

Community health workers' knowledge about HPV and challenges for health education in primary health care

Conocimiento de agentes comunitarios de salud sobre VPH y desafíos para la educación en salud en la atención primaria

Conhecimento de agentes comunitários de saúde sobre HPV e desafios para a educação em saúde na atenção primária

Sílvia Silles^{1*}

ORCID: 0009-0009-4325-1807

Natalia Cristina de Oliveira²

ORCID: 0000-0002-0747-9478

Liliana Scorzoni¹

ORCID: 0000-0002-0178-6653

Julia Teixeira Nicolosi¹

ORCID: 0000-0001-9906-2890

¹Universidade Guarulhos. São Paulo, Brazil.

²Universidade Estadual Paulista. São Paulo, Brazil.

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*Corresponding author:

silviasilles234@gmail.com

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Abstract

This study assessed community health workers' knowledge about HPV in primary health care in the southern region of São Paulo, identifying specific gaps and their association with sociodemographic and training characteristics. A cross-sectional study was conducted with 183 community health workers using an electronic questionnaire including sociodemographic and work variables and an HPV knowledge instrument. Descriptive statistics and Student's t-test were used, considering a 5% significance level. Participants showed a higher percentage of correct answers on general aspects of HPV, while gaps persisted in specific content, including condom effectiveness, natural history of infection, and vaccination schedule. These findings reinforce the need for continuing education for community health workers, with emphasis on technical-scientific content related to HPV prevention, vaccination, and transmission.

Descriptors: Community Health Workers; Human Papillomavirus Viruses; Papanicolaou Test; Knowledge; Primary Health Care.

Resumen

Este estudio evaluó el conocimiento de los Agentes Comunitarios de Salud sobre el VPH de Atención Primaria de Salud de la región sur del municipio de São Paulo, identificando lagunas específicas y su asociación con características sociodemográficas y de formación profesional. Se realizó un estudio transversal con 183 Agentes Comunitarios de Salud, mediante cuestionario electrónico con variables sociodemográficas y laborales e instrumento de evaluación del conocimiento sobre VPH. Se utilizó estadística descriptiva, prueba t de Student, considerando un nivel de significación del 5%. Los participantes presentaron un mayor porcentaje de aciertos en aspectos generales sobre el VPH, mientras persistieron lagunas en contenidos específicos, incluyendo la eficacia del preservativo, la historia natural de la infección y el esquema de vacunación. Los hallazgos refuerzan la necesidad de educación permanente de los ACS, con énfasis en contenidos técnico-científicos relacionados con la prevención, la vacunación y la transmisión del VPH.

Descriptores: Atención Primaria de Salud; Virus del Papiloma Humano; Prueba de Papanicolaou; Conocimiento; Agentes Comunitarios de Salud.

Resumo

Este estudo avaliou o conhecimento de Agentes Comunitários de Saúde sobre HPV da Atenção Primária à Saúde da região sul do município de São Paulo, identificando lacunas específicas e sua associação com características sociodemográficas e formativas. Trata-se de estudo transversal realizado com 183 Agentes Comunitários de Saúde, por meio de questionário eletrônico contendo variáveis sociodemográficas e laborais e instrumento de conhecimento sobre HPV. Foi utilizada estatística descritiva, teste t de Student, considerando nível de significância de 5%. Os participantes apresentaram maior percentual de acertos em aspectos gerais sobre o HPV, enquanto persistiram lacunas em conteúdos específicos, incluindo eficácia do preservativo, história natural da infecção e esquema vacinal. Os achados reforçam a necessidade de educação permanente dos Agentes Comunitários de Saúde, com ênfase em conteúdos técnico-científicos relacionados à prevenção, vacinação e transmissão do HPV.

Descritores: Agentes Comunitários de Saúde; Papilomavírus Humano; Teste de Papanicolaou; Conhecimento; Atenção Primária à Saúde.

Introduction

Human papillomavirus (HPV) is a highly prevalent sexually transmitted infection associated with a broad spectrum of clinical manifestations, ranging from asymptomatic infections to malignant neoplasms. More than 200 HPV types have been identified and classified into low-risk types, predominantly associated with genital and cutaneous warts, and high-risk oncogenic types, which are implicated in the etiology of anogenital and oropharyngeal cancers^{1,2}. Among these, HPV types 16 and 18 account for a substantial proportion of cervical cancer cases, establishing persistent HPV infection as the main risk factor for the development of this neoplasm^{1,3}. Transmission occurs predominantly through sexual skin-to-skin or mucosa-to-mucosa contact. HPV is currently one of the most common viral sexually transmitted infections, and it is estimated that most sexually active adults will become infected at some point in their lives^{1,4}.

Globally, cervical cancer remains a major public health problem, particularly in low- and middle-income countries, where access to screening and vaccination remains limited¹. Recent estimates place cervical cancer among the malignancies with the highest incidence in the Brazilian female population and reinforce persistent infection with oncogenic HPV types as a necessary condition for most cases^{3,4}. This situation has driven the development of integrated global strategies combining immunization, organized screening, and timely treatment of precursor lesions, to eliminate cervical cancer as a public health problem^{1,2}.

Within Brazil's Unified Health System (Sistema Único de Saúde, SUS), Primary Health Care (PHC) is the main point of entry into the healthcare system and the organizing axis of healthcare networks, playing a central role in health promotion and disease prevention, including the prevention of sexually transmitted infections. The Family Health Strategy (FHS) is the priority model for PHC in Brazil and promotes territorially based, continuous care centered on the population's needs. This model creates opportunities to implement cervical cancer screening, provide and monitor HPV vaccination, and develop health education activities^{5,6}. Within this framework, Community Health Workers (CHWs) occupy a strategic position by connecting popular knowledge with technical and scientific knowledge, maintaining longitudinal contact with families, and facilitating community access to other levels of the healthcare system⁷⁻⁹.

In this context, CHWs serve as a strategic link between healthcare services and the population assigned to their coverage areas. Their responsibilities include identifying needs, providing longitudinal follow-up for families, and mediating between popular knowledge and technical and scientific knowledge. Their work is organized around the local territory and home visits and incorporates health education, surveillance, and the promotion of social participation. These responsibilities place CHWs in a privileged position to address sensitive topics such as sexuality, sexually transmitted infection prevention, and adherence to cervical cancer screening¹⁰⁻¹².

The responsibilities of CHWs include providing guidance on infection transmission, signs and symptoms, and preventive measures, as well as encouraging regular cervical cytology screening and adherence to HPV vaccination, which is recognized as one of the most effective strategies for preventing cervical cancer and other HPV-associated malignancies. At the same time, these professionals work under conditions characterized by excessive workloads and exposure to various physical, biological, psychological, and organizational demands. These conditions may affect both their own health and the quality of the educational activities they conduct in the community^{7,10,13}.

CHWs' level of knowledge about HPV, its prevention, screening, and treatment directly influences the quality of the information they communicate to the community, their ability to address questions and fears, and their capacity to counter resistance, misinformation, and misconceptions related to vaccination and cervical cytology screening^{14,15}. Recent studies conducted in different settings have identified substantial knowledge gaps among healthcare professionals regarding HPV and its vaccine, suggesting that conceptual weaknesses may negatively affect the effectiveness of educational activities, vaccination coverage, and screening adherence¹⁶⁻¹⁸.

Considering the relevance of HPV as a public health problem, the central role of PHC in prevention strategies, and the contribution of CHWs to information dissemination and community mobilization, it is essential to understand the extent to which these professionals are familiar with key aspects of the infection and its control. Knowledge gaps may compromise the quality of guidance provided, reduce public adherence to recommended preventive practices, and limit the impact of public policies aimed at reducing the burden of HPV-associated diseases^{3,14}. From a health education perspective, identifying CHWs' training needs regarding HPV is essential for planning more targeted, evidence-based continuing education activities adapted to the specific characteristics of their local territories^{12,15}. In this context, the present study aimed to assess knowledge of HPV and its prevention among CHWs working in Primary Health Care in the southern region of the municipality of São Paulo, Brazil, identifying knowledge gaps and their associations with sociodemographic characteristics and professional training.

Methodology

This was an observational, cross-sectional, descriptive, and analytical study with a quantitative approach. It was conducted among Community Health Workers affiliated with the Family Health Strategy at Primary Health Care facilities in the southern region of the municipality of São Paulo, Brazil, all of which belonged to the same Social Organization. Data were collected between July and October 2024.

The eligible population comprised of 567 Community Health Workers distributed across the 18 healthcare facilities affiliated with the organization during the study period. Of these, 455 professionals consented to receive the questionnaire electronically, constituting the



accessible study population. Active CHWs who agreed to participate by electronically accepting the Informed Consent Form were included. Professionals who were away from work on leave, vacation, or for other reasons during the data collection period, as well as those who could not be contacted electronically, were excluded. Ultimately, 183 CHWs completed the instruments, corresponding to a participation rate of 40.2% of the accessible population and 32.3% of the total eligible population. No a priori sample size calculation was performed. A convenience sample was used, comprising eligible professionals who volunteered to participate; therefore, the study did not constitute a census of the eligible population.

Data were collected using two self-administered questionnaires delivered through an electronic form. The first instrument covered sociodemographic and occupational variables. The second was the HPV Knowledge Questionnaire, originally developed by Waller *et al.*¹⁹ and subsequently adapted and validated for Brazilian Portuguese by Manoel *et al.*²⁰. This questionnaire comprises 33 items organized into seven thematic domains: the health consequences of HPV; HPV and cervical cancer screening; symptoms; causes, risk factors, and transmission; prevention and treatment; prevalence; and vaccination. All 33 items use a dichotomous true/false response format, without a "don't know" option. Each correct answer was assigned one point, and the final score was calculated by summing the correct responses, yielding a possible range of 0–33 points. The percentage of correct answers was calculated by dividing the number of correct responses by the total number of questionnaire items. The instrument does not establish a cutoff point for categorically classifying knowledge levels.

The data were organized in a spreadsheet and analyzed using the Statistical Package for the Social Sciences (SPSS), version 27. Descriptive analyses were initially

performed, calculating absolute and relative frequencies for categorical variables and measures of central tendency and dispersion for continuous variables. Comparisons between groups defined by sex and previous participation in HPV training were conducted using the independent-samples Student's t-test, after assessment of the test's applicability assumptions using the Kolmogorov–Smirnov test. A significance level of 5% was established for all inferential analyses.

The study complied with the ethical guidelines outlined in Resolution No. 466/2012 of the Brazilian National Health Council for research involving human participants. The project was approved by the Research Ethics Committee of the University of Guarulhos (UNG; CAAE: 74805323.0.0000.5506; Opinion No. 6,478,833, approved on October 31, 2023), the Southern Regional Health Coordination Office, affiliated with the São Paulo Municipal Health Department (CAAE: 74805323.0.3003.0086; Opinion No. 6,938,415, approved on July 8, 2024), and the Dr. João Amorim Center for Studies and Research (CEJAM; CAAE: 74805323.0.3002.9107; Opinion No. 6,620.105, approved on January 22, 2024). No sensitive data from medical records or healthcare information systems were used. Participants were informed about the research objectives, procedures, potential risks, and benefits and provided their consent by electronically accepting the Informed Consent Form.

Results

A total of 183 Community Health Workers working in the Family Health Strategy participated in the study. Most participants were female (85.2%), had completed secondary education (57.4%), and were aged 38–43 years (26.8%). Regarding length of service, 31.7% had worked in the role for 1–3 years, 25.1% for 4–7 years, 13.1% for 8–10 years, and 29.0% for more than 10 years (Table 1).

Table 1. Absolute and relative demographic distribution of Community Health Workers. São Paulo, SP, Brazil, 2024 (n=183)

Variable	n (%)
Sex	
Female	156 (85.2)
Male	27 (14.8)
Age group	
20–25 years	19 (10.4)
26–31 years	33 (18)
32–37 years	33 (18)
38–43 years	49 (26.8)
44–49 years	29 (15.8)
50–56 years	19 (10.4)
Educational attainment	
Completed elementary education	7 (3.8)
Incomplete secondary education	3 (1.6)
Completed secondary education	105 (57.4)
Incomplete higher education	36 (19.7)
Incomplete higher education	32 (17.5)
Length of service as a CHW	
1–3 years	58 (31.7)
4–7 years	46 (25.1)
8–10 years	24 (13.1)
More than 10 years	53 (29.0)

Note: CHW: Community Health Worker.



Table 2. Absolute and relative frequencies of CHWs' reported training on HPV and the Papanicolaou test.

São Paulo, SP, Brazil, 2024 (n=183)

Type of training	Response	n (%)
HPV training*	No	95 (51.9)*
	Yes	87 (47.5)*
Papanicolaou test training	No	72 (39.3)
	Yes	111 (60.7)

Note: *n=182 (one response was missing).

Most CHWs reported having participated in training related to the Papanicolaou test (60.7%). Conversely, most participants reported never having received specific training on HPV (51.9%), as shown in Table 2. Regarding knowledge, the CHWs demonstrated an understanding of general aspects of HPV, including its association with cervical cancer (90.1%) and the importance of vaccination as a preventive

measure (87.5%). However, substantial gaps were identified in specific areas: only 4.9% answered correctly regarding the effectiveness of condom use in preventing HPV, and only 5.5% recognized that treatment of HPV-associated lesions does not eliminate the virus, with persistent HPV infection representing a risk factor for the recurrence of cervical cancer precursor lesions (Table 3).

Table 3. Frequency of correct responses to the HPV knowledge questionnaire. São Paulo, SP, Brazil, 2024 (n=183)

Questions	Correct responses n (%)
1) Can HPV cause cervical cancer?	180 (98.4)
2) Can a person have HPV for many years without knowing it?	181 (98.9)
3) Does having many sexual partners increase the risk of acquiring HPV?	171 (93.4)
4) Is HPV very rare?	179 (97.8)
5) Can HPV be transmitted through sexual intercourse?	173 (94.5)
6) Does HPV always cause signs or symptoms?	128 (69.9)
7) Does using a condom (male or female) reduce the risk of acquiring HPV?	9 (4.9)
8) Can HPV cause HIV/Aids?	131 (71.6)
9) Can HPV be transmitted through direct skin-to-skin contact involving the genital area?	147 (80.3)
10) Do men not acquire HPV?	161 (88.0)
11) Does having sexual intercourse at an early age increase the risk of acquiring HPV?	130 (71.0)
12) Are there many types of HPV?	119 (65.0)
13) Can HPV cause genital warts?	165 (90.2)
14) Can HPV be cured with antibiotics?	102 (55.7)
15) Will most sexually active people acquire HPV at some point in their lives?	77 (42.1)
16) Does HPV generally not require treatment?	10 (5.5)
17) Do girls vaccinated against HPV no longer need Papanicolaou tests when they are older?	180 (98.4)
18) Does one of the HPV vaccines protect against genital warts?	85 (46.4)
19) Do HPV vaccines protect against all sexually transmitted infections?	168 (91.8)
20) Will people vaccinated against HPV never develop cervical cancer?	157 (85.8)
21) Do HPV vaccines protect against most cases of cervical cancer?	118 (64.5)
22) Should the HPV vaccine be administered in three doses?	46 (25.1)
23) Are HPV vaccines more effective when administered to people who have never had sexual intercourse?	124 (67.8)
24) Is the vaccine provided free of charge by SUS at healthcare facilities?	180 (98.4)
25) Does the vaccine prevent infection with only certain HPV types, including the most common types 6, 11, 16, and 18?	142 (77.6)
26) Should women and men living with HIV, solid-organ or bone-marrow transplant recipients, and patients with cancer aged 9–45 years receive the vaccine in a three-dose schedule (months 0, 2, and 6)?	95 (51.9)
27) Does SUS provide HPV vaccination for girls and boys aged 9–14 years?	180 (98.4)
28) If a woman's HPV test is positive, will she definitely develop cervical cancer?	164 (89.6)
29) Can samples for HPV testing and Papanicolaou testing be collected at the same time?	152 (83.1)
30) Can an HPV test indicate how long ago a person acquired an HPV infection?	132 (72.1)
31) Can an HPV test determine whether a person needs to receive the HPV vaccine?	157 (85.8)
32) Are HPV test results available on the same day the test is performed?	135 (73.8)
33) If a test indicates that a woman does not have HPV, is her risk of developing cervical cancer low?	84 (45.9)

Note: HPV: human papillomavirus.

Regarding cervical cancer prevention and screening, most CHWs reported advising the population about the importance of regular cervical cytology screening (Papanicolaou testing) (78.3%). However, 31.6% of respondents believed that undergoing regular screening

eliminated the need for HPV vaccination. Regarding HPV vaccination, 67.2% of CHWs reported discussing the topic during home visits, while 42.1% reported encountering resistance from the population, mainly due to misinformation and concerns about adverse effects. When

CHW training on HPV was assessed, only 37.2% reported having participated in specific HPV training during the previous two years. Furthermore, 82.6% considered an ongoing training program necessary to improve their knowledge and the quality of the information provided to the population. There was no statistically significant

difference in the number of correct answers on the questionnaire between groups categorized by participants' sex ($p = 0.60$). However, CHWs who had received specific HPV training achieved significantly more correct answers than those who had not received such training ($p = 0.02$), as shown in Table 4.

Table 4. Comparison of mean knowledge scores and standard deviations according to sex and previous training on HPV and the Papanicolaou test. São Paulo, SP, Brazil, 2024 (n=183)

Sex	Mean (SD)	p^*
Female	23.8 (2.8)	0.60
Male	24.1 (3.7)	
HPV training		
Yes	24.4 (3.0)	0.02
No	23.3 (2.8)	
Papanicolaou test training		
Yes	24.1 (2.9)	0.10
No	23.4 (3.0)	

Note: * p values obtained using the Student's t -test; statistically significant when $p \leq 0.05$. HPV: human papillomavirus.

Discussion

The objective of this study was to analyze CHWs' knowledge of HPV, considering the importance of these professionals as a link between the community and healthcare services within the Family Health Strategy. The results revealed important knowledge gaps among these professionals, highlighting the need for educational interventions.

The sample was predominantly female (85.2%), with the largest age group being 38–43 years and most participants having completed secondary education. This profile is like that reported by Manoel *et al.*²⁰ and reflects the historical association between women and caregiving roles in healthcare. This predominance may positively influence approaches to topics such as HPV and adherence to preventive measures.

Length of service as a CHW ranged from 1 to 15 years, with an average of approximately seven years of professional experience. This profile is like that observed in other Brazilian studies of CHWs, which have reported a predominance of women, secondary-level education, and extensive experience in Primary Health Care, with a substantial proportion of professionals having worked at this level of care for several years^{11,13}.

Although general knowledge of HPV reached a mean score of 72% correct responses, important gaps were identified. Questions concerning the effectiveness of condoms in reducing HPV transmission (only 4.9% correct responses) and the need for treatment of the infection (5.5%) revealed weaknesses that could compromise preventive practices. Similar results were reported by Manoel *et al.*²⁰, who found high rates of insufficient training among CHWs in Santa Catarina, Brazil. These findings contrast with those from countries such as the United States and Mexico, where regular training programs have resulted in significant improvements in healthcare professionals' knowledge²¹.

The lack of specific training is concerning: 51.9% of the CHWs in this study reported having received no training on HPV. Similar findings were described by Manoel *et al.*²⁰ in

a study conducted in Santa Catarina, which also identified substantial training gaps among CHWs regarding HPV and its prevention. Recent reviews of CHW practices in other locations and settings indicate that, although these professionals occupy a strategic position in health promotion, continuing education is not always provided systematically, resulting in heterogeneity in knowledge and practices^{8,12}. These educational deficiencies reinforce the need for continuing education, given that CHWs serve as a primary link between the community and healthcare services.

Regarding specific knowledge of HPV, assessed using the validated questionnaire, participants generally performed well on items widely disseminated through public health policies. Most CHWs recognized the association between HPV and cervical cancer (98.4% correct responses), the possibility of asymptomatic and long-lasting infection (98.9%), and the role of multiple sexual partners as a risk factor (93.4%). High rates of correct responses were also observed regarding the fact that HPV is not a rare infection (97.8%) and its potential transmission through sexual intercourse (94.5%). These results suggest good assimilation of general information disseminated through educational campaigns and institutional materials.

However, substantial gaps were identified in items requiring more specific knowledge. Only 4.9% of participants correctly answered the question regarding the effectiveness of condom use in reducing the risk of acquiring HPV, and only 5.5% understood that, in most cases, the infection does not require specific treatment because it tends to regress spontaneously. These findings indicate difficulties in understanding the nuances of prevention and the natural history of the infection, which may lead to inaccurate or incomplete information being communicated to the population.

The correct response rate for this item (4.9%) was substantially lower than would be expected by chance for a dichotomous question (approximately 50%). This suggests not random lack of knowledge, but rather a systematic and widely shared misconception among CHWs regarding the



actual effectiveness of condoms in preventing HPV infection. At least two non-mutually exclusive hypotheses may explain this pattern. The first concerns the mechanism of HPV transmission, which occurs through direct skin-to-skin or mucosal contact, including genital areas not covered by condoms, such as the perineal, scrotal, and perianal regions. This characteristic distinguishes HPV from sexually transmitted infections transmitted through bodily fluids, for which condoms provide protection closer to complete. CHWs may therefore be applying a general rule that is valid for most sexually transmitted infections inappropriately to HPV. The second hypothesis is cognitive in nature and relates to a possible binary simplification bias, whereby the partial protection afforded by condoms is interpreted as an absence of protection, even though risk reduction, although incomplete, remains epidemiologically significant. This difficulty in recognizing the partial yet meaningful protective effect of condoms is consistent with findings from other studies reporting persistent misconceptions about prevention among healthcare professionals^{22,23}. Although condoms do not completely eliminate the risk of HPV transmission, their regular use is associated with a lower probability of infection and reinfection and provides protection against other sexually transmitted infections^{1,4}. In practical terms, insufficient understanding of this distinction may compromise the communication of combined prevention strategies during CHWs' interactions with the community, diminishing the perceived value of condoms as a multipurpose protective measure during home visits.

Another critical issue concerns the understanding of HPV infection treatment. As with the previous finding, the correct response rate for this item (5.5%) was substantially below the level expected by chance, indicating a systematic misconception among CHWs regarding the need for specific treatment of the infection. This difficulty may result from a failure to distinguish between the clinical management of HPV-associated lesions, such as genital warts and cervical intraepithelial lesions, which often require interventions such as cauterization, excision, or conization, and the elimination of the virus itself, which occurs spontaneously in most cases through the action of the immune system without the need for specific antiviral therapy. When answering this question, CHWs may have associated an HPV diagnosis with the clinical procedures they observe in healthcare settings, which are directed toward treating lesions, and incorrectly generalized these procedures to the viral infection itself. Additionally, this misconception may reflect the inappropriate application of a general rule relevant to most bacterial sexually transmitted infections, which require active antibiotic treatment, to a viral infection whose natural history is predominantly self-limiting. Studies conducted in different settings have described similar misconceptions among both healthcare professionals and the general population, including the belief that antibiotics are useful for treating HPV^{18,23,24}. Such misconceptions may compromise the quality of guidance provided, create unrealistic expectations regarding treatment, and cause unnecessary anxiety among individuals diagnosed with the infection.

In the vaccination domain, high rates of correct responses were observed for widely disseminated information, including the availability of free vaccination through SUS (98.4%) and the recommendation for girls and boys aged 9–14 years (98.4%). Furthermore, a substantial proportion of CHWs recognized that the vaccine does not prevent infection with every HPV type but protects against the most common types and those associated with greater oncogenic risk (77.6%). These results demonstrate an important foundation of knowledge for their role in disseminating information about vaccination within the community.

Conversely, some results warrant attention, particularly the knowledge of the vaccination schedule in effect in 2024 (25.1% correct responses) and the greater effectiveness of vaccination before sexual activity begins (67.8% correct responses). The lowest rate of correct responses among the vaccination-domain items concerned the number of doses, a finding that requires careful interpretation. Unlike the other items in this domain, this question retained the answer key from the original instrument developed by Waller *et al.*¹⁹ and translated by Manoel *et al.*²⁰ in 2017, which considered a three-dose schedule correct, as this was the schedule in effect when the instrument was developed. Since then, recommendations regarding the number of HPV vaccine doses have undergone successive revisions internationally and nationally, moving from a three-dose schedule to reduced two-dose schedules and, more recently, to a single dose for certain age groups and populations²⁵. Considering this evolution, the low percentage of correct responses may reflect not so much a genuine lack of knowledge among CHWs as a lag between the instrument's original answer key and the rapid evolution of vaccination recommendations. This finding illustrates an important challenge for continuing CHW education: the need for ongoing updates as vaccination schedules change over relatively short periods, depending on the country, age group, and clinical characteristics of the target population.

The finding concerning the greater effectiveness of vaccination before the onset of sexual activity differs in nature from the previous result. This is a stable immunological principle that has not changed over time and remains a central basis for current vaccination recommendations, including more recent recommendations supporting simplified schedules for younger age groups²⁵. Therefore, unlike the previous finding, the correct response rate for this item (67.8%) cannot be explained by changes in vaccination schedule recommendations. Rather, it represents a technical knowledge gap among CHWs regarding the immunological rationale underlying early vaccination. This gap has practical implications given the role of CHWs in counseling families and actively identifying adolescents during home visits. Insufficient understanding of the importance of vaccination before exposure to the virus may limit their ability to emphasize the need for timely vaccination within the recommended age range, particularly in settings characterized by vaccine hesitancy.

The analysis of associations between knowledge scores and participant characteristics revealed no



statistically significant difference between groups defined by sex ($p = 0.60$). In contrast, CHWs who participated in specific HPV training had higher mean knowledge scores than those who had not received such training ($p = 0.02$). Although no significant association was observed with training on cervical cytology screening, the results suggest that HPV-specific training tends to improve these professionals' knowledge, consistent with findings from other studies^{14,15,20}.

The association between specific training and better questionnaire performance reinforces the importance of continuing education as a strategy for strengthening CHWs' professional practice in areas of high epidemiological relevance¹⁵⁻¹⁷. Structured educational interventions, when designed in a contextualized and participatory manner, have been shown to improve healthcare professionals' knowledge of HPV, increase their confidence in discussing the topic with service users, and potentially increase active recommendations for vaccination^{15,17,21}. For CHWs, continuing education strategies that take into account their working conditions, working hours, and available resources appear particularly relevant for consolidating knowledge and promoting sustainable changes in educational practices^{12,26}.

The literature also emphasizes that, in addition to technical training, investment is needed in accessible and continuous educational strategies, such as regular courses, illustrated educational materials, and integrated activities involving professionals at different levels of care. Digital platforms for professional development, which have been successfully adopted in other countries, may offer a promising alternative for the Brazilian context^{17,21,27}.

Among the study's limitations, the use of self-administered questionnaires should be noted, as this may have introduced response bias. In addition, the sample was based on convenience sampling, without a prior sample size calculation, and the participation rate (40.2% of the accessible population and 32.3% of the total eligible population) may limit the representativeness of the findings for all CHWs in the region studied. Conducting the study within a single Social Organization also restricts the generalizability of the results to other institutional settings and regions of the country. Future studies should consider multicenter samples encompassing different regions and sociocultural contexts, as well as qualitative approaches that

could provide a deeper understanding of CHWs' perceptions, barriers, and training needs regarding HPV and its prevention strategies.

Despite these limitations, the results demonstrate that, although CHWs have knowledge of general aspects of HPV, important gaps persist in specific topics that may affect the quality of the guidance provided to the population. Identifying these weaknesses provides a basis for planning targeted continuing health education activities for this professional group, focusing on priority topics such as prevention, the natural history of infection, vaccination schedules, and special groups eligible for vaccination. Strengthening CHW training may therefore contribute to improving health education within PHC and achieving national and global cervical cancer prevention targets^{3,8}.

Conclusion

The assessment of CHWs' knowledge of HPV revealed a mixed picture. On the one hand, participants demonstrated a solid understanding of concepts widely disseminated through public health policies, including the relationship between HPV and cancer and the importance of vaccination. On the other hand, critical technical and scientific knowledge gaps persist. Deficiencies in understanding the natural history of the infection, the partial effectiveness of barrier methods, and the specific characteristics of vaccination schedules suggest that the communication of knowledge within local communities may be vulnerable to conceptual inaccuracies.

The better performance observed among professionals who had previously participated in HPV training confirms the central role of continuing education in transforming professional practice. These findings indicate that systematic, context-specific educational interventions are essential to translating general knowledge into specialized technical competence and ensuring that guidance provided to the community is based on up-to-date evidence. Ultimately, this assessment provides a basis for planning institutional policies aimed at strengthening Primary Health Care. By addressing CHWs' theoretical knowledge gaps, the effectiveness of prevention and health education activities can be enhanced, contributing strategically to the achievement of national and global goals for the elimination of cervical cancer.

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