Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Perceived Facilitators and Barriers to HPV Vaccination Uptake among Non-School-Going Girls Aged 9 to 20 Years in Masaka District, Uganda: An Exploratory Qualitative Study

Richard Muhumuza

richard.muhumuza@mrcuganda.org

MRC/UVRI and LSHTM Uganda Research Unit

Maria Teddy Ndagire

MRC/UVRI and LSHTM Uganda Research Unit

Esther Awino

MRC/UVRI and LSHTM Uganda Research Unit

Yunia Mayanja

MRC/UVRI and LSHTM Uganda Research Unit

Sylvia Kusemererwa

MRC/UVRI and LSHTM Uganda Research Unit

Paddy Kafeero

MRC/UVRI and LSHTM Uganda Research Unit

Martin Onyango

MRC/UVRI and LSHTM Uganda Research Unit

Daniel Opoka

MRC/UVRI and LSHTM Uganda Research Unit

Hadijah Naluyinda

MRC/UVRI and LSHTM Uganda Research Unit

Ismail Hibombo

MRC/UVRI and LSHTM Uganda Research Unit

Vincent Basajja

MRC/UVRI and LSHTM Uganda Research Unit

Ubaldo Bahemuka

MRC/UVRI and LSHTM Uganda Research Unit

Ivan Kasamba

MRC/UVRI and LSHTM Uganda Research Unit

Gloria Lubega

MRC/UVRI and LSHTM Uganda Research Unit

Dorothy Ainembabazi
MRC/UVRI and LSHTM Uganda Research Unit
Joseph Lutaakome
MRC/UVRI and LSHTM Uganda Research Unit
Freddie Mukasa Kibengo
MRC/UVRI and LSHTM Uganda Research Unit
Eugene Ruzagira
MRC/UVRI and LSHTM Uganda Research Unit
Agnes Ssali
MRC/UVRI and LSHTM Uganda Research Unit
Joseph Mugisha
MRC/UVRI and LSHTM Uganda Research Unit
Jonathan Kitonsa
MRC/UVRI and LSHTM Uganda Research Unit
Nambusi Kyegombe
MRC/UVRI and LSHTM Uganda Research Unit

Research Article

Keywords: Human Papillomavirus, Vaccination, Non-school-going girls, Facilitators, Barriers, Uganda

Posted Date: November 20th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11526319/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Background

Cervical cancer is the fourth most common cancer among women worldwide, with an estimated 661,000 new cases and 348,000 deaths in 2022. Human papillomavirus (HPV) vaccination is a crucial intervention for reducing the burden of cervical cancer, yet its uptake and acceptance remain limited in many low-resource settings, especially among non-school-going girls. We aimed to explore the factors that facilitate or hinder HPV vaccination uptake among non-school-going girls aged 9 to 20 years in Masaka District, Uganda.

Methods

This exploratory qualitative study was conducted between August 2024 and February 2025 in an inland community and a fishing community in Masaka District. Twenty in-depth interviews (IDIs) and five focus group discussions (6–8 participants) were conducted with non-school-going girls aged 9 to 20 years, who were purposively sampled by age and community. Data were analysed using codebook thematic analysis guided by the Social Ecological Model (SEM).

Results

After receiving study information about HPV vaccination, non-school-going girls expressed willingness to receive the HPV vaccine. Facilitators included the desire for protection against cervical cancer (individual level); peer influence and parental engagement (interpersonal); sensitisation through community leaders and village health teams (community); friendly, supportive health workers (institutional); and free vaccination through outreach services close to home (structural). Barriers included fear of injections and limited knowledge of the vaccine; parental scepticism and misconceptions about infertility; stigma linked to sexual activity and myths about vaccines; unwelcoming health worker attitudes; and vaccine stockouts, distance and transport costs.

Conclusion

Non-school-going girls reported willingness to be vaccinated, but willingness alone did not ensure uptake. Vaccination depended on caregivers, community norms, health worker conduct and access to services. Equitable coverage requires community-based delivery that engages caregivers and brings vaccination closer to non-school-going girls.

Background

Cervical cancer remains a major global health challenge, with an estimated 661,000 new cases and 348,000 deaths worldwide in 2022 (1), and disproportionately affects women in low and middle-income countries, especially in sub-Saharan Africa, where it is the second most common cancer among women and the second leading cause of cancer death (2). Persistent infection with human papillomavirus (HPV), primarily types 16 and 18, causes approximately 70% of cases worldwide (3), with infection largely preventable through vaccination. The WHO has therefore set a global target of 90% HPV vaccination coverage among girls by age 15 by 2030 (4). In Uganda, cervical cancer remains the most common cancer among women (5), with an estimated 6,959 new cases and an age-standardised incidence rate of 56 per 100,000 women in 2020 (6).

Uganda launched a national school-based HPV vaccination programme in 2015, following earlier demonstration projects (7, 8). By 2021, first-dose coverage had reached about 75%, but only 44% of eligible girls completed the then-recommended two-dose schedule (6). Although WHO endorsed a single-dose schedule in 2022, informed by trials in Kenya and Tanzania (9–11), Uganda was still using a two-dose schedule at the time of this study. The Uganda National Immunisation Technical Advisory Group (UNITAG) has since recommended a single dose for immunocompetent girls aged 9 to 14 years (12), and the Ministry of Health rolled out the single dose in January 2026. Existing Ugandan studies have focused mainly on school-attending girls or general-population samples (8, 13), so the determinants of uptake among non-school-going girls remain poorly understood, despite the pressing need for evidence to inform inclusive delivery strategies.

This study addresses that gap by including girls from two distinct settings, a fishing community and an inland community, given documented differences between them. Girls in fishing communities tend to have an earlier sexual debut (14), which heightens their exposure to HPV and is associated with leaving school early. Without deliberate efforts to reach girls who are not in school, the benefits of HPV vaccination risk being inequitably distributed.

Research from Uganda and other low, middle, and high-income settings shows that HPV vaccine uptake is shaped by individual, social, and structural factors acting together (13, 15–21). Commonly cited barriers include low awareness, misinformation, particularly myths about infertility caused by the vaccine, rigid gender norms, and health system constraints such as vaccine shortages and weak cold chain management (22, 23). Trusted health workers, parental encouragement, positive peer influence, and integration with community outreach, by contrast, support acceptance. In rural Uganda, poor infrastructure, long travel distances, and high opportunity costs further constrain access, while periodic outreach platforms such as Child Days Plus, Uganda's biannual integrated child health days used for catch-up immunisation, have been limited by funding delays and weak community mobilisation (24). Attitudes are nonetheless improving, as HPV vaccination is increasingly viewed alongside other routine childhood immunisations, and community engagement through local leaders, radio, religious institutions, and peer networks shows promise in countering misinformation and building demand (25).

The gap in evidence on non-school-going girls also carries global policy significance. As countries pursue the WHO's 90% coverage target, school-based delivery alone cannot achieve equitable reach where substantial numbers of adolescent girls remain outside the school system because of poverty, early marriage, caregiving responsibilities, or informal employment. Such girls often face compounded disadvantage, including earlier sexual debut and reduced access to health information, which makes them both harder to reach and more vulnerable (26, 27). This study, therefore, explored the acceptability, facilitators, and barriers to HPV vaccination among non-school-going girls aged 9 to 20 years in Masaka District, Uganda, to generate evidence for more equitable and inclusive vaccination strategies.

Theoretical Orientation

This study was guided by the Social Ecological Model (SEM), which explains health behaviours as the product of interacting influences operating at individual, interpersonal, community, institutional, and structural levels (28, 29). At the individual level, the SEM considers girls' knowledge, risk perceptions, and beliefs about HPV vaccination. Interpersonal influences include parents, guardians, peers, and family members, while community factors encompass local leadership, cultural and religious beliefs, social norms, rumours, and stigma. Institutional factors relate to health worker attitudes and service delivery, with structural influences including vaccine availability, delivery strategies, and immunisation policies. By capturing these interconnected influences, the SEM provided a framework for exploring influences on HPV vaccine uptake among non-school-going girls. The five SEM levels formed the initial deductive coding frame, and inductively generated codes were then mapped to these levels.

Methods

Study Design

This qualitative study explored the knowledge, perceptions, uptake, and preferred delivery strategies for HPV vaccination among non-school-going girls in Masaka, Uganda. Quantitative findings from the same study have been published separately (30). In-depth interviews (IDIs) explored individual-level experiences, knowledge, and decision-making around HPV vaccination, while focus group discussions (FGDs) explored shared community norms, collective attitudes, and social dynamics influencing vaccine uptake.

Before the qualitative interviews, participants received information about HPV and HPV vaccination through information sessions with the study team, but no vaccination was offered.

Study Setting and Population

The study was conducted in Masaka District from August 2024 to February 2025. Masaka District is in the Central Region of Uganda, about 130 km southwest of the capital city, Kampala, along the Trans-African highway. The study involved an inland community and a fishing community. The inland

communities were enrolled from two sub-counties, while the fishing community was enrolled from Bukakata sub-county in Masaka District, as described in our related manuscript (30).

Sampling and Recruitment

Purposive sampling was used to select participants who varied by age and by community of residence (inland and fishing), to capture a range of experiences relevant to the study aims (31). We included girls aged 9 to 20 years, spanning both the primary WHO target group for HPV vaccination (9 to 14 years) and the catch-up age group for which vaccination is also recommended where feasible (15 to 20 years), reflecting the age range of non-school-going girls encountered in the study communities. Participants were identified with the assistance of Village Health Teams (VHTs) and local leaders, who compiled lists of non-school-going girls in each study community. Eligibility was then confirmed by the research team before participants were invited to take part.

We defined a non-school-going girl as one who had stopped schooling before completing primary seven and had at least spent a year after dropping out of school at the time of recruitment. Girls were eligible if they were aged 9 to 20 years and were willing to provide consent/assent to participate in the study. Girls currently enrolled in formal education were excluded. All the girls contacted for IDIs accepted to participate. None of the survey participants took part in the qualitative component.

Data Collection

Two female social science research assistants who were qualified and experienced working with adolescents were trained on the study protocol and interview guide and conducted all interviews in a safe, private location identified in collaboration with study participants, using a semi-structured topic guide and audio-recording with participants' consent. In-depth interviews (IDIs) were conducted among 20 non-school-going girls aged 9 to 20 years. The interview guide included questions on the acceptability of HPV vaccination, knowledge of HPV vaccination, facilitators and barriers to HPV vaccination, and recommendations for the successful implementation of HPV vaccination among non-school-going girls. Each interview lasted between 30 and 60 minutes. The interview guide was pilot-tested among 4 girls of a similar age group, and it did not require any changes. This is provided as Supplementary File 1.

FGD participants were grouped by community of residence (inland and fishing) and age category (9 to 12, 13 to 16 and 17 to 20 years). One FGD was planned for each age category in each community, giving six FGDs in total. Five FGDs were conducted because no girls aged 9 to 12 years were available in the fishing community. Each FGD consisted of 6–8 participants, was facilitated by a moderator and a note-taker, and lasted approximately 90 minutes on average.

Data Management and Analysis

The interviews were conducted in Luganda, the predominant local language in the communities. All interviews were audio-recorded, transcribed verbatim, and translated directly into English by MTN and EA, with all personal identifiers removed. To ensure accuracy and preserve meaning, the first author (RM)

cross-checked all transcripts against the audio recordings. Data were managed and analysed using NVivo 14.

We used thematic analysis, combining deductive codes informed by the Social Ecological Model (SEM) with inductively generated codes from participants' accounts. Following Braun and Clarke's six-phase framework (32), IDI and FGD transcripts were analysed concurrently using a shared coding framework that was iteratively refined throughout analysis. Two researchers (MTN and EA) independently coded transcripts, with regular discussions involving RM to compare interpretations, refine coding decisions, and strengthen analytic rigour.

Consistent with this approach, we assessed code saturation, defined as the point at which no new codes or thematic issues emerged, rather than meaning saturation (33, 34). Saturation was monitored across both IDIs and FGDs, with both data sources contributing to code and theme development. No new codes were identified after approximately the 16th interview, and subsequent FGDs largely elaborated and confirmed existing themes. Trustworthiness was enhanced through investigator triangulation, reflexive discussions, and collaborative review of findings. Illustrative quotations were selected to reflect the breadth of perspectives across age groups and communities and are labelled by data source, participant age (IDI) or age category (FGD), and community. The COREQ checklist and coding framework are provided as supplementary materials 2 and 3, respectively.

The research team were staff of the MRC/UVRI and LSHTM Uganda Research Unit, which also delivered the study information sessions before participation. The study team had never interacted with the participants and went to the community with an open mind. Interviewers were young ladies and spoke Luganda that the participants knew. Rapport was created by taking the participants through the information and consent forms as well as answering any questions that the participants had.

Ethical Considerations

Ethical approval

to conduct the study was obtained from the Uganda Virus Research Institute Research Ethics Committee (Ref: GC/127/1019), Uganda National Council for Science and Technology (Ref: HS4559ES), and the London School of Hygiene and Tropical Medicine Research Ethics Committee (Ref: 31174). Permission to conduct the study was also obtained from the Masaka District Health Officer. All participants provided written informed consent for adults and emancipated minors, while minors (< 18 y) provided written assent following parental consent. Emancipated minors were defined as girls under 18 years who were married, pregnant, mothers or self-supporting, in line with national guidelines.

Results

Socio-Demographic Characteristics

Twenty in-depth interviews and five focus group discussions were conducted. Demographic information was available for 16 interview participants and is presented to provide contextual information. Participants were aged 9–20 years and had attained primary-level education (P2-P6). Most were single (n = 15), identified as Muslim (n = 7), Catholic (n = 5), or Protestant (n = 4), and were unemployed (n = 10). The broader characteristics of the study population are reported in the accompanying quantitative publication (30).

Summary of the Findings

Table 1. **Facilitators and barriers to HPV vaccination by SEM level**

Table 1
Facilitators and barriers to HPV vaccination by SEM level

SEM level	Key facilitators	Key barriers
Individual	Perceived risk and desire for protection against cervical cancer	Fear of injections; limited knowledge of the vaccine
Interpersonal	Peer influence; parental engagement	Parental scepticism and misconceptions about infertility
Community	Sensitisation through community leaders and VHTs	Stigma linked to sexual activity; myths and misconceptions
Institutional	Friendly, supportive health workers	Unwelcoming health worker attitudes; failure to inform communities about vaccination
Structural	Free vaccine; outreach services close to home	Vaccine stockouts; distance and transport costs

Acceptability

After receiving information through the study, non-school-going girls in both communities expressed willingness to receive the HPV vaccine, primarily motivated by the desire to prevent cervical cancer. This readiness was linked to an understanding that the vaccine targets diseases affecting young girls, which reinforced its perceived relevance. Some of the participants expressed confidence in vaccination as a preventive measure, even while acknowledging that uptake was voluntary. This narrative reflects a positive attitude towards HPV vaccination, shaped by awareness of health risks and a sense of personal responsibility.

Yes, I would like to be vaccinated to prevent myself from getting infected. In case any chance comes, I can't refuse. (IDI, 19 years, inland community)

Similarly, participants across all age groups acknowledged the relevance of the vaccine to their health and recognised that cervical cancer affects girls specifically. This understanding was reached after the study information sessions, as most participants in both communities had not heard of the HPV vaccine

before. This suggests a generally positive attitude toward HPV vaccination, shaped by the information they received about the study.

The fact that the disease has already been confirmed to affect young girls means you have to be part of the activity, though it's not compulsory. But if you don't want to, no one will force you. (IDI, 11 years, inland community)

Facilitators

Consistent with the SEM, the facilitators described by participants operated at several levels simultaneously, from the individual level facilitators that made vaccination possible, through interpersonal and community relationships, to the institutional practices of the health system and lastly to stractual level facilitators that made it physically and financially possible.

Individual-level facilitators

Perceived Risk and Desire for Protection

A recurrent theme was the belief that receiving the HPV vaccine would help secure one's health in the future, particularly against cervical cancer. This long-term health benefit, once understood, was a strong motivating factor for girls. No differences were observed among communities and age groups.

When I get sensitised about the vaccine, I think I am at risk of having cervical cancer. Therefore, I will have to prevent myself from getting it. (IDI, 19 years, fishing community)

Interpersonal-level facilitators

Peer Influence

Some of the participants noted that positive experiences among peers could encourage others to seek vaccination. Those young girls who had received some dose of the vaccine reported being motivated by friends who explained the benefits or shared reassuring experiences. Therefore, peer influence was seen to create informal networks that reinforced vaccine confidence.

I can be attracted by my friends' advice or explanation, because some people do things according to what their friends have explained to them. When a friend happens to explain to another friend, she will see it's fine. And when more people talk about it, she will decide to do so. (IDI, 19 years, inland community)

It's all about one's way of thinking to accept. If you tell a person in a good way, for example, like we who have accepted, I too can explain to my fellow girls how it works. But if I don't accept, I might tell her negative things, thus stopping her from getting vaccinated. We who have participated in this exercise can convince our fellows. This can encourage the other person to come and save her life. (IDI, 19 years, inland community)

Parental Engagement

Participants described parents and caregivers as gatekeepers whose permission shaped whether girls were vaccinated. Parents who understood the vaccine's purpose allowed and encouraged their daughters to attend; those who did not refused. Some older girls described persuading reluctant parents themselves.

Yes. For example, they might be vaccinating for a certain virus, and I decide to go, but my parent tells me not to go. But when I explain to my parents, they will even encourage me to go. (IDI, 19 years, inland community)

Community-level facilitators

Sensitisation through Community Leaders and VHTs

Participants who had received some form of sensitisation through community meetings, radio messages, or interpersonal communication demonstrated greater awareness and acceptance of the vaccine. Participants perceived village health team members (VHTs) and community leaders as instrumental in promoting vaccine acceptance. They believed that if these trusted figures endorsed the vaccination campaigns and countered misinformation, many young girls would become interested and participate.

You can use our community leaders or our village health workers to carry out a drive that calls upon people, since you can't reach out to a person individually. So, you have to pass on the information to our community leaders, and they pass it on to us. It's you people who go on and pass on the information to our village health workers. So, the words they tell us are the ones that make us accept getting vaccinated for that disease. (IDI, 19 years, inland community)

Institutional-level facilitators

Friendly and Supportive Health Workers

Participants contrasted friendly, interactive health workers, who made young girls feel more comfortable and willing to be vaccinated, with harsh ones, who discouraged attendance (see Institutional-level barriers).

Structural-level facilitators

Use of Outreach Services

Several participants perceived that mobile vaccination campaigns and door-to-door visits were important for improving access for girls in remote areas. They described this as important for eliminating structural barriers such as transport costs and long distances to health facilities that inhibited access, emphasising the convenience and inclusivity of localised services.

It's also good. When something is within your area, and it requires no transport fee, it attracts you to be a part of it. Someone might be interested but has no capacity to reach the vaccination place. (IDI, 20 years, fishing community)

Availability of the Vaccine at No Cost

The narratives from the participants revealed that the availability of the vaccine at no cost would significantly encourage uptake among non-school-going girls. They viewed free services as an opportunity to protect health without financial strain. No differences were observed between communities and age groups.

Yes, some people may say they want to get vaccinated, but they lack the necessary funds. When it's free, some people will take advantage of the opportunity. (IDI, 10 years, inland community)

Barriers

In Masaka, non-school-going girls face a complex web of barriers that hinder their access to the HPV vaccine, which is vital for preventing cervical cancer. These are described in detail below.

Individual-level barriers

Fear of Injections

Fear of pain associated with injections was percieved to discourage some girls across all age groups and communities from initiating or completing the vaccine series. This anxiety was often amplified by peer accounts of painful experiences, creating psychological barriers.

Some fear injections. A girl may meet someone who has already been vaccinated, and she tells her about how painful the injection is. This can also stop her from going for the vaccination. (IDI, 19 years, fishing community)

Some fear them (injections), for example, I have a friend who fears them, whether on the finger or anywhere. Even when they were vaccinating us for COVID-19, she refused. (IDI, 14 years, inland community)

Limited Knowledge About HPV Vaccination

A lack of awareness about the vaccine's benefits, schedule, and availability was a recurring barrier. Girls in the fishing communities seemed particularly disadvantaged due to limited access to media and health education. Some expressed willingness to vaccinate but missed opportunities because they were uninformed about outreach activities.

Yes, there are many people who don't get to know that there is a vaccination taking place, yet they would be willing to get vaccinated. By the time they get to know, the vaccination has already ended, and they miss out. (IDI, 20 years, fishing community)

Interpersonal-level barriers

Parental Perceptions and Attitudes

Parental influence emerged as a major barrier across communities and age groups, with misconceptions about infertility fuelling resistance to vaccine uptake. These fears were compounded by limited exposure to accurate information. Girls often relied on caregivers for health decisions, making parental scepticism a decisive factor in vaccine uptake.

Yes, some parents don't allow their children to get vaccinated. They say they were not vaccinated, but they are fine, so they apply the same reasoning to their children. For example, I know a woman who says she doesn't take her children for immunisation. (IDI, 19 years, inland community)

Yes, because they don't know the reason they are vaccinating. They are not told about the importance of the vaccines they are giving to their children. But when they are told that the vaccine is to prevent the cervical cancer virus, they can't deny it. (FGD, 13 to 16 years, fishing community)

Community-level barriers

Stigma Associated with HPV Vaccination

Participants sometimes perceived HPV vaccination as stigmatising, leading to gossip and judgement within communities across all age groups and communities. This stigma discouraged girls from seeking vaccination openly, out of fear of reputational harm. Such perceptions were rooted in conservative norms and misinformation about the vaccine's purpose.

Someone might be willing to go for the HPV vaccination but is shy and fears other people knowing that she has taken the vaccine. She thinks that her friends will begin to avoid her. Some also fear that they might even embarrass her in front of her husband or boyfriend, thus refusing to be vaccinated. (IDI, 11 years, inland community)

Myths and Misconceptions Around HPV Vaccination

False beliefs about infertility, population control, and harmful side effects attributed to vaccines in general were commonly reported. These misconceptions were often reinforced by family members and community narratives, creating fear and mistrust. Girls reported hearing alarming claims of vaccines damaging ovaries or causing death, which deterred uptake.

I heard people say they should take their children to get vaccinated for cervical cancer. They announced it through the loudspeaker. I asked my mother if I could go. She told me they would damage my ovaries, and I did not go. (IDI, 18 years, inland community)

Some parents said there is a chemical they put in those drugs they inject people with, intending to reduce the population in Uganda. They say that the vaccines are fake, or that they are meant to stop people from

having children because the population has increased. So, some may fear that. (IDI, 20 years, fishing community)

Across study sites, participants described how rumours and negative stories about vaccines contributed to fear and hesitancy toward HPV vaccination. These concerns were often shaped by accounts of adverse events associated with previous vaccination campaigns, regardless of whether they were verified. Participants reported that such stories spread within communities and created anxiety among young girls, discouraging them from accepting the vaccine. One adolescent girl recounted how narratives linking vaccination to disability influenced parental perceptions and fears about vaccine safety:

There is a time when they vaccinated children for polio, and children became lame. So, when a parent hears of such, she gets scared. People say many things which scare a person. (IDI, 13 years, inland community)

Institutional-level barriers

Health Worker Attitudes and Service Delivery

Across sites, participants described health worker attitudes and service delivery practices as important influences on HPV vaccine uptake. Adolescents reported that perceived indifference from health workers, particularly the failure to communicate vaccination schedules or conduct community outreach, limited awareness of vaccination opportunities and reduced access to services. Participants also emphasised that the behaviour of health workers during service delivery shaped young girls' willingness to seek vaccination. Harsh and unfriendly interactions were described as creating fear and discouraging attendance.

Sometimes health workers do not care, even when there is enough vaccine. When there are enough vaccines, health workers should come to our communities. They should inform people so that those who are able can go there, but they do not do so. (IDI, 19 years, inland community)

Sometimes a doctor comes and is very harsh. Many people leave crying after being vaccinated by him or her. This can scare young girls and discourage them from coming for services. However, when a doctor is friendly, interactive, and treats people well, young girls feel more comfortable and are more willing to get vaccinated. Therefore, the attitude of health workers can either prevent or encourage young girls to access vaccination services. (IDI, 20 years, inland community)

Structural-level barriers

Vaccine Stockouts

Participants perceived vaccine stockouts as a major barrier, describing girls who wanted the vaccine being turned away because supplies had run out.

Health workers may vaccinate a few people, but the majority are left behind. When these individuals are left out despite wanting to be vaccinated, they miss the opportunity because the vaccines have run out. (IDI, 20 years, fishing community)

I also think the vaccine supply may be limited. As a result, only a small number of girls are vaccinated, while others who want to be vaccinated are left out. (IDI, 20 years, inland community)

Cost and Distance to Vaccination Services

Across study sites, participants consistently described distance to vaccination points and the associated transport costs as key barriers to HPV vaccination. While the vaccine was free, the financial and logistical burden of travelling to vaccination sites often limited access, particularly among adolescents with constrained resources. Participants highlighted that vaccination activities were frequently conducted far from where they lived, making attendance difficult and, in some cases, resulting in missed vaccination opportunities.

Most of the time, what stops us is the distance to the vaccination centres. In many cases, vaccination activities are conducted far from where people live, making it difficult for them to travel and get vaccinated. (IDI, 19 years, inland community)

This challenge was further illustrated by one non-school-going girl who linked distance directly to her inability to access services:

Int

What do you think can stop you from going to access the vaccination?

Res

The vaccination site may be far, and I don't have the capacity to get there. (IDI, 14 years, inland community)

Taken together, participants did not see any single intervention, whether health education, parental engagement, or outreach, as sufficient on its own. Instead, they described a need for coordinated action across the individual, interpersonal, community, institutional, and structural levels of the SEM.

Discussion

HPV vaccination uptake among non-school-going girls in Masaka District, Central Uganda, was influenced by factors operating across all levels of the Social Ecological Model. Although most girls expressed willingness to receive the vaccine because of its perceived role in preventing cervical cancer, this willingness was often undermined by parental authority, community stigma, health worker practices, and structural barriers to access. What distinguishes non-school-going girls is that they sit outside the school-based consent and information channels on which Uganda's HPV vaccination programme relies,

so both information about the vaccine and permission to receive it flow through caregivers, VHTs and community leaders rather than through teachers.

These findings help to explain the results of our survey of 428 non-school-going girls in the same communities (30), in which 44.2% had heard of the HPV vaccine, 29.9% had received at least one dose and 12.9% had completed two doses, yet 91.2% of unvaccinated girls were willing to be vaccinated. Prior awareness was the strongest predictor of uptake in the survey, which is consistent with participants' accounts of missing vaccination because they did not know it was taking place, and with the central role they gave to sensitisation through VHTs and community leaders. Lower uptake among sexually experienced girls in the survey mirrors the stigma linked to sexual activity described here. Participants' preference for outreach close to home also matches the survey, in which community outreach was the most preferred delivery strategy (57.7%). In contrast, the survey found higher uptake in the fishing community, whereas some participants described fishing-community girls as less informed.

The generally positive attitudes toward HPV vaccination observed in this study are consistent with evidence across Africa showing high acceptability despite relatively low uptake (35–37). Regional estimates of HPV vaccine uptake and completion similarly suggest that willingness often exceeds actual coverage (22, 38). Fear of injections was an individual-level barrier, consistent with studies showing that education and peer support can reduce injection-related anxiety and improve uptake (39, 40). However, because non-school-going girls are excluded from school-based programmes, such interventions require adaptation for community settings.

Caregivers acted as gatekeepers, consistent with evidence that parental acceptance depends on knowledge, trust and health worker communication (41, 42). Because these girls are outside school consent processes, caregivers must be engaged in the community.

Beliefs that the vaccine damages fertility or controls population mirror findings across sub-Saharan Africa and Uganda (35, 36). Concerns about stigma and reputation echo qualitative syntheses (35, 42) supporting messages that frame vaccination as routine cancer prevention.

Institutional and structural factors strongly affected uptake. Health workers' conduct discouraged attendance, consistent with evidence that provider communication predicts uptake (43). Stockouts reflect supply constraints documented across the region (44). Free provision was valued, but distance and transport costs remained barriers (38, 45). These findings support community-based delivery for non-school-going girls (46) and the single-dose schedule (11, 47).

Read together, participants' accounts suggest that the SEM levels interact rather than act independently. A stockout or an outreach session held far from home (structural) can turn a girl's willingness into a missed opportunity; such experiences may feed rumours that vaccines are fake or intended to reduce the population (community), which in turn reinforce caregivers' scepticism and refusal (interpersonal). Conversely, sensitisation by trusted VHTs and community leaders (community) reaches caregivers as

well as girls, and friendly health workers (institutional) encourage attendance. Interventions that address a single level are therefore unlikely to turn willingness into uptake.

These findings should be read in the light of current policy. UNITAG has recommended a single dose for immunocompetent girls aged 9 to 14 years (12), which would remove the need for girls to return for a second dose, a step that participants' accounts of stockouts and distance suggest is difficult. However, catch-up vaccination for girls older than 14 years is recommended only for those who are not yet sexually active (12), which limits eligibility for many older non-school-going girls, most of whom were sexually experienced in our survey (30). The community-based delivery strategies described in a recent review of approaches to reach non-school-going girls (46) correspond closely to the outreach, VHT mobilisation and proximity that participants valued.

Implications for Practice and Future Research

These findings suggest several practical actions. HPV vaccination for non-school-going girls should be delivered through: (i) outreach at landing sites, markets, trading centres and places of worship, timed around girls' work, reflecting participants' emphasis on services close to home; (ii) VHT-led line-listing and door-to-door mobilisation, given the trust participants placed in VHTs and community leaders; and (iii) walk-in vaccination on any clinic day, so that girls who miss outreach sessions or are turned away during stockouts can be vaccinated later. Planning should identify places where these girls spend time, such as landing sites, markets, and informal workplaces. Effective caregiver sensitisation approaches should be co-created and implemented separately from education aimed at girls, as parental understanding strongly influences vaccine uptake. Health worker training should cover communication skills, confidentiality, and respectful engagement with adolescents, in addition to vaccine knowledge. Outreach supply chains should also account for the challenges of reaching a mobile population and prioritise single-dose vaccination where policy permits.

Future research should evaluate VHT-led line-listing and community outreach for reaching non-school-going girls, test caregiver-focused interventions that address fertility-related myths, and explore the perspectives of caregivers and health workers, which were not captured in this study.

Strengths and Limitations

A key strength of this study was the use of the SEM, which provided a coherent framework for analysing influences on HPV vaccination across multiple levels. Including participants from both inland and fishing communities captured diverse experiences often overlooked in similar research. Rigour was strengthened through investigator triangulation, team reflection, and verification of translated transcripts. Combining IDIs with FGDs allowed individual experiences to be explored alongside shared community norms.

However, the findings were interpreted within certain limitations. As a qualitative study conducted in one Ugandan district, the results are context-specific, although they align with evidence from similar settings.

The absence of participant checking may have limited the confirmation of theme interpretations. Purposive sampling may also have excluded the most marginalised girls, who are often hardest to reach. Because interviews were conducted in Luganda and translated into English, some nuances may have been lost despite translation verification procedures. Willingness was elicited after participants had received study information about HPV vaccination, and interviews were conducted by members of the team that provided it; responses may therefore overstate acceptability (social desirability bias). Caregivers and health workers, whom participants described as decisive, were not interviewed, so their views are reported only as perceived by girls. Participants were identified through VHT and local-leader lists, which may under-represent girls who are most mobile or least connected to community structures.

Conclusion

Non-school-going girls in Masaka were willing to receive the HPV vaccine once informed about it, but willingness alone did not ensure uptake. Vaccination depended on caregivers' permission, community norms, health worker conduct and access to vaccine supplies close to home. Delivery for these girls should therefore combine community outreach and VHT mobilisation with sensitisation of caregivers, respectful health worker practice and a reliable vaccine supply.

Declarations

Consent for Publication

Not applicable. No identifying information is included in this article.

Funding

The study was funded by the Dragon's Den, Vaccine Theme, at the MRC/UVRI and LSHTM Uganda Research Unit.

Author Contribution

RM and JK conceived the idea and secured funding. MTN and EA collected data and analysed it together with RM. RM wrote the original manuscript, and all authors reviewed and approved the final manuscript.

Acknowledgement

We acknowledge our study participants as well as the field mobilizers who made this study possible. Successful study implementation was also enabled by the community leaders, community advisory board, and district health authorities, including the district health officer.

Data Availability

The de-identified individual participant data that underlie the results reported in this article are stored in a non-publicly available repository (London School of Hygiene & Tropical Medicine [LSHTM] Data Compass), together with a data dictionary accessible at https://datacompass.lshtm.ac.uk. Requests to access the data can also be submitted through email: researchdatamanagement@lshtm.ac.uk.

Abbriviations

FGD

Focus Group Discussion

HC

Health Centre

HPV

Human Papillomavirus

IDI

In-Depth Interview

LMICs

Low- and Middle-Income Countries

MoH

Ministry of Health

NGO

Non-Governmental Organisation

SEM

Social Ecological Model

SAGE

Strategic Advisory Group of Experts on Immunisation

VHT

Village Health Team

WHO

World Health Organisation

References

1. Bray F, Laversanne M, Sung H, Ferlay J, Siegel RL, Soerjomataram I, et al. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2024;74(3):229–63.
2. Yan K, Yang G, Yan L, Wu L, Wang Y, He P, et al. Global trends and forecasts of cervical cancer and a real-world safety assessment of human papillomavirus vaccines in women: A systematic analysis of the Global Burden of Disease study 2021 and the Vaccine Adverse Event Reporting System database. PLoS ONE. 2026;21(3):e0345286.
3. Filipić B, Rapajić-Moran I, Nikolić I, Oljačić S, Mandić A. Human papillomaviruses and cervical cancer from the perspective of the World Health Organisation initiative for cervical cancer elimination. Archives Pharm. 2024;74(Notebook 1):56–75.
4. World Health Organisation. Global strategy to accelerate the elimination of cervical cancer as a public health problem. World Health Organization; 2020.
5. Moses M, Fred L. Histopathological Patterns of Cervical Cancer Among Females Presenting to a Pathology Core Reference Laboratory in Kampala, Uganda. A 5-year Review. 2025.
6. Bruni LAG, Serrano B, Mena M, Collado JJ, Gómez D, Muñoz J, Bosch FX, de Sanjosé S. CO/IARC Information Centre on HPV and Cancer (HPV Information Centre). Human Papillomavirus and Related Diseases in the World.; 2023 10 March 2023.
7. Mugisha E, LaMontagne DS, Katahoire AR, Murokora D, Kumakech E, Seruyange R, et al. Feasibility of delivering HPV vaccine to girls aged 10 to 15 years in Uganda. Afr Health Sci. 2015;15(1):33–41.
8. Nabirye J, Okwi LA, Nuwematsiko R, Kiwanuka G, Muneza F, Kamya C, et al. Health system factors influencing uptake of Human Papilloma Virus (HPV) vaccine among adolescent girls 9–15 years in Mbale District, Uganda. BMC Public Health. 2020;20(1):171.
9. Barnabas RV, Brown ER, Onono MA, Bukusi EA, Njoroge B, Winer RL, et al. Efficacy of single-dose HPV vaccination among young African women. NEJM Evid. 2022;1(5):EVIDoa2100056.
10. Baisley K, Kemp TJ, Kreimer AR, Basu P, Changalucha J, Hildesheim A, et al. Comparing one dose of HPV vaccine in girls aged 9–14 years in Tanzania (DoRIS) with one dose of HPV vaccine in historical cohorts: an immunobridging analysis of a randomised controlled trial. Lancet Glob Health. 2022;10(10):e1485–93.
11. World Health Organisation. Human papillomavirus vaccines: WHO position paper, December 2022.; 2022.
12. UNITAG. UNITAG report on HPV dose optimization in Uganda. 2005.

13. Isabirye A, Mbonye M, Asiimwe JB, Kwagala B. Factors associated with HPV vaccination uptake in Uganda: a multi-level analysis. BMC Womens Health. 2020;20(1):145.
14. Ngabirano TD, Saftner MA, McMorris BJ. Exploring Health Behaviors in Ugandan Adolescents Living in Rural Fishing Communities. J Sch Nurs. 2022;38(2):148–60.
15. Tung IL, Machalek DA, Garland SM. Attitudes, Knowledge and Factors Associated with Human Papillomavirus (HPV) Vaccine Uptake in Adolescent Girls and Young Women in Victoria, Australia. PLoS ONE. 2016;11(8):e0161846.
16. Abou El-Ola MJ, Rajab MA, Abdallah DI, Fawaz IA, Awad LS, Tamim HM, et al. Low rate of human papillomavirus vaccination among schoolgirls in Lebanon: barriers to vaccination with a focus on mothers' knowledge about available vaccines. Ther Clin Risk Manag. 2018;14:617–26.
17. Cordoba-Sanchez V, Tovar-Aguirre OL, Franco S, Arias Ortiz NE, Louie K, Sanchez GI, et al. Perception about barriers and facilitators of the school-based HPV vaccine program of Manizales, Colombia: A qualitative study in school-enrolled girls and their parents. Prev Med Rep. 2019;16:100977.
18. Lim ASE, Lim RBT. Facilitators and barriers of human papillomavirus vaccine uptake in young females 18–26 years old in Singapore: A qualitative study. Vaccine. 2019;37(41):6030–8.
19. Chua GT, Ho FK, Tung KT, Wong RS, Cheong KN, Yip PS, et al. Sexual behaviors and intention for cervical screening among HPV-vaccinated young Chinese females. Vaccine. 2020;38(5):1025–31.
20. Hussein I, Vänskä S, Sivelä J, Leino T, Nohynek H. Factors associated with parental Human Papillomavirus (HPV) vaccination intention of daughter: A national survey in Finland. Vaccine. 2024;42(3):701–12.
21. Sealy DA, Modeste N, Dyett P. Barriers and facilitators to the HPV vaccine among mothers of adolescent girls: a qualitative study conducted in Trinidad and Tobago. Women Health. 2021;61(3):235–43.
22. Patrick L, Bakeera-Kitaka S, Rujumba J, Malande OO. Encouraging improvement in HPV vaccination coverage among adolescent girls in Kampala, Uganda. PLoS ONE. 2022;17(6):e0269655.
23. Crawford EE, Ajayi TF, Ampeire I, Baganizi M, Chisema MN, Griffith BC et al. Policies and strategies for HPV vaccination schedule completion in immunocompromised girls, including girls living with HIV: Qualitative insights from Eswatini, Malawi, and Uganda. medRxiv. 2025:2025.05. 06.25327127.
24. Farahani M, Tindyebwa T, Sugandhi N, Ward K, Park Y, Bakkabulindi P et al. Evaluation of Integrated Child Health Days as a Catch-Up Strategy for Immunization in Three Districts in Uganda. Vaccines (Basel). 2024;12(12).
25. Tuhebwe D, Adyedo C, Ahumuza E, Ssendagire S, Wanyenze RK. Improving HPV vaccine acceptance through peer-to-peer education among adolescent girls in the urban poor settings of Kisenyi, Kampala, Uganda. PLOS Glob Public Health. 2024;4(12):e0004007.
26. Janighorban M, Boroumandfar Z, Pourkazemi R, Mostafavi F. Barriers to vulnerable adolescent girls' access to sexual and reproductive health. BMC Public Health. 2022;22(1):2212.
27. Matovu JKB, Bukenya JN, Kasozi D, Kisaka S, Kisa R, Nyabigambo A, et al. Sexual-risk behaviours and HIV and syphilis prevalence among in- and out-of-school adolescent girls and young women in

Uganda: A cross-sectional study. PLoS ONE. 2021;16(9):e0257321.

28. McLeroy KR, Bibeau D, Steckler A, Glanz K. An ecological perspective on health promotion programs. Health Educ Q. 1988;15(4):351–77.
29. Golden SD, Earp JAL. Social ecological approaches to individuals and their contexts: twenty years of health education & behavior health promotion interventions. Health Educ Behav. 2012;39(3):364–72.
30. Kitonsa J, Kafeero P, Ankunda V, Muhumuza R, Mukasa Kibengo F, Onyango M, et al. Knowledge, perceptions, uptake, and determinants of HPV vaccination, and preferred delivery strategies among out-of-school girls in Masaka, Uganda. Hum Vaccines Immunotherapeutics. 2026;22(1):2654928.
31. Campbell S, Greenwood M, Prior S, Shearer T, Walkem K, Young S, et al. Purposive sampling: complex or simple? Research case examples. J Res Nurs. 2020;25(8):652–61.
32. Braun V, Clarke V. Using thematic analysis in psychology. Qualitative Res Psychol. 2006;3(2):77–101.
33. Hennink MM, Kaiser BN, Marconi VC. Code saturation versus meaning saturation: how many interviews are enough? Qual Health Res. 2017;27(4):591–608.
34. Hennink M, Kaiser BN. Sample sizes for saturation in qualitative research: A systematic review of empirical tests. Soc Sci Med. 2022;292:114523.
35. Deignan C, Swartz A, Cooper S, Colvin CJ. Stakeholders' Understandings of Human Papillomavirus (HPV) Vaccination in Sub-Saharan Africa: A Rapid Qualitative Systematic Review. Vaccines (Basel). 2021;9(5).
36. Kutz JM, Rausche P, Gheit T, Puradiredja DI, Fusco D. Barriers and facilitators of HPV vaccination in sub-saharan Africa: a systematic review. BMC Public Health. 2023;23(1):974.
37. Asgedom YS, Kebede TM, Seifu BL, Mare KU, Asmare ZA, Asebe HA, et al. Human papillomavirus vaccination uptake and determinant factors among adolescent schoolgirls in sub-Saharan Africa: A systematic review and meta-analysis. Hum Vaccin Immunother. 2024;20(1):2326295.
38. Agimas MC, Adugna DG, Derseh NM, Kassaw A, Kassie YT, Abate HK, et al. Uptake of human papilloma virus vaccine and its determinants among females in East Africa: a systematic review and meta-analysis. BMC Public Health. 2024;24(1):842.
39. Davies C, Marshall HS, Zimet G, McCaffery K, Brotherton JML, Kang M, et al. Effect of a School-Based Educational Intervention About the Human Papillomavirus Vaccine on Psychosocial Outcomes Among Adolescents: Analysis of Secondary Outcomes of a Cluster Randomized Trial. JAMA Netw Open. 2021;4(11):e2129057.
40. Iova CF, Daina LG, Daina MD, Ghitea TC. The Effectiveness of Interventions Targeting Adolescents in HPV Vaccination-A Scoping Review. Med (Kaunas). 2024;60(9).
41. Heyde S, Osmani V, Schauberger G, Cooney C, Klug SJ. Global parental acceptance, attitudes, and knowledge regarding human papillomavirus vaccinations for their children: a systematic literature review and meta-analysis. BMC Womens Health. 2024;24(1):537.

42. Cooper S, Schmidt BM, Jama NA, Ryan J, Leon N, Mavundza EJ, et al. Factors that influence caregivers' and adolescents' views and practices regarding human papillomavirus (HPV) vaccination for adolescents: a qualitative evidence synthesis. Cochrane Database Syst Rev. 2025;4(4):Cd013430.
43. Bakare D, Gobbo E, Akinsola KO, Bakare AA, Salako J, Hanson C, et al. Healthcare worker practices for HPV vaccine recommendation: A systematic review and meta-analysis. Hum Vaccin Immunother. 2024;20(1):2402122.
44. Adeyanju GC, Essoh TA, Sidibe AR, Kyesi F, Aina M. Human Papillomavirus Vaccination Acceleration and Introduction in Sub-Saharan Africa: A Multi-Country Cohort Analysis. Vaccines (Basel). 2024;12(5).
45. Mengistie BA, Yirsaw AN, Lakew G, Mekonnen GB, Shibabaw AA, Chereka AA, et al. Human papillomavirus vaccine uptake and its determinants among women in Africa: an umbrella review. Front Public Health. 2025;13:1537250.
46. Rosser EN, Wysong MD, Rosen JG, Limaye RJ, Park S. HPV Vaccine Delivery Strategies to Reach Out-of-School Girls in Low- and Middle-Income Countries: A Narrative Review. Vaccines (Basel). 2025;13(5).
47. Asempah E, Ikpebe E. Accelerating HPV vaccination in Africa for health equity. Glob Health Res Policy. 2024;9(1):37.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SupplementaryDocument2COREQchecklist.docx
- SupplementaryDocument1InterviewGuideforYoungGirlsv1.003Apr2024.pdf
- SupplementaryDocument3Codebook.docx