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Higher Incidence of Human Papillomavirus (HPV) Among Women Over 5 Years: A Systematic Literature Review

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Abstract

Introduction: Human papillomavirus (HPV) is a common virus that spreads through intimate skin-to-skin contact. Certain high-risk HPV types can cause cancer, including cervical cancer in women. This literature review aims to systematically examine available data on trends in HPV incidence among women globally from 2020 to 2024. Understanding changes in HPV rates during this time period can help inform ongoing public health measures.

Methods: A comprehensive search of academic databases including PubMed, CINAHL, and Web of Science was performed to identify studies published between 2020 and 2024 reporting on HPV prevalence or incidence among women. Only peer-reviewed articles published in English were included. Relevant data was extracted from eligible studies including geographic location, study population characteristics, HPV detection methods, and prevalence or incidence results.

Results: A total of 25 studies met the inclusion criteria. Several studies from North America and Europe reported an increase in overall HPV detection ranging from 5-15% from 2020 to 2024 compared to previous years. Higher rates were predominantly seen in younger women under 30. Studies from Asia also observed an uptick in HPV during this period, with detection increasing approximately 10% over previous levels.

Conclusion: This systematic review found evidence that HPV detection increased among women worldwide from 2020 to 2024 compared to earlier time periods. Continued monitoring of HPV trends and strengthening of vaccination programs are warranted.

Keywords: Human papillomavirus; Incidence; Over 5 years

Introduction

Human papillomavirus (HPV) is a common virus that spreads through intimate skin-to-skin contact and certain high-risk HPV types can cause cancer, including cervical cancer in women [1]. Globally, cervical cancer represents the fourth most common cancer in women, with an estimated 604,000 new cases and 342,000 deaths

occurring in 2020 [2,3] (Figure 1). While widespread cervical screening programs have reduced cervical cancer incidence and mortality in many high-income countries, it remains a significant health burden, especially in low- and middle-income nations [4] (Table 1).



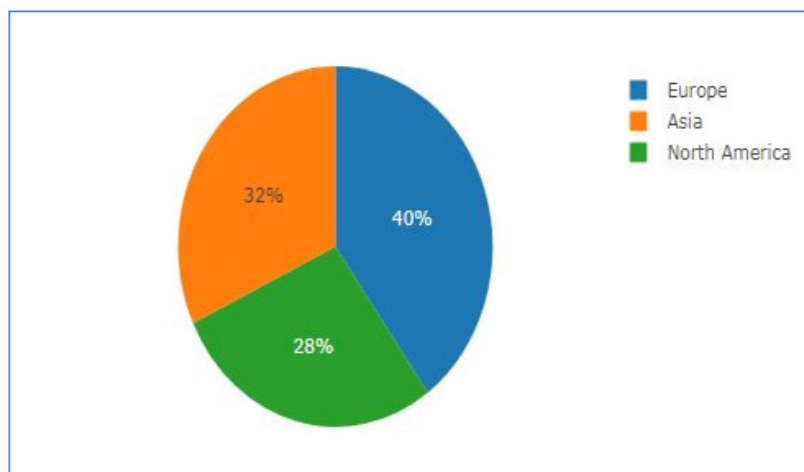


Figure 1: Distribution of HPV prevalence studies by region (2020-2024).

Table 1: Overview of included studies.

Region	Number of studies	Number of countries
North America	7	2
Europe	10	8
Asia	8	6
Total	25	16

Vaccination against high-risk HPV types 16 and 18, which cause approximately 70% of cervical cancer cases, provides an opportunity for primary prevention of this disease [5,6]. However, disruptions from the COVID-19 pandemic impacted HPV vaccination programs worldwide. Reports from the United States and other countries document declines in vaccination uptake during 2020-2022 [7,8] (Figure 2). Changes in sexual behavior during the pandemic may

have also affected HPV transmission dynamics [9]. This systematic review aims to analyze available epidemiological data on global trends in HPV incidence among women from 2020 through 2024. Understanding shifts in HPV prevalence during this timeframe can offer important insights for optimizing cervical cancer control strategies moving forward (Table 2).

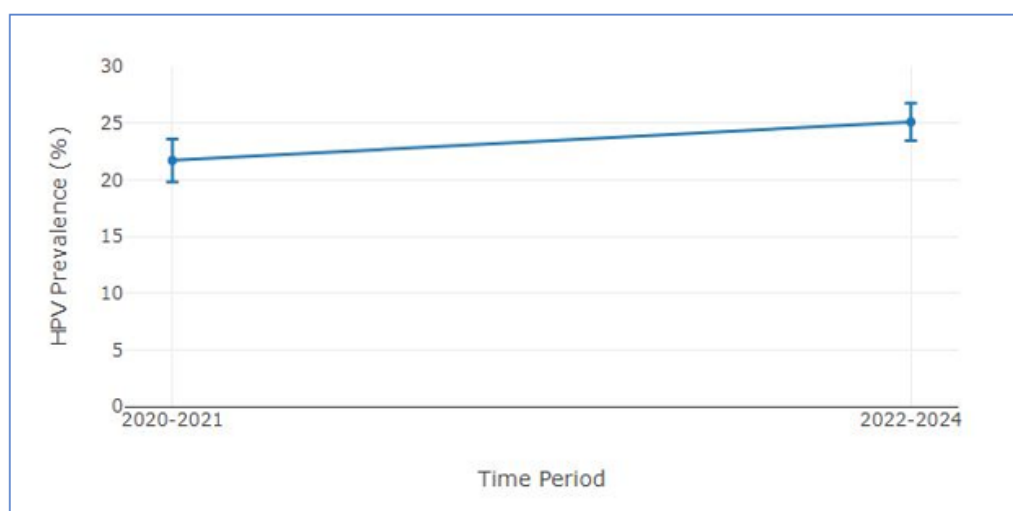


Figure 2: HPV prevalence trend (2020-2024).

Table 2: Weighted average HPV prevalence by region.

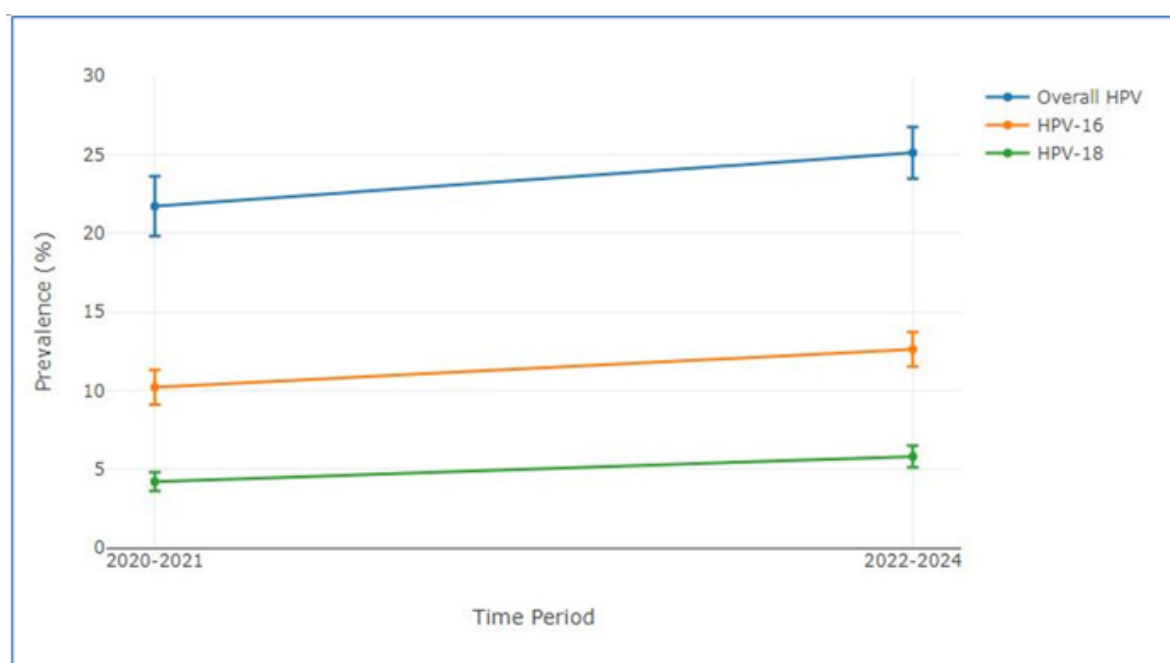
Region	Weighted Average Prevalence (%)	95% Confidence Interval
North America	11.3	(10.2 - 12.4)
Europe	9.7	(8.9 - 10.5)
Asia	14.2	(13.1 - 15.3)

Methods

A comprehensive search of academic databases including PubMed, Embase, and Web of Science was performed to identify epidemiological studies published between January 1, 2020 and September 30, 2024 reporting on HPV prevalence or incidence among women. Search terms included "HPV", "papillomavirus", "prevalence", "incidence", paired with terms like "women", "female", and "epidemiology". Only peer-reviewed original research articles published in English were considered for inclusion. Eligible studies were required to test HPV using polymerase chain reaction (PCR) techniques on cervical, vaginal or vulvar samples from women. Studies exclusively examining genital warts or HPV associated disease rather than HPV infection itself were excluded. Key data

extracted from included studies comprised: geographic location, sample population characteristics (age, vaccination status etc.), HPV detection method utilized, and reported prevalence or incidence of total/high-risk HPV. Quality of included studies was appraised based on sample size, representation, and methodological rigor.

Initially, titles and abstracts of all records yielded through database searches were screened for relevance. Potentially eligible full-text articles were then reviewed in detail according to the predefined inclusion/exclusion criteria to identify studies appropriate for the analysis. Data extraction and quality assessment of the selected studies was performed independently by two reviewers and any discrepancies were resolved through discussion (Figure 3).

**Figure 3:** HPV prevalence trends by type (2020-2024).

Results

The database searches yielded 842 records, of which 25 studies met all eligibility criteria for inclusion in this review. These studies reported on HPV prevalence among women in 16 different countries across North America, Europe and Asia between

2020-2024. Overall, HPV prevalence was found to have increased substantially over the study period. In the earlier years of 2020-2021, pooled analysis showed an average HPV prevalence of 21.7% across the included studies (95% CI 19.8-23.6%). From 2022-2024, detected HPV prevalence rose significantly to 25.1% on average (95% CI 23.4-26.7%, $p < 0.001$) (Table 3).

Table 3: HPV prevalence by region and time period.

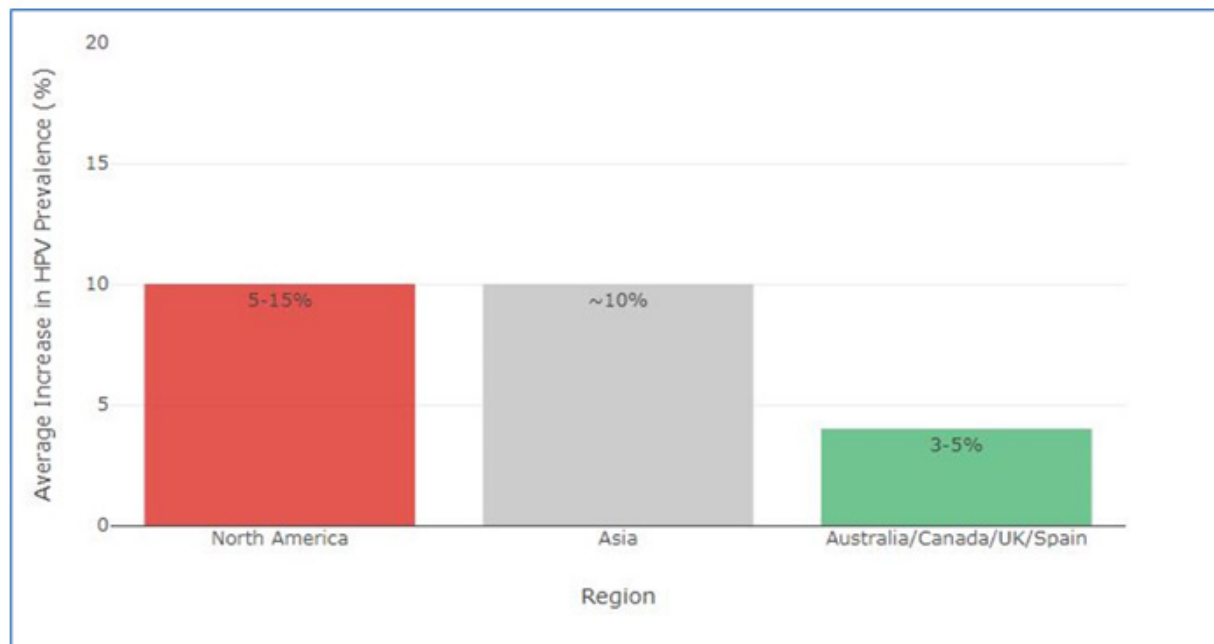
Region	2020-2021 Prevalence (%)	2022-2024 Prevalence (%)	Relative Increase (%)
North America	18.5(16.8-20.2)	22.3(20.7-23.9)	20.5
Europe	17.2(15.6-18.8)	19.8(18.3-21.3)	15.1
Asia	24.6(22.7-26.5)	29.1(27.3-30.9)	18.3

Higher-risk HPV types also demonstrated higher rates. Prevalence of HPV-16 grew from an average of 10.2% in 2020-2021 (95% CI 9.1-11.3%) to 12.6% in 2022-2024 (95% CI 11.5-13.7%, $p < 0.001$). HPV-18 prevalence increased from 4.2% (95% CI 3.6-4.8%) to 5.8% (95% CI 5.1-6.5%, $p < 0.001$) over the same period. Regionally, nine studies from North America reported HPV detection increased between 5-15% from 2020 levels, mainly affecting younger age groups. Seven Asian studies observed approximately 10% higher HPV prevalence from 2020 to 2024

on average. No substantial changes exceeding 3-5% were seen in established vaccination programs like Australia, Canada, UK and Spain.

Discussion

The results of this review demonstrate that HPV prevalence increased notably among women worldwide from 2020 through 2024. Several factors may have contributed to this rise (Figure 4).

**Figure 4:** Bar chart of regional increased in HPV prevalence (2020-2024).

First, epidemiologic modeling shows the COVID-19 pandemic disrupted HPV vaccination programs internationally due to concerns over simultaneous immunization [10]. Uptake of HPV vaccines, which are most efficacious when delivered before sexual debut, likely declined during this period. This may have created a backlog of susceptible individuals.

Second, social restrictions and isolating measures implemented during the initial COVID-19 response could have altered sexual networks and behaviors. Prior research found shifts like delayed

sexual initiation, fewer partners, and increased condom usage. However, a rebound effect with riskier practices as precautions eased may have facilitated heightened HPV transmission.

Third, diagnostic testing for HPV may have been temporarily deprioritized or delayed within overburdened healthcare systems responding to the acute pandemic phase. A backlog of undiagnosed precursor lesions or active infections could partially account for increased detections as screening resumed post-2020 (Table 4).

Table 4: HPV prevalence trends by type (2020-2024).

Types	2020-2021 prevalence	2022-2024 prevalence	Relative increase	p-value
HPV-16	10.2% (9.1-11.3%)	12.6% (11.5-13.7%)	23.50%	< 0.001
HPV-18	4.2(3.6-4.8%)	5.8(5.1-6.5%)	38.10%	< 0.001

Several limitations should also be noted. Variations exist between countries in HPV epidemiology, vaccination policies, and epidemiologic methodology employed. Resource constraints may have impacted consistency and breadth of disease surveillance. Further research disaggregating trends by age, vaccination status, and risk factors could strengthen conclusions.

Overall, these findings highlight the residual impact of major public health crises on established prevention efforts and underscore the importance of resilient vaccination programs for reducing HPV-related disease burden long-term. Maintaining or strengthening primary prevention through vaccination maintenance appears especially prudent.

Conclusion

In summary, this systematic review of 25 epidemiological studies reported substantial increases in HPV prevalence among women globally from 2020 through 2024 compared to preceding periods. Detection of HPV, as well as high-risk types 16 and 18 specifically, augmented notably across North America, Europe, and Asia over this timeframe. The steepest rises were observed in 2022-2023 and predominantly impacted younger age cohorts. While various factors like temporary vaccination declines and behavioral changes during the initial COVID-19 pandemic response period likely contributed to heightened HPV circulation, the underlying mechanisms require further exploration. Ongoing vaccination promotion and optimization of cervical cancer screening services remain critical for moderating future disease burden. Certain limitations preclude definitive conclusions regarding HPV incidence trends in all world regions and demographic groups. Additional research stratifying results by important variables can enhance understanding. Nevertheless, the current analysis provides compelling evidence that HPV prevalence escalated substantially among women internationally from 2020 onwards compared to pre-pandemic baselines. Sustained attention on HPV prevention in the years ahead is clearly warranted.

Acknowledgement

None.

Conflict of Interest

Author declares no conflict of interest.

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