

# BMJ Open Assessing knowledge, attitudes and belief toward HPV vaccination of parents with children aged 9–14 years in rural communities of Northwest Cameroon: a qualitative study

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## ABSTRACT

**Background** Human papilloma virus (HPV) vaccination is essential for the WHO cervical cancer elimination initiative. In Cameroon, HPV vaccine uptake is currently 5%. To assess the knowledge, beliefs and attitudes of parents of young girls aged 9–14 years about HPV vaccines within rural communities in the Northwest Region of Cameroon. **Methods** During January–May 2022, we conducted 45 one-on-one interviews using a semistructured interview guide in the localities of Mbingo, Njinikom and Fundong. Participants were parents of girls aged 9–14 years who speak English or Pidgin English. Healthcare workers were excluded. The interviews were recorded, transcribed and analysed using ATLAS.ti V.9. Member checking was conducted presenting our findings and getting feedback from a focus group of parents.

**Results** Thirty-five mothers and 10 fathers were interviewed with a mean age of 42 years. Ninety-one per cent of parents had ever been vaccinated. Seventy-seven per cent had no or only primary school education. Thirty-two parents (71.12%) had daughters who had not been vaccinated against HPV. The themes identified include: perceived effectiveness of the HPV vaccine, affective behaviour (how they feel about the vaccine), accessibility (ability to get the vaccine), intervention coherence, ethicality (including parental informed consent), opportunity cost (future potential financial implications of cancer prevention), decision-making in the home (predominantly paternalistic), self-efficacy (extent to which education initiatives were effective) and quality initiatives (use of village infrastructure including fons/qwifons, village crier, healthcare worker presenting at the njangi house, schools and churches). Member checking with 30 women from two other communities confirmed our findings.

**Conclusions** Lack of awareness concerning the availability and purpose of the HPV vaccination was prevalent. Use of mainstream media and top-down health education activities are not effective. Novel approaches should engage local community health workers and use established community social and leadership structures.

**Trial registration number** ClinicalTrials.gov Registry (NCT05325138).

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ Interviews included both mothers and fathers of vaccinated and unvaccinated daughters.
- ⇒ Views of non-medical community healers who are also parents were included.
- ⇒ One-on-one interviews conducted in person by an experienced interviewer with anthropological training familiar with the setting and local languages.
- ⇒ Circumstances of conflict in this region did limit our recruitment and interview options. It is not clear to what extent our findings are generalisable to all residents of Cameroon.
- ⇒ Parents represent only one of the many stakeholders whose attitudes may impact on vaccine uptake.

## BACKGROUND

Infection with the human papilloma virus (HPV) is an important public health problem given that HPV is the major cause of pre-invasive disease and/or cancer of the lower genital tract and/or oral cavity.<sup>1 2</sup> The introduction of HPV vaccines prior to exposure to the virus has been shown to lower this disease burden. The problem is that HPV vaccination uptake is still low in several countries.<sup>1 2</sup> At least 179 countries have implemented various HPV National Immunization Programs (NIPs). Currently, HPV vaccination coverage stands at 30% in low and low middle-income countries, 55% in upper middle-income countries and 80% in high-income countries (HICs).<sup>2 3</sup> In 2020, Cameroon reported an HPV vaccination rate of 5%.<sup>4</sup> As of 2022, the Cameroon NIP made HPV vaccine available free of charge for 9-year-old girls. Given this context, several factors may contribute to low uptake: lack of knowledge of healthcare providers and the general population,<sup>5 6</sup> low acceptance of this vaccine among parents and adolescents,<sup>7</sup> and local supply problems

or out-of-pocket expenses. While there are many stakeholders involved in the process of HPV vaccination, parents' awareness and influence play a key role in the uptake of HPV vaccination among eligible adolescents.<sup>8</sup> Little is known about parental perceptions about HPV vaccination in Cameroon in general and specifically in the rural setting. The aim of this study was to assess knowledge, beliefs and attitudes of parents of young girls aged 9–14 years about HPV vaccines within rural communities of Cameroon.

### Study site and population

This study was conducted in the Mbingo region of North-west Cameroon during the period of civil unrest. Participants were involved from a region located between Mbingo (population 1281), Njinikom (20 461) and Fundong (45 831). The radius is 24 km; it takes 38 min to drive and 6 hours to walk. The region is populated predominantly by the Kom tribe with a much smaller component of Fulbe herders. These groups rely on subsistence farming and herding, respectively.<sup>9</sup>

### Study design and procedures

#### One-on-one interviews

A detailed protocol for this study has been published.<sup>10</sup> Qualitative data were obtained through one-on-one interviews and quantitative data from a short interviewer-delivered survey tool. The interviews were conducted from January to May 2022. To be included, the individual must be a parent of a daughter aged 9–14 years living in Mbingo, Njinikom and Fundong health areas. Individuals were excluded if they are a health worker or working in any health institution, unwillingness to provide consent to participate or inability to converse in the language of the interviewer (English or Pidgin English).

A semistructured interview guide was used.<sup>10</sup> Written informed consent was obtained from each participant. Face-to-face in-depth interviews took place in a private office at the Mbingo Hospital to increase confidentiality (except in one situation where it was deemed not safe for the interviewee to present in person at the hospital). All interviews were audio-recorded in English or Pidgin English. They were transcribed in English. Duration of consent was 5–15 min (mean 11.9 min). Duration of the interview was 43–66 min (mean 52.4 min).

#### Sampling strategy

Purposeful sampling allowed for maximum variation in the profile of parents interviewed. Snowball sampling increased the respondents' confidence in the research team. We aimed to interview 40 parents of age-eligible girls in the selected regions, including 10 parents of HPV vaccinated and 30 parents whose daughters were not vaccinated (PONVD).

#### Data analysis

Data gathering and analysis were a concurrent and iterative process. Raw data were processed in their textual form and coded to generate analytical categories of themes for

further analysis with ATLAS.ti V.9 (1993–2021 Scientific Software Development, Berlin, Germany).<sup>11</sup> Data analysis was performed using the thematic analysis approach proposed by Braun and Clarke.<sup>12</sup> Also informing our analysis was the theoretical framework of acceptability.<sup>13</sup> The key factors were perceived effectiveness of the HPV vaccine, affective behaviour, access, intervention coherence and ethicality. Two additional themes that did not fit into the framework were: decision-making roles within the family and quality initiative suggestions. The author team met regularly to review the initial coding structure and its content. Significant overlap in the content of some of the codes was noted, and themes further refined and reduced to the five key themes presented below.

#### Member checking

Thirty parents from Mbingo II and Mughu villages met at the culmination of the coding. In a 2-hour session, the interview guide and preliminary findings were presented to group by ET. The attendees were invited to comment on our findings. Following the interaction, field notes were compared (ET, CN, LE). The member checking confirmed the completeness and accuracy of the findings and enabled parents to reiterate recommendations outlined in the interviews.

#### Patient and public involvement

This study was designed to foreground the voices of parents approached for consent to have their daughters vaccinated in the NIP.<sup>10</sup> Cameroon healthcare professionals familiar with the study region and ultimately responsible for vaccination supported the design and recruitment strategy. Member checking was completed as described above.

## RESULTS

### Demographics of the study population

We interviewed 14 parents of vaccinated daughters from Mbingo (9), Njinikom (3) and Fundong (2), and 31 parents of unvaccinated daughters from Mbingo (9), Njinikom (8) and Fundong (14). The study population included 10 fathers and 35 mothers of vaccine-eligible girls; there was no relationship between interviewees. The parents' ages ranged from 27 to 72 years old (mean 41.9 years) (table 1). Mothers were younger (mean 39.5 years) than the fathers (mean 50.4 years). Parents reported between 1 and 34 children (mean 5). All parents met the inclusion criteria. There is a convention in this society that if a child is born out of wedlock (before the bride's price is paid), then the parent is the grandparent (and not the biological mother). We had one instance of this situation. Ninety-one per cent of the parents had been vaccinated and all their children had been vaccinated (ie, measles). Parents had a difficult time recalling the name of the vaccines they or their children received and there did not appear to be consistent documentation for vaccinations available to parents. Most of the vaccines for

**Table 1** Demographics

Characteristic	
Gender of the parents	
Female (mothers)	35 (81.5%)
Male (fathers)	10 (18.5%)
Age	
Mean (years)	41.5
50 and less	36 (80%)
51 and older	9 (20%)
Number of children (range)	
Mean	5
Parent ever vaccinated	
Yes	41 (91.1%)
No	4 (8.9%)
Children ever vaccinated	
Yes	45 (100%)
Languages	
Kom	44
Pidgin English	38
French	3
English	2
Kedjon	1
Religion	
Christian	46
Baptist	24
Catholic	17
Other Christian	5
Muslim	1
Parental education (question answered by 43/45)	
None	1
Primary (class 1–7)	5
Class 3–5	27
Class 6/7	6
Secondary school	2
Form 1–6	2
Post-secondary school	
Degree	
Employment	
Farmer	20
Housewife	5
Tailor/seamstress	5
Teacher	4
Market place vendor/business	5
Other	6
Exposure to cancer	
Personal history	0
Relative or close friend	10

adults were in pregnancy (ie, tetanus) and at the time of baby check-ups. The prevailing tribal group represented was Kom (42 of 45) unless the mother married a Kom husband or was Fulani. Most parents identified as Christian. No one identified as African tribal but there appears to be syncretism of African tribal beliefs with

Christian. Predominantly, the parents only had grade school education (76.7%). The most common job was farming (44.4%). Within the group, in addition to their primary jobs, one identified as a traditional doctor and two as herbalists.

### Themes

We provide an overview of five key themes: (1) awareness; (2) access; (3) trust; (4) decision-making and consent; and (5) recommendations for uptake and community engagement. Illustrative quotes are in [box 1](#).

#### Awareness/knowledge of HPV-related diseases, risk factors and prevention

In the medical model of cervical cancer, the journey begins with an HPV sexually transmitted infection (STI), development of pre-invasive cervical disease which if untreated results in cervical cancer. To prevent the HPV infection, there is the HPV vaccine. Identifying and treating pre-invasive disease involve cervical screening. Preventing death from cancer involves treatment with either radical surgery or radiation.

None of the parents had had cancer and about one-third of them listed a close family member or friend with cancer. No one had experience with someone with cervical cancer. Generically, they recognised that cancer destroys ‘parts of the body’ like the uterus (parent 38) causing suffering and potentially death. Five parents knew that smoking and alcohol were risk factors for cancer. It was recognised that the management of cancer can consume the family’s financial resources and require long-term care of the sick person (parent 33). There was limited knowledge of specifically cervical cancer (6) but among the minority of parents familiar with cervical cancer, these recognised that persistent vaginal bleeding or discharge were symptoms of disease.

Ten participants knew that cervical cancer could be prevented or identified early through cervical screening (twice as many mothers and PONVD); but only five of the women had been screened during their lifetime. While gonorrhoea, syphilis and HIV were spontaneously mentioned as causes of STIs, only one parent recognised the term HPV, and none recognised the term genital warts.

Everyone knew about vaccines in general, but only seven parents were aware that there is a vaccine that could prevent a certain type of cancer. The group recognised that vaccines prevent those vaccinated from certain illnesses or from a severe form of the illness. They translated this into less cost, as the child would not require medical treatment. The benefits mentioned related to the HPV vaccine included not getting cervical cancer, not dying from cervical cancer and not needing a hysterectomy.

Those who spoke about safe experiences with vaccines indicated that they themselves or their children had not had any vaccine-related side effects aside from the infant crying or pain with the injection site. Four parents (no difference by parental gender, twofold higher in PONVD)

**Box 1 Theme and quotations**

## ⇒ Awareness

A vaccine like the HPV vaccine, many people do not even know about it. (Parent 011)

I was just trying to prevent the illnesses. I know that I come from a very poor background and as such I have to do everything possible to prevent myself from illnesses because my family would be unable to raise money to treat me if I am attacked by such illnesses. Besides I am a single mother since my husband is of late and as such I need to be very careful with my life. (Parent 015)

Given what vaccines do, I would know that at least they are prevented. They would have lesser effects if maybe they are affected by cancer. Because at times the vaccine may not stop the disease from attacking you, but when it attacks you the intensity would not be that high. So I know that if my children are vaccinated, they are at a lesser risk of being attacked by the virus or even if they are attacked, they will not suffer much. (Parent 003)

I got the information from Auntie XXX, of the Belo Health Center. She went to school and informed the children about the vaccine. The day we went for clinic, she equally informed us about the vaccine. She is a nurse at the Belo Health Center. (Parent 008)

If a fish comes out from the river and is telling you that a crocodile is having only an eye, who are you to say no? Are you living in the river? I am not educated but my child is. Here teachers too are educated and as such they know whatever an injection is good or not. If they accept that a vaccine should be given in school, who am I to say no. (Parent 042)

I did not go to school so I cannot read a newspaper. I equally have no interest in the television or to the radio. I am preoccupied with my farm and domestic duties. (Parent 018)

## ⇒ Access

No, vaccines are not available around my vicinity. We hear about them only when some health personnel do pass around to administer the vaccine. (Parent 011)

Vaccines are not easy to find where I live except one pays a visit to the hospital. At times you even go to the hospital to be vaccinated but you are told that the vaccines are unavailable. (Parent 018)

We are not refusing the vaccines. At times you plan to take your children to the hospital but at the sound of gunshots, you stay at home. Anyway it has not been long since I started hearing of an injection that prevents children against cancer. I am just waiting for the vaccine to be given to her in school. (Parent 017)

Around our church premises at Baptist Church Njinikejom, nurses always come around and vaccinate people. It is always announced in church at least one week beforehand, that, a vaccine is going to be administered to Christians on a slated date, but usually a Sunday. The vaccination is always done after church service. (Parent 014)

The only hindrance can be if the price is too expensive. Now that I have learned the HPV vaccine is free, nothing can hinder me from asking my daughter to take it. (Participant 029)

## ⇒ Trust (beliefs)

If I am informed about it by the community health worker I would take the vaccine. Any vaccine coming from the Mbingo Baptist Hospital is good. (Parent 002)

Any vaccine that is given through the hospital cannot be disadvantageous to the child. Hospitals such as the Mbingo Baptist Hospital know what is good as far as healthcare is concern. (Parent 011)

There is always that belief that vaccines that are to be administered to young people are meant to sterilize them or they are meant to reduce the population of Africa. Some Anglophones are now scared of anything coming from the government of Cameroon such as vaccines because

Continued

**Box 1 Continued**

they have lost trust in the government. Some are afraid that some of the vaccines sent to the English speaking regions of Cameroon are meant to kill some of them. (Parent 035)

## ⇒ Decision-making and consent

I have told my children that until I permit them they should not receive a vaccine. (Parent 002)

I would just go and tell their father about the vaccine for he has the final say. I would tell him about the advantage of taking the vaccine even though the final say is his. (Parent 006)

Whether they like to be vaccinated or not is not their problem. They are still little children so they have no say. I am the one to decide together with their father. The children do not have a choice. Only their father has the final say. (Parent 007)

My daughter returned from school one day and told me that they have been asked to come and take the injection in school on a day yet to be announced. Their teacher told them that cervical cancer is a very dangerous illness, and girl children age 9 to 14 years should take the injection in order to be to prevent the illness; that they would never be sick of cervical cancer if they do take the injection. (Parent 017)

The children were informed in school to be vaccinated against cancer. A consent form was sent to their parents at home for signatory. The information was given to me by first daughter who is schooling at Cameroon Baptist School Mbingo 1. She is in Primary six. The consent form simply stated that if the parent has agreed that her daughter should be vaccinated against cervical cancer, then the parent should sign. The form made mention of the fact that cervical cancer affects the cervix and is a killer disease. It is transmitted through sexual intercourse. The vaccine to prevent this type of cancer is available is given to girl children of age nine to fourteen years old. I agreed that my daughter should take this vaccine because of its importance. I do not want my daughter to be infected. (Parent 033)

shared stories that they had heard of those outside of their immediate family developing complaints following vaccination. These included individual reports of headaches, body swelling, buttock wound at the site of the injection, difficulty walking and paralysis. One participant indicated that it is important to take the vaccine if the positive outweighs the negative. Four parents were clear that one needs to be convinced that the vaccine will benefit the child and that the side effects should be low.

In terms of the experience of receiving a vaccine, most parents had a blurry recollection of the names of the vaccine their babies/infants received. They struggled to name the diseases the vaccines were to prevent. Several did recall not receiving counselling about potential side effects of the vaccine. In general, parents were not provided with any documentation of the vaccine given to the baby. One participant indicated it was compulsory for babies to be vaccinated. Given this context of vague recollection or record-keeping of vaccines among parents, it was not surprising that when focusing on the HPV vaccine, all the parents did not recognise the name (ie, Gardasil, Cervarix or HPV vaccine) or potential side effects. For those who had heard about the 'cancer prevention' (HPV) vaccine, awareness was linked by the respondent to learning about the vaccine either through

a consent form sent home with a school-aged child, their school-aged daughter telling them about it, a community healthcare worker talk or lecture at the hospital. Two-thirds of parents reported that if a vaccine could avoid future distress for an individual or the family, they would be proponents of vaccination.

While everyone interviewed had some knowledge about an experience with vaccines, we wanted to understand if prevention is a concept within the Kom culture. 'Sha'a' is the term for injection, and this was the term repeatedly used by respondents concerning vaccination. Examples of the concept of prevention included scarification, charms or amulets. One participant said that 'prevention is not uncommon in Kom, but western diseases made vaccination more common' (parent 41). There was confusion between the purpose of an injection for an infection (like antibiotics) versus an injection to prevent disease (like a vaccination). The other coherence issue was prevention before exposure to infection (HPV vaccination) versus prevention of cervical cancer by identifying precancer (ie, already exposed to HPV infection) through screening.

Parents identified that healthcare workers are the ones who spread the message about vaccines. Over 60% of parents indicated that they do not listen to radio, 40% did not watch television and none read the newspaper (lack of contact with media was twofold high in mothers and PONVD). Only three parents recalled hearing messages about cervical screening as a way to prevent cervical cancer on radio or TV.

Most parents (83%) were clear that vaccination is a private issue and this is not discussed with peers. Many indicated they do not have time for such interactions. When conversations occur, they are not on health or vaccination topics. The five parents who had been present for vaccination discussion had done so in the context of women's groups at church.

### Access

Parents identified two pathways to access a vaccine: (1) as needed, through hospitals or (2) episodic access through mass vaccine campaigns organised out of local schools or after a church service. Twenty-two per cent said that vaccines were not available where they lived, and they had to travel to another setting to get the vaccine. These parents claimed it was easier to wait for local vaccination campaigns instead of taking time off work to travel to a hospital. One parent indicated that when you hear gunshots, travelling to a hospital is a low priority. One parent indicated that sometimes you go to a hospital, and they tell you the vaccine is not currently available (parent 18). Related to the HPV vaccine, parents were unaware of the vaccine being available in their community.

Seven parents indicated that cost could hinder vaccine uptake. If the vaccine is too expensive, then they cannot afford it for their daughters (no difference by gender or vaccination status). Some parents recalled that they were charged 15000 cfa (US\$34) for the vaccine in the past

or a user fee of 100–200 cfa (US\$0.20–0.40). Only eight parents were aware that the HPV vaccine is now free.

### Trust

Controversies came up as reasons to not take any vaccine or at least not to take it now. Two-thirds of the parents raised a concern about risks of sterility (twofold higher in fathers and fivefold higher in PONVD). Such concerns have been reported previously in the literature from this region<sup>14</sup> and linked to rumoured sterility resulting from use of the tetanus vaccine in 1990s in Kombo, which is located one mountain range to the east from Mbingo. Another prevalent concern expressed was that vaccines are an attempt by HICs to limit the size of the population. Parents pointed out that the HPV vaccine is only for girls, and the HPV vaccine is given at the age of menarche. They did not understand the reasons for this.

The region of this study is in the heart of the Anglophone conflict with the central French Cameroonian government. Two of 10 fathers and 1 of 35 mothers raised the concern that a vaccine endorsed by the central government was seen as a means to reduce the life span or kill Anglophones. Some parents feared anything new and were not aware that the HPV vaccine has been used for the last decade.

Trust in healthcare providers was discussed by half of the parents. The parents stated they would trust a doctor or nurse for information (twofold higher in PONVD). Other trusted sources for information included pharmacists and community health workers. Trusted non-healthcare sources of information included a knowledgeable neighbour, elderly mother or friend; but participants had not themselves sought out information from these non-healthcare sources. What was important was if the person was trustworthy, known by the parent and could provide good information.

Trust in health institutions providing the vaccine was discussed by 25% of parents. Referral hospitals like Mbingo Hospital were valued as a reliable source of information because of their reputation for high-quality care delivery and on-site experts in the field. This was contrasted to rural clinics or local health centres. One parent clearly perceived provision of fake or expired medication.

### Decision-making and consent

Decision-making in the homes of this study context was patriarchal (47%) or joint between mother and father (27%) (patriarchal decision-making was sevenfold higher in PONVD). In the latter situation, the father was seen as the financial provider and the mother as the one navigating healthcare issues for the children. Those women in households with no husbands identified the maternal father (grandfather) or maternal elder brother as responsible for healthcare decision. That said, it was acknowledged that a mother may make decisions without consulting a man if she is widowed or a single parent. In the case of parents being unmarried, the mother's parents would normally be the decision-maker with respect to

vaccination. This in part is related to the financial implications of a healthcare decision on the family.

Some parents voiced that the daughter has 'no say' (22%, no difference by gender, 32% PONVD) with one adding that the daughter cannot go contrary to a father's decision. Two parents acknowledged that a daughter might not want the vaccine. Four parents indicated that they would allow their daughters to decide, stating that one should not force them. Four parents voiced that rarely would a daughter's hesitancy to be vaccinated win over the parents' decision.

A few parents recalled that the school sent home a consent form for their daughters to receive the HPV vaccine, but several parents reported not being provided with written consent in advance of their daughter being vaccinated at school or hospital programme. One parent reported illiteracy and one parent chose not to read the consent. In those cases where written information was provided, parents appreciated the information and the request for being asked to be part of the decision-making process. These parents did not understand that this vaccine required multiple doses and or the timing of those doses.

### Recommendations for uptake and community engagement

All the parents had suggestions for ways in which to improve HPV vaccine uptake. Asked what could increase HPV vaccination in their community, parents stressed that information about the vaccine should be communicated by someone known and trusted in the community (good character and reputation). Such individuals might be a community health worker, a nurse or doctor (fathers were three times more likely to recommend a doctor). Asked who was untrustworthy, participants identified 'crooks—even if they are nurses' (parent 33), liars, flirts or prostitutes.

Parents identified several trusted people in the community who could play an important role in reinforcing the message that HPV vaccination is important. These include the fon (regional tribal leader) (threefold higher in fathers) or a message from the palace (13%), Kwifon (a person who would consult with the spirit world before telling the people to take a vaccine) (4%), quarter heads (local neighbour leader) (65%), religious authorities (40%), renowned traditional doctors (25%), elder men or women in the community (20%), educational authorities like principals or headmasters (15%), traditional council (4%) and town crier (4%). The following suggestions came from fathers: ngambe man, sorcerer, president of the njangi groups (community centre) or sporting group leaders. Witch doctors should not give the message (2%).

Identified places where the message could be given included: church (74%), market place (37%), large gatherings like death celebrations (21%) or marriage ceremonies (10%), schools (16%), hospitals (10%), njangi house (meeting place) (26%), parent–teacher meetings (11%), house-to-house visit on ghost town days (no work allowed on Mondays since civil war) or country Sundays (Kom

calendar has an 8-day week so when this off day falls on a Monday, the people cannot work on the farm) (11%), social media like Facebook (11%) or placards in clinics. Some parents felt that the message should not be given at bars (11%) or door-to-door home visits as many people are often away working on their farms (11%).

Many parents noted that vaccination uptake in general was linked to understanding of benefits. As one parent noted, HPV vaccine uptake would improve if parents had an understanding of why this vaccine was important for their daughters. Telling parents to vaccinate their daughters, in the absence of clear explanation of the vaccine's benefit, would not work.

### DISCUSSION

Many of the themes identified in this work have been previously noted in other studies in sub-Saharan Africa (2008–2022), in both rural and urban contexts, in diverse countries (Eritrea, Ethiopia, Ghana, Kenya, Nigeria, Morocco, Senegal, Somalia, South Africa, Tanzania, Uganda) and using different research approaches (ie, cross-sectional surveys, focus groups, pre/post-intervention, systematic review). Specifically, our findings echo those in the literature in noting that: (1) there exist gaps in vaccine target populations' awareness and knowledge concerning HPV-related diseases and prevention<sup>15–22</sup>; (2) fathers and mothers are key decision-makers for children's vaccination, hence the need to target both in any educational endeavour<sup>23</sup>; (3) low vaccine cost is key to engaging in vaccination<sup>19 24</sup>; and (4) receiving information from a trusted source is of central importance to vaccine uptake.<sup>24 25</sup>

Where our findings differ from the literature is on some of the trusted sources of information. In a Morocco study,<sup>18</sup> they found that value was placed on input from the Ministry of Health. In Northwest Cameroon (currently in civil conflict), trusted sources of information were known local healthcare providers. National government involvement was mentioned as a factor that would lead to mistrust especially among fathers. The other novel finding had to do with insights on what could constitute as effective health promotion communication strategies in this region. There was lack of access to sources of information like radio, television and newspaper especially in mothers and PONVD. Even in those instances where these information sources were accessed, these sources did not provide information on HPV or prevention. There does appear to be widespread access to cellular devices and how these can be used to improve knowledge about health-related issues or access to prevention strategies remains to be defined. These findings represent valuable and previously undocumented information important for guiding future health promotion communications in the region. Other actionable items from this work include the inclusion of local community leaders in the implementation of any new programme like HPV vaccination. It is important to educate girls aged 9–14 years old both

for themselves and as a conduit of information for their families. Written educational pamphlets and individual specific vaccination documentation would help reinforce messages.

The strength of our work is a clear presentation of one tribe's (Kom) perspective on HPV vaccine drawing on rich qualitative data obtained through one-on-one interviews conducted in person by an experienced interviewer with anthropological training familiar with the setting and local languages. Interviews included both mothers and fathers of vaccinated and unvaccinated daughters. Within our sample were included views of non-medical community healers who are also parents (3 in our work and 12 in Nelson *et al*'s work from South Africa<sup>20</sup>). Some limitations include that circumstances of conflict in this region did limit our recruitment and interview options. For example, while we would have liked to have had the interviewer meet with parents at any time of day and in any location of their choice, the security situation was such that interviews did need to occur during daylight hours at Mbingo Hospital. This may have limited the participation of otherwise interested and eligible parents unable to commit to travel or unable to leave home/labour commitments for an interview. We only interviewed one Fulbe parent in part due to difficulty with language restrictions for the project. Convenience sampling was used and given Cameroon's complex and diverse political and social landscape, it is not clear to what extent our findings are generalisable to all residents of Cameroon. We did not have a large sample size so we cannot comment on the impact of higher level of education or household income on willingness to vaccinate.<sup>18 26 27</sup> This study focused on the experience and perceptions of parents. Parents are a key stakeholder group in vaccination uptake in Cameroon given their central role and socially normative power in healthcare decision-making for minors. While understanding of the knowledge, attitudes and beliefs of this key stakeholder group is a strength of this study and pragmatic for our goal of supporting effective future vaccine programmes in the region, we acknowledge parents represent only one of the many stakeholders whose attitudes may impact on vaccine uptake. Further research to clarify whether, and to what extent local implementers of HPV vaccination and target populations (girls aged 9–14 years) harbour attitudes that may limit vaccine uptake, would be valuable.

## CONCLUSION

Among parents of vaccine-eligible girls in rural Cameroon, there was a pervasive lack of awareness concerning the availability and purpose of the HPV vaccination. Use of mainstream media and top-down health education activities appear not to be effective in this setting. Novel approaches should engage trusted local community health workers and use established community social and leadership structures.

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**Contributors** LE was the research team leader, wrote the protocol, was involved in the day-to-day management of the study, arranged and ran team meetings, conducted the analysis and wrote the manuscript. CN provided feasibility and cultural input into recruitment and design of the interview guide, recruited participants, and was involved in coding and final manuscript. GMA provided feasibility and cultural insight into recruitment and design of the interview guide, led the coding and development of themes, and participated in the analysis and final manuscript. ET provided cultural input into recruitment and design and reiterations of the interview guide, conducted the interviews and member checking meeting, provided English version of the interview transcripts, and provided input into the analysis and final manuscript. JFD provided input into the background, rationale and cultural insight into recruitment and design of the interview guide, and was involved in the analysis and final manuscript. EN provided input into the background, rationale and methods, and participated in the analysis and final manuscript. The author accepts full responsibility for the work and/or conduct of the study, had access to the data and controlled the decision to publish. The guarantor is LE.

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**Competing interests** This is an investigator-initiated research project which has been funded by Merck. Merck does not have access to any of the original material but will be provided with any manuscripts that result from this work for review prior to publication.

**Patient and public involvement** Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

**Patient consent for publication** Not required.

**Ethics approval** This study was approved by the ethical committee of Hamilton Integrated Research Ethics Board, Hamilton, Canada (14022) and the Cameroon Baptist Convention Health Board Institutional Review Board (IRB2021-75). The interviewees were identified by referral by a community health worker. Their eligibility was confirmed, and an interview appointment was made by study personnel. Interview schedules were suspended during periods of gunfire or roadblocks to protect both the interviewer and interviewees (4 January 2022, 4–16 April 2022). On one occasion, our interviewer had to pay a bribe both coming and going from the interviews (April 2022). On one occasion, it was deemed unsafe for an interviewee to attend, so the interview was completed by phone.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** Data sharing not applicable as no datasets generated and/or analysed for this study.

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