Barriers preventing utilization of the Human Papillomavirus (HPV) vaccine in adolescents,

systematic review

by

Lynell Shove

BS, Concordia University, 2016

Thesis Submitted in Partial Fulfillment

of the Requirements for the

Master’s Degree in Public Health

Concordia University

August 2016
Abstract

The Human Papillomavirus (HPV) vaccine is proven to be effective against cancers caused by HPV types 6, 11, 16, and 18. These cancers are but not limited to cervical, vulvar, vaginal, and anal cancer. The virus is a common sexually transmitted virus, with the best prevention being the vaccine. To provide optimal immunity, this 3-shot vaccine should be given within the appropriate time frame during adolescent years prior to becoming sexually. The vaccine has not been highly utilized among the eligible age group; leading to HPV related cancers rising. By identifying the barriers that exist from receiving the vaccine, adolescents can be saved from incurable illnesses. This systematic review will identify the barriers and use the health belief model to encourage vaccination utilization and interventions to assist with increase vaccine coverage in adolescents.
Introduction

Statement of Problem

The Human Papillomavirus (HPV) is the most common sexually transmitted infection that has led to 275,000 deaths worldwide (Hariri, Dunne, Saraiya, Unger, & Markowitz, 2011). This infection can lead to many health issues like genital warts, cervical cancer, penile cancer, anal cancer, and oropharyngeal cancer. In most cases, the infected individual shows no symptoms and will unknowingly transmit the virus to others (Roberto, Krieger, Katz, Goei, & Jain, 2011). Between 2004 and 2008, there was a national average of 33,369 HPV-associated cancers annually (Btoush, Brown, Fogarty, & Carmody, 2015). Approximately 6.2 million people become infected each year and 500,000 new cases of cervical cancer related to HPV occur annually (Hariri, Dunne, Saraiya, Unger, & Markowitz, 2011). In 2006, the Food and Drug Administration approved the HPV vaccine that comes as a three shot series that protects from four high risk strains of HPV. Two of the strains cause 70% of cervical cancers and two strains cause 90% of genital wart infections (Roberto, Krieger, Katz, Goei, & Jain, 2011). This vaccine is recommended for both males and females starting at age 11. Since its introduction, the vaccine has not been widely utilized as a key tool of preventative care. It has only reached 37% of adolescents that have full protection against HPV, meaning they have received all three doses (Sussman, Helitzer, Bennett, Soalres, Lanoue, & Getrich, 2015). The lack of understanding the barriers of utilizing this vaccine results in many unnecessary deaths annually.

Purpose Statement

The purpose of this systematic review is to identify the barriers of adolescents receiving the HPV vaccine. Furthermore, the purpose of this research is to identify where the barriers
exist. This will allow interventions to be implemented to ensure the target population is being reached. The vaccine was created to ensure the protection of the public from cancers that are caused from HPV.

**Research Questions and Hypothesis**

The research questions that will be addressed are:

- What are the barriers preventing adolescents from receiving all three vaccines of the HPV vaccination series?
  - Hypothesis: There are barriers preventing adolescents from receiving all three vaccines of the HPV vaccination series
  - Null Hypothesis: there is no barriers that are preventing adolescents from receiving all three vaccines of the HPV vaccinations series
- What is the association between physician/healthcare provider patient education and support of the HPV vaccine and adolescents receiving the vaccination series?
  - Hypothesis: There is a significant association between the healthcare provider patient education of the HPV vaccine series and adolescents receiving the vaccination series
  - Null Hypothesis: There is no significant association between healthcare provider patient education and adolescents receiving the HPV vaccination series

**Potential Significance**

According to the Center for Disease Control and Prevention (CDC), 79 million Americans are currently infected with HPV and about 14 million people become newly infected each year (2012). By identifying the barriers, this research can be used to increase vaccination
rates, thus assisting with decreasing the high statistic of 11,000 women being diagnosed with cervical cancer each year and 4,400 people die from this disease in the United States (CDC, 2012). This can also identify if there is an association between patient education and vaccination rates that will assist with increasing vaccination utilization.
Literature Review

Theoretical Foundation

The Health Belief Model was developed in the early 1950s by scientists examining the reason individuals refuse to take advantage of disease prevention strategies or preventative screening tests (Boston University School of Public Health, 2016). The model thrives on six constructs: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cue to action, and self-efficacy. This model stems from both psychological and behavioral theories that rely on a person’s perception of the benefits and barriers of a health behavior (Boston University School of Public Health, 2016). The individual’s will not take part in a given action unless the benefits outweigh the risks. The Health Belief Model was founded on analyzing the reasons people were refusing preventative care; this would be utilized to assist with finding the barriers that exist in adolescents not receiving the HPV vaccination. It is also based on the perceived benefits outweighing the risks, it is essential that there is a link between the physician education and vaccination utilization. This would address the need for education and reaching out to the eligible patients that are not protected from HPV related illnesses.

Key Concepts and Variables

Vaccines are crucial, as they are the best preventable intervention against diseases. There is a vaccine that will protect against the Human Papillomavirus (HPV), which can be administered to both males and females (CDC, 2015). In the United States, nearly 80 million people, about 1 in four, are currently infected and about 14 million people become infected with HPV each year; however, the vaccination rates have been very low (CDC, 2015). The 2014 National Immunization Survey Teen showed that “four out of ten adolescent girls and six out of
ten adolescent boys hadn’t started the HPV vaccine series, and were vulnerable to cancers caused by HPV infections” (CDC, 2014). This vaccine is very important as it protects against the cancers that are caused by HPV yet it is being underused. The barriers to the lack of increasing vaccination rates need to be found so interventions can be implemented to protect people against HPV.

There is a lack of HPV vaccinations amongst adolescents. The completion of the three-dose vaccine is crucial to ensure protective immune response (Gallagher, Kadokura, Eckert, Miyake, Mouiner-Jack, Aldea, Ross & Watson-Jones, 2016). The coverage is low, 53.8% of girls and 20% of boys aged 13 to 17 received at least the first of the three dose vaccine, and only 33.4% and 6.8% received all three doses, respectively (Moss, Fled, O’Malley, Entzel, Smith, Gilkey, & Brewer, 2013). Unless the greater effort is placed on vaccination, cervical cancer disparities will persist or worsen (Tiro, Tsui, Bauer, Yamada, Kobrin & Breen, 2012).

Identifying the barriers to completing vaccinations in adolescents will provide valuable knowledge for future vaccinations and further development of adolescent health platforms (Gallagher et al, 2015). One barrier is the system and compliance issue that indicates the lack of opportunity for vaccination during wellness visits to physician offices (Sussman et al, 2015). This can be related to the lack of tracking and reminder capabilities (Sussman et al, 2015). To refrain from that, scheduled appointments should be made for the second and third vaccine to ensure completion of the multi dose vaccination (Sussman et al, 2015). These missed opportunities leads to the low vaccination rates and higher risks of cervical cancers.

It is the responsibility of physicians and health care providers to ensure adolescents are receiving the appropriate vaccinations at the right age. A study found that “88.9% of those
whose doctor had ‘strongly recommended’ the vaccine completed the vaccine series compared to 71.3% completion in those whose doctors had only ‘recommended’ the vaccine” (Kester, Zimet, Fortenberry, Kahn & Shew, 2013, pg.882). Provider support is a contributing factor to HPV vaccination rates (Perkins, Brogly, Admas & Freund, 2012). Targeting effort towards provider support will greatly impact the vaccine uptake and can lead to better vaccination coverage.

To increase the vaccination rates, programs like school-covered programs may be a solution. Offering voluntary vaccines while at school has shown to be effective for United Kingdom and Australia. They have achieved 80% vaccination rates with such school programs (Moss et al, 2013). A survey was taken of 33 school health centers in North Carolina and 79% expressed an interest in participating in new activities to promote HPV vaccinations (Moss et al, 2013). This will help with increasing the vaccination rates as well as the complete three shot vaccinations within the appropriate time frame. School based programs will reach majority of adolescents at the opportune age, provide easier accessibility to the vaccines, and offer low income and minority groups access.

There needs to be effort to improve vaccination rates in the low income and minority adolescents. “Fewer than half of low income and minority adolescents receiving health maintenance services initiated HPV vaccination and only 20% received all three doses” (Pertkins et al, 2012, p.819). Improving this disparity in the low income population will decrease the disparities in HPV-related cancers (Btoush, Brown, Fogarty, & Carmody, 2015).
Methods

The systematic review was selected to investigate the barriers that are contributing to low HPV vaccination rates in adolescents and the association between education from physicians and receiving the vaccination. This systematic review will review studies found in the past 10 years to determine the barriers adolescents receiving the HPV vaccine. This will help fill the gap of identifying avenues for adolescents receive the recommended preventative treatment; as well as identify if there is a lack of education from healthcare professionals.

Inclusion and exclusion criteria

The inclusion and exclusion criteria are displayed in Table 1.

Table 1

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adolescents, ages 11 to 12 years old</td>
<td>Studies on children &lt; 11 and adults&gt; 18</td>
</tr>
<tr>
<td>HPV vaccination given during this age group</td>
<td>studies not based on the HPV vaccine</td>
</tr>
<tr>
<td>Articles published from 2006-present</td>
<td>Study design: editorials, opinions</td>
</tr>
<tr>
<td>English</td>
<td>Non- English</td>
</tr>
<tr>
<td>Peer reviewed articles</td>
<td>Articles that were published from 2005 and before</td>
</tr>
<tr>
<td>Full text</td>
<td>Non full-text</td>
</tr>
</tbody>
</table>
After applying the inclusion and exclusion criteria, I determined there were three studies from peer-reviewed journals to include in the systematic review. The number of findings that were included and excluded within this process is presented in figure 1.

![Diagram showing the breakdown of studies included, excluded, and final number of studies.]

Figure 1. results of Inclusion and Exclusion Criteria

**Data Analysis Plan**

The number of studies identified were narrowed down using the inclusion and exclusion process indicated. A total of 2,409 studies were found from using the key terms and the search databases. With this total, 1,557 were excluded based on the pre-identified exclusion criteria of this review. A total of 853 full text articles were identified, of these full-text articles 101 were excluded due to the identified exclusion criteria. This resulted in 751 studies; all were reviewed to identify relatable research to answer research questions and inclusion criteria.
Results

Data Collection

For the initial literature review, search engines were used to identify relevant studies. After initial these included: Academic Search Premier and CINAHL Plus with Full text. When using the Academic Search Premier, the search terms used were; “HPV vaccination barriers” and “adolescents”, as well as “vaccinations”, “adolescents”, and “barriers”. When the CINAHL Plus with Full text, the search terms used were “vaccinations” and “adolescents or teenagers”. The scope of the literature review will be to find studies related to the HPV vaccine education and the barriers indicated. The inclusion criteria incorporated full text articles written in English from 2006 to present, and included adolescents aged 11 to 17. The studies that were excluded were based on the full text being unavailable, and were not peer-reviewed. This search produced 19 hits with 7 meting the inclusion and exclusion criteria. All 7 abstracts were reviewed to determine the relevance to the purpose of the study.
Figure 2 displays the process utilized to excluded and include studies for this systematic review.

To keep this research accurate and reliable inclusion criteria was created and multiple searches were used with combination of search terms. If the studies did not meet the criteria, the information was discarded, as it did not contribute to the purpose of this review. The criteria was selected to ensure the validity and relevant studies were selected.
These were selected based off the methodology, inclusion and exclusion criteria, and were included based off the relevance to this systematic review. After reviewing, 4 studies were deemed appropriate to included in the systematic review. Adults aged 18 and older who received the HPV vaccination were excluded from this review.

Table 2 includes the information extracted form the studies included in the systematic review.

Table 2

*Characteristics of Included Studies*

<table>
<thead>
<tr>
<th>Study (Authors’ name)</th>
<th>Setting</th>
<th>Theory</th>
<th>Sampling Procedure</th>
<th>Participant Characteristics</th>
<th>Data Analysis Approach</th>
<th>Key Themes</th>
<th>Quality Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oldach &amp; Katz, (2012)</td>
<td>Ohio Public Health</td>
<td>Observational Study</td>
<td>45 health departments offering HPV vaccines</td>
<td>Health department s</td>
<td>Adolescent Barriers to HPV vaccine</td>
<td>Lack of knowledge, side effects, newness, children not sexually active and too young to receive vaccine</td>
<td>4</td>
</tr>
<tr>
<td>Sussman et al, (2015)</td>
<td>Primary Care</td>
<td>Observational study</td>
<td>Interviews</td>
<td>Primary care physicians</td>
<td>Evaluate health care delivery models of HPV vaccine</td>
<td>Patient attributes and health system delivery of care are vaccine challenges</td>
<td>3</td>
</tr>
<tr>
<td>Forster, Waller, Bowyer and Marlow, (2015)</td>
<td>12 London Schools, 259 females</td>
<td>Observational study</td>
<td>Survey after being offered the HPV vaccine</td>
<td>Girls aged 15 to 16 years old – unvaccinated status</td>
<td>Free-text reported reasons form girls</td>
<td>74% un/under vaccinated girls (n=259), reasons: lack of need, safety concerns, lack of parental consent, need for more information</td>
<td>4</td>
</tr>
</tbody>
</table>
Table 2 presents the characteristics of the studies included in the systematic review. It contains only qualitative studies as they were found appropriate to answer the research questions of this review. Table 3 below describes the results of the included studies in the systematic review.

**Results**

Table 3 *Results of Included Studies*

<table>
<thead>
<tr>
<th>Author</th>
<th>Quality Score</th>
<th>Intervention</th>
<th>Measures</th>
<th>Results</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oldach &amp; Katz (2012)</td>
<td>4</td>
<td>Ohio Appalachia adolescent Vaccine Barriers</td>
<td>Questionnaire of HPV Vaccine barriers</td>
<td>Top barriers found • Lack of knowledge (25 of 45, 55.6%) • Concern about side effects (17 out of 15, 37.8%) • New vaccine (16 out of 45, 35.6%) • Children are not sexually active (16 out of 15, 35.6%)</td>
<td>Yes, Females in target population have higher cervical cancer than those not living in Ohio Appalachia</td>
</tr>
<tr>
<td>Sussman (2015)</td>
<td>3</td>
<td>Vaccine Barriers</td>
<td>Physician interviews</td>
<td>Lack of capacity to track and distribute reminders to patients was the greatest barrier</td>
<td>Yes, targeting Patient attributes and health system delivery of care will overcome the barriers</td>
</tr>
<tr>
<td>Forster, Waller, Bowyer and Marlow, 2015</td>
<td>4</td>
<td>259 Females in London report reasons for non-vaccination</td>
<td>Survey 3 years after being offered HPV vaccine</td>
<td>• Lack of parental consent (82/202, 41%) • Safety concerns (51/202, 25%) • Belief they did not need vaccine (38/202, 19%)</td>
<td>Yes, barriers vary among each individual</td>
</tr>
</tbody>
</table>
Table 3 shown above, displays the significant barriers preventing adolescents from receiving the HPV vaccination series. The primary outcomes of the studies were all similar and consistent with each other, the reason for non-vaccination is the need for more information and the safety concerns of the vaccination. The top barrier that was not consistent with the rest of the studies was Forester et al (2015), as this study took place in London schools, free of charge, the parents did not consent to have vaccine administered. The responses that were found from this was that they were going to wait until the adolescent was older, and long term side effects may be possible as this is a new vaccine (Forester et al, 2015). The belief that the vaccine was not needed is because the adolescents are not sexually active (Forester et al, 2015). Physicians are having a difficult time tracking the vaccination schedules and sending out reminders to patients that are eligible.
Conclusion

Interpretation of Findings

The HPV vaccine has not be utilized among adolescents, there is still a significant amount of adolescents unprotected from the HPV virus. The 3 studies found were to answer the following research questions:

• What are the barriers preventing adolescents from receiving all three vaccines of the HPV vaccination series?
• What is the association between physician/healthcare provider patient education and support of the HPV vaccine and adolescents receiving the vaccination series?

Through this systematic review, the barriers preventing adolescents from receiving all three vaccines of the HPV vaccination series is due to the lack of information and education the adolescent has and their parents. There are also other barriers like the safety concern of the vaccination and the parent’s belief that the adolescents are not sexually active. These barriers are significant and can be overcome with the proper education and knowledge from physicians or public health officials.

The association between healthcare provider education and support of the HPV vaccination leads the adolescents to receive the vaccination. However, there is a barrier physicians have, the physicians have a difficult time with tracking the eligible patients and providing reminders to patients to come back for the complete series.

Limitations

There is one significant limitation of this review, there is a limited about of studies found that met the inclusion and exclusion criteria. This is due to the target population of this review
being adolescents aged 11 to 17 receiving the HPV vaccination. During the research phase, most of the studies that were found included all ages that were eligible for the vaccination, ages 11 to 26. It is recommended that the vaccination series be completed before an individual becomes sexually active, which the earlier the better as sometimes parents are not aware of their child’s sexual activity. With that knowledge, targeting the adolescent ages to analyze the barriers that exist can greatly impact the lives of thousands. These ages are not within the inclusion criteria so they were excluded from this review.

There is a potential of personal bias due to my compassion of ensuring everyone has the most optimal source of preventable disease treatment. This may cause some bias within this review by not believing in some of the barriers that are being stated. I may not include the studies that I don’t believe the barriers exist. The detailed method of how the review was conducted was explained earlier to allow transparency and replication of the study. This ensures that no bias was incorporated to affect the results or the selection of studies.

The reliability of this review was high. The studies within this study all displayed similar information, the consistent barrier is the lack of knowledge or information. The generalizability may be affected due to the limited studies. This causes limited information or data regarding barriers adolescents have in receiving the HPV vaccine. Also, one of the studies used only had information from females and not males. There are potential issues that may exist due to the location of adolescents, the access to the vaccination, the out of pocket costs associated with vaccination, and the religion of the adolescents as some don’t believe in having sex outside of marriage.
While these limitations do exist within this review, the data shows that there is still a lack of utilization of HPV with the consistent barrier being knowledge.

**Recommendations**

Based on the research conducted, there is a lack of understanding the barriers regarding vacation. These are preventing HPV protection coverage amongst adolescents and causing health issues. In order to overcome these barriers, public policy needs to be addressed amongst adolescents and pediatricians/primary care physicians to ensure opportune vaccination is increased and education is provided to both adolescents and parents. With providing the opportune vaccination, physicians can provide the proper education to parents and adolescents that will encourage vaccination. Creating this public policy change will enable to provide all appropriate information and overcome the barriers that currently exist.

Additional research is needed to identify specific barriers for males and females that are preventing HPV vaccination utilization. Further studies can also be conducted on the school centers or community centers that can provide vaccinations and if this route would be effective for communities to increase HPV vaccination coverage. Research can also be done to increase awareness of the importance of the vaccination and to increase vaccination utilization.

There is a gap in the literature and research about the vaccination barriers among male adolescents. Since the vaccine series was approved for both males and females, the only studies found, were only conducted on females. This has led to the lack of understanding the barriers confronting males. Additional research is needed to address changing the perception that the vaccination is for females only.
Closing the gap in literature, conducting further research, creating awareness and providing knowledge of the HPV vaccination will help to create better understanding to create policy and social change.

**Implications for Social Change**

Social change needs to start at the individual level. Each individual needs to understand the need for the complete three shot series of the HPV vaccine to be considered immune. Also the importance of the vaccination and the contribution it has to their overall health and the health of others. Families then need to be knowledge able of the vaccinations needed during adolescent years and the edibility years.

Social change efforts need to be implemented within the community, like pubic health departments, schools, and community health centers. The result of this review indicate the need for further information and education, and community can provide this. Whether it would be conferences, educational classes, or

Policy changes need to occur to ensure that every adolescent is provided with the opportunity to be educated about the vaccination and offered administration. Along with this policy change, ensuring the access to the vaccination series is enforced with the policy change. Adolescents and their parents look to professionals like public health official and physicians to ensure that they are in proper health status and remain current with preventable disease treatments. This will also help to close the gap in knowledge that the vaccination is only for males.

**Conclusion**
There is a lack of utilization of the HPV vaccinations to provide immunity to adolescents. The main barrier among all adolescents is the lack of knowledge and education of the HPV virus and the vaccination information. While the adolescents have this barrier, physicians have difficulty with tracking the vaccinations and sending out reminders to patients. With these two barriers, adolescents are not receiving the best optimal preventative treatment. History shows that using vaccinations are the best way to eradicate deadly viruses and with the lack of utilization with this vaccination more people are suffering from HPV related cancers ultimately resulting in death. Creating policy and social changes, thousands of lives can be saved and the HPV virus can be a thing of the past.
References


papillomavirus vaccination rates in low-income, minority adolescents: a multicenter
Study. *Journal Of Women’s Health (15409996)*, 21(8), 813-820.
doi:10.1089/jwh.2011.3364

completion of the quadrivalent Human Papillomavirus (HPV) vaccine in a private

communication with parents about the human papillomavirus (HPV) vaccine: an
doi:10.1080/10410236.2010.550021

Catching up with the HPV vaccine: challenges and opportunities in primary care. *Annals
Of Family Medicine, 13*(4), 354-360. doi:10.1370/afm.1821