

Frequency of Human Papillomavirus in Patients Attending Paropakar Maternity and Women's Hospital, Nepal

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Abstract

Introduction: Cervical cancer remains a major cause of morbidity and mortality in Nepal. Human Papillomavirus (HPV) infection is the primary etiological factor. This study aimed to determine the frequency of HPV infection among women attending a tertiary care gynecological outpatient department in Kathmandu.

Methods: A cross-sectional study was conducted at Paropakar Maternity and Women's Hospital over three months. A total of 185 married or sexually active women aged 30–60 years were enrolled. Cervical samples were collected and tested for HPV DNA, including high-risk genotypes HPV-16 and HPV-18. Sociodemographic and clinical data were collected. Data analysis was performed using SPSS v26, applying chi-square and ANOVA tests, with $p < 0.05$ considered significant.

Results: Of 185 women, 172 (93.0%) were HPV negative. Thirteen (7.0%) tested positive: HPV-16 in 7 (3.8%), HPV-18 in 3 (1.6%), and other types in 3 (1.6%). HPV positivity was more frequent in women aged 50–59 years. We found that post-menopausal women were significantly more likely to have HPV infection than pre-menopausal women. No significant associations were found with parity, smoking, or age at marriage.

Conclusions: HPV was detected in 7%, with HPV-16 being the most common genotype. These findings underscore the importance of strengthening screening and vaccination programs in Nepal.

Keywords: Cervical cancer, Human papillomavirus, Screening.

Introduction

Cervical cancer is the second most common cancer in women.¹ Almost all cases are related to persistent infection with high-risk human papillomavirus (HPV).² These are classified into high, intermediate, and low-risk groups depending on their oncogenic potential.^{3,4} HPV-16 and HPV-18 cause about 70% of cervical cancers.^{4,5} Among different screening methods, HPV DNA testing is a primary screening method.⁶⁻¹⁰ HPV is also the most common sexually transmitted infection globally.^{11,12} In Nepal, cervical cancer is the most common cancer among women.^{13,14} The reported prevalence of HPV infection in Nepalese studies ranges from 8.6% to 19.7%, with HPV-16 being the most frequent.¹⁵⁻¹⁸ However, limited information exists on the factors associated with it, such as menopausal status, age at marriage, parity, and smoking. This study was conducted to determine the frequency of HPV infection and its associated factors in women attending the gynecology outpatient department of a tertiary care hospital in Kathmandu.

Methods

This was a cross-sectional study conducted among 185 married or sexually active women aged 30–60 years attending the gynecology outpatient department (OPD). The study was carried out at Paropakar Maternity and Women's Hospital (PMWH), Kathmandu, Nepal. The study was conducted over a three-month period (22 May 2025 to 21 August 2025). Ethical approval for this study was obtained from the Institutional Review Board of the National Academy of Medical Sciences and the Institutional Review Committee of PMWH (reference number: 1547/2081/82). Written informed consent was obtained from all participants prior to enrollment. Each participant was clearly informed about the purpose of the study, the procedures involved, the potential risks and benefits, and their right to withdraw at any time without affecting their ongoing care. Confidentiality of all collected information was strictly maintained.

Inclusion criteria for this study comprised women who were married or sexually active, aged between 30 and 60 years, attending the obstetrics and gynecology outpatient department of PMWH during the study period. Women meeting these requirements were considered eligible for participation and were invited to enroll after a thorough explanation of the study objectives and procedures. Exclusion criteria included women who had previously undergone a total hysterectomy, and women who presented with cervical lesions or masses that bled on contact during clinical examination were excluded. In addition, women who were either mentally or physically unable to undergo a pelvic examination were also excluded. These criteria were applied consistently to ensure the safety of participants, the quality of collected samples, and the reliability of study findings.

A total of 185 eligible participants were enrolled using convenience sampling during the study period. Sample size was calculated using the following formula:

$$n = Z^2 p(1-p) / e^2$$

$$= (1.96)^2 \times (0.14) \times (0.86) / (0.05)^2$$

$$= 185 \text{ where, } n = \text{sample}$$

p = prevalence from previous study, 14.4% (In a study carried out

by Sunila et al in 2016 in Kavre district, Nepal the prevalence of HPV was 14.4%. 16 e = margin of error (5%).

Z = 1.96 at 95% CI.

Cervical samples were collected by trained gynecologists and processed in the department of Pathology. DNA extraction and polymerase chain reaction (PCR) were performed to detect HPV-16, HPV-18, and other high-risk types. Data were collected and entered using SPSS version 26 software. For categorical variables, descriptive statistics, including frequency and percentage, were presented. Mean, and standard deviation were used to represent numerical data. One-way ANOVA test was applied to compare between more than two independent groups. Chi-Square Exact test was applied for inferential analysis. A p-value of less than 0.05 was considered significant.

Results

A total of 185 women participated in the study. The mean age was 41.1 ± 8.5 years. HPV infection was detected in 13 (7.0%) participants: HPV-16 in 7 (3.8%), HPV-18 in 3 (1.6%), and other HPV types in 3 (1.6%). The majority were HPV-negative (Table 1).

Table 1: Status of HPV detection among study patients

HPV Detection	Frequency (%)
Not Detected	172 (93.0%)
HPV 16	7 (3.8%)
HPV 18	3 (1.6%)
HPV others	3 (1.6%)

HPV detection was most frequent among women aged 50–59 years (40%), though the difference across age groups was not statistically significant ($p = 0.103$). No significant associations were observed between HPV positivity and education ($p = 0.534$), age at marriage ($p = 0.697$), parity ($p = 0.837$), or smoking status ($p = 0.772$). (Table 2, Table 3) However, menopausal status was significantly associated with HPV infection ($p = 0.012$), with 40% of menopausal women testing positive compared to 9.9% of non-menopausal women (Figure 1).

Table 2: Association between HPV detection and socio-demographic indicators

Indicators	HPV not detected (N=172)	HPV16/18 (N=10)	HPV others (N=3)	Total (N=185)	P-value
Age (in years)					0.103*
Mean±SD	40.9±8.4	46.0±11.1	35.6±11.1	41.1±8.5	
30 to 39	77(44.8%)	3(30.0%)	2(66.7%)	82(44.3%)	
40 to 49	67(39.0%)	2(20.0%)	1(33.3%)	70(37.8%)	
50 to 59	22(12.8%)	4(40.0%)	0(0.0%)	26(14.1%)	
>59	6(3.5%)	1(10.0%)	0(0.0%)	7(3.8%)	
Education					0.534†
Illiterate	19(11.0%)	3(30.0%)	1(33.3%)	23(12.4%)	
Able to read and write	100(58.1%)	4(40.0%)	2(66.7%)	106(57.3%)	
Primary (1 to 5)	5(2.9%)	1(10.0%)	0(0.0%)	6(3.2%)	
Secondary (SEE and above)	21(12.2%)	1(10.0%)	0(0.0%)	22(11.9%)	

Higher Secondary and Above	27(15.7%)	1(10.0%)	0(0.0%)	28(15.1%)	
Age of Marriage (Years)					0.697*
Mean±SD	40.9±8.4	46.0±11.1	35.6±11.1	19.0±4.0	
10 to 15	24(14.0%)	0(0.0%)	1(33.3%)	25(13.5%)	
16 to 20	108(62.8%)	8(80.0%)	2(66.7%)	118(63.8%)	
21 to 25	28(16.3%)	2(20.0%)	0(0.0%)	30(16.2%)	
>25	12(7.0%)	0(0.0%)	0(0.0%)	12(6.5%)	
Parity					0.837†
Nulli-para	9(5.2%)	0(0.0%)	0(0.0%)	9(4.9%)	
Primi-para	26(15.1%)	2(20.0%)	0(0.0%)	28(15.1%)	
Multipara	137(79.7%)	8(80.0%)	3(100.0%)	148(80.0%)	
Status of Smoking					0.77 †
Non-Smoker	158(91.9%)	9(90.0%)	3(100.0%)	170(91.9%)	
Active Smoker	6(3.5%)	1(10.0%)	0(0.0%)	7(3.8%)	
Passive Smoker	8(4.7%)	0(0.0%)	0(0.0%)	8(4.3%)	
One-Way ANOVA*, Chi-Square test†					

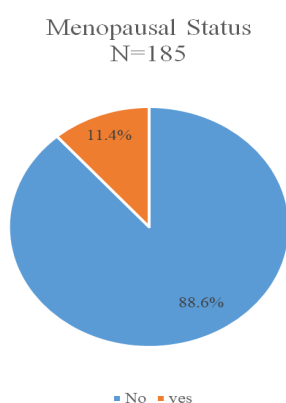


Figure1: Distribution of Menopausal status

Post-menopausal women had a higher frequency of HPV infection ($p = 0.012$). Most participants were multiparous (80%) and non-smokers (91.9%). Most of the women ($N=105$) had no clinical symptoms. Out of 80, who had symptoms, per vaginal discharge and abdominal pain were common (Figure 2), but no significant correlation with HPV infection was observed.

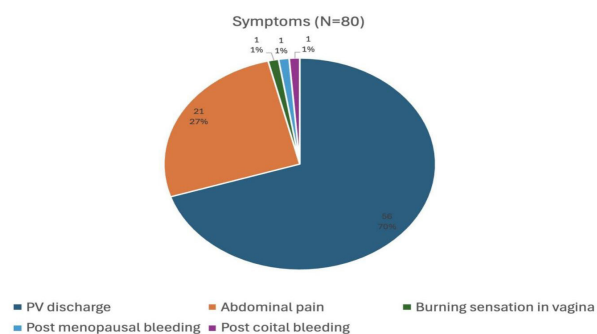


Figure 2: Distribution of symptoms of the study population

Discussion

In this study, the overall frequency of HPV infection among women attending the gynecology outpatient department of a tertiary hospital in Kathmandu was 7%. HPV-16 was the most common type, followed by HPV-18 and other high-risk types. The majority of participants were HPV-negative. Among the socio-demographic and reproductive factors examined, menopausal status showed a significant association with HPV infection, while age, education, age at marriage, parity, and smoking did not show significant relationships.

The HPV positivity rate found in our study is somewhat lower than that reported in several earlier studies from Nepal. Sherpa et al. documented an overall HPV frequency of 8.6% in an urban population, with high-risk types detected in 6.1% of women.¹⁵ Shrestha et al reported a prevalence of 14.4% in a large rural cohort, while Thapa et al. observed 19.7% in Jumla, a remote district of Nepal.^{16,17} Bhusal et al found that HPV-16 and HPV-18 were the most common high-risk types among cervical cancer patients.¹⁸ Similarly, Johnson et al. reported 9.6% high-risk HPV positivity in women from far western Nepal.¹⁹ In comparison to these studies, our HPV positivity rate of 7% appears lower, which may reflect differences in geographic setting (urban vs. rural), sample characteristics (convenience-based hospital sample vs. community cohorts), or methodological factors such as sampling strategy, sample size, HPV genotyping platform, and the number of genotypes individually tested. Urban hospital-based populations may have different risk profiles than rural community samples.

Internationally, our HPV positivity rate is also lower than that reported in several Asian and African studies. A meta-analysis from Asia estimated a prevalence of 14.4% among women with normal cytology.²⁰ In India, prevalence has been reported as 37.3% in Bihar and 36.8% in West Bengal, with HPV-16 and HPV-18 being the most common types.^{21,22} A recent Ugandan

study reported 16.7% prevalence among reproductive-age women, with multiple high-risk genotypes.²³ Differences in prevalence may be due to variation in sexual behavior, screening coverage, sample size, laboratory techniques, and underlying population risk factors.

An important finding in our study was the significant association between menopausal status and HPV infection. About 40% of menopausal women tested positive, compared to less than 10% of non-menopausal women. Previous studies on this association have shown mixed results. Some studies suggest that older or menopausal women may have a higher risk due to reactivation of latent HPV infection with immune senescence, hormonal changes, and reduced cervical epithelial regeneration.^{24,25} Others argue that transient infections are more common in younger women and tend to clear spontaneously, while persistent infections become more clinically relevant in older age groups.^{11,12} Our results suggest that menopausal women may represent an important risk group in Nepal and should be carefully targeted in screening strategies. This observation is particularly relevant in the context of Nepal, where many women may not routinely access gynecological services after childbearing years and thus remain unscreened until symptoms develop. Developing awareness campaigns that emphasize the importance of continued screening in peri- and postmenopausal women could help in early detection and timely intervention.

Other socio-demographic factors, such as education, parity, smoking, and age at marriage, were not significantly related to HPV infection in our sample. Some previous studies have found associations between these factors and HPV risk, particularly parity and early marriage.^{16,17,22} The lack of significant associations in our study could be due to the relatively small number of HPV-positive cases, which limited the statistical power to detect differences. However, it is also possible that urban populations in Nepal may have different behavioral and reproductive patterns compared to rural populations, which could partially explain the inconsistencies with prior findings.

From a public health perspective, our findings reinforce the need for strengthening HPV vaccination and screening programs in Nepal. The current frequency of high-risk HPV infection detected in this study, though lower than in some reports, is still concerning given the high mortality of cervical cancer in the country.^{13,14} The World Health Organization recommends HPV DNA testing as the preferred screening method, starting at age 30 with repeat testing every five years, and earlier initiation for HIV-positive women.^{9,10} Expanding access to HPV DNA testing in Nepal remains a challenge, but integrating it into existing reproductive health services could make it more feasible and cost-effective. Although Nepal is making progress in HPV vaccination, scaling up adolescent HPV vaccination programs could have a major impact on reducing cervical cancer incidence in the future.²⁶ Incorporating school-based vaccination programs, along with community-based outreach in rural areas, could improve vaccine coverage. At the same time, ensuring affordability and addressing cultural barriers will be essential for the long-term success of HPV prevention efforts.

Our study has several limitations. As it was conducted in a single

tertiary hospital in Kathmandu, it may not be representative of the general population of Nepal. The relatively small number of HPV-positive cases restricted the ability to explore associations with the HPV subtypes in detail. Finally, only a limited number of HPV genotypes (16, 18, and others) were tested, and more detailed genotyping might reveal a broader distribution of types. This study provides useful data on HPV infection frequency in an urban hospital-based setting in Nepal and highlights the importance of menopausal status as a possible risk factor. Future studies with larger, population-based samples and more comprehensive HPV genotyping are needed to confirm these findings and to better guide prevention strategies. Additionally, longitudinal follow-up would help clarify the natural history of HPV infection in different age groups and identify women at greatest risk for persistence and progression to cervical cancer.

Conclusions

HPV infection was detected in 7% of women in this hospital-based study, with HPV-16 being the most common type. Menopausal status was significantly associated with infection, suggesting that older women may be at higher risk. Strengthening HPV vaccination and implementing effective screening programs remain essential steps toward reducing the burden of cervical cancer in Nepal.

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