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Human papillomavirus vaccine knowledge and hypothetical acceptance among women in Appalachia Ohio

Mack T. Ruffin IV[a,*], Erinn M. Hade[b], Melissa R. Gorsline[c], Cecilia R. DeGraffinreid[c], Mira L. Katz[d], Sarah C. Kobrin[e], Electra D. Paskett[f]

[a] Department of Family Medicine, University of Michigan, 1018 Fuller St., Ann Arbor, MI 48104-1213, United States
[b] Center for Biostatistics, The Ohio State University, 2012 Kenny Road, Columbus, OH 43221, United States
[c] Comprehensive Cancer Center, The Ohio State University, Suite 525, 1590 North High Street, Columbus, OH 43201, United States
[d] Comprehensive Cancer Center and College of Public Health, The Ohio State University, Suite 525, 1590 North High Street, Columbus, OH 43201, United States
[e] Applied Cancer Screening Research Branch, Behavioral Research Program, Division of Cancer Control and Population Sciences, National Cancer Institute, 6130 Executive Blvd., Room 4096, Rockville, MD 20852, United States
[f] Comprehensive Cancer Center, College of Medicine and College of Public Health, The Ohio State University, Suite 525, 1590 North High Street, Columbus, OH 43201, United States

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ABSTRACT

Objective: To assess hypothetical acceptance of the human papillomavirus (HPV) vaccine for themselves and a daughter age 9–12 years among Appalachia Ohio women.
Methods: Women with an abnormal Pap smear and randomly selected women with a normal Pap smear from 17 clinics completed an interview in 2006–2008.
Results: From 1131 original study participants, 807 (71%) completed a survey about the HPV vaccine for their daughters and themselves. Nearly half, 380 (47%), of the participants had heard of a vaccine to prevent cancer, and 362 (95%) of respondents had heard of HPV. The participants were then told that the FDA had approved a vaccine to prevent HPV. Only 379 (38%) participants identified girls ages 9–12 years as a group who should get the vaccine. After being given the official HPV vaccine recommendation statement, 252 (31%) wanted the vaccine; 198 (25%) were "not sure"; and 353 (44%) did not want the vaccine for themselves. With respect to giving the HPV vaccine to a daughter ages 9–12 years, participants responded "yes" 445 (55%); "not sure" 163 (20%); or "no" 185 (23%). Numerous reasons were provided supporting and opposing vaccine acceptance for themselves and for a daughter. Their physician's recommendation for the HPV vaccine increased vaccine acceptance to 86% for themselves and 90% for a daughter.
Conclusion: Knowledge, acceptance, and barriers about the HPV vaccine vary among women living in Appalachia Ohio. Physician recommendation is a key facilitator for vaccine diffusion in this region.

1. Introduction

Human papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the United States (U.S.) [1]. It is well established that high-risk HPV types (16 and 18), account for approximately 70% of cervical cancers [2], and low-risk HPV types (6 and 11) cause genital warts and low-grade cervical lesions, but do not lead to cervical cancer [3]. A quadrivalent vaccine, Gardasil, was licensed by the U.S. Food and Drug Administration (FDA) in June 2006 and protects against HPV types 6-, 11-, 16- and 18-related disease in young women [4] and men [5]. The Advisory Committee on Immunization Practices (ACIP) currently recommends vaccination of females who are 11–12 years old, but the vaccine can be administered as early as age 9 [6]. Catch-up vaccinations are recommended for females' ages 13–26 who have not been previously vaccinated [6]. In 2009, ACIP told clinicians that the vaccine could be given to young men ages 9–26 but did not make a recommendation for routine use at that time [7]. Additionally, in 2009 a second vaccine to prevent only HPV types 16- and 18-related diseases was approved for use for young women [8].

Prior to FDA approval of HPV vaccines, numerous studies were completed to assess parental acceptance of a theoretical HPV vaccine. Overall, this research suggested that most parents would be accepting of having their adolescents and pre-adolescents vaccinated against HPV [9–15]. While parents in general are accepting of HPV vaccination for their daughters [16,17], some parents are concerned that the HPV vaccine may lead to earlier sex initiation or increased risky sexual behaviors [10,14]. Since the approval of the HPV vaccine, data from focus groups of parents,

* Corresponding author. Tel.: +1 734 998 7120; fax: +1 734 998 7335.
E-mail addresses: mruffin@umich.edu (M.T. Ruffin IV), Erinn.Hade@osumc.edu (E.M. Hade), lissarue@hotmail.com (M.R. Gorsline), Cecilia.DeGraffinreid@osumc.edu (C.R. DeGraffinreid), Mira.Katz@osumc.edu (M.L. Katz), kobrins@mail.nih.gov (S.C. Kobrin), Electra.Paskett@osumc.edu (E.D. Paskett).

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community leaders, and healthcare providers throughout Ohio Appalachia reported unique themes of barriers (healthcare access, poor provider–patient communication, not having time), lack of knowledge (about cervical cancer, HPV, and HPV vaccine), and cultural attitudes (pride, religious, conservative) [18]. Appalachian self-identification may be a marker of these values and beliefs that may represent women not receptive to HPV vaccination [19].

From interviews of 52 mothers, others have identified lack of knowledge about HPV, age-related concerns, and low perceived risk of infection as reasons for declining vaccination [20]. Parents' religiosity, perceived perception that their child is susceptible to HPV, and perceived negative consequences of HPV infection were significant predictors of parents' intent to vaccinate as well [21]. In another survey, among parents aware of the HPV vaccine, 19% had already vaccinated their daughter(s), 34% intended to, 24% were undecided, and 24% had decided against vaccination [22].

Decision-making authority for vaccination and other medical services given to an individual younger than 18 years old is generally placed with parents or those responsible for their care [22,23]. One-fourth (25.1%) of adolescent females aged 13–17 years initiated the vaccine series ($\geq$1 dose) in 2007 [24]. Between 2008 and 2009, National Immunization Survey-Teen data showed an increase in HPV vaccine initiation from 37.2% to 44.3% and in HPV vaccine series completion ($\geq$3 doses) from 17.9% to 26.7% among adolescent females [25]. Still, coverage remains far from the Healthy People 2010 objective of increasing HPV vaccine series completion to 80% among females aged 13–15 [26].

Currently, one area with high cervical cancer mortality in the U.S. is Appalachia, a geographic region that stretches from southern New York to northern Georgia, Alabama, and Mississippi [27,28]. Young women living in the Appalachian region may have the greatest potential to benefit from widespread diffusion and uptake of the HPV quadrivalent vaccine given the high cervical cancer and high HPV infection rates in this region. However, there are limited data on the knowledge and acceptance of the HPV vaccine from women living in Appalachia [18]. From our experience in this rural, conservative population, we hypothesized that women would not be familiar with HPV or the vaccine. We also hypothesized that they would not be interested in receiving the vaccine for themselves or for a daughter. We sought to describe and characterize women who were familiar with the vaccine, those who would want the vaccine for themselves and those who would want it for a daughter, and the reasons for these responses. Finally, we hypothesize that women with a current abnormal Pap smear or a history of abnormal Pap smears would be more likely to want the vaccine for themselves or a daughter, given the exposure to abnormal screening tests.

2. Materials and methods

The Community Awareness, Resources and Education (CARE) Project, was one of eight National Institutes of Health-funded Centers for Population Health and Health Disparities. The goal of the CARE project was to investigate and characterize the environmental, societal, behavioral, and biological mechanisms of cervical abnormalities among women living in Appalachia Ohio. This paper reports on research conducted in one of the CARE projects, a case–control study designed to examine factors related to the risk of an abnormal Pap test. The present study was conducted as an ancillary study to this project. The Institutional Review Boards of The Ohio State University, the University of Michigan, and the Centers for Disease Control and Prevention (CDC) approved this study.

Women were eligible to participate in the CARE case–control study if they were age 18 or older, a resident of Appalachia Ohio, had an intact uterine cervix and corpus, were not pregnant, and did not have a history of cervical cancer. Women scheduled for a routine Pap smear on a day that a study nurse was in 1 of 17 clinics located throughout Appalachia Ohio were asked to participate in the parent study. On the day of the Pap smear, women signed a written informed consent, completed a short self-administered questionnaire prior to undergoing cervical cancer screening, and provided blood and saliva samples (self-reported smokers only). A unique demographic question in the survey was Appalachian self-identity [19]. The Appalachian self-identity question, "Do you consider yourself to be Appalachian?" A participant could answer "Yes," "No," or "Do not know" to this item. The responses were dichotomized into yes and no/do not know.

During the scheduled exam, an additional cytology sample was taken and the physician obtained a sample for HPV typing.

All women with an abnormal Pap smear according to the 2001 Bethesda System for reporting Pap smear Results [29] were considered cases, and controls were sampled from recruited patients who had normal Pap results. For each case, three controls were randomly selected from all normal Pap smear results from the same clinic as the case. Controls were selected from within a three-month window around the time the case received her Pap smear. The HPV types were determined using the commercially manufactured PCR-based Roche AMPLICOR [30,31].

After cytology review, women selected as cases and controls were asked to complete a second survey. Questions assessing HPV vaccine knowledge and behavioral intentions (for self and a daughter age 9–12 years) were developed in collaboration with behavioral scientists in the National Cancer Institute's Applied Cancer Screening Research Branch. The items were adapted from responses to the 2005 Health Information National Trends Survey (HINTS) including the reasons to and not to vaccinate [32]. The questions are available in the supplemental information. The primary survey collection method was telephone interviews from January 2006 to December 2008.

The medical records of the study participants were reviewed for evidence of completing (or starting) or declining to receive the HPV quadrivalent vaccine. Participants age 18–26 years with no medical record evidence of completing (or starting) or declining the HPV quadrivalent vaccine were contacted by mail or telephone to determine if they had completed or declined the vaccine series. Participants who had started or completed the HPV vaccination series were classified as having exposure to the vaccine. The remaining study participants were classified as having no exposure to the HPV vaccine.

2.1. Statistical analysis

Univariable logistic regression models that incorporated a random effect for clinic were used to determine crude associations between outcomes (want the HPV vaccine for self, or want the HPV vaccine for a daughter 9–12 years old, or awareness of a vaccine to prevent cancer) and potential correlates. To characterize women who were aware of a vaccine to prevent cancer, those who would want the vaccine for themselves and for those who would want it for a daughter 9–12 years old and for those who report a doctor had recommended the vaccine (grouped as yes/no), multivariable logistic regression models were constructed. Covariates that were most influential from the estimated crude associations were entered first into the model (ordered by the overall covariate p-value from univariable models), with subsequent covariates added thereafter. We note that although the poverty income ratio was collected and is described in univariable analyses, this potential covariate was missing for a large proportion of participants and is not included in modeling. Potential interactions were considered. The final multivariable models included a random effect for clinic of recruitment to reflect the sampling structure of the study. Model diagnostics and goodness of fit were verified for all final models. All reported