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Effects of HPV 16 in women with cervical cancer: A narrative review

Efectos del VPH 16 en mujeres con cáncer de cuello uterino: Una revisión narrativa

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ABSTRACT

Objective: to identify associated factors and clinical factors in patients with diabetes.
Method: literature review based on a narrative synthesis. Data sources: Scopus, Science direct, Web of sciencie, Google scholar, PubMed and SciELO. Data selection: The documents were selected and analyzed under a critical review of the literature taking into account the inclusion and exclusion criteria.
Results: a corpus of 17 articles was analyzed, of which 7 performed quantitative analyses, 2 retrospective cohort studies, 3 observational studies, 1 experimental methodology study, 1 cross-sectional study, 1 systematic review and 2 descriptive studies. The population studied in the articles includes various categories: women between 30 and 65 years old, adolescents and adults over 60 years old, women attending gynecological check-ups, indigenous women from rural and urban areas and women with prevalence of cervical cancer and other types of carcinomas, in addition to studies for the development of prophylactic vaccines. The studies were carried out in various countries: 2 Turkey, 1 Spain, 1 Chile, 3 Ecuador, 3 China, 1 Indonesia, 1 Mexico, 1 Argentina, 2 Colombia, 1 Italy, each providing a unique perspective to the research. Negative cytology was analyzed in three articles highlighting its presence in healthy women carrying the Human Papillomavirus. Seven articles were also identified that address the prevalence and types of HPV, two that point to factors associated with the development of cervical cancer, and six that address high- and low-grade lesions. Regarding socioeconomic status, 12 articles were conducted in populations in low-income countries, only three were from high-income countries, and one was from a middle-income country.
Conclusion: the review showed that HPV type 16 is strongly associated with cervical cancer, with significant impacts in diverse populations and socioeconomic contexts. The studies highlight severe symptoms and high mortality, highlighting the need to strengthen prevention and treatment, especially in resource-limited countries.

Keywords: HPV 16; HPV 18; Cervical Cancer.

RESUMEN

Objetivo: identificar los efectos del virus papiloma humano de tipo 16 asociados al cáncer de cuello uterino.
Diseño: revisión de la literatura basado en una síntesis narrativa. Fuentes de datos: Scopus, Science Direct, Web of Science Google scholar, PubMed y SciELO. Selección de datos: Los documentos fueron seleccionados y analizados bajo una revisión crítica de literatura tomando en cuenta los criterios de inclusión y de exclusión.
Resultados: se analizó un corpus de 17 artículos de los cuales 7 realizaron análisis cuantitativos, 2 estudio de cohorte retrospectivo, 3 estudios observacionales, 1 de estudio de metodología experimental, 1 de estudio tipo transversal, 1 de revisión sistemática y 2 estudios descriptivos. La población estudiada en los artículos incluye diversas categorías: mujeres entre 30 y 65 años, adolescentes y adultos mayores de 60 años, mujeres que acuden a controles ginecológicos, mujeres indígenas de zonas rurales y urbanas y mujeres con prevalencia de cáncer de cuello uterino y otros tipos de carcinoma, además estudios para el desarrollo de vacunas profilácticas. Los estudios se realizaron en diversos países: 2 Turquía, 1 España, 1 Chile, 3 Ecuador, 3 China, 1 Indonesia, 1 México, 1 Argentina, 2 Colombia, 1 Italia, cada uno aportando una perspectiva única a la investigación. La citología negativa fue analizada en 3 artículos que destacan su presencia en mujeres sanas portadoras del Virus del Papiloma Humano, además se identificaron 7 artículos que abordan la prevalencia y los tipos de VPH, 2 que señalan los factores asociados al desarrollo de cáncer de cuello uterino y 6 sobre lesiones de alto y bajo grado. Respecto al nivel socioeconómico, 12 artículos fueron realizados en poblaciones en países de bajos ingresos, solo 3 de países de altos ingresos y otro de mediano ingreso.
Conclusión: la revisión evidenció que el VPH tipo 16 está fuertemente asociado al cáncer de cuello uterino, con impactos significativos en diversas poblaciones y contextos socioeconómicos. Los estudios destacan síntomas graves y alta letalidad, lo que resalta la necesidad de fortalecer la prevención y el tratamiento, especialmente en países con recursos limitados.

Palabras clave: VPH 16; VPH 18; Cáncer Cervical.

INTRODUCTION

The main factor in cervical cancer is HPV (Kabaca et al., 2021), accounting for 70 % of cases worldwide (Alemany et al., 2010) and being the fourth most common cancer in the world (Mazarico & Gonzalez-Bosquet, 2012), constituting a public health problem (Arbyn et al., 2020). The problem is evidenced by the delay in early disease detection (Brotherton et al., 2010). Factors associated with the persistence of the virus in the community include age, sexual behavior, immune system integrity, immunizations, and access to treatment in remote areas (Hernández-Aguado et al., 2023). Cross-sectional studies report the identification of the prevalence of various genotypes with 58, 16, 18,33 associated with cervical cancer in urban and rural areas of 24 districts in Vietnam (Ho Minh Nguyet et al., 2024). In addition, a clinical study reported that HPV 16 and 18 are responsible for high-risk oncogenic cells with atypical squamous cell manifestations (McGill et al., 2024). A meta-analysis was also conducted to evaluate the effectiveness of HPV self-sampling in increasing participation in cervical cancer screening (Gennaro et al., 2022). A retrospective study was conducted, including literature reviews across various databases, to analyze and link research on the adverse reactions, effectiveness, and impact of the monovalent vaccine against cervical cancer (Anaya Rodríguez, 2024). Therefore, the objective of this study is to conduct a brief narrative review, considering the manifestations and prevalence of HPV 16 and 18.

METHOD

A comprehensive narrative review was conducted to explore the scientific literature on Human Papillomavirus (HPV16), drawing on the following databases: Scopus, SciELO, Google Scholar, PubMed, and ScienceDirect. To refine the search, the following terms were used: "HPV 16," "HPV 18," "cervical cancer," and "HPV 18." In addition, the Boolean operator AND was used to refine and broaden the search scope, and the search period was extended from March to June 2025, with articles published between 2015 and 2025 considered for review. This search covered texts written in English and Spanish, specifically excluding case reports, interviews, letters to the editor, theses, and books, as they are less empirical or have a specific focus. Within the aforementioned databases, a total of 12 290 articles were initially identified using the designed search string. Of these, 12 290 corresponded to the Scopus database, 10 557 to PubMed, 27 to SciELO, 104 to Google Scholar, and 256 000 to ScienceDirect. Next, 12 273 duplicate articles were eliminated. Subsequently, articles that did not align with the study's objective and others that did not contribute to the results table and discussion of the work were excluded, as they did not meet the established inclusion criteria. As a result of this filtering and selection process, a final corpus of 17 articles relevant to the review was obtained.

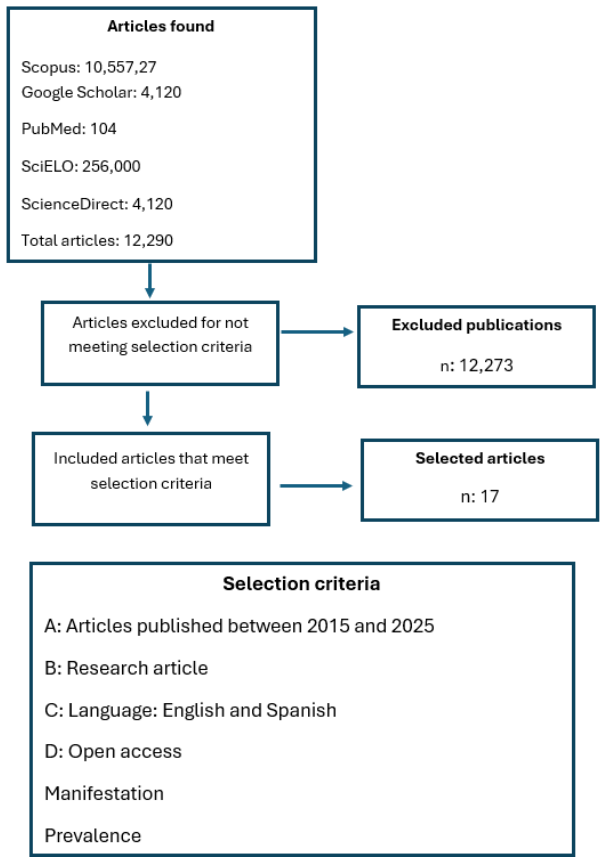

Figure 1. Diagram flow

RESULTS AND DISCUSSION

A corpus of 17 articles was analyzed, of which 7 performed quantitative analyses, 2 were retrospective cohort studies, 3 were observational studies, 1 was an experimental methodology

study, 1 was a cross-sectional study, 1 was a systematic review, and 2 were descriptive studies. The population studied in the articles includes various categories: women between 30 and 65 years of age, adolescents and adults over 60 years of age, women attending gynecological check-ups, indigenous women from rural and urban areas, and women with a prevalence of cervical cancer and other types of carcinomas, as well as studies for the development of prophylactic vaccines. The studies were conducted in various countries: two in Turkey, one in Spain, one in Chile, three in Ecuador, three in China, one in Indonesia, one in Mexico, one in Argentina, two in Colombia, and one in Italy, each contributing a unique perspective to the research. Negative cytology was analyzed in 3 articles that highlight its presence in healthy women who are carriers of the Human Papillomavirus. In addition, 7 articles were identified that address the prevalence and types of HPV, 2 that point out the factors associated with the development of cervical cancer, and 6 on high- and low-grade lesions. Regarding socioeconomic status, 12 articles were conducted in low-income countries, 3 in high-income countries, and 1 in a middle-income country.

The purpose of the study was to determine the manifestations and prevalence of the effects of human papillomavirus (HPV16) in patients with cervical cancer, which was analyzed by comparing the results with other studies.

Manifestation

HPV 16 and 18 present negative cytology that can only be identified after one year (Kabaca et al., 2021), despite causing serious lesions (Aydogdu, 2023a), evidenced by the increase in miRNA that promotes cell expansion, driving the progression of cancer (Rao et al., 2025a) and by the negative regulation of TAZ, a protein that promotes tumor growth and proliferation (Hao et al., 2025) through the GLUT 1 protein that transports cancer cells (Moreno-Acosta et al., 2013a). They are also associated with the risk of cervical intraepithelial neoplasia (CIN) (Campoverde et al., 2017), which, when associated with HPV 33, causes a high-grade lesion (Hernández-Aguado et al., 2023), leading to atypical squamous cells of undetermined significance (ASCUS), commonly in women aged 30 to 39 (Aydogdu, 2023a). Finally, the most common symptoms are vaginal bleeding, abnormal discharge, pelvic pain, and fatigue (Savira et al., 2022).

Negative cytology

HPV 16,18 presents negative cytology, which can be diagnosed after 1 year (Kabaca et al., 2021). In some cases, where the ElectroSurgical Excision Procedure (ESAP) has been used, cases persist with negative cytology (Oncins Torres et al., 2018). However, CO2 vaporization treatment has proven effective as a method for achieving negative cytology, i.e., cured women (Navarro Santana et al., 2018), considering that in the first round of screening, women at high risk for cancer are referred for colposcopy, with a low risk of serious abnormalities (Smith et al., 2022). In some cases, the Pap smear test was negative, showing that cytology may not be sufficient to identify all cases of high-risk infections (Kussaibi et al., 2021).

TAZ (Transcription coactivator protein)

HPV 16 and 18 are associated with TAZ, which promotes tumor proliferation (Rao et al., 2025b) and belongs to the S100 protein family, contributing to invasion, migration, and drug resistance (Wu & Xu, 2025), identifying the risk of precancerous lesions that progress to cervical intraepithelial neoplasia grade 1 (CIN1) (Baasland et al., 2025).

Table 1. Studys results

Study title	Methodology	Objective/Sample	Main results
Comparative Pilot Study on HPV Testing with Partial Genotyping in Primary Screening vs. Other Strategies for Cervical Cancer Population Screening, CRYGEN 16/18 study. (Hernández-Aguado et al., 2023)	Prospective study (quantitative: square difference)	The objective was to present the results of colposcopy-guided biopsies in women not infected with HPV16/18ar with negative cytology. Sample of 752 patients between the ages of 30 and 65.	The identification of intraepithelial neoplasia was associated with women who were smokers and menopausal, and was also associated with HPV 31 and 59. However, cytology was negative and abnormal for HPV 16 and 18, with a one-year wait for identification.
Meaning of high-risk HPV other than type 16/18 in women with negative cytology: Is it really safe to wait 1 year? (Kabaca et al., 2021)	Retrospective cohort study (dependence analysis, R-squared, and logistic regression)	Demonstrate the advantages of a new protocol for cervical cancer screening based on molecular detection of HPV with first-line genotyping of 16 and 18. Sample: 1,977 women aged 35 years.	High-grade HPV is caused by HPV 16 and is characterized by the fact that not all cases present abnormal cytology, and is also associated with HPV 33, causing the intraepithelial lesion to present high-grade squamous differentiation.
Distribution of prevalence, genotype, and test results Human papillomavirus pap smear in women in southeastern Turkey. (Aydogdu, 2023a)	Observational, cross-sectional, descriptive study	To assess the prevalence and types of cervical HPV in women in southeastern Turkey. Sample of 13,300 cervical smears.	HPV was detected more frequently in women aged 30 to 39 years. High-risk viruses predominated, and samples of ASCUS (Atypical Squamous Cells of Undetermined Significance) were present. However, healthy women were also identified, but with some lesions that could develop into cancer.
Risk factors of human papillomavirus-related cervical lesions in postmenopausal women in : a cross-sectional study. (Zeng et al., 2025a)	Quantitative, cross-sectional study.	To determine which risk factors are independently associated with cervical lesions in postmenopausal women. Sample: In Chengdu, 917 postmenopausal women were recruited.	A total of 624 patients with low-grade squamous intraepithelial lesions were identified, while 293 older women had high-grade squamous intraepithelial lesions. HPV types 16 and 18 were associated with a lower probability of developing high-grade squamous intraepithelial lesions.
Human papillomavirus infection and associated risk factors in indigenous and urban women in Cañar province, Ecuador (Julia Irma et al., 2020)	Descriptive observational cross-sectional study.	Detect HPV infection, identify genotypes present, quantify viral load, and analyze sociodemographic data. Sample: 200 samples from women between the ages of 15 and 55 as of September 17, 2018.	A high frequency of high-risk HPV infection and precancerous lesions was identified in women, especially in urban areas, suggesting greater exposure to risk factors.

HPV16-miRNAs exert oncogenic effects through enhancers in human cervical cancer. (Rao et al., 2025a)	Quantitative study	Investigate the microRNAs encoded by HPV 16 in cervical cancer cells and their effects on cell proliferation and migration via gene regulation. Sample: Cell lines used: SiHa: (HPV16-positive) C33A: (HPV negative)	The analysis shows that miRNAs are increased in cervical cancer, and different types of HPV activate genes that promote cell expansion and mobility, driving cancer progression.
Dow-regulation of miR-125b by HPV16 E6 might promote cervical cancer progression through TAZ/TEAD (Hao et al., 2025)	Experimental methodology and bioinformatics study	To determine whether microRNA miR125 influences the biological behavior of cervical cancer through the interaction of the oncoprotein E6 of HPV16 with TAZ. Sample: 15 patients with HPV16-positive squamous cell carcinoma. 15 patients with high-grade squamous intraepithelial lesion. 10 patients with chronic cervical inflammation.	miR125b is downregulated in HPV16 cervical cancer, and its expression reduces tumor growth by negatively regulating TAZ (Transcriptional co-Activator with PDZ-binding motif), a protein that promotes cancer cell proliferation.
Analysis of the reasons for abandonment of the follow-up and treatment process by women with precursor lesions of cervical cancer in the province of Jujuy: implications for management (Palomino M & Aires, 2012)	Descriptive study	To analyze the magnitude and reasons for treatment abandonment in women. Sample: Women diagnosed with HSIL (high-grade squamous intraepithelial lesion) treated in the province of Jujuy during 2010.	A significant proportion of women with precancerous lesions and carcinoma abandoned treatment, mainly due to organizational difficulties in the health system and personal reasons.
Cervical Cytology Coverage Uterine and Related Factors in Colombia, 2005 (Piñeros et al., 2007)	Quantitative, observational, cross-sectional, and analytical study.	To describe the use of the Pap test and the main factors related to its use in Colombian women aged 25 to 69. Sample: 37,211 households were interviewed, as well as 41,344 women aged 13 to 49 and 9,756 women aged 50 to 69.	Many women aged 25 to 69 have Pap smears, but poor women or women without children are less likely to have this test.

Expression of hypoxic and glycolytic markers CAIX, GLUT-1, HKII and its relationship with early response to treatment in squamous cell carcinoma of the cervix. (Moreno-Acosta et al., 2013a)	Quantitative, observational, retrospective cohort study.	This study evaluates the expression of CAIX, GLUT1, and HKII (carbonic anhydrase (CAIX), glucose transporter type 1 (GLUT-1), and hexokinase II (HKII) as possible indicators of early response to treatment in cervical cancer. Sample: 66 women with squamous cell carcinoma of the cervix, stages IIB and IIIB according to the FIGO classification, with a mean age of 47 years; 22 patients received radiotherapy, and 44 were treated with chemoradiotherapy.	In squamous cell cervical cancer, most lesions have keratin, and a minority do not. In advanced stages of the disease (FIGO IIB or IIIB), the GLUT-1 protein has been found near blood vessels.
Frequency of human papillomavirus in women attending cervical cancer screening programs in Chile (Brebi et al., 2017a)	Cross-sectional study	To determine the prevalence in a group of women who participated in a cervical screening program in the public health system in Chile Sample: 985 Cervical biopsy or smear	A large percentage of women were reported to be at high risk for cervical cancer, and several types of HPV were found, but the most common was HPV16, which is associated with a higher incidence of cervical cancer.
Characterization of common human papillomavirus genotypes in women treated at the Monte Sinai and Social Security Hospitals in Cuenca, Ecuador, 2008–2014 (Campoverde et al., 2017)	Cross-sectional observational study.	To identify the prevalence of different Human Papillomavirus (HPV) genotypes in cervical samples and analyze their relationship with epidemiological risk factors in sexually active women in the city of Cuenca. Sample: 500 women treated at hospitals of the Ecuadorian Social Security Institute (IESS), with real-time PCR and Pap smear tests.	Most of the people studied had HPV infection, with type 16 being the most common, associated with an increased risk of cervical cancer. The most frequent precancerous lesion was CIN I (Cervical Intraepithelial Neoplasia grade I), which indicates mild damage to the cervix.
Current status of human papillomavirus (HPV) infection associated with cervical lesions in Ecuadorian women. Systematic Review (Hao et al., 2025b)	Systematic Review	Review and analyze HPV research in Ecuador to identify prevalent genotypes and evaluate available information. Sample: Research on HPV in Ecuador over the last 11 years.	The results indicated that genotypes 16, 58, and 18 are the most prevalent in Ecuador. However, no positive homogeneity was found.

Multiple HPV 16 infection with two strains: a possible marker of neoplastic progression in the pre- (Bruno et al., 2020a)	Quantitative	To analyze the relationship between HPV infection types and cervical lesions to improve prognosis. Sample: 909 women with positive cervical cytology.	The presence of HPV was associated with an increased risk of developing severe cervical lesions. Most infections were caused by combinations that were more frequent in cases of CIN3 (Cervical Intraepithelial Neoplasia grade 3), with HPV genotypes 16, 18, and 31 being identified.
Effectiveness of high-risk human papillomavirus genotyping for cervical cancer screening. A multicenter screening cohort study in rural China. (Yu et al., 2024)	Observational, multicenter, open-label cohort study	To evaluate the effectiveness of primary testing for high-risk human papillomavirus (HR-HPV) in rural areas of China. Sample: 9,500 women aged 21 to 64 living in villages or subdistricts.	One in eight women had abnormal cytology, with the most frequently diagnosed lesions being cervical cancer in only a small percentage of cases. HPV 16 and 18 infection was associated with more severe cytological lesions.
Human papillomavirus infection in women and its prevention (Ochoa Carrillo et al., 2015)	Quantitative study	To analyze advances in knowledge about epidemiological aspects, as well as the prevention and early detection of cervical cancer, in order to disseminate information and promote preventive actions among the population. Sample: 2,956 samples were taken in the most affected countries in Latin America: Nicaragua, Honduras, El Salvador, and Mexico.	The results showed that HPV type 18 is found in a few cases of cervical cancer. This could be due to the damage this type of virus causes to cell structure, leading to their death and, as a result, their elimination. HPV type 16 was the most commonly found in cases of cervical cancer.
Prevalence of Oncogenic Human Papillomavirus in Cervical Cancer Patients in Riau Province, Indonesia (Savira et al., 2022)	Descriptive study	To evaluate the presence of high-risk HPV in women with cervical cancer in Riau Province, Indonesia, and to describe the clinical manifestations associated with HPV infection. Sample: 86 of the 110 women tested positive for genotype 16, the most common in the middle age group.	In Riau Province, type 16 was the most common HPV genotype. The most common clinical symptoms in patients with cervical cancer were vaginal bleeding, vaginal discharge (fluor albus), abnormal vaginal discharge, pelvic pain, and fatigue.

When analyzing cell lines from squamous cell carcinoma of the head and neck (SCCHN), it was observed that those derived from cases without clinical progression showed slower proliferation and higher expression of a tumor suppressor gene that produces the protein 53 (TP53) related to the state of infection (Nair et al., 2020), with the hormones estrogen (E2) and prolactin (PRL) increasing the expression of oncogenes (E6/E7) in cervical cancer cells, raising hormone levels and changing the cellular location of their receptors (Ramírez-López et al., 2019).

GLUT1 (Glucose transporter 1)

HPV 16 and 18 are associated with GLUT1, a protein that facilitates the transfer of malignant cells (Moreno-Acosta et al., 2013b). Magnetic resonance imaging (MRI) detected cystic pituitary adenomas (PA) and the expression of certain proteins; however, PAs are more invasive and proliferative (Yin et al., 2025). In addition, hepatocellular carcinoma (HCC) was identified, as was the enzyme dihydrolipoil transacetylase (DLAT), promoting the spread of cancer to other parts of the body (Yin et al., 2025). Six genes associated with metabolism were also identified: ASRGL1, SLC38A3, SLC2A1, ALDH1B1, GAD1, and GLYATL1, with SLC38A3 being the most oncogenic, showing lower immune filtration and higher tumor risk (Jiang et al., 2025). Syphilis, caused by Treponema pallidum (Tp), generates inflammatory substances. When glucose levels rise, it increases the production of these substances, and when glucose or Hypoxia-Inducible Factor 1 (HIF-1) is blocked, inflammation decreases (Xiong et al., 2025).

CIN1 (Cervical Intraepithelial Neoplasia grade 1)

These HPV genotypes develop cervical intraepithelial neoplasia (CIN1) (Campoverde et al., 2017), which usually disappears spontaneously and does not require treatment (Bonilla-Osma et al., 2018). Immunohistochemistry of p16INK4a, a tumor suppressor protein, was detected (Barrios et al., 2012), and p16 staining was used to differentiate between cervical intraepithelial neoplasia grade 1 (CIN1) and cervical intraepithelial neoplasia grade 2 (CIN2) lesions. If the CIN2 sample is positive, it is classified as grade 2 cervical intraepithelial neoplasia (CIN2), helping to identify lesions that require treatment (Dai et al., 2025). Performing coinfection testing alongside HPV-ar could reduce the incidence of grade 1 cervical intraepithelial neoplasia (CIN) in the region (Onyango et al., 2025).

HPV 33

HPV 16 has been associated with HPV 33, a relationship that favors the development of high-risk squamous intraepithelial lesions (Hernández-Aguado et al., 2023), responsible for conventional treatment failure rates (Mungo et al., 2023). It allowed the identification of grade 3 cervical intraepithelial neoplasia (CIN3) in patients with atypical glandular cells (AGC) through extensive genotyping (Tang et al., 2024), also finding the proportion of invasive cervical cancer (ICC), which is most responsible for cases worldwide and highlighting the importance of developing genotype-specific vaccination and screening strategies (Wei et al., 2024), demonstrating that HPV33 was one of the most common genotypes in women aged 40 to 44, highlighting the importance of taking preventive measures against cervical cancer (Lin et al., 2024)

ASCUS (Atypical squamous cells of undetermined significance)

HPV 16 and 18 are commonly referred to as atypical squamous cells of undetermined significance (ASCUS) in women aged 30 to 39 (Aydogdu, 2023b), indicating mild changes in squamous cells that do not allow for a determination of whether they are benign or abnormal. Serious lesions were found in postmenopausal patients more than in premenopausal patients, and referral for colposcopy and biopsy is recommended in these cases (Jin et al., 2023). In

patients with atypical glandular cells (AGC), the rate of incomplete viral genotyping is increased (Tang et al., 2024). (Tang et al., 2024), unnecessary colposcopies (Rao et al., 2025a), the viral load decreased, and the virus remained in an episomal form, which could reduce the risk of progression to cervical cancer (Na et al., 2024).

Prevalence

HPV has been detected in asymptomatic women, often manifesting as precursor lesions and cervical cancer, even though the genotypes do not cause cancer on their own, but rather an infection that worsens (Brebi et al., 2017b). However, the most prevalent are 16, 58, and 18, without a homogeneous distribution (Falcón-Córdova & Carrero Yenddy, 2021), while in advanced cases such as cervical intraepithelial neoplasia CIN 3, genotypes 16, 18, and 31 stood out for their association with severe damage to the cervix (Bruno et al., 2020b). Although type 16 appears in both mild and severe alterations, its link with the latter was low (Zeng et al., 2025b). Urban areas are conditions that favor high-risk infections (Julia Irma et al., 2020), where many patients interrupt medical follow-up due to personal or health barriers (Palomino M & Aires, 2012), while those with fewer economic resources or no children have less frequent access to preventive screening (Piñeros et al., 2007).

CIN 3 (Cervical Intraepithelial Neoplasia Grade 3)

HPV infection is associated with an increased risk of developing serious cervical lesions, the most common being Grade 3 Cervical Intraepithelial Neoplasia (CIN3) with the most common genotype HPV 16 (Bruno et al., 2020b). If this disease continues to progress in the human body, it can lead to cervical cancer (Basile & Calderaro Di Ruggiero, 2024). This type of cancer often begins with precancerous lesions called CIN, which can be classified as grade 1, 2, or 3 (with 2 and 3 being the most severe) (Julio et al., 2024). Having grade 3 cervical intraepithelial neoplasia (CIN3) implies a high risk of cervical cancer, and even with follow-up, the risk increases over time (Loopik et al., 2020). If CIN2 (cervical intraepithelial neoplasia grade 2) is detected by biopsy or by a surgical procedure called LEEP, it is possible to prevent progression to a more severe grade (Rao et al., 2025a).

Mild abnormalities

Type 16 was detected in both mild and severe abnormalities, with little association with severe abnormalities (Zeng et al., 2025b). Non-pregnant women showed a higher frequency of atypical squamous cells, especially in the 20-29 age group (Rozany Mucha Dufloth, 2015). Colposcopy has proven useful in identifying cervical lesions in patients with mild cytological results (Allende et al., 2024). The Linear Matrix HPV genotyping test is used to analyze cervical DNA in women with cytology results within normal limits or with minor abnormalities, such as low-grade squamous intraepithelial lesions (Aguilar-Lemarroy et al., 2015). Finally, to guide the treatment of grade 1 cervical intraepithelial neoplasia, the probability of lesion progression and the frequency with which these are treated in women who are part of cervical cancer screening programs are analyzed (Baasland et al., 2025).

Screening

Participation in screening decreases among those facing economic difficulties or who have not had children (Piñeros et al., 2007), since early detection of cervical cancer in its precancerous stage allows for effective treatment (Himabindu et al., 2025). Currently, the effectiveness of 10 primary screening strategies based on molecular, cytological, or combined techniques is being analyzed (Hernández-Aguado et al., 2023). Among the most relevant proposals is the design of a screening method capable of simultaneously detecting cytological techniques, or a combination

of both (Hernández-Aguado et al., 2023). Among the most relevant proposals is the design of a screening method capable of simultaneously detecting HPV types 16 and 18, which are responsible for more than 70 % of cervical cancers, along with other high-risk types (Mohammadi et al., 2025). These advances may help develop targeted screening approaches and programs in regions with a higher incidence of abnormal cell changes (Gupta et al., 2025).

Limitations

The present study has some limitations, as it could have covered many more sources identified in the literature. In addition, the articles consulted present specific results for a certain type of population and methodology, but they have been generalized. The abundant literature on the subject allows us to identify additional aspects beyond manifestation and prevalence. More comprehensive studies are recommended to move toward a systematic review, as the subject warrants such a review.

CONCLUSION

Genotypes 16 and 18 can persist in women with negative cytology, even after certain treatments, where CO2 vaporization is more effective in achieving negative results. Although women carrying these viral types are often referred for colposcopy, with a low risk of developing serious lesions, negative cytology alone does not always detect all high-risk infections. The TAZ protein has been implicated in tumor proliferation, invasion, and drug resistance, thereby increasing the risk of lesions such as grade 1 cervical intraepithelial neoplasia, in which hormones such as estrogen and prolactin elevate oncogenes. GLUT1 promotes tumor spread, increases tumor risk, and, in the symphysis, increases inflammation in response to glucose. It can also cause grade 1 cervical intraepithelial neoplasia but sometimes progresses to grade 2. Staining allows for more accurate differentiation of lesions requiring treatment. HPV 33 develops high-risk lesions, including grade 3 cervical intraepithelial neoplasia (CIN3) and even invasive cervical cancer, making vaccination and screening strategies necessary. ASCUS indicates mild cellular changes, especially in postmenopausal women, so colposcopy and biopsy are recommended for patients with atypical glandular cells (AGC) and without genotyping, which increases the risk. Finally, when the virus is found in episomal form and with a lower load, it reduces the risk of progression to cancer.

HPV type 16 is linked to precancerous lesions such as cervical intraepithelial neoplasia grade 3 (CIN3), which can progress to cervical cancer if left untreated. Electrosurgical excision with a loop (LEEP) is an effective option for treating CIN2 and preventing its progression. Although HPV type 16 can be found in both mild and severe lesions, its presence does not always indicate progression to severe forms, as its association with advanced cases is relatively low. Women aged 20 to 29 who are not pregnant have more cellular abnormalities. Colposcopy and genotyping help detect lesions, and the management of CIN1 depends on risk. Early detection improves prognosis, but screening rates are low among women with fewer resources. New screening strategies that identify high-risk HPV seek to improve prevention in vulnerable areas.

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