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Using a School Based Health Center to Vaccinate Adolescents for Human Papillomavirus: A Review of Literature

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Abstract

Vaccination against the Human Papillomavirus (HPV) is a well-known and effective method for preventing cervical cancer. In the United States, vaccines against Human Papillomavirus (HPV) are recommended for routine use in adolescents 11 to 12 years of age. HPV is a disease that causes over 33,000 cervical cancer diagnosis each year in the United States. Although this vaccine is recommended for the prevention of HPV, immunization rates stay 25- 30% lower than other preteen immunizations in the United States. The purpose of this review is to evaluate the use of school-based health centers as a solution to increasing the initiation and completion of HPV vaccinations in adolescents. Scientific databases were accessed to search for relevant literature. The search included PubMed, CINAHL (Cumulative Index to Nursing and Allied Health Literature), ERIC (Education Resources Information Center), Soc INDEX, PsyINFO, ProQuest Nursing and Allied Health, and Google Scholar. Key terms such as HPV, Human Papillomavirus Infection, Vaccines, Vaccination, Immunization, School-Based Health Center, Adolescent or Child, and Papillomavirus Vaccines were used. Of the 4,653 records, 15 articles met inclusion criteria. Most evidence advocates for the use of School-Based Health Centers (SBHC) or School-Based Programs (SBP) to increase vaccination. However, the literature identifies a small percentage of schools in the United States with an SBHC onsite.

Keywords: Adolescents; HPV; Human papillomavirus vaccination; Immunization; School-based health centers;

Introduction

Human papillomavirus (HPV) is the most common sexually transmitted infection in the United States [1]. Papillomavirus infections disproportionately affect younger women compared to older women, affecting a prevalence of 27% to 45% women aged 18-24 years. HPV is not only a cause of cervical cancers but a significant portion of vulvar, vaginal, penile, anal, and oropharyngeal cancers [2]. Prevention is better than cure. The most effective method to prevent HPV infection is to vaccinate with the HPV vaccine. However, even though the effectiveness of this vaccine is well known, the uptake of this vaccine is low. This highlights the need for introduction of programs to increase the rate of HPV vaccines [2]. Hence, the idea of utilizing a school-based health center as means of increasing the rate of the HPV vaccine. According to [3], the completion of HPV vaccine series is highest when provided in a school setting. This may be attributed to the supportive attitude of parents and physicians toward receiving vaccinations at school sites [4].

In the United States, HPV vaccines are administered in clinical settings but barriers like financial aid, insurance coverage, and transportation negatively affect the uptake of the vaccine. Therefore, as a solution, the introduction of school-based health centers, which are often located in or near schools, can bridge the gap between socioeconomically disadvantaged, and provide quality, accessible health care [5].

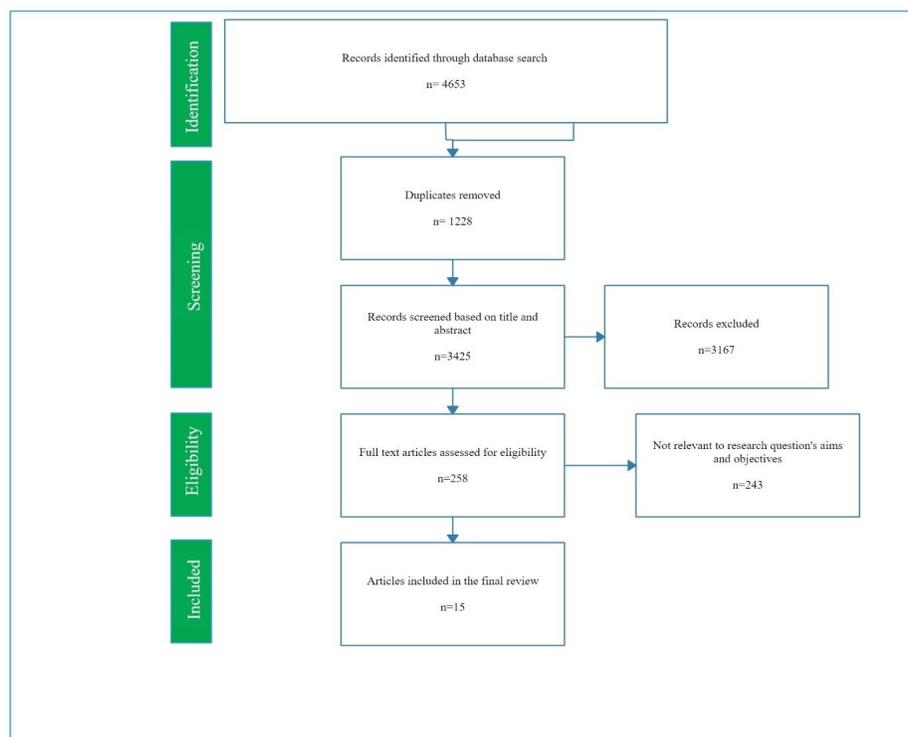
Methods

The literature search was guided by a health sciences library specialist. Systematic review software subscription was purchased to assist with organizing and reviewing the results for inclusion and exclusion criteria. The researchers used PRISMA guidelines within the software to track results of the article reviews. The overall process and outcomes of the review are outlined in Figure 1. To be eligible for inclusion, studies needed to include (1) studies written in English, (2) studies that measured school-based health centers and HPV, (3) studies measuring adolescent response to HPV vaccination, (4) studies from the United States and other countries (5) systematic reviews (6) studies published within the period of 2010 through 2020. Letters, opinions, commentaries or articles published prior to 2010 were excluded. Studies that focused on flu, smallpox, polio, HIV and coronavirus were also excluded.

Search Methods to Identify Studies

Seven databases were searched to retrieve a wide array of online databases, websites, and information repositories. These databases included PubMed, CINAHL, ERIC, Soc INDEX, PsycINFO, ProQuest Nursing and Allied Health, and Google Scholar. Boolean operators “AND” and “OR” and MeSH terms were used to broaden the search. Keywords used for searching were HPV, human papillomavirus infection, vaccines, vaccination, schools, immunization, school-based, health center, adolescent or child and papillomavirus vaccines; school-based health centers AND vaccination; human papillomavirus AND vaccination; school-based health centers OR human papillomavirus vaccination.

As shown in the PRISMA diagram (Figure 1), 4653 journal articles were identified. After eliminating (n=1228) duplicates, a total of (n=3425) remained. The title and abstracts of these articles were screened by two independent reviewers. After applying the inclusion and exclusion criteria, (n= 3167) articles were found to be irrelevant leaving (n=258) articles to be evaluated by a full-text review. Again, these articles were reviewed by the two reviewers, and results were discussed to meet consensus. Through this process, another (n=243) studies were excluded. A final sample of (n=15) articles met inclusion criteria. Information from each study was independently extracted by the reviewers, placed in an evaluation table and compared for relevant evidence. This table listed the study, purpose, population/sample, research design, outcomes and results or conclusions (Table 1).



Author	Study or Research Question	Design, Sample, and Tool	Summary of Findings	Recommendations
[6]	Update on HPV Vaccination among adolescent women and report of receipt of vaccine.	Review	Uptake and series completion among young women are low.	Rates may improve by implementing school-based vaccination programs and using an innovative call reminder
[7]	Examined immunization registry data to decide completion of the 3 dose HPV vaccine.	quantitative series among adolescents in Seattle Washington	Found that adolescents who used SBHCs for HPV vaccine doses had significantly higher series completion rates than their counterparts who received all their doses in traditional health care settings	Using SBHCs to supply immunization services is an important strategy to protect adolescents against serious vaccine preventable diseases, including HPV related cancers. SBHCs should be expanded and promoted nationwide to provide more adolescents with Using SBHCs to supply immunization services is an important strategy to protect adolescents against serious vaccine preventable diseases, including HPV related cancers. SBHCs should be expanded and promoted nationwide to provide more adolescents with
[1]	Review the effectiveness of interventions conducted at the practice or community level to increase uptake of HPV vaccines in the US	Systematic review. Looked at 14 interventions to increase uptake of HPV vaccine.	Practice and community based intervention approaches included reminder calls, physician focused interventions, school-based programs, social marketing.	Found statistically significant increases in at least 1 HPV vaccination outcome in 12 studies. To address suboptimal rates of HPV vaccination in the US, future efforts should focus on programs that can be implemented within health care settings, such as a reminder call, physician focused efforts as well as community locations such as schools.
[8]	Examined whether HPV vaccine acceptance improved over 8 weeks (about 2 months) following implementation of a clinic policy requiring immunization records to be reviewed at every visit along with providing parents with written recommendation and education.	Used the Plan, do, Study, Act model to implement interventions and make policy changes to decrease missed opportunities.	HPV vaccine acceptance and vaccination rates can be increased in the SBHC setting	HPV vaccine acceptance and vaccination rates can be increased in the SBHC setting
[9]	Can school located vaccination have a major impact on human papillomavirus vaccination rates in the United States?	Meta-analysis of studies published between 2007-2014	SBHC's have more of the infrastructure in place to deliver routine vaccines and to bill; however, most focus on low-income adolescents and have not billed for vaccinations. SBHC are in very few schools nationally and therefore their potential for increasing HPV rates nationally is small. Reimbursement issues stay and unless that can be fixed, HPV delivery in schools may not be increased.	Very few schools have a SBHC. The reimbursement and billing should be fixed to increase vaccination for HPV. Right now, most programs focus on the low income adolescent. This is a barrier to students who may have other forms of payment as they do not qualify for the VFC vaccine.
[10]	Adolescent immunization delivery in school-based health centers: a national survey	Adolescent immunization delivery in school-based health centers: a national survey	Summary of findings: SBHCs appear to be a good resource for delivering vaccines. There are few SBHCs nationally. SBHCs appear to be an important resource, particularly for low income and uninsured adolescents who may have limited access to vaccination elsewhere. SBHCs appear to be a good means of expanding access.	SBHC can be an important resource for vaccinations, especially low income and uninsured adolescents. Reminder recalls should be implemented.
[11]	Addressing adolescent immunization disparities: a retrospective analysis of school-based health center immunization delivery	Retrospective cohort analysis of children and adolescents who received care within the Denver Health system.	SBHCs appear to be a favorable site for HPV vaccination. The authors found the SBHCs to be superior to CHC as a setting for completion of adolescent immunization series. SBHCs can supply reminder recalls, depending on the financial arrangement, many can take patients no matter their ability to pay, parents are not missing work,	At the time of this study, there are no federal dollars for sustainable programs. New policies should be promoted to enhance financial viability of SBHCs allowing them to expand and deliver more care.

[12]	Reducing missed opportunities for human papillomavirus vaccination in school-based health centers: impact of an intervention	Multicomponent intervention consisting of 3 immunization process workflow modifications	School based vaccination has been effective at increasing HPV vaccine coverage rates among teens internationally, but challenges with billing for vaccine and collaborating with underfunded school districts still limit potential.	School based vaccination has been effective at increasing HPV vaccine coverage rates among teens internationally, but challenges with billing for vaccine and collaborating with underfunded school districts still limit potential.
[13]	Conducted a process evaluation of an intervention to increase SHC (Student Health Clinic) to better understand the feasibility and challenges of such interventions to increase vaccinations to 2,975 adolescents.	A process evaluation	School health clinics have appeared as a potentially important avenue for increasing vaccination rates among adolescents. With little investment, SHC can increase the number of vaccinated adolescents.	For consent, a checkbox should be implemented to give global consent for vaccines. A checkbox for refusal. The staff can follow up with the parents and understand why they refused. Also, encourage collaboration.
[14]	Conducted a mixed methods study of parents and adolescents to examine acceptability of and perceived facilitators and barriers to HPV vaccination at SBHC's among parents and adolescents living in a geographic area with access to SBHC's.	A mixed methods study	HPV vaccines visit at SBHC were acceptable, and SBHC users expressed more favorable attitudes. Barriers to HPV vaccination at SBHCs can be addressed through more education about SBHC role and improvement of system to coordinate care.	Next steps for SBHCs can take to raise adolescent HPV vaccine. Target HPV reminder systems, enhance attitudes toward vaccination at SBHC by interventions, outreach campaigns to raise awareness, structured protocols to communicate with other h.c. providers about immunization given at SBHC.
[5]	Study aimed to improve understanding of HPV vaccination services in school health centers and to find the barriers for providing the vaccine. Also sought to assess the viability of potential interventions to increase HPV vaccine in the centers.	Interviews Structured telephone questionnaire that focused on school health center vaccination services and procedures, barriers to providing HPV vaccine, and potential intervention for increasing vaccine uptake.	Findings indicate that cost, parental consent, and record keeping demands limit the ability of school health centers to offer HPV vaccine. Interventions at school health centers represent important, underutilized tools that could have valuable public health impact.	School health centers reported facing several key barriers to providing HPV vaccine, many were interested in partnering with outside agencies. On low-cost interventions to increase HPV vaccine uptake amongst adolescents. Activities likely to raise HPV vaccine are student incentives, parent reminders, and obtaining consent from parents while they are at school.
[15]	Reviewed the completion of the human papillomavirus vaccine series in 19 Oregon health centers.	Review of SBHC vaccine record data	450 people started the 3 dose HPV vaccine in 2007. By 2008 51% of these received all 3 doses. Series completion increased significantly with age, differed significantly between race groups, lowest among black persons, and did not differ significantly by insurance status.	Even in challenging conditions, school-based health centers provide excellent preventive care to vulnerable youth. These results support the importance of maintaining and expanding school based health center access in vulnerable adolescent populations.
[16]	The purpose of this study is to examine the effect of brief health messaging on parents' intentions to vaccinate their young adolescent, the first dose uptake of HPV vaccine, and series completion.	Random question computer aided interview questions to 445 parents	The use of SBHC does minimize logistic barriers that are associated with return visits necessary to compel the vaccination series. The use of an SBHC fosters a high series of completion rates and suggests they represent an excellent venue for delivery of multi dose vaccines, like HPV vaccine.	

[17]	The purpose of this study is to describe HPV vaccination rates and policies at SBHC visited, identify barriers and facilitators to HPV vaccine uptake, and describe the potential role for clinician-to clinician AFX to improve rates in this setting.	Conducted clinician visits to clinic sites. Assessed HPV initiation and completion rates. Analyzed responses to a questionnaire and summarized interviews to identify barriers and facilitators to HPV immunization practices and QI (Quality Improvement).	SBHC that allowed adolescent self-consent had a higher baseline rate. Challenges are retrieving consent from parents. Barriers were found with follow up appt. Scheduling and policy that allows students to leave class for an appointment.	Streamlining consent processes can be helpful for SBHC vaccine success. Encourage providers to address barriers as to use the SBHC as a good source of vaccinations.
[18]	The purpose of this study was to evaluate a medical student driver vaccine blitz at a SBHC center to increase vaccination.	Intervention Study. Medical school students provided an education for middle school staff on the importance of vaccination. In turn, they provided a "vaccine blitz" or campaign/intervention activity to vaccinate students at school using the SBHC	This study provided exposure to underserved populations, adolescents health, SBHCs, community medicine and multidisciplinary work.	Vaccine initiatives within an SBHC can be feasible, replicable, and an effective way to increase adolescent vaccination rates.

Table 1: Table listed the study, purpose, population/sample, research design, outcomes and results or conclusions.

Results

Our search resulted in the identification of 15 relevant articles that met our inclusion criteria (Figure 1). Themes found within the 15 research articles are as follows: HPV completion and vaccination rates (n=1) [6]. Acceptability of receiving the HPV vaccine at a SBHC (n=1) [14]. Adolescent immunization disparities and how a SBHC may assist with this issue (n=1) [11]. HPV series completion at SBHC (n=4) [7,9,10,15]. Interventions to make improvements to existing vaccine implementation at SBHC (n=9) [1,5,8,12,13,16-19].

Evidence to Support the Use of a SBHC for HPV Vaccination

Several articles within the literature search advocated for the use of an SBHC as a great resource for HPV vaccination of adolescents. Reasons have been cited as to why this route of vaccination can be favorable (1) Studies conducted by Munn, et al. [7] showed that adolescents who used SBHC's for HPV vaccination had a higher completion rate than those that received their vaccine at another healthcare setting. (2) The SBHC is more accessible for adolescents, many because of their age, have decreased interaction with a traditional healthcare facility or primary physician. The SBHC is located at the school and more accessible for the students [5]. (3) Due to the need to receive 2 or 3 injections in the HPV series, many students do not complete their series. With the SBHC, the students have a better chance of completion due to the availability of the vaccine on the school premises. Students are already at school and can easily be seen at the SBHC to complete the series [15]. (4) Since the schools are on-site with the SBHC, this eliminates the scheduling issues that may cause a barrier or a delay in vaccination [15]. (5) Insurance disparities do not affect vaccine completion. State and national programs that provide free vaccine, SBHCs appear to be able to address these barriers by programs such as the Vaccines for Children Program (VFC) [12]. Children can receive preventive care such as vaccines despite their income [8]. (6) School-based health centers can provide an alternative to primary care settings for vaccination as most children <14 years of age are in school. This eliminates parents missing work or transportation issues that may occur [16]. (7) Parents feel SBHC's are convenient, some services are free, and feel confident for the vaccines their children receive there. (8) Schools that have a SBHC are positioned to assist with barriers to the vaccine. SBHCs are more likely to vaccinate low-income students and racially and ethnically diverse students. (9) Best practice to increasing vaccination uptake is for more schools to offer vaccinations through SBHC's [19]. (10) The American Academy of Pediatrics (AAP) supports SBHC's and believes immunization rates could increase by using school based clinicals. Other countries, outside of the United States are cited as exceeding 90% vaccination rates by using school-based interventions [8].

Vaccination Barriers Experienced by SBHC's

Although there are many positives to utilizing an SBHC for vaccination, the literature identifies some barriers.

(1) Billing of Private Insurance Companies: A common barrier throughout the literature is the SBHC's lack of ability to bill private insurance companies. If the SBHC is not able to bill, they are strapped to only administering vaccines to children that are Vaccine for Children (VFC) eligible [9].

- (2) Administrative Support: Securing buy-in from administrators, faculty, and staff of the school. Without proper support, SBHC's find it difficult to promote vaccination [17].
- (3) Parental Consent: Retrieving consent from a parent or guardian is a barrier for many SBHC's. Some articles discuss receiving a blanket consent from a parent or guardian for all vaccines at the beginning of the school year. This may be a solution to receiving consent for the HPV vaccine [12].
- (4) Parental and Guardian Fears: Parents and guardians have expressed concerns about the immunization and the possible side effects, safety of vaccine, fear of promoting sexual activity, perception that child is too young to be vaccinated since they are not sexually active, belief the vaccine is not necessary, and concern over cost [20].

Other Perceived Barriers to the HPV Vaccine

The literature discusses a phenomenon as "Missed Opportunities." This can be a situation where a child has been in contact with a health care service and is eligible for vaccination, but the child does not receive the vaccine for which he or she is eligible. Missed opportunities occur when adolescents present to a healthcare clinic and the immunization history is not reviewed, a follow up is not scheduled for additional doses of a vaccine, or the provider did not recommend vaccines.

Discussion

Immunization has been shown to be one of the most successful and secure public health measures. The HPV vaccine was recommended by ACIP (Advisory Committee on Immunization Practices) in 2006 for regular vaccination of adolescent females aged 11-12 [21]. The ACIP guideline was extended in 2011 to include teenage males. Even though the President's Cancer Panel finds HPV vaccination to be a top priority in cancer prevention, coverage rates are poor and fell short for the Healthy People 2020 goal of 80% coverage for both men and women. By 2018, only 48.0 percent of adolescents aged 13 through 15 years received recommended doses of the HPV vaccine. The target rate for Healthy People 2020 was 80% and remains at this target for Healthy People 2030 [22].

According to 2013 National Immunization Survey data, 57.3% of females and 34.6% of males received at least one dose of HPV vaccine compared to 86% for Tetanus, Diphtheria, And Pertussis (Tdap) and 77.8% for meningococcal conjugate vaccines. This shows both the disparity between male and female vaccination rates and the difference between other vaccine adolescent vaccine coverage [23]. A study conducted by Stokley, et al. [24] revealed that, providers often miss opportunities to vaccinate adolescents during routine healthcare visits as evidenced by the fact that nearly two-thirds of 11 - 12-year-olds are not vaccinated for HPV at office visits where they receive other vaccines. According to Gargano, et al. [25] if these missed opportunities were avoided, approximately 93% of 13 - to 17-year-old females would have at least started the series by 2012. Peer-to-peer education for healthcare professionals has been shown to be successful in addressing barriers to adolescent vaccine adoption. As a result, promoting vaccines within a SBHC may be useful in minimizing missed opportunities and motivating providers to make a positive recommendation [4]. Kessels, et al. [26] reported that adolescents with health insurance and high healthcare use are associated with higher vaccine coverage. By increasing access to healthcare through an SBHC, this may contribute to increased HPV vaccination rates amongst a population of students that are under-insured or un-insured.

Conclusion

In the United States, HPV vaccine initiation rates among adolescents aged 13 to 17 years old have increased by around five percentage points per year since 2013, and now stand at over 65 percent. However, series completion stays below 50 percent [27]. Oliver, et al. [17] reported that even in the absence of a national school immunization program in the United States, there are opportunities in the school setting that can be used to improve vaccination rates. These opportunities include 1) school-located vaccination clinics 2) school mandates for HPV vaccination and 3) using School-Based Health Centers (SBHCs). According to Blake & Middleman [28], parents have expressed an interest in having their children receive the HPV vaccine in schools, and some school-based initiatives have proven to be effective. According to reports, adolescents served by SBHCs have higher vaccination rates for influenza, hepatitis B, tetanus, and HPV completion. Therefore, SBHCs are in a unique position to overcome HPV vaccine barriers [17].

After careful review of the literature, there are many positives to using a SBHC to increase vaccination rates of all vaccines but especially Human Papillomavirus (HPV). There are strategies that can be implemented to improve vaccination success with SBHC's. The first strategy is education. Parents and guardians need to have a clear understanding of the vaccine. This involves the ability to ask questions about the vaccine, including safety, efficacy, and dispelling myths. The second strategy is convenience. Parents do not need to be present for their child to receive a vaccine. The parent or guardian does not need to miss work or schedule an appointment with their healthcare provider. Transportation can be an issue for many parents and guardians. Utilizing the SBHC for vaccination is helpful as the students are transported to school, often by school transportation which helps with reaching the vulnerable or hard to reach population. Most SBHC's are attached to the school or within close proximity to the school buildings, this in turn decreases stress.

In closing, the information gathered through this literature review could be generalized to countries outside of the United States. Many of the suggestions given to increase HPV vaccination in the school aged population could be applied to an international audience as well.

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