



Published in final edited form as:

J Prim Care Community Health. 2012 July 1; 3(3): 170–173. doi:10.1177/2150131911429574.

Pilot Study: Health Behaviors Associated with HPV Vaccine Uptake among Adolescents

Carolyn J. Heckman, PhD,

Licensed clinical health psychologist, Assistant Professor, Cancer Prevention and Control Program, Fox Chase Cancer Center, Philadelphia, PA

Carolyn Y. Fang, PhD, and

Health psychologist, Associate Professor and Co-leader, Cancer Prevention and Control Program, Fox Chase Cancer Center, Philadelphia, PA

Ignacio Jayo

Science teacher, William Tennent High School, Warminster, PA

Carolyn J. Heckman: carolyn.heckman@fcc.edu; Carolyn Y. Fang: carolyn.fang@fcc.edu; Ignacio Jayo: jayoig@centennialsd.org

Abstract

Background—Despite approval of a vaccine found to be very effective in preventing human papillomavirus (HPV) infection and related cancers, many young people have not yet been vaccinated. Since health behaviors tend to co-occur, the purpose of the current study was to examine relationships among HPV vaccine uptake and other health behaviors among adolescents.

Methods—Fifty-nine high school students completed a paper-and-pencil pilot survey regarding HPV vaccine knowledge and attitudes as well as HPV vaccination and other health behaviors.

Results—We found that HPV vaccination was significantly associated with health-promoting behaviors among girls (e.g., not smoking, $p = .02$), whereas vaccination willingness was associated with health risk behaviors among boys (e.g., higher sugar diet, $p = .03$).

Conclusions—Effective interventions to promote HPV vaccination among adolescents may benefit from a simultaneous focus on multiple health behaviors and/or health in general. Interventions tailored by gender may also be beneficial.

Keywords

HPV vaccine acceptance; health risk behaviors; health promotion behaviors; adolescents

Introduction

In 2006, a vaccine to prevent human papillomavirus (HPV) infection was approved by the US Federal Drug Administration.¹ The vaccine was first approved for girls and young women aged 9 to 26 years to prevent cervical, vulvar, and vaginal cancers.^{1,2} In 2009, the vaccine was approved for HPV infection prevention in boys and men 9 to 26 years old and later for prevention of anal cancer among men.³ Effective vaccination requires three injections over a period of several months.

Despite the proven benefits of the vaccine, its implementation has been less than complete. Most US parents (70–80%) are supportive of the vaccine for girls, but less so for boys, probably in part because the vaccine was approved more recently for boys.^{4–7} Most studies have focused on parental acceptance rather than adolescents and young adults themselves, particularly males. Additionally, much of the existing literature has focused on hypothetical HPV vaccination prior to FDA approval. Two recent large studies examined vaccine uptake and completion rates among girls. From 2006–2010, acceptance rates at the University of Maryland Medical Center were: 91% initiation and 33% completion among 9–13 year old girls and 35% initiation and 11% completion among 9–26 year old females.⁸ In the North Carolina state immunization registry, 55% of 9–26 year old females completed the vaccine series between 2006 and 2009.⁹ Few studies have yet reported on uptake among males. Most of these studies have focused on hypothetical acceptance among gay and bisexual men because this population is at higher risk of HPV infection and anal cancer than heterosexual men.¹⁰ In a small study of men who have sex with men up to age 55 years, 64% of the sample completed the vaccination series offered off-label by a surgical practice between 2007 and 2009.¹¹

Although most prior studies have focused on demographic factors and attitudes toward vaccination and healthcare in general, it may be important to consider how health behavior patterns may be associated with vaccine uptake. Research has shown that health behaviors tend to co-occur; indeed, several parental behavioral factors (including physical activity and smoking) have been found to be associated with parental acceptance of the HPV vaccine for their daughters.¹² The only available study that explored the association between HPV vaccination and another health behavior found HPV vaccination to be associated with injectable contraceptive use by females.¹³ The purpose of the current pilot study was to examine potential relationships among HPV vaccination and other health behaviors among adolescent girls and boys, focusing on other behaviors known to be associated with adult cancer development. We hypothesized that positive HPV attitudes and vaccine uptake would be associated with other healthy behaviors such as not smoking, healthy eating and body weight, sunscreen use, and safer sex.

Methods

Subjects

Participants in the current pilot study were 59 (41 girls, 18 boys) high school students recruited from science classes at a public school in the suburbs of Philadelphia, Pennsylvania. Mean age was 16.75 years (SD = 1.22). The majority of participants (93%) were non-Hispanic white. Participants were fairly equally divided among sophomores, juniors, and seniors, with only 7% being freshmen.

Measures

Girls were asked whether they had gotten the HPV vaccine with the following response options: all three shots, 1 or 2 shots, I am in the process of getting an appointment, and no shots. Boys were asked how likely they would be to get the HPV vaccine from 1 = not at all likely to 5 = very likely. Additional measures included behavioral health items adapted from the well-validated US Centers for Disease Control 2007 Youth Risk Behavior Survey.¹⁴ The topics of these items included height and weight in order to calculate body mass index; number of days physically active in the past week; intake of fruit, vegetables, sugar, and fat in the past week; sexual history including intercourse, oral sex, and unprotected sex; smoking; as well as skin protection, ultraviolet radiation exposure, and sunburns.

Procedure

This study was Institutional Review Board-approved, and parental and student consent/ assent and HIPAA authorization were obtained prior to the paper-and pencil survey.

Data Analysis

Girls who reported having received all three shots were coded as having been vaccinated. Boys who reported being likely or very likely to get the vaccine were coded as willing to be vaccinated. Exploratory chi-square analyses were used to examine potential associations between HPV vaccination and other health behaviors.

Results

Overall, 54% of the female respondents reported having received the full HPV vaccine, 15% had received 1–2 shots, and only 1 girl reported being in the process of making an appointment. Among boys, 33% reported vaccine willingness. Associations between health behaviors and HPV vaccination for adolescent girls and boys are reported in Tables 1 and 2, respectively. We found that girls were significantly more likely to have been vaccinated if they had never smoked ($p = 0.02$) and a trend toward being more likely to have been vaccinated if they did not have a BMI in the overweight range ($p = 0.08$). We found that boys were significantly more likely to be willing to be vaccinated if they had a higher sugar diet ($p = 0.03$) and a trend toward higher willingness to be vaccinated if they did not wear sunscreen ($p = 0.09$). None of the other associations between health behaviors and vaccination was statistically significant. In particular, there was no significant association found between sexual history (e.g., vaginal intercourse, oral sex, unprotected sex) and vaccine acceptance.

Discussion

In the present study, over half of the female respondents reported completing the 3-shot vaccination series. Uptake and awareness of the HPV vaccine have been increasing over time, likely related to widespread marketing efforts and mass media campaigns. Our preliminary data suggest that HPV vaccination may be associated with health-promoting behaviors among girls; but, in contrast, our data suggest that vaccine willingness may be associated with risky health behaviors among boys. Specifically, adolescent girls who did not smoke were more likely to have received the vaccine, and girls who were not overweight showed a trend toward being more likely to have been vaccinated. One plausible explanation for this finding may be the parental monitoring hypothesis,¹⁵ which postulates that high parental monitoring is associated with lower prevalence of risk behaviors such as smoking and drinking. It is possible that high parental monitoring is also associated with greater uptake of other illness prevention strategies such as vaccination. Indeed, given current medical guidelines that typically require parental consent for minors to receive the vaccine, it is acknowledged that any such associations between adolescent health behaviors and vaccine uptake will be directly impacted by parental acceptance of the vaccine.

Among boys, diet (higher sugar intake) was associated with willingness to accept vaccination. However, it should be noted that most boys (and girls) did not have a low sugar diet. Additionally, boys who did not use sunscreen showed a trend toward being more willing to accept vaccination. Given that the HPV vaccine has not been available nor marketed for as long to boys and men as to girls and women, it is likely that awareness of this vaccine is lower among adolescent boys than girls. Finally, sexual risk behaviors were not found to be associated with vaccination among either girls or boys. Such findings may help to ease parental concerns that vaccination will alter adolescent sexual behavior.

The study's strengths are that it addresses the novel topic of the association of other health behaviors with HPV vaccine acceptance among both girls and boys. Of course, this pilot study is limited by the use of a small convenience sample and assessing hypothetical vaccination among boys. One of the major reasons for the small sample size was the requirement to obtain both a signed parental consent and HIPAA as well as student assent and HIPAA. We believe that the low consent rates are not indicative of active study refusal. Additionally, the sample was from a suburban public high school, likely similar to many others in the US, and we obtained some significant results despite the small sample size. Although we cannot rule out the associations that were not found to be significant due to the small sample size, the significant and nearly significant findings are promising. Finally, future research should investigate the relationship of other health behavior to actual vaccine uptake among boys.

Despite these limitations, these preliminary findings suggest that, among adolescent girls, HPV vaccination may be associated with some other health-promoting and cancer prevention behaviors. Whether health risk behaviors continue to be associated with vaccine willingness among boys as HPV vaccine awareness increases among boys and their parents should be examined. Vaccination was not found to be associated with sexual risk behaviors in either girls or boys. In light of recent study findings that parental health behavior patterns may contribute to parental uptake of the HPV vaccine for daughters,¹² it may be informative to examine in more depth whether similar behavioral patterns are observed for adolescent vaccine acceptance. Recent studies have demonstrated that simultaneous interventions for multiple health behaviors can be more efficacious than interventions focusing on single or sequential behavior change.^{16–18} Interventions tailored to each individual's personal characteristics, including interventions to increase vaccination, and those tailored by gender, have also been found to be more efficacious than non-tailored programs.¹⁹ This pilot study provides an initial look at health behavior patterns related to HPV vaccine acceptance among adolescents and offers hypotheses and directions for future research.

Acknowledgments

The investigators were funded by NIH grants K07CA108685 (PI: CH) and P30CA006927 (Fox Chase Cancer Center). The authors thank Jeanne Pomenti, Sara Filseth, Indira Friel, and the participating Science students and teachers for their assistance with this project.

References

1. Kimmel SR. Practical implementation of HPV vaccines in clinical practice. *J Fam Pract.* 2006; (Suppl):18–22. [PubMed: 17366754]
2. Adams M, Jasani B, Fiander A. Human papilloma virus (HPV) prophylactic vaccination: challenges for public health and implications for screening. *Vaccine.* 2007; 25(16):3007–3013. [PubMed: 17292517]
3. US Food and Drug Administration. [Accessed September 28, 2011] Gardasil. <http://www.fda.gov/BiologicsBloodVaccines/Vaccines/ApprovedProducts/ucm094042.htm>
4. Vietri JT, Chapman GB, Li M, Galvani AP. Preferences for HPV vaccination in parent-child dyads: Similarities and acknowledged differences. *Prev Med.* 2011; 52(5):405–406. [PubMed: 21396952]
5. Woodhall S, Lehtinen M, Verho T, Huhtala H, Hokkanen M, Kosunen E. Anticipated acceptance of HPV vaccination at the baseline of implementation: a survey of parental and adolescent knowledge and attitudes in Finland. *J Adolesc Health.* 2007; 40(5):466–469. [PubMed: 17448408]
6. Constantine NA, Jerman P. Acceptance of human papillomavirus vaccination among Californian parents of daughters: a representative statewide analysis. *Perspect Sex Reprod Health.* 2007; 39(3): 167–175. [PubMed: 17845528]

7. Brabin L, Roberts SA, Kitchener HC. A semi-qualitative study of attitudes to vaccinating adolescents against human papillomavirus without parental consent. *BMC Public Health*. 2007; 7:20. [PubMed: 17291343]
8. Schluterman NH, Terplan M, Lydecker AD, Tracy JK. Human papillomavirus (HPV) vaccine uptake and completion at an urban hospital. *Vaccine*. 2011; 29(21):3767–3772. [PubMed: 21440038]
9. Tan W, Viera AJ, Rowe-West B, Grimshaw A, Quinn B, Walter EB. The HPV vaccine: are dosing recommendations being followed? *Vaccine*. 2011; 29(14):2548–2554. [PubMed: 21300098]
10. Reiter PL, Brewer NT, McRee AL, Gilbert P, Smith JS. Acceptability of HPV vaccine among a national sample of gay and bisexual men. *Sex Transm Dis*. 2010; 37(3):197–203. [PubMed: 20118831]
11. Thomas EA, Goldstone SE. Should I or shouldn't I: decision making, knowledge and behavioral effects of quadrivalent HPV vaccination in men who have sex with men. *Vaccine*. 2011; 29(3): 570–576. [PubMed: 20950728]
12. Fang CF, Coups EJ, Heckman CJ. Behavioral correlates of HPV vaccine acceptability in the 2007 Health Information National Trends Survey (HINTS). *Cancer Epidemiol Biomarkers Prev*. 2010; 19:319–326. [PubMed: 20142234]
13. Widdice LE, Bernstein DI, Leonard AC, Marsolo KA, Kahn JA. Adherence to the HPV vaccine dosing intervals and factors associated with completion of 3 doses. *Pediatrics*. 2011; 127(1):77–84. [PubMed: 21149425]
14. Eaton DK, Kann L, Kinchen S, et al. Youth risk behavior surveillance--United States, 2007. *MMWR Surveill Summ*. 2008; 57(4):1–131. [PubMed: 18528314]
15. Bohnert KM, Rios-Bedoya CF, Breslau N. Parental monitoring at age 11 and smoking initiation up to age 17 among Blacks and Whites: a prospective investigation. *Nicotine Tob Res*. 2009; 11(12): 1474–1478. [PubMed: 19897527]
16. Conn VS, Hafdahl AR, Lemaster JW, Ruppar TM, Cochran JE, Nielsen PJ. Meta-analysis of health behavior change interventions in type 1 diabetes. *Am J Health Behav*. 2008; 32(3):315–329. [PubMed: 18067471]
17. Hyman DJ, Pavlik VN, Taylor WC, Goodrick GK, Moye L. Simultaneous vs sequential counseling for multiple behavior change. *Arch Intern Med*. 2007; 167(11):1152–1158. [PubMed: 17563023]
18. Prochaska JJ, Spring B, Nigg CR. Multiple health behavior change research: an introduction and overview. *Prev Med*. 2008; 46(3):181–188. [PubMed: 18319098]
19. Noar SM, Benac CN, Harris MS. Does tailoring matter? Meta-analytic review of tailored print health behavior change interventions. *Psychol Bull*. 2007; 133(4):673–693. [PubMed: 17592961]

Table 1

Association between vaccination and other health behaviors among female students (n = 41)

Variable	Vaccinated	Un-Vaccinated	$\chi^2(df), p$
Ever smoked	3	9	5.60(1), 0.02
Never smoked	19	10	
Overweight	3	7	2.98(1), 0.08
Not overweight	19	12	
High sugar diet	5	6	2.72(2), 0.26
Medium sugar diet	13	11	
Low sugar diet	1	5	
Wears sunscreen	17	14	0.71(1), 0.79
Does not wear sunscreen	5	5	

Table 2

Association between vaccine willingness and other health behaviors among male students (n = 18)

Variable	Would Vaccinate	Would Not Vaccinate	$\chi^2(df), p$
Ever smoked	2	1	1.80(1), 0.18
Never smoked	4	11	
Overweight	2	5	0.12(1), 0.73
Not overweight	4	7	
High sugar diet	3	3	7.20(2), 0.03
Medium sugar diet	9	1	
Low sugar diet	0	2	
Wears sunscreen	2	9	2.92(1), 0.09
Does not wear sunscreen	4	3	