Women's Health Issues xxx-xx (2015) 1–6

ELSEVIER

WOMEN'S HEALTH ISSUES

www.whijournal.com

Original article

Primary Care Physicians' Adherence to Guidelines and Their Likelihood to Prescribe the Human Papillomavirus Vaccine for 11- and 12-Year-Old Girls

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Article history: Received 19 January 2015; Received in revised form 11 July 2015; Accepted 28 July 2015

A B S T R A C T

Background: Inadequate physician adherence to guidelines has received scant attention as a possible cause of suboptimal human papillomavirus (HPV) vaccination rates. We assessed the extent to which primary care physicians (PCPs) adhere to clinical guidelines and their reported intentions to prescribe HPV vaccine to females in the targeted age group, and how this is influenced by perceptions of guideline clarity and other factors.
Methods: We surveyed 301 PCPs to explore their sociodemographic and practice-related characteristics, beliefs, professional norms, and perceived barriers to administer HPV vaccine. Logistic regression predicted the likelihood to prescribe HPV vaccine to 11- and 12-year-old girls on an array of variables hypothesized to influence physicians' recommendations.
Results: Only 67% of PCPs reported being likely to prescribe HPV vaccine to 11- and 12-year-old patients. PCPs were more likely to prescribe vaccine to 11- and 12-year-old girls if they believed HPV vaccine guidelines were clear (odds ratio [OR], 1.85; 95% CI, 1.03–3.35), agreed with a mandate requirement (OR, 2.39; 95% CI, 1.01–5.61), felt comfortable discussing HPV vaccination with early adolescent girls (OR, 5.10; 95% CI, 2.75–9.45), and had at least 25% of their patients using public assistance to pay for their clinic visits (OR, 3.82; 95% CI, 1.91–7.34). Practice specialty (family physicians or pediatricians) and region were not significant predictors.
Conclusions: PCPs exhibit moderate levels of adherence to professional guidelines regarding HPV vaccination. Potential public health benefits will not be realized without stronger efforts to improve the rates at which PCPs administer the vaccine, particularly to 11- and 12-year-olds for whom it is preferentially recommended.

Human papillomavirus (HPV) is the most common sexually transmitted infection in the United States and worldwide (Forman et al., 2012; Satterwhite et al., 2013). Persistent infection with high-risk strains can cause cervical, anogenital, oropharyngeal, and other cancers, as well as genital warts (Jemal et al., 2013). HPV vaccination began in 2006 when the quadrivalent HPV vaccine was introduced for use in females and a bivalent HPV vaccine was approved in 2009. Both vaccines protect against HPV types 16 and 18, which cause 70% of cervical cancers, and the quadrivalent vaccine also protects against HPV-6 and HPV-11, responsible for 90% of genital warts. By 2010, the prevalence of HPV-16 and HPV-18 decreased by 56% in 14- to 19-year-old females, confirming vaccine efficacy (Markowitz et al., 2013).

Vaccination is advised before exposure to HPV and hence sexual debut, which occurs during adolescence for most people (Guttmacher Institute, 2014). It is also more cost effective when given to preteens. The Advisory Committee on Immunization Practices (ACIP) recommends routine vaccination for 11- and 12-year-old girls (although this may begin at age 9) and "catch-up" vaccination through 26 years of age (Markowitz et al., 2014). The recommendation for the quadrivalent vaccine was expanded in 2011 to include males and a 9-valent vaccine will become available in 2015, offering protection against 90% of cervical and

Supported by a grant from the National Institute of Allergy and Infectious Diseases (NIAID), grant no. R03AI090499-01, awarded to A. Kulczycki (PI).
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1049-3867/$ - see front matter Copyright © 2015 by the Jacobs Institute of Women's Health. Published by Elsevier Inc.
http://dx.doi.org/10.1016/j.whi.2015.07.012

other anogenital cancers (Dochez, Bogers, Verhelst, & Rees, 2014; Petrosky et al., 2015).

HPV vaccination rates remain low, however, and substantially lower than for other vaccines licensed and recommended for children and adolescents at about the same time. In 2013, only 57% of 13- to 17-year-old females had initiated HPV vaccination and 38% were fully immunized with all three doses of vaccine (Centers for Disease Control and Prevention, 2014a, 2014b). Geographic, socioeconomic, racial, and ethnic disparities in HPV vaccine initiation and completion have emerged. The lowest vaccination rates are found in Southern states, in poorer neighborhoods and in rural communities, among those not covered by public insurance, and among non-Hispanic Blacks (Dempsey, Cohn, Dalton, & Ruffin, 2011; Gelman et al., 2013; Niccolai, Mehta, & Hadler, 2011; Pruitt & Schootman, 2010; Widdice, Bernstein, Leonard, Marsolo, & Kahn, 2011; Ylitalo, Lee, & Mehta, 2013). For example, HPV coverage rates in Mississippi and Alabama, which are more rural and have among the lowest median household incomes of U.S. states, are significantly lower than those found in the more economically developed and urban Northeastern states. Failure to address these vaccination disparities could potentially exacerbate disparities in cervical cancer rates and in the incidence of other HPV-associated diseases in the future.

Numerous professional organizations, including the American Academy of Family Physicians and the American Academy of Pediatrics, have issued position statements endorsing ACIP guidance (Wolfe, 2012). However, multiple factors may impede implementation of HPV vaccination in practice. These factors may include parental attitudes and beliefs such as fears the vaccine may increase early sexual activity, low awareness that it decreases cervical cancer and genital warts, perceived low risk for contracting HPV, and the expense and time of negotiating three vaccinations and clinic visits (Bednarczyk, Davis, Ault, Orenstein, & Orner, 2012; Darden et al., 2013; Dorell, Yankey, Santibanez, & Markowitz, 2011; Holman et al., 2014; Mayhew et al., 2014). Multiple factors may also prevent health care professionals from prescribing HPV vaccine, but these have been less studied. Vaccination rates will likely remain low without good adherence to professional guidelines and, potentially, mandated HPV vaccination for middle school entry. However, a mandate requirement is resisted by many stakeholders (Chatterjee, 2013; Colgrove, Abiola, & Mello, 2010; National Conference of State Legislatures, 2013; Perkins & Clarke, 2012) who may include physicians (deSante, Caplan, Shofer, & Behman, 2010; Kahn, Cooper, et al., 2009), although recent studies of their beliefs about mandated HPV vaccination are lacking.

The goal of this study was to understand the extent to which adherence to clinical guidelines, as indicated by the reported intentions of primary care physicians (PCPs) to prescribe HPV vaccination, is influenced by perceptions of guideline clarity. Lack of guideline clarity has been identified as a factor related to behavioral inertia and failure to adopt best clinical practices as suggested by evidence (Cabana et al., 1999). However, there is surprisingly limited research on how physicians perceive HPV vaccine guidelines. Specifically, we examined PCPs' stated likelihood to prescribe HPV vaccine for 11- and 12-year-old girls as recommended by their professional guidelines. We hypothesized that the key predictors of likelihood to prescribe the vaccine to girls in the vaccine-targeted age group are attitudinal factors, professional norms, and perceived barriers to vaccination, as well as sociodemographic and practice-related characteristics. Further, we explored possible regional variations between Southern states and the rest of the country in reported likelihood levels of vaccine prescription and their correlates.

Our focus is on family physicians and pediatricians because they are primarily responsible for prescribing the vaccine to females in the targeted age group. Earlier research suggested strongly that physician recommendation of HPV vaccination increases parental and adolescent vaccine acceptance (Brewer & Fazekas, 2007), intent to receive it (Kahn, Ding, et al., 2009), and immunization rates (Caskey, Landau, & Alexander, 2009). Recent studies reiterate the salience of physicians' recommendations (Darden et al., 2013; Holman et al., 2014), but the term is often used nonspecifically in the HPV vaccination literature and other factors associated with such behaviors remain unexamined, particularly with respect to the target age group. Physicians' adherence to clinical practice guidelines and their perceptions have received scant attention. These issues need to be reevaluated now that the vaccine has been available and recommended for several years. Moreover, as argued recently by the President's Cancer Panel, HPV vaccination research should be a national priority given that immunization rates remain well below those needed to obtain population-level benefits and those attained for other new vaccines recommended routinely at 11 and 12 years of age (U.S. Department of Health and Human Services, 2014).

Methods

Survey Instrument

We developed and pretested a questionnaire to explore PCPs' intentions to administer the HPV vaccine. Survey development was informed by elicitation of PCPs' views, reviews of research regarding influences on physicians' HPV vaccine behavior and their perceptions of professional recommendations, and constructs of the theory of planned behavior (attitudes, perceived behavioral controls, and subjective norms). Survey content validity was assessed by seven prominent family physicians and related faculty at the authors' university and experts in the field of HPV vaccination. Questionnaire items were piloted with 10 family practitioners and pediatricians before survey administration.

The outcome measure was assessed using the item: "How likely are you to prescribe HPV vaccine to girls who are 11 or 12 years old?" Responses ranged from *not at all likely* to *very likely* on a 5-point Likert scale. A vaccine prescription involves a clinic order authorizing vaccine use and should include a recommendation as part of a patient-centered discussion with the patient and parent, rather than as a simple declarative instruction that may not be a sufficient driver of patient behavior. Multi-item Likert-scaled responses were also used to represent other constructs of interest. These included views and understanding of ACIP and professional society recommendations, belief in mandated HPV vaccination for middle school entry and comfort discussing HPV vaccination with 11- to 13-year-old girls; as well as potential barriers such as the administrative costs associated with reimbursement for health care providers, and the lack of patient adherence to follow-up vaccinations. Scaled responses were dichotomized (likely versus unlikely; agree versus disagree) to preserve sufficient cases in variable response categories for analyses. Other relevant independent variables included sociodemographic and practice characteristics, such as medical specialty, practice setting, region, years since graduation from medical school, and estimated proportions of racial/ethnic minority patients and using public assistance.