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“I do not have enough information to decide”: understanding parental hesitancy toward human papillomavirus vaccination of adolescents in Cameroon

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Abstract

Human papillomavirus (HPV), the primary cause of cervical cancer, remains a major global public health concern, particularly in Sub-Saharan Africa, including Cameroon. Despite vaccination programs, coverage remains suboptimal. This study assessed factors associated with HPV knowledge and parents’ willingness to authorize HPV vaccination for their children in Cameroon. A cross-sectional online survey was conducted from June to November 2025 among parents of children aged 9-18 years across various regions in Cameroon. A self-administered questionnaire collected data on sociodemographic characteristics, HPV-related knowledge, and attitudes and perceptions toward HPV vaccination. Binary logistic regression identified factors associated with HPV awareness and willingness to vaccinate. Statistical significance was set at $p < 0.05$. Among 332 participants, 70.8% were female, 60.8% were aged 31-50 years, and 72.0% had a tertiary education. Overall, 66.9% were aware of HPV, and 62.3% knew about HPV vaccines. Higher monthly income (≥ 709 USD) was significantly associated with HPV awareness. Additionally, 66.3% were willing to vaccinate their children, while insufficient information was the main reason for hesitancy in 97.3%. Parents in Cameroon have moderate knowledge of HPV. Awareness campaigns are needed to improve understanding of vaccine effectiveness. Provider-led education could improve acceptance and uptake of the vaccine.

Key words: human papillomavirus; vaccination uptake; Cameroon.

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Introduction

Human papillomaviruses (HPVs) are non-enveloped, double-stranded DNA viruses and represent the most prevalent sexually transmitted infection worldwide, with more than 200 genetically distinct genotypes identified.¹ Persistent infection with oncogenic HPV types is the primary etiological factor for cervical cancer and contributes to other anogenital and oropharyngeal malignancies in both females and males.² Among high-risk genotypes, HPV16 and HPV18 account for more than 70% of cervical cancer cases across the world.² Although sexual transmission is the predominant mode of spread, perinatal mother-to-child transmission has also been reported, highlighting the broader public health implications of HPV beyond sexual transmission.³

According to GLOBOCAN 2022 estimates, cervical cancer remains a major global health challenge, with approximately 662,301 new cases and 348,874 deaths worldwide in 2022, making it the fourth most common cancer and cause of cancer death among women globally.⁴ The burden of disease is disproportionately con-

centrated in low-resource settings, where cervical cancer remains one of the leading causes of cancer incidence and mortality among women.⁵ Globally, over 80% of cervical cancer and deaths occur in low- and middle-income countries, with Sub-Saharan Africa among the regions with the highest incidence and mortality rates. In 2022, Africa accounted for approximately 23% of worldwide cervical cancer deaths.⁶ Conversely, in high-income countries, incidence and mortality are two to four times lower because of effective screening and vaccination programs.⁶

Preventive HPV vaccination before sexual initiation has shown high efficacy against infection by oncogenic HPV types as well as the subsequent risk of precancerous lesions and cervical cancer.³ National Immunization Programs (NIPs) have gained momentum in a global effort, with at least 179 countries having adopted HPV immunization plans.⁷ However, the coverage is much higher in high-income settings, with estimates of 80% compared with 55% in upper-middle-income countries and 30% in low- and middle-income countries.⁷ In 2020, Cameroon implemented HPV vaccination into its national program, which includes free vaccination for

9-year-old girls. However, national coverage remains extremely low, estimated at approximately 5% in 2020.⁸

HPV vaccination programs are generally considered to be safe, effective, and cost-effective, with robust evidence demonstrating substantial reductions in HPV infections, genital warts, and cervical precancerous lesions following vaccine introduction.⁸ The low vaccine coverage in Cameroon is attributed to multidimensional factors, such as socioeconomic constraints, limited access to preventive health services, insufficient health communication, socio-cultural and religious beliefs, and parental hesitancy.⁹ Because the target population eligible for HPV vaccination consists of minors, parental consent is a decisive factor in vaccine uptake and program success.

Despite global evidence identifying behavioral and contextual predictors of HPV vaccine acceptance, empirical data on parental knowledge, perceptions, and decision-making in Cameroon remain limited. This knowledge gap constrains the ability of public health programs to design culturally appropriate and targeted interventions to improve vaccine uptake. The present study, therefore, aims to assess the knowledge, perceptions, and practices of Cameroonian parents regarding HPV vaccination and to identify factors associated with parental authorization of HPV vaccination of their children.

Materials and Methods

Study design and setting

A cross-sectional analytical study was conducted across three regions (Central, South, and West) in Cameroon, including urban and rural areas. The study participants included all parents of children aged 9-18 years who agreed to participate in the study. Participants were informed about the study's aims within the questionnaire and made aware that their involvement was voluntary and confidential. Data collection occurred over 6 months (June to November 2025) via an online electronic questionnaire distributed using Google Form. The reporting of this study was guided by the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement and the Checklist for Reporting Results of Internet E-Surveys (CHERRIES).

Study population and eligibility criteria

The study targeted parents or legal guardians living in Cameroon who had at least one child aged 9-18 years and who were involved in health-related decision-making for that child. Participants were eligible if they were aged 18 years or older, resided in Cameroon, and completed the eligibility screening questions at the beginning of the questionnaire. Participants were excluded if they did not meet eligibility criteria, submitted incomplete questionnaires, or provided inconsistent responses.

Sampling strategy and recruitment

A non-probability sampling strategy combining convenience and snowball sampling was used. Initial recruitment was conducted through parent-teacher associations, women's groups, health-care facilities, and professional or community parent networks. The survey link was disseminated through WhatsApp, e-mail, and other digital communication channels. Participants were also encouraged to share the survey with other eligible parents in their networks to improve coverage. Participation was voluntary, anonymous, and without compensation.

Survey instrument and data collection

Data were collected using a structured, self-administered questionnaire developed in English and French. The questionnaire was adapted from previously used Knowledge, Attitudes, and Practices instruments and contextualized for Cameroon. It included sections on i) sociodemographic characteristics; ii) awareness of HPV and HPV vaccination; iii) attitudes and perceptions toward HPV vaccination; and iv) vaccination practices and reasons for acceptance or refusal. A pilot test was conducted among a small group of parents to assess clarity, relevance, and comprehensibility. Minor revisions were made before full dissemination.

Outcome variables

Two main outcome variables were analyzed: awareness of HPV and parental willingness to authorize HPV vaccination.

Awareness of HPV was assessed using the dichotomous question: "Have you ever heard of the human papillomavirus?". Responses were recorded as "Yes" or "No". In this study, this variable was used as a proxy for HPV awareness, rather than as a composite knowledge score.

Willingness to vaccinate was assessed using a dichotomous response variable based on whether the participant reported being willing to authorize HPV vaccination for their child.

Explanatory variables

Independent variables included age, sex, marital status, education level, employment status, monthly income, health insurance coverage, and number of children. These variables were selected based on their potential relevance to parental awareness and vaccine decision-making.

Data management and statistical analysis

Survey responses were exported from Google Forms into Microsoft Excel for cleaning and coding, then analyzed using IBM SPSS Statistics version 22. Descriptive statistics were used to summarize participant characteristics and survey responses using frequencies and percentages. Binary logistic regression analyses were conducted to identify factors associated with: i) HPV awareness, defined as having ever heard of HPV, and ii) willingness to authorize HPV vaccination for one's child. For each outcome, univariate logistic regression analyses were first performed. Variables with $p \leq 0.25$ in univariate analyses, as well as variables considered epidemiologically relevant, were eligible for inclusion in multivariable logistic regression models. Adjusted odds ratios (aORs) with 95% confidence intervals (CIs) were reported. Statistical significance was set at $p < 0.05$.

Handling of missing data

Data completeness was assessed before analysis. Questionnaires with substantial missing information on key study variables were excluded from the final dataset. For the remaining observations, complete case analysis was used. The extent of missing data was low and was considered unlikely to materially affect the findings.

Bias and study limitations

Because the study used an online survey and non-probability sampling, selection bias may have occurred, especially in favor of participants with internet access, digital literacy, and higher levels of education. Self-reported responses may also be affected by recall bias and social desirability bias. In addition, the use of a single dichotomous awareness question did not allow for detailed

measurement of the depth or accuracy of HPV knowledge. However, this approach was appropriate for assessing basic awareness in the study population.

Ethical considerations

The study was conducted in accordance with the Declaration of Helsinki and received ethical approval from the Regional Ethics Committee under reference CE N° 0056 CRERSHC/2023. Electronic informed consent was obtained from all participants before access to the questionnaire. No personally identifiable information was collected, and all data were stored securely with restricted access.

Results

Sample characteristics

Overall, the study sample consisted of 332 parents of children aged 9-18 years at the time of the survey. The majority of participants were female (70.8%, n=235), aged 31-50 years (60.8%, n=202), and unmarried (53.9%, n=179). Most participants had attained tertiary education (72.0%, n=239), and 66.3% (n=220) were employed. Approximately 70.2% (n=233) reported no public health insurance coverage. Regarding income, 32.5% (n=108) earned less than 177 USD per month. Most parents (85.3%, n=284) reported having one or two children (Table 1).

Table 1. Sociodemographic characteristics of the study sample.

Variables	Frequency (%)
Gender	
Male	97 (29.9)
Female	235 (70.8)
Age (years)	
15-30	115 (34.6)
31-50	202 (60.8)
>50	15 (4.5)
Family status	
Married	153 (46.1)
Unmarried	179 (53.9)
Educational status	
Primary	27 (8.1)
Secondary	66 (19.9)
Tertiary	239 (72.0)
Occupational status	
Employee	220 (66.3)
Unemployed	112 (33.7)
Monthly family income (USD)	
No income	70 (21.1)
<177	108 (32.5)
178-355	66 (19.9)
356-532	41 (12.3)
533-709	17 (5.1)
>709	30 (9.0)
Social insurance (public)	
Yes	99 (29.8)
No	233 (70.2)
Number of children	
1-2	284 (85.3)
3-4	33 (9.9)
≥5	15 (4.5)

Awareness of HPV and associated factors

Out of the 332 participants enrolled, 66.9% (n=222) reported having heard of HPV. Among those aware, the most common sources of information were healthcare professionals (42.2%, n=105), internet/social media (40.0%, n=100), and friends or family (23.7%, n=59). Sexual intercourse was identified as the main mode of HPV transmission (63.9%, 212/332), while 9.6% (32/332) incorrectly believed that HPV could be transmitted through contaminated syringes. Regarding prevention of HPV transmission, vaccination was the most reported preventive measure (66.3%, n=220). Moreover, the majority of participants recognized the association between HPV and cervical cancer (67.2%, n=223). However, 21.7% (72/332) of respondents reported having no knowledge of diseases associated with HPV (Table 2).

In univariate logistic regression analysis, sociodemographic variables were examined for association with HPV awareness (Table 3). Male parents had lower odds of awareness compared with females (61.9% vs. 68.9%; OR=0.73; 95% CI: 0.44-1.19), although this was not statistically significant (p=0.21). An increasing, but non-significant trend in HPV awareness was observed with advancing age, with parents aged >50 years having higher odds of awareness compared with those aged ≤30 years (OR=2.13; 95% CI: 0.56-8.00; p=0.26). Marital status was not associated with HPV awareness, as similar levels were observed among married and unmarried (67.3% vs. 66.5%; OR=0.96; 95% CI: 0.60-1.52; p=0.87). Parents with 3-4 children showed lower awareness compared with those with fewer children (61.8%; OR=0.73; 95% CI: 0.42-1.26; p=0.26). Higher and non-significant awareness was

Table 2. Knowledge, sources of information, and perceptions regarding HPV among parents.

Variables	Frequency (%)
Knowledge of HPV as a virus	
Yes	222 (66.9)
Source of information on HPV*	
Physician	105 (42.2)
Internet/social media	100 (40.0)
Friends/family	59 (23.7)
Television/radio	54 (21.7)
Pharmacist	9 (3.6)
Other	58 (23.3)
Perception on means of HPV transmission*	
Intercourse	212 (63.9)
Shared use of syringes among individuals	32 (9.6)
Shared use of soiled objects	17 (5.1)
Perception regarding prevention of HPV transmission*	
Vaccination against HPV	220 (66.3)
Use of condoms during intercourse	113 (34)
Regular pap smears	127 (38.3)
Delayed sexual activity	56 (16.9)
Use of contraceptive pills	7 (2.1)
No idea	68 (20.5)
Perceptions regarding diseases associated with HPV*	
Cervical cancer	223 (67.2)
Genital and anal warts	64 (19.3)
Pre-cancerous lesions	94 (28.3)
Genital and anal cancer	75 (22.6)
Oro-pharyngeal cancer	28 (8.4)
No idea	72 (21.7)

*Question with multiple responses. Percentages may exceed 100% because respondents could select more than one source.

observed among parents with tertiary education (71.1%; OR=1.97; 95% CI: 0.87-4.42; p=0.10). Similarly, employment status was not associated with HPV awareness (unemployed: 67.0%; OR=1.01; 95% CI: 0.62-1.63; p=0.97). Although parents with health insurance had higher awareness levels, the difference was not statistically significant (73.7% vs. 63.9%; OR=0.63; 95% CI: 0.37-1.06; p=0.08). Monthly income was the only factor significantly associated with HPV awareness. Parents earning ≥USD 709 per month were more likely to report awareness compared with those reporting no income (OR=4.33; 95% CI: 1.36-13.77; p=0.01).

After adjusting for gender, age, educational status, monthly income, social insurance, and number of children, only higher monthly income (>709 USD) remained significantly associated with HPV awareness (aOR=3.85; 95% CI: 1.15-12.90; p=0.03) (Table 3).

Attitudes and perceptions toward the HPV vaccine and factors associated with parental authorization

Overall, 62.3% (207/332) of participants were aware of the existence of HPV vaccines. Among these respondents (n=207), health care professionals were the primary source of information (74.8%, 155/207), followed by the internet and social media (38.6%, 79/207), and television or radio (23.6%, 49/207) (Table 4).

More than half were willing to vaccinate their children (66.3%, 220/332). The main reason for acceptance was “I want to protect my child from HPV infection in the future” (48.8%, 106/220), followed by physicians’ recommendations (41.3%, 91/220). Among those who declined vaccination (n=112), the main reason was “I do not have enough information available to make a decision” (97.3%, 109/112), followed by “I do not believe that vaccination is safe” (43.7%, 49/112) (Figure 1). Additionally, 66.0% (219/332) of participants reported that they would recommend HPV vaccination to others, primarily for the prevention of cervical cancer (89.5%, 196/219) (Table IV). Regarding perceived vaccine effectiveness, 63.3% (210/332) reported having no opinion, while 28.9% (96/332) believed the vaccine to be effective. Among parents willing to vaccinate their children (n=220), 66.3% (146/220) intended to do so within the next 6 months, while 25.0% (55/220) planned vaccination after one year. Regarding factors associated with parental authorization, no statistically significant associations were observed. However, a slightly higher proportion of male parents authorized vaccination compared to female parents (70.1% vs. 64.7%; OR=1.28; 95% CI: 0.76-2.13; p=0.34) (Table 5). Younger parents aged 15-30 years had the highest authorization rate (72.2%), whereas those aged 31-50 years (63.4%) and >50 years (60.0%) showed lower odds of authorization. These associations were not significant in both univariate (63.4%; OR=0.66; 95% CI:

Table 3. Factors associated with HPV knowledge among parents: univariate and multivariate logistic regression analysis.

Variables	HPV Knowledge n (%)	OR (95% CI)	p	aOR (95% CI)	p
Gender					
Female	162 (68.9)	1		1	
Male	60 (61.9)	0.73 (0.44-1.19)	0.21	0.78 (0.45-1.35)	0.38
Age (years)					
15-30	75 (65.2)	1			
31-50	135 (66.8)	1.07(0.66-1.74)	0.77		
>50	12 (80.0)	2.13 (0.56-8.00)	0.26		
Family status					
Married	103 (67.3)	1			
Unmarried	119 (66.5)	0.96 (0.60-1.52)	0.87		
Educational status					
Primary	15 (55.6)	1		1	
Secondary	37 (56.1)	1.02 (0.41-2.51)	0.96	1.10 (0.42-2.85)	0.84
Tertiary	170 (71.1)	1.97 (0.87-4.42)	0.10	1.75 (0.70-4.35)	0.23
Occupational status					
Employed	147 (66.8)	1			
Unemployed	75 (67.0)	1.00 (0.62-1.63)	0.97		
Monthly income (USD)					
No income	42 (60.0)	1		1	
<177	69 (63.9)	1.17 (0.63-2.19)	0.60	1.10 (0.55-2.20)	0.78
178-355	44 (66.7)	1.33 (0.66-2.68)	0.42	1.25 (0.58-2.70)	0.56
356-532	30 (73.2)	1.81 (0.78-4.21)	0.16	1.60 (0.65-3.95)	0.30
533-709	11 (64.7)	1.22 (0.40-3.68)	0.72	1.15 (0.35-3.75)	0.82
>709	26 (86.7)	4.33 (1.36-13.77)	0.01*	3.85 (1.15-12.90)	0.03*
Social insurance					
Yes	73 (73.7)	1		1	
No	149 (63.9)	0.63 (0.37-1.06)	0.08	0.70 (0.40-1.20)	0.19
Number of children					
1-2	152 (68.8)	1			
3-4	47 (61.8)	0.73 (0.42-1.26)	0.26		
≥5	23 (65.7)	0.87 (0.40-1.84)	0.71		

OR, odds ratio; CI, confidence interval; aOR, adjusted odds ratio; *Statistically significant.

0.40-1.09; $p=0.11$ and 60.0%; $OR=0.57$; 95% CI: 0.19-1.75; $p=0.33$, respectively) and multivariate analyses ($aOR=0.79$; 95% CI: 0.48-1.31; $p=0.36$ and $aOR=0.69$; 95% CI: 0.23-2.05; $p=0.50$). Similarly, unmarried parents were slightly less likely to authorize vaccination compared to married parents, with no statistical significance ($OR=0.86$; 95% CI: 0.54-1.37; $p=0.54$). Educational level and occupational status were not associated with HPV vaccine authorization. Parents with 3-4 children and those with ≥ 5 children had lower odds of authorizing vaccination compared to those with 1-2 children, but these associations were not statistically significant in both crude ($OR=0.69$; 95% CI: 0.40-1.19; $p=0.18$ and $OR=0.76$; 95% CI: 0.36-1.61; $p=0.48$) and adjusted analyses ($aOR=0.81$; 95% CI: 0.46-1.41; $p=0.45$ and $aOR=0.85$; 95% CI: 0.38-1.91; $p=0.69$). Monthly income and social insurance coverage were also not significantly associated with parental authorization ($p>0.05$) (Table 5).

Discussion

This study aimed to assess the knowledge, perceptions, and practices of Cameroonian parents regarding HPV vaccination and to identify factors associated with parental authorization of HPV vaccination for their children. This study provides important and policy-relevant insights into parental knowledge, attitudes, and decision-making regarding HPV vaccination in Cameroon, where cervical cancer remains a major public health burden and vaccine coverage is still suboptimal. Approximately two-thirds of parents were aware of HPV (66.9%) and the existence of HPV vaccines (62.3%), and a similar proportion expressed willingness to vacci-

nate their children (66.3%). However, substantial knowledge gaps, particularly regarding HPV-related diseases and vaccine effectiveness, persist and appear to play a critical role in parental hesitancy.

The level of awareness observed (66.9%) aligns with findings from other Sub-Saharan African settings (50-75%) but remains lower than levels reported in many high-income countries, where awareness often exceeds 80%.⁹ These disparities likely reflect differences in the long-standing implementation of school-based vaccination programs, structured health communication strategies,

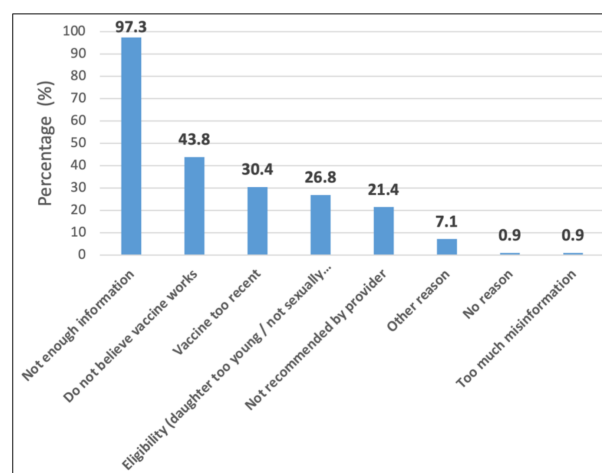


Figure 1. Reasons for non-vaccination.

Table 4. Parental awareness, attitudes, and intentions regarding HPV vaccination.

Variables	Frequency (%)
Knowledge of the existence of HPV vaccine	
Yes	207 (62.3)
Source of information on HPV vaccine*	
Health care professional	155 (74.8)
Internet/social media	79 (38.6)
Friends/family	36 (17.3)
Television/radio	49 (23.6)
Printed material (leaflets, newspapers, magazines)	20 (9.6)
Will you authorize the administration of the HPV vaccine to your eligible children?	
Yes	220 (66.3)
Reasons for allowing your children to receive the vaccine	
Physician recommendation	91 (41.3)
I wanted to protect my child from being infected with HPV in the future	106 (48.8)
Person in close environment with cervical cancer	21 (9.5)
Would you recommend vaccination to a third party?	
Yes	219 (66)
What do you think about the HPV vaccine efficacy?	
Effective	96 (28.9)
Ineffective	26 (7.8)
No idea	210 (63.3)
Why would you recommend the vaccine to your children?*	
Prevents the risk of cancer	196 (89.5)
Protects against lesions	96 (43.8)
How soon do you plan to vaccinate your children against HPV?	
Within the next 6 months	146 (66.3)
Within one year	19 (8.6)
More than one year	55 (25.0)

*Question with multiple responses. Percentages may exceed 100% because respondents could select more than one source.

and the integration of adolescent vaccination into routine health services.¹⁰ Persistent misconceptions regarding HPV transmission and disease consequences further underscore the need for context-specific and culturally tailored educational interventions.

Health care providers emerged as the primary source of HPV-related information, consistent with prior evidence demonstrating that physician recommendations are one of the strongest determinants of vaccine acceptance.¹¹ This finding underscores the central role of frontline health care providers in shaping parental perceptions and reinforces the importance of strengthening provider-initiated communication within routine maternal, child, and adolescent health services. At the same time, the growing contribution of the internet and social media platforms reflects the increasing digitalization of health information environments.¹²

Although awareness was moderate, important knowledge gaps remain; nearly one-third of parents were unwilling to vaccinate their children, most frequently citing insufficient information. These findings suggest that hesitancy is primarily driven by insufficient information, although concerns about vaccine safety were also reported by a substantial proportion of parents and should not be overlooked. Within the framework of the World Health Organization 3C model of vaccine hesitancy (confidence, convenience, and complacency), these barriers appear to be mainly related to gaps in knowledge and confidence, rather than strong ideo-

logical opposition. This distinction is important, as it suggests that targeted educational strategies may yield measurable improvements in vaccine uptake.⁹ Although concerns about side effects and vaccine safety were reported, they appeared secondary to informational barriers, further indicating that hesitancy may be amenable to structured communication interventions rather than requiring complex trust-building strategies. Also, some misconceptions persisted, including incorrect beliefs about non-sexual transmission routes, indicating an incomplete understanding of HPV epidemiology. Sociodemographic factors were not consistently associated with HPV awareness; however, household income emerged as the only significant predictor, with parents in the highest income category demonstrating significantly higher awareness. While most sociodemographic variables were not significantly associated with awareness, the observed association with income suggests that economic factors may influence access to HPV-related information.¹³ Additionally, a large proportion of parents reported having no opinion regarding vaccine effectiveness, reflecting uncertainty and limited understanding of vaccine benefits. This divergence may reflect context-specific dynamics in Cameroon, including uneven dissemination of HPV-related information and limited systematic integration of HPV education into primary health services. Similar patterns have been documented in other low-resource settings, where access to targeted health messaging, rather than

Table 5. Factors associated with parental authorization of HPV vaccination: univariate and multivariate logistic regression analysis.

Variables	Authorize administration of the HPV vaccine n (%)	OR (95% CI)	p	aOR (95% CI)	p
Gender					
Female	152 (64.7)	1			
Male	68 (70.1)	1.28 (0.76-2.13)	0.34		
Age (years)					
15-30	83 (72.2)	1			
31-50	128 (63.4)	0.66 (0.40-1.09)	0.11	0.79 (0.48-1.31)	0.36
>50	9 (60.0)	0.57 (0.19-1.75)	0.33	0.69 (0.23-2.05)	0.50
Family status					
Married	104 (68.0)	1			
Unmarried	116 (64.8)	0.86 (0.54-1.37)	0.54		
Educational status					
Primary	17 (63.0)	1			
Secondary	45 (68.2)	1.26 (0.49-3.21)	0.62		
Tertiary	158 (66.1)	1.14 (0.50-2.62)	0.74		
Occupational status					
Employed	145 (65.9)	1			
Unemployed	75 (67.0)	1.04 (0.64-1.69)	0.84		
Monthly income (USD)					
No income	45 (64.3)	1			
<177	75 (69.4)	1.26 (0.66-2.38)	0.47		
178-355	38 (57.6)	0.75 (0.37-1.50)	0.42		
356-532	30 (73.2)	1.51 (0.65-3.53)	0.33		
533-709	11 (64.7)	1.01 (0.33-3.08)	0.97		
>709	21 (70.0)	1.29 (0.51-3.25)	0.58		
Social insurance					
Yes	67 (67.7)	1			
No	153 (65.7)	0.91 (0.55-1.50)	0.72		
Number of children					
1-2	152 (68.8)	1			
3-4	46 (60.5)	0.69 (0.40-1.19)	0.18	0.81 (0.46-1.41)	0.45
≥5	22 (62.9)	0.76 (0.36-1.61)	0.48	0.85 (0.38-1.91)	0.69

OR, odds ratio; CI, confidence interval; aOR, adjusted odds ratio.

socioeconomic position alone, appeared to shape awareness levels.¹⁴ Collectively, these findings underscore the need for broad-based, equity-oriented communication strategies that reach diverse population groups across socioeconomic strata.

No significant predictors of parental HPV vaccine authorization were identified, suggesting that vaccination decisions may be influenced by unmeasured contextual or perceptual factors rather than sociodemographic characteristics alone. Younger parents may be more receptive to preventive innovations and more accustomed to vaccination campaigns disseminated through digital platforms. Importantly, willingness to vaccinate was relatively high; however, this did not consistently translate into immediate vaccination intentions. Such delays represent a critical contributor to missed vaccination opportunities in low- and middle-income countries.¹⁵

The discrepancy between relatively favorable parental attitudes and persistently low national HPV vaccine coverage in Cameroon suggests the presence of structural and programmatic barriers beyond parental willingness. These findings likely reflect structural barriers, including limited access to vaccination services, inconsistent vaccine availability, supply chain constraints, and insufficient integration of HPV vaccination into routine and school-based programs.¹⁶ Addressing these systemic barriers, alongside strengthening parental education, will be essential to achieving sustained improvements in vaccine uptake and reducing cervical cancer inequities.

While this study provides valuable insights, it has limitations. The use of an online survey and snowball sampling may have introduced selection bias, favoring parents with internet access and higher literacy levels. Self-reported data are also subject to recall and social desirability biases. Additionally, the cross-sectional design precludes causal inference. We can also state the limited generalizability to rural populations. Nevertheless, the study has important strengths, including bilingual administration and a comprehensive assessment of knowledge, attitudes, and decision-making determinants. These findings provide actionable evidence to inform equitable and context-sensitive HPV vaccination strategies in Cameroon and similar low-resource settings.

Conclusions

Despite moderate parental awareness of HPV and its vaccine in Cameroon, important knowledge gaps, particularly regarding vaccine effectiveness and HPV-related diseases, continue to limit uptake. Although willingness to vaccinate was relatively high, hesitancy was mainly driven by insufficient information, with additional concerns about vaccine safety. Household income was the only factor significantly associated with awareness, suggesting inequities in access to information. Health care providers were the most trusted source of information, underscoring their key role in improving vaccine uptake. Increasing HPV vaccination coverage will require targeted education and efforts to address structural barriers to access. An integrated, equity-focused approach is essential to advance cervical cancer prevention in Cameroon.

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