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Examining maternal beliefs and human papillomavirus vaccine uptake among male and female children in low-income families



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ABSTRACT

Purpose: This study examines within-family differences in the uptake of the HPV vaccine and HPV-related beliefs by children's sex.

Methods: From a 2011–2013 survey of mothers of children aged 9–17 years in Texas, mothers with both male and female children ($n=350$) were selected.

Results: Mothers were more likely to report having initiated and completed HPV vaccination for their daughters than sons. Mothers did not express differences by children's sex in HPV-related beliefs. Among those who had not completely vaccinated either child, mothers were more likely to report they wanted their daughters compared to sons vaccinated and were more likely to report feeling confident they could get their daughters vaccinated than their sons.

Conclusion: In this population, mothers were more likely to report HPV vaccination of and motivation to vaccinate daughters compared to sons, although maternal beliefs about HPV did not differ by children's sex.

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1. Introduction

The human papillomavirus (HPV) is responsible for approximately 18,000 cancers among females and 8000 cancers among males per year in the United States [1]. HPV vaccination has the potential to prevent the majority of HPV-related cancers and genital warts. While the Advisory Committee on Immunization Practices recommends that males and females receive routine HPV vaccination beginning at 11 or 12 years of age [2], recent estimates from the National Immunization Survey – Teen of the receipt of ≥ 1 dose were 60.0% in adolescent females and 41.7% in adolescent males [3]. Thus far, interventions aiming to increase HPV vaccination, have had limited success, with mixed results found in two recent reviews [4,5].

Studies have identified differences in barriers to HPV vaccination of sons compared to daughters, including differences in provider recommendation, concerns about safety, and parents not knowing that boys could get the vaccine [6]. Though studies have examined within-family differences in HPV vaccination intention by children's sex [7], no studies have reported on within-family differences in HPV-related beliefs by children's sex. The aim of this

study was to examine within-family differences by children's sex in HPV vaccine uptake and HPV-related beliefs.

2. Methods

Between September 2011 and October 2013, women with ≥ 1 child aged 9–17 years were identified through review of the daily census and approached at four reproductive health clinics operated by the University of Texas Medical Branch (UTMB) to participate in a survey on HPV vaccination. Eligible participants were invited to complete a self-administered survey, available in either English or Spanish, and were reimbursed \$5 for their time and effort. The UTMB Institutional Review Board approved this study. Of the 1436 women who met eligibility criteria, 1392 (97%) participated and 44 (3%) declined [8]. A subset of the original study, mothers who had both a son and a daughter 9–17 years old ($n=350$), were included in these analyses.

Participants responded to questions regarding the HPV vaccine separately for their oldest daughter and oldest son in the 9–17 years age range. Mothers were asked whether their daughter/son had completed the HPV vaccine series, had started (but not completed) the series, had scheduled an appointment to receive it, or had not received any doses. Dichotomous variables were created for initiation (≥ 1 dose received) and completion (≥ 3 doses) of the vaccine series.

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Mothers stated their agreement with statements about their beliefs beginning with, “If my daughter/son gets HPV,” and ending with, “it could harm her/his future health,” “it could harm her/his future relationship with her/his partner,” and, “I will be devastated.” Response options were dichotomized with those who reported they strongly disagreed, disagreed, or were neutral versus those who reported they agreed or strongly agreed. Mothers also responded to the following question on a 0–100% Likert scale with eleven points, “If your 9–17 year old daughter/son does NOT get Gardasil, what are the chances that she/he will contract HPV?” A similar question was asked about their child developing genital

warts. Response options were dichotomized with those reporting 0% versus > 0%. Mothers also were queried, “I want my daughter/son vaccinated against the human papillomavirus (HPV) within the next year,” and, “I feel confident that I could get Gardasil for my daughter/son.” Response options were dichotomized with those who reported they strongly disagreed, disagreed, or were neutral versus those who reported they agreed or strongly agreed, while mothers with one or both children having completed the vaccine series were excluded from analysis.

McNemar's chi-squared tests for paired samples were used to examine marginal homogeneity across children's sex in maternal beliefs and children's HPV vaccination uptake. Statistical significance was assessed at the $\alpha=0.05$ level. All analyses were performed using Stata Version 14.0 [9].

Table 1

Demographic characteristics of families with both a son and a daughter 9–17 years old ($n=350$).

	n (%)
Maternal age, years	
< 30	19 (5.4)
30–39	266 (76.0)
≥ 40	65 (18.6)
Maternal race/ethnicity	
White	67 (19.1)
Black	98 (28.0)
Hispanic	178 (50.9)
Other	7 (2.0)
Maternal marital status	
Single/Never married	60 (17.3)
Married/Cohabiting	189 (54.5)
Separated/Divorced/Widowed	98 (28.2)
Maternal education	
Did not graduate high school	172 (49.1)
High school graduate or GED	108 (30.9)
College degree or some college	70 (20.0)
Maternal employment status	
Does not work	192 (54.9)
Employed (full time or part time)	158 (45.1)
Annual household income	
Less than \$15,000	135 (39.0)
\$15,000–\$29,999	158 (45.7)
≥ \$30,000	53 (15.3)
Current maternal smoking	84 (24.1)
Mother ever diagnosed with an STD	55 (15.8)
Mother ever diagnosed with HPV infection	21 (6.0)
Mother ever had an abnormal pap smear	96 (27.6)
Mother ever diagnosed with atypical precancerous cervical cells/ cervical cancer	27 (7.7)
Age of daughters, mean (SD)	13.5 (2.4)
Age of sons, mean (SD)	13.1 (2.5)

3. Results

A total of 350 mothers indicated they had both a daughter and a son between 9–17 years of age. Most mothers were between 30 and 39 years of age, Hispanic, and married or cohabiting (Table 1). Mothers were more likely to report their daughters compared to sons had initiated the series and completed it, but overall vaccination was low, with 72.3% reporting no HPV vaccination for either child (Table 2). There were no differences by children's sex in mothers' beliefs about HPV, perceived risk of their children contracting HPV, or perceived risk of their children developing genital warts.

Among those who had not yet completely vaccinated either child ($n=277$), mothers were more likely to report they wanted their daughters compared to sons vaccinated in the next year (Table 2). Mothers were also more likely to report feeling confident they could get their daughters vaccinated than their sons.

4. Conclusions/discussion

In this population, HPV vaccine uptake differed by children's sex, but maternal beliefs about HPV by children's sex were similar. These results suggest beliefs may not be driving sex differences in HPV vaccination. Mothers were more likely to report they wanted their daughters vaccinated than their sons and were more likely to report feeling confident they could get their daughters vaccinated, despite similar perceptions of risk. Since some physicians report a

Table 2

Child HPV vaccination uptake and maternal beliefs about HPV in families with both a son and a daughter 9–17 years old ($n=350$).

	Both daughters and sons % (95% confidence interval)	Neither daughters nor sons % (95% confidence interval)	Daughters, but not sons % (95% confidence interval)	Sons, but not daughters % (95% confidence interval)	p-value ^a
Initiated HPV vaccine	8.6 (6.0–12.0)	72.3 (67.3–76.7)	17.4 (13.8–21.8)	1.7 (0.8–3.8)	< 0.001
Completed HPV vaccine	2.6 (1.3–4.9)	84.3 (80.1–87.7)	11.7 (8.7–15.5)	1.4 (0.6–3.4)	< 0.001
HPV will harm future health	41.2 (36.1–46.5)	42.3 (37.2–47.6)	6.7 (4.5–9.9)	9.9 (7.1–13.5)	0.145
HPV will harm future relationships	39.1 (34.1–44.4)	44.6 (39.4–50.0)	6.1 (4.0–9.2)	10.1 (7.4–13.8)	0.061
Feel devastated if child got HPV	60.4 (55.1–65.5)	29.3 (24.7–34.4)	4.1 (2.4–6.8)	6.2 (4.0–9.3)	0.237
Positive risk of contracting HPV	67.9 (62.6–72.7)	25.8 (21.4–30.8)	3.6 (2.1–6.3)	2.7 (1.4–5.1)	0.513
Positive risk of developing genital warts	65.6 (60.2–70.5)	28.1 (23.5–33.2)	2.1 (1.0–4.4)	4.2 (2.5–7.0)	0.127
Want child vaccinated for HPV in the next year ^b	43.3 (37.6–49.3)	42.6 (36.9–48.5)	10.1 (7.1–14.3)	4.0 (2.2–7.1)	0.007
Feel confident they could get child vaccinated for HPV ^b	44.4 (38.6–50.3)	40.1 (34.4–46.0)	11.2 (8.0–15.5)	4.3 (2.5–7.5)	0.004

^a p-values calculated using McNemar's chi-squared test for paired samples.

^b Mothers who answered questions about at least one child who had completed the HPV vaccine series were excluded from these analyses ($n=73$ excluded).

preference to vaccinate girls [10], associations between confidence in getting children vaccinated by sex and provider recommendation should be further explored.

This study has several strengths and limitations. While a strength of this study was the inclusion of a diverse, low-income population, the small sample size limited our ability to conduct multivariate analyses. We focused on views and behaviors that differ by children's sex within a family, essentially controlling for maternal characteristics, though reliance on maternal report of children's HPV vaccination is subject to recall bias. The survey used in this study had not been validated.

Mothers did not report different perceptions about how HPV would impact their sons compared to daughters, yet were less likely to vaccinate sons. This may lead to male adolescents being exposed to vaccine-preventable strains of HPV prior to initiating the series. Future interventions should address the disparity in uptake by ensuring parents receive both adequate information about HPV vaccination and equal access to the vaccine for their sons and daughters.

Disclaimer

This work reflects the opinions of the authors and does not represent the opinions or influences of the National Institutes of Health.

Conflict of interest statement

The authors declare that there are no conflicts of interest.

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