

FACTORS ASSOCIATED WITH LOW UPTAKE OF HUMAN PAPILLOMA VIRUS VACCINATION AMONG GIRLS AGED 10-14 YEARS IN MBALE CITY

EMILY CHEPTOEK

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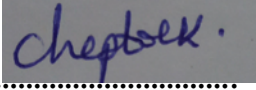


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DECLARATION

I hereby declare that all the work in this research proposal is original unless otherwise acknowledged. To the best of my knowledge, this research proposal has never been presented to any institution for any academic award.

Signature 

Date ...17/11/2025

CHEPTOEK EMILY

(Researcher)

APPROVAL

I do acknowledge that this research report has been written under my guidance and supervision and is therefore ready for submission as partial fulfillment of the requirements for the award of Masters of Public Health.

Sign 

Date ...20/11/2025.....

AGGREY BYARUHANGA
(SUPERVISOR)

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ACRONYMS & ABBREVIATIONS

CC:	Cervical cancer
CCS:	Cervical cancer screening
CHDP:	Child Health Days Plus
COVID-19:	Coronavirus Disease of 2019
DHO:	District Health Office
HMIS:	Health Management Information System
HPV:	Human papillomavirus
ICHDs:	Integrated Child Health Days
MOH:	Ministry of health
SDG:	Sustainable Development Goal
UHC:	Universal Health Coverage
WHO:	World health organization

OPERATIONAL DEFINITIONS

Human papillomavirus (HPV) is a group of more than 200 related viruses, some of which can cause warts or papilloma (benign tumors), while others can lead to various forms of cancer.

Vaccination is the process of administering a vaccine to an individual to stimulate their immune system to develop protection against a specific infectious disease.

Immunization is the process by which an individual is made immune or resistant to an infectious disease, typically through the administration of a vaccine.

Vaccine refers to a biological preparation that provides active acquired immunity to a particular infectious disease

Immunity is the body's ability to resist or defend against infection, disease or other biological invasion.

Micro-organism refers to infectious agents that can only be seen under the microscope, can exist as single cells, cell clusters, or multicellular organisms and covers bacteria, viruses, fungi and protozoa.

Antigens are molecules or molecular structures that are recognized by the immune system, specifically by antibodies, B cells, or T cells.

CHAPTER ONE

Abstract:

Background: Human papillomavirus (HPV) vaccination is a proven crucial strategy for prevention of cervical cancer. Despite government programs for the HPV vaccination, the coverage among the eligible girls remains suboptimal in Uganda. This study assessed HPV vaccination coverage and explored factors associated with missed HPV vaccination among girls 10-14 years in Mbale city, Uganda. Understanding the reasons for the missed HPV vaccination is essential for making strategic improvements for HPV vaccination program.

Methods: A descriptive cross-sectional study was conducted among 436 girls aged 10-14 years in Mbale city, Uganda. Fifty (50) schools were randomly selected and stratified by classes. Data was collected using a standard semi-structured and analyzed using stata version 16. Descriptive statistics including univariate, bivariate, and multivariate analysis were used to come up with variables that showed significant associations with HPV uptake using a 95% confidence interval (CI).

Results: Overall, 68.4% of the girls reported to have received at least a dose of HPV vaccine, while 31.6% were unvaccinated. Major reasons for the missed vaccination included inadequate awareness about cervical cancer and HPV vaccine, fear of vaccine side effects, large households affecting family decisions, and absence from school during vaccination days.

Conclusion: The uptake of HPV Vaccine was suboptimal below the 90% WHO recommended coverage in Mbale city, as 31.6% of eligible girls missed vaccination. Strengthening community sensitization, Equipping teachers with educative messages on vaccination, improving access to vaccination services in school and community, and enhancing follow-up strategies to ensure reach of missed girls are some of the efforts to reduce HPV vaccination inequities.

INTRODUCTION AND BACKGROUND

1.1 Introduction

Human papillomavirus (HPV) is the primary cause of cervical cancer (>99%) and is responsible for 83- 95% anal, 87% oro-pharyngeal, 60-65% vaginal and 20- 25% vulvar cancers in women (Plan 2013). Globally, cervical cancer is ranked fourth most common type of cancer with 528,000 new cases annually, lung cancer (583,100), colorectal cancer (614,304) and breast cancer (1,676,633 cases) (Bray, Ferlay et al. 2018). Women are at greater than 80% risk of acquiring HPV infection with most infection occurring within 3-4 years of becoming sexually active (Kisaakye, Namakula et al. 2018).

The global estimate for HPV vaccination coverage was at 12.2% (Spayne and Hesketh 2021). In the last 15 years, there has been an improvement in HPV vaccination programs, however in Sub Saharan Africa HPV vaccine completion rate is still as low as 20% compared to developed countries with 77% completion rate (Bruni, Saura-Lázaro et al. 2021, Lubeya, Mwanahamuntu et al. 2022)

Sub-Saharan Africa has the third highest incidence (17.5%) of cervical cancer cases after India (17.7%) and East and Central Asia (18.2%) (Feng, Lin et al. 2024). The region registers second largest numbers of global cervical cancer deaths (21.6%) after India (25.4%). A study conducted in 2018 showed that the East African region continues to record the highest number of new cervical cancer; with an average of 52,613 cases annually (Bruni, Barrionuevo-Rosas et al. 2018).

World Health Organization (WHO) recognizes primary prevention of cervical cancer since most of the cervical cancer cases are preventable (WHO 2019). Vaccinating girls aged between 9-13 years with HPV vaccine before being exposed to sex is one of the primary prevention measures because it can offer protection against cervical cancer in its initial onset (Kisaakye, Namakula et al. 2018).

1.2 Background

Uganda is one of the five countries with the highest cervical cancer incidence rates in the Sub-Saharan Africa (Isabirye, Mbonye et al. 2020). It is estimated that Uganda registers approximately 3500 women newly diagnosed of cervical cancer and 4400 die of cervical cancer annually (WHO 2020). At Uganda cancer institute (UCI), every year, 8 out of every 10 women are diagnosed with cervical cancer (UCI 2021). It is also projected that by 2025, about 7500 new cervical cancer cases and 4800 deaths are likely to occur in Uganda (WHO 2020) .

The Ministry of Health adopted HPV vaccination as recommended by WHO as primary prevention of cervical cancer (WHO 2015). HPV vaccination programme started in 2008 piloting it in two districts namely Ibanda and Nakasongola districts (MOH 2008). During the pilot phase, the vaccine used was bivalent HPV vaccine (cervarix, Glaxosmithkline, Belguim) and this was administered to girls aged 10 years or in primary school grade 5 in 3 doses at an interval of 0, 1 and 6 months (MOH 2008). The health workers from the nearest health facility take the vaccine to the targeted girls in schools as part of school health programme. To ensure that eligible out of school girls get vaccinated, community outreaches were conducted to supplement the school visits (Kumakech, Andersson et al. 2017).

Uganda adopted a phased approach to rollout HPV vaccination nationally using the quadrivalent HPV vaccine (Gardasil, Merck MSD, USA) with 12 districts in 2010 and countrywide in 2014 (Kumakech, Andersson et al. 2017). Nationally, 2 doses of vaccine at an interval of 0 and 6 months is administered to girls aged 10 years or in primary school grade 4 (MOH 2008). Currently, HPV vaccines delivered to girls have been integrated into a bi-annual (every April and October) school health programme known as child health days plus (CHDP) during which health workers visit schools to provide catch-up vaccination, deworming and Vitamin A supplement (MOH 2023). For the out of school girls, the delivery of vaccine is integrated into monthly community outreaches for immunization services delivery (Liddon, Leichter et al. 2012). HPV vaccines have proven to provide cross-protection against other oncogenic HPV

genotypes (Costa, Giraldo et al. 2020). To address factors associated with low uptake of HPV vaccine, MOH encourages districts to establish multiple vaccination centers such as schools, health facilities and community outreaches providing routine immunization services (Snidal 2018).

Despite the above strategies to improve HPV vaccination coverage and curb down cervical cancer, eastern Uganda still registers a number of new infections. The factors associated with the uptake of HPV vaccination among 9-14-year-old girls in Mbale city has not been documented. Therefore, this study aimed at assessing factors associated with the low-uptake of HPV vaccination among 10-14-year-old girls in Mbale City.

1.3 Problem Statement

Cervical cancer remains a significant public health problem in Uganda and is one of the leading causes of cancer-related morbidity and mortality among women. National estimates showed that approximately 3,500 women were newly diagnosed each year, with about 2,400 deaths annually (Uganda Cancer Institute [UCI], 2024). Over the past five years, Uganda had recorded an estimated 22,000 cases of cervical cancer, underscoring the high disease burden (UCI, 2024). Persistent infection with the Human Papilloma Virus (HPV) was the primary cause of cervical cancer, and vaccination of girls aged 10-14 years was recognized as an effective preventive strategy (World Health Organization [WHO], 2018; Bruni et al., 2021).

In response, the Government of Uganda introduced the HPV vaccine into the routine Expanded Programme on Immunization (EPI) in 2015, targeting girls aged 10-14 years through school-based, age-based community strategies and integration with Child Health Days (Ministry of Health [MoH], 2015). Despite these efforts, HPV vaccine uptake remained below national targets of 90% in several districts, including Mbale City. This low uptake persisted amidst a high cervical cancer burden and raised concerns about the effectiveness of existing vaccination strategies. Factors such as community misconceptions about the vaccine, negative attitudes among caregivers and adolescents, inadequate community mobilization, vaccine stock-outs, negative

perceptions of health workers, and limited access to health facilities were suspected contributors (Kisakye et al., Mwaka et al., 2016). However, context-specific evidence for Mbale City is limited.

Therefore, this study sought to determine the level of HPV vaccine uptake and to identify the factors associated with low uptake among girls aged 10-14 years in Mbale City. The findings were intended to provide evidence to inform policy and strengthen HPV vaccination interventions aimed at improving coverage and reducing the burden of cervical cancer.

1.4 Justification

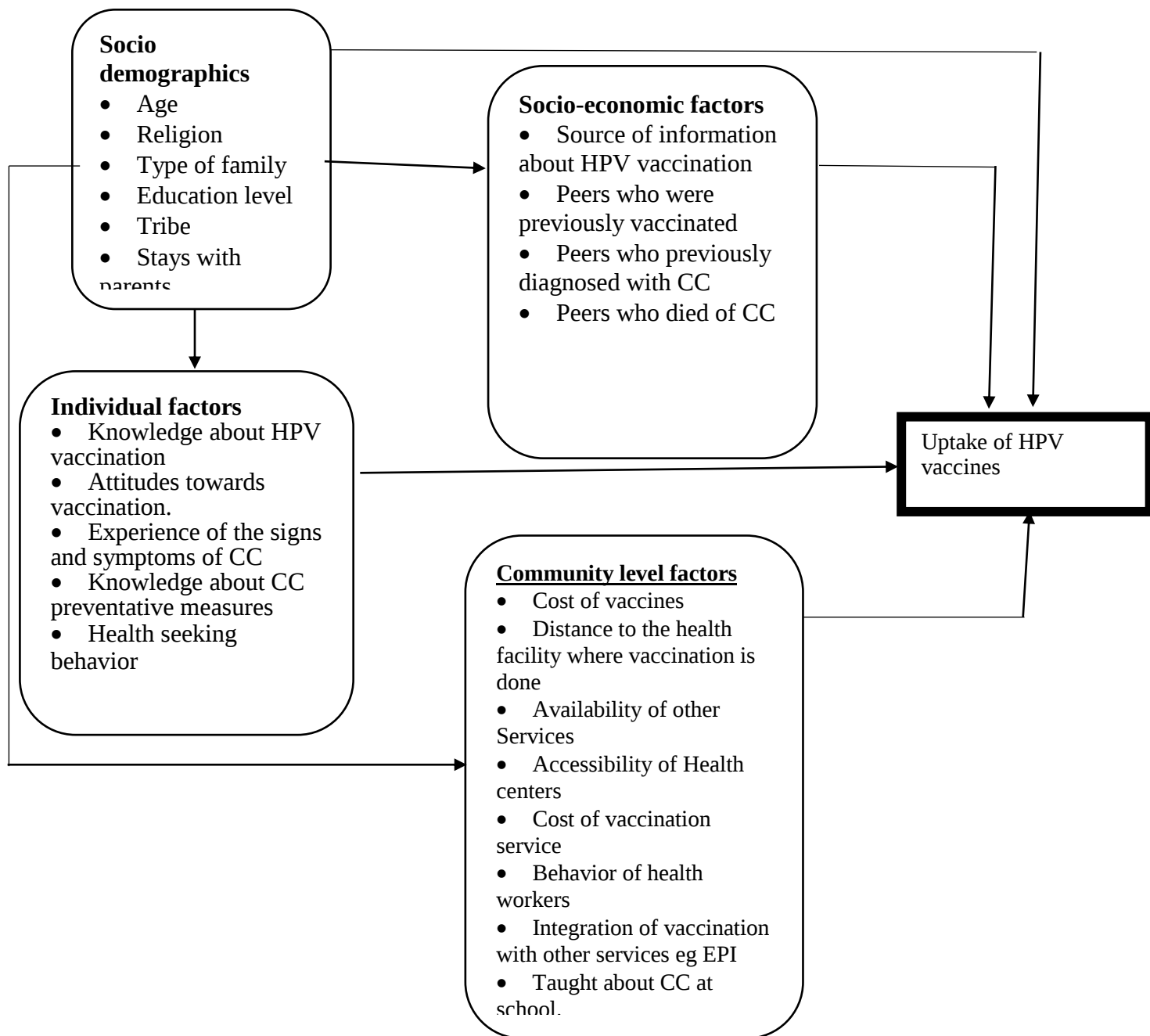
In order to achieve Universal Health Coverage (UHC), Uganda has strived to make investments to ensure vaccination is among the first top priorities, committing adequate resources and ensuring communities appreciate the value of immunization, demand and protect immunization services as a basic right. This aims at achieving Sustainable Development Goal (SDG) 3 “Ensure healthy lives and promote well-being for all ages”. However, there is limited documented data on factors associated with HPV vaccination uptake among 10-14-year-old girls in Mbale City.

Therefore, this study sought to document the factors associated with uptake of HPV vaccination among 10-14-year-old girls. This study will provide information to the City health officer’s office and implementing partners to guide them in the effective implementation of HPV vaccination among 10-14-year-old girls.

The recommendations of this study will guide further research in this area of HPV vaccination among 10-14-year-old girls.

1.5 Conceptual framework

(Adopted from Bronfenbrenner's ecological systems theory).



Narrative

This conceptual framework was adapted from Bronfenbrenner's ecological systems theory. Various factors play a critical role leading to practice of health behaviour (uptake of HPV vaccination in this case). These factors are categorised into individual factors and community level factors. Socio economic factors like person's source of information about HPV vaccination, peers who were previously vaccinated peers who previously diagnosed with cervical and having peers who died of cervical cancer may directly influence HPV vaccine uptake. Socio-demographics like persons age, religion, education level, can also lead to go for vaccination. Such factors can as well influence socio-economic factors, individual factors or community factors hence leading to HPV vaccination. Individual factors like knowledge about HPV vaccines, attitudes towards vaccination, experience of the signs and symptoms of cervical cancer, about cervical cancer preventative measures can lead to direct uptake of HPV vaccination. Community factors like cost of services, distance to the health facility, availability of other Services, accessibility of Health centers, cost of vaccination, behavior of health workers, integration of cervical cancer screening with other services and integration of HPV vaccination with other programs like expanded program for immunization can also lead to uptake of HPV vaccines.

1.6 Objectives of the study

1.6.1 General objective:

To assess the uptake of HPV vaccination and associated factors among 10-14-year-old girls in Mbale city.

1.6.2 Specific objectives.

- 1) To determine the level of uptake of HPV vaccination among 10-14-year-old girls in Mbale city.
- 2) To identify the factors associated with uptake of HPV vaccination among 10-14-year-old girls in Mbale city.

1.7 Research questions

1. What is the level of uptake of HPV vaccination among 10-14-year-old girls in Mbale city?
2. What are the factors associated with uptake of HPV vaccination among 10-14-year-old girls in Mbale city?

1.8 Scope of the study

1.8.1 Content scope

The scope of the study was limited to only girls aged 10-14 years. It assessed the level of uptake of HPV vaccination and associated factors among girls in this age bracket.

1.8.2 Geographical scope

The study was conducted in Mbale city. The district is located in the eastern part of Uganda. It is bordered by Manafwa to southwest, Sironko to the north, Tororo to the south, Bududa District to the northeast, Butaleja District to the southwest, Budaka District to the west and Pallisa District. Mbale City, the largest town in the eastern region and the location of the regional headquarters, is located approximately 245 km from Kampala.

1.8.3 Time scope

The study lasted a period of 2 months to completion. The time selected was adequate to enable data collection, analysis and writing of the dissertation.

CHAPTER TWO: LITERATURE REVIEW

2.1 Uptake of Human papilloma virus (HPV) vaccine

Efforts to prevent HPV infection, including HPV vaccination, are an important part of prevention strategies to potentially reduce the risk of cervical cancer around the globe (WHO 2019). Different studies across the globe have however reported lower rate of acceptance of HPV vaccine among adolescent girls (27.1%) (Choi, Leung et al. 2019). A cross sectional study conducted in Hongkong, established the uptake of the HPV vaccine at 2.9% (Choi, Leung et al. 2019). Conversely, substantially higher HPV vaccination uptake rates have been reported in several high-income countries. In the United Kingdom, HPV vaccination coverage reached 91.5%, representing one of the highest uptake rates in the developed world (Lee, Kim et al. 2016). Similarly, high coverage was reported in Taiwan,(91%) (Tu, Wang et al. 2015), Prince Edward Island in Canada (87.4%) (Bird, Obidiya et al. 2017), Australia (83%) (Tung, Machalek et al. 2016), Denmark (80%) (Suppli, Hansen et al. 2018), and Malaysia (77.9%) (Muhamad, Buang et al., 2018).

A cross sectional study conducted in South Africa revealed that only 38.9% of the study respondents reported to have been vaccinated; of which only a half completed all the three doses (Katz, Nkala et al. 2019). In a different study conducted in Ethiopia, more than half (55.6%) 230/413 had not received any dose of the HPV vaccine, (23.4%) 97/413 had received one dose and (21%) 87/413 had received two doses and the HPV vaccine uptake in the country was 44.4% (Beyen, Bulto et al. 2022). Yordanos S. et al., (2024) conducted a meta-analysis on the Human papilloma vaccine uptake among adolescent girls in Sub Saharan Africa. They studied 16 papers from different countries in Sub Saharan Africa. From a total of 8866 school girls, fifty percent (4,470) received the HPV, representing. The subgroup analysis by country revealed the highest uptake of HPV 62.52% for Kenya, followed by Ethiopia 49.58%, Central African countries 4.11%, and a lower prevalence of 3.77% in Nigeria. Based on the random- effects model, the pooled prevalence estimate of HPV uptake among adolescent girls was 28.53%.

In East Africa, Kenya's uptake of the first dose of HPV vaccine improved from 25% in 2019 to 33% in 2020 according to Kenya's Ministry of Health. In a separate study by (Karanja-Chege 2022), it is reported that out of 687,500 girls who received the first dose of HPV, just over 110,000 girls returned for the 2nd dose, representing 16% coverage. The reasons for dropout need to be elucidated further but may include forgetting due to the long 6-month dose interval, assumption that one dose is sufficient as well as disruption of Immunization services by the COVID-19 pandemic. A study conducted in Kenya on factors influencing uptake of human papillomavirus vaccine among 385 school-going adolescent girls (10-14 years) in Kibra Sub County, Nairobi City County, Kenya found the uptake of the HPV vaccine was 29.9%. (Kinya E. et al., 2025), which causes a public health concern. In Tanzania, government successfully applied for Global Alliance for vaccination and immunization (Gavi) support for national introduction in 2017 (Mphuru, Li et al. 2022). In April 2018, HPV vaccination was introduced into Tanzania's national immunization schedule for the 14-year-old girls, using the routine immunization delivery strategy, and not via campaigns or other point-in-time delivery strategies. In Dar es salaam, out of 389 respondents who participated in a cross sectional study by (Nhumba and Sunguya 2022), only 83 (21.3%) had received the second dose of HPV vaccine, 137 (35.2%) had received the first dose of HPV vaccine shot which was high compared to the second shot. The majority of the respondents had not received both first and second doses of the HPV vaccine. Therefore, the uptake level of the second dose of the HPV vaccine was lower compared with the first dose. The level of uptake is said to be even much lower in the rural areas of the country. In Uganda, HPV vaccines against HPV 16 and 18 have been available since 2006 (Isabirye, Mbonye et al. 2020). just like many African countries, uptake of HPV vaccines among girls is said to be low; where the majority (78%) have not been vaccinated (Isabirye, Mbonye et al. 2020). A cross-sectional study conducted in Mbale showed that (14%) 56 of 407 adolescents self-reported vaccine uptake. The low level of vaccine uptake in this study implies that actors need to devise scientifically driven strategies to increase uptake of the vaccine among female adolescents in the country. In 2025, the Uganda Ministry of health conducted a Behavioral and Social Drivers BeSD survey on HPV vaccination. The survey

aimed at generating evidence for designing targeted social and behavior change interventions to enhance HPV uptake among adolescent girls in Uganda. The survey revealed that cervical cancer remains Uganda's leading cause of cancer related deaths among women with approximately 6959 new cases and 4607 deaths annually. Despite the high prevalence of 36% among Ugandan women, it is diagnosed late and treatment options are limited and significant HPV vaccination coverage disparities persist across the country with some districts achieving only 58.8% first dose coverage and 30% completing the previous 2 doses.

2.2 Individual factors associated with uptake of HPV vaccines

Various study findings have attributed individual factors such as age, knowledge of mother regarding HPV vaccines, source of information, to be significantly associated with uptake of HPV vaccines among girls. A trends analysis study conducted in Spain found that being between the ages of 14 and 20 was related with increased uptake of HPV vaccines among girls (Portero de la Cruz and Cebrino 2022). It is however important to note that the age bracket for HPV vaccination in Uganda is 10-14 years (Bitariho, Tuhebwe et al. 2023). Similarly, findings from (Tavasoli, Kane et al. 2018, Johnson, Head et al. 2020), also showed that uptake of HPV vaccines increased with increasing age of the adolescent females. A study by (Portero de la Cruz and Cebrino 2022) observed a reduction in HPV uptake among older girls and the opposite among younger ones. However, another study showed a decline in HPV uptake among older women over time; this finding is especially concerning because women who are vaccinated with HPV receive the most benefit (Petkeviciene, Ivanauskiene et al. 2018).

A cross sectional study conducted in Ethiopia by (Beyen, Bulto et al. 2022) showed that the main reasons mentioned by the respondents for being vaccinated were having pre-information 41(22.28%), believing that it has benefits 36(19.57%), and encouragement from health workers 34(18.48%). On the other hand, among unvaccinated school girls, unavailability of pre-information 70(30.4%) fear of side effects 34(14.78%), and being absent during vaccination day 29(12.61%) were some of

the reasons for hesitating to get vaccinated (Beyen, Bulto et al. 2022). In such a study area, these findings imply that strategies to increase uptake of HPV vaccination should make a peculiar focus on those factors.

Additionally, a cross sectional study conducted by (Nhumba and Sunguya 2022) in Uganda revealed that (52.3%) 182/348 reported lack of awareness about the HPV vaccine as the major reason for not having received it. Receiving vaccines from outreach clinics, having many options from which to receive the vaccine, getting an explanation on possible side-effects, and receiving the vaccine alongside other services were positively associated with uptake.

Another study showed that lower uptake of HPV vaccines was linked to a variety of socio-economic conditions from the findings by (Murfin, Irvine et al. 2020). Willems et al showed that women with a high level of education and those with higher social status were more likely to have their daughters vaccinated with HPV vaccine (Willems and Bracke 2018, Ayenew, Zewdu et al. 2020). The link between educational attainment and access to information about HPV vaccine or the ability to make informed decisions could explain the association between educational level and HPV vaccines uptake, whereas social class is related to the accessibility of HPV vaccines (Blumenthal, Gaffikin et al. 2017). This association has not been assessed in Mbale region.

A cross sectional study by (Portero de la Cruz and Cebrino 2022) demonstrated reduced HPV vaccines uptake among immigrant girls in Spain. This is an important public health issue, and a wide range of sociodemographic and psychological factors, such as language difficulties, high mobility, difficult working conditions, and low risk perception among immigrants, can all contribute to a reduced immigrant HPV vaccines uptake (Alam, Shafiee Hanjani et al. 2021, Jang, Meischke et al. 2021).

Religion has been found to be significantly associated with uptake of HPV vaccines (Mpachika-Mfipa, Kululanga et al. 2022). Studies conducted in Nigeria by (Mpachika-Mfipa, Kululanga et al. 2022) and (Awodele, Adeyomoye et al. 2011) revealed that

respondents who were Christians were more likely to be vaccinated with HPV vaccines as compared to those who were Muslims. On the contrary, several studies have shown that there is no significant association between religion and uptake of HPV vaccines (Hami, Ehlers et al. 2014, Chosamata, Hong et al. 2015).

Furthermore, studies conducted by (Ali-Risasi, Mulumba et al. 2014) and (Ndejjo, Mukama et al. 2017) and (Mupepi, Sampselle et al. 2011) further established that place of residence was a predictor of uptake HPV vaccines as semi-urban residents were more likely to be vaccinated than village residents. Findings revealed the availability of vaccines and daily clinics at the district hospital, a scenario that is not common in health facilities in the rural areas. A Tanzanian study done by (Moshi, Bago et al. 2019) supports this notion as women residing in urban areas were found to be more likely to be knowledgeable about cervical cancer and HPV vaccines than their counterparts who lived in the rural areas.

In a qualitative cross sectional study carried out in Uganda by (Ndejjo, Mukama et al. 2017) it was found that the greatest facilitator of HPV vaccines uptake among young girls is having adequate knowledge of signs and symptoms of a cancer related disease that prompted them to visit health facilities for consultation. The manifestation of signs and symptoms also determined the number of times one went to the facility and some women pointed it out as an important determinant for uptake of HPV vaccine even in the future.

Adequate knowledge of cervical cancer and the vaccines is very important if women are to be aware of the risks, measures for prevention and the necessity of HPV vaccines uptake, particularly among those living with HIV. A cross sectional study carried out by (Alber, Brewer et al. 2018) shows that parents/caretaker's knowledge was significantly associated with HPV vaccines uptake, similar to previous research from Canada (Hislop, Jackson et al. 2003). Parents with better knowledge of cervical cancer are likely to have their daughters vaccinated than those without such knowledge. Providing the health education about cervical cancer prevention to women such as at the hospitals might increase their knowledge and awareness of the diseases, subsequently increasing their perception about HPV vaccines.

In a cross sectional study carried out in Korea (Chang, Myong et al. 2017), it was shown that mothers of older age, higher education level and unemployed women were significantly associated with HPV vaccination among their daughters, the findings were similar to that of a study in Taiwan (Lin 2008). The above finding is however contrary to findings by (Phaiphichit, Paboriboune et al. 2022) which showed no significant association with these factor variables.

2.3 Community level factors associated with HPV vaccination.

In terms of lifestyle habits, girls residing in Germany were shown to be more likely to be vaccinated for cervical cancer **if they consumed alcohol** and engaged in physical activity during their free time (Brzoska, Aksakal et al. 2020).

Regarding physical activity, studies conducted in Lithuania and Ethiopia found a beneficial effect on uptake of HPV vaccines (Domingo-Salvany, Bacigalupe et al. 2013, Williams, Rakovac et al. 2021). It is expected that girls who engage in healthy activities are more health conscious than those who engage in unhealthy behaviors, and hence more likely to participate in HPV vaccination exercises (Venturelli, Sampaolo et al. 2019). It is noteworthy that contradictory findings on this association have been reported, such as high rates of HPV vaccines uptake among girls who do little physical activity (Ng'ang'a, Nyangasi et al. 2018), implying that primary prevention programs should target all the populations, including those with healthy habits, rather than just those who lead more unhealthy lifestyles.

Family history regarding cervical cancer has also been found to be a facilitator to HPV vaccines uptake (Ndejjo, Mukama et al. 2017). A few participants reported family history as a facilitator for taking up HPV vaccines.

Cost of HPV vaccines has also been found in some cases to be associated with its uptake among women (Musoke, Boynton et al. 2014). However, a study by (Johnson, Head et al. 2020) found that cost of the vaccines did not contribute significantly to the uptake of HPV vaccines. This finding could be due to the fact that more than half of the women who had sufficient knowledge of a vaccines in the study by (Johnson,

Head et al. 2020) reported that services were free. Previous studies in LMICs also found that the ability to afford the vaccines did not result in vaccination (Were, Nyaberi et al. 2011, Ezechi, Gab-Okafor et al. 2013). This suggests that other factors such as cultural beliefs could influence the attitudes and perceptions of women and may hinder women from taking up HPV vaccines. Various studies on the other hand highlight the cost of HPV vaccines as a crucial barrier to vaccination especially when women perceive the cost to be high (Beining 2012, Eze, Umeora et al. 2012).

Findings of a study by (Andany, Liu et al. 2014) in Ethiopia showed that the HPV uptake was greater among girls who utilized medical care provided through the private sector compared to those women who utilized medical care offered in other sectors. Specifically, women utilizing private health services were more likely to be vaccinated against cervical cancer than girls whose medical care was provided by the MoH. These findings support those of (Al Nsour, W Brown et al. 2012), implying that there is a need to direct the attention of the governmental and military healthcare sectors to adopt and promote preventive approaches, such as vaccination.

Most people do not go to a hospital unless they are sick or have abnormal symptoms or their friend is sick. Women are likely to take up HPV vaccines if they experience STI signs and symptoms (Alam, Shafiee Hanjani et al. 2021), similar to findings from other countries such as Spain (Puig-Tintoré, Castellsagué et al. 2008), Ethiopia (Teame, Addissie et al. 2018), Thailand (Budkaew and Chumworathayi 2014), and Uganda (Ndejjo, Mukama et al. 2016). Having STIs symptoms is an important factor in reproductive health.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter entails the methods used by the researcher to carry out the study. It is sub divided into introduction, study design, study area, study population, study unit, eligibility criteria, sample size determination, sampling technique and procedure, study variables, data collection methods, data collection tools, data collection procedure, quality controls, data processing and management, data analysis, ethical considerations, study limitations and plan for dissemination.

3.2 Study design

This study was a descriptive cross-sectional study that involved quantitative methods of data collection.

3.3 Study area

The study was conducted in Mbale City, located in Mbale District. Mbale City comprises two divisions (Industrial Division and Northern Division). According to the 2024 National Housing and Population Census, the city has a population of 322,300 people with an annual growth rate of 2.5%. The main economic activities in Mbale City include small-scale businesses and agri-processing factories. All government health facilities in the city conduct routine vaccinations for children and young girls, either at the health facilities themselves or through community outreach programs.

3.4 Study population

The study population consisted of girls aged 10-14 years who were present at the time of data collection

3.5 Selection Criteria

3.5.1 Inclusion criteria

School going girls aged 10-14 years present at the time of data collection were requested to participate in the study.

3.5.2 Exclusion criteria

Girls aged 10-14 years were critically sick and unable to speak at the time of study were excluded.

3.6 Sample size determination

The sample size formula for Kish Leslie (1965) was used as expressed below,

$$\text{Sample size, } n = \frac{Z^2 \times P(1-P)}{\sigma^2}$$

Where Z is the standard normal deviate of 1.96 (95% confidence interval)

P= Number of girls vaccinated with HPV vaccine (52.3%) (Nabirye, Okwi et al. 2020)

D= level of precision (+/- 5%)

$$n = \frac{1.96^2 \times 0.523(1-0.523)}{0.05^2} = 379$$

Considering a non-response rate of 10%

n= 422 participants.

The research assistants interviewed 436 participants in total.

3.7 Sampling technique and procedure

Mbale city is among the 10 newly established cities in Uganda. The cities attract many schools where the girls eligible for HPV vaccine can be found yet the city continues to have suboptimal coverage of below 90%. Coverage trends for HPV dose 1 and 2 respectively 2020 to 2023; 73.5 and 28.3, 58.7 and 15.0, 136.1 and 64.5, 67.2 and 43.1 DHIS2. Mbale city has 126 schools. Fifty (50) schools were randomly selected and stratified by classes. Population proportion sample (PPS) for selected schools was used to allocate the schools, size being the number of pupils/students in each primary school. The proportional number of participants was selected by simple random

sampling technique. The sampling frame was obtained from the pupils/students' enrollments of the schools.

3.8 Data collection tools

A pre-tested, interviewer administered, semi-structured questionnaire adopted from reviewed literature was used to collect data. The questionnaire was translated to *Lumasaba*, the predominant language in Mbale city. It was subdivided as per study objectives. The first section constituted socio-demographics of study respondents. Second, third, and fourth sections were composed of questions regarding level of uptake of HPV vaccination, individual factors and community level factors. The tool was uploaded on the online data collection platform, Kobo collect.

3.9 Study variables

3.9.1 Dependent variable

The dependent variable of this study was the Uptake of HPV vaccine. This variable was dichotomized as "Yes or No".

3.9.2 Independent variables

- **Socio-demographics-** Age, religion, marital status, occupation, education level, ethnicity, parity.
- **Individual factors-** Knowledge about HPV vaccines, attitudes and perceptions of girls towards vaccines, experience of the signs and symptoms of cervical cancer, monthly income, Source of information about HPV vaccines, peers who were previously vaccinated, peers who previously diagnosed with cervical, peers who died of cervical.
- **Community level factors-**Cost of vaccines, distance to the health facility, availability of vaccines, accessibility of Health centers, Their attitudes towards the behavior of health workers, integration of HPV vaccination with other services.

3.10 Data collection procedure

Trained research assistants visited the selected schools on a daily basis. With support from the school teachers, the research assistant read the consent and assent forms to each selected study respondent. After consent, the study respondent appended a signature or thumb print to the consent/assent form. The research assistants then read for the study respondents' questions on the questionnaire in the Language they understood, as they ticked where appropriate on the tool. All questions on the tool were read to the study respondent in a systematic flow. After the tool was complete, the research assistant gave a word of thanks to the study respondent for taking her time to participate in the study.

3.11 Quality control

Selection and training of research assistants

The researcher selected four competent research assistants with adequate knowledge and skills in data collection. They were trained in data collection and process of consenting.

Pre-testing of data collection tool

The questionnaire was pre-tested in two schools (one primary and one secondary) outside the city. The pretested tools were updated to remove any inconsistencies.

Field supervision

Research assistants were supervised at all times by the researcher to ensure all the required data is collected from all the respondents.

Field editing of data collected

Data collection tools were edited as appropriate to ensure all relevant information with regards to the objectives of the study is collected.

Use of mobile data collection platform

The researcher uploaded the questionnaire on Kobo-collect tool, mobile application for data collection. The URL and user name was provided to the research assistants who used it to collect the data and instantly forward it to the central server.

3.12 Data Management and Analysis

Data was collected using Kobo collect and analyzed using stata version 16. Univariate analysis was conducted to generate mean for continuous variables such as age and proportions/percentages for categorical variables. At bivariate level, the outcome variable was uptake of HPV vaccines. Logistic regression analysis was used to identify the significant associations between the outcome variable and predictor variables to generate crude odds ratios and p-values at 95% confidence interval. At multivariate level, variables that showed significant associations at bivariate analysis were included into the final multivariate model to adjusted odds ratios, p values and their 95% confidence intervals.

3.13 Ethical considerations

Permission was sought from Uganda Christian University, Institutional review board. Permission was also sought from Mbale city health officer, and the city education department. Furthermore, permission to conduct the study was sought from the individual school administrations. Assent was obtained from 10 to 14-year-old girls to conduct the study. All information provided by the respondents was confidential. Participation in the study by respondents was voluntary.

3.14 Plan for dissemination

The research report will be shared with the Uganda Christian University Library, the Mbale City Health Department, and the Mbale City Education Department. In addition, the author intends to publish the findings of this study in peer-reviewed scientific journals to contribute to academic knowledge and inform public health practice.

CHAPTER FOUR: PRESENTATION OF THE FINDINGS

4.1 Socio-Demographics of the respondents

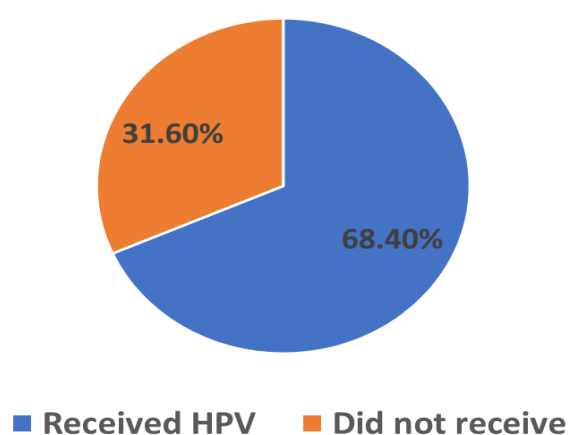
As illustrated in the table below, of the 436 respondents, 78.2% were in the ages of 12-14 years and only 21.8% were 10-11 years the recommended age for receiving HPV vaccine as per the Ugandan context. Majority of the respondents were either Catholic, Anglican or Muslim with only 16% being born again. More than half of the respondents (57.8%) were the Bagisu who speak Lumasaba, which could be linked to the region where Mbale city is situated. Of the study respondents, the majority were in upper primary classes (84.6%). Only 15.4% were in lower primary. Regarding number of children in the households where the respondents belonged, the majority came from households of less than five children (83.5%). Only 16.5% came from households of more than five children. On whether the respondents lived with their parents or not, majority (74.3%) reported to be living with their parents while the remaining 25.7% were staying with people who are not their parents.

Table 1: Sociodemographic characteristics of respondents (N = 436)

Variable	Frequency	Percentages (%)
	Mean (SD)= 12.4 (1.1), Median (IQR)= 12 (10-12)	
Age (Continuous)		
Age (Categorical)		
10-11	95	21.8
12 13 14	341	78.2
Religion		
Anglican	120	27.5
Born-again	73	16.7
Catholic	121	27.7
Muslim	122	27.9
Tribe		
Bagishu	251	57.6
Baganda	60	13.8
Basoga	48	11
Others	77	17.6
Level of Education		
Lower Primary	67	15.4
Upper Primary	369	84.6

Number of children at HH		
0-5	364	83.5
6 Above	72	16.5
Stay with Parents		
No	112	25.7
Yes	324	74.3

Table 2: Uptake of Human Papilloma Virus Vaccine among Young Girls aged 10-14 years in Mbale City



Interpretation of results

The above findings indicate that of the 436 girls 10-14 years in Mbale city who participated in the study, 68.4% reported having been vaccinated with HPV vaccine, while the remaining 31.6% had not been vaccinated.

Table 3: Factors associated with Low Human Papilloma Virus Vaccine Uptake among Young Girls aged 10-14 years in Mbale City

Risk	Received HPV Vaccine		Crude OR (95% CI)	p-value
	No (n=138) (n=298)	Yes		
Age				
10-11	50 (52.6)	45(47.4)	REF	<0.001
12-14	88 (63.8)	253(84.9)	3.2(1.9-5.1)	
Religion				
Muslim	39 (28.3)	52(17.5)	REF	0.04
Catholic	34(24.6)	87(29.2)	2.1(1.9-2.6)	
Anglican	44(31.9)	76(25)	1.4(0.9-2.1)	
Pentecost	21(15.2)	83(27.8)	2.9(1.2-3.7)	
Tribe				
Bagisu	65(47.1)	186(62.4)	REF	0.03
Baganda	26(18.8)	34(11.4)	0.7(0.5-1.2)	
Basoga	16(11.6)	32(10.7)	0.5(0.4-1.1)	
Others	31(22.5)	46(15.4)	0.9(.0.7-1.5)	
Education Level				
Lower Primary	31(22.5)	36(12.1)	REF	0.03
Upper Primary	107(77.5) 262(87.9)		2.4(2.2-2.8)	
Number of children in HH				
0-5	90(79.7)	44(14.7)	REF	<0.001
6-8	48(20.3) 254(85.3)		5.7 (4.4-6.7)	
Stay with parents				
Yes	115(83.9)	89(29.8)	REF	<0.001
No	23(22.16.3) 209(70.2)		8.5(6.2-9.8)	
Ever heard about Cervical Cancer				
Yes	18(13) 119(39.9)		REF	<0.001
No	120(86.9) 179(60.1)		4.3(2.6-6.4)	
Ever heard about HPV Vaccine				
Yes	16(11.6)	203(68.1)	REF	1.0 (0.6-1.4)
No	122(88.4)	95(31.9)		
Type of family				
Nuclear	83(60.1)	165(55.4)	REF	0.9(0.6-1.5)
Extended	55(39.9)	133(44.6)		
HPV prevents cervical cancer				
Yes	18(13.1)	119(39.9)	REF	

No	120(86.9)	179(60.1)	0.7(0.4-1.1)	
Fear of side effects of HPV Vaccine				
No	94(68.1)	130(43.6)	REF	
Yes	44(31.9)	168(56.4)	2.9(2.4-4.1)	0.04
Ever received any HPV at School				
Yes	86(62.3)	101(33.9)	REF	
No	52(37.7)	197(66.1)	3.7(2.2-4.8)	0.02

A bivariate and multivariate analysis was conducted to identify factors associated with low uptake of the HPV vaccine among adolescent girls. Girls aged 12-14 years were 3.2 times more likely to miss the HPV vaccination compared to those aged 10-11 years (OR = 3.2, 95% CI: 1.9-5.1, $p < 0.001$). Compared to Muslim girls, Catholic (OR = 2.1, 95% CI: 1.9-2.6, $p = 0.04$) and Pentecostal girls (OR = 2.9, 95% CI: 1.2-3.7, $p = 0.05$) had higher odds of receiving the vaccine. Girls enrolled in upper primary were 2.4 times more likely to miss the HPV vaccination compared to those in lower primary (OR = 2.4, 95% CI: 2.2-2.8, $p = 0.03$). Girls from households with 5-8 children were more likely to miss the vaccine compared to those from households with fewer than five children (OR = 5.7, 95% CI: 4.4-6.7, $p < 0.001$). Girls not staying with their parents were 8.5 times more likely to miss the HPV vaccination (OR = 8.5, 95% CI: 6.2-9.8, $p < 0.001$). Those who had not heard about cervical cancer were 4.3 times more likely to miss the vaccination (OR = 4.3, 95% CI: 2.6-6.4, $p < 0.001$). Girls who feared side effects were also more likely to miss the vaccine (OR = 2.9, 95% CI: 2.4-4.1, $p = 0.04$). Finally, girls who had not received HPV vaccination at school were 3.7 times more likely to miss the HPV vaccination (OR = 3.7, 95% CI: 2.2-4.8, $p = 0.02$).

Table 4: Multivariable analysis showing factors associated with missed HPV vaccination

Risk	Received HPV Vaccine		Crude OR (95% CI)	p-value	Adj OR(95%CI)	p-value
	No (n=138)	Yes(n=298)				
Age						
10	50 (52.6)	45(47.4)	REF		REF	
12	88 (63.8)	253(84.9)	3.2(1.9-5.1)	<0.001	1.9 (0.9-2.8)	
Number of children in House hold						
5	90(79.7)	44(14.7)	REF			
8	48(20.3)	254(85.3)	5.7 (4.4-6.7)	<0.001	2.8(2.1-4.5)	0.02
Ever heard about Cervical Cancer						
Yes	18(13)	119(39.9)	REF		REF	
No	120(86.9)	179(60.1)	4.3(2.6-6.4)	<0.001	3.7(2.1-5.3)	<0.001
Fear of side effects						
No	94(68.1)	130(43.6)	REF		REF	
Yes	44(31.9)	168(56.4)	2.9(2.4-4.1)	0.04	3.4(2.8-4.8)	0.01
Ever received any HPV at School						
Yes	86(62.3)	101(33.9)	REF		REF	
No	52(37.7)	197(66.1)	3.7(2.2-4.8)	0.02	2.7(2.1-3.5)	0.03

After adjusting for potential confounders, several factors remained significantly associated with low uptake of the HPV vaccine among adolescent girls. Girls from households with five to eight children were 2.8 times more likely to miss the HPV vaccination compared to those from smaller households (AOR = 2.8, 95% CI: 2.1–4.5, $p = 0.02$). Girls who had not heard about cervical cancer were 3.7 times more likely to miss the vaccination compared to those who were aware (AOR = 3.7, 95% CI: 2.1–5.3, $p < 0.001$). Those who feared side effects were 3.4 times more likely to miss the HPV vaccination compared to girls who did not report such fears (AOR = 3.4, 95% CI: 2.8–4.8, $p = 0.01$). Additionally, girls who had not received HPV vaccination at school were 2.7 times more likely to miss the HPV vaccination compared to those vaccinated at school (AOR = 2.7, 95% CI: 2.1–3.5, $p = 0.03$).

CHAPTER 5: DISCUSSION OF THE FINDINGS

5.1 Discussion

The study findings indicate that of the 436 girls 10-14 years in Mbale city who participated in the study, 68.4% (95% CI: 64.0%-72.8%) reported having been vaccinated with HPV vaccine, while the remaining 31.6% had not been vaccinated.

This study identified several factors independently associated with low uptake of Human papillomavirus (HPV) vaccine among adolescent girls aged 10-14 years in Mbale city. One key finding was that girls from larger households (Five to eight children) were nearly three times more likely to miss HPV vaccination compared to those from smaller household. A similar study conducted in Uganda revealed that individual and community characteristics including household composition significantly influenced HPV vaccination uptake, indicating that socioeconomic and familial pressures affect preventive health behaviors (Isabirye A. et al., 2020). Larger households often face competing needs among others financial to caregiving responsibilities, which may cause the members to draw less focus on preventive health care interventions compared to smaller households. This therefore underscores the need for tailored strategies that increase availability of services such as vaccination within reach of the communities. Efforts to improve HPV vaccine coverage should include targeted follow-up and support for families with many children, possibly through community health worker engagement and family- friendly outreach strategies that reduce barriers for large households.

Knowledge about cervical cancer and HPV vaccine was another significant determinant. Girls who had not heard about cervical cancer were more likely to miss vaccination, which aligns with evidence showing that low awareness and knowledge are predictors of poor HPV vaccine uptake in Uganda and other sub-Saharan African countries, for instance in Kampala, where low knowledge and negative perceptions were linked to low uptake (Bitariho G. et al., 2023). Systematic reviews of HPV vaccination in sub-Saharan Africa also established that good knowledge and positive attitudes significantly increase the likelihood of vaccine uptake among adolescent

girls, confirming that awareness is a consistent predictor across settings (Yordanos S. et al., 2024). These findings underscore the importance of comprehensive education campaigns in schools, communities and health facilities, and equipping teachers with the necessary materials on HPV to improve understanding of cervical cancer and HPV vaccination benefits. Health messages should target both adolescents and caregivers and leverage multiple media to reach diverse populations.

Concerns about the safety of the vaccine emerged as a significant factor in determining the uptake of the HPV vaccine. Girls who feared side effects were substantially more likely to miss vaccination. This finding is consistent with other study findings in low and middle-income countries, where fear of side effects or safety concerns is a frequently reported barrier to HPV vaccination uptake related to widespread misinformation about vaccine safety and perceived adverse outcomes (Emmanuel A. et al., 2025). Being a vaccine that targets a sexually transmitted disease, yet is given to the young adolescents who are presumed have not started sexual intercourse causes unnecessary fears. Myths of the HPV vaccine having a contraceptive component that can cause infertility emerge (Kamulegeya J. 2020). Studies across Africa and beyond have documented that safety concerns fueled by rumors and misconceptions are significant obstacles to vaccine acceptance, reflecting similar psychological and cultural barriers observed in the current study. A qualitative study in Lilongwe, Malawi on Barriers and strategies to enhance HPV vaccine uptake in adolescents living with HIV and their guardians found that misconceptions such as beliefs that the vaccine causes infertility or is part of population-control efforts deterred uptake among adolescents and caregivers (Chicondi M. et al., 2025). Another study in Ethiopia, on perspectives of adolescent school girls in Addis Ababa on barriers of HPV uptake identified that rumors and misinformation fueled fear and mistrust about the HPV vaccine, limiting engagement with vaccination campaigns. Poor communication and myths were central to girls' hesitancy. (Berhenu W. et al., 2025). A US national immunization survey, JAMA pediatrics 2008-2019, found that safety concerns or fear of adverse effects was increasingly cited as the main reason parents refused the HPV vaccine. The authors link this trend to the spread of disinformation and vaccine mistrust amplified on social

media which erodes confidence and contributes to lower uptake (Chido-Amajouyi OG et al., 2021). In the absence of clear information about the vaccine, these fears may outweigh the benefits leading to refusal to take the vaccine. Providing clear, culturally appropriate information about side effects and vaccine safety can build confidence and reduce vaccine hesitancy.

The setting of vaccination was also a significant predictor. HPV vaccination in Uganda is largely through school-based vaccination outreaches MOH (2008) as school-based delivery has been shown to significantly improve uptake by reducing access barriers. Girls who had not received the HPV vaccine at school were more likely to miss vaccination. This is largely because other than health facility where there are a few opportunities for vaccination of girls 10-14 years, community outreaches are taken to schools routinely and intensified in the months of integrated child days. (Kamulegeya J. 2020). The school is a mobilized community where girls can be found in large numbers and health information and school-based interventions are likely to succeed when outreaches are conducted to schools (Kinya E et al., 2025). Evidence from Ethiopia and other sub-Saharan African countries indicates that school-based strategies achieve higher coverage relative to static health facility approaches because they conveniently reach large numbers of eligible girls in a familiar environment (Addisu D. et al., 2023). In contrast, the reliance on facility-based vaccination often misses out-of-school girls and those with limited access to health services, compounding disparities in uptake. Lack of coordination between health facilities and schools further limits follow-up of missed girls in the community (Getachew et al., 2024). Strengthening and expanding school-based vaccination efforts along with tailored outreaches for out-of-school adolescents should be a priority. Improved coordination between Health care providers and teachers on schedules for the school vaccination, good record keeping of vaccinated and unvaccinated girls, and regular school visits to follow-up of missed children can enhance access and ensure that logistical barriers do not impede vaccine uptake.

Comparison with broader literature highlight additional systemic and contextual influences on HPV vaccine uptake. Health system factors such as inadequate provider training, limited information, Education, and communication (IEC) materials, and

inconsistent community mobilization were identified in other Ugandan contexts as barriers to effective HPV vaccination delivery (Nabirye J. et al., 2020). These findings mirror results from Kenya and other low and middle-income countries where facility - level inefficiencies, weak outreach, and lack of supportive communication contribute to low vaccine coverage. Additionally, systematic reviews in sub-Saharan Africa confirm that better knowledge, positive attitudes, and urban residence are generally associated with higher uptake, while rural contexts and negative perceptions are common barriers to vaccination (Agimas M. et al., 2024). Strengthening health system capacity through provider training, robust IEC tools, and community mobilization is critical. Ensuring that health workers are well equipped to counsel clients and promote the HPV vaccine will help address both supply and demand side constraints. Beyond individual and health system factors, evidence suggests that sociodemographic disparities, such as wealth status and parental education influence HPV vaccine uptake in low and middle-income countries. Meta-analyses have found that wealth index and parental marital status are associated with vaccination behaviors although associations vary across settings, highlighting the complex context specific nature of vaccine uptake determinants (Yordanos S. et al., 2024). This reinforces the importance of addressing disparities through tailored public health programming, ensuring that vulnerable subgroups do not miss vaccination initiatives. Policy makers and program planners should prioritize equity-focused strategies that consider socioeconomic and demographic variations. Community-driven interventions that engage caregivers and address broader social determinants are essential to improving uptake.

Overall, the pattern of factors associated with low HPV vaccine uptake in Mbale city reflects broader regional and global evidence where knowledge gaps, fear of side effects, household dynamics, and delivery challenges converge to limit vaccine coverage. These findings underscore the need for integrated public health strategies that address individual, social, and health system barriers comprehensively. A multipronged approach combining education, access-enhancing delivery strategies, risk communication, and health system strengthening is essential to increase HPV

vaccine uptake and reduce the burden of cervical cancer in Mbale city and similar contexts.

5.2 Study Limitations

This study had several limitations that should be considered when interpreting the findings. First, the cross-sectional design of the study limits the ability to establish causal relationships between HPV vaccine uptake and the associated factors identified. Second, the study relied on self-reported information regarding HPV vaccination status and related factors, which may have introduced recall bias or social desirability bias, potentially affecting the accuracy of the reported uptake. Third, the study included only school-going girls aged 10-14 years, thereby excluding out-of-school girls who may experience different barriers to HPV vaccination, which limits the generalizability of the findings to all eligible girls in Mbale City.

5.3 Conclusion

This study assessed the HPV vaccination uptake and examined factors associated with low vaccination uptake among girls 10-14 years in Mbale city. The findings show that a substantial number of girls 31.6% remained unvaccinated which threatens efforts for achieving universal coverage required for cervical cancer prevention. Overall, the study identified a combination of factors as causes for missed HPV vaccination including individual knowledge gaps affecting awareness for cervical cancer, fear of side effects, household constraints and service delivery challenges. Combating these barriers requires designing comprehensive strategies that strengthen community awareness of cervical cancer and HPV, promote risk communication to allay vaccine safety fears, support households of many children and ensures effective follow-up for girls absent during the vaccination. Enhancing these strategies will reduce missed opportunities for vaccination and ultimately reduce exposure to HPV infection and cervical cancer in Mbale city.

5.4 Recommendations

- i. The Ministry of Health and Mbale City Health Department should intensify community sensitization on cervical cancer and HPV vaccination, with specific focus on addressing fears and misconceptions about vaccine side effects.
- ii. Mbale city health team should strengthen school-based HPV vaccination through improved coordination between health facilities and schools, including follow-up mechanisms for girls who miss vaccination during school vaccination days.
- iii. Parents and guardians should be targeted with accurate and timely information on HPV vaccination to improve acceptance and support for vaccinating eligible girls.
- iv. Community and religious leaders should be engaged at all levels to promote positive attitudes toward HPV vaccination and to reduce sociocultural barriers.
- v. Future studies should include out-of-school girls and explore health system and parental factors influencing HPV vaccine uptake to inform comprehensive interventions

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Appendices

Appendix I: Consent form

Introduction: My name is _____, a student of Uganda Christian University. I am conducting research on uptake of HPV vaccination associated factors among women aged 10-14 years in Mbale city.

Purpose of research: This research intends to assess the level of uptake of HPV vaccines and associated factors among school going children in the city. Specifically, it will assess level of uptake, individual and community level factors associated with uptake of HPV vaccines among school going children. This will inform evidence based and effective interventions geared towards reducing the public health burden of cervical cancer, especially among women.

Procedure: If you accept to take part in this research, I will ask you a few questions pertaining uptake of HPV vaccines. This may take approximately 15-20 minutes or less of your time.

Risks and benefits: There is no risk associated with this research nor will there be a tangible benefit. On the other hand, information obtained from you will assist in planning and implementation of the strategies geared towards reducing the public health burden of cervical cancer.

Participation: You are free not to participate in this study without any consequences. You are also free not to answer a question that makes you uncomfortable.

Confidentiality: No personal information that identifies you shall be written down. Your participation in this study shall not be disclosed to any person.

Interviewers signature..... Date

Respondent's signature Date

Appendix II: Assent form for participation in a Study on HPV vaccination uptake

Title of the Study:

Uptake of HPV Vaccination and Associated Factors among School-Going Children in Mbale City, Uganda

Introduction:

Hello! My name is _____, and I am conducting a study to understand how many children are getting the HPV vaccine and what factors influence their decision. We would like to invite you to participate in this study because we believe your input is very important.

What is HPV and the HPV Vaccine?

HPV stands for Human Papillomavirus, a virus that can cause certain diseases like cervical cancer. The HPV vaccine helps protect against these diseases.

Purpose of the Study:

The purpose of this study is to find out how many children in Mbale City have received the HPV vaccine and what reasons they have for getting or not getting the vaccine.

What Will You Have to Do?

If you agree to participate, you will be asked to:

Answer some questions about yourself, your health, and your thoughts on the HPV vaccine.

The questions will take about 15-20 minutes of your time.

Voluntary Participation:

Your participation in this study is completely voluntary. This means you do not have to take part if you do not want to, and you can stop at any time without any consequences. If you choose not to participate, it will not affect your grades or your relationship with your school or teachers.

Confidentiality:

All the information you provide will be kept private. Your name will not be on any of the forms, and your answers will be combined with those of other students so that no one can tell which answers are yours.

Risks and Benefits:

There are no known risks to you for participating in this study. While you may not directly benefit from this study, the information you provide will help us understand how to improve the HPV vaccination program in Mbale City, which could benefit many other children.

If You Have Questions:

If you have any questions about the study, you can ask them now or at any time. You can also talk to your parents or guardians about the study.

Agreement:

If you agree to participate in this study, please sign your name below. Remember, you can change your mind at any time.

Child's Assent:

I have read this form (or had it read to me) and I understand what the study is about. I understand that I can ask questions at any time. I agree to participate in this study.

Child's Name:

Signature:

Date:

Researcher's Name:

Signature:

Date:

Thank you for considering participation in this study. Your contribution is valuable and appreciated!

Appendix III: Questionnaire

Structured questionnaire for the study assessing uptake of HPV vaccines and associated factors among girls aged 9-14 years in Mbale city.

Section A: socio-demographic characteristics of study respondents		
A001	Age of study respondent in complete years	____.
A002	Religion of study respondent	1. Muslim ☐ 2. Catholic ☐ 3. Anglican ☐ 4. Born again ☐ 5. Others _____
A003	Tribe of study respondent	1. Gishu ☐ 2. Muganda ☐ 3. Musoga ☐ 4. Others specify _____
A004	Level of education of child	1. Lower primary ☐ 2. Upper primary ☐ 3. Lower secondary ☐ 4. Upper secondary ☐
A005	Number of children at home	_____
A006	Are you staying with your parents?	1. Yes ☐ No ☐
Section B: Level of uptake of HPV vaccination		
B007	Are you aware of a vaccine which prevents cervical cancer?	1. Yes ☐ 2. No ☐
B008	If yes, have you ever been vaccinated with the vaccine (HPV)?	1. Yes ☐ 2. No ☐
B009	If yes, when were you vaccinated?	1. Within 6 months ☐ 2. 12 months ☐ 3. More than 12 months ☐
B010	How many doses of HPV vaccine	_____ doses

	have you received so far?	
B011	If yes, why did you go for vaccination?	1. Health workers came to our school 2. Advice from health worker ☐ 3. Hard signs and symptoms ☐ 4. Others specify _____
B012	If no, why are you not vaccinated?	1. Not aware of the vaccine ☐ 2. Not at risk ☐ 3. Vaccines not available ☐ 4. Others specify _____
Section C: Individual factors influencing uptake of HPV vaccination.		
C013	Do you know cervical cancer?	1. Yes ☐ 2. No ☐
C014	Do you know about HPV vaccines?	1. Yes ☐ 2. No ☐
C015	Type of family	1. Nuclear family ☐ 3. Extended family ☐
C016	How many doses of HPV vaccines is someone supposed to take for HPV?	_____
C017	Do you think vaccination is important in prevention of cervical cancer?	1. Yes ☐ 2. No ☐
C018	Do you think cervical cancer can be prevented?	1. Yes ☐ 2. No ☐
C019	Do you think you are at risk of getting cervical cancer when you are not vaccinated with HPV?	1. Yes ☐ 2. No ☐
C020	What is the recommended age to start HPV vaccination?	_____
C021	Where do you mainly go to seek health care when you fall sick?	3. Traditional/herbal ☐ Biomedical ☐
C022	Do you think one can be vaccinated against cervical cancer?	2. Yes ☐ 3. No ☐
C023	What cervical cancer preventative measures do you know? (Select those you know)	1. Vaccination ☐ 2. Protected sex ☐ 3. Early screening & treatment ☐ 4. Wrong answer ☐ 5. Other correct ☐ answer _____
C024	Which cervical cancer signs & symptoms do you know?	1. Vaginal bleeding ☐ 2. Change in vaginal discharge ☐ 3. Pain during sex ☐ 4. Lower back pain ☐ 5. Other correct answer ☐ specify _____ 6. Wrong answer ☐
Section D: Community level factors influencing uptake HPV vaccination		
DO25	What was your source of information	1. Health worker ☐

	regarding HPV vaccination?	2. Peers ☐ 3. Media ☐ 4. Others specify _____
D026	Have you ever been taught about cervical cancer at school?	4. Yes ☐ 5. No ☐
D027	Have you ever received any vaccine at school?	5. Yes ☐ 1. No ☐
D028	Do you know of anyone who was vaccinated with HPV?	1. Yes ☐ 2. No ☐
D029	Do you know of anyone who has ever been diagnosed with cervical cancer?	1. Yes ☐ 2. No ☐
D030	Are there cervical cancer poster awareness at school?	6. Yes ☐ 3. No ☐
D031	Are there cervical cancer poster awareness at hospital?	7. Yes ☐ 1. No ☐
D032	Are CC vaccines always available at the hospital?	8. Yes ☐ 1. No ☐
D033	Do you know anyone who has ever died from cervical cancer?	1. Yes ☐ 2. No ☐
D034	Do you talk with your peers about HPV vaccination?	1. Yes ☐ No ☐
D035	Do people in your circles encourage you to go for HPV vaccination?	1. Yes ☐ 2. No ☐
D036	Do you think HPV vaccination is expensive?	1. Yes ☐ 2. No ☐
D037	Do you think the HPV injection is painful?	1. Yes ☐ 2. No ☐
D038	Do you think the process of being vaccinated is cost effective?	1. Yes ☐ 2. No ☐
E039	Does the nearest health facility provide HPV vaccines?	1. Yes ☐ 2. No ☐
E040	Have you ever sought HPV vaccine at hospital?	9. Yes ☐ 3. No ☐
E041	If yes, how often does it provide HPV vaccination services?	1. Daily ☐ 2. Weekly ☐ 3. Monthly ☐
E042	Does the nearest health facility provide other sexual and reproductive health services?	1. Yes ☐ 2. No ☐
E043	Where do you seek health care services when sick?	1. Private facility ☐ 2. Government facility ☐
E044	Do you find it easy to access sexual reproductive health services?	1. Yes ☐ 2. No ☐
E045	Have you ever been recommended for HPV vaccination by health worker?	1. Yes ☐ 2. No ☐

E046	Do you know where HPV vaccination is done?	1. Yes ☐ 2. No ☐
E047	Approximate distance from place of residence to where vaccination is done (meters).	_____
E048	Approximate distance from your home to the nearest health facility.	_____
E049	What is the approx cost of HPV vaccination services?	1. Yes ☐ 2. No ☐
E050	How do you rate health workers who provides HPV vaccination services?	1. Very professional ☐ 2. Not professional ☐
E051	Do you always go for outreach clinics in your community?	10. Yes ☐ 3. No ☐

Thank you for taking your time to participate in this study.

LUMASABA LUGISU TRANSLATION

LUPULUPUSI LWESIBA TUBASILEKHO II:

Lupulupusi lwesi ufukilisilakho khu khwituba mu khure belesa khwe inambisa ye kamasuswa ke likato lya kookolo uwe kumvnwa kwa nabaana

KUMURWE KWE NDEBERESA:

Inambisa iye likato lya kookolo uwe kumunwa kwa nabaana nalundi ni bibyamano biambasa na ni babaana bechimiko chishtsy isomelo mushirimba Mbale, Uganda.

KHURUMBULA:

Uwahe, lisina lyase ise _____ nalundi ise ndi khurebelesa nio khumanye Bubunji bwe babaana bali khufuna kamasuswa ke likato lya kookolo uwe kumunwa kwa baana ni bichili babaana bano bakhalaho baryo khuli.

Khukhwakanila witabaase muberesa kano lwekhuba khumanya khuri byesi unatubasakho buli bukhulu naabi.

Kokolo unekumunwa kwanabaana nalundi likato lye kamaasuswa kekookolo uwekumunwa kwa nabaana nishoshi?

H.P.V shimanyisa khaukha kha kookolo khakholesawa babandu. Khaukha kha rela kookolo uwe khunabaana. Likato lya kookolo liyeta khukaya tsindwale tsino.

SHITSILILIWA SHE KHUREBELESA:

Shitsililiwa she khurebelesa khuno shili khumanya bubunji bwebabaana mu shirimba Mbale babafuna likato lyekamasuswa ni tsinono tsikila bakafuna oba taa.

IWE UNAKHOLA SHIINA?

NOOLA ABE WAFUKILISILE KHUKHWITUBAMO, UNALOBWA KHU:

Khukhwilamo bireebo bikhuambakho, byebulamubwo bibyambaaso byo khumasuswa- ke likato lya kookolo uwe kumunwa kwanabaana.

Bireebo bino binakhuyila ndakhikha 15-20 khumbuka yoowo:

Khukhwitubamo khuli khwekhukhwikanila khukhwituba mu khurebelesa khuno khuli khwe khukhwikanila busa. Shimanyisa shiri nga abe iwe wakhukana taa, ishikhwikombesa khubamo taa, nalundi unyala wakamisa mumbuka yossi akhali khurya binamano taa nenoola warobole khukhwitubamo, ndi, wambakana yowo nililekelo namwe balekeli inonakisiwa taa namwe byeyama mukhusoma khwo.

KHUKHWIMONYA.

Byosi byes wilamo kane bibe byeshimonyo. Lisina lyowo ilinabakho khulupulubusi lwosi taa, nalundi byesi'we wililemo kane bitubaasme ni bye byalekelwa bandi bilekhe khumanyi kha bibyowo nibyo bili tawe.

KHUTALA NI BYESI UFANAMO

Mbao shekhumanyile shesi unatala nga nga wetubile mu khurebelesa khuno, iwe unyala khulekha bhufunamo burerefu taa mukhu rebelesa khuno, ne byesi ukhubolele byakhuyeta khulosela khungonamo inengekharengkha iyelikato mushirimba mba shinyala shayeeta babaana baramile.

IKWANGWANYI:

Nga abe wafukilisile khukhwitubasa khu khurebelesa khuno, khukhulomba urone lisina lyowo amwaalo ahano. Neshebuliluri unyala wabirulamo imbaka yoosi.

KHUFUKILIS KHWOMWANA:

Na lwatsile lupulupusi luno (namwe nahula balwilwatsa) nalundi naminyele khurebelesa khuli khushina. Naminyile indi inyala khureeba birebo imbuka yoosi. Nafukilisile khukhwitubasa.

LISINA LYO MWANA:

SAHI:

SHIPUKHU:

LISINA LYO MUREBELESI:

SAHI:

SHIPUKHU:

Wanyala khukhwambasa khukhwituba mu khurebelesa khuno. Byesi ukholele (bila bye kamakhulu nalundi khwasimile)

LUPULUPUSI LUTUBASIWILEKHO III: BIREEBO

Bireebo byesi witsusa mu mapongo bye khurebelesa khunambisa ye kamaasuswa ke likato lya kookolo uwe kumunwa kwanabaana nalundi na biambakanakho mubakhaana be chimiiko chili akarikari 9-14 mushiriimba Mbale.

	SHISITSA A: TSIMBELA TSEMBONEKHA MUBANDU BAREEBELEWAKHO	
A001	Chimiiko mubwi cho mundu uliikhurebelesewakho	
A002	Idiini uyomundu ulikhu rebelesawakho	1. Umusilamu ☐ 2. Umukatoliki ☐ 3. Umupurotesitanti ☐ 4. Umulokole ☐ 5. Ali mubaramile ☐
A003	Linambo lyayo uli khurebelesewakho	1. Umumasaaba ☐ 2. Umukanda ☐ 3. Umusoga ☐ 4. Nibaramile nga bebuula ☐
A004	Wasoma khukhwola mu shakhenga	1. Khukhwola P3 ☐ 2. Khukhwoola P5 ☐ 3. Khukhwoola S4 ☐ 4. khukhwoola S6 haya ☐
A005	Baali benga iwaawe	
A006	Umenya ni basaali bowo?	1. Yii ☐ 2. Taawe ☐
	Shisitsa b: inambisa ye likato ya yola heena	
B007	Wamanyakho likato lishinga kookolo uwanabaana	1. Yii ☐ 2. Taawe ☐
B008	Ne noola yii bukhupakho imbisyo iye lakato lino?	1. Yii ☐ 2. Taawe ☐
B009	Ne noola yii likato li bakhupa liina?	1. Mumyesi chiseeba ☐ 2. Chimyesi 12 ☐ 3. Khubirikh chimyesi 12 ☐
B010	Ari wafunakho dozi tsenga?	
B011	Ne noola yii lwashiina watsya likato	1. Basawu beetsa khwlekelo lyeeffe 2. Khuleleeka khwebasawu 3. Lwe bulolelo ni bafaa 4. Lwe bibindu bindi Hubibule ----- --

B012		
	SHISITSA C: BIHAMBAKANA NUMUNDU UMWENE BIBYAKILA WARANI LIKATO LYA KOOKOLO	
C013	Wamanya kookolo uwanabaana?	1. Nakhulikho khwikaata 2. Khu funa bulwale taa 3. Likato lye kamaaso mbao twa 4. Lwe bibindi bibule ----- -----
C014	Wamanyakho kau kookolo uwanabaana?	1. Yii ☐ 2. Taawe ☐
C015	Shikuuka shelisaye	1. Mayi ni papa mutweela ☐ 2. Bulebe bwekhumbi ☐
C016	Umundu ashile khufuna dozi tsenga tse kamaasuswa ke likato	_____
C017	Iwe wambaasa uri shikhulu umundu khukhwishinga khu kookolo uwanabaana?	1. Yii ☐ 2. Taawe ☐
C018	Iwe waambasa uri kookolo anyala khuhingiwa?	1. Yii ☐ 2. Taawe ☐
C019	Iwe wambaasa uri uba weralile nga bakhukhupa likato lye kamasuwa ka kookolo taa?	_____
C020	Miiko shiina chichashila khukhupilakho likato lye kamaasuswa ka kookolo	_____
C021	Waheena esi iwe ufunila bukangi bwowo?	_____
C022	Wambaasa uri umundu banyala khumushinga khu kookolo wa nabaana	1. Yii ☐ 2. Taawe ☐
C023	Wamayakho tsisambo tsenga tsesi banyala khushingamo kookolo wanabaana. (robolamo) itso tsesi wamanya	1. Likato ☐ 2. Khukwakwarisa bipala ☐ 3. Khukhwiyiba lusa khang nibukangi bwakhwo ☐ 4. Wakwile khukhwilamo ☐ 5. Itsilamo induufu ☐
C024	Bulolelo shiina nibifani byakookolo byesi umanyile?	1. Kautsata mubukhas ☐ 2. Khushukha khu bitsurukha mu bukhasi. ☐ 3. Barafunga uli mukhigata ☐ 4. Kumukongo khusiina ☐ 5. Khukhwilamo khukhundi kutuu khubuule ☐ 6. Itsilamo ikhali induufu taa ☐

	SHISITSA D: BICHILA BEMUSHITSA BARAMBISA LIKATA LYE KAMAASUSWA KA KOOKOLO	
D025	Wamanya uryena biambakana ni kamaasuswa ke likato?	1. Umusawu ☐ 2. Bashase ☐ 3. Mubyekemakhuwa ☐ 4. Musambo tsitsindi tsibuule ☐
D026	Bakhuleekelakho khu kookolo uwanabaana ileekelo?	1. Yii ☐ 2. Taawe ☐
D027	Wakhupiwakho likato ileekelo?	1. Yii ☐ 2. Taawe ☐
D028	Wamanyakho ukundi uwakhupiwa likato lye kamaasuswa ka kookolo?	1. Yii ☐ 2. Taawe ☐
D029	Wamanyakho uwebaaluwa bamunyolamo kookolo uwanabaana	3. Yii ☐ 4. Taawe ☐
D030	Wabonakho bipande bilangilila khumanyisiwa khwa kookolo ileekelo?	1. Yii ☐ 2. Taawe ☐
D031	Khwikangilo wabonakho bipande bilangilila khumanyisa kwakookolo	1. Yii ☐ 2. Taawe ☐
D032	Kamasuswa ka kookolo kabawo khikangilo lwawa	1. Yii ☐ 2. Taawe ☐
D033	Wamanyakho uwafa kookolo wa nabaana?	1. Yii ☐ 2. Taawe ☐
D034	Ukanikhakho nibasho khwikaato lya kookolo wanabaana	1. Yii ☐ 2. Taawe ☐
D035	Basaandu besi wakhala nabo bakhupilisa khusya bakhuupe imbiso ye likato	5. Yii ☐ 6. Taawe ☐
D036	Wambaasa kamasuuswa ke likato lya kookolo kaano kebey ingali	1. Yii ☐ 2. Tawe ☐
D037	Wambaasa imbiso ye likato lya	1. Yii ☐

	kookolo ilimo burafu	2. Tawe ☐
D038	Wambaasa kumulimo kwe khukhupa kamakata kuno kulengana nikamapita kat	1. Yii ☐ 2. Tawe ☐
E039	Likangilo lifuriisa khuba akhwimbi bakhueelamo kamaasuswa ke likato	1. Yii ☐ 2. Tawe ☐
E040	Waheetsakho khamaasuswa ke likato lya kookolo wanabaana khwikangilo likhulu	1. Yii ☐ 2. Tawe ☐
E041	Ne noola yii, kamakato kabayo chimishimba chenga	1. Bulishifu ☐ 2. Buli sapiti ☐ 3. Buli mwe ☐
E042	Likangilo lye akhwimbi unyoolayo buwelesa bwe byekhukhwigata ni khusalisa	1. Yii ☐ 2. Taawe ☐
E043	Iwe unyoola waheena buwelesa bwe bye bulamu nga walwalile	1. Mwikano lyabene ☐ 2. Mwikano lya kafume ☐
E044	Shangu khutuya buhelesi buhambakana ni bye bulamu bwekhukhwikata ni khusaala	1. Yii ☐ 2. Taawe ☐
E045	Wamanya esi bapila kamakato ke ka masuswa ka kookolo	1. Yii ☐ 2. Taawe ☐
E046	Ambaasilisa buhaaliyi khukhwama esi wewe umenya khukhwola esi bapila kamakato (mumita)	_____
E047	Ambaasilisa buhaaleyi khukhwama ingo iwowo khukhwola khwikanilo lifuura khuba akhwimbi	_____
E048	Wambasilisa buhelesa bwe likato lya kookolo wanabaana bwa bei shi?	1. Yii ☐ 2. Taawe ☐
E049	Basawu babana buhelesi bwe likato lyakookolo wanabaana ubambaasakho uri shiina	1. Bamanya nha ☐ 2. Bakamanya naabi taa ☐
E050	Utsyatsaka esi basawu betsilakho mushisitsa showo	1. Yii ☐ 2. Taawe ☐

Wanyala khurahe imbaka yowo khukhwitubaasa mu khurebeela khuuno

Appendix IV: Work plan

S/No	Activity	Months (2025)							
		Jan	Feb	March	April	May	June	July	Aug
1	Concept development								
2	Proposal development								
3	Process of collecting data								
4	Data entry and analysis								
5	Report writing								
6	Printing and submission of report								

Appendix V: Budget breakdown

Activity	Items Required	Quantity	Unit Cost	Total Cost
Personnel costs	Allowance to data collectors per respondent	422	2,000	844,000
	Teacher compensation	20	10,000	200,000
	Respondent time compensation	422	1,000	422,000
	Printing	120 pages	100	12,000
	Binding	3 copies	3,000	9,000
Data collection	Photo copying questionnaires	250 copies	500	125,000
	Transport	20 days	10,000	200,000
	Stationery	2 sets	5,000	10,000
Data analysis	Consultation			50,000
Report writing	Printing	70 pages	100	7,000
	Photocopying	210 pages	100	21,000
	Binding	4 copies	3000	12,000
Miscellaneous				50,000
GRAND TOTAL				1,962,000



UGANDA CHRISTIAN
UNIVERSITY

A Centre of Excellence in the Heart of Africa

Office of the Vice Chancellor
Research Ethics Committee UG-026



30th July 2025

CHEPTOEK EMILY
Uganda Christian University
emilycheptoeck@gmail.com
+256782927558

UG-REC-026 APPROVAL NOTICE

To: Cheptoeck Emily; Principal Investigator

Re: UCU-REC Application titled: *Factors Associated with Low Uptake of Human Papilloma Virus Vaccination among Girls Aged 10-14 Years in Mbale City.*

Application Number: UCUREC-2025-1709
Version: 4.1

Type of Review:

- ☐ INITIAL REVIEW
- ☐ Protocol Amendment
- ☐ Letter of Amendment (LOA)
- ☐ Continuing Review
- ☐ Material Transfer Agreement
- ☐ Other, Specify:

I am pleased to inform you that the UG-REC-026; UCUREC under expedited review approved the above referenced application.

Approval of the research is for a period from 30th July 2025 to 30th July 2026.

This research is considered minimal risk category.

As Principal Investigator of the research, you are responsible for fulfilling the following requirements of approval:

1. All co-investigators must be kept informed of the status of the research.
2. Changes, amendments, and additions to the protocol or the consent form must be submitted to the REC for re-review and approval prior to the activation of the changes. The REC application number assigned to the research should be cited in any correspondence.



Research and Ethics

P.O. Box 4, Mukono; Uganda, Plot 67-173, Bishop Tucker Road, Mukono Hill.
Tel: +256 (0) 312 350 000 Fax: +256 (0) 4142 99 803 Email: rec@ucu.ac.ug Web: www.ucu.ac.ug
UCUREC is accredited by Uganda National Council for Science & Technology, FDU, and National Institutes for Health of the United States of America

To: The City Education Officer Mbalale city

Thru: City Health officer Mbalale city

From: Cheptook Emily 0782927558

Date: 4th October, 2025

Dear Sir,

RE: REQUEST FOR PERMISSION TO CONDUCT DATA COLLECTION TO ASSESS HPV VACCINE UPTAKE IN SCHOOLS.

I am a student of Uganda Christian University (UCU) pursuing a masters' program in public health. As a requirement for the fulfilment of this program, a student has to conduct an academic research in the field approved by the University's research and ethics committee. My research is on HPV vaccine; the vaccine that is given to girls 10 years old to prevent cancer of the cervix. The study aims to assess the factors associated with the low uptake of HPV vaccine among girls 10-14 years. My study area is Mbalale city.

I write to request permission to access the primary schools of Mbalale city to interview school going girls 10-14 years.

Attached here is an approval from the university.

Thank you.

cc. Mr. ByaruhangaAgrey – Research supervisor