Published in final edited form as:

Prev Med. 2015 May ; 74: 63–66. doi:10.1016/j.ypmed.2015.03.004.

Association between mother-child sexual communication and HPV vaccine uptake

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Abstract

Objective—To examine the association between mother-child communication about sex, sexually transmitted diseases (STDs), and contraception/condoms and HPV vaccine uptake by gender.

Methods—Women (n=1372) with 1 child aged 9-17 years receiving care in reproductive health clinics in Southeast Texas were asked to complete a self-administered questionnaire between September 2011 and October 2013.

Results—The majority of mothers with 1 eligible daughter (n = 886) reported having talked about 'sex' (77.7%), 'STDs' (76.6%) and 'contraception' (73.2%) with their daughter. The respective figures for mothers with 1 son (n = 836) were 68.8%, 69.0% and 65.3%. Mothers who discussed sex, STDs, or contraception with their daughters compared to those who did not were more likely to report that their daughter initiated (1 dose) HPV vaccination after adjusting for confounders (all p<.05). Similarly, mother-son discussions about STDs or condoms, but not sex, were associated with HPV vaccine initiation for their sons compared to those who did not discuss these topics. These associations were not significant with regard to HPV vaccine completion (3 doses) for neither daughters nor sons.

Conclusion—Mother-child communication on STDs and contraception/condoms is associated with HPV vaccine initiation, but not completion, among both daughters and sons.

Keywords

Adolescent; HPV; HPV vaccination; communication; maternal behavior

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Conflict of Interest Statement

The authors declare that there are no conflicts of interest.

Introduction

The human papillomavirus (HPV) is responsible for virtually all cervical cancer cases and the majority of genital warts [Dunne et al., 2007]. HPV can also cause vaginal, anal, penile, and oropharyngeal cancers [CDC, 2014a]. HPV vaccination was first approved in the United States for females aged 9-26 years in 2006. In 2009, it was also approved for males aged 9-21 years [Markowitz et al., 2014]. Although recommended for both genders [Markowitz et al., 2014], HPV vaccination rates differ significantly by gender. In 2013, only 34.6% of males 13-17 years old in the United States received 1 dose of this vaccine compared to 57.3% of females [Elam-Evans et al., 2014]. In 2012, HPV vaccine uptake among 11-12 year olds was reported to be even lower: 16.4% in males and 27.1% in females [Cullen, et al. 2014]. Gender differences also exist in completion rates with 48.3% of adolescent males and 70.4% of females completing the 3-dose series in 2013 [Elam-Evans et al., 2014]. Low vaccination rates persist even though the vaccine is covered by most private health insurance plans [Kaiser Family Foundation, 2014] and the Vaccines for Children Program for those uninsured/underinsured 18 years old [CDC, 2014b].

Mothers are often the key decision-makers regarding HPV vaccination for their children [Berenson et al., 2014] and the primary parent who discusses sexual topics with both daughters and sons [Wilson & Koo, 2010]. There have been mixed findings in the few studies examining the relationship between mother-child sexual communication and HPV vaccination. One study demonstrated a positive association between mother-daughter sexual communication during adolescence and HPV vaccine initiation among daughters in college [Roberts et al., 2010] while the other did not [Marchand et al., 2012]. However, both studies were limited to college women who can make their own vaccination decisions and also did not assess mothers' perspectives. Previous studies on mother-son sexual communication found that it was positively associated with decreased risky sexual behaviors and increased use of condoms [Kapungu et al., 2010; Harris et al., 2013]. However, there is a lack of studies examining mother-son sexual communication and HPV vaccination. Thus, there is a need to examine whether mother-child sexual communication with younger daughters or sons impact vaccine uptake when mothers are the vaccine decision-makers. The purpose of this study was to examine the association between mother-child communication on 'sex', 'sexually transmitted diseases' (STDs), or 'contraception/condoms' individually and HPV vaccine initiation and completion among daughters and sons aged 9-17 years. We hypothesized that there would be associations between mothers who discussed each topic individually with their children and HPV vaccine initiation and completion, regardless of gender.

Methods

Women who had 1 child between 9-17 years old were identified among patients attending four different reproductive health clinics operated by the University of Texas Medical Branch (UTMB) in Southeast Texas between September 2011 and October 2013 by reviewing the daily census and approaching patients at these clinics. Among publicly-funded reproductive health clinics serving this region, these UTMB clinics are the largest and serve the majority of low-income patients residing in the area. After confirming eligibility, women

were invited to complete a 20-30-minute paper and pencil self-administered survey on HPV vaccination. Of the 4379 women who attended the clinics, 1436 met eligibility criteria. Of these, 1392 (97%) completed the survey and 44 (3%) declined. Twenty (10 incomplete, 9 invalid, 1 missing) surveys were later excluded, leaving 1372 women. Participants were reimbursed \$5 for their time and effort. All procedures were approved by the UTMB Institutional Review Board.

Information on demographics, current smoking status, and history of diagnosis with a STD, HPV infection, abnormal Pap smear, atypical precancerous cervical cells or cervical cancer were obtained by self-report. Mothers were asked a series of questions about their daughter and/or son aged between 9-17 years. If they had more than one daughter and/or son in this age category, the oldest one of either gender was targeted. Mother-child sexual communication was measured by asking three separate questions with similar wording: "How comfortable were you discussing 'sex' with your daughter/son?" Two more questions asked about "STDs" and "contraception/condoms". Response options for these questions were: "very comfortable", "comfortable", "uncomfortable", "very uncomfortable", and "haven't talked about this". We collapsed the first four responses to "ever discussed" and the last response as "never discussed". HPV vaccine uptake was measured by asking "Which of the following best describes your daughter's/son's current situation?" Response options were: 1) "completed the series of 3 shots", 2) "has started (but not completed) the series", 3) "already scheduled an appointment to receive the HPV vaccine", 4) "has not received the HPV vaccine." We combined the first and second responses to measure HPV vaccine initiation (received 1 dose), used the first response only to measure HPV vaccine completion (received 3 doses), and combined the third and fourth responses to measure the unvaccinated group.

Bivariate analyses were performed using chi-square test or Fisher exact test as appropriate. Multivariable logistic regression was used to examine association between mother-child discussion of sexual topics and child HPV vaccine uptake by gender after adjustment for confounding variables. We included socio-demographic characteristics of mothers and children's age (9-12 vs. 13-17) in the initial multivariable models. To achieve the final multivariable models, we used a backward elimination of variables with a *P* value >0.2 from the initial multivariable models. We have also retained variables that changed the outcome variable >10% after excluding it. Mother's age and race/ethnicity and child's age were forced into all models even if they did not meet the criteria. Analyses were performed using STATA 12 (Stata Corporation, College Station, TX).

Results

A total of 1372 women of 1436 approached (95.5%) participated in this study, of which 886 (64.6%) had at least one daughter, 836 (60.9%) had at least one son and 350 (25.5%) had both. Most women (59.7%) belonged to the age group 30-39 years (Table 1). The mean age of daughters was 12.4 years (range 9-17, SD ± 2.7). Seventy-seven percent of mothers had discussed 'sex' with their daughters. Similarly, nearly 77% of mothers had discussed 'STDs' with their daughters and 73% had discussed 'contraception'. Of these discussions, comfortable mother-daughter discussions were 66.3% for 'sex', 67.8% for 'STDs', and

64.4% for ‘contraception’. The mean age of sons was 12.1 years (range 9-17, SD ± 2.5). Sixty-nine percent of mothers had discussed ‘sex’ with their sons, with 69% having discussed ‘STDs’ and 65% having discussed ‘condoms’. Comfortable mother-son discussions on ‘sex’, ‘STDs’, and ‘condoms’ were 56.5%, 59.5%, and 56.4% respectively. Among those vaccinated, daughters had received one (n=61), two (n=25), or three (n=106) injections. Their initiation and completion rates were 21.8% (n=192) and 12.1% (n=106). Sons received one (n=32), two (n=12), or three (n=37) shots with initiation and completion rates of 9.8% (n=81) and 4.5% (n=37).

In bivariate analyses, mothers who discussed ‘sex’, ‘STDs’, or ‘contraception’ with their daughters, compared to those who had not, were significantly more likely to report their daughters initiated and completed HPV vaccination (Table 2). However, after adjusting for confounders, these associations remained statistically significant only for HPV vaccine initiation. On the other hand, both bivariate and multivariable analyses showed that mothers who had discussed ‘STDs’ or ‘condoms’ with their sons, as compared with those who had not, were significantly more likely to report HPV vaccine initiation for their sons, but not vaccine completion. Significant association was not observed between mother-son communication about ‘sex’ and HPV vaccine initiation/completion in either analysis. The effects were similar for both 9-12 and 13-17 year old daughters and sons.

Discussion

This study explored the association between mother-child communication about ‘sex’, ‘STDs’, or ‘contraception/condoms’ and HPV vaccination in both daughters and sons aged 9-17 years. Similar to Roberts and colleagues [2010], we found a positive association between mother-daughter communication about each sexual topic and HPV vaccine initiation among daughters. This suggests that mother-daughter communication about these sexual topics may improve HPV vaccine initiation among daughters. However, we did not observe a significant association between mother-daughter communication and vaccine completion in the adjusted analyses. This could be due to the fact that mothers may face additional barriers for vaccine completion, such as lack of time or transportation, cultural attitudes, and motivation [Niccolai et al, 2011; Chou et al, 2011].

We also observed that mothers who discussed ‘STDs’ or ‘condoms’ with their sons significantly more likely to have their sons initiate the HPV vaccine compared with those who had not discussed. These mothers may have included HPV and its prevention in their discussions about ‘STDs’ and ‘condoms’. However, this difference was not observed for mother-son discussion about ‘sex’. It is possible some mothers in our study who discussed ‘sex’ may have focused on the biology of sex and/or waiting to have sex, but not STDs and its prevention as previously reported [Wilson & Koo, 2010]. It has also been observed that the “gender mismatch” between mothers and sons make discussions about sex uncomfortable due to mothers’ lack of knowledge about male sexual development [Cox et al., 2010]. Another study showed that HPV vaccination could be an opportunity for mothers to begin discussing sex with young children [McRee et al., 2012]. Therefore, mother-son discussion about sex should incorporate HPV and its prevention to improve sons’ HPV vaccination.

Study Limitations

Our cross-sectional survey limits the opportunity to examine a causal relationship between mother-child communication about each sexual topic and child vaccination. Self-reported information is subject to recall bias leading to misclassification of HPV vaccination status. When compared to electronic medical records, accuracy of self-reported HPV vaccination status was reported to be more favorable than other vaccines [Rolnick et al., 2013]. Mother-child discussions about sex, STDs and contraception/condoms may have occurred simultaneously, although we measured them individually. Also, analyses based on the range of discussion (from “very comfortable” to “very uncomfortable”) may have affected some of the associations because mothers could be less comfortable discussing about sexual topics with sons than daughters. In addition, mother-child discussions may have been over-reported resulting in a greater difference with vaccine uptake (exposure misclassification). This study was limited to low-income mothers; therefore findings may not be generalizable to other groups. Despite these limitations, our study was unique by surveying a diverse sample of mothers on their communication with their children about sexual topics and children's HPV vaccine uptake.

Conclusion

Mother-child communication about ‘STDs’ or ‘contraception/condom’ was positively associated with HPV vaccine initiation for both daughters and sons. A similar association was observed for daughters, but not sons when ‘sex’ was discussed. This may have been due to limiting discussions with sons to the biology of sex as reported in the literature. To improve HPV vaccination, mothers should be educated on how to discuss these topics with their young children. However, mother-child communication about any of these topics was not associated with vaccine completion which could have been due to other barriers. To address this, mothers need support to overcome additional barriers related to children's vaccine completion.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgements

Federal support for this study was provided by the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) to Dr. Tyra Gross as an NRSA postdoctoral fellow under an institutional training grant. (T32HD055163; PI AB Berenson).

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Highlights

- Mother-child communication on sexual topics was associated with HPV vaccine uptake.
- For daughters, the association was for discussing sex, STDs and contraception.
- For sons, the association was for discussing STDs and condoms, but not sex.
- These positive associations were for child HPV vaccine initiation, not completion.
- Teaching mothers how to discuss sexual topics may improve child HPV vaccine uptake.

Table 1

Sample characteristics of mothers with 1 child aged 9-17 years (n=1372) (Southeast Texas, Sept. 2011-Oct. 2013)

	n (%) ^a
Age, years	
<30	195 (14.2)
30-39	819 (59.7)
40	358 (26.1)
Race/ethnicity	
White	262 (19.1)
Black	395 (28.8)
Hispanic	697 (50.8)
Other	18 (1.3)
Marital status	
Single/never married	278 (20.4)
Married/cohabitating	674 (54.5)
Separated/divorced/widowed	344 (25.2)
Education	
Did not graduate high school	599 (43.7)
High school graduate or GED	425 (31.0)
College degree or some college	347 (25.3)
Education of partner	
Did not graduate high school	476 (35.1)
High school graduate or GED	364 (26.8)
College degree or some college	211 (15.6)
Does not have a partner ^b	306 (22.6)
Employment status	
Does not work	759 (55.4)
Employed (full/part time)	612 (44.6)
Annual household income	
Less than \$15,000	559 (41.3)
\$15,000-\$29,999	585 (43.2)
\$30,000 or above	210 (15.5)
Current smoker	298 (21.8)
Ever diagnosed with a STD	198 (14.6)
Ever diagnosed with the HPV infection	102 (7.5)
Ever had an abnormal pap smear	408 (29.9)
Ever diagnosed with atypical precancerous cervical cells/cervical cancer	128 (9.4)

GED, General Education Diploma; HPV, Human papillomavirus; STD, Sexually transmitted disease

^aNumbers do not add up to 1372 due to missing data

^bnumber is much higher than the single/never married because some separated/divorced/widowed currently may not have a partner

Table 2

Percentage and Odds ratio (95% CI) of HPV vaccine initiation and completion among 9-17 year old children (N=1372) by maternal-child discussion about sex, STD, and contraceptive/condoms (Southeast Texas, Sept. 2011-Oct. 2013)

	Total ^d 886	Daughters					
		Initiation (n=192)			Completion (n=106)		
		(%)	P value ^b	Odds ratio (95%CI)	P value ^c	(%)	Odds ratio (95%CI)
Ever discussed about sex							
No	196	9.7	<.001	ref	.002*		
Yes	684	25.1		2.30 (1.35-3.92)		5.1	ref
Ever discussed about STD							
No	206	8.8	<.001	ref	<.001*		
Yes	675	25.6		2.67 (1.55-4.59)		14.3	1.99 (0.97-4.06)
Ever discussed about contraception							
No	236	11.5	<.001	ref	.006*		
Yes	645	25.4		1.93 (1.17-3.02)		14.3	1.64 (0.87-3.10)

	Total ^d 836	Sons					
		Initiation (n=81)			Completion (n=37)		
		(%)	P value ^b	Odds ratio (95%CI)	P value ^c	(%)	Odds ratio (95%CI)
Ever discussed about sex							
No	260	7.0		ref			
Yes	573	11.1		1.32 (0.73-2.38)		0.92 (0.41-2.08)	
Ever discussed about STD							
No	258	5.1	.002	ref	.018*		
Yes	574	11.9		2.19 (1.14-4.21)		3.1	ref
Ever discussed about condoms							
No	289	5.6	.003	ref	.029*		
Yes	544	12.0		1.96 (1.10-3.58)		3.8	ref

CI, confidence interval; STD, sexual transmitted diseases

Socio-demographic characteristics of mother (age, race/ethnicity, marital status, education, partner's education, work status, income, smoking status) and history of diagnosis with the human papillomavirus infection, precancerous cervical lesion, and STD and history of having abnormal Pap smear, as well as children's age groups (9-12 vs. 13-17) were included in the initial multivariable models. To achieve

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the final multivariable models, we used a backward elimination of variables with a P value $> .2$ from the initial multivariate models. We have also retained variables that changed the outcome variable $> 10\%$. Mothers' age and race/ethnicity and children's age were forced into all multivariable models even if they did not meet the criteria.

^dNumber of women with daughter and son do not add up to 1372 as many of them had both daughter and son.

^eBased on Chi square or Fisher exact test

^fBased on multivariable logistic regression analyses