

Cervical Cancer Risk Factor: HPV Infection Among Indonesian Urban Women

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ABSTRACT

Cervical cancer is the fourth rank of women cancer in the world. The major cause of that cancer is Human Papilloma Virus, with the globally prevalence around 11.7% in 2010. In Indonesia, there is limited data of HPV infection. The aim of the study was to provide the national data of HPV infection among Indonesian urban women. The study was conducted in 2016-2017 in 34 provinces and 76 districts. Samples were cervical swabs collected from women who met inclusion criteria. Cervical swabs were screened for HPV infection using the hybrid capture method, then data were analyzed as descriptive. A total of 35,408 cervical swab specimens from 34 provinces in Indonesia were tested. The prevalence of HPV infection among urban women was 5.2%, mostly (85%) as high-risk HPV group. The highest prevalence of HPV infection was discovered among women, either aged 35-44 years old (5.9%), had educational background of college (5.7%), working as an employee (6.8%) or already divorced (10.4%). The discovery of HPV infection among Indonesian urban women which commonly from the high risk group is potential for cervical cancer. Therefore, the preventive dealings such as early detection and HPV vaccination are required to control the HPV infection in Indonesia.

Keywords: HPV, infection, Indonesia

1. INTRODUCTION

Cervical cancer is the fourth most common cancer among women worldwide. The major cause of cervical cancer is the Human Papilloma Virus (HPV) [1,2]. Several studies showed that the prevalence of HPV infection varies considerably in some countries. However, globally the prevalence of HPV infection was estimated at 11.7% in 2010 [3]. In Indonesia, data of cervical cancer and the prevalence of HPV infection is very limited. Estimated 95.9 million for women aged ≥ 15 years old have cervical cancer risk with an incident 17 per 100.000 inhabitants per year [4]. Study in the hospital showed that among 10 cervical cancer patients with IIB-IIIIB stadium nearly 91.7% were HPV positive [5], while in the community of women aged 15-70 years old in three cities of Jakarta, Tasikmalaya, dan Bali, the HPV prevalence exposed much lower of 11.4% [6]. Indonesia has a considerable population and nearly a half of the population are women [7], who have a risk of being infected HPV. The aim of the study was to provide the national data of HPV infection among Indonesian urban women.

2. METHOD

The design of the study was a laboratory-based cross-sectional, subsample of non-communicable disease research of breast tumors and pre-cervical cancer lesion was conducted in 2016. Ethical approval was obtained from the ethic committee of National Institute of Health Research and Development (NIHRD), no LB 02.01/5.2/KE/154/2016.

A purposive sampling method was designed by Center Bureau of Statistic (BPS) from 34 provinces and 76 districts in Indonesia, which represented the national data. All respondents were selected based on inclusive criteria: women aged 25-64 years old, had marital or sexual intercourse history, living in urban area and willing to give informed consent. Those with serious illness, trouble in communicating, and pregnancy were excluded from this study. The selection of urban areas was regarding the feasibility of specimen collection and also transportation. Cervical swab specimens from those respondents were gathered at selected primary health centers, then transferred in special media to the NIHRD laboratory, Jakarta. Cervical swab specimen was taken by trained doctors or midwives and was done in a local community health center

(Puskesmas), which fulfilled the required facility. Hybrid capture (®Qiagen) (8) method based on DNA hybridization principle was performed to screen HPV positive and differentiate the high and low risk HPV, according to the kit manual. This method is based on the principle of viral DNA denaturation and the complementary chain of DNA and probe RNA hybridization, resulting in a form of complex DNA-RNA hybrid. The quantitative result was interpreted qualitatively using cut-off points determined by the standard, the positive control (marked by the formation of HPV DNA-RNA hybrid complex), and also the negative one. The result then was combined with the health variables obtained from the questionnaire. The data were analyzed descriptively using SPSS version 15, weighed and represented as nationwide prevalence.

3. RESULTS AND DISCUSSION

A total of 35,408 specimens were collected from 34 provinces in Indonesia. Figure 1 shows the specimen distribution. The number of the specimen from Java Island (West, Central and East Java Provinces) was the highest. Meanwhile, the least specimen number was from West Sulawesi, West Papua, and Riau Island. The national HPV prevalence among Indonesian urban women was 5.2%, mostly caused by high risk group (3.5%), and then followed by mix group of high and low risk HPV (0.9%), and the last by low risk group (0.8%), as described on Table 1.

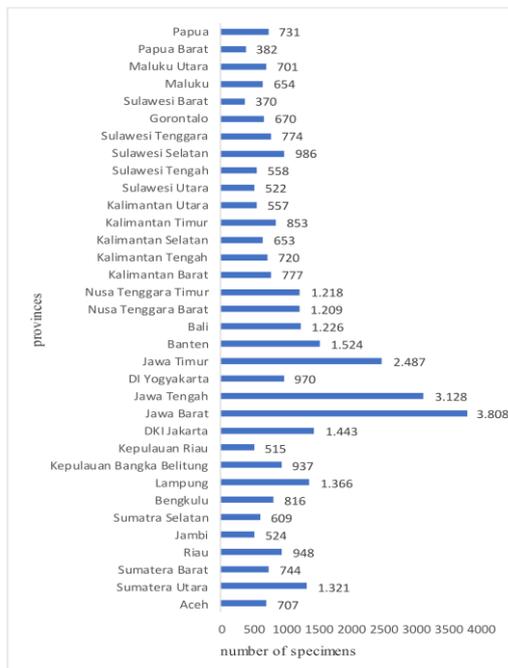


Figure 1. Specimen Distribution by provinces in Indonesia

Table 1. The percentage of HPV infection among Indonesian urban women based on the risk groups

| HPV Risk Groups | % |
|-------------------------|------|
| HPV Positive | 5.2 |
| - High Risk | 3.5 |
| - Low Risk | 0.8 |
| - Mix high and low risk | 0.9 |
| HPV negative | 94.8 |

Table 2 shows the HPV prevalence by socio-demographic variables. According to age groups, most of the respondents and also the HPV prevalence were woman at 35-44 years old. Based on education, occupation and marital status, the peak proportion of HPV were from university or diploma, non-working women or a housewife, an employee and divorced women respectively. Moreover, the quite similar percentage of HPV infection was discovered among all household poverty index groups.

Table 2. Prevalence of HPV Infection among Indonesian Urban Women by Socio-demographic Characteristics.

| Characteristic | n weighted | HPV Positive (%) | 95% CI | HPV Negative | 95% CI |
|-----------------------|------------|------------------|---------|--------------|----------|
| Age Group (Years old) | | | | | |
| 25-34 | 10,916 | 5.7 | 5.0 6.6 | 94.3 | 93. 95.0 |
| 35-44 | 11,878 | 5.9 | 5.4 6.5 | 94.1 | 93. 94.6 |
| 45-54 | 8,200 | 4.5 | 4.0 5.1 | 95.5 | 94. 96.0 |
| 55-64 | 4,414 | 3.5 | 2.8 4.4 | 96.5 | 95. 97.2 |
| Education | | | | | |
| Uneducated | 889 | 3.4 | 2.2 5.3 | 96.6 | 94. 97.8 |
| Not finish elementary | 2,515 | 5.6 | 4.4 7.1 | 94.4 | 92. 95.6 |
| Elementary School | 8,514 | 4.6 | 4.0 5.2 | 95.4 | 94. 96.0 |
| Junior high school | 7,636 | 5.4 | 4.7 6.3 | 94.6 | 93. 95.3 |
| Senior High School | 12,273 | 5.5 | 4.9 6.2 | 94.5 | 93. 95.1 |
| University/diploma | 3,583 | 5.7 | 4.6 7.0 | 94.3 | 93. 95.4 |
| Occupation | | | | | |
| Non-working/housewife | 22,685 | 5.0 | 4.6 5.5 | 95.0 | 94. 95.4 |
| Employee | 4,195 | 6.8 | 5.7 8.1 | 93.2 | 91. 94.3 |
| Entrepreneur | 4,174 | 4.7 | 3.8 5.7 | 95.3 | 94. 96.2 |
| Peasant/Fisher/Labore | 3,129 | 4.9 | 3.9 6.0 | 95.1 | 94. 96.1 |
| Others | 1,225 | 6.5 | 4.7 8.7 | 93.5 | 91. 95.3 |
| Marital Status | | | | | |
| Not married | 64 | 7.8 | 2.5 23. | 92.2 | 76. 97.5 |
| Married | 32,514 | 5.1 | 4.7 5.4 | 94.9 | 94. 95.3 |
| Divorced* | 929 | 10.3 | 7.8 13. | 89.7 | 86. 92.2 |
| Widow * | 1,901 | 5.7 | 4.5 7.5 | 94.3 | 92. 95.5 |
| Household poverty | | | | | |
| Low | 6,639 | 5.3 | 4.5 6.0 | 94.7 | 94. 95.5 |
| Lower middle | 9,285 | 5.2 | 4.5 5.9 | 94.8 | 94. 95.5 |
| Middle | 5,442 | 5.3 | 4.5 6.2 | 94.7 | 93. 95.5 |
| Upper middle | 7,227 | 5.3 | 4.6 6.2 | 94.7 | 93. 95.4 |
| High | 6,815 | 5.2 | 4.6 6.1 | 94.8 | 93. 95.4 |
| Indonesia | 35,408 | 5.2 | 4.9 5.6 | 94.8 | 94. 95.1 |

*Divorced refers to women separated from her spouse who was still alive at the time of marriage dissolution, widow denotes to women who lost her spouse by dead

The result of this HPV screening was descriptive, thus not analyzing further the causal relationship with the characteristic determinants. The HPV prevalence is diverse among nation and regions. Our results report that there were 5.2% HPV cases in Indonesia, about half the percentage of worldwide HPV cases in 2010 (11.7%), and less than those reported in Sub-Saharan Africa, East Europe, and Latin America. However, the dominance of high-risk HPV group might rise an attention for causing cervical cancer later. In Asia, a meta-analysis from 79 HPV studies that used PCR as its diagnostic method revealed that 14.4% of HPV infection was found in women with normal histology,(9) almost similar to the percentage of the same cases in

Thailand among rural women (15.1%). (10) In addition, this number was nearly threefold more than that among Indonesian women living in urban areas. According to the age group, a meta-analysis from 194 HPV studies of women with normal cytology which published from year 1995 to 2009 showed that the highest prevalence of HPV infection was found in women aged <25 years, then it declined in the late 20s and 30s and later increased drastically after the age of 45 years in America and Africa. Meanwhile, in Yunnan South China, the prevalence of HPV was the highest at age <29 years in women living in urban areas and age >50 years in women living in rural areas. (11) This finding is quite different compared to our result. Although both studies involving women living in urban areas, the highest HPV prevalence in our investigation is found in women aged 35-44 years old. The possible conjecture for this difference is geographical location where the sample was taken and the ethnicity of the respondents that may affect the HPV case proportion. (12-14).

The level of education and smoking behavior (11) was also believed to influence the prevalence of HPV infection in both urban and rural areas of Yunnan, South China. In Indonesia, except for the population that was unable to pursue education, the prevalence of HPV infection in individuals from various education levels starting from junior high school up to universities are almost the same, at around 5%. Several factors such as unsafe sexual intercourse, sexual intercourse at an earlier age, non-married relationship, increasing number of lifetime sexual partners and the presence of HIV infection were closely related to HPV infection, especially the high-risk HPV in Nigeria and also Ethiopia (15,16), with the exception for age factor, in Ethiopia (16). Meanwhile, another study in Indonesia displayed that HPV infection had strongly associated with the number of marriages. (7) Socioeconomic factors also seemingly influence the HPV infection. Women with low income were almost twofold proportion of HPV infection than the high ones in America, (14) and nearly three times higher than the normal condition in Brasilia. (13) While in Indonesia, this prevalence was almost even across all socioeconomic levels.

4. CONCLUSION

The prevalence of HPV infection in Indonesian urban women from the study was 5.2%, mostly due to high-risk HPV group which potentially generate cervical cancer. Therefore, HPV screening as early detection and also vaccination are required to control HPV infection rates and prevent cervical cancer. It is also necessary to perform the HPV genotype examination with regard to the HPV vaccination event gradually carried out at the present moment in Indonesia.

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