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*Screening, Diagnosis, and Prevention in Clinical Practice:
Evidence from Argentine and Latin American Medicine
(English Version)*

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Cervical cytology and cervical cancer

Citología cervical y cáncer de cuello uterino

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ABSTRACT

Objective: to compare cervical cytology and cervical cancer.

Method: literature review based on a narrative synthesis. Data sources: Scopus, Science Direct. Data selection: Documents were selected and analyzed through a critical literature review, considering the inclusion and exclusion criteria.

Results: a corpus of 19 articles was analyzed: 3 qualitative, 1 comparative, 9 quantitative, 1 quantitative retrospective, and 1 quantitative logistic model. The study population contained only one category: 19 articles focused on women. The studies were conducted in various countries: 5 in the US, 1 each in Canada, China, France, England, Greece, Brazil, the United Kingdom, Europe, Norway, Asia, and the Middle East, each contributing a unique perspective to the research. The diagnoses were characterized by 4 articles that highlighted high sensitivity in HPV and fluorescence, low clinical signs, and the usefulness of AGC to detect cancer. The associated factor was characterized by having 10 articles that helped facilitate HPV, affected pregnancy, misinformation, overscreening, treatment well, and failure in prevention. HPV manifestation was characterized by 4 articles that highlighted cell loss, elevated markers, useful cytology, and cultural barriers. Regarding socioeconomic level, 4 articles mentioned that they were from low-income countries, 8 articles mentioned that they were from middle-income countries, and 6 were from countries that did not specify their socioeconomic level.

Conclusion: HPV type 16 is strongly associated with cervical cancer, with high diagnostic efficacy through molecular and cytological tests. The studies, mostly conducted in middle- and high-income countries, show barriers such as misinformation, failures in prevention, and inequality in access to diagnosis. The need to improve education and access to health services is highlighted, especially in low-income settings.

Keywords: Cervical Cytology; HPV; Cervical Cancer.

RESUMEN

Objetivo: comparar la citología cervical y el cáncer del cuello uterino.

Método: revisión de la literatura basado en una síntesis narrativa. *Fuentes de datos:* Scopus, Science direct. *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 19 artículos de los cuales 3 son cualitativos, 1 comparativo, 9 cuantitativos, 1 cuantitativo retrospectivo y 1 cuantitativo de modelo de regresión logística. La población estudiada solo contiene una categoría: 19 artículos se centraron en mujeres. Los estudios se realizaron en diversos países: 5 de EE. UU, 1 en Canadá, China, Francia, Inglaterra, Grecia, Brasil, Reino Unido, Europa, Noruega, Asia, Medio Oriente, cada uno aportó

una perspectiva única a la investigación. Los diagnósticos se caracterizaron por 4 artículos que resaltaron la alta sensibilidad en VPH y fluorescencia, bajo signos clínicos, y utilidad de AGC para detectar cáncer; el factor asociado fue caracterizado por 10 artículos que ayudaron facilitar VPH, afectar embarazo, desinformar, sobrecargar, tratar bien y fallar en prevención; la manifestación del VPH se caracterizó por 4 artículos que resaltaron la pérdida celular,

marcadores elevados, citología útil y barreras culturales. Respecto al nivel socioeconómico, 4 artículos mencionaron que eran de países de bajos ingresos, 8 artículos mencionaron que era países medio y 6 de países que no especifican su nivel socioeconómico. **Conclusión:** el VPH tipo 16 está fuertemente asociado al cáncer de cuello uterino, con alta eficacia diagnóstica mediante pruebas moleculares y citológicas. Los estudios, realizados mayormente en países de ingresos medios y altos, evidencian barreras como desinformación, fallas en prevención y desigualdad en el acceso al diagnóstico. Se resalta la necesidad de mejorar la educación y el acceso a servicios de salud, especialmente en contextos de bajos recursos.

Palabras clave: Citología Cervical; VPH; Cáncer del Cuello Uterino.

INTRODUCTION

Cervical cancer is a major global health problem because 10 % of those who suffer from infections develop cervical cancer, ranking fourth among cancers affecting women (Song & Wang, 2025a), with a mortality rate of almost 90 % (Van Keer et al., 2017), with HPV being an associated factor (Ho et al., 1995) that develops high-grade infections in 4 % of cases (Fey & Beal, 2004). In the United States, late detection (Leyden et al., 2005) and ineffective screening (Manjula, 2023) result in limited opportunities, increasing mortality among young older women (Zhetpisbayeva et al., 2023) due to the incorrect use of traditional screening methods. Added to this reality are other factors such as early marriage and multiple pregnancies (Gultekin et al., 2020), now requiring invasive procedures (Rohner et al., 2020).

Biomarkers do not offer an assertive value (Koenen et al., 2015), so it was necessary to use urine as a cervical biopsy for HPV DNA testing (Burroni et al., 2015), aggravating persistent infections in women with positive results (Castle et al., 2005). In 2008, two vaccines were implemented and administered in some European countries (Burroni et al., 2015), mostly in adolescents to prevent human papillomavirus (Moss et al., 2017). On the other hand, Lynch syndrome increases the development of endometrial cancer by 71 % compared to the general population (Hampel et al., 2006), with MMR-deficient carcinomas including the absence of MSH2/MSH6, MSH6, PMS2, or MLH1/PMS2 without hypermethylation (Y. Wang et al., 2018). For this type of cancer, transvaginal ultrasounds and biopsies are performed as an alternative that does not offer benefits because it does not reduce mortality (Renkonen-Sinisalo et al., 2007).

Several recent studies have addressed key aspects of cervical cancer and its detection (D. Singh et al., 2023) analyzed global inequalities in the incidence and mortality of this disease (Li et al., 2025) studied the relationship between high-risk HPV genotyping and histopathological

findings in women with abnormal glandular cytology (Thrall et al., 2024), and alternatives to Pap smears as a triage test in HPV-positive cases were also evaluated, highlighting new techniques such as methylation. Along these lines (Song & Wang, 2025a), methylation testing was shown to surpass traditional cytology in diagnostic accuracy, improving risk classification and reducing unnecessary procedures.

The objective of this narrative review was to briefly discuss cervical cytology in women with cervical cancer, considering the diagnosis, associated factors, and manifestation of HPV.

METHOD

A comprehensive narrative review was conducted to explore the existing scientific literature on cervical cancer and cervical cytology, consulting the Scopus and ScienceDirect databases. To refine the search, terms such as “cervical cancer,” “cervical cytology,” “early cancer detection,” “cervical cancer prevention,” and “Pap tests” were used. In addition, the Boolean operator AND was used to both 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.

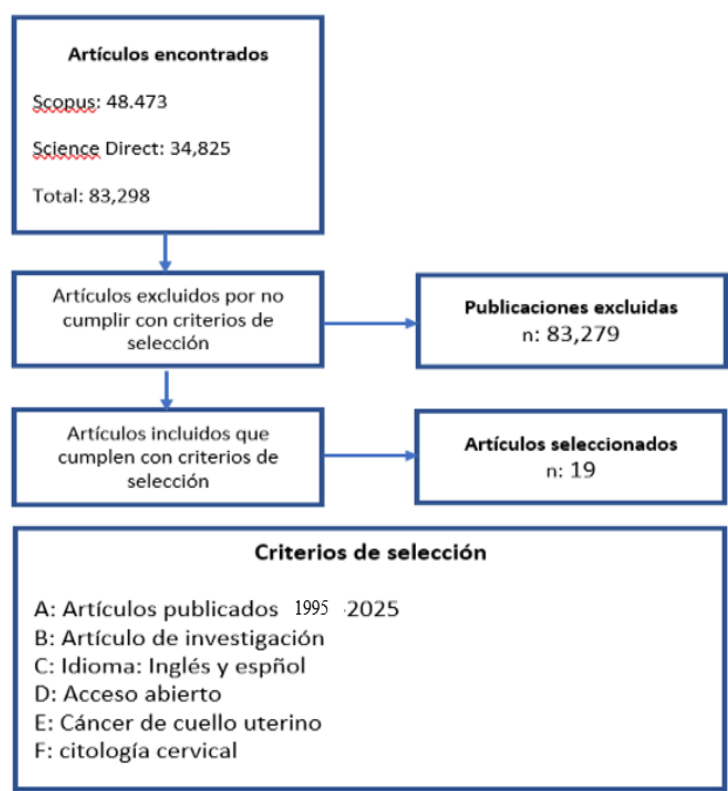


Figure 1. Flow diagram

This search covered texts written in English and Spanish, specifically excluding case reports, interviews, letters to the editor, theses, and books, due to their less empirical nature or specific focus. Within the aforementioned databases, a total of 83,298 articles were initially identified using the designed search string. Of these, 48,473 corresponded to the Scopus database and 34,825 to ScienceDirect. Duplicate articles were then removed. Subsequently, articles that did

not align with the study's objective and others that did not contribute to the results table or the discussion of the work, in addition to not meeting the established inclusion criteria, were excluded. As a result of this filtering and selection process, a final corpus of 19 articles relevant to the review was obtained.

RESULTS AND DISCUSSION

A corpus of 19 articles was analyzed, comprising 12 quantitative, 4 qualitative, 1 systematic review, 1 descriptive narrative review, 1 comparative study, and 1 retrospective study. The population studied included women aged 25 to 69, adolescents, pregnant women, homeless women, women from ethnic minorities, and school teachers, as well as general population records from countries with different contexts. The studies were conducted in various countries, including Canada, France, Norway, Libya, the United States, Arab countries in the Middle East, Europe, and Latin America, providing perspectives from diverse social, economic, and cultural realities. Six articles were identified that addressed factors associated with limited access to screening tests or socioeconomic conditions; five that focused on the effectiveness or improvement of diagnostic techniques, such as liquid cytology or colposcopy; and four that dealt with clinical manifestations of HPV and molecular markers. In addition, three articles analyzed the results of surgical interventions or treatments in women with cervical lesions. In terms of socioeconomic status, most of the studies were conducted in low- and middle-income countries, reflecting a global concern for improving access to and effectiveness of cervical cancer diagnosis in vulnerable contexts.

The study aimed to evaluate the effectiveness of different diagnostic methods, such as HPV testing, cytology, fluorescence, and molecular biomarkers (E-cadherin and p16INK4a) in the early detection of HPV-16-associated cervical cancer, as well as to identify biological and social factors that influence its diagnosis and follow-up, to strengthen prevention and screening strategies.

Diagnostics

Some diagnostics, such as HPV testing, are more sensitive and consistent than cytology in detecting severe cervical lesions (Ramírez et al., 2023). The cervical fluorescence method, which distinguishes CIN2+ cervical lesions by detecting human papillomavirus (HPV) in cervical cell smears, remains a useful diagnostic tool due to its predictive value (Vaitkuviene et al., 2012). The detection of cervical cancer allows for the identification of some symptoms, such as purulent mucus and induced bleeding, despite having low predictive value (Marrazzo et al., 2002). On the other hand, abnormal granular cells (AGC), despite being benign, show lesions that help to detect better cases of cervical cancer (Risse et al., 2010).

HPV testing

HPV testing is more sensitive and consistent than cytology in detecting serious cervical lesions. It is used for preoperative conditions (Wu et al., 2025) and to identify co-infections with *Chlamydia trachomatis* (CT) among women who are positive for high-risk human papillomavirus (HPV-HR) (Onyango et al., 2025). It should be noted that, in these tests, infections by a single HPV genotype are more frequent, especially in cases of high-grade lesions such as vaginal intraepithelial neoplasia (VaIN) and cervical intraepithelial neoplasia (CIN), compared to multiple infections (Lu et al., 2025a).

Table 1. Results

Types of Study	Methodology	Objective/Sample	Main Results
Cervical Smear Photodiagnosis by Fluorescence (Vaitkuvienė, 2012)	Comparative studies (statistical differences, linear correlation)	Identify changes that typically occur in cells and tissues during physiological processes. Sample: 78 cases	Some regions of cervical fluorescence allow CIN2+ cervical lesions to be distinguished. Cervical smears (a test used to detect human papillomavirus (HPV) in cervical cell samples) are useful for diagnosis because they have predictive value.
Performance of cervical cytology and HPV testing for primary cervical cancer screening in Latin America: an analysis within the ESTAMPA study (Ramírez, 2023)	Quantitative (logistic regression models)	To evaluate the effectiveness of cytology and high-risk HPV testing for precancer and intraepithelial neoplasia. Sample: 42,000 women aged 30 to 64 were evaluated	The study showed that HPV testing is much more sensitive and consistent than cytology in detecting serious cervical lesions.
Progressive loss of E-cadherin immunoexpression during cervical carcinogenesis (Cavalcante, 2014)	Quantitative	To investigate the immunoexpression of E-cadherin during cervical carcinogenesis. Sample: 64 cases of different types of cervical cancer were diagnosed.	The loss of E-cadherin (a protein that acts as an adhesive between epithelial cells) increases as damage to the cervix progresses, being most noticeable in cancer.
Mycoplasma genitalium Infection Is Associated with Microscopic Signs of Cervical Inflammation in Liquid Cytology Specimens (Dehon, 2014)	Comparative	To evaluate common infectious etiologies and liquid cytology samples. Sample: Studies were conducted on 473 women	High cervical inflammation is caused by the bacterium M-genitalium and is associated with HPV-18, facilitating the transmission of the disease, as evidenced by having passed the threshold of -2 per epithelial cell.
Perinatal outcomes of pregnant women with cervical intraepithelial neoplasia (He, 2013)	Quantitative	Diagnose the results in pregnant women with the help of cervical intraepithelial neoplasia diagnosis. Sample: 108 cases of pregnant women	The rate of cesarean sections increased significantly due to the elevation of the CIN, which complicated the pregnancy of some women.
Predicting Chlamydial and Gonococcal Cervical Infection: Implications for Management of Cervicitis (Marrazzo, 2002)	Quantitative	Establish cervical clinical outcomes to anticipate infections by Chlamydia trachomatis and Neisseria gonorrhoeae. Sample: The study was conducted on 6,230 women	Cervical signs such as purulent mucus and induced bleeding have a low positive predictive value for detecting infections in women aged 25 years and older.
Increased diagnostic accuracy of atypical glandular cells in cervical liquid-based cytology using cell blocks (Risse, 2010)	Quantitative	Reducing the number of diagnoses in glandular cells using liquid-based cervical cytology (brushing) Sample: Performed on 87 patients	Most AGCs (abnormal glandular cells) are benign, but they showed actual lesions, which helped to better detect cases.

Contribution of combined colposcopy and cytology in cervical pathology (Tamiolakis, 2005)	Quantitative	To evaluate the usefulness of colposcopy and Pap smear tests in the diagnosis of abnormal cells. Sample: 58 cases	Gynecological cervical cytology improves diagnosis when the choice detected is greater.
Immunostaining in cytological and histological specimens from the uterine cervix: A systematic review and meta-analysis (Tsoumpou, 2009)	Systematic	To evaluate whether the p16INK4a biomarker helps to better detect and classify cervical lesions caused by HPV. Sample: 61 studies were conducted	p16INK4a (a biomarker of HPV infection, a measurable substance or characteristic that indicates the presence, progression, or response to a disease or treatment) is detected more often when the cervical lesion is more severe, whether in smears (cell or fluid samples) or biopsies (removal of a small tissue sample).
Integrative review of cervical cancer screening in Western Asian and Middle Eastern Arab countries (Ali, 2017)	Qualitative	Explore factors that influence access to women with cervical cancer in some Arab countries.	Arab Muslim women face a lack of information about cervical screening, a procedure that helps identify those who may have a specific disease or condition before they show symptoms.
Results of cervical cancer detection among First Nations and non-First Nations women of the Nations in Alberta, Canada (Yang et al., 2024)	Quantitative	Evaluate using records from the Cervical Cancer Screening Program among First Nations women in Canada. Sample: 25-69 years	First Nations women participate less in screening (identification of diagnostic tests) and have more high-risk Pap smears than non-Indigenous women.
Preferences for cervical cancer detection: the role of implicit associations (Korfagea et al., 2017)	Quantitative	Investigate whether implicit associations about Pap smears influence attitudes and intention to undergo screening. Sample: 226 people.	The brochure improved knowledge but did not change screening intentions, which depended on conscious attitudes. It is recommended that it be adapted for at-risk groups.
Excess Pap Testing for Cervical Cancer Screening: Any Benefit? A Retrospective Cohort in Alsace, France (Thiery et al, 2016)	Qualitative	To evaluate the benefits or harms of shorter intervals between Pap tests. Sample: Samples were taken from women aged 25 to 35.	Overscreening detects more minor lesions without reducing cancer, leading to possible overtreatment.
Cervical cancer in women under 40 years of age: a cohort study of clinicopathological characteristics and outcomes of fertility-preserving surgery (Matthew Flint 2025)	Quantitative	Conduct consistent studies in patients with cervical cancer under 40 years of age for complete resection (complete removal of an organ, tissue, or part thereof during surgery). Sample. Fifty-seven patients were included.	The study reveals failures in the prevention of cervical cancer in young women, with low cytological detection and a lack of vaccination data. Conservative surgery showed good results in fertility and low recurrence.

Cervical Cancer Screening Among Homeless Women of New York City Shelters (Asgary et al., 2015)	Quantitative	To evaluate the proportion and factors associated with Pap smear screening among homeless women. Sample: 297 women	Homeless women showed little knowledge about Pap tests and received little or no follow-up. Improving education and access to screening is recommended.
An overview on the implementation of HPV vaccination in Europe (Bonanni et al., 2011)	Narrative review	To describe the status of implementation of human papillomavirus (HPV) vaccination programs in Europe and highlight the strategies adopted to improve the coverage and effectiveness of these programs. Sample: 40 countries	Genital infections do not affect the quality of cytology. Even if there is an infection, it is not recommended to delay the test, as this could result in missing the opportunity to perform it.
Regular follow-up with cervical cytology is of questionable value following surgical treatment of microinvasive cervical cancer (Ashmore et al., 2024)	Quantitative Retrospective	- To evaluate the usefulness of prolonged cytological monitoring after conservative surgery for microinvasive cervical cancer (stages IA1 and IA2). Sample: 98 women	Microinvasive cancer with no recurrence after 11 years. Only two cases with lesions, so follow-up could be spaced out.
Overcoming Cultural and Linguistic Barriers: South Asian Minority Women's Experiences with Radiotherapy for Cervical Cancer in Norway (Harvinderjit et al., 2025)	Qualitative	This analysis sought to promote fairer and more equitable healthcare services and provide more individualized information to women who are part of minority groups. Women aged 30 to 55	Three predominant themes were identified in relation to the experiences of ethnic minority women undergoing radiotherapy in Norway: cultural aspects, linguistic challenges, and feelings of loneliness and vulnerability. (HPV manifestation)
Awareness and knowledge gaps about cervical cancer. (Hamid et al., 2025)	Quantitative	This analysis assessed secondary school teachers' understanding of the warning signs, symptoms, and risk factors for cervical cancer in Benghazi, Libya, and analyzed sociodemographic connections with knowledge gaps. Sample: 3,892 female teachers	In Benghazi, female teachers' limited knowledge of cervical cancer highlights the need for education and campaigns to promote prevention and HPV vaccination.

Fluorescence method

The cervical fluorescence method, which distinguishes CIN2+ lesions of the cervix by detecting human papillomavirus (HPV) in cervical cells using smears, is a useful diagnostic tool due to its predictive value when combined with colposcopy, EF, and biopsy (Vaitkuviene et al., 2012). For EF, a cream containing 3 % 5-ALA is used. After about 2 hours, fluorescence spectra are collected (Vansevičiute et al., 2015), detecting abnormal areas and separating cell parts, aiding diagnosis based on complete slide images (Jiang et al., 2023). A FISH platform is also applied to cervical smear samples to detect and characterize tumor and endothelial cells (TECs) at various stages of the lesion, exploring its diagnostic utility (Wang Yanling, 2025).

AGC

Abnormal granular cells (AGC), although benign, can help detect cervical cancer more effectively (Risse et al., 2010) by specifying findings such as polyps, neoplasms, or cancer, which justifies a complete evaluation (Monti et al., 2024). In this regard, identifying genotypes 16, 18, 58, 52, and 33, which are responsible for high-risk HPV infection (Tao et al., 2025), is essential for guiding management (Tang et al., 2024) in women aged 30 to 49 years. It was observed that the nuclei had somewhat varied shapes and small nucleoli (Turashvili et al., 2019), which facilitated a good cytological diagnosis (Toyoda et al., 2019).

Associated factor

Lack of information and knowledge about cervical cancer is a factor (Hamid et al., 2025; Ali et al., 2017), as is homelessness, which prevents women from receiving follow-up care (Asgary et al., 2016). Women who participate little in screening also have higher-risk cytologies (Yang et al., 2024). However, information in brochures should increase knowledge, but the intention to screen is not effective (Korfage et al., 2018). On the other hand, excessive screening may detect more minor lesions, but it does not reduce cancer and can lead to overtreatment (Thiery et al., 2017). Biological factors also play a role: Mycoplasma genitalium can cause inflammation and facilitate HPV-18 transmission (Dehon & McGowin, 2014). Similarly, the increase in CIN has complicated pregnancies and raised the rate of cesarean sections (He et al., 2013). Finally, the positive results: conservative surgery in young people has been effective (Flint et al., 2025). After 11 years without recurrence, it is suggested to space out follow-up (Ashmore et al., 2024).

Lack of information

The lack of information and limited knowledge about cervical cancer becomes a factor (Hamid et al., 2025) (Ali et al., 2017), so it is proposed to evaluate the performance of high-risk HPV screening within the National Cancer Detection Program (PNDC) and compare it with traditional cytology, applying an equitable statistical approach that allows for the identification of areas for improvement and the strengthening of the national program (Hurtado-Salgado et al., 2018);(Isaza, 2009), while the prevalence of HPV was higher in women aged 30 years, with single infections predominating and variations according to area and altitude, so it is recommended to adjust detection and prevention strategies considering these geographical and demographic differences (Q. Wang et al., 2022)

Biological factors

Some biological factors also cause inflammation, facilitating the transmission of HPV-18 (Dehon & McGowin, 2014). Variants of the CTLA4 gene have been found that can influence the immune response (de Oliveira et al., 2025) to cervical cancer, emphasizing the need for early detection and intervention, inhibiting the growth and migration of cancer cells () and improving the response to cisplatin (H. Tao et al., 2024) by altering cell metabolism and activating the

MAPK (Mitogen-Activated Protein Kinase) pathway, which aids in cell regulation (Huang et al., 2024).

Manifestation of HPV

The loss of E-cadherin, a protein that acts as an adhesive between epithelial cells, increases as cervical tissue damage progresses, becoming more pronounced in advanced stages of cancer (Cavalcante et al., 2014a). Similarly, the p16INK4a biomarker is associated with HPV infection and was detected more frequently in advanced cervical lesions, both in smear samples and biopsies (Tsoumpou et al., 2009). On the other hand, genital infections do not affect the quality of cytology; in this sense, it is not recommended to delay the test, as an important opportunity for early detection could be missed (Bonanni et al., 2011) in women who underwent radiotherapy (H. V. Singh et al., 2025).

E-cadherin

The loss of E-cadherin, a protein that acts as an adhesive between epithelial cells, increases as cervical tissue damage progresses, becoming more pronounced in advanced cancer stages (Cavalcante et al., 2014b). It is one of the promising molecular markers highlighted for its diagnostic efficacy in SCC (head and neck squamous cell carcinoma) (Meliante et al., 2025), which is essential for evaluating how metformin can modulate the malignant behavior of aggressive cells and make them more sensitive to radiotherapy (Palazzo et al., 2024). It also interprets the joint oncogenic effect of HIV-1 and HPV-16 by promoting a partial EMT transition and facilitating aggressive characteristics such as motility, clonogenicity, and tumorigenicity (Zhitkevich et al., 2024). The loss of this protein makes the epithelial barrier more sensitive (Samuels et al., 2023).

p16INK4a biomarker

The p16INK4a biomarker is associated with HPV infection and was detected more frequently in advanced cervical lesions, both in smear samples and biopsies (Tsoumpou et al., 2009b), and increases as the severity of the cervical lesion progresses, highlighting its value as a diagnostic marker in HPV-16-associated cervical cancer (Khamseh et al., 2025). The presence of DNA was evaluated in relation to tumor status determined by various molecular markers, including immunohistochemistry (Rosing et al., 2025). Additional staining with SenTraGor (GL13) confirmed the presence of senescent cells, suggesting that p16INK4a overexpression in this case reflects cellular senescence rather than an HPV-driven oncogenic process (Chaurasia et al., 2025). Immunocytochemistry was performed on the lesion samples using antibodies (Usta et al., 2025).

Cytology

On the other hand, genital infections do not affect cytology quality; accordingly, it is not recommended to delay testing, as an important opportunity for early detection could be missed (Bonanni et al., 2011). This is performed in women of appropriate age to assess the risk of cervical lesions and guide the need for colposcopy, biopsy, or treatment (Xiao et al., 2025). HPV testing has a sensitivity for detecting high-grade CIN (cervical intraepithelial neoplasia) (Lu et al., 2025). Screening results can improve adherence in women who avoid invasive gynecological examinations (Song & Wang, 2025) by detecting cellular changes before they progress to precancerous lesions or cervical cancer (Himabindu et al., 2025).

Limitations

This research has certain limitations, as it was not possible to cover all the existing literature

on the subject. Therefore, only some associated and clinical factors were addressed. In addition, the studies mentioned in the discussion have a particular focus depending on the population and methodology used, while this study conducted a more general analysis. For this reason, it is recommended that the review of sources be expanded to develop a systematic review in the future.

CONCLUSION

HPV testing is sensitive because its cytology allows the detection of severe cervical lesions in preoperative conditions, identifying co- and multiple infections, as well as high-grade lesions and intraepithelial neoplasia. In addition, the fluorescence method has proven useful for detecting cervical lesions with high accuracy, especially when combined with machine learning.

Likewise, the presence of AGC and the identification of high-risk genotypes are key to a more effective and targeted cytological diagnosis. Cervical cancer is attributed to a lack of information and knowledge, and it is recommended that detection and prevention strategies be adjusted in different regions and altitudes. In addition, some biological factors cause inflammation, facilitate HPV-18 transmission, and identify variants of the CTLA4 gene, influencing the immune response to cervical cancer and emphasizing the need for early intervention. The loss of E-cadherin promotes the progression of cervical cancer and suggests diagnostic value in SCC.

In addition, it influences the response to treatment and cellular aggressiveness promoted by HIV-1 and HPV-16. The p16INK4a biomarker is associated with HPV and cervical cancer, although its overexpression may also indicate cellular senescence, so it should be interpreted with caution. Genital infections do not alter cytology, and delaying its performance prevents early detection of cervical lesions.

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