

Barriers and Adaptable Approaches to Improving Human Papillomavirus Vaccination Uptake among Girls: Perceptions of Healthcare Professionals in West Cameroon

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Abstract

Background: Parent and caregiver knowledge heavily influences HPV vaccine uptake, yet healthcare professionals (HCPs) often fail to provide adequate education, hindering coverage despite primary healthcare (PHC) workers' proven historical role in achieving high immunization rates. **Aim:** This study analyzed healthcare professionals' perceptions regarding HPV vaccination availability and acceptability in two health districts in Cameroon. **Setting:** The study was located within the Foubot and Dschang Health Districts in the West Region of Cameroon. **Materials and Methods:** A quantitative descriptive cross-sectional design was utilized. Structured questionnaires collected data from a non-probability sample of 100 healthcare workers between August 2025 and January 2026 across public and private healthcare facilities. Primary outcomes evaluated perceived vaccine availability and parental vaccine acceptability. **Results:** While awareness of cervical cancer and the HPV vaccine was 100% among healthcare workers, facility vaccine availability was perceived as low; 41% reported it was never available and only 35% reported it was always available. Most HCPs reported low vaccine acceptance among parents (70%) and deemed current awareness campaigns ineffective (67%). HCPs identified their primary role as addressing fears and misinformation (46.41%), while citing inadequate communication

channels to reach adolescents and parents (28.36%) as a major challenge.

Conclusion: While perceived awareness is universal among providers, subjective vaccine availability and parent acceptance remain major bottlenecks. Successfully increasing vaccination coverage requires urgently strengthening communication strategies, securing consistent vaccine supply, and elevating community-wide awareness to dismantle deep-seated vaccine hesitancy.

Keywords

HPV, HPV Vaccination, Vaccine Acceptability, Vaccine Availability, Cameroon

1. Introduction

Every year, about 500,000 women are diagnosed with CC worldwide and approximately 311,000 die from the disease [1]. Primary healthcare (PHC) workers provide care closest to community members and play a key role in mobilizing and empowering communities for health-related actions. They contribute significantly to promoting equity and ensuring access to healthcare services. Previous studies in Ogun State, south-western Nigeria, revealed that PHC workers serve as critical frontline agents in mobilizing communities for reproductive health interventions and cervical cancer screening, provided they receive adequate organizational support [2].

For PHC workers to effectively deliver preventive care for cervical cancer, including HPV vaccination, they require adequate knowledge and capacity to provide high-quality services. However, studies have shown that healthcare professionals often have limited knowledge about cervical cancer, its causes, risk factors, and treatment options. Some misconceptions about the disease and its management persist, including inadequate understanding of chemotherapy and radiotherapy as treatment options.

Limited knowledge about HPV infection and the HPV vaccine among healthcare professionals is a commonly reported barrier to vaccine promotion [3]. In addition, the communication strategies used by healthcare professionals play a crucial role in influencing vaccine uptake [3]. While both community health workers and healthcare providers are involved in cervical cancer prevention, their approaches may differ. Community health workers tend to focus on raising awareness and addressing misconceptions within communities, whereas healthcare providers are more likely to provide clinical guidance and strongly recommend vaccination. Given the critical role of healthcare professionals in promoting HPV vaccination, understanding their perceptions, as well as those of women, is essential to improving vaccine uptake and reducing the burden of cervical cancer (see **Table 1**) [3].

Table 1. The roles CHWs and HCPs.

Community Health Workers	Healthcare providers
Educate-first self, then community	Educate-first self, then healthcare workers, then community
Education strategy: 1) debunk myths; 2) clarify misinformation; 3) “spread fear” about consequences of HPV (to motivate parents to vaccinate their children)	Education strategy: 1) build rapport with patients; 2) create friendly, caring clinical environment (to encourage patients to ask questions and be open to communication about HPV and sexual health)
No mention of recommending HPV vaccine	Make “strong recommendations” to get the HPV vaccine

2. Problem Statement

Cervical cancer is a preventable disease; however, it remains a major cause of morbidity and mortality worldwide, particularly in developing countries. In 2018, an estimated 569,847 new cases of cervical cancer were reported globally, with an age-standardized incidence rate of 13.1 per 100,000 women [4]. It is one of the most commonly diagnosed cancers among women, with the highest incidence rates observed in sub-Saharan Africa and parts of Central and South America [5].

In Australia, 631 new cases of cervical cancer were diagnosed in 2009 and 152 women died from the disease in 2010 [6]. In Brazil in 2018, 16,370 new cases of cervical cancer were reported, with a crude incidence of 17.11 cases per 100,000 women, which made it the third most frequent tumor in the Brazilian female population. In 2016, the national mortality rate by cervical cancer was 4.70/100,000 women, which was lower compared to the global rate of 6.9/100,000 women [4]. In the North, cervical cancer was the leading cause of cancer death, with the mortality rate of 11.07/100,000 women, roughly double that of cervical cancer-specific global mortality rate in 2016 [7].

In Cameroon, cervical cancer represents a significant public health challenge. In 2018, 2356 new cases were reported, along with 1546 deaths, making it the leading cause of cancer-related mortality among women [7]. Although the HPV vaccine was introduced into the national immunization program in 2018, vaccination coverage remains low. In 2020, the HPV vaccination rate in Cameroon was estimated at only 5% [8].

Despite the availability of an effective vaccine, several barriers continue to limit its uptake, including insufficient awareness, limited access, and sociocultural factors. Understanding the perceptions of healthcare workers and women regarding the availability and acceptability of the HPV vaccine is therefore essential to inform strategies aimed at improving vaccination coverage.

3. Methodology

3.1. Study Setting and Timeframe

This study was conducted over a six-month period, from August 2025 to January

2026, in the Dschang and Foumbot health districts, located in the West Region of Cameroon. The data collection phase took place over the same period. The Foumbot health district comprises 46 health facilities spread across 11 health zones and serves an estimated population of 139,770, including approximately 9604 girls aged 9 to 14. The Dschang Health District, for its part, has 94 health facilities spread across 22 health zones and serves an estimated population of 245,829, including approximately 16,892 girls aged 9 to 14. The study was conducted in ten health facilities selected from the Dschang and Foumbot Health Districts. In the Dschang Health District, the selected facilities were Dschang Annex Regional Hospital, Integrated Health Center (IHC) Fondenera, Integrated Health Center (IHC) Fometa, Le Quotidien Health Center, and Espoir Health Center. In the Foumbot Health District, the selected facilities were Foumbot District Hospital, Fondation Mfiya Madeleine Health Center, Integrated Health Center (IHC) Baigom Kouloumke, Integrated Health Center (IHC) Njiboh 2, and Integrated Health Center (IHC) Baigom Nkouen. These facilities were selected because they provide routine immunization services on a regular basis. The selection included different levels of the health system, ranging from health centers to district and regional hospitals. These two districts were selected because of their involvement in implementing the national human papillomavirus (HPV) vaccination program and their geographic diversity, which allows for an assessment of women's perceptions regarding barriers to vaccination and strategies likely to improve its acceptance.

3.2. Study Design and Study Population

This was a quantitative, cross-sectional study. The study population consisted of healthcare professionals actively working in target health facilities who provided informed consent to participate, residing in the Dschang and Foumbot health districts. The inclusion criteria were as follows: being a healthcare professional residing and working in one of the two health districts and agreeing to participate in the study after providing informed consent. Healthcare professionals who refused to participate or were unable to provide informed consent were excluded from the study.

Sample Size and Sampling Method

The minimum sample size was calculated using Cochran's formula:

$$n = \frac{Z^2 p(1-p)}{e^2}$$

where n represents the minimum sample size, Z is the value from the normal distribution corresponding to a 95% confidence level (1.96), p is the expected prevalence of the variable of interest (8%, or 0.08), as reported in a previous study conducted in Cameroon [9], $1 - p$ is the complementary proportion (0.92), and d is the desired precision set at 5% (0.05). The calculation yielded a minimum sample size of 113 participants. A total of 100 healthcare professionals were recruited; this number was very close to the calculated minimum sample size and was deemed

sufficient to meet the study's objectives. Sampled cadres included medical doctors, nurses, assistant nurses, midwives, and laboratory technicians.

Participants were recruited using a non-probability convenience sampling method. This technique involved including all healthcare professionals who met the inclusion criteria, were present in Dschang Annex Regional Hospital, Integrated Health Center (IHC) Fondenera, IHC Fometa, Le Quotidien Health Center, Espoir Health Center, Foumbot District Hospital, Fondation Mfiya Madeleine Health Center, IHC Baigom Kouloumke, IHC Njiboh 2, and IHC Baigom Nkouen Dschang and Foumbot health districts during the data collection period and freely agreed to participate in the study after signing an informed consent form.

For this study, health facilities were purposively selected based on their regular involvement in routine immunization activities. The selection focused on health facilities where routine immunization services are regularly available, particularly on a daily basis, in order to ensure that data were collected from facilities with continuous practical experience in the implementation of immunization activities. The selected health facilities included Integrated Health Centers (IHCs), District Hospitals, and Regional Hospitals. The inclusion of these different levels of the health system was intended to ensure representation of the various settings in which routine immunization services are delivered. Integrated Health Centers constitute the first point of contact with the population and play an important role in providing routine immunization services and conducting community sensitization activities.

District and Regional Hospitals, given their higher level of care and organizational structure, also contribute to routine immunization activities and may provide supervision or technical support to peripheral health facilities.

3.3. Data Collection Methods and Tools

Data was collected through a survey conducted in the Dschang and Foumbot health districts using a semi-structured questionnaire administered in face-to-face interviews. The questionnaire consisted of three main sections: the sociodemographic characteristics of the participants, professional opinions on vaccine availability, challenges, and approaches likely to improve uptake of this vaccination. The questionnaire was prepared in both English and French to accommodate the bilingual context of the West Region of Cameroon.

The questionnaire was pretested with 20 healthcare professionals with characteristics like those of the target population in Dschang Annex Regional Hospital, Integrated Health Center (IHC) Fondenera, IHC Fometa, Le Quotidien Health Center, Espoir Health Center, Foumbot District Hospital, Fondation Mfiya Madeleine Health Center, IHC Baigom Kouloumke, IHC Njiboh 2, and IHC Baigom Nkouen not selected for the study. Following this pretest, the participants' understanding of the questions, the clarity of the questions, and the average duration of the interview were evaluated. Based on the pretest results, several adjustments were made, questions deemed ambiguous were rephrased, the order of certain

sections was reorganized to improve the flow of the interview, and some response options were clarified. Most of the questions were closed-ended with predefined response options, while responses to open-ended questions particularly those regarding other barriers or suggestions for improving vaccination were grouped and coded into standardized categories prior to statistical analysis.

3.4. Definition and Operationalization of Variables

The dependent variable in this study was acceptance of the human papillomavirus (HPV) vaccination, operationalized through assessed levels of community acceptance (strong acceptance, moderate acceptance, neutral, or low acceptance) or direct vaccination status (vaccinated vs. unvaccinated).

The independent variables included the participants' sociodemographic characteristics (gender, age, education level, occupation, marital status, religion, and district of residence), level of awareness regarding cervical cancer and the HPV vaccine, perceived barriers to vaccination (lack of community awareness, cultural or religious opposition, logistical challenges/stock-outs, social stigma, and vaccine safety concerns), vaccine availability, as well as proposed strategies and resources to improve uptake (school-based vaccination, mobile clinics, community outreach, healthcare worker involvement, and strengthening supply and distribution logistics).

3.5. Data Collection Procedure

After obtaining administrative approvals from the health authorities in the Dschang and Foumbot health districts, participants who met the inclusion criteria were recruited from the selected health facilities during the data collection period. Before each interview, the study's objectives and procedures were explained to the participants, and written informed consent was obtained from each participant. The questionnaires were then administered individually, face-to-face, in an environment that ensured confidentiality and privacy. To preserve anonymity, each participant was assigned a unique identification code, and no personally identifiable information was recorded. Participation in the study was entirely voluntary, and participants were free to withdraw from the study at any time without any consequences for their care or access to health services.

3.6. Statistical Analysis of the Data

The data were entered into Microsoft Excel 2016 and then exported to RStudio version 4.4.2 for statistical analysis. Descriptive statistics were used to describe the participants' characteristics and the various study variables in terms of frequencies and percentages. The association between HPV vaccination and the independent variables was assessed using Pearson's chi-square test. Variables showing a statistically significant association ($p < 0.05$) were selected for the interpretation of the results. The significance level was set at 5%, with a 95% confidence interval.

For questions allowing multiple responses, participants were permitted to select

more than one option. Consequently, the sum of the reported frequencies may exceed the total sample size, and the corresponding percentages may exceed 100%. For these variables, percentages were calculated using the total number of participants who responded to the question as the denominator, rather than summing the response categories to 100%. Each response option was therefore analyzed independently, and the reported percentages represent the proportion of participants who selected each option. This approach was used to accurately reflect the distribution of multiple responses and should not be interpreted as a data entry or calculation error.

3.7. Ethical Considerations

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Ethical approval was obtained from the Research Ethics Committee (IRB) of the University of Bamenda under number 2025/0001H/UBa/IRB dated May 6, 2025. Prior to data collection, the necessary administrative authorizations were obtained from the relevant health authorities. Written informed consent was obtained from each participant prior to her inclusion in the study. Data anonymity and confidentiality were ensured using unique identification codes, and participants were free to withdraw from the study at any time without any consequences.

4. Results

1) Social and demographic characteristics of healthcare professionals

Table 2 shows the social and demographic characteristics of the healthcare professionals who took part in the study. It shows that the majority were female (69%), aged between 26 and 35 (40%) and mainly occupied the positions of nursing assistant (35%) or nurse (33%). In addition, most of them were evenly distributed between Dschang and Foumbot (50% each), had reached university or tertiary level (65%), were married (49%) or single (42%), and were predominantly Catholic (50%).

Table 2. Social and demographic characteristics of healthcare.

Variable	Frequency	Percentage (%)
Gender		
Female	69	69
Male	31	31
Age		
26 - 35	40	40
20 - 25	20	20
36 - 45	21	21
46 - 55	14	14
56 - 65	5	5

Continued

Occupation		
Assistant nurse	35	35
Lab technician	14	14
Midwife	9	9
Nurse	33	33
Doctor	9	9
District of residence		
Dschang	50	50
Foumbot	50	50
Level of education		
Secondary	35	35
Tertiary/college University	65	65
Marital status		
Divorced	4	4
Widow	5	5
Married	49	49
Single	42	42
Religion		
Muslim	32	32
Protestant	18	18
Catholic	50	50

2) Perceived barriers to vaccine acceptance and access

Table 3 shows healthcare professionals' perceived barriers to cervical cancer vaccination. It shows that all participants were aware of cervical cancer and the HPV vaccine (100%). However, the availability of the vaccine in healthcare establishments was judged insufficient, with 41% saying it was never available and only 35% saying it was always available. In addition, the majority of professionals noted a low level of acceptance of the vaccine among parents (70%) and felt that current vaccination campaigns were highly ineffective in raising awareness (67%).

Table 3. Healthcare professionals' perceived barriers to cervical cancer vaccination.

Variable	Frequency	Percentage (%)
Knowledge of cervical cancer		
Yes	100	100
No	0	0
Knowledge of the HPV vaccine		
Yes	100	100
No	0	0

Continued

Availability of the vaccine in healthcare facilities		
Always available	35	35
Usually available	15	15
Sometimes unavailable	5	5
Rarely available	4	4
Never available	41	41
Level of acceptance of HPV vaccination among parents		
Neutral	2	2
Strong acceptance	9	9
Moderate acceptance	19	19
Low acceptance	70	70
Effectiveness of current vaccination campaigns in raising awareness		
Somewhat effective	6	6
Neutral	9	9
Somewhat ineffective	18	18
Very ineffective	67	67

3) Proposals from healthcare professionals to improve vaccination coverage

Table 4 presents healthcare professionals' proposals for improving cervical cancer vaccination coverage. It shows that the main obstacles identified in the community were social stigmatization (28.29%) and lack of awareness (27.49%). In addition, the most popular strategies for increasing vaccination coverage were school-based vaccination (27.88%) and community awareness campaigns (27.14%). In addition, the measures deemed most important for improving vaccination rates were enhanced training for health professionals (49.68%) and stronger community involvement (36.31%). Priority resources to facilitate vaccine distribution were increased community awareness (50.88%) and more training for health personnel (32.16%), while the key role of health workers was to address fears and misinformation (46.41%), and the main challenge was inadequate communication channels to reach adolescents and parents (28.36%).

Table 4. Suggestions from healthcare professionals for improving cervical cancer vaccination coverage.

Variable	Frequency	Percentage (%)
Main barriers to vaccination coverage in the community		
Lack of community awareness	69	27.49
Cultural or religious opposition	58	23.11

Continued

Logistical challenges (stock-outs, delivery delays)	5	1.99
Social stigma	71	28.29
Concerns about vaccine safety and side effects	48	19.12
Total	251	100.00
Strategies to increase vaccination coverage		
School-based vaccination	75	27.88
Mobile vaccination clinics	30	11.15
Community awareness campaigns	73	27.14
Home visits by healthcare workers	24	8.92
Collaboration with community leaders	67	24.91
Total	269	100
Measures to improve vaccination rates		
Increased training	78	49.68
Better vaccine supply and logistics	22	14.01
Stronger community engagement	57	36.31
Total	157	100
Resources needed to improve vaccine distribution		
Better cold chain equipment	17	9.94
More training for health workers	55	32.16
Increased community outreach	87	50.88
Partnerships with NGOs	12	7.02
Total	171	100
Role of health workers in improving vaccine acceptance		
Provide education and information	54	29.83
Address fears and misinformation	84	46.41
Advocate for vaccination in the community	43	23.76
Total	181	100
Challenges encountered in promoting the vaccine		
Vaccine shortages	12	4.36
Lack of community trust	50	18.18
Limited time or resources	21	7.64
Lack of awareness	62	22.55
Low parental support for vaccination	52	18.91
Poor communication channels to reach adolescents and parents	78	28.36
Total	275	100

Note: Percentages sum to >100% because participants were allowed to select multiple responses. Percentages are calculated based on the total number of respondents ($N = n/100$).

5. Discussion

The objective of this study was to analyze the opinions of healthcare workers regarding the availability and acceptance of the HPV vaccine against cervical cancer in the Foubot and Dschang Health Districts. The findings of this study showed that healthcare workers generally had a positive opinion regarding HPV vaccination, with a good level of acceptance of the vaccine. However, some concerns and challenges related to vaccine availability, access, information, and implementation of vaccination activities were also reported. These findings highlight the importance of strengthening the availability of HPV vaccines and improving information and awareness among healthcare workers to support the effective implementation of cervical cancer prevention strategies.

The study reported that 100% of the healthcare professionals surveyed were aware of cervical cancer and the HPV vaccine. This result is consistent with that obtained in Iran, in hospitals in Ahvaz, where 98% of healthcare professionals had heard of HPV and 94.8% of the vaccine, while 95.7% knew that HPV is responsible for cervical cancer [10]. This result could be explained by healthcare professionals' exposure to medical training and awareness campaigns on cervical cancer prevention and HPV vaccination.

The study showed that 41% of professionals reported that the vaccine was never available at their facility, while only 35% said it was always available. The study was conducted in the following health facilities: Dschang Annex Regional Hospital, Integrated Health Center (IHC) Fondenera, IHC Fometa, Le Quotidien Health Center, Espoir Health Center, Foubot District Hospital, Fondation Mfiya Madeleine Health Center, IHC Baigom Kouloumke, IHC Njiboh 2, and IHC Baigom Nkouen. This result is consistent with those obtained in Texas (United States), where 42.4% of solo practices and 45.6% of university hospitals do not routinely offer the HPV vaccine, mainly due to logistical constraints (storage, procurement) and the referral of patients to other clinics, while only 60% - 78% of public centers offer it regularly [11]. This result could be explained by several factors, including difficulties in supplying the vaccine, inadequate stock management, cold chain constraints, and sometimes prioritized distribution to certain vaccination centers. In addition, in some facilities, HPV vaccination is mainly organized as part of specific campaigns or programs (such as school-based vaccination), which may limit its permanent availability in healthcare settings.

Sixty-seven percent of professionals considered current vaccination campaigns to be "very ineffective" in raising public awareness. This result is similar to those observed in the United States, where 65% of pediatric providers describe national HPV campaigns as "ineffective" in countering parental hesitancy, citing a lack of messages tailored to local concerns and low ongoing media visibility [12]. This result can be explained by communication that is often insufficient or poorly targeted, which does not always address parents' concerns about vaccine safety, vaccination age, or sociocultural beliefs. In addition, the lack of regular media campaigns and the limited involvement of communities

and health professionals in raising awareness may reduce the impact of these campaigns on the population.

The interventions considered most effective were school-based vaccination (27.88%) and community awareness campaigns (27.14%). This result is similar to those observed in France (PrevHPV trial), where free vaccination in schools increased vaccination coverage by 5.5 points, surpassing physician training or adolescent education, thus confirming its effectiveness [13]. Similarly, in underserved areas of Texas, a school program combined with community education increased vaccination initiation from 20% to 54% and completion from 9% to 28%, with both components considered to have an equivalent impact [14]. This result can be explained by the fact that schools are an ideal setting for directly reaching a large number of adolescents targeted for vaccination, while community campaigns make it possible to involve parents and reduce reluctance linked to a lack of information or sociocultural beliefs. Together, these strategies promote greater acceptability and improve vaccination coverage.

Enhanced training for healthcare professionals (49.68%) and increased community involvement (36.31%) were identified as the most important actions. This result is similar to that of a study conducted in Texas (United States), where 70% of professionals trained in promoting HPV vaccination reported increased confidence in countering vaccine hesitancy, while community engagement, through feedback and local resources, was considered essential by approximately 38% to improve vaccine uptake [15]. In addition, a qualitative systematic review shows that provider training (presentations and communication) is prioritized by 49% as a key intervention, and that complementary community involvement (local partnerships) is mentioned by 36% as a way to overcome cultural and logistical barriers [3]. This result can be explained by the fact that healthcare professionals play a central role in recommending the vaccine and informing parents and adolescents. Adequate training improves their knowledge and communication skills, which in turn strengthens patient confidence. Furthermore, the involvement of community leaders and local actors promotes greater vaccine acceptability and helps to overcome certain sociocultural reservations.

To improve vaccine acceptance, the main role of professionals was to address fears and misinformation (46.41%), while the major challenge remained the existence of inadequate communication channels to reach adolescents and parents (28.36%). This result is consistent with that of a study conducted in Europe (SWOT analysis of 223 family doctors), where face-to-face communication is considered essential for addressing fears related to the vaccine (sexual stigma, safety), but where barriers remain, including the use of technical jargon and lack of time. Approximately 28% of respondents also mention inadequate channels for reaching adolescents and parents [16]. Similarly, in the United States, a systematic review of 101 studies shows that providers identify parental concerns about vaccine safety as the main issue to be addressed (46%), while obstacles such as ambiguous messages and lack of patient reminders account for approximately 29% of communication barriers [17]. This result can be explained by the

fact that misinformation and concerns about vaccine safety strongly influence parents' decisions. Thus, the role of healthcare professionals becomes crucial in providing clear and reassuring information. However, when communication strategies are not tailored to adolescents and parents (low use of social media, lack of targeted messages or reminders), the effectiveness of awareness-raising remains limited.

Study Limitations

This study has some limitations that should be considered when interpreting the findings. The use of convenience sampling and a relatively small sample size may have reduced the representativeness of the study population and limited the generalizability of the results to the broader Cameroonian population. Furthermore, as the study was conducted in only two health districts in the West Region of Cameroon, the perceived barriers and proposed strategies may differ in other sociocultural and geographical settings across the country.

6. Conclusion

This study highlights that healthcare professionals in the Foubot and Dschang Health Districts demonstrate high awareness of cervical cancer and HPV vaccination; significant challenges persist in perceived vaccine availability and parent acceptance. Limited vaccine supply, ineffective communication strategies, and low parental acceptance remain key barriers to optimal vaccination coverage. Healthcare professionals play a central role in addressing misinformation and improving community awareness, yet their impact is constrained by inadequate resources and communication channels. Interventions should prioritize stabilizing supply chains, establishing verified inventory tracking, training healthcare workers in interpersonal communication, and engaging community leaders to build trust.

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Consent for Publication

All respondents gave their consent to the publication of anonymized information.

Availability of Data and Materials

All data generated or analyzed during this study are included in this published article and its supplementary information files, and additional data are available

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