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Parents' health beliefs and HPV vaccination of their adolescent daughters☆

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ABSTRACT

Though many studies have documented correlates of HPV vaccine acceptability, our study is one of the first to examine correlates of vaccine initiation. The current study aimed to identify modifiable correlates of HPV vaccine initiation among adolescent girls in high risk communities and whether correlates varied by race and urban/rural status. In 2007, we conducted a cross-sectional survey of 889 parents of adolescent girls aged 10–18 living in areas of North Carolina, USA with high cervical cancer rates. We analyzed data using logistic regression. Health Belief Model constructs were associated with HPV vaccine initiation in multivariate analyses, including doctor's recommendation to get HPV vaccine, perceived barriers to obtaining HPV vaccine, and perceived potential vaccine harms. While exploratory stratified analyses suggested that many of the same parent beliefs were important correlates of HPV vaccine initiation regardless of racial group or urban/rural status, a few differences did exist. These potentially modifiable beliefs offer well-defined targets for future interventions designed to increase HPV vaccine coverage. However, the beliefs' relative importance may differ between racial groups and regions.

Introduction

Cervical cancer is highly preventable, yet it remains prevalent within certain geographical areas of the United States, with higher rates among African American and rural women (Akers, Newmann, & Smith, 2007; Benard, Coughlin, Thompson, & Richardson, 2007; Saraiya et al., 2007). Almost all cervical cancer is caused by persistent infection with human papillomavirus (HPV) (Schiffman & Castle, 2003), primarily HPV types 16 and 18. The United States Advisory Committee on Immunization Practices currently recommends three doses of quadrivalent (types 6, 11, 16, 18) HPV vaccine be administered routinely to females 11–12 years of age, as well as catch-up doses for 13 to 26-year-olds who have not yet received the vaccine (Markowitz et al., 2007). If adopted widely, HPV vaccines may prevent 70% of cervical cancers in the United States (Smith et al., 2007; Villa et al., 2006). However, HPV vaccine initiation among eligible females remains low in the United States, with recent estimates of having at least one vaccine dose ranging from 5% to 26% (Centers for Disease Control and Prevention, 2008; Kahn et al, 2008; Rosenthal et al., 2008).

Given that parents likely play a large role in the vaccination behaviors of their adolescent daughters, their beliefs about HPV vaccination are important for vaccine initiation. The associations of parent beliefs and HPV vaccine acceptability and intent to vaccinate have already been studied extensively (Brewer & Fazekas, 2007; Constantine & Jerman, 2007; Dempsey, Zimet, Davis, & Koutsky, 2006; Fazekas, Brewer, & Smith, 2008; Olshen, Woods, Austin, Luskin, & Bauchner, 2005). Since intent does not always translate into health behavior (Johnston & White, 2003; Rivis & Sheeran, 2003), this research needs to be extended to actual vaccine initiation. At this time, only one published study has addressed parent beliefs and HPV vaccine uptake. In this study of 153 parents recruited from a primary care clinic, believing their daughter would not oppose the vaccine regimen was the only parent belief associated with vaccine initiation (Rosenthal et al., 2008).

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The Health Belief Model (HBM) (Becker, 1974) is one of the most widely used theoretical frameworks for understanding health behaviors (Painter, Borba, Hynes, Mays, & Glanz, 2008), including vaccine uptake (Blue & Valley, 2002; Brewer et al., 2007; Brewer & Fazekas, 2007; Chapman & Coups, 1999). HBM constructs have previously been applied to HPV vaccine research (Brewer & Fazekas, 2007). Specifically, perceived risk (or likelihood) is the belief that HPV infection and cervical cancer are likely to occur. Perceived severity is how severe the negative effects of HPV infection and cervical cancer are believed to be. Perceived effectiveness (or benefit) is the belief that HPV vaccine will diminish the risk or severity of HPV infection and cervical cancer. Perceived barriers are any perceived obstacles preventing HPV vaccination. Cues to action are situational factors prompting HPV vaccination, such as a doctor's recommendation.

The current study applied the HBM to identify parent beliefs associated with HPV vaccine initiation. Such beliefs offer modifiable targets for future intervention studies attempting to increase HPV vaccine initiation. Because we believe it is important to study populations where individuals are at high risk of cervical cancer since they stand to benefit the most from widespread coverage of HPV vaccine, we focused on female adolescents from an area with cervical cancer rates well above the United States national rate. Additionally, we aimed to determine if associations differed by race and urban/rural status because these factors are important determinants of cervical cancer mortality (Akers et al., 2007; Newmann & Garner, 2005; Yabroff et al., 2005).

Methods

Study design

The Carolina HPV Immunization Measurement and Evaluation (CHIME) Project was designed to investigate HPV vaccine decision making by caregivers for adolescent girls in an area where women are at high risk of cervical cancer. The sampling and data collection methods used for the caregiver study are reported in detail elsewhere (Hughes et al., 2009) and briefly below.

We identified counties in North Carolina that had 1) high rates of invasive cervical cancer (i.e., incidence >10 cases/100,000 women annually from 1993 to 2003 and mortality >4 cases/100,000 women annually from 1994 to 2004) relative to the United States national rate (mean incidence during 1993–2003 = 8.57 cases/100,000 women, mean mortality during 1994–2004 = 2.88 cases/100,000 women (National Cancer Institute, 2008)), 2) 20% or more African American residents, and 3) at least 1500 girls in the targeted age range of 10–18 years (to allow for a minimum number of caregivers). Eleven counties met study inclusion criteria, of which nine (eight rural and one urban) were geographically clustered in the southeast part of the state. After matching the eight rural counties on population size, proportion of African American residents, and rates of cervical cancer, we randomly selected four rural counties to study (Duplin, Harnett, Sampson, and Wayne counties). The one urban county (Cumberland) in this region was also selected.

Trained interviewers contacted a probability sample of households with telephone line access in these five counties. Households were sampled using either random-digit-dialing (5%) or a non-overlapping targeted-list frame of directory-listed residential telephone numbers with available recent household demographic information (95%). We oversampled rural telephone exchanges (U.S. Census Bureau, 2008), households likely to be African American, and households likely to contain a 10–18 year-old female.

Once a household was confirmed to contain a female aged 10–18, consent for a study interview was sought from a caregiver. Parents, grandparents, or any other individual who self-identified as being responsible for the adolescent's care were considered to be caregivers. Female caregivers were preferred, but male caregivers were interviewed if a female caregiver was unavailable. For the sake of simplicity, we refer to participants as parents for the remainder of this report. If a household contained more than one 10–18 year-old female, interview software randomly selected one as the index child for the interview. Interviewers were intermittently monitored during their calls and evaluated every two weeks to help ensure high data quality.

Interviews were conducted between July and October 2007. We interviewed 73% (889/1220) of parents contacted in eligible households (Hughes et al., 2009). Parents received a ten dollar payment for the phone interview. The study was approved by the Institutional Review Board at the University of North Carolina.

Measures

Vaccine initiation

To ensure that parents had some understanding of HPV, they received the following information: "HPV is a common sexually transmitted infection that sometimes leads to genital warts, abnormal Pap tests, and cervical cancer," and "An HPV vaccine is now available that protects against most genital warts and cervical cancer. Sometimes it's called the cervical cancer vaccine, HPV shot, or Gardasil. I'll call it the HPV vaccine."

Vaccine initiation, the main study outcome, was assessed by asking "Has [name] had any shots of the HPV vaccine?" Response options were "yes," "no," and "don't know" for this item. Because few daughters had received more than one dose of the vaccine, we focus on vaccine initiation of having received at least one dose, although we acknowledge that three doses are required for full vaccine effectiveness.

Beliefs

Perceived severity of cervical cancer if their daughters got the disease was assessed using the question "How serious would it be if [name] got cervical cancer?" Perceived likelihood of their daughters getting cervical cancer (conditional on whether or not the daughter had been vaccinated) was examined using "Given that your daughter has been vaccinated against HPV, what is the chance that she will get cervical cancer in the future?" for vaccinated daughters, and "Without the vaccine, what do you think is the chance that [name] will get cervical cancer in the future?" for unvaccinated daughters. Response options were "slightly," "moderately," "very," and "extremely" for perceived severity (coded 1–4, respectively), while perceived likelihood items used "no chance," "low," "moderate," and "high chance" (coded 1–4, respectively). Cues to action examined were having received a doctor's recommendation to get HPV vaccine and reporting a history of cervical cancer or genital warts among the parent or someone they care about.

We assessed perceived vaccine effectiveness (2 items, $\alpha = 0.64$, possible range = 1.0–4.0), perceived potential harms of HPV vaccine (6 items, $\alpha = 0.70$, possible range = 1.0–4.0), and perceived barriers to getting their daughter HPV vaccine (5 items, $\alpha = 0.70$, possible range = 1.0–4.0) using scales developed by McRee et al. (McRee, Brewer, Reiter, Gottlieb, & Smith, working paper). The perceived effectiveness scale addressed the ability of HPV vaccine to prevent cervical cancer and genital warts. The perceived potential harms scale assessed beliefs about vaccine safety and potential adverse events following vaccination. The perceived barriers scale addressed the difficulty of finding a healthcare provider with HPV vaccine available, a healthcare provider where the vaccine was affordable, a healthcare provider that was easy to get to,