

# Survey of cervical cancer and precancerous lesion prevention knowledge within community health service centers in Shanghai, China

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## Abstract

To study deficiencies in knowledge of the general public health-care professionals in community health service centers regarding the prevention of cervical intraepithelial neoplasia and cervical cancer. In addition, this study examined the key content of training required for primary health-care personnel to prevent cervical precancerous lesion and cervical cancer.

A questionnaire was distributed among 172 medical staff personnel (the ratio of general practitioners and nurses was 1:1 in five community health service centers in Shanghai, China). This questionnaire assessed four knowledge areas of cervical cancer prevention using 10 single-choice questions.

Out the 172 questionnaires distributed, 105 (61.05%) were completed correctly. No statistically significant difference in the percentage of complete correct answers among the five community health service centers was seen ( $P = .06$ ). Additionally, there was no significant difference in the percentage of correct answers among the three age groups surveyed: age  $\leq 35$  years, 36–45 years, and  $\geq 46$  years ( $P = .12$ ). We did find a statistically significant difference in the percentage of correct answers between general practitioners and nurses ( $P = .01$ ) and between staff with master's degrees, bachelor's degrees, and associate's degrees ( $P = .03$ ).

General practitioners and nurses in community health service centers in Shanghai require additional education on the secondary prevention of cervical intraepithelial neoplasia and cervical cancer. The health knowledge related to human papillomavirus also needs to improve. Nurses and medical staff with lower degrees have insufficient awareness of the prevention of precancerous lesions of the cervix and cervical cancer; these two groups should be prioritized for additional training.

**Abbreviations:** ACOG = the American College of Obstetricians and Gynecologists, HPV = human papillomavirus, HR-HPV = high-risk human papillomavirus, WHO = World Health Organization.

**Keywords:** Delivery of health care, early detection of cancer, papillomavirus infections, precancerous conditions, uterine cervical neoplasms

## 1. Introduction

Cervical cancer is a common malignancy in women that tends to develop in younger reproductive age (15–44 years).<sup>[1]</sup> Accord-

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ing to the World Health Organization (WHO), 80% of cervical cancer occurs in developing countries, which have only 5% of all global medical resources.<sup>[2]</sup> Progression from abnormal cervical cytology to invasive cervical cancer generally takes 15 to 20 years.<sup>[3]</sup> Although this stage involves chronic development of cervical precancerous lesions, it belongs to the controllable stage of chronic diseases; thus, it is a key period in which to prevent the occurrence of invasive cervical carcinoma. With the continuous improvement and development of cervical cancer screening strategies, detection rates for cervical precancerous lesions and early cervical cancer have increased significantly. Experiences in developed countries have shown that widely standardized national cervical cancer screening programs can significantly reduce the incidence and mortality from cervical cancer.<sup>[4]</sup>

Persistent infection with high-risk human papillomavirus (HR-HPV) is an important cause of cervical cancer.<sup>[5,6]</sup> The distribution rate of HR-HPV infection increases from the normal cervix to inflammation to cervical intraepithelial neoplasia (CIN) to cervical cancer.<sup>[7,8]</sup> Therefore, the prevention of HR-HPV infection can effectively prevent cervical cancer.<sup>[9]</sup> Since the first HPV vaccine was listed in 2006, there are now bivalent vaccines, tetravalent vaccines, and nonavalent vaccine.<sup>[10]</sup> The three kinds of vaccines have been introduced in mainland China. Community health service centers, which are responsible for public health, will play a crucial role in the primary and secondary prevention of cervical cancer.

A large number of female residents, female migrant workers, and obstetric and gynecological patients have been included in cervical cancer prevention knowledge studies.<sup>[11–13]</sup> However, there are few studies looking at the knowledge levels of prevention of cervical cancer among public health-care professionals in community health service centers in China. This study was conducted to assess the degree of knowledge on the prevention of cervical cancer among the public health-care professionals in community health service centers in China. Other aims included identifying deficiencies in knowledge of how to prevent HPV infection, improving early detection of cervical precancerous lesions, and forming a theoretical basis for the comprehensive management of cervical precancerous lesions, as well as cervical cancer screening and prevention with the cooperation of community health service centers.

## 2. Methods

### 2.1. Study design and participants

This study used a cross-sectional method and was conducted from April to June 2017 in five health service centers in the following subdistricts: Xujiahui, Xietu, Fenglin, Tianping, and Hunan. The five centers were located in Shanghai urban areas. These five community health service centers employed 494 general practitioners and nurses: 120 members of staff in Xujiahui Center, 133 in Xietu Center, 113 in Fenglin Center, 97 in Tianping Center, and 31 in Hunan Center. A cross-sectional study method was adopted in this survey. Questionnaires were distributed to general practitioners and nurses on duty on the survey day, the ratio of general practitioners to nurses was 1:1; questionnaires were collected the same day. In total, 172 completed questionnaires were obtained, accounting for 34.82% of the total number of general practitioners and nurses in all five community health service centers. Specifically, 40 questionnaires were collected from the Xujiahui center, 42 from the Xietu center, 40 from the Fenglin center, 28 from the Tianping center, and 22 from the Hunan center. The study was approved by the Medical Research Ethics Committee of The International Peace Maternity & Child Health Hospital of China welfare institute [Approval number (GKLW) 2015–28]. The response to the survey questionnaire was considered as informed consent from all individual participants included in the study.

The questionnaire was designed based on the guidelines for the screening and prevention of cervical cancer published by the American College of Obstetricians and Gynecologists (ACOG) in 2016<sup>[14]</sup> and following consultation with experts from the Cervical Disease Center of the International Peace Maternity and Child Health Hospital of the China Welfare Institute and the heads of the medical and educational departments of the five community health service centers. The questionnaire was aimed at public health-care professionals who provide health-care services to community residents and patients. Each questionnaire had 10 single-choice questions, and a single answer was to be chosen from among the 3 options. The questionnaire had 4 aims: (i) to assess basic knowledge, including which female-associated cancer has been found to be associated with the virus; (ii) to assess knowledge of primary prevention, inquiry regarding which viral infection mainly causes high-grade cervical precancerous lesions and cervical cancer, and for which cancer can vaccination provide primary prevention; (iii) to assess knowledge of

secondary prevention, including what the meaning of secondary prevention of cervical cancer is, what tests are included in a comprehensive cervical screening, what clinical situations need referral to a specialist hospital, and what diagnoses are associated with cervical precancerous lesions; and (iv) to assess knowledge of public health education, for which there was an inquiry into the types of HR-HPV infections that are most likely to lead to cervical cancer, which behaviors can effectively protect from HR-HPV transmission, and characteristics associated with HPV infection in men.

### 2.2. Statistical analysis

SPSS 13.0 (SPSS Inc., Chicago, IL) was used to perform all statistical analyses. This study analyzed the 10 single-choice questions and presented the findings as original tallied scores (numbers) and averages (percentages). The Chi-squared test was performed to compare the correct answer rates between the five community health service centers, the age category of the public health-care professionals, and the position and education of the general practitioners and nurses. A *P* value less than .05 was considered statistically significant.

## 3. Results

### 3.1. Baseline characteristics

One hundred and seventy-two participants completed the questionnaire. The average age of the respondents was  $36.76 \pm 7.27$  (25–60) years; the average age of the 86 general practitioners was  $38.13 \pm 7.09$  (28–60) years; and the average age of the 86 nurses was  $35.40 \pm 7.22$  (25–53) years. When divided into age categories, 85 participants (49.42%) were aged  $\leq 35$  years, 63 participants (36.63%) were aged 36–45 years, and 24 patients (13.95%) were aged  $\geq 46$  years. The highest educational degrees achieved by participants were 17 (9.90%) master's degrees, 127 (73.84%) bachelor's degrees, and 28 (16.28%) had associate's degrees.

### 3.2. Content analysis of the four aims of the questionnaire (Table 1)

Correct answer percentages for basic knowledge, primary prevention, secondary prevention, and public health education were 100%, 99.42%, 64.53%, and 87.79%, respectively. The question with the lowest number of correct answers was “What the meaning of secondary prevention of cervical cancer is?” It was answered incorrectly by 27.33% of the participants.

### 3.3. Analysis of factors affecting the accuracy of the answers (Table 2)

Of the 172 questionnaires obtained, 105 (61.05%) answered all questions correctly. There was no significant difference in the numbers of completely correct questionnaires between the five community health service centers ( $\chi^2 = 9.15$ ,  $P = .06$ ). There was also no significant difference in the percentage of correct answers among the 3 age groups,  $\leq 35$  years, 36–45 years, and  $\geq 46$  years ( $\chi^2 = 4.18$ ,  $P = .12$ ). There was, however, a statistically significant difference between the percentage of general practitioners and nurses who answered all questions correctly ( $\chi^2 = 7.07$ ,  $P = .01$ ). In addition, there was a significant difference between the percentage of complete correct answers

**Table 1**  
**Analysis of the four aspects of the questionnaire and the 10 single-choice questions.**

Aspect	Number of correct answers (correct rate %)	Number of incorrect answers (incorrect rate %)	10 single-choice questions	Number of correct answers	Number of incorrect answers
				(correct rate %)	(incorrect rate %)
Basic knowledge	172 (100.00)	0 (0.00)	Which female-associated cancer has been found to be associated with the virus?	172 (100.00)	0 (0.00)
Primary prevention	171 (99.42)	1 (0.58)	Which viral infection mainly causes high-grade cervical precancerous lesions and cervical cancer?	172 (100.00)	0 (0.00)
			Which cancer can be vaccinated for in primary prevention?	171 (99.42)	1 (0.58)
Secondary prevention	111 (64.53)	61 (35.47)	What the meaning of secondary prevention of cervical cancer is?	125 (72.67)	47 (27.33)
			What tests are included in a comprehensive cervical screening?	149 (86.63)	23 (13.37)
			What clinical situations need referral to a specialist hospital?	162 (94.19)	10 (5.81)
			Which diagnoses are associated with cervical precancerous lesions?	166 (96.51)	6 (3.49)
Public health education	151 (87.79)	21 (12.21)	Which types of high-risk human papillomavirus infections are most likely to lead to cervical cancer?	165 (95.93)	7 (4.07)
			What behavior can effectively protect from high-risk human papillomavirus transmission?	172 (100.00)	0 (0.00)
			What are the characteristics of human papillomavirus infection in men?	155 (90.12)	17 (9.88)

by participants with master’s, bachelor’s, and associate’s degrees ( $\chi^2 = 6.80, P = .03$ ).

**4. Discussion**

According to the 2013 report of cancer incidence and mortality in China,<sup>[1]</sup> cervical cancer (6.16%) was the sixth most common female malignant tumors and the eighth most common cause of mortality (4.17%). HPV bivalent vaccines, quadrivalent vaccines, and nona-vaccines were introduced to mainland China in 2016, 2017, and 2018, respectively. Community health service centers can provide free medical service consultation and also undertake basic public health services, such as the main sites where vaccinations are administered. In this study, we found that

the basic knowledge of cervical cancer and primary prevention among medical staff in community health service centers was nearly 100%. However, regarding the questions on public health education, the correct answer rate was only 87.79%, which meant that the public health-care workers’ education and cervical cancer-related knowledge of HPV were insufficient. Therefore, improvements need to be made in the distribution of HPV information between public health-care professionals. Much of the burden of vaccine education falls on primary care providers, but this is difficult for the sector to undertake alone. As clinicians who care for a large proportion of patients with HPV-related conditions, obstetrician-gynecologists and other women’s health care providers must share responsibility for the vaccination of eligible patients. Obstetrician-gynecologists can support efforts

**Table 2**  
**Analysis of factors affecting the accuracy of survey responses.**

Influencing factors	Questionnaire items		$\chi^2$	P
	Correct (n = 105)	Incorrect (n = 67)		
Community health service centers				
Fenglin	24 (60.00%)	16 (40.00%)	9.15	.06 (>.05)
Hunan	10 (45.46%)	12 (54.54%)		
Tianping	14 (50.00%)	14 (50.00%)		
Xietu	33 (78.57%)	9 (21.43%)		
Xu jiahui	24 (60.00%)	16 (40.00%)		
Age (years)				
≤35	54 (63.53%)	31 (36.47%)	4.18	.12 (>.05)
36–45	33 (52.38%)	30 (47.62%)		
≥46	18 (75.00%)	6 (25.00%)		
Position				
General practitioner	61 (70.93%)	25 (29.07%)	7.07	.01 (<.05)
Nurse	44 (51.16%)	42 (48.84%)		
Education degree				
Master	15 (88.24%)	2 (11.76%)	6.80	.03 (<.05)
Bachelor	76 (59.84%)	51 (40.16%)		
Associate	14 (50.00%)	14 (50.00%)		

to eradicate HPV-related disease in their patients and families via multiple avenues, including providing the HPV vaccine and being community advocates of vaccination.<sup>[15]</sup>

China formulated a comprehensive policy on the prevention and control of cervical cancer at the national level in 2004 and then introduced a free screening project for cervical cancer and breast cancer in 2009. This major national health project was named “two cancer screening” and provides free, voluntary screening for women aged 35 to 65 years. The community health service centers of all provinces and cities undertook “two cancer screening.” Therefore, the public health-care professionals in the community health service centers were simultaneously involved in secondary prevention of cervical cancer, namely, cervical cancer screening. During the screening process, medical personnel encounter women of all ages. Researchers reported that the barriers and facilitators to cervical cancer screening were related to age, education, socioeconomic status, marital status, sexual behavior, and sex of the health-care providers.<sup>[13]</sup> Women who were older, less educated, or from lower socioeconomic groups participated the least in cervical cancer screening.<sup>[13]</sup> Therefore, according to these results, we could amend the contents of community health service centers in residents’ health education courses in order to adapt to the different cultures and income levels of residents, thereby improving awareness of cervical cancer screening. In parallel, a brochure detailing cervical cancer prevention approaches could be issued as a supplement to facilitate follow-up information access and information sharing with family and friends.

Our study also found that there was no significant difference in the percentage of complete correct answers among the five community health service centers, nor among the three age groups (age  $\leq 35$  years, 36–45 years, and  $\geq 46$  years). However, there was a statistically significant difference in the percentage of complete correct answers between general practitioners and nurses and a significant difference in the percentage of complete correct responses among participants with different education degrees (master’s degree, bachelor’s degree, and associate’s degree), this may be related to those with higher degrees having more opportunities to interact with others and acquire medical knowledge. These findings suggested that training of nurses and the background knowledge of those with only an associate’s degree in prevention and understanding of cervical precancerous lesions and cervical cancer need to be improved and become more focused. The survey also showed that the rate of correct answers to the secondary prevention questions was only 64.53%; therefore, training should be targeted at the secondary prevention of cervical cancer. Secondary prevention involves screening, diagnosis, and referral of patients with cervical precancerous lesions and cervical cancer. Clinicians who are specialized in cervical research will be required to carry out systematic training of primary health care personnel. The general public health-care professionals need to be better educated about cervical cancer, opportunities for prevention and early detection, and warning signs; this in turn will help to destigmatize cervical cancer.<sup>[16]</sup>

Training content could include information on cervical cancer screening methods, how to interpret abnormal results, and how to refer patients to more specialist centers, so the public health-care professionals can identify abnormal results and provide accurate, timely referrals to the specialist hospitals. In addition, the relationship between HPV with and cervical precancerous lesions and cervical cancer, as well as the postoperative follow-up system, could be further explained. Patients with cervical precancerous lesions or cervical cancer who receive their

diagnosis and treatment from a specialist hospital could be returned to the community health service center for unified management, which would allow timely follow-up for patients. Cervical cancer is distinct among cancers in that it involves chronic infection with HR-HPV.<sup>[3]</sup> This period of time is the chronic development period of cervical lesions, in which the disease can be prevented and controlled. Referral of patients between community health centers and hospitals would be conducive to the formation of integrated management programs for cervical precancerous lesions and cervical cancer screening and prevention.

In conclusion, the general public health-care professionals at community health service centers in Shanghai, especially those with lower educational levels, need to improve knowledge of cervical cancer and precancerous lesions prevention. In addition, it is necessary to focus education on secondary prevention and HPV knowledge in cervical cancer screening. Comprehensive management of cervical precancerous lesions and cervical cancer screening and prevention needs the participation of residents, community health service centers, and specialist centers to achieve timely screening, an accurate diagnosis, and effective treatment to prevent the occurrence of cervical cancer. The survey focused on Shanghai’s urban areas, not including public health-care professionals in suburban areas. Based on these results, we will calculate a sufficient sample size and expand the survey to the suburbs of Shanghai to make the results more comprehensive in the future.

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