European Journal of Clinical Pharmacy
Print ISSN: 2385-409X **Online ISSN**: Applied Website:
https://farmclin.com/

TO STUDY THE SEROPREVALENCE AND RISK FACTORS OF HUMAN PAPILLOMAVIRUS AMONG WOMEN ATTENDING A TERTIARY CARE CENTRE

Dr. Kanchan Maurya1, Dr. Mohan Lal Gupta2, Dr. Amit Kumar Sinha3, Dr. Ashish Pal4

1Senior Resident, Department of Pathology, ESIC Medical College & Hospital, India.
2Assistant Professor, Deparment of Microbiology, ESIC Medical College & Hospital, India.
3Assistant Professor*, Department of Pathology, ESIC Medical College & Hospital, India.
4Senior Resident, Department of Microbiology, ESIC Medical College & Hospital, India.

.

***Corresponding Author:** ashpal197@gmail.com

ABSTRACT

Background: Human papillomavirus (HPV) infection is the most common sexually transmitted viral infection worldwide and is strongly associated with cervical cancer and other anogenital malignancies. The burden of HPV infection remains particularly high in developing countries due to limited screening, lack of awareness, and poor vaccination coverage. Understanding the epidemiological and sociodemographic determinants of HPV infection is essential for developing targeted preventive strategies.

Aim: To determine the prevalence of HPV infection and evaluate the sociodemographic risk factors associated with HPV among women attending a tertiary care centre.

Material and Methods: A hospital-based cross-sectional study was conducted among **100 women aged 21–65 years** attending the gynecology outpatient department of a tertiary care hospital. Cervical samples were collected using sterile cervical brushes and preserved in transport medium. HPV DNA detection and genotyping were performed using **Real-Time PCR**. Sociodemographic parameters such as age, occupation, education level, socioeconomic status, and residence were analyzed to determine their association with HPV infection..

Results: Out of **100 women screened**, **23 were HPV positive**, giving an overall prevalence of **23%**. The highest prevalence was observed in women aged **21–30 years (35%)**. HPV infection was more common among **housewives (23.08%)**, **illiterate women (50%)**, **low-income groups (25%)**, and **rural residents (26.15%)**. Educational status and residence showed strong associations with HPV prevalence.

Conclusion: HPV infection remains a significant public health concern, particularly among women from rural and lower socioeconomic backgrounds. Increasing awareness, improving cervical cancer screening programs, and expanding HPV vaccination coverage are essential to reduce HPV-associated morbidity and mortality.

KEYWORDS: Human papillomavirus, Cervical cancer, PCR, Prevalence, Sociodemographic factors, Rural population.

How to Cite: Dr. Kanchan Maurya, Dr. Mohan Lal Gupta, Dr. Amit Kumar Sinha, Dr. Ashish Pal, (2025) TO STUDY THE SEROPREVALENCE AND RISK FACTORS OF HUMAN PAPILLOMAVIRUS AMONG WOMEN ATTENDING A TERTIARY CARE CENTRE, European Journal of Clinical Pharmacy, Vol.7, No.1, pp. 6997-7003

INTRODUCTION

Human papillomavirus (HPV) is a small, non-enveloped, double-stranded DNA virus belonging to the Papillomaviridae family, known for infecting epithelial tissues of the skin and mucosa. More than 200 HPV genotypes have been identified, among which approximately 14 high-risk types are associated with malignancies, particularly cervical cancer. HPV types 16 and 18 are responsible for nearly 70% of cervical cancer cases globally [1-4]

Cervical cancer remains a major global health concern, ranking as the fourth most common cancer among women worldwide. According to the World Health Organization, approximately 604,000 new cases and 342,000 deaths were reported globally in 2020.[2] The burden of disease is disproportionately higher in low- and middle-income countries, where screening programs and vaccination coverage remain inadequate [5,6]

HPV infection is primarily transmitted through sexual contact, and most sexually active individuals acquire the infection at some point in their lifetime. Although many infections are transient and cleared by the immune system, persistent infection with high-risk HPV types can lead to precancerous lesions and eventually invasive cervical carcinoma [7-9]

The epidemiology of HPV infection varies across different populations due to sociodemographic, behavioral, and biological factors. Early age at sexual debut, multiple sexual partners, poor genital hygiene, high parity, smoking, and immunosuppression are recognized risk factors that increase susceptibility to HPV infection [10-13]

Studies have shown that education level, socioeconomic status, and rural residence significantly influence HPV prevalence. Women with limited access to healthcare services and screening programs are at higher risk for persistent HPV infection and progression to cervical cancer [14,15]

In India, cervical cancer accounts for a significant proportion of cancer-related deaths among women. Despite the availability of effective screening techniques such as Pap smear, HPV DNA testing, and vaccination, many women remain unscreened due to lack of awareness and limited healthcare accessibility [16-18]

Recent molecular diagnostic techniques such as Real-Time Polymerase Chain Reaction (PCR) have significantly improved the detection and genotyping of HPV infections. Molecular testing offers high sensitivity and specificity, making it an essential tool in epidemiological studies and cervical cancer screening programs [19-21]

Understanding the distribution and determinants of HPV infection in specific populations is essential for designing targeted prevention strategies. Epidemiological data can help guide vaccination programs, screening policies, and community awareness initiatives aimed at reducing the burden of HPV-related diseases [8]

Therefore, the present study was conducted to determine the prevalence of HPV infection and associated sociodemographic risk factors among women attending a tertiary care centre.

.

MATERIALS AND METHODS

A hospital-based cross-sectional study was conducted in the Department of Microbiology among women attending the gynecology outpatient department of a tertiary care hospital. For a period of 12 months i.e, November 2024 to November 2025.

A total of 100 women aged 21–65 years presenting with symptoms suggestive of genital infection were included in the study.

Sample Collection

Cervical samples were collected using sterile cervical brushes and placed in preservative solution. Samples were transported to the microbiology laboratory for further processing.

Laboratory Procedure

DNA extraction was performed using standard extraction kits. Detection of HPV DNA and genotyping were performed using Real-Time PCR assay according to the manufacturer's instructions.

Inclusion Criteria

1. Women aged 21–65 years
2. Married women attending gynecology OPD
3. Women presenting with symptoms such as
4. vaginal discharge
5. genital itching
6. abnormal bleeding
7. dyspareunia

Exclusion Criteria

1. Pregnant women
2. Women with previous hysterectomy
3. Women vaccinated against HPV
4. Women diagnosed with cervical cancer
5. Patients unwilling to participate

Statistical Analysis

Data were analyzed using descriptive statistical methods. HPV prevalence was calculated as percentages for different sociodemographic variables.

RESULTS

Out of 100 women screened, 23 were positive for HPV infection, giving an overall prevalence of 23%. The age-wise distribution showed that the highest prevalence was observed among women aged 21–30 years (35%), followed by women aged 31–40 years (21.43%). Women aged 41–50 years showed a prevalence of 15.15%, whereas those aged above 50 years had a prevalence of 40%, although the sample size in this group was small.

Occupation

HPV prevalence varied according to occupational status. Housewives constituted the majority of participants (78%), with a

prevalence of 23.08%. Women engaged in physical work showed slightly higher prevalence (30%), whereas those in sedentary professions demonstrated a lower prevalence (16.67%).

Educational Status

Educational level showed a strong association with HPV infection. Illiterate women demonstrated the highest prevalence (50%), while women educated up to 10th standard showed 28% prevalence. Women with intermediate education had 13.33% prevalence, and graduates showed 18.18% prevalence.

Socioeconomic Status

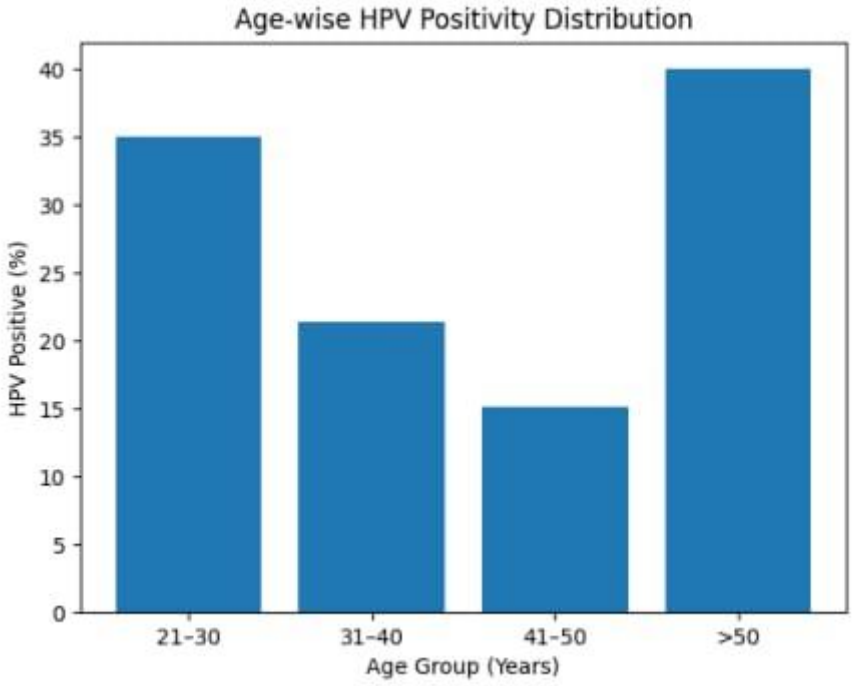
Women belonging to low-income groups showed the highest HPV prevalence (25%), whereas middle-income groups showed 17.86% prevalence. High-income groups demonstrated 25% prevalence, although the sample size was relatively small.

Residence

HPV infection was more common among rural women (26.15%) compared to urban women (17.14%), suggesting that residence and access to healthcare services influence infection rates.

Table 1: Age-wise Distribution

Sr. No.	Age Group (Years)	Screened	HPV Positive	% Positive
1	21–30	20	7	35.00
2	31–40	42	9	21.43
3	41–50	33	5	15.15
4	>50	5	2	40.00
	Total	**100**	**23**	**23.00**



Graph 1: : Age-wise Distribution

Table 2: Occupation

Sr. No.	Occupation	Screened	HPV Positive	% Positive
1	Housewife	78	18	23.08
2	Sedentary Profession Employee	12	2	16.67
3	Physical Work	10	3	30.00
	Total	**100**	**23**	**23.00**

Table 3: Education Status

Sr. No.	Education Level	Screened	HPV Positive	% Positive
1	Illiterate	12	6	50.00
2	Up to 10th	25	7	28.00
3	Intermediate / Secondary	30	4	13.33
4	Graduation	33	6	18.18
	Total	**100**	**23**	**23.00**

Table 4: Socio-Economic Status

Sr. No.	Socio-Economic Status	Screened	HPV Positive	% Positive
1	Low Income	60	15	25.00
2	Middle Income	28	5	17.86
3	High Income	12	3	25.00
	Total	**100**	**23**	**23.00**

Table 5: Residence

Sr. No.	Residence	Screened	HPV Positive	% Positive
1	Urban	35	6	17.14
2	Rural	65	17	26.15
	Total	**100**	**23**	**23.00**

Among 100 women screened, 23 were positive for HPV infection, giving an overall prevalence of 23%. The highest prevalence was observed among women aged 21–30 years (35%), followed by women aged >50 years (40%), although the latter group had a smaller sample size. With respect to occupation, physical workers (30%) and housewives (23.08%) showed higher infection rates compared with women employed in sedentary professions (16.67%).

Educational status showed a clear association with HPV infection, with illiterate women demonstrating the highest prevalence (50%), whereas women with intermediate or higher education had lower infection rates. Socio-economic analysis revealed that women belonging to low-income groups had higher HPV prevalence (25%) compared with those in the middle-income group (17.86%). Residence also influenced infection rates, as rural women (26.15%) had a higher prevalence compared with urban women (17.14%)

DISCUSSION

Human papillomavirus infection remains one of the most prevalent sexually transmitted infections worldwide and is recognized as the principal etiological factor in cervical carcinogenesis [22-25] . In the present study, the overall HPV prevalence was 23%, which is consistent with findings from several epidemiological studies conducted in developing countries.

A study by Kulkarni et al. reported an HPV prevalence of 24.5% among Indian women, which is comparable to the prevalence observed in the present study [11]. Similarly, Senapati et al. reported a prevalence of 25% among women attending tertiary healthcare centers in eastern India [14].

The highest prevalence of HPV infection in the present study was observed among women aged 21–30 years, which aligns with findings reported by Herrero et al., who demonstrated that HPV infection peaks soon after sexual debut.[12] Younger women

often have higher rates of HPV infection due to increased exposure and biological susceptibility of the cervical transformation zone [16].

Interestingly, a second peak in prevalence was observed among women aged above 50 years, which may be attributed to reactivation of latent infections or declining immune responses. Similar findings were reported by Hildesheim and Wang, who described a bimodal age distribution of HPV infection [17].

Educational status was strongly associated with HPV infection in the present study. Illiterate women demonstrated significantly higher infection rates compared to educated women. This finding is consistent with studies by Saxena et al. and Ganju et al., who reported that low literacy levels contribute to poor awareness regarding reproductive health and cervical cancer screening [18].

Socioeconomic status also influenced HPV prevalence. Women from low-income backgrounds had higher infection rates, which may be related to poor healthcare accessibility, inadequate hygiene practices, and lack of awareness regarding preventive measures. Similar observations were reported in studies conducted in Ethiopia, Bangladesh, and China.
The present study also demonstrated higher HPV prevalence among rural women, which may be explained by disparities in healthcare access and limited screening services. Kadian et al. reported similar findings in a study conducted in northern India, where rural residence was identified as a significant risk factor for HPV infection [24].

Recent epidemiological studies continue to highlight the global burden of HPV infection and its association with cervical cancer. A study conducted by Satapathy et al. (2024) [26] in India investigated the prevalence of HPV among cervical samples collected from women attending tertiary care hospitals. The authors reported a considerable prevalence of HPV infection among women with cervical abnormalities, emphasizing that high-risk HPV genotypes remain the primary etiological agents for cervical carcinogenesis. The study also highlighted regional variation in HPV prevalence across different parts of India, reinforcing the importance of continuous screening and vaccination strategies.

Similarly, Mittal et al. (2024) [27] evaluated the prevalence of high-risk HPV infection among women attending a tertiary care facility and reported that HPV infection was more frequent among older age groups and women with limited access to routine screening programs. The authors concluded that demographic factors such as age, education level, and socioeconomic status play a significant role in determining HPV infection risk. Their findings support the observations of the present study, where higher infection rates were observed among women from lower socioeconomic backgrounds.

In another recent investigation, Phukan et al. (2025) [28] assessed the prevalence of 14 high-risk HPV subtypes among adult female participants and reported an overall HPV prevalence of approximately 13%, with HPV-16 and HPV-18 being the most dominant oncogenic genotypes. The authors emphasized that early detection of high-risk HPV infections through molecular techniques such as PCR can significantly improve cervical cancer prevention strategies.

A large population-based study by **Xu et al. (2025)** [29] analyzed HPV genotype distribution among women undergoing cervical screening and demonstrated that HPV infection remains highly prevalent in gynecological outpatient populations. The authors observed that HPV prevalence varied significantly with age, geographical location, and healthcare accessibility, highlighting the importance of targeted screening and vaccination programs for high-risk populations.

Another community-based study conducted by **Pham et al. (2025)** [30] reported that approximately **7.5% of women tested positive for high-risk HPV infection**, with HPV-16 and HPV-18 remaining the most common oncogenic types. The study emphasized the need for improved cervical cancer screening programs, particularly in developing countries where HPV vaccination coverage remains low.

These recent findings are consistent with the results of the present study, which also demonstrate a substantial prevalence of HPV infection among women attending tertiary care facilities. Collectively, these studies highlight the continuing importance of **HPV vaccination, molecular screening, and public health awareness programs** in reducing HPV-associated disease burden worldwide.

Occupation also appeared to influence HPV prevalence. Women engaged in physical work had slightly higher infection rates compared with those in sedentary occupations. This may be associated with socioeconomic disparities and educational differences.

Overall, the findings of the present study emphasize the importance of **public health interventions such as HPV vaccination, awareness programs, and cervical cancer screening.** Strengthening preventive strategies is crucial to reduce the burden of HPV-associated diseases, particularly in rural and underserved populations..

CONCLUSION

The present study highlights the significant prevalence of HPV infection among women attending a tertiary care centre. Sociodemographic factors such as age, education, socioeconomic status, and rural residence play important roles in determining infection risk. Women from rural areas, lower socioeconomic backgrounds, and lower educational levels were found to be

particularly vulnerable to HPV infection. Public health strategies focusing on awareness, vaccination, and regular cervical cancer screening are essential to reduce HPV-related morbidity and mortality.

LIMITATIONS

1.Behavioral risk factors such as sexual history and contraceptive use were not extensively evaluated.
2. HPV genotype distribution was not analyzed in detail.

DECLARATIONS

Conflicts of interest: There is no any conflict of interest associated with this study
Consent to participate: There is consent to participate.
Consent for publication: There is consent for the publication of this paper.
Authors' contributions: Author equally contributed the work.

REFERENCES:

1. López de Munain J. Epidemiology and current control of sexually transmitted infections: the role of STI clinics. Enferm Infecc Microbiol Clin (Engl Ed). 2019;37(1):45-49.
2. Patel NJ, Mazumdar VS. The current status of sexually transmitted infections and reproductive tract infections in Vadodara city: health-care provider perspective. Indian J Community Med. 2019;44(3):247-251.
3. Bahrami A, Hasanzadeh M, Shahidsales S, Farazestanian M, Hassanian SM, Ahmadi MM, et al. Genetic susceptibility in cervical cancer: from bench to bedside. J Cell Physiol. 2018;233(3):1929-1939.
4. Balasubramaniam G, Gaidhani RH, Khan A, Saoba S, Mahantshetty U, Maheshwari A. Survival rate of cervical cancer from a study conducted in India. Indian J Med Sci. 2021;73(2):203-211.
5. Parwez A, Singh S, Kumar R, Kumari S, Kumar A, Ali M. Oncogenic human papillomavirus DNA in female sex workers of Bihar, India. Int J Health Sci (Qassim). 2022;16(2):17-26.
6. Abdoulaye O, Alain Y, Blavo-Kouame EB, Tchibeh KF, Nguessan SD, Pierre KO, et al. Human papillomavirus infections in female sex workers in Côte d'Ivoire. Am J Cancer Res Rev. 2017;1(3):1-6.
7. Diop-Ndiaye H, Beiter K, Gheit T, Sow A, Dramé A, McKay-Chopin S, et al. Human papillomavirus infection in Senegalese female sex workers. Papillomavirus Res. 2019;7:97-101.
8. Adams AR, Nortey PA, Dortey BA, Asmah RH, Wiredu EK. Cervical human papillomavirus prevalence, genotypes and associated risk factors among female sex workers in Greater Accra, Ghana. J Oncol. 2019;2019:8062176.
9. Tiiti TA, Muchengeti M, Kahn K, Gómez-Olivé FX, Tollman S, Bärnighausen T, et al. High prevalence of human papillomavirus infection among women attending a tertiary hospital in Gauteng Province, South Africa. BMC Cancer. 2022;22:854.
10. UNAIDS. Global HIV & AIDS statistics—Fact sheet 2023. Geneva: UNAIDS; 2023.
11. Kulkarni SP, Kulkarni SS, Kulkarni V. Prevalence and genotype distribution of human papillomavirus infection among women. Cureus. 2023;15:e35227.
12. Getinet M, Gelaw B, Sisay A, Mahmoud EA, Asrie F. Prevalence of human papillomavirus and associated factors among women attending cervical cancer screening service. BMC Clin Pathol. 2015;15:16.
13. Bayu H, Berhe Y, Mulat A, Alemu A. Cervical cancer screening service uptake and associated factors among women in Ethiopia. PLoS One. 2016;11:e0150749.
14. Senapati R, Nayak B, Kar SK, Dwibedi B. HPV genotypes distribution in Indian women with cervical cancer. BMC Infect Dis. 2017;17:30.
15. Lin M, Chen J, Huang S, Lee Y. Human papillomavirus infection and associated risk factors among women. Aust N Z J Obstet Gynaecol. 2008;48:189-194.
16. Herrero R, Castle PE, Schiffman M, Bratti MC, Hildesheim A, Morales J, et al. Epidemiologic profile of human papillomavirus infection and cervical neoplasia. J Infect Dis. 2005;191(11):1796-1807.
17. Hildesheim A, Wang SS. Host and viral genetics and risk of cervical cancer. Virus Res. 2002;89:229-240.
18. Jayant K, Rao RS, Nene BM, Dale PS. Improved survival among cervical cancer patients in rural India. Indian J Cancer. 2009;46:155-159.
19. Baloch Z, Yasmeen N, Li Y, Zhang W, Lu H, Wu X, et al. Prevalence and risk factors of HPV infection among women in Pakistan. BMC Infect Dis. 2016;16:228.
20. Xu Y, Wang Q, Zhang L, Chen Y. Human papillomavirus infection and its association with cervical lesions. Int J Clin Exp Pathol. 2009;2(2):169-175.
21. Wang X, Wang H, Zhang J, Li X. Distribution of human papillomavirus genotypes among women. Virol J. 2022;19:6.
22. Nahar Q, Sultana F, Alam A. Prevalence and risk factors of HPV infection among Bangladeshi women. PLoS One. 2014;9:e107675.
23. Sharma N, Mishra SI, Aggarwal P. Awareness of cervical cancer and HPV infection among women in India. Indian J Community Med. 2012;37:154-158.
24. Kadian LK, Gulati D, Yadav R. Prevalence of human papillomavirus infection among women attending tertiary care centre. J Clin Diagn Res. 2019;13:QC10-QC13.
25. Deksissa ZM, Gebremariam A, Bisetegn TA. Prevalence and risk factors of HPV infection among women in Ethiopia. BMC Res Notes. 2015;8:618.
26. Satapathy P, Mishra S, Dash S. Prevalence of human papillomavirus among cervical samples in Indian women and

its association with cervical lesions. *Medicine (Baltimore).* 2024;103(32):e38952.

27. Mittal S, Gupta R, Singh P, Sharma R. High-risk HPV prevalence estimates among older female patients attending a tertiary care centre. *Indian J Community Med.* 2024;49(4):612-618.
28. Phukan PK, Borah P, Dutta S. Prevalence of 14 high-risk human papillomavirus subtypes among adult women: a hospital-based study. *Asian Pac J Trop Dis.* 2025;15(1):34-40.
29. Xu MY, Zhang Y, Li X, Chen H. Prevalence and type distribution of human papillomavirus infection among women undergoing cervical screening. *Front Microbiol.* 2025;16:1735393.
30. Pham AHT, Nguyen TT, Tran HT. Prevalence of high-risk HPV infection in community women and associated risk factors. *BMC Infect Dis.* 2025;25:214