What influences HPV vaccine acceptability and parental intent to vaccinate?

A Master's project submitted in partial fulfillment of the requirements for the degree of

MASTERS OF NURSING

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Graduation Date: August, 2012
To the Faculty of Washington State University:

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ACKNOWLEDGEMENTS

I would like to thank the following individuals for their continuous support throughout my education.

To the entire faculty and staff at Washington State University Spokane I thank you for your encouragement and commitment to education.

To my Mother and Father, Cindy and Don Dootson for giving me the opportunity to pursue my dreams since a young age and their continuous loving words.

To my Mother and Father in law, Linda and Dan Berry for their letters of support and encouraging thoughts throughout my schooling.

To my close friends and fellow colleagues for reminding me to take a little time off to have some fun.

And lastly to my husband, the love of my life, Tony Berry, who was there for every laugh, tear and late night providing me with the strength and love I needed to fulfill my dream.
What influences HPV vaccine acceptability and parental intent to vaccinate?

Abstract

Human Papillomavirus affects 6.2 million people annually in the United States and is the most common sexually transmitted disease (CDC, 2010). The HPV vaccine was FDA approved for females 9-26 years of age in 2006 and three years later was approved for use in males age 9-26 years. Since its FDA approval vaccine rates have remained low – around 32% for completion of the vaccine series in the United States (CDC, 2010). The ACIP recommends the vaccine be routinely administered to girls and boys age 11-12 years of age to ensure vaccine series completion before sexual debut. Given the recommended age of routine vaccination, parental consent is required for vaccine administration. This literature review examined parental HPV vaccine acceptability and the intention to vaccinate their sons and daughters with the HPV vaccine. The review revealed that parents have little knowledge of what HPV is or how it is transmitted. Previous concerns about HPV vaccination causing increased sexual promiscuity were found to be held by only a small minority of parents surveyed. The literature showed that parents see health care providers as an important source for vaccine information and look to their health care provider for the recommendation to vaccinate their children.

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August, 2012

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Submitting to Journal of Pediatric Nursing

Key Words: HPV vaccine acceptability, HPV vaccine, parental intent to vaccinate
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>iv</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>6</td>
</tr>
<tr>
<td>THEORETICAL FRAMEWORK</td>
<td>10</td>
</tr>
<tr>
<td>REVIEW OF LITERATURE</td>
<td>11</td>
</tr>
<tr>
<td>DISCUSSION</td>
<td>18</td>
</tr>
<tr>
<td>RECOMMENDATION FOR PRACTICE AND RESEARCH</td>
<td>21</td>
</tr>
<tr>
<td>CONCLUSION</td>
<td>22</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>23</td>
</tr>
</tbody>
</table>
Introduction

Human Papillomavirus (HPV) is the most common sexually transmitted disease in the United States. In 2011 the Centers for Disease Control and Prevention estimated that 20 million people were currently infected with HPV in the United States (Centers for Disease Control and Prevention [CDC], 2011). The quadrivalent HPV vaccine provides immunization against HPV types 6, 11, 16, and 18. Approximately 90% of genital warts are caused by HPV types 6 and 11 and 70% of cervical cancer cases are caused by HPV types 16 and 18 (CDC, 2011). Cervical cancer is responsible for approximately 4,000 deaths per year in the United States and in 99.7% of cervical cancer cases HPV DNA can be identified (Haupt & Sings, 2011). New research has also linked HPV to vulvar, vaginal, penile, oropharyngeal and anal cancers and the quadrivalent HPV vaccine has been shown to prevent some of these cancers as well (Haupt & Sings, 2011).

In June of 2006 the United States Food and Drug Administration (FDA) approved the use of Gardasil, the quadrivalent HPV vaccine which covers against four types of HPV for females age 9-26 years. The Advisory Committee on Immunization Practices (ACIP) recommended the HPV vaccine for use in females age 9-26 years in 2007. In 2009 the FDA licensed Gardasil vaccine for use in males ages 9-26 years and approved the bivalent HPV vaccine for use in females ages 9-26 years. The bivalent vaccine only provides immunity against HPV types 16 and 18 which are the cancer causing types and does not provide protection against types 6 and 11 which are the genital wart types. The ACIP recommendation is to vaccinate females with either the bivalent or quadrivalent HPV vaccine and in males only the quadrivalent HPV vaccine is recommended.

The ACIP recommends that the HPV vaccine be administered to girls and boys age 11 to 12 years because the vaccine is most effective if given prior to the first sexual encounter. Ideally
the children receiving the vaccination would complete the entire 3-dose series before their sexual
debut which adds to the importance of starting the series in the pre-teen years. Many people are
unaware of the fact that condoms do not provide full protection against HPV allowing the virus
to spread without direct intercourse. The HPV vaccine is administered in a three shot series with
the second shot administered at two (2) months and a third shot administered at six (6) months
after the initial vaccination.

Haupt & Sings, 2011, reviewed the safety and efficacy of the quadrivalent HPV vaccine
since its approval in 2006 with more than 74 million vaccinations having been administered
worldwide. Five clinical trials were reviewed to look at vaccine safety with 21,480 girls and boys
included in the study ranging from age 9-26 years. The review found that eight (8) people
experienced treatment related adverse reactions with no deaths linked to immunization and that
equal rates of syncope occurred in both the vaccine group and the placebo group. In 2006 the
ACIP recommended watching any adolescent or young adult for 15 minutes post any vaccination
due to the larger percentage of this population experiencing syncope with vaccination (Haupt &
Sings, 2011). After an initial two year review of HPV vaccine safety, the CDC concluded that
“the HPV vaccine continues to be safe and effective and its benefits continue to outweigh its
risks” (Haupt & Sings, 2011, p. 472). More than 12,000 females received the HPV vaccine in
clinical trials before release to the public with no concerns for safety arising.

In addition to initial review studies on vaccine safety, continual monitoring of vaccine
safety occurs through the Vaccine Adverse Event Reporting System (VAERS), the Clinical
Immunization Safety Assessment Network and the Vaccine Safety Datalink Project (Markowitz
et al., 2010). These measures are in place to keep track of rare reactions and look for trends in
reporting to identify possible vaccine safety concerns. According to the VAERS report published
in 2011 approximately 40 million doses of Gardasil had been distributed and a total of 20,096 reports were received through the VAERS system (Centers for Disease Control and Prevention [CDC], 2011). Out of the 20,096 reports, 92% of the events were deemed non-serious consisting of pain at injection site, fever, dizziness, nausea and syncope. Eight percent were considered serious and included reports of Guillian-Barre syndrome, blood clots, and death (CDC, 2011). The article reported that Guillian-Barre syndrome occurs at a rate of 1-2 per 100,000 teenagers and there was no evidence to show that the rate of Guillian-Barre syndrome increased more than the normal population occurrence after HPV vaccination. Most of the people who reported blood clots had co-existing risk factors for blood clots including use of oral contraceptive agents, obesity and smoking (CDC, 2011). A total of 71 deaths were reported with 34 deaths being confirmed and showing no pattern to suggest that the death occurred due to HPV vaccination (CDC, 2011). Of the remaining deaths insufficient information was given to follow up on death report confirmation (CDC, 2011).

Depending on the insurance status of study participants cost is either of high concern or no concern at all for those with full insurance coverage. In one study of parents with pre-teen and teenage girls the researchers predicted that cost would be a barrier; however 100% of the study participants stated that they had insurance coverage so cost was not a perceived barrier (Askelson et al., 2010). One thousand two hundred seven (1,207) study participatees were mailed surveys with 306 surveys returned (Askelson et al., 2010). Surveys sent back with parents indicating their daughter was outside of the 9-15 age range were excluded, along with parents who indicated that their daughter had already been vaccinated. That left 217 surveys which were included in the analysis (Askelson et al., 2010). All of the study participants lived in Iowa and the researchers reported that only 3% of children in Iowa are without health insurance so cost was unlikely to be
a major barrier to vaccination in the state of Iowa. According to the CDC the average cost of the quadrivalent HPV vaccine is $111.96 to $130.27 per shot and the bivalent HPV vaccine is $96.08 to $128.75 per shot ("Vaccine price," 2012).

Barnack, Reddy, and Swain (2010) recruited participants from a professional polling service and the first 100 parents who met criteria for the study were selected to complete the survey. They found that 79% of parents surveyed would vaccinate their children with the HPV vaccine but this percentage dropped to 65% if the vaccine was not covered by their insurance (Barnack et al., 2010). This study indicated that cost can be prohibitive for some of the study participants. One hundred health care providers were also surveyed through a professional polling service asking them if they thought HPV vaccine cost would be a barrier to their population (Barnack et al, 2010). Sixty-six percent of health care providers surveyed were concerned about the cost of vaccination and predicted that cost would be a barrier for some of their parents if it was not covered by insurance (Barnack et al., 2010). The CDC Morbidity and Mortality Weekly Report published in 2011 stated that in the United States vaccine administration most often takes place through pediatric offices and primary care offices. The vaccine is generally covered for those with insurance. For those children without insurance or families who meet criteria the United States has the Vaccines for Children program that will provide the vaccine to eligible children less than 18 years of age at no cost. The Reiter, McRee, Gottlieb, and Brewer (2010) study focused on male adolescents and analyzed 406 complete surveys of mothers who had 9-18 year old sons. The study questioned their willingness to vaccinate their sons with the HPV vaccine if it was free versus if the vaccine series cost $400 out of pocket. The study found that parental willingness to vaccinate decreased dramatically from 47% of parents indicating that they were ‘definitely willing’ or ‘probably willing’ to vaccinate if
the vaccine was free to 11% when faced with a $400 out of pocket expense (Reiter et al., 2010). This suggested that vaccine cost can be a barrier to the vaccination of boys.

Although the HPV vaccine was approved in 2006 for use in females and in 2009 for use in males, vaccine rates have remained low in comparison to other preteen and teenage immunizations. Between 2009 and 2010 immunization rates increased in three of the routinely recommended vaccinations given to teenagers. Meningococcal conjugate increased from 53.6% to 62.7%, Tetanus, diphtheria, and acellular pertussis (Tdap) coverage increased from 55.6% to 68.7% and HPV vaccine series completion increased from 26.7% to 32.0% in 2010 (Centers for Disease Control and Prevention [CDC], 2010). These statistics demonstrated that HPV vaccine rates still lagged behind other recommended vaccinations. Given the fact that the HPV vaccine is recommended for administration to girls and boys by 11-12 years of age, the parents of these children will be responsible for the decision to vaccinate. The purpose of this literature review is to identify factors that influence HPV vaccine acceptability and parental intent to vaccinate their children.

**Theoretical Framework**

The Health Belief Model is a theory that was originally developed to improve the public's use of preventative health services. “The Health Belief Model explained the health behavior in terms of several constructs: perceived susceptibility of the health problem, perceived severity, perceived benefits, perceived barriers and cues to action” (McEwen & Wills, 2011, p. 290). This model helps predict what factors will influence parental acceptance and intent to vaccinate their children against HPV. It suggests that parents need to believe their children are susceptible to HPV, perceive HPV infection as a threat, think of vaccination against HPV as a health benefit and believe the benefit outweighs barriers to vaccination. Barriers to vaccination
include concerns about safety and cost of vaccination. An example of a cue to action that influences HPV vaccination is the endorsement by someone’s personal health care provider.

**Review of Literature**

Most studies show that acceptance for the HPV vaccine is moderately-high to high among parents of males and females in the pre-teen and teenage years. The studies reviewed revealed the complex nature of vaccine acceptance. In most of the studies vaccine acceptability was determined through parents filling out and returning surveys that used a variety of questions. Barnack et al., (2010) found that intention to vaccinate was high among 79 of the 100 parents included in their study. Parents from 34 different states completed and returned surveys. The study findings suggest that health care providers “may be successful in encouraging parents to vaccinate their children if they educate parents about the large number of adolescents infected with HPV and the possible negative consequences of contracting HPV” (Barnack et al., 2010, p. 32). In this study the parents of children ages 7-17 years were also asked about their concerns about vaccination increasing early sexual activity. Although the actual percentage results were not listed, the researchers reported that a very low percentage of parents surveyed were concerned the vaccine would increase sexual activity with the majority believing that the two would not be correlated (Barnack et al., 2010).

An England based study found that 75% of the 684 mothers surveyed were interested in accepting the HPV vaccine for their daughters (Marlow, Waller, & Wardle, 2007). The sample population included mothers’ from inner city, suburban and rural areas who were selected using convenience sampling and had to have a daughter age 8-14 years of age. The study also assessed the mothers’ social norms and nearly all of the mothers believed other mothers around them would opt to vaccinate their daughters. This indicated that what other parents around them
believed about vaccination had an impact on their perception of the vaccine. Eighty percent of
the mothers agreed that age 10-14 years of age is an appropriate time to start the vaccine series
(Marlow et al., 2007).

A 2011 study found that social norms play an important role in vaccine acceptability to
parents and intention to vaccinate their children with the HPV vaccine (Reynolds & O’Connell,
2011). The study used a social norms scale to assess parental intention to vaccinate and found
that there was a strong correlation between the social acceptability of the HPV vaccine and their
intention to vaccinate. This study surveyed 325 parents of daughters 9-18 years of age which
were recruited using several different methods. Email blasts on two of the Long Island
University campuses were sent out, a Google advertisement was placed and letters were given to
children in 4th-8th grade to take home to their parents at three Catholic schools in Brooklyn and
Queens.

They found that 107 of the daughters were already vaccinated with the HPV vaccine,
which was close to the national vaccination rates in the United States. The 107 parents who had
already vaccinated did not have their data included in this section of study results. The data were
analyzed using logistic regression with 76 of the parents intending to vaccinate and 142 parents
indicating they had no intent to vaccinate. Several variables were examined in the logistic
regression including susceptibility, social norms, attitudes towards vaccines and health care
providers as the source of the information. For each point increase the odds of intending to
vaccinate increased in the respective categories by 16.6% for susceptibility, 12.9% for social
norms, 78.6% for attitudes and 33.3% if the health care provider was the source of information
(Reynolds & O’Connell, 2011). These results indicated that parents who thought their daughter
was susceptible to HPV and who held a positive attitude about vaccination were more likely to
choose vaccination. Findings in this study also suggest that health care providers as the source of information can be a strong predictor of intent to vaccinate. In this study 53.5% of parents would not accept the HPV vaccine for their daughters (Reynolds & O'Connell, 2011). This percentage is much higher than that found in other studies which may be due to the fact that all parents who indicated they were “not sure” if they would opt for vaccination were coded as not intending to vaccinate. Reynolds and O’Connell (2011) also concluded that parents with low knowledge were perhaps underestimating the risk of HPV of their daughters and would benefit from more education about the way HPV is contracted.

Reiter, McRee, Gottlieb & Brewer (2010) conducted a study of 406 mothers with daughters 9-18 years of age with participants from all four geographical sections of the United States. If the mothers also had a son in the specified age range they were given male based questions in addition to the female questions. Seventy nine percent of mothers were non-Hispanic white, 9% were Hispanic, 7% were non-Hispanic African American, and 6% reported “other” for ethnicity (Reiter et al., 2010). The mothers were recruited through a national survey company and received free internet access for filling out surveys each month. The study found that mothers’ knowledge about HPV and the HPV vaccine was low with only 43% answering HPV knowledge questions correctly (Reiter et al., 2010). The study found that greater knowledge of the disease was associated with higher acceptance of the HPV vaccine for their boys (Reiter et al., 2010).

Gerend, Weibley, and Bland (2009) surveyed 82 parents from four different pediatric clinics in the southeastern United States. A sign was posted in each of the clinics explaining the study and parents with at least one child under age 18 were recruited. The study found that parents were reluctant to give a new vaccine to their children with 28% indicating that they
would want the vaccine on the market for 3-5 years before administration and 24% indicating that they would want the vaccine to be on the market for greater than 5 years before consenting to administration (Gerend et al., 2009). This study also surveyed parents about their concerns that the HPV vaccine could increase earlier sexual activity. The results indicated that concerns were rare with a mean score of 1.9 on a five point scale where 1 = strongly disagree and 5 = strongly agree (Gerend et al., 2009). Almost 50% of the parents surveyed had already vaccinated their daughter with the HPV vaccine and 100% of the parents indicated that they had received a recommendation to vaccinate from their health care provider (Gerend et al., 2009). Another emerging trend noted in this article was that lower to middle income populations were more likely to support vaccination with the HPV vaccine than parents of higher economic status.

Intent to vaccinate is another important factor because vaccine acceptability may be high but may not correlate to vaccine initiation and intention. In the articles reviewed intention to vaccinate was also determined through a set of surveys targeting parents with children in the designated age group of pre-teen and teenage years.

A 2007 article published in Canada recruited parents of children age 8-18 years old through random digit dialing across all of Canada. The final number of parents who completed the survey totaled 2,083 and 1,350 had a daughter in the selected age range. The study showed findings consistent with lack of parental knowledge of HPV and the HPV vaccine. Nine hundred seventy one parents indicated they had never heard of HPV and 1,520 did not know how HPV was transmitted (Ogilvie et al., 2007). The study found that more than 70% of parents indicated they would have their daughters vaccinated with the HPV vaccine and that the single strongest predictor in vaccine intent was attitudes towards vaccination in general. Another major influencing factor was the recommendation of vaccination by one’s health care provider. The
study used a 7-point Likert scale to ask parents whether they thought a health care provider’s recommendation to vaccination is influential with the results scoring a 6.2 mean on the scale. A mean of 5.8 on the Likert scale was found regarding the question, “HPV vaccine will not make children sexually active at an earlier age” (Ogilvie et al., 2007, p. 1509). This indicated that approximately 20% of parents had some concerns about vaccine administration influencing sexual behavior and may be related to the low knowledge of HPV among parents in this population (Ogilvie et al., 2007). This study was a nationally conducted Canadian study supporting the idea that general knowledge about HPV is low and that health care providers represent an important informative body for vaccine education.

Dempsey, Butchart, Singer, Clark, & Davis, (2011) focused on intention to vaccinate males with the HPV vaccine. They conducted a national study in the United States using random digit dialing including people without landline phones by also using address based sampling methods. A total of 1,178 parents completed the survey and indicated they had at least one son between the ages of 0-17 years. The results found that 90% of parents with boys age 0-17 years indicated HPV vaccination was important (Dempsey et al. 2011). In the 0-8 year group 53% of parents indicated they would be ‘likely’ or ‘very likely’ to have their sons vaccinated at 11-12 years of age. Only 48% of parents indicated they were ‘likely’ or ‘very likely’ to vaccinate their sons age 9-17 years with the vaccine in the next 2-3 years (Dempsey et al., 2011). Intention to vaccinate was higher among parents who perceived the HPV vaccine to have significant health benefits, believed that family and friends would support vaccination and that the barriers to the vaccine were few (Dempsey et al., 2011).

A 2010 study published by The Journal of School Nursing found that a mother’s attitude towards vaccinations was the single strongest predictor of intent to vaccinate. The study was
conducted in Iowa with 1,207 surveys sent out to mothers with daughters born between 1993 and 1999 which would make the daughter between the ages of 9-15 years (Askelson et al., 2010). The surveys were mailed to mothers whom were registered to vote in Iowa and 217 were included in the analysis. Most mothers believed the vaccine was a good idea, beneficial and held positive attitudes towards vaccination (Askelson et al., 2010). The authors had hypothesized that mothers would be worried about the vaccine increasing sexual activity which was not the case; mothers did not believe the vaccine would affect their daughters decision to become sexually active. The interesting point of this study was that 1/3 of mothers reported knowing someone with HPV, but did not perceive their children were at risk for HPV and therefore seemed to believe that the vaccine may not be necessary. Only 48% of mothers’ reported that they intended to vaccinate their daughters with the HPV vaccine (Askelson et al., 2010). Due to the perception of low risk this group of mothers may be underestimating the risk for disease for their daughters and therefore believe vaccination for their children is unnecessary.

Allen et al., 2011 conducted a study specifically looking at the HPV vaccine among ethnically diverse parents in the United States. The study participants were recruited through the Boston area via health and social service agencies to participate in focus groups on the HPV vaccine (Allen et al., 2011). A total of 64 parents of children age 9-17 years of age were included in the focus groups. Ninety eight percent of the participants indicated they had health insurance, 59% of the participants were African American, 19% were Hispanic, and 23% were Caucasian (Allen et al., 2011). Transcripts from the focus group sessions were independently examined to identify themes; the researchers used Corbin and Strauss’ procedure to identify coding categories. Instead of compiling a list of statistics the focus group data was published in groups of quotes showing trends in data. The study found that “parents almost universally reported
feeling that they did not have sufficient information to make an informed decision about vaccinating their daughters” (Allen et al., 2011, p. 4). The study found that the Hispanic population preferred having a conversation with the mother, daughter and health care provider working together to make a decision about vaccination (Allen et al., 2011). The African American population preferred that the mother and health care provider make a decision on vaccination and indicated it was less important to include the daughter in the decision (Allen et al., 2011). The Caucasian population commonly expressed the view that the daughter should make the decision after becoming adequately informed about HPV (Allen et al., 2011). Each population expressed a preference for receiving vaccine information from their daughters’ primary care provider. The article found that increasing provider and parent communication about HPV and increasing HPV knowledge may be related to increased intention to vaccinate.

Reiter, Brewer, Gottlieb, McRee & Smith (2009) completed a study focused on counties in North Carolina that had some of the highest rates of cervical cancer in the United States. Participants were recruited from one urban county and four rural counties identified to have greater than 10 cases of cervical cancer per 100,000 residents reported between 1993 and 2003. Caregivers were contacted through a random digit dialing service and a non-overlapping targeted list frame directory with skilled interview personnel conducting the phone interviews once the primary caregiver was established. Households had to have at least one 10-18 year old female to participate. A total of 889 people completed the survey, with three surveys excluded from analysis due to incomplete data. Seventy percent of the caregivers were non-Hispanic white and 23% were non-Hispanic African American, 106 (12%) caregivers indicated that the child in the household had already been vaccinated against HPV (Reiter et al., 2009). Only 22% of participants reported having received a health care provider’s recommendation to vaccinate their
child against HPV (Reiter et al., 2009). The statistical analysis was completed using bivariate logistic regressions that compared the caregivers who had reported vaccine initiation to those who had not yet started the vaccine series. The researchers found that parents who received a recommendation from a health care provider were more likely to have opted for vaccine initiation in their daughters (all \( p < 0.01 \)) (Reiter et al., 2009). The strongest correlates of vaccine initiation in the non-Hispanic white population were health care provider recommendation, perceived likelihood of daughters getting cervical cancer, perceived potential harms of HPV vaccine and belief about insurance coverage (Reiter et al., 2009). The strongest correlates of vaccine initiation in the African American population were health care provider recommendation, perceived potential harms and perceived barriers to getting the HPV vaccine (Reiter et al., 2009). This information suggests that health care provider recommendation may increase vaccination initiation.

Trends noted throughout review of the articles included low parental knowledge and low perception of risk for disease in their children. In addition, social norms impacted the decision to vaccinate and concerns about vaccine safety and cost were reported.

**Discussion**

This paper reviewed HPV vaccine acceptance and parental intention to vaccinate their children with the Health Belief Model guiding the review of the research. The research methods used in all of the studies reviewed in this paper were questionnaires and interviews of parents who had children less than 18 years of age. Surveys assessed vaccine knowledge, attitudes, acceptability, intention to vaccinate and barriers to vaccination. Throughout the review of the literature several themes were identified.
Overall vaccine acceptability is relatively high for vaccinating males and females, but may not correlate directly to intention to vaccinate. Parental vaccine acceptance has many contributing factors. Studies show that parent’s attitudes towards vaccination in general are significant contributors to HPV vaccine acceptance. Several studies also found that mothers and fathers who perceived that other families around them would support HPV vaccination were more likely to accept vaccination of their own children. This predicts that social norms in a community contribute to the decision to vaccinate. HPV vaccine knowledge was found to be low among parents and many could not correctly identify what HPV does to the body or identify HPV as something that can cause cancer. Other studies found that parents did not feel they had sufficient information to make an informed decision about whether or not to pursue HPV vaccination for their children. A consistent trend throughout the literature review was that parents did not have a thorough understanding of what HPV can do to the body and why someone would choose to vaccinate against HPV.

In addition to insufficient HPV knowledge parents consistently perceived their child’s risk of acquiring HPV as low. According to the Health Belief Model parents will consider their child’s perceived susceptibility to the health problem in deciding on whether or not to adapt the new health behavior. This was found to be true in the literature review and Askelson et al. (2010) hypothesized that parents are underestimating their child’s risk behaviors in the case of HPV susceptibility. O’Donnel et al. (2008) found that 38 percent of young girls 12 years or younger reported that they had hung out with boys that their parents would disapprove of and parents only thought 17 percent of their daughters were hanging out with those boys. This study also assessed other early preteen risk taking behaviors like drinking alcohol. Parents in the study underestimated their children’s actions in each of the risk taking behaviors studied. This study
indicates that parents can often underestimate their children's risk taking behaviors including their sexual relationships. Marlow et al. (2007) found that over 40 percent of parents in the surveyed population would not endorse age 12 or younger as an appropriate age for vaccination. The information from O'Donnell et al. (2008) can be used to help parents understand why the recommended vaccination age is 11-12 years of age to ensure that most of the population is vaccinated before their first sexual encounter.

Olshen et al. (2005) conducted a study on HPV vaccine acceptance before FDA approval of the vaccine occurred in 2006. The study found that some parents were concerned about the HPV vaccine increasing sexual activity in adolescents. In more recent studies the results showed that parental concerns about the HPV vaccine increasing adolescent sexual promiscuity are a rare occurrence. Ogilvie et al. (2007) found that 20% of parents studied had concerns about the HPV vaccine influencing sexual behavior; this population of parents was based in Canada and had very low levels of HPV knowledge. Gerend et al. (2009) found that very small minorities of parents living in the Southwestern United States were concerned with the vaccine increasing sexual promiscuity, but these findings were not the majority consensus. Barnack et al. (2010) noted that parental fears over vaccination increasing sexual activity were very low and did not correlate with their intention to vaccinate their children with the HPV vaccine. This indicates that there is a small population of parents who are concerned about the vaccination increasing sexual activity, but does not reflect the majority of parents' opinions. More targeted research on this small population is needed to see if open discussion of these concerns with their primary care provider would help to reduce these fears.

Parents see health care providers as an important source for vaccine information and look to health care providers for recommendations to vaccinate against HPV (Barnack et al. 2010;
Wanting to receive vaccine education and information about the vaccination against HPV by a health care provider was a consistent trend in the research. Many parents believed that they would have a more favorable outlook about vaccinating their children if their health care provider was in favor of the HPV vaccine and took the time to educate them about the vaccination. This information indicates that health care providers’ knowledge and endorsement could help increase vaccination rates (Barnack et al. 2010).

Vaccine safety and cost of vaccination were addressed by parents in multiple studies. Some parents are hesitant to give their children a newer vaccine and need information about vaccine safety and potential side effects before determining their course of action. The Health Belief Model suggests that people will consider the perceived benefits of the new health choice minus the perceived barriers in determining their likelihood of action. This theoretical idea is consistent with parental concerns identified in research. In theory, safety as a vaccination concern should decrease over time as the national vaccination programs continue to report that the vaccine is safe with minimal adverse side effects. The cost of the vaccine will continue to be of concern for those without insurance, but with state programs covering childhood vaccinations, this barrier should be limited.

**Recommendation for Practice and Research**

Increasing parental knowledge of what HPV is and what it can cause may contribute to increased vaccination rates. Health care providers can contribute to increasing knowledge and initiation of vaccination by giving parents accurate HPV vaccine information and discussing concerns directly with parents. Vadaparampil et al. (2011) found that there are many missed clinical opportunities for HPV vaccination at the clinical setting level. The study surveyed 1,013
providers who work in Pediatrics, Family Practice or an Obstetrician and Gynecological setting. The study found that only 34.6 % of the physicians always recommended the HPV vaccine to early adolescents. This indicates that providers are encountering patients who are eligible for vaccination without discussing the possibility of HPV vaccination. Future research needs to evaluate provider comfort in educating and recommending the HPV vaccine and examine provider barriers to vaccination recommendation. Additional research also needs to examine the possibility of including HPV vaccination in the childhood vaccination series. This may be beneficial considering that the vaccination is a three shot series and young children return to the clinic more often in early infancy and childhood for routine well child exams. Research would need to address long term vaccine efficacy to ensure the intended protection lasts through the teenage and adult years, when sexual exposure is most likely to occur.

Conclusion

The HPV vaccine was first approved by the FDA in 2006 for females. Several years later the vaccine was also approved for use in males. Vaccination rates have continued to be lower than other common pre-teen and teenage vaccination rates. Research shows that HPV and HPV vaccine knowledge is low. Health care providers’ recommendations for vaccination have been shown to be valuable to parents who will be responsible for consenting for administration at the recommended age of 11-12 years. Health care providers need to start addressing HPV vaccination with all eligible patients and their parents to enhance vaccine knowledge, increase vaccination rates and address barriers to vaccination. Future research needs to evaluate actual initiation of the vaccine series at the clinic level, ways to effectively increase HPV knowledge and provider barriers to recommending HPV vaccination.
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