Kentucky Journal of Undergraduate Scholarship

Volume 2 | Issue 1 Article 7

6-1-2018

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Cover Page Footnote
This paper was completed in Eastern Kentucky University's occupational science course titled "Health Care Delivery System". The primary author completed this project under the guidance and supervision of Dr. Amy Marshall.

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Abstract: *Human Papillomavirus infections (HPV) are the most common sexually transmitted diseases in the United States. Of cancers in parts of the body where HPV is often discovered about 80% originated from an HPV infection. Despite this knowledge and the effectiveness of the HPV vaccine, vaccination by both genders in Kentucky and on a national scale remains highly underutilized. As a result, preventable incidence and mortality rates from HPV-related illness are elevated. Health care delivery factors such as increased vaccination and preventative care, insurance coverage, and accessible rural health care are necessary for HPV prevention and promotion of holistic health. The importance of advocacy for policies supporting the vaccine, sexual health, and education about HPV and the vaccine is fundamental to reducing HPV-related cancer rates nationwide. Since the vaccine was approved in 2006, education in forms of parental endorsement, healthcare provider recommendation, peer support, and video intervention have proven effective. As time passes and the vaccine is increasingly utilized, there will be an opportunity for research to identify methods of education for specific populations.*

Keywords: Human Papillomavirus, HPV, Prevention, Vaccine, Vaccination, Occupational Science, OS, Occupational Therapy, OT

Description of Human Papillomavirus and Vaccination

Human Papillomavirus infections (HPV) are the most common sexually transmitted diseases in the United States. Human Papillomavirus is contracted through skin and mucous membrane contact of an infected individual with another. The contact does not require penetrative sexual intercourse, thus can be passed on to others by various forms of sexual activity. Some sexually transmitted forms of HPV are low-risk and others are high-risk. Low-risk forms of HPV do not cause cancer, yet are responsible for 90% of all cases of genital warts (National Cancer Institute, 2015).

High-risk forms of HPV can lead to the development of cervical cancer, anal cancer, oropharyngeal cancers, and cancers of the vagina, vulva, and penis. Although most high-risk HPV infections will be resolved by the body's immune system, 70% of all cervical cancers are caused by two high-risk HPV strains alone (National Cancer Institute, 2015). The Food and Drug Administration has approved the use of three vaccines to prevent HPV, Gardasil being the most common. These vaccinations eliminate HPV strains 16 and 18, the strains responsible for 70% of all cervical cancer diagnoses (National Cancer Institute, 2015). Because these vaccinations do not combat HPV infections or HPV-induced cancers that already exist, preventative vaccination is imperative.

National and Community Health Care Issues

Nationwide, four out of ten adolescent girls and six out of ten adolescent boys have not received the HPV vaccine (Centers for Disease Control and Prevention [CDC], 2015). Not only is this alarming on a national scale, but Kentucky faces additional risk. Compared to other states, Appalachian Kentucky shows significantly higher rates of diagnoses and deaths as a result of HPV-related cancers (Wilburn, Vanderpool, Knight, Evers, n.d.). Despite the disturbing rates of HPV-related cancers in Kentucky, HPV vaccine utilization is low. Only 26.8% of adolescent girls (ages 13-17) have received all three doses of the HPV vaccine, compared to the national rate of 37.6% (CDC, 2014). Data for Kentucky males, ages 13-17, is incomplete beyond 19% initiating the series, significantly lower than the 35% U.S. male initiation rate (CDC, 2014). Because of low HPV vaccination rates both nationally and in Kentucky, issues of education and prevention must be addressed.

How HPV Prevention Impacts the Delivery of Health Care

This topic impacts the delivery of health care because several factors must be recognized for cost-efficient, accessible HPV prevention. The funds required to provide HPV vaccines for higher percentages of the population and to increase Papanicolaou tests (also referred to as pap tests, or cervical screenings for HPV or cancerous cells) must be available and used in the most efficient way to deliver these services and remain effective. In addition, healthcare coverage providing access to preventative care to cover these costs is essential. There must also be primary care physicians accessible to young people in order for them to receive pap tests and vaccination. "More than two-thirds of Kentucky's counties – 81 out of 120, and nearly all of them rural – are officially designated health professional shortage areas (HPSAs) for primary care by the Health Resources and Services Administration" (Casey, Jones, Gross, & Dixon, 2004, p. 3). Because primary care providers are typically who administer these crucial services, this shortage is a relevant obstacle in Kentucky and other rural parts of the

country to adequate care for cervical screening and vaccination. One study involved focus groups with 27 women, 19 parents, 31 community leaders, and 37 healthcare providers in Appalachian Ohio. These participants revealed that central barriers to HPV vaccination in this region are access to healthcare services, access to insurance coverage, poor patient-provider communication, and insufficient time (Katz, Reiter, Heaner, Ruffin, Post, D. M., & Paskett, E. D., 2009). Not only does Ohio neighbor Kentucky directly, but because these regions are both Appalachian, they also share the same rural qualities. Thus, these issues regarding health care delivery must be addressed in order to effectively protect individuals from HPV infections in rural regions of the United States.

Impact of HPV and Prevention on Population

Although HPV infections and HPV-related cancers affect individuals of all ages, HPV prevention and vaccination is concentrated on young people. Pichichero (2007) discussed the Gardasil vaccine after its development and release, explaining that pre-adolescent and adolescent girls were the primary target recipients of the vaccine. Ages 11 through 12 were the initial focus for Gardasil, but the Food and Drug Administration approved the use of the vaccine in females as young as nine. This age range is critical because they are unlikely to have yet engaged in sexual activity putting them at risk for HPV infection. Although this age range is ideal, women are encouraged to receive the vaccine through age 26. "Vaccination of the entire US population of 12-year-old girls would prevent more than 200,000 HPV infections, 100,000 abnormal Pap tests, and 3,300 cases of cervical cancer" (Pichichero, 2007, p. 197). The remarkable positive effects of vaccination on women are apparent, but for men, are often overlooked. Because the vaccine is frequently marketed for preventing cervical cancer, many are unaware that HPV vaccination in men can also prevent "more than 5 million cases of genital warts and 40,000 cancer-related deaths over the next century" (Thomas & Snell, 2013). Thus, our national population is eventually affected because HPV prevention has the ability to decrease the rates of HPV-related cancers in both males and females of future generations.

Of cancers in parts of the body where HPV is often discovered, approximately 80% of them are caused by HPV infections (CDC, 2016). Despite this knowledge, HPV vaccination by both genders remains underutilized. Education about HPV and the vaccine must be emphasized in order to reduce HPV-related cancer rates nationwide.

Healthcare Policy and Primary Care in Relation to HPV Prevention

Human Papillomavirus prevention is promoted through the Affordable Care Act (ACA) in multiple ways. The ACA expands Medicaid coverage, providing more accessibility to the HPV vaccination and pap tests. Preventative care is now also covered under the ACA, promoting services

to avoid HPV infection. According to one study, the ACA was found to be associated with an estimated 1.1 million more women (ages 19 to 25) initiating the HPV vaccination series and 854,000 more completing it than prior to its implementation (Lipton & Decker, 2015). Healthy People 2020, a national initiative that has set objectives to improve the overall health of the United States by year 2020, also promotes increasing HPV vaccination rates. Kentucky has set a goal to have 80% of adolescents immunized against HPV by 2020 to align with these national goals (Wilburn, Vanderpool, Knight, Evers, n.d.).

Primary care is intended to be the initial contact an individual has with health care delivery services. Its goal is to be comprehensive, coordinated, and consistent (Shi & Singh, 2015). Consistency of primary care is essential to HPV prevention because pap tests and HPV screening are recommended every three years. If an individual has a history of abnormal pap results they should consult with their primary care provider to have more frequent pap tests and ensure that cervical cancer does not develop (American Society of Cytopathology, 2016). In addition, having a primary care provider is central to HPV prevention because individuals must see their provider on three occasions in order to receive all three doses before the vaccine will take effect. After the first dose, the second administration should occur at least 1 to 2 months later. The third dose should be received 6 months after the first (Immunization Action Coalition, 2016). If an individual lacks consistent primary care, this increases the barrier to completing the series and protecting themselves against infection.

Application of HPV Prevention to Occupational Science

Occupational science places emphasis on promoting the physical, mental, social, and spiritual health of individuals, otherwise known as holistic health (Shi & Singh, 2015). In contrast, the United States has historically focused on the medical model of health care, which emphasizes making a diagnosis and treating that issue. After treatment, the person is then considered "healthy". As a result, many Americans only see physicians when they feel ill. In order to promote HPV prevention, society's ideas of health and healthcare delivery must shift away from the medical model's emphasis on diagnosis and toward preventative care. This encourages individuals to see physicians in order to address all aspects of their health periodically to prevent illness. HPV vaccination and screening lie within these periodic visits, preventing HPV-related cancers rather than treating the person after a cancer diagnosis has been made.

In addition to holistic health, occupational science stresses recognizing the individual cultural beliefs and values of clients and understanding how they influence occupational behavior. Hasselkus (2011) explains that culture influences what occupations are chosen for routines, priorities, and what daily behaviors are considered suitable according to their values. Therefore, culture may influence what preventative care and

medical services an individual is willing to consider. For example, a study assessing HPV vaccination in Appalachia found that states in the U.S. "Bible Belt" have values that affect their utilization of the vaccine. Individuals with more conservative and religious beliefs were less likely to accept or receive the vaccine (Reiter, Katz, & Paskett, 2013). Because occupational science emphasizes understanding how values influence occupation, political and religious principles are important factors to consider when encouraging HPV preventative care in Kentucky.

HPV Prevention and Role as a Future Healthcare Provider

The goal of promoting and utilizing preventative care is that the future of healthcare delivery will shift toward focusing on the preventative needs of our nation and community, resulting in a healthier population overall. As a healthcare provider, advocating for HPV prevention and educating others about its importance is essential. A healthcare provider should be committed to all aspects of their client's physical, mental, social, and spiritual wellness. Therefore, the provider does not need to be a primary care physician or gynecologist to promote sexual and reproductive health. Working in pediatric care is an opportunity to educate adolescent clients and their parents about HPV and vaccination through pamphlets, videos, or open discussions about sexual health. Healthcare providers can also recommend clients to see other professionals to learn more. In order to provide clients with knowledge about these topics, providers have a responsibility to be educated about the seriousness of sexual health issues in young people.

In addition to client education, healthcare providers can engage in legislative advocacy to address HPV-related issues and promote preventative care. For example, in 2006, Representative Watkins sponsored a bill in Kentucky to require HPV vaccination for school enrollment. Despite amending the bill the following February by offering parents the ability to opt out of the vaccine for any reason, the bill did not pass (Dekker, 2008). Healthcare providers can meet with state legislators to advocate for the passage of such bills by providing them with knowledge of HPV and cervical cancer rates and the cost-effective nature of preventative care. They can also educate others about the issues and form advocacy groups willing to speak to legislators together.

Relevance of HPV Prevention to Current Healthcare Policies

Controversy still surrounds the HPV vaccine due to distrust of pharmaceutical companies, the cost of the vaccination series, debate surrounding adolescent prevention of sexually transmitted infections (stressing abstinence-only approaches), and fear of side effects of the vaccine (Larkin, 2007). These conflicting viewpoints have had significant influence on healthcare policy surrounding the vaccine.

In an attempt to promote HPV vaccination, many state legislators have proposed mandating them, much like Representative Watkins's bill in 2007. Such a bill was proposed again in Kentucky in 2014 and rejected. The most recent bill was proposed in February of 2015, encouraging Kentucky citizens to educate themselves about HPV-related cancers and advantages of receiving the vaccine. Only Virginia, Washington, D.C., and Rhode Island currently have laws in place mandating the vaccine (National Conference of State Legislatures, 2016). These bills have yet to pass in most states due to the controversial nature of the issue and illustrate how political climate influences healthcare policy.

In addition to political barriers, other policy issues regarding administrative protocol within clinics affect HPV vaccination rates. In a study asking healthcare providers (7 nurses and 1 physician) in Appalachian Kentucky about low HPV vaccine uptake, they recommended several policy changes that would increase the likelihood of individuals receiving the vaccine. These changes altered interactions with women during their health care experience, such as asking about their HPV vaccination status upon arrival, having a standing physician order for the vaccine, and asking about the vaccine during women's health appointments and college physicals (Head, Vanderpool, & Mills, 2013). This illustrates how minor policy changes outside of larger legislative decisions can also have an impact on vaccination rates.

Implications of HPV Prevention on Healthcare Service Delivery

Education is a pivotal factor in promoting HPV preventative behaviors. Education for the general public about HPV, the many cancers predominantly caused by HPV infections, and characteristics of the vaccine is fundamental to increasing vaccination rates and dispelling myths about its safety and effectiveness. Research analyzing what methods are most effective for promoting HPV vaccines in women can be utilized to encourage receiving the vaccine. A study of 495 women ages 18 to 26 in southeastern Kentucky showed that parental endorsement, healthcare provider recommendation, and peer support all enhanced the probability of receiving the vaccine (Casey, Crosby, Vanderpool, Dignan, & Bates, 2013). Another study revealed that an intervention titled "1-2-3 Pap" utilizing a DVD about HPV vaccination and cervical cancer made women 2.44 times more likely to complete the vaccination series (Vanderpool, Cohen, Crosby, Jones, Bates, Casey, & Collins, 2013). Based on evidence, these methods are useful to health promotion programs attempting to increase rates of those receiving the vaccine because they are applicable to many populations and involve education at multiple levels (family, health care delivery, and peers).

Humpan Papillomavirus vaccination and promotion have historically been targeted toward women. Because there is currently no test for males to indicate if they carry HPV, future delivery should also emphasize the

positive effects of males receiving the vaccine as well. A study analyzing parents' decisions about HPV vaccination found that 76% of decisions to vaccinate sons were likely or very likely influenced by protecting their female partners from HPV transmission (Schuler, DeSousa, & Coyne-Beasley, 2014). Parents of adolescent males may be unaware that their sons can unknowingly be carriers of HPV. This study suggests that educating parents of males about the harmful implications of not receiving the vaccine on females may increase vaccination rates.

Consequence of HPV Prevention on Healthcare Service Delivery

Education about the seriousness of HPV infections and the effectiveness of the HPV vaccine will increase the probability of adolescents and their parents being receptive to considering the vaccine. As a result, rates of those receiving the vaccine will increase, thus reducing the amount of HPV-related cancers in Kentucky and the rest of the country. Because the FDA recently approved the HPV vaccine in 2006 and there has been limited success in its utilization, research has yet to discover what methods of education are most effective. As time passes, there will be opportunities for research to discover what methods are proving most valuable in educating diverse populations about HPV and the vaccine to increase its use.

Because cost of healthcare delivery is a primary concern in the United States, cost of HPV prevention should be addressed. Research suggests that preventative care in the form of pap screens and HPV vaccination will save the government sizeable funds. One study analyzed the costs of family planning compared to costs of treating preventable conditions. The study revealed that in 2010 pap tests and HPV vaccination prevented about 3,680 cases of cervical cancer, 2,110 cervical cancer deaths, and 9,000 cases of abnormal sequelae and precancerous lesions. As a result, the government saved 23 million dollars by performing pap tests and HPV vaccinations (Frost, Sonfield, Zolna, & Finer, 2014). Service delivery will be impacted because initial costs to distribute and perform vaccines and screenings to higher percentages of the population will be costly, yet evidence shows that in the long-term money will be saved by utilizing these preventative methods.

Conclusion

Preventative care is central to improving overall health. By promoting HPV vaccination and pap tests, the amount of HPV-related cancers will be reduced nationwide. Increasing HPV vaccination rates is a multidimensional process involving recognition of access to services, cost of vaccination and screening, client education about HPV and cervical cancer, and how culture influences acceptability of HPV preventative care.

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