

TRENDS AND CHALLENGES IN THE DETECTION AND PREVENTION OF HUMAN PAPILLOMAVIRUS

TENDÊNCIAS E DESAFIOS NA DETECÇÃO E PREVENÇÃO DO PAPILOMAVÍRUS HUMANO

TENDENCIAS Y DESAFÍOS EN LA DETECCIÓN Y PREVENCIÓN DEL VIRUS DEL PAPILOMA HUMANO

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Submission: 03-02-2025**Approval:** 26-06-2025**ABSTRACT**

Introduction: Human Papillomavirus is a widely spread sexually transmitted infection worldwide, proven to be responsible for a significant number of cervical cancer cases.

Objective: This study aims to identify the main trends and challenges in the detection and prevention of the virus, beyond vaccination, through an integrative literature review.

Method: This is an integrative literature review, with a systematic search of scientific databases, including studies that address detection methods, prevention strategies, screening programs, and educational interventions in different populations. **Results:** Although there have been advances in early detection and the implementation of vaccines, there are still significant barriers, such as unequal access to screening programs and a lack of awareness of the issue in vulnerable populations. **Conclusion:** In addition to vaccination, it is essential to strengthen health education strategies and expand the coverage of screening programs to ensure early detection and reduce the incidence of Human Papillomavirus and its complications.

Keywords: Human Papillomavirus; Uterine Cervical Neoplasms; Early Detection of Cancer; Papillomavirus Vaccines.

RESUMEN

Introducción: El Virus del Papiloma Humano es una infección de transmisión sexual muy difundida en todo el mundo, siendo responsable de un número significativo de casos de cáncer cervical. **Objetivo:** Este estudio tiene como objetivo identificar las principales tendencias y desafíos en la detección y prevención del virus, además de la vacunación, a través de una revisión integrativa de la literatura. **Método:** Se trata de una revisión integrativa de la literatura, en la cual se realizó una búsqueda sistemática en bases de datos científicas, incluyendo estudios que abordan métodos de detección, estrategias de prevención, programas de cribado e intervenciones educativas en diferentes poblaciones.

Resultados: Aunque ha habido avances en la detección temprana y en la implementación de vacunas, todavía existen barreras significativas, como el acceso desigual a los programas de cribado y la falta de conciencia sobre el tema en poblaciones vulnerables.

Conclusión: Además de la vacunación, es fundamental fortalecer las estrategias de educación para la salud y ampliar la cobertura de los programas de cribado para garantizar la detección precoz y reducir la incidencia del Virus del Papiloma Humano y sus complicaciones.

Palabras clave: Virus del Papiloma Humano; Cáncer Cervical; Detección del VPH; Vacuna contra el VPH.

RESUMO

Introdução: o Papilomavírus Humano é uma infecção sexualmente transmissível altamente difundida mundialmente, sendo comprovadamente responsável por um número significativo de casos de câncer cervical. **Objetivo:** identificar as principais tendências e desafios na detecção e prevenção do vírus, além da vacinação, a partir de uma revisão integrativa da literatura. **Método:** trata-se de uma revisão integrativa de literatura, na qual foi realizada uma busca sistemática em bases de dados científicas, incluindo estudos que abordam métodos de detecção, estratégias de prevenção, programas de rastreamento e intervenções educativas em diferentes populações. **Resultados:** embora existam avanços na detecção precoce e na implementação de vacinas, ainda há barreiras significativas frente ao cenário dessa doença, como a desigualdade de acesso a programas de rastreamento e a falta de conscientização sobre o assunto em populações vulneráveis. **Conclusão:** além da vacinação, é fundamental fortalecer as estratégias de educação em saúde e ampliar a cobertura dos programas de rastreamento, para garantir a detecção precoce e a redução da incidência do Papilomavírus Humano e suas complicações.

Palavras-chave: Papilomavírus Humano; Câncer Cervical; Detecção do HPV; Vacina contra o HPV.



INTRODUCTION

Human Papillomavirus (HPV) is a common Sexually Transmitted Infection (STI) that infects the skin and mucous membranes of sexually active men and women. According to the Ministry of Health, it is estimated that 80% of the sexually active population will be infected with HPV throughout their lives. There are more than 200 types of HPV, of which at least 12 are oncogenic, especially types 16 and 18, which are responsible for 70% of Cervical Cancer (CC) cases⁽¹⁾.

Human Papillomavirus is the most common STI in the world, and is relevant due to its association with CC and other tumors in men and women. It is transmitted through skin-to-skin or skin-to-mucosa sexual contact, and does not require penetration for contagion. HPV infection can be asymptomatic or cause warts in places such as the vagina, vulva, cervix, anus, glans, mouth and throat. The presence of warts increases transmission risk, although symptoms are not necessary for contagion to occur⁽²⁾.

Some strategies are used to prevent HPV, with vaccination being the most effective measure. Other methods include the use of condoms, which, although they do not completely eliminate the risk of infection, significantly reduce exposure to the virus. In addition, the preventive exam, known as the Pap smear, is essential for detecting CC and its precursor lesions, enabling early treatment⁽³⁾.

Several public policies aim to detect and prevent HPV, such as the “Viva Mulher” program, created in 1997, which organized a

support network, increased adherence to cytopathological examinations, trained health professionals and brought greater visibility to the CC⁽⁴⁾. Another measure has expanded the target audience for the quadrivalent HPV vaccine, which includes children and adolescents aged 9 to 14, regardless of gender, since 2022⁽⁵⁾.

Based on the data presented, this study aims to investigate current trends and challenges in HPV detection and prevention, in addition to vaccination. It seeks to identify the main trends and difficulties faced in HPV detection and prevention, as reported in the current literature. The overall objective is to analyze these aspects to identify effective strategies which improve public health and reduce the incidence of cancers associated with the virus.

METHOD

This work is an Integrative Literature Review, which according⁽⁶⁾ is the broadest methodological approach regarding reviews and involves gathering knowledge on a topic as its general purpose, helping in the foundations of a significant study for nursing, and is divided into six stages, as presented below:

Stage 1: Elaboration of the guiding question

Development of the guiding question was guided by the “PICO” acronym with the following information: P: Studies and reports which address HPV detection and prevention in women of different ages; I: HPV detection methods, prevention strategies, screening programs, public education and health

interventions; C: Comparison between different detection methods, effectiveness of prevention strategies, public health policies and barriers faced in implementing detection and prevention programs; O: Trends in HPV incidence and prevalence, effectiveness of detection and prevention methods, challenges faced in implementing public health programs and effective interventions.

Based on this strategy, the guiding question was structured: “What are the main trends and challenges faced in HPV detection and prevention, in addition to vaccination, as reported in the current literature?”

Stage 2: Search or sampling in the literature

The search period covered the months of July and August of 2024, in the following stipulated platforms: Nursing Database (*Banco de dados de Enfermagem - Bdenf*), Latin American and Caribbean Literature in Health Sciences (*Literatura Latino-Americana e do Caribe em Ciências da Saúde - Lilacs*), Scopus through the Virtual Health Library (*Biblioteca Virtual em Saúde - BVS*), Scientific Electronic Library Online (SciELO) and the Coordination for the Improvement of Higher Education Personnel (*Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Capes*) journals.

The DeCS descriptors used were: “HPV” OR “*Papilomavírus*” OR “*Papilomavírus Humano*” AND “*Câncer de Colo de Útero*” OR “*Câncer Cervical*” OR “*Neoplasias de Colo de Útero*” AND “*Detecção do HPV*” OR “*Rastreamento do HPV*” OR “*Teste de HPV*” AND “*Prevenção do HPV*” OR “*Vacina contra o HPV*” AND

“*Epidemiologia do HPV*” OR “*Transmissão do HPV*” AND “*Infecção por HPV*” OR “*Lesões por HPV*”. In turn, the MeSH search terms used were: “Papillomavirus Infections” OR “Human Papillomavirus” AND “Uterine Cervical Neoplasms” OR “Cervical Intraepithelial Neoplasia” AND “Early Detection of Cancer” OR “Mass Screening” AND “Vaccination” OR “Papillomavirus Vaccines”.

Inclusion criteria were then established to better select the results, namely: only primary studies which directly address the HPV detection and/or prevention, that explore current trends and challenges in HPV detection and prevention, are original and freely available, published in the last five years, complete, and in any language. The exclusion criteria were articles which do not present relevant information regarding HPV, review articles, non-citable articles, as well as articles that are repeatedly indexed, incomplete, have low scientific quality and poorly structured methodology.

Stage 3: Data collection

Data collection was performed by reading the titles, abstracts and full texts of the selected studies. A total of 712 articles were found after applying the criteria, of which 163 were selected for complete critical reading, and of these, 17 were included in the final review. The extracted data included: authorship, year, country, type of study, objective, methodology and main findings. Table 1 details the characteristics of the included studies. This collection was independently performed by two reviewers, ensuring accurate and complete

extraction of the information. A third reviewer was consulted in case of disagreements for consensus, ensuring validity of the collected data.

Stage 4: Critical analysis of the included studies

Critical evaluation of the selected studies was conducted based on criteria of methodological quality, relevance and level of evidence using validated tools for integrative reviews. In turn, the adequacy of the design to the proposed objective, clarity in the presentation of results, coherence between methods and conclusions, and compliance with ethical research principles were verified for each article. This stage enabled us to identify strengths, limitations and gaps in the knowledge produced on Human Papillomavirus detection and prevention.

Stage 5: Discussion of the results

The extracted data were descriptively and integratively analyzed, organized in a narrative synthesis which allowed the main findings among the included studies to be compared. No specific categories or thematic axes were created, as the discussion focused on identifying consensus, divergences and gaps related to trends and challenges in HPV detection and prevention, considering the contexts of the studies analyzed. This approach sought to preserve the breadth of the topic, articulating the

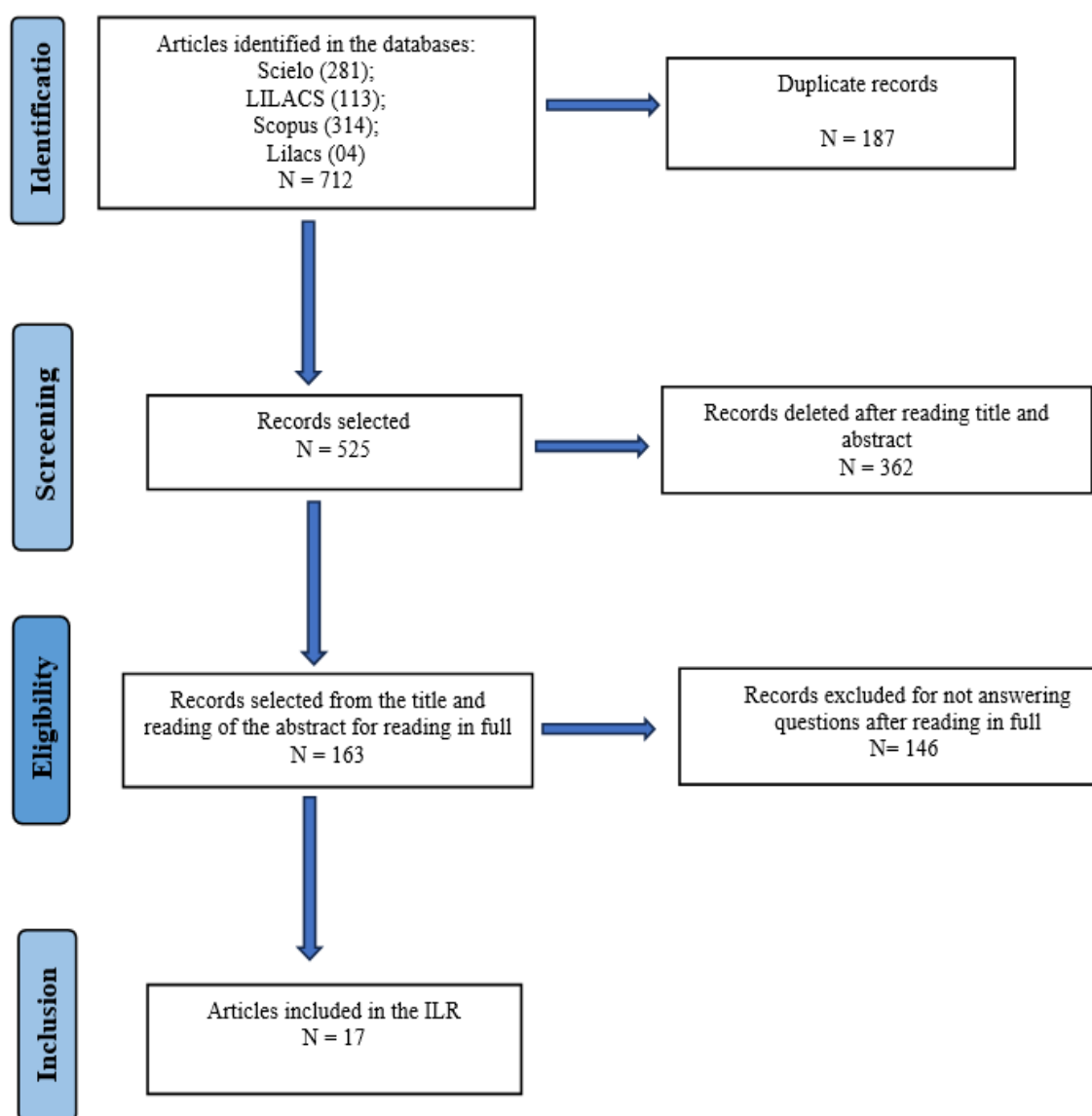
available evidence with recommendations for health practice and research.

Stage 6: Presentation of the integrative review

The presentation of the results followed the recommendations of the PRISMA-Scr model, including a detailed flowchart of inclusion and exclusion of studies, as well as explanatory tables with the main methodological characteristics of the articles analyzed. The findings were reported in a clear, objective and well-founded manner, respecting the integrity of the original information. Finally, the integrative review was written considering articulation between the results, their implications for nursing practice, research and public policy formulation.

RESULTS

A total of 712 studies were found after searching the databases using the necessary strategy. The pre-established inclusion and exclusion criteria were then applied. Studies which did not meet the proposed objective of the review were excluded, as well as duplicate studies, leaving 163 studies, of which 17 were included after critical analysis to construct the final discussion. The flowchart of the aforementioned process is illustrated in Figure 1.

Figure 1 - Prisma-Scr flowchart.

Source: Adapted by the author, 2024 (Prisma Scr 2020 flowchart model).

Table 1 - Characteristics of studies selected for review.

Number	Title	Authors/Year	Method	Objective	Results
	Barriers and facilitators to cervical cancer screening among under-screened women in Cuenca, Ecuador: the perspectives of women and health professionals	Crespo et al./2022 ⁽⁷⁾	Qualitative study	Understanding barriers and facilitators to cervical cancer screening among under-screened women and healthcare providers in Ecuador.	The results indicated that respondents perceived different barriers to screening. Health professionals highlighted political and individual barriers, while women mainly mentioned organizational barriers, such as long waiting times, lack of access to health facilities, and inadequate communication with doctors. Both groups cited political enablers, such as national cervical cancer screening campaigns, and community and individual factors, including health literacy and women's empowerment.
2	Barriers and innovative interventions for early detection of cervical cancer	Garbanati et al./2019 ⁽⁸⁾	Trial	Describe different types of barriers to cervical cancer screening and propose strategies for innovative interventions that can improve early detection of the disease.	Reducing barriers to early cervical cancer detection and regular screening among Latinas in the U.S. and high-risk women in the Americas requires better understanding of screening options and consideration of the use of appropriate technologies.
3	Barriers associated with lack of interest in the Papanicolaou result	Lucas and Chung/2024 ⁽⁹⁾	Observational, analytical, case-control study.	To determine the personal, cultural and institutional barriers associated with patients' lack of interest in knowing (collecting) the Pap smear report.	A total of 138 cases and 138 controls were studied. Regarding personal barriers, age between 25 and 35 years was significantly associated with a lack of interest in collecting reports (OR = 0.021; 95%CI: 0.35-0.92; p = 0.021). Lack of education or having completed only elementary school were associated with a lack of interest in collecting Pap smear reports (OR = 2.83; 95%CI: 1.30-6.15; p = 0.007); not having heard of the human papillomavirus (HPV) (OR = 2.56; 95%CI: 1.17-5.60; p = 0.016); and having difficulty due to work hours (OR = 2.01; 95%CI: 1.23-3.27; p = 0.005).
4	Knowledge of human papillomavirus and Pap test among Brazilian university students	Baptista et al./2019 ⁽¹⁰⁾	Cross-sectional study	To verify the knowledge of university students in health courses and other areas on relevant issues related to HPV and the	Female college students demonstrated greater knowledge about basic HPV issues and preventive examinations, but less about its relationship with genital

				Pap smear test.	warts and cervical cancer. Being a student in the health field and having a high income were factors associated with greater knowledge. Only a minority identified all the risk factors for HPV infection.
5	Knowledge, attitudes, and perceptions associated with HPV vaccination among female Korean and Chinese university students	Kim et al./2022 ⁽¹¹⁾	Cross-sectional study	To investigate the knowledge, attitudes and perceptions about HPV vaccination among Korean and Chinese female university students, analyzing how these factors influence the intention to get vaccinated, considering the cultural and social differences between the two groups.	There were no significant differences between Korean and Chinese female college students in HPV knowledge, attitudes, perceptions, and vaccination intention. Vaccination intention in Korean female students was influenced by a positive attitude and high knowledge about HPV. Among Chinese female students, factors such as sexual experience, awareness of genital warts, perception of the severity of infection, and negative emotions toward HPV were also determinants.
6	The knowledge of female students regarding the human papillomavirus and vaccines at a selected university in South Africa	Mushasha et al./2021 ⁽¹²⁾	Cross-sectional descriptive study with a quantitative approach	To determine female students' knowledge of Human Papillomavirus (HPV) and its vaccines at a selected university in Limpopo Province, South Africa.	Of the 310 respondents, 56.8% had never heard of HPV, while 43.2% were somewhat familiar with the virus and its vaccines. The majority (82.9%) were uncertain about the two vaccines available in South Africa, and only 1.9% knew that anal cancer is linked to HPV. Furthermore, 56.8% did not know whether vaccines prevent cervical cancer, while only 6.1% disagreed that HPV vaccines offer such prevention.
7	Social Media as a Tool to Promote Health Awareness: Results from an Online Cervical Cancer Prevention Study	Lyson et al./2019 ⁽¹³⁾	Experimental study	To investigate whether participation in an online social media platform and receiving brief, personalized messages are effective in increasing knowledge, awareness, and prevention behaviors related to human papillomavirus (HPV) and cervical cancer.	There were no statistically significant changes in knowledge and prevention behaviors between baseline and post-intervention survey. However, HPV awareness modestly increased from 90% to 94% ($p = 0.003$) among participants who had ever heard of the virus. The findings indicate that most participants already had considerable knowledge and engagement in cervical cancer prevention behaviors. Furthermore, awareness of HPV can be increased through brief engagements on social media platforms and receiving personalized health messages.

8	The Relationships Between Social Media and Human Papillomavirus Awareness and Knowledge: Cross-sectional Study	Jo et al./2022 ⁽¹⁴⁾	Cross-sectional study	To examine the association between social media use and HPV knowledge and awareness.	Approximately 68.4% of respondents were aware of HPV, 64.0% were aware of the HPV vaccine, and 48.0% were aware of the link between HPV and cervical cancer. However, knowledge about the link between HPV and penile (19.2%), anal (18.3%), and oral (19.9%) cancer was lower. Although social media use was associated with awareness of HPV and the vaccine, these associations were not significant after adjusting for demographic variables. Groups less likely to report awareness included men, older individuals, those with household incomes below US\$20,000, those with a high school education, or those living in households where adults were not fluent in English.
9	Clarity of publications on HPV in Instagram profiles of official health agencies in Brazil	Nunes et al./2023 ⁽¹⁵⁾	Infodemiological study with a quantitative approach.	Analyze the clarity of publications about the human papillomavirus (HPV) on the Instagram profiles of official Brazilian health agencies.	This is the first study to analyze the clarity of online content on Instagram social media about HPV produced by official Brazilian health agencies. The results reveal an unsatisfactory level of communication clarity in written health-related educational materials. Studies evaluating educational materials in Brazil are scarce and also report low quality.
10	The impact of HPV vaccine narratives on social media: Testing narrative engagement theory with a diverse sample of young adults	Leader et al./2022 ⁽¹⁶⁾	Social media-based intervention study using narrative engagement theory.	To test whether variations in narrative engagement led to differences in HPV vaccine intentions.	Young adults were receptive to watching narrative-based health information videos on social media. When promoting HPV vaccination, more engaging information leads to higher intentions to talk about the vaccine and get vaccinated.
11	HPV vaccine coverage in Australia and associations with HPV vaccine information exposure among Australian Twitter users	Dyda et al./2019 ⁽¹⁷⁾	Ecological study.	To determine whether Twitter-derived estimates of exposure to HPV vaccine information were associated with differences in coverage across regions in Australia.	Models using topic exposure measures were more closely correlated with HPV vaccine coverage (women: Pearson's $R = 0.75$ [0.49 to 0.88]; men: $R = 0.76$ [0.51 to 0.89]) than models using employment and education as factors (women: 0.39 [-0.02 to 0.68]; men: 0.36 [-0.04 to 0.66]). In Australia, positively framed news tended to reach more Twitter users overall, but critical vaccine information constituted larger proportions

					of exposures among Twitter users in low-coverage regions, where distorted characterizations of safety research and critical vaccine blogs were popular.
12	Testing Messages on Facebook to Promote Use of an HPV Educational Web- Intervention	Reno and Dempsey/ 2021 ⁽¹⁸⁾	Experimental study	To use Facebook advertising to test the comparative effectiveness of messages designed using the Extended Parallel Processing Model (EPPM) to promote the use of CHICOS among Latino young adults and parents of adolescents and to analyze differences in the effectiveness of messages that highlighted HPV-related cancers, genital warts, or a control condition, as well as differences in messages in Spanish and English.	Latino young adults and parents were more likely to click on Facebook ads containing messages in Spanish and those mentioning cancer risks pertinent to this population compared with those in English or messages discussing genital warts. Therefore, the findings suggest that Facebook advertising has the potential to be a useful tool for motivating online information seeking about HPV vaccination.
13	Evaluation of graphic messages to promote human papillomavirus vaccination among young adults: A statewide cross-sectional survey	Teoh et al./2019 ⁽¹⁹⁾	Statewide cross-sectional study	Determine the most user-friendly graphic to promote HPV vaccination to young adults.	Participants were slightly more engaged with posts featuring humorous graphics or infographics than photos of diseases or patients (paired p-values < 0.0001). There were small but statistically significant differences in response to graphics by gender, race, HPV vaccination status, and eHealth literacy.
14	Effect of Health Intervention via Web- Based Education on Improving Information-Motivation-Behavioral Skills Related to HPV Vaccination Among Chinese Female College Students	Wang et al./2023 ⁽²⁰⁾	Descriptive intervention study.	To evaluate the effect of web-based education on improving information-motivation-behavioral skills related to HPV vaccination among Chinese female college students.	A total of 449 students (235 in the intervention and 214 in the control group) were included in the analysis. There were no statistical differences in demographic information between the two groups.
15	Cervical Cancer Prevention on Instagram: Content and Social Interaction Analysis of Brazilian Accounts	Vicente et al./2022 ⁽²¹⁾	Qualitative study of content analysis and social interaction of Brazilian accounts.	Analyze the content of Instagram posts about cervical cancer.	Posts recruited using #cervicalcancer provided 60% of posts with secondary prevention-related content; #papsmear provided 46% of posts with irrelevant content; #hvp and #papillomavirus provided 50% and 64% of posts with informative content, respectively; and #hpvvaccine provided 58% of

					posts with primary prevention-related content. The posts that received the highest number of likes were those with the hashtags #hpv and #papillomavirus, with 151.33 and 78.00 likes/post, respectively. Most posts had fewer than five comments/post, except for #hpv, which had 64.76 comments/post. According to the users' profiles, the majority of posts, regardless of the hashtag used, were made by healthcare professionals.
16	Reasons for non-attendance to cervical cancer screening and acceptability of HPV self-sampling among Bruneian women: A cross-sectional study	Chaw et al./2022 ⁽²²⁾	Cross-sectional study	To determine reasons for non-attendance and explore their acceptance of human papillomavirus (HPV) self-staining as an alternative to Pap testing.	A total of 174 non-screening participants were enrolled, of whom 97 (55.7%) also participated in HPV self-collection. The main reasons for not attending Pap test screening were fear of poor results (16.1%, n = 28); embarrassment (14.9%, n = 26); and lack of time due to domestic commitments (10.3%, n = 18). When compared to those who agreed to participate in HPV self-collection, those who declined were significantly older (p = 0.002) and less likely to agree that they are susceptible to cervical cancer (p = 0.023). They preferred to receive Pap test-related information from healthcare professionals (59.0%, n = 155), social messaging platforms (28.7%, n = 51), and social media (26.4%, n = 47). The HPV self-sampling kits were positively received among the 97 participants, and >90% agreed with their ease and convenience. Nine (9.3%) tested positive for hr-HPV, of which eight were non-16/18 HPV genotypes.
17	Feasibility of Utilizing Social Media to Promote HPV Self-Collected Sampling among Medically Underserved Women in a Rural Southern City in the United States (U.S.)	Asare et al./2021 ⁽²³⁾	Cross-sectional study	To assess factors influencing MUWs' intention to participate in social media-based HPVST interventions.	The results showed that over 44% of women were more than three years overdue for their Pap smears, 12% had never had a Pap smear, and 34% were unsure whether they had ever had one. Over 82% reported frequent use of social media (i.e. Facebook), and 52% expressed willingness to participate in social media-promoted



					HPVST interventions. Women who perceived social media as providing privacy (Adjusted Odds Ratio [AOR] = 6.23, 95%CI: 3.56-10.92), social support (AOR = 7.18, 95%CI: 4.03-12.80), being less costly (AOR = 6.71, 95%CI: 3.80-11.85), and convenient (AOR = 6.17, 95%CI: 3.49-10.92) had significantly greater odds of participating in these interventions.
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DISCUSSION

HPV prevention and detection are theoretically feasible through accessible and effective methods. However, recent studies reveal that practical barriers, such as low screening and lack of early detection of cervical cancer, especially in vulnerable groups, persist. Women's lack of knowledge and risk perception about cervical cancer and the importance of screening are barriers^(7,8), contributing to hesitation in seeking tests. In addition, beliefs and attitudes that associate the Pap smear with pain and embarrassment discourage many women from undergoing it.

Following the same reasoning⁽⁹⁾, highlight that the likelihood of a patient undergoing the Pap smear increases significantly with knowledge about CC and HPV. There are personal barriers in addition to the test collection, such as a lack of information about HPV and the importance of early screening, which can prevent the patient from returning to receive the results. The study also points out that low education level is one of the most common barriers which hinder adherence to Pap smear

screening. Since the "Education level" factor is relevant and impacts HPV prevention and detection and consequently Cervical Cancer, it is important to evaluate the knowledge and perceptions of university students from different countries.

A study in Brazil with 473 female students from health sciences courses and other areas evaluated knowledge about HPV infection, CC and the Pap smear test. Although the majority knew what the test is and how often it is done, 52.4% did not associate HPV with genital warts and 47.8% did not link it to cervical cancer. Only 10.6% recognized all the risk factors for HPV infection. The results indicate that a lack of understanding about this STI and its consequences persist, even among students with higher education and worryingly among those in the health field⁽¹¹⁾.

A second sample consisting of 273 Korean female students (46.3%) and 317 Chinese female students (53.7%) was recruited from two universities, one in Korea and one in China. Participants were interviewed about their general characteristics, attitudes toward the HPV vaccine, and their knowledge and perceptions

about the subject. Only 23.2% reported having heard of the virus, with no significant differences between the groups, indicating a similar level of initial knowledge. However, when asked about the target population for vaccination, Korean female students showed greater agreement that the vaccine should be administered to both sexes (67.0%), while 15.8% believed that vaccination was not necessary in the absence of symptoms. The proportion among Chinese female students who supported vaccination for both sexes was lower (52.7%), and 31.0% considered the vaccine unnecessary in the absence of symptoms. This variation suggests differences in understanding about the need for vaccination and its effectiveness, possibly related to access to information and misinformation in each country, highlighting the importance of knowledge on this current topic⁽¹²⁾.

Finally, a study⁽¹²⁾ at a university in South Africa with 310 students revealed insufficient knowledge about HPV, with more than 50% of participants stating that they had never heard of the virus and 66.5% of women unaware of its transmission methods. This lack of information about HPV and its relationship with cervical cancer, as well as about prevention and screening methods, highlights the need to seek approaches which promote change in this scenario. In this context, the increasing use of technologies and social media platforms can be an effective tool to increase health awareness. Recent studies suggest that participation in social media and receiving short, personalized messages can significantly improve knowledge

about HPV⁽¹⁸⁾.

A study with 2,948 participants assessed knowledge about HPV and the search for health information online. As a result, 75.63% of respondents reported that they search for health information online, demonstrating positive behavior regarding the use of these platforms. However, although there was an initial association between the use of social media and understanding of HPV, this relationship lost significance after adjustments for demographic factors, indicating that other variables may play a more relevant role in awareness and knowledge about the virus⁽¹⁶⁾.

A pioneering study assessed the clarity of content about HPV shared on Instagram by official Brazilian health agencies. The study analyzed 81 profiles and 130,398 posts using the BR-CDC-CCI instrument, which assesses user interaction measured by the number of likes and related to the use of clear and objective language. Over the course of eight years, only 0.38% of publications addressed HPV, with 26.2% coming from the Ministry of Health, which had the highest percentage and level of clarity. However, the quality and clarity of educational posts were considered low, not keeping up with the alarming increase in the disease in Brazil. This highlights the need to increase the frequency of educational materials on social media to inform the population⁽²³⁾.

Additionally, HPV vaccination was analyzed from the perspective of social media, as per studies^(13,14,16). Highlighted⁽¹⁶⁾ that campaigns with realistic narratives increase interest in

discussing the vaccine with health professionals. In turn, the authors^(17,18) analyzed the general influence of discussions about the vaccine on Twitter and Facebook, revealing that most of the information found was positive, including the effectiveness of the vaccine and success stories. The use of advertising on these platforms has been shown to be effective in promoting the search for information, contributing to a more favorable acceptance of the HPV vaccine.

The studies^(15,21) confirm the positive impact of online education in promoting HPV vaccination and raising awareness about the virus. Both used questionnaires to assess knowledge and explore digital strategies which increase user attractiveness and adherence. Noted⁽²⁰⁾ that while there was a significant increase in knowledge, online education had limited impact on motivation and behavioral skills for vaccination, indicating the need for long-term follow-up. Found⁽¹⁹⁾ that humorous graphics and infographics were slightly more appealing to young people than pictures of diseases, but stressed that the effectiveness of campaigns depends on several factors. Both highlight online education as an essential tool for raising awareness and adherence to vaccination, but emphasize that knowledge alone does not guarantee behavioral change. They suggest optimizing educational strategies for more effective results, combining them with other methods, and adopting a long-term approach to promote lasting behavioral change.

The use of digital strategies is emerging as a trend and is expanding in control of cervical

cancer, which is related to previous HPV infection. A study⁽¹⁷⁾ analyzed the content and interactions on Brazilian Instagram accounts during “*Março Lilás*”, an awareness campaign on cervical cancer prevention. The results showed that the most common posts were images with text, followed by videos, with a predominant focus on secondary prevention of the disease, while primary prevention was little addressed, and at times neglected. The study highlights the need for health professionals to engage young audiences who consume online content, optimizing the integrative potential of these health communication strategies.

Regarding another trend to circumvent the number of women suffering from HPV, a study conducted in Brunei investigated the reasons for non-attendance for Human Papillomavirus screening and explored the acceptance of self-collection of the test as an alternative to the Pap smear among women. A total of 174 women participated and completed a questionnaire about the reasons for not attending the tests. The main factors were emotional barriers, such as fear of negative results and embarrassment. Among the women invited, 55.7% received self-collection kits; 10% expressed dissatisfaction, but the rest agreed with the ease and convenience of the method. The high acceptance of self-collection suggests that it may be a viable alternative to increase adherence to screening and improve HPV diagnosis⁽¹⁸⁾.

In line with the aforementioned content and directly aligned with the study above, social

media is again mentioned in the feasibility process to promote the collection of HPV samples among women in the United States in a study. Based on the results⁽¹⁹⁾, self-collection of HPV is considered convenient, with the ability to increase women's sense of privacy and improve access to remote areas, aiding in the disease diagnosis. More specifically, the study assessed the intention to perform self-testing for virus detection and the likelihood of participating in studies of this nature on social media. The sample consisted of 254 women, of whom more than 82% reported regular use of social media and 57.48% expressed an intention to participate in HPV self-testing. When asked about their willingness to participate in an intervention or study conducted on social media, 52.36% of the women indicated that they would probably participate, meaning that more than half of the sample would be willing to participate if they were guided on the process. Furthermore, 42.9% of them preferred self-collection to conventional collection. These results reinforce the idea of the viability and effectiveness of the role of social media in tackling this problem.

FINAL CONSIDERATIONS

The reviewed studies highlight the need for innovative strategies for HPV and CC prevention and detection, especially among vulnerable populations. Lack of knowledge, emotional barriers and difficulty in access are significant obstacles to effective screening. In this context, the use of digital technologies and

self-collection of tests, together with the potential of social media, emerge as promising alternatives to increase awareness, improve adherence to screening and facilitate earlier diagnoses, especially in remote areas. An integrated approach which combines education, technology and digital communication is essential to overcome the challenges in the fight against HPV and its consequences.

Therefore, the study comprehensively addresses emerging trends in HPV detection and prevention, in addition to highlighting the challenges which still impact screening and early diagnosis, responding to the research question. By integrating diverse research on behaviors, attitudes and communication strategies, it offers a holistic view of the current dynamics in the fight against the virus and CC.

The contributions of this study to nursing are significant, influencing clinical practice, education and health policy. It can improve screening techniques, promote awareness-raising and professional training activities, and update protocols, as well as provide valuable information for developing health policies. As such, this is an important study to foster research and innovation in healthcare.

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Declaration of Conflict of Interest

We declare no conflict of interest.

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