overall number correct between the pre education questions on HPV and the post education questions on HPV. A sign test of the difference found evidence that the difference was not 0 p=0.015. The means and median do not really reflect this although the change variable does. Although the statistical increase from pre teaching to post teaching was not as robust as I felt it would be the data does show an increase. There were challenges to the project that contributed to not having as great of an increase in correct post-test answers. This project was scheduled to be completed one month prior to when it actually was completed. Due to circumstances outside of my control with staff changing at the dental school this project was completed on a Friday in June. The students have returned to in-person learning post-Covid but that is rather new, as is the Friday meetings. Twenty-two participants did not complete the entire study, these where included in the data, with further thought they should not have been as it skewed the post-percentages slightly. Many of the faculty members asked questions at the end of the presentation and several students and faculty approached me after thanking me for presenting this topic to them and that they do not get detailed information on this vaccine and how to discuss it with patients. This gives practical significance to the project. Faculty and students commented that this aspect of HPV is not covered as in-depth in their curriculum, in particular the statistics and quality of life issues related to a diagnosis of OPC. Faculty and students also had many comments regarding the vaccine; vaccination is not presented to them as something for them to discuss with and recommend to their patients. This identified and addressed gaps in training.

D. Perceived responsibility and willingness to discuss HPV and the HPV vaccine

1. Discussing the link between HPV and oropharyngeal cancer falls within the scope and role of the dental professions?

1. strongly agree 204 91.07%

2. somewhat agree 15 6.70%

3. not agree/disagree 2 0.89%

4. somewhat disagree 2 0.89%

5. strongly disagree 1 0.45%

2. Recommending HPV vaccination falls within the scope and role of a dental professional?

1. strongly agree 178 79.11%

2. somewhat agree 42 18.67%

3. not agree/disagree 2 0.89%

4. somewhat disagree 2 0.89%

5. strongly disagree 1 0.44%

3. It is important for a dental provider to provide counseling to parents about HPV vaccine and HPV’s link to OPC?

1. strongly agree 178 79.11%

2. somewhat agree 39 17.33%

3. not agree/disagree 5 2.22%

4. somewhat disagree 2 0.89%

5. strongly disagree 1 0.44%

4. I am currently able to describe the burden of HPV disease?

1. strongly agree 110 48.89%

2. somewhat agree 90 40.00%

3. not agree/disagree 19 8.44%

4. somewhat disagree 5 2.22%

5. strongly disagree 1 0.44%

5. I am currently able to provide useful and compelling information about the HPV vaccine to parents to aid in decision making for vaccination?

1. strongly agree 121 53.78%

2. somewhat agree 83 36.89%

3. not agree/disagree 15 6.67%

4. somewhat disagree 6 2.67%

5. strongly disagree - -

6. I can define the importance of HPV vaccination for cancer prevention:

1. strongly agree 147 65.33%

2. somewhat agree 73 32.44%

3. not agree/disagree 2 0.89%

4. somewhat disagree 3 1.33%

5. strongly disagree - -

7. I am currently able to explain the rationale for vaccinating youth ages 11-12?

1. strongly agree 152 67.56%

2. somewhat agree 61 27.11%

3. not agree/disagree 8 3.56%

4. somewhat disagree 4 1.78%

5. strongly disagree - -

8. I am aware of the CDC’s recommendations for administering the HPV vaccine to both males and females?

1. strongly agree 175 77.78%

2. somewhat agree 44 19.56%

3. not agree/disagree 3 1.33%

4. somewhat disagree 3 1.33%

5. strongly disagree - -

\*\*\*There were 22 responses missing for each question\*\*\*

These responses reflect that the students feel it is in their purview to discuss HPV disease as it relates to head and neck cancer and the HPV vaccine, but that they still feel they need more education.

**Methods/Design Implementation Plan**

The method utilized was a quality improvement initiative. The contextual elements that will be covered include the dental providers’ knowledge level and comfort level regarding HPV disease and its role as a causative agent for certain cancers and discussing and recommending the HPV vaccination to patients that meet the age criteria and to patient’s with children. The method utilized was the questionnaire outlined in appendix A, B, C, D, and E, with true/false response, and “how likely” responses, a written summary of the educational points regarding current HPV statistics as they relate to head and neck cancer and that HPV vaccination prevents this form of cancer. A pre-teaching and post-teaching questionnaire were given to students that agree to participate. A talking points guide was provided to each student to utilize during patient visits.

Participants were asked only on the pre-educational questionnaire if they have received the HPV vaccination. The same questions were asked post educational presentation, with the same scale. This was completed during a designated class time. One presentation for the dental students, hygiene students, and faculty. This group of students has returned to in person-on campus learning therefore it occurred in a classroom.

The response to each question was scored either correct or incorrect. The pre education scores were compared to the post education scores with McNemar’s tests of agreement for each question to see how responses have changed. The change in the HPV questions and the HPV vaccine questions were summarized separately and those changes examined with a sign test on the normality of differences. See appendix B, appendix C, and appendix D for pre and post questions HPV and HPV vaccine questions and questions for perceived willingness to discuss HPV and the vaccine. See appendix E for talking points hand out.

The outcomes were measured clinically by comparison of pre- and post-educational surveys. This is a quasi-experimental design, which is commonly used to evaluate participants’ attitudes or perceptions relative to an event or comfort in applying information presented in a training session. Participants will not be randomly assigned therefor outcome causality cannot be determined, rather an association between intervention and outcome is made. Better scoring on a post test, in this instance an increase in choosing (1. Very comfortable, and very likely), would imply better knowledge or perception relative to the intervention (Stratton, 2019). The data collection tool scored the group of pre-tests into how many of each choice there is in total, the same occurred for the post-test. The demographic data collected was limited to if the participant is in the dental program or the hygienist program or faculty members. Learning outcomes were assessed utilizing the Kirkpatrick model (level 2) which considers whether participants acquired the intended knowledge, skills, or attitudes based on their participation in the educational intervention and the collected information before and after the learning activity (Sanchez-Ramirez et al., 2018).

**Ethical Consideration**

Participants agreed to participate, with the understanding that not participating will have no ill consequences. This Quality Improvement (QI) project was submitted to IRB at Detroit Mercy, review of the IRB process at Detroit Mercy shows no harm anticipated to participants or providers. IRB was approved through the Detroit Mercy Dental School, a separate IRB for the school of nursing was not needed.

**Implications for Practice**

Research has indicated that dental providers have relatively low knowledge of HPV-related OPCs, especially regarding the link between oral cancer and HPV and the HPV vaccine. The ADA has taken the stance that all dental exams should include a discussion of cancer prevention. They note the increase in oral cancer in individuals without the traditional risk factors of tobacco and alcohol consumption. The ADA’s center for Evidence-Based-Dentistry has stated oral health professions should strongly and clearly recommend the HPV vaccination to all age-eligible patients. “Yet, whether and how this HPV-related prevention, including recommendation of the HPV vaccine, is currently implemented into dental practices is not well understood,” (Griner et al., 2019). Increasing the dental providers’ role in prevention of HPV related teaching will improve health outcomes of patients. Some barriers noted by dental care providers are the perceptions that HPV is a sensitive topic as it is typically known as a sexually transmitted disease. Dental providers can also be uncomfortable with discussions involving cancer. A tool to guide the conversation and address sensitive topics will increase provider comfort level and ways to respond to patients’ questions with confidence and knowledge. “Increasing dental provider awareness, knowledge, and self-efficacy of this topic can ultimately serve to reduce HPV-related oropharyngeal cancer morbidity and mortality,” (Griner et al., 2019).

**Sustainability Plan**

The plan to sustain this project is to incorporate the one-page educational summary into the curriculum for dental and hygiene students at Detroit Mercy’s dental school, as well as the one-page summary of talking points and guidelines. A member of the faculty can incorporate this into their teaching points. The oral pathology portion of the curriculum may be the most beneficial time to add this topic, as visualizing the effects of HPV becoming cancerous will enhance the need to discuss this topic with patients and to recommend the vaccination. The barriers are that statistics will change over time; therefore, the sheets will need to be updated, not all faculty members may feel the HPV vaccine should be discussed in this setting. This project could be utilized at any dental school.

**Dissemination**

At the completion of the project presentation it was disseminated to Detroit Mercy via zoom presentation which was open to the McAuley School of Nursing (MSON) as well as the Detroit Mercy dental school and interested parties from the community. A poster presentation will be completed and submitted to various professional conferences for approval; Michigan Council of Nurse Practitioners (MICNP) and American Association of Nurse Practitioners (AANP) both for consideration of 2023 meetings.

**Conclusion**

Results of this quality improvement project proved successful in increasing the knowledge of dental, and hygiene students as well as faculty, in relation to HPV, and HPV’s role as a causal agent for OPC and the HPV vaccination as prevention for HPV related cancers. It identified opportunities to fill gaps in training for dental care providers particularly in regard to discussing and recommending the HPV vaccine to patients and parents of patients. It provided a tool with talking points to increase comfort level of discussing this topic. Interprofessional relationships were strengthened between the Detroit Mercy MSON and the Detroit Mercy Dental School. The goals of the presentation were achieved.

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**Appendix A: Demographic data collection tool**

A. Demographic Data

1. Faculty\_\_\_\_\_\_ Dental Student\_\_\_\_\_ Dental Hygiene Student\_\_\_\_\_

If you are a student program year? \_\_\_\_\_1 \_\_\_\_\_2 \_\_\_\_\_3 \_\_\_\_\_4

1. Gender \_\_\_\_\_ Male \_\_\_\_\_Female \_\_\_\_\_ Other (specify \_\_\_\_\_\_)
2. Race: \_\_\_\_\_\_White \_\_\_\_\_\_ Black \_\_\_\_\_\_ Asian \_\_\_\_\_\_ Other(specify\_\_\_\_\_)
3. Have you received the HPV Vaccination: \_\_\_\_\_\_ No \_\_\_\_\_\_ Yes

If No where you offered the HPV vaccination: \_\_\_\_\_\_ No \_\_\_\_\_\_ Yes

**Appendix B: Questions on HPV and HPV-OPC**

B. Questions on HPV and HPV-OPC

1. There are many types of HPV? true\_\_\_\_\_\_\_\_\_ false\_\_\_\_\_\_\_\_\_
2. HPV is a bacterial infection? true\_\_\_\_\_\_\_\_\_ false\_\_\_\_\_\_\_\_\_
3. A person can be infected with HPV without knowing? true\_\_\_\_\_\_\_\_ false\_\_\_\_\_\_\_\_
4. In most cases HPV infections go away without causing any health any significant health problems? true\_\_\_\_\_\_\_\_ false\_\_\_\_\_\_
5. HPV can be transmitted via sexual contact? true\_\_\_\_\_\_\_\_ false\_\_\_\_\_\_\_\_
6. Some types of HPV are associated with greater than 70% of OPC? true\_\_\_\_\_\_ false\_\_\_\_
7. The same types of HPV that infect the genital areas can infect the mouth and throat? true\_\_\_\_\_\_\_\_ false\_\_\_\_\_\_\_\_
8. Antibiotics can cure HPV? true\_\_\_\_\_\_\_\_ false\_\_\_\_\_\_\_\_
9. OPC caused by smoking is more deadly than OPC caused by HPV? true\_\_\_\_\_\_false\_\_\_\_\_
10. Early stages of HPV-OPC are often asymptomatic? true\_\_\_\_\_\_\_false\_\_\_\_\_\_\_\_

**Appendix C: Questions on HPV Vaccination**

C. Questions on HPV vaccine

1. There are vaccines that provide immunity against certain types of HPV?

true\_\_\_\_\_\_ false\_\_\_\_\_\_

1. HPV vaccines lead to long lasting immunity? true\_\_\_\_\_\_ false\_\_\_\_\_\_
2. HPV vaccine protects men and woman against OPC? true\_\_\_\_\_\_ false\_\_\_\_\_\_
3. HPV vaccines are covered by most insurances? true\_\_\_\_\_\_ false\_\_\_\_\_\_
4. HPV vaccines may cause serious side effects? true\_\_\_\_\_\_ false\_\_\_\_\_\_
5. HPV vaccine is administered in one dose? true\_\_\_\_\_\_ false\_\_\_\_\_\_
6. The recommended age for HPV vaccination in youths is 11 to 12 years?

true\_\_\_\_\_ false\_\_\_\_\_\_

1. HPV vaccine prevents greater than 90% of individuals from getting genital warts? true\_\_\_\_\_\_ false\_\_\_\_\_\_
2. People who have been diagnosed with HPV should not receive the HPV vaccine? true\_\_\_\_\_\_ false\_\_\_\_\_\_
3. The Centers for Disease and Prevention (CDC) recommends that the HPV vaccine should be administered to both males and females? true\_\_\_\_\_\_ false\_\_\_\_\_

**Appendix D: Perceived Responsibility & Willingness to Discuss HPV & Vaccine**

D. Perceived Responsibility & Willingness to Discuss HPV and the HPV vaccine

1. Discussing the link between HPV and oropharyngeal cancer falls within the scope and role of a dental professional?

Strongly agree\_\_\_\_\_ somewhat agree\_\_\_\_\_ not agree/disagree\_\_\_\_\_ somewhat disagree\_\_\_\_\_ strongly disagree\_\_\_\_\_

2. Recommending HPV vaccination falls within the scope and role a dental professional?

Strongly agree\_\_\_\_\_ somewhat agree\_\_\_\_\_ not agree/disagree\_\_\_\_\_ somewhat disagree\_\_\_\_\_ strongly disagree\_\_\_\_\_

3. It is important for a dental provider to provide counseling to parents about HPV vaccine and HPV’s link to OPC?

Strongly agree\_\_\_\_\_ somewhat agree\_\_\_\_\_ not agree/disagree\_\_\_\_\_ somewhat disagree\_\_\_\_\_ strongly disagree\_\_\_\_\_

4.I am currently able to describe the burden of HPV disease?

Strongly agree\_\_\_\_\_ somewhat agree\_\_\_\_\_ not agree/disagree\_\_\_\_\_ somewhat disagree\_\_\_\_\_ strongly disagree\_\_\_\_\_

5. I am currently able to provide useful and compelling information about the HPV vaccine to parents to aid in decision making for vaccination?

Strongly agree\_\_\_\_\_ somewhat agree\_\_\_\_\_ not agree/disagree\_\_\_\_\_ somewhat disagree\_\_\_\_\_ strongly disagree\_\_\_\_\_

**Appendix D Continued**

6. I can define the importance of HPV vaccination for cancer prevention?

Strongly agree\_\_\_\_\_ somewhat agree\_\_\_\_\_ not agree/disagree\_\_\_\_\_ somewhat disagree\_\_\_\_\_ strongly disagree\_\_\_\_\_

7. I am currently able to explain the rationale for vaccinating youth ages 11 or 12?

Strongly agree\_\_\_\_\_ somewhat agree\_\_\_\_\_ not agree/disagree\_\_\_\_\_ somewhat disagree\_\_\_\_\_ strongly disagree\_\_\_\_\_

8. I am aware of the CDC recommendations for administering the HPV vaccine to both boys and girls?

Strongly agree\_\_\_\_\_ somewhat agree\_\_\_\_\_ not agree/disagree\_\_\_\_\_ somewhat disagree\_\_\_\_\_ strongly disagree\_\_\_\_\_



**Appendix E: Talking Points**