



## Original article

# Knowledge of human papillomavirus vaccination and related factors among parents of young adolescents: a nationwide survey in China



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## ABSTRACT

**Purpose:** To investigate the human papillomavirus (HPV) vaccine-related knowledge and factors associated with the knowledge among parents of young adolescents in China.

**Methods:** The study was based on data of a survey carried out in seven geographic regions of China. Parents of students in junior middle school were surveyed during parents' meetings.

**Results:** A total of 2895 parents were included in the analyses. Of parents, 38.3% responded with "yes" to more than three of the six knowledge questions, among whom only 4.5% of them correctly answered all six questions. Social benefit programs (41.3%), doctors and/or nurses (39.7%), and newspapers and/or magazines (36.5%) were selected as the top three sources of HPV-related knowledge. Mothers, parents who work in the health care sector, and parents with a higher annual income or with vaccination experience outside the expanded program on immunization showed a better knowledge base. Parents who consented to sex education for children or showed fear of cervical cancer were likely to have more HPV-related knowledge. In particular, the knowledge level of parents with prior consultation regarding HPV vaccines was higher.

**Conclusions:** Parents of young adolescents in China possessed a low level of HPV vaccine-related knowledge. Findings highlight the need for tailored health education through different channels to improve HPV-related knowledge among parents.

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## Introduction

Cervical cancer is the third most commonly diagnosed gynecologic cancer and the second leading cause of gynecologic cancer-related deaths in China. Annual absolute estimates of cases and deaths of cervical cancer were 75,400 and 33,900 [1]. It is

becoming one of the priorities in the long-term strategy for cancer prevention and control in China [2].

However, there is no nationwide population-based cervical cancer screening program in China. Government-sponsored mass screening has only been made available to a limited population in rural China. An earlier large-scale free screening initiative based on visual inspection and cytology covered only about 10 million rural women aged between 35 years and 59 years between 2009 and 2012 [3]. Women in urban areas are referred to cervical cancer screening at an opportunistic basis or through employment-based physical examination [2]. In addition to limited coverage, the effectiveness of cervical cancer screening is compromised because

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of dysfunctional health care infrastructure and relatively expensive screening technologies in many regions [4].

Fortunately, cervical cancer can be effectively prevented by prophylactic vaccines. Gardasil quadrivalent HPV 6/11/16/18 vaccine (Merck, Whitehouse Station, NJ) and Cervarix bivalent HPV 16/18 vaccine (GSK, London, UK) have been approved and are commercially available in more than 100 countries [5,6]. Both of them protect against approximately 70% of cervical cancer [7]. Gardasil also targets at HPV 6 and HPV 11 which cause at least 80% of genital warts [8,9]. Because the China Food and Drug Administration requests evidence of safety and efficacy from clinical trials in Chinese population before licensure in mainland China, phase III clinical trials of both prophylactic vaccines are still ongoing in China. Because the two trials are at the final stage, HPV vaccines are expected to be commercially available for Chinese women in upcoming years. In addition, a newly developed HPV 16/18 vaccine by Xiamen Innovax Biotech (130 Xinyuan Road, Haicang District, Xiamen, China) is tested in a multicenter phase III clinical trial [10,11]. Hopefully, this local vaccine will reduce the costs and increase the availability of prophylactic HPV vaccines in mainland China.

At present, there are no national guidelines for HPV vaccination in China. The prophylactic HPV vaccines are developed for immunization before sexual debut to gain the largest health benefits for preventing HPV-related cervical lesions and even genital warts. The primary target population of existing HPV vaccines is young adolescents. Because most of the females aged more than 16 years in mainland China experience sexual debut [12], it is optimal to recommend vaccination started from an earlier age. According to the position paper released by World Health Organization in 2009, HPV immunization programs should initially prioritize high coverage in females primarily aged 9 to 10 through 13 years [13]. Parental acceptance is important for HPV vaccination among young adolescents because they cannot make decisions regarding vaccination at their own discretion. To understand perceptions and acceptance of HPV vaccination among parents of young adolescents, a multicenter, national cross-sectional survey was initiated in China [14]. Results showed that only 36.2% of parents accepted HPV vaccination for their children. Based on previous results, we conducted secondary analyses to further investigate the knowledge of HPV, HPV-related diseases and vaccines, sources of information, and factors associated with HPV-related knowledge among parents of young adolescents.

## Methods

### *Study design and subjects*

Multistage nonrandomized cluster sampling method was used in this study. The study was based on a survey in seven geographic regions including northern, northwestern, northeastern, central, southern, southwestern, and southeastern China between November 28, 2011 and May 9, 2012 [14]. In brief, a representative city was identified in each region, including Beijing, Xi'an, Dalian, Wuhan, Guangzhou, Chengdu, and Jinan. In each city, a convenient junior middle school was selected based on existing contacts. Parents of students in several classes of each school were surveyed during parents' meetings. The parents were convened in such meetings regularly by schools, and these occasions were thus chosen for our survey for reasons of convenience, organization, and quality assurance. The study was approved by the Institutional Review Board of the Cancer Institute of Chinese Academy of Medical Sciences (CICAMS). Informed consent was obtained from each parent before our survey.

### *Data collection and quality control*

Selected medical students were trained locally on how to administer the questionnaire on HPV vaccine-related knowledge and perceptions of HPV vaccination that was adapted from those used in different populations based on expert opinions [15,16]. It comprised questions for basic demographic information, knowledge of HPV, cervical cancer and/or genital warts, and HPV vaccines and perceptions of HPV vaccination. Study objectives and questionnaire matters were explained to parents before the survey. Informed consent was obtained from each individual parent before completing the questionnaire. Informed consent was obtained from each individual parent before they were given the questionnaire. Those who signed on the informed consent form were invited to complete the questionnaire. Our surveyors were open to questions regarding the questionnaire during the survey and queries of HPV vaccination-related knowledge after the survey. Survey data were double entered in a database developed by a CICAMS statistician using EpiData (EpiData Association, Odense, Denmark) in each region and transferred to a CICAMS data manager for audits before they were merged into the central database.

### *Statistical analysis*

SPSS 13.0 (SPSS Inc., Chicago, IL) was used to perform statistical analyses. Based on data from the previous survey, our study analyzed HPV-related knowledge and related factors among parents. Knowledge of HPV, cervical cancer and/or genital warts, and vaccines was presented by numbers and percentages. Logistic regression model was used to analyze the association between potential predictor variables and HPV-related knowledge scores. Odds ratios (ORs) with 95% confidence intervals (CIs) were presented based on Wald  $\chi^2$  statistics. Statistical significance was assessed by two-tailed tests with  $\alpha$  level of 0.05.

## Results

### *Demographic characteristics*

Demographic information of study participants was shown in Table 1. A total of 2895 parents completed the survey and provided information that was analyzable. These consisted of 1063 fathers (37.2%) and 1793 mothers (62.8%) with a mean age of 40.40 years (SD, 4.68). Among them, 98.1% parents were ethnic Han Chinese, 42.4% had received education beyond senior middle school, and 8.4% worked in the education or health care sector. Households of 25.7% participants had an annual income per capita more than 50,000 RMB, and 24.1% of the household had less than 10,000 RMB. Only 31.9% had received vaccination outside the National Expanded Program on Immunization (EPI) that provides at least 11 vaccines for free as a government-sponsored program.

### *Knowledge of HPV, HPV-related diseases, and HPV vaccine*

As shown in Table 2, of parents who responded to concerning questions, 78.5% had heard of cervical cancer and/or genital warts, only 25.1% had heard of HPV, and even fewer parents knew HPV infection can cause cervical cancer and/or genital warts (16.4%), or knew the HPV vaccine (15.6%). Parents (30.4%) understood that the most appropriate stage for HPV vaccination was before sex debut and 68.2% thought that routine gynecologic or andrological examination was needed after HPV vaccination. Overall, 38.3% responded with "yes" to more than three of the six questions, among whom only 4.5% correctly answered all six questions.

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