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Prevalence and risk factors for human papillomavirus infection among Chinese ethnic women in southern of Yunnan, China



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ABSTRACT

Background: Dai is a major Chinese ethnic minority group residing in rural areas of the southern part of Yunnan. However, no data exist on the Human Papillomavirus (HPV) prevalence and genotype distribution among Dai women.

Method: A total of 793 participants (Dai = 324, Han = 251, other ethnic = 218) were included in this study. PCR was performed to detect the HPV-positive samples, and genotyping was performed with an HPV Geno-Array.

Result: The overall HPV prevalence was very low among Dai women compared to the others. The prevalence of high-risk-HPV infections was significantly higher ($p = 0.001$) among other ethnic women (22.0%) than that among Han (13.1%) and Dai women (7.1%). The overall HPV, high-risk-HPV, single and multiple infection prevalence among rural women were 12.9%, 12.1%, 12.3%, and 0.5%, respectively. HPV-16 (5.5%) was shown to be the most prevalent genotype, followed by HPV-52 (2.6%) and HPV-58 (2.4%). Urban women had relatively higher rates of overall HPV (16.0%), high-risk-HPV (14.1%), single genotype (11.9%), and multiple genotype (4.1%) infections. In urban women, HPV-52 (3.6%) was the most prevalent genotype, followed by HPV-39 (2.7%) and HPV-16 (1.2%). In the urban area, HPV prevalence was highest in women aged <29 years, but declined with increasing age. However, in rural women, the highest HPV prevalence was observed among women at older age (>50 years). Education and smoking habit were significantly associated with HPV infection among both rural and urban area women ($p < 0.001$).

Conclusion: The prevalence and genotype distribution of HPV varied among ethnic women in urban and rural area of Yunnan Province.

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Introduction

Human Papillomavirus (HPV) infection is an established cause of cervical cancer, which is a leading cause of death in women of developing regions of the world.¹ The People's Republic of China is the homeland of approximately 1.3 billion inhabitants and is the most densely populated country worldwide. In China, there have been 78,400 new cases of cervical cancer reported in 2010,² causing 20,000 deaths.³

Epidemiologically, the prevalence and genotype distribution of HPV substantially vary with respect to age, ethnicity, developmental level, and health facility.⁴ Worldwide, the prevalence of HPV is approximately 11–12%, with significant regional variation. The highest HPV prevalence has been reported in Africa (24%), followed by Latin America (16%), and Eastern Europe (21%).⁵ Significant regional variations in HPV genotype distribution have also been reported. In general, HPV-16 is more frequent in all continents worldwide, whereas the distribution of other genotypes varies from region to region. HPV-18 is the second leading genotype in Europe and South America, whereas HPV-52 and HPV-58 are more dominant in Asia.⁶

China is the second leading world economy. The National Central for Cancer Registry, which was established in the 1960s, was expanded to cover 31 provinces in 2009; however, it only covers the urban population. Thus, there is a lack of data on disease burden in ethnic populations who reside in mostly remote areas, and the existing cancer-related figures do not represent the whole population.⁷ Yunnan is a hard, hilly area, with 26 Chinese government state-certified ethnic groups scattered among various concentrated community areas that have completely different norms and traditions. Southern Yunnan bordered with South-east Asian countries and likewise many ethnic groups live on both sides of the border. Most groups such Dai, Hani etc. are certified ethnic groups in China and South-east Asian countries. However, the norms and costumes of these groups vary. As such, the Dai ethnic group, with a population of about 1.2 million, mainly lives in rural areas of the southern part of Yunnan Province particularly in Xishuangbanna prefecture.⁸ Tibetans are typically settled in highland and mountainous areas, the Naxi group lives in low, hilly areas. The Hani people mainly work in agricultural farming, and live in remote mountainous areas. The Han group represents the ethnic majority, comprising 92% of the total population of China, and they are equally distributed throughout China. They are well educated, mostly belonging to the ruling class, and reside in urban areas. Mass immunization with HPV vaccines has the potential to minimize cervical cancer incidence in women, but the available HPV vaccine only controls the type of HPV for which it is formulated. Furthermore, the vaccine undergoing trials has been formulated based on data recoded from developed areas. Due to the variation in prevalence and genotype distribution of HPV worldwide, and particularly in China, investigating the prevalence and genotype distribution of HPV among various populations of Yunnan Province would be very useful for designing a strategy for HPV control. According to our best knowledge, there are no reports on the prevalence and

genotype distribution of HPV among Dai women in comparison with other ethnicity. Therefore, this study was designed to determine the prevalence rate of HPV and its genotype distribution among women of Dai and other ethnicity in southern of Yunnan Province, China and to identify factors associated with HPV infection in rural and urban areas of Yunnan Province.

Materials and methods

Study population and design

A total of 793 (Dai = 324, Han = 251, other ethnic = 218; 381 rural and 412 urban) women were recruited from four different towns and villages of the southern of Yunnan Province, in 2014. To be included in the study the woman should: (1) be mentally and physically normal; (2) be aged 18 years or more; (3) be a permanent resident of local area; (4) not be virgin; (5) not be presently pregnant; (6) have not undergone a total uterine or cervical resection; and (7) be willing to undergo HPV testing and provide consent to participate in the present study. Due to ethnic custom, community meetings were organized in which local community leaders were requested to talk about the importance of this study. The interested women were requested to visit the local community medical (hospital) center, and the object of study was again explained individually.

Questionnaire and descriptions

A standardized questionnaire was especially developed for this study containing the following items:

- **Demographic data:** area (rural or urban), ethnic background, age, education;
- **Sexual behavior:** age at first intercourse, married (polyandry or not) or unmarried, number of lifetime sexual partners, condom use;
- **Medical and reproductive history:** participation in cervical cancer screening, history of sexually transmitted infections, pregnancies, number of babies;
- **Smoking habits:** active or past smoker, regular cigarettes or traditional Chinese tobacco products.

All participants were interviewed by a trained interviewer in the local dialect of Chinese in a separate room using the standardized. After the interview, a qualified gynecologist did the pelvic examination and collected two cervical samples with a cyto-brush (HybriBio) for HPV genotyping and cytological analysis.

DNA extraction and histopathological analysis

The DNA extraction process was completed through the DNA Extraction Kit (Qiagen, Valencia, CA, USA) by following the recommendation of manufacturer.⁹ The cervical intraepithelial neoplasia grading and cervical cancer was diagnosed according to the World Health Organization classification system (CIN I–III).¹⁰

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