

RESEARCH COMMUNICATION

Prevalence of Cervical Human Papilloma Virus Infection Among Married Women in Vietnam, 2011

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Abstract

The burden of cervical cancer is increasing in Vietnam in the recent years, infection with high risk HPV being the cause. This study aimed to examine the prevalence of HPV and the distribution of HPV specific types among the general population in 5 big cities in Vietnam. Totals of 1500 women in round 1 and 3000 in round 2 were interviewed and underwent gynecological examination. HPV infection status, and HPV genotyping test were performed for all participants. Results indicated that the prevalence of HPV infection in 5 cities ranged from 6.1% to 10.2% with Can Tho having highest prevalence. The most common HPV types in all 5 cities were HPV 16, 18 and 58. Most of the positive cases were infected with high risk HPV, especially in Hanoi and Can Tho where more than 90% positive cases were high risk HPV. Furthermore, in Can Tho more than 60% of women were infected with multiple HPV types. The information from this study can be used to provide updated data for planning preventive activities for cervical cancer in the studied cities.

Keywords: Cervical cancer - human papilloma virus - Vietnam - geographical variation

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Introduction

Human papilloma virus (HPV) is associated with cervical cancer, high-risk types causing cervical, anal, and other genital cancers. Such types are detected in 99% of cervical cancers, and worldwide approximately 70% are due to HPV types 16 and 18 (Walboomers et al., 1999).

Cervical cancer is the second most common cancer among women worldwide (after breast cancer), accounting for 11.7% of the total cancer burden (Ferlay et al., 2000). In Vietnam, the incidence rate of cervical cancer is 17.3 per 100,000 women, accounting approximately for 6000 new cases and 2500 deaths per year (Pham, 2001). Acknowledging the increasing burden of cervical cancer, the National Cancer Control program in Vietnam had established the registry system for cervical cancer in five big cities (i.e., Hanoi, HCM cities, Thai Nguyen, Hue, Can Tho). Data from the registry system showed that the rate of cervical cancer in these cities was increasing significantly over time. (National registry system for cervical cancer in Vietnam 2007) In order to design effective interventions for preventing/controlling cervical cancer in these cities, we need to have information such as epidemiology of cervical cancer's risk factors such as HPV infection; however such information is not available from the registry system or other sources.

Thus, this study was conducted in the five cities (Hanoi, HCM, Thai Nguyen, Hue, Can Tho) in 2010 and 2011 to collect information on: (1) prevalence of HPV cervical infection; and (2) distribution of HPV specific type.

Materials and Methods

Study population and enrollment

The first round of the study was done in 2010 in two cities, Hanoi and HCM. The estimated sample size for each city was 850 women. Using formula for sample size for a proportion estimate with relative precision, sample size was calculated with the following parameters: anticipated prevalence of HPV as 10%, (Pham and et al 2002) the relative precision of 22%, estimated non-respondent rate of 10%. The second round of the study was done in 2011 in three cities, Hue, Can Tho and Thai Nguyen. The estimated sample size for each city was increased to include 1100 women to increase the precision of the estimated prevalence.

The selection criteria for this study were married women: (1) not pregnant (2) had not undergone a hysterectomy or conization and (3) not mental impaired. In each city, eligible women were randomly selected. These women were explained about the objectives of the study as well as obtained a written consent form for their participation in this study. The response rate in the first round was 89% (750 women participated in each city) and in the second round was 91% (1000 women participated in each city).

Procedure to collect/process information and specimen

Information and specimen collection was done through the following steps. First, a personal interview was done to collect information on socio-demographic variables,

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obstetric/gynecologic history, and sexual lifestyle. After interviewing, each participant was scheduled for a pelvic examination carried out by a gynaecologist. Samples of exfoliated cells from the ectocervix were collected with 2 wooden Ayre spatulas. Samples of exfoliated cells were sent to the laboratory of Vietnam National Institute of Dermatology for HPV test on the same day of the sample collections. The HPV genotyping protocol includes 4 steps. The first step is to receive and treat samples using cotton swab and storage solution. The second step is to extract DNA HPV using DNA extraction kit based on phenol/chloroform. The third step is to use the real-time PCR kit (Light Power iVA HPV PCR Kit) to detect HPV DNA using TaqMan probe. Step 4, genotype by reverse dot blot, was applied for all the HPV positive samples detected in step 3 using the LightPower iVAHPV Genotype RDB Kit. This kit allows the detection of 24 Human Papillomavirus genotype by reverse dot blot (i.e., Low-risk: 6, 11, 42, 43, 61, 70, 71, 81 and High-risk: 16, 18, 31, 33, 35, 39, 45, 51, 52, 53, 56, 58, 59, 66, 68, 82). Ethics Approval

The study protocol was submitted to the Hanoi school of Public Health IRB, registered with U.S. Dept. of Health and Human Services - IORG number 0003239, FWA number FWA00009326. The protocol was reviewed and cleared by this ethical committee (Ethical Approval Number 013/2010/YTCC-HD3)

Results

Characteristics

Table 1 presents the characteristics of study subjects. As there was no difference across cities in these rounds, the data were aggregated for all cities by round 1 and round 2. The majority of women participated in both round 1 and round 2 were living with their husband (89.5% and 91.6%). Round 1 was done in Hanoi and HCM cities, the two biggest cities in Vietnam. That can explained with the level of highest education attained among women in round 1 seems to be better off compared to that among women in round 2. The distribution of age group is comparable between the two rounds.

Prevalence of cervical HPV infection

Figure 1 presents the prevalence of cervical HPV infection for 5 studied cities with their 95% CI. In the first round, there were 108 HPV positive cases among total

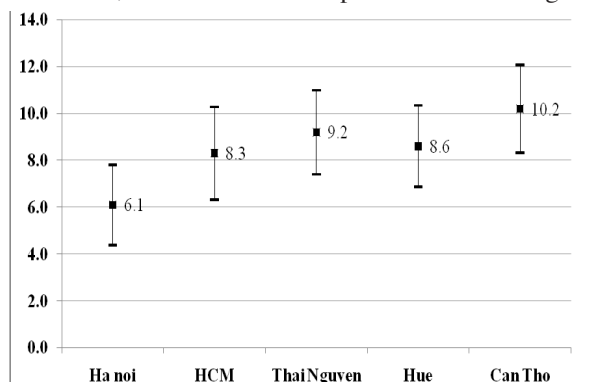


Figure 1. Prevalence of Cervical HPV Infection with 95% CI Across 5 Cities

Table 1. Characteristics of Study Sample in Round 1 and Round 2

Characteristics	Round 1	Round 2
Age group		
<30	222 (14.8%)	389 (13.0%)
30-39	514 (34.3%)	887 (29.5%)
40-49	554 (36.9%)	977 (32.5%)
≥50	210 (14.0%)	749 (25.0%)
Highest education attained		
Primary	98 (6.5)	584 (19.5%)
Secondary	463 (30.9%)	900 (30.1%)
High school	586 (39.1%)	771 (25.8%)
>High school	353 (23.5%)	735 (24.6%)
Occupation		
Government officers	294 (19.6%)	549 (18.3%)
Workers/handicraft	202 (13.5%)	232 (7.7%)
Small trade	348 (23.2%)	731 (24.3%)
Un-employed/House-wife/Retired	518 (34.5%)	1036 (34.5%)
Other	138 (9.2%)	455 (15.2%)
Marital status		
Live with husband	1342 (89.5%)	2745 (91.6%)
Separated/divorced	85 (5.7%)	91 (3.0%)
Widower	45 (3.0%)	107 (3.6%)

1500 women in Hanoi and HCM cities. The prevalence of cervical HPV infection in Hanoi was 6.1% (95% CI: 4.4%; 7.8%), lower than that in HCM city (8.3% with 95% CI: 6.3% to 10.3%). In the second round, in total 280 cases were detected positive to HPV infection among 3000 women in Thai Nguyen, Hue and Can Tho. The prevalence rate was highest among women in Can Tho (p=10.2%).

Infection with low risk/high risk HPV

Figure 2 presents the distribution of HPV high risk/low risk across 5 studied cities. There are three types of HPV infection: infected with only low risk HPV, with only high risk HPV or infected with both low risk and high risk HPV. Low-risk HPV generally does not cause the cell changes that can lead to cervical cancer while high-risk HPV can lead to cervical cancer. (Lorincz et al. 1992) The prevalence of high risk HPV infection (i.e., infected with only high risk HPV or infected with both) among married women was highest in Can Tho (9.3% of sample or 91.2% of positive cases) and lowest in Hanoi (5.6% of sample or 91.3% of positive cases).

Infection with singular or multiple HPV types

A woman may be infected with only one HPV type

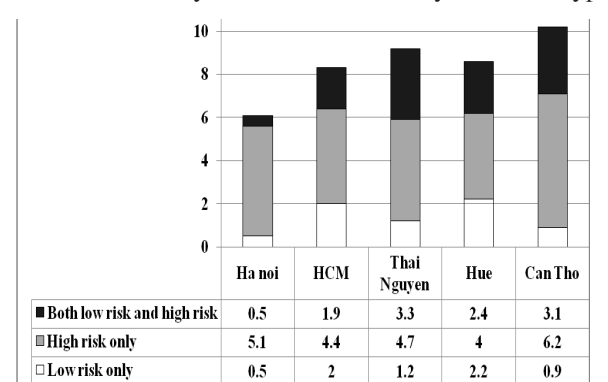
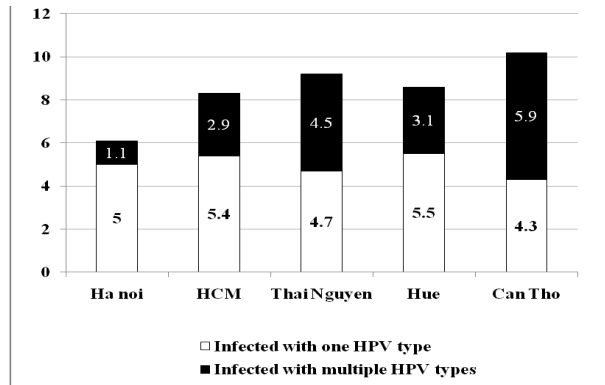


Figure 2. Distribution of HPV High Risk/low Risk Across 5 Cities

Table 2. The 5 Most Common HPV Types Among 5 Cities

Hanoi	HCM	Thai Nguyen	Hue	Can Tho
16 (1.7%)	18 (4.4%)	16 (3.8%)	18 (3.6%)	18 (4.9%)
18 (1.5%)	11 (2.3%)	18 (2.5%)	11 (3.2%)	16 (4.8%)
58 (1.2%)	16 (1.5%)	81 (2.2%)	16 (2.7%)	11 (2.5%)
81 (0.8%)	58 (0.9%)	11 (1.9%)	58 (1.1%)	58 (2.2%)
45 (0.5%)	70 (0.8%)	58 (1.7%)	81 (1.1%)	81 (1.7%)

**Figure 3. Distribution of Singular/Multiple HPV Infection Across 5 Cities**

(i.e., singular infection) or with more than one type (i.e., multiple infection). Figure 3 presents the distribution of singular/multiple HPV infection across five cities. In Hanoi, most HPV positive cases were infected with only one type of HPV. However, in Can Tho the prevalence of multiple HPV infection was higher than the prevalence of singular HPV infection (5.9% vs. 4.3%). In Thai Nguyen, cases infected with multiple HPV accounts for almost half of the total positive cases. In HCM and Hue, more than 60% of cases were infected with singular HPV type.

Most common HPV types

In this study, 24 types of HPV were detected. These were HPV type 6, 11, 16, 18, 31, 33, 35, 39, 42, 43, 45, 51, 52, 53, 56, 58, 59, 61, 62, 66, 68, 70, 71, and type 81. Table 2 show 5 most common HPV types in each studied city. In all cities, HPV type 16, 18 and 58 were among the most common types. HPV type 11, a low risk type, also presented among the top 5 most common types in 4 cities (i.e., excepted Hanoi)

Discussion

The prevalence of cervical HPV infection among married women in 5 studies cities ranged from 6.1% to 10.2%, comparable with the prevalence of HPV infection reported in other studies. (Pham and et al 2002; Dunne et al. 2007)The prevalence of HPV infection was highest in Can Tho, this figure was also consistent with the fact that among 5 cities, Can Tho had highest rate of cervical cancer.(National registry system for cervical cancer in Vietnam 2007) Most positive cases in this study were infected with high risk types, which can lead to cervical cancer. These findings highlight the importance of designing intervention model to control HPV infection and cervical cancer for women in the 5 studied cities.

A broad spectrum of 24 HPV types was reported in this study with the most popular types of HPV 16 and

18; this finding was similar with previous studies in Vietnam and other countries.(Giuliano and Papenfuss, 2001; Pham et al., 2002; Dunne et al., 2007) . Currently, some health organizations are considering two types of HPV vaccines licensed by the FDA (i.e., Cervarix made by GlaxoSmithKline and Gardasil made by Merck).(Food and Drug Administration (FDA)) Cervarix protects against only HPV types 16 and 18 while the vaccine Gardasil also protects against HPV types 6 and 11. However, none of the currently available vaccines can protect against the HPV type 58 (i.e., high risk) while HPV type 58 was reported to be one of the most common types found in all 5 cities. Previous studies also reported that HPV58 was among the most common types found in cervical cancer specimens in China, Thailand, and the Philippines (Clifford et al., 2003).

One may question that due to limited financial resources in round 1, the sample size in Hanoi and HCM cities was not as big as sample size in other cities and this may affect the precision of the estimation. However, sample size in round 1 was already calculated to ensure the minimum size for estimating a proportion. All the estimation yielded from this study should provide a representative indicator of the 5 studied cities because we had followed a very strict protocol to avoid biases such as women were randomly chosen, all clinical examination and specimen collections were done by qualified gynecologists, and all the samples were examined by a national qualified laboratory. The detection of HPV positive using real time PCR method and the genotyping of HPV type using reverse dot blot method in this study also provided more precise results compared to the Hybrid Capture Tube Method applied in previous studies (Giuliano and Papenfuss, 2001). In conclusion, an increasing trend of HPV infection was observed in this study. As HPV infection has high correlation with cervical cancer, attention/preparation should be taken for cervical cancer screening and treatment for Hanoi population.

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