Human Papillomavirus Vaccination Counseling in Pediatric Training: Are We Discussing Otolaryngology-Related Manifestations?

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Abstract

Objective. Demonstrate the need for increased education regarding otolaryngology-related manifestations of human papillomavirus (HPV). Highlight a need to incorporate otolaryngology-related manifestations of HPV in vaccine counseling.

Study Design: Survey.

Setting. Tertiary care academic children’s hospital.

Subjects. Pediatric residents, fellows, and staff.

Methods. An online survey was made available regarding HPV education and vaccination.

Results. Participants (N = 348) initiated the survey representing 28.4%, 25.6%, and 19.0% postgraduate year 1, 2, and 3 residents, respectively, as well as 17.5% chief residents/fellows and 9.5% attendings. Participants rated their prior education as none or fair regarding recurrent respiratory papillomatosis (63.8%) and oropharyngeal squamous cell carcinoma (68.3%). In contrast, 60.6% and 70.9% rated their education on genital warts and cervical cancer correspondingly as good or excellent. When asked what was routinely discussed during HPV vaccine counseling, 63.3% reported “never” discussing recurrent respiratory papillomatosis and 52.9% “never” discussing oropharyngeal squamous cell carcinoma. A range from 92.7% to 95.5% responded that there was a need for increased education regarding HPV and its role in recurrent respiratory papillomatosis and oropharyngeal squamous cell carcinoma.

Conclusions. Increased education about HPV and its otolaryngology-related manifestations should be undertaken to increase provider, patient, and parent awareness of recurrent respiratory papillomatosis and oropharyngeal squamous cell carcinoma. We propose that discussing the risks of otolaryngology-related disease be routinely included in HPV vaccination counseling.

Keywords

human papillomavirus, vaccination, counseling
of primary care providers and the public for proper HPV vaccination counseling.

Although there have been several survey studies examining physician knowledge and practices regarding the HPV vaccine,6-8 none have addressed the need for incorporation of ENT-related manifestations into vaccine counseling. The goal of this study was to assess the baseline knowledge of HPV and its ENT-related manifestations among pediatric trainees and attending physicians, the practices regarding incorporation of these manifestations into vaccine counseling, and the need for further education in these areas.

Methods

We drafted a survey to assess the knowledge of ENT-related manifestations and their incorporation into vaccination counseling. The survey (Tables 1-4, Figures 1 and 2; see Supplement 1 at www.otojournal.org/supplemental) was made available online via SurveyMonkey (https://www.surveymonkey.com). The study was conducted over a 2-month period from October 2013 to December 2013. A pediatric residency coordinator emailed the survey link to the all attending physicians, fellows, and residents at the home institution. At the time of the survey, there were 119 residents, 43 fellows, 4 chief residents, and 1100 attending physicians at the home institution; 194 pediatric residency programs were then subsequently emailed via their coordinator, with a request that the survey be sent to their residency program. A single reminder email was sent to the home institution and pediatric residency coordinators. Attending physicians at outside institutions were not targeted. An estimated potential number of resident respondents would be 7900 based on the number of pediatric positions filled that year, multiplied by 3.9,10 Practicing community pediatricians were not sampled. The participants were enrolled purely through voluntary participation. There was no compulsory involvement or financial incentive for involvement in the survey. The study was deemed exempt by the institutional review board at Phoenix Children’s Hospital.

Results

Respondent Characteristics

A total of 348 participants initiated the survey, with approximately 90% (314) completing the entire survey. Respondents were 26.4% male and 73.6% female. The distribution across level of training was 28.4%, 25.6%, and 19.0% postgraduate year 1, 2, and 3 residents, respectively, as well as 17.5% chief residents/fellows and 9.5% attendings. While the potential geographic distribution of participants was vast across the United States, this was not queried in the survey. The attending response rate for the home institution represents 3% of those attendings emailed. This certainly underrepresents the response rate of pediatric attendings who actually offer and administer vaccines, as those who do not administer vaccines (eg, medical or surgical subspecialties) may not have taken the survey but were sent the email. The trainee response rate is also likely underestimated, as confirmation from the emailed coordinators was not received from every program; therefore, the true number of pediatric trainees actually emailed is unclear. If we assume that all pediatric trainees were actually emailed, the response rate would be approximately 4%.

Knowledge and Education

The survey questions concerning knowledge are listed in Table 1. In all true/false questions regarding HPV, the
The majority of respondents answered correctly. In 2 of the 4 true/false questions, 96.8% to 97.1% of respondents answered correctly. There was the most disparity when respondents were asked if HPV-related head and neck cancers were more common in females, with 69.4% correctly answering false and 30.6% answering true. When asked which diseases HPV played a role in and with the ability to select multiple options, 99.1% and 95.1% of respondents selected genital warts and cervical cancer, respectively. In contrast, 68.7% selected RRP, and 71.6% selected OPSCC.

When asked to self-rate prior education on HPV and its role in various diseases (Table 2), 63.8% and 68.3% of participants rated their prior education as “none” or “fair” regarding RRP and OPSCC, respectively. In contrast, 60.6% and 70.9% rated their education on genital warts and cervical cancer correspondingly as “good” or “excellent” 92.7% to 95.5% of respondents felt that there was a need for increased education about HPV and its role in RRP and OPSCC.

Current Practices and Attitudes

When asked what the respondent routinely discussed in HPV vaccine counseling, 87.5% “mostly” or “always” include the risk of cervical cancer (Table 3). In contrast, 63.3% “never” discuss the risk of RRP, and 52.9% “never” discuss the risk of OPSCC. Another 22.5% and 23.5% “rarely” discuss RRP and OPSCC, respectively, resulting in the majority of respondents routinely not including ENT-related manifestations of HPV in their vaccination counseling. If ENT-related manifestations were not discussed, the most common reasons allowing for multiple selections were “not remembering but discussing if asked” (59.6%) and “not aware of ENT-related manifestations” (31.9%; Table 4). When discussing specific risk factors, the majority of providers (82.6%-94.6%) cited the same risks regardless of sex, excluding cervical cancer, in which 62.2% of providers are more likely to discuss with female patients.

A total of 91.4% of respondents report offering the vaccine equally to both sexes, while the remaining 8.6% report offering it more commonly to females. The vaccine is typically offered at the same time regardless of sex (Figure 2), with 70.2% to 71.5% offering the vaccine at 11 to 13 years for both sexes and 22.1% to 26.0% offering the vaccine at 9 to 10 years. If the vaccine is initially declined, the majority of providers offer the vaccine again, with 29.6% offering it at every subsequent visit, 41.1% offering it at most subsequent visits, 26.4% offering it occasionally at subsequent visits, and only 2.9% never offering it again.

In the opinion of the respondents, 31.2% felt that there was equal consent for vaccination of male and female patients, while 65.0% felt that parents were more likely to consent for vaccination of females and 3.8% more likely in males. For those who consent for vaccination, providers estimated that the most common age for vaccination was similar between sexes, ranging 55.1% to 59.4% at ages 11 to 13 years and 30.3% to 30.7% at ages 14 to 16 (Figure 2). A total of 95% of providers with children intend for both their daughters and sons to receive the HPV vaccine, with no difference between the sexes.

### Table 2. Prior Education: “How Would You Rate Your Prior Education on HPV and Its Role in the Following?”

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Fair</th>
<th>Moderate</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genital warts</td>
<td>1.2</td>
<td>11.8</td>
<td>26.4</td>
<td>43.4</td>
<td>17.2</td>
</tr>
<tr>
<td>Genital cancer</td>
<td>4.3</td>
<td>17.9</td>
<td>31.4</td>
<td>35.2</td>
<td>11.2</td>
</tr>
<tr>
<td>Cervical cancer</td>
<td>0.6</td>
<td>9.5</td>
<td>19.0</td>
<td>43.5</td>
<td>27.4</td>
</tr>
<tr>
<td>RRP</td>
<td>35.1</td>
<td>28.7</td>
<td>23.2</td>
<td>10.4</td>
<td>2.6</td>
</tr>
<tr>
<td>Oropharyngeal cancer</td>
<td>32.3</td>
<td>36.0</td>
<td>22.5</td>
<td>7.5</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Abbreviations: HPV, human papillomavirus; RRP, recurrent respiratory papillomatosis.

### Table 3. HPV Vaccine Counseling: “Do You Routinely Discuss the Following Risks in Your HPV Vaccine Counseling?”

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Most of the Time</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genital warts</td>
<td>3.5</td>
<td>5.4</td>
<td>17.5</td>
<td>26.1</td>
<td>47.5</td>
</tr>
<tr>
<td>Genital cancer</td>
<td>9.0</td>
<td>9.9</td>
<td>16.4</td>
<td>25.6</td>
<td>39.1</td>
</tr>
<tr>
<td>Cervical cancer</td>
<td>3.2</td>
<td>2.2</td>
<td>7.0</td>
<td>25.9</td>
<td>61.7</td>
</tr>
<tr>
<td>RRP</td>
<td>63.3</td>
<td>22.5</td>
<td>9.3</td>
<td>2.3</td>
<td>2.6</td>
</tr>
<tr>
<td>Oropharyngeal cancer</td>
<td>52.9</td>
<td>23.5</td>
<td>12.6</td>
<td>5.2</td>
<td>5.8</td>
</tr>
</tbody>
</table>

Abbreviations: HPV, human papillomavirus; RRP, recurrent respiratory papillomatosis.
Discussion

Although there are several scientific articles and reviews of OPSCC\textsuperscript{1-5} and RRP\textsuperscript{11-13} in otolaryngology literature, these conditions are rarely discussed within the pediatric literature. Further pediatric literature regarding these conditions and effects from vaccination will be critical for increased pediatrician awareness and their inclusion in vaccination counseling and future HPV vaccination research.

While there are few data regarding HPV vaccination effect on OPSCC, it is a logical anticipated result given its responsible subtype. More than 90% of HPV-positive OPSCC cases are attributable to HPV 16, which is covered by the quadrivalent HPV vaccine.\textsuperscript{14} Both oral sex and open-mouthed kissing are associated with the development of oral HPV infection, as are increases in the number of lifetime oral or vaginal sex partners.\textsuperscript{15} Furthermore, because oral/oropharyngeal HPV is likely acquired from genital HPV infection through sexual behaviors, kissing, or autoinoculation, vaccination should indirectly reduce the incidence of oral/oropharyngeal HPV 16/18 infection by decreasing infection at genital sites.\textsuperscript{16} Emerging evidence showed a direct effect of the HPV vaccine on human oral/oropharyngeal HPV infection in one study—specifically, a vaccine efficacy of 93\% against oral HPV 16/18.\textsuperscript{16,17} Additionally, animal studies have shown that immunization has a demonstrated reduction in the development of HPV oral lesions.\textsuperscript{18,19} It will take decades to see a vaccine effect in this area, as OPSCC presents later in life than most HPV-associated genital cancers and most prior HPV vaccine research had predominately female subjects, while OPSCC is more common in males.

HPV immunization in children to prevent cancer as an adult or potentially prevent vertical transmission to one’s child is a relatively new consideration within the realm of pediatrics. HPV vaccination has been shown to be successful in prevention of cervical, anal, vaginal, and vulvar cancers, as well as genital warts.\textsuperscript{8} It is currently recommended to be administered at ages 11 to 12 years, before onset of sexual activity and during the highest antibody response age.\textsuperscript{20} The HPV vaccine was licensed for use in females in 2006 and 2009 for males ages 9 to 26 years. Both the
Advisory Committee on Immunization Practices and the American Academy of Pediatrics revised their recommendations to recommend routine vaccination of males in addition to females in 2011 and 2012, respectively. Despite these recommendations, only 6.8% of boys in 2012 aged 13 to 17 years received all 3 recommended doses, an increase from 1.3% in 2011. The rate of male adolescents receiving ≥1 doses of the vaccine was 20.8% in 2012, a significant increase from 8.3% in 2011.

The vaccine is safe, with no discernible, vaccine-specific adverse effects after >40 million doses, with the exception of rare anaphylaxis to vaccine components. Despite its efficacy and safety, the Centers for Disease Control and Prevention reported in the Morbidity and Mortality Weekly Report that vaccination rates remain low, with 33.4% of females aged 13 to 17 years completing the 3-dose series in 2012. In the same study, 53.8% of adolescent girls 13 to 17 years received ≥1 doses of any HPV vaccine in 2012, with no increase in coverage from 2011.

Among unvaccinated girls, 84% had a health care encounter in which they received a vaccine but not HPV vaccine. If the HPV vaccine had been administered during health care visits when another vaccine was administered, vaccination coverage for ≥1 doses could have reached 92.6%. While prior studies have cited that infrequent health care encounters in adolescents are a barrier to HPV vaccination, the Morbidity and Mortality Weekly Report study and this study demonstrate that providers are not capitalizing on subsequent visits after initial refusal to vaccination. It is crucial to recommend the HPV vaccine at each subsequent visit when initially declined to avoid missed opportunities for vaccination.

Prior studies have shown that parents’ reasoning for not vaccinating their teenage daughters mainly included “not needed or not necessary,” “safety concerns or side effects,” “not sexually active,” “lack of knowledge,” or “not recommended,” thereby showing a large potential for provider intervention. Others have had concerns that HPV vaccination may lead to modification of sexual behavior, but studies have shown no associated increased sexual activity with vaccination.

According to the Accreditation Council for Graduate Medical Education program requirements for pediatrics, each residency program is responsible for development of its educational program consisting of regular didactic sessions and overall educational goals. The American Academy of Pediatrics currently publishes Pediatrics Review and Education Program for a recommended board review resource and offers credits for continuing medication education and maintenance of certification for physicians, nurse practitioners, and physician assistants. Its published study guide states to “recognize that specific human papillomavirus strains are associated with cervical cancer and others with genital warts.” RRP and OPSCC are not mentioned. While hepatocellular carcinoma and nasopharyngeal carcinoma are presented as a known consequence of hepatitis C and EBV, respectively, OPSCC is not listed a consequence of HPV infection. The American Board of Pediatrics recommends to “understand the epidemiology of human papillomavirus infection and recognize the clinical features associated with human papillomavirus infection” in its content outline for board certification.

This study demonstrates a substantial need for increased education of the ENT-related manifestations of HPV, with the anticipation that providers may in turn educate patients and parents. Almost all pediatric survey participants in this study felt a need for increased education regarding these diseases, which is in concordance with prior otolaryngologist survey respondents of the American Head and Neck Society showing overwhelming support for activities to educate clinicians, increase public awareness, educate patients, and advocate for health policy related to HPV. Provider-directed education is especially important in HPV vaccine counseling, as prior studies have shown that providers give weaker recommendations for HPV vaccination as compared with other vaccines. Parental and patient education will be crucial, given that, despite increasing provider recommendation over a 3-year period, parents increasingly intended not to vaccinate their daughters, >40% in 2010, indicating a need for intervention on a larger scale.

Increased efforts for male vaccination should be undertaken for several reasons. It is proven to be effective in male external genital lesions, anal HPV, and intraepithelial neoplasia. OPSCC is more likely to affect males and is increasing in incidence. Additionally, vaccination of males will increase herd immunity for prevention of cervical cancer among other HPV-associated diseases. It is estimated that by increasing 3-dose HPV vaccine coverage to 80% of all recommended adolescents, an estimated 53,000 cases of cervical cancer could be prevented over the lifetimes of those aged ≤12 years, and for every year that increases

Figure 2. Estimated ages of offering and receiving human papillomavirus vaccine. *N/A applies to responses “I do not offer the vaccine to this gender” or “Will not undergo vaccination.”
in coverage are delayed, another 4400 women will go on to develop cervical cancer.\textsuperscript{22,32}

This study primarily reflects the attitudes of pediatric trainees and so may not accurately assess practicing community physicians’ and attending physicians’ knowledge and attitudes regarding HPV vaccination and ENT-related manifestations of HPV. Furthermore, it may underrepresent the knowledge of all pediatric trainees secondary to a low survey response rate. However, it is a valuable first step in measuring current knowledge and need for further education. More studies will be needed to further assess this educational gap and how to address it within medical education in the future.

Conclusion

Little is published or publicized about the ENT-related manifestations of HPV among the general population and medical providers. Consequently, such manifestations are not routinely discussed in HPV vaccine counseling. Increased educational efforts about HPV and its associated diseases, including the less-recognized ENT-related manifestations, need to be undertaken.

This study demonstrates a large need for education of medical providers participating in vaccination efforts. There is a tremendous need for organizations involving otolaryngologists and primary care providers to join together to recognize this as a problem and step forward to better educate clinicians, patients, and the public regarding the ENT-related manifestations of HPV and the importance of vaccination. These efforts may include but are not limited to educational materials, media coverage (print, electronic, social, and broadcast), and local, state, or national meeting lectures. The results of this survey may also serve as a stimulus for further research regarding ENT-related manifestations of HPV knowledge, incorporation in vaccine counseling, and further educational efforts. An additional survey of currently practicing pediatricians may be useful in the future to further delineate the rate of incorporating ENT-related manifestations of HPV into vaccine counseling in the community. Furthermore, a survey of parents regarding potential change in vaccination, manifestations of HPV into vaccine counseling in the community. Furthermore, a survey of parents regarding potential change

Author Contributions

Sharon H. Gnagi, conceptualized and designed the study, participated in data collection and analysis, drafted the initial manuscript, and approved the final manuscript as submitted; Forrest T. Gnagi, participated in designing the study and data collection, reviewed and revised the manuscript, and approved the final manuscript as submitted; Scott A. Schraff, supervised conception and design of study and data collection, critically reviewed manuscript, and approved the final manuscript as submitted; Michael L. Hinni, supervised conception and design of study and data collection, critically reviewed manuscript, and approved the final manuscript as submitted.

Disclosures

Competing interests: Michael L. Hinni’s employer owns the rights to his invention of a laryngoscope and has licensed it to Karl Storz for potential manufacturing.

Sponsorships: None.

Funding source: None.

Supplemental Material

Additional supporting information may be found at http://otojournal.org-supplemental.

References