



ARSII UNIVERSITY
COLLEGE OF HEALTH SCIENCES
DEPARTMENT OF PUBLIC HEALTH

Human papillomavirus vaccination uptake and its associated factors among female adolescent students in Chole Woreda, Arsi Zone, Oromia Regional State, Ethiopia, 2025.

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Abstract

Background: While HPV is the leading cause of cervical cancer and its vaccine is the only most effective and cost-efficient solution for prevention, uptake has been lagging. The Human Papillomavirus vaccine offers great promise in reducing the cervical cancer burden; however, this low uptake is particularly evident in low-resource settings, such as Ethiopia, where the contextual factors influencing acceptance remain under-explored.

Objective: To assess the uptake of Human Papillomavirus vaccination and its associated factors among female adolescent students in Chole Woreda, Arsi Zone, Oromia Regional State, Ethiopia, in 2025.

Methods: A mixed-methods cross-sectional study was conducted on female adolescent students in Chole Woreda from September to November 2025. The study used multi-stage proportional sampling across eight schools. Data were collected via Kobo Collect and analyzed in SPSS, with statistical significance set at $p < 0.05$ in multivariable logistic regression. The qualitative findings were analyzed with manual thematic analysis.

Result: The HPV vaccine uptake in the study area was found to be 60.6%. Multivariable logistic regression identified five key factors independently associated with this uptake: attitude towards HPV vaccination (AOR = 0.03; 95% CI: 0.01, 0.08; $p < 0.01$), Fathers' educational level (AOR = 0.02; CI: 0.00, 0.09; $p < 0.01$), knowledge towards cervical cancer (AOR = 0.19; 95% CI: 0.06, 0.59; $p < 0.01$), place of birth (AOR = 0.30; 95% CI: 0.10, 0.92; $p < 0.05$), and occupational status of the mother (AOR = 0.14; 95% CI: 0.02, 0.85; $p < 0.05$). These quantitative findings were further corroborated by qualitative results, which revealed that misconceptions and a lack of awareness were significant barriers to vaccine acceptance.

Conclusion: HPV vaccine uptake in Chole Woreda is significantly hampered by knowledge deficits, misconceptions, and influential parental socio-demographic factors. Therefore, targeted interventions focusing on parental education and correcting misconceptions are critically recommended to boost vaccination uptake.

Key words: Human papillomavirus vaccination, Knowledge, Attitude.

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Abbreviations and Acronyms

AOR	Adjusted Odds Ratio
CI	Confidence Interval
GAVI	Global Alliance for Vaccination and Immunization
HPV	Human Papillomaviruses
KII	Key Informant Interview
MAC	Multi-Age Cohort
SPSS	Statistical Package for Social Sciences
SAGE	Strategic Advisory Group of Experts on Immunization
VIF	Variance Inflation Factor
VCR	Vaccine Coverage Rates
WHO	World Health Organization

1. INTRODUCTION

1.1 Background

Human papillomaviruses (HPVs) are a large family of non-enveloped, double-stranded, circular DNA viruses. HPV is primarily transmitted through sexual contact, and most sexually active individuals will be exposed to the virus shortly after becoming sexually active (1, 2). Non-oncogenic HPV types 6 and 11 are estimated to be the primary causes of 90% of genital warts, while HPV strains 16 and 18 are the main contributors to cervical cancer (3).

Human papillomavirus is the most common sexually transmitted infection. While most cases are asymptomatic and resolve on their own, persistent infections can lead to cancer in both men and women. Approximately 75% of sexually active females will become infected with HPV at some point in their lifetime.(4, 5).

As a result, the World Health Organization launched the cervical cancer elimination campaign in 2020, marking the first global commitment to eliminating a malignancy. The plan is built on three pillars: the HPV vaccine to protect young girls and boys from infection, early detection and treatment of cervical cancer, and access to cancer therapy(6).

The human papillomavirus vaccine is one of the most effective strategies to protect women who have never been infected with HPV(7). The HPV vaccination was originally developed by the University of Queensland in Australia, and the final version was created by Georgetown University Medical Center, the University of Rochester, and the National Cancer Institute of the United States(8). The Food and Drug Administration approved the first preventive HPV vaccination, Gardasil, and 64 countries nationwide started HPV immunization programs (9).

Vaccination is one of the most effective ways to prevent HPV infection. The HPV vaccine can prevent more than 90% of these malignancies (10). Gardasil and Cervarix are two HPV vaccinations that protect against HPV strains 16 and 18 (11).

In Ethiopia, the HPV vaccination was officially launched on December 6, 2018, at Tesfa Kokeb Primary School in Lideta Sub-city of Addis Ababa, with the Ministry of Health planning to vaccinate over one million girls aged 14. Ethiopia immunizes more than 2 million 14-year-old girls against HPV nationwide in two schedules. Vaccination took place in schools, communities, and health institutions from January 25 to 29, 2021 (12).

The Ministry of Health of Ethiopia, in its effort to prevent cervical cancer and promote a healthier population, implemented the Human Papillomavirus vaccination program nationwide with the cooperation of GAVI (Global Alliance for Vaccination and Immunization), reaching over 6.8 million Multi-Age Cohort (MAC) girls aged 9 to 14.

The nationwide HPV (MAC) single-dose vaccination was launched on November 18, 2024, by Dr. Mekdes Daba, the Health Minister of Ethiopia. The HPV MAC immunization doubled the total number of immunized girls in the country to nearly 13 million, including the 6.3 million girls vaccinated in the previous five years. Cervical cancer is the fourth most prevalent cancer worldwide, impacting over 8168 women in Ethiopia(13).

Despite the national rollout of the HPV vaccine in Ethiopia, uptake remains suboptimal, especially in rural and underserved areas. Factors such as socio-cultural, norms, knowledge gaps, parental consent, and misinformation may contribute to low coverage. Therefore, this study aims to assess HPV vaccine uptake and its associated factors among school-aged female adolescents aged 9 to 14 years in Chole woreda.

1.2 Statement of the problem

The lifetime probability of a woman contracting an HPV infection exceeds 80%, with the majority of infections occurring within 3 to 4 years of sexual initiation. HPV infections are observed in over 99% of patients with cervical cancer (14).

The World Health Organization recommends HPV vaccination for girls aged 9-14 years as the most cost-effective public health intervention against cervical cancer (15).

In 2022, cervical cancer was the fourth most common cancer among women globally and the fourth leading cause of cancer-related deaths in women, with about 662,000 new cases and approximately 349,000 fatalities. This cancer is most common among women in 25 countries, primarily located in sub-Saharan Africa (16).

Cervical cancer is the leading cause of cancer-related deaths among women in sub-Saharan Africa. Of the 20 countries with the highest incidence worldwide, 18 are in the Africa Region. In 2022, Africa accounted for 23% of global cervical cancer deaths, and this percentage is expected to rise to 30% by 2030 if current trends continue (17). Only 28 out of 47 nations in the region have incorporated HPV vaccines into their national immunization programs, with first-dose coverage reaching just 33% in 2022. (17).

Ninety percent of new cervical cancer diagnoses and deaths occur in low- and middle-income countries (18). Cervical cancer affects over 570,000 women worldwide, resulting in approximately 311,000 deaths each year. The majority of these deaths (more than 85%) occur in less developed countries (19). Cervical cancer is the second most common type of cancer in Ethiopia. The country reports approximately 7445 new cases of cervical cancer each year. Annually, about 5,338 deaths occur alongside these 7445 new cases (20).

The Director-General of the World Health Organization (WHO) announced a global program for cervical cancer elimination and launched a strategy in 2020 to expedite this effort. According to the strategy, countries should implement a three-pillar approach, achieving 90%, 70%, and 90% targets for vaccination, screening, and treatment, respectively, by 2030(21).

The percentage of Ethiopian adolescents who have received the vaccine ranges from 15% to 66.5%(9, 22). Nevertheless, the data varies from study to study. Numerous studies conducted in Ethiopia also revealed conflicting results; some suggested that parental education had a good impact (23, 24) while others suggested that it was likely to be connected to the conditions (22, 25).

Though the intensity of this link varies significantly among settings, studies conducted in Ethiopia consistently point to an urban advantage in HPV vaccination uptake. Adolescents who grew up in cities were more than three times as likely to get vaccinated in Nekemte (AOR=3.46), whereas living in a rural location dramatically decreased the odds of uptake in Minjar-Shenkora and South West Shoa (AOR=0.12 and 0.25, respectively). Despite the similarity in the direction of association, urban girls are more likely to be vaccinated. The significant regional diversity in effect size shows significant contextual differences that call for additional research (22, 24, 26).

The majority of studies done in Ethiopia were quantitative in nature (12, 23, 27, 28) and they might have focused on cities (26, 29, 30).

Since its introduction in 2018, the vaccine had been administered using a 2-dose regimen. However, in alignment with the 2022 recommendations of the WHO strategic advisory group of experts on immunization (SAGE), the 2024 national campaign shifted to a single dose schedule(13).

This shift allowed for the examination of recent trends, changes in vaccination policies, and the impact of ongoing public health campaigns.

Most of previous studies overlooked the significance of contextual phenomena. The mixed-methods approach employed in this study enables a more comprehensive examination of the factors influencing vaccination uptake. Thus, this study tries to determine the contribution of: Socio-demographic, knowledge, attitude, and environmental factors on the uptake of HPV vaccine among school adolescent girls.

1.3 Significance of the study

WHO established strategy design and coverage improvement plans to reduce the disease's burden and achieve the 90% goal of the global cervical cancer elimination campaign. Consequently, an evidence-based study on the HPV vaccination and related factors is critical for monitoring the program's progress toward eliminating HPV-related diseases and achieving the stated aim.

Therefore, this study may identify barriers and factors influencing HPV vaccine use, which could then serve as a foundation for future interventions. Additionally, this study aims to provide vital information for policymakers and program implementers at the national and regional levels, and the information generated from the study is expected to benefit adolescents by guiding service provision. It also offers baseline information and direction for further research activities in the area. Overall, this study assessed HPV vaccine uptake and its associated factors among female adolescent school students in Chole woreda, Arsi Zone, Oromia, Ethiopia.

2. LITERATURE REVIEW

2.1 Magnitude of HPV Vaccination

Since the introduction of the human papillomavirus (HPV) vaccine, numerous studies have been conducted globally to assess the factors influencing vaccine uptake among adolescents.

The study from Hong Kong reported a lower acceptance rate (27.1%)(31) compared to that in the United States (52%)(32). Parental acceptance of the vaccine was also examined. In Hong Kong, parental acceptance rose from 27.5% in 2008 to 37.6% in 2012(31); However, this remained lower than the rate observed in the United States 69.6% (32).

The proportion of adolescents who completed the full HPV vaccination series varies widely, ranging from 0.7% to 91.4%. Once more, Scotland had the highest completion rate at 91.4%, followed by Taiwan (89%), Prince Edward Island (81.4%), Australia (70%), and Denmark (62%). Japan and Germany saw moderate completion rates at 48.2% and 41%, respectively, while France and the United States recorded lower rates between 23.7% and 33.3% and from 0.7% to 27.7%, respectively(4).

As of 2018, global HPV immunization coverage remained inadequate. In sub-Saharan Africa, the completion rate for the HPV vaccine was approximately 20%, in stark contrast to developed nations like Australia and New Zealand, which reported a 77% rate. A pooled estimate showed that 28.53% of schoolgirls in sub-Saharan Africa took the vaccine, with rates differing by region. Kenya recorded the highest uptake at 62.5%, while Nigeria had the lowest at just 3.8%. In northern Uganda, a study involving 245 girls aged 9–14 revealed that only 19.6% had been vaccinated, with 3.7% receiving one dose, 9.8% having two doses, and 5.3% completing the vaccination series. Among those unvaccinated, 43.1% pointed to a lack of awareness as their main reason(33).

Various studies conducted in Ethiopia have explored the acceptance of the HPV vaccine among adolescent girls, revealing significant variability in acceptance levels across different regions.

According to the study conducted in Oromia region at Ambo, the uptake of HPV vaccination was about 44.4%(34). In addition, a study in Amhara region at Minjar-Shenkora, 66.5% of individuals were vaccinated(22). In the Southwest Shoa Zone, the vaccine uptake was 31.65%(24), and a recent study in Harar found that 50.6% of participants were willing to accept the vaccine(27). While a study conducted in Amhara region, at Bahirdar city the uptake of HPV vaccination was merely 16%(9).

2.2 Associated Factors with HPV vaccination

2.2.1 Socio-demographic Factors

The relationship between maternal education and vaccine uptake is complex, showing an inverse correlation in developed nations like the U.S. and Norway, but a positive correlation in places like Hong Kong and South West Shoa, where highly educated mothers boost vaccination rates(4, 24). Beyond education, acceptance varies significantly by demographics: in Arba Minch, Muslims (64.7% acceptance) and 14-year-olds (nearly three times more likely to accept) showed higher HPV vaccine uptake, while in South West Shoa, students in rural areas were 75% less likely to be vaccinated than their urban counterparts(23, 24).

2.2.2 Knowledge and Attitude Related Factors

In Asia, research from Hong Kong, Malaysia, and the United States revealed that adolescents had limited awareness and knowledge. In Hong Kong, just 28.8% were aware of HPV, and 40.3% knew about the vaccine(4).

Five studies were conducted in Hong Kong, Malaysia, the United States, and Latvia. In Hong Kong, slightly more than a quarter of adolescents were aware of HPV (28.8%) and the HPV vaccine (40.3%). Latvia demonstrated even lower awareness, with only 21.5% recognizing HPV and 9.9% aware of the vaccine. Malaysian girls showed the highest level of awareness at 77.6%(35).

Six studies assessed HPV knowledge in adolescents from Hong Kong, the United States, Germany, the Netherlands, the United Kingdom, and Latvia. Knowledge levels showed considerable variation among these nations. In the United States, 91% of adolescents recognized sexually transmitted infections (STIs)(36). In Germany, 73.1% of girls and 52.5% of boys identified HPV as a sexually transmitted infection (STI)(37).

In the Netherlands, a significant number of girls recognized that the HPV vaccine does not safeguard against every HPV type (62%) or all STIs (88%). They were aware that HPV increases the risk of cervical cancer (81%) and that cervical cancer does not always lead to death (82%). Nevertheless, just 20% knew that HPV could lead to genital warts, and only 5% understood that HPV infections might clear up independently (38).

In Hong Kong, 92.9% of girls were aware that cervical cancer is a common female cancer, but fewer knew about its risk factors. For example, 41.1% recognized HPV as a cervical cancer risk factor(31).

In Latvia, 73.1% of adolescents knew HPV is linked to cervical cancer, but only 26.9% knew it can cause genital warts. Overall, adolescents demonstrated a limited understanding of HPV-related infections and consequences (39).

Attitudes and knowledge regarding HPV vaccination are highly variable across Ethiopian regions. In Bahir Dar city, 58% of students have favorable attitudes(9). In addition, Minjar-Shenkora reported a high initiation rate of 66.5%, with 80.5% recognizing the HPV-cervical cancer link(22). In the Southwest Shoa Zone, with 41% having good knowledge, though only 21.5% perceived a personal risk(24). Whereas, in Arba Minch, the highest knowledge was demonstrated, with 75.2% having an excellent understanding of HPV(23).

In Jimma town, 74.6% of adolescents knew the HPV vaccine prevents disease, and 65% understood transmission, although only 52.7% had good overall knowledge. Parental influence remained strong, with 34.7% deferring vaccine decisions to their parents (12). Separately, a study in Harar reported 50.6% willingness to accept the vaccine and a 66.7% favorable attitude. These findings suggest that many Ethiopian adolescents have a positive disposition toward HPV vaccination, indicating that targeted education could significantly increase uptake despite current knowledge gaps(27).

2.2.3 Environmental Factors

A study conducted in Thailand indicated that individuals who were not vaccinated also experienced a positive subjective norm. Many (73.5 percent) strongly agreed or agreed that significant others would want them to get vaccinated. More than half (63.0 percent) believed that their doctor would support them in getting the vaccine. However, many (84.4 percent) did not feel social pressure to get vaccinated against HPV, and 64.5 percent did not believe that most women are getting vaccinated against HPV(40).

Overall, these studies highlight the significance of thorough health education, accessible vaccination services, and parental involvement to enhance HPV vaccine coverage and alleviate the burden of HPV-related diseases.

The reviewed literature highlights significant global, regional, and national variations in the awareness, knowledge, attitudes, and uptake of the HPV vaccine among adolescents, particularly school-aged girls. Worldwide, awareness and knowledge of HPV and its vaccine are inconsistent, with greater awareness observed in developed countries such as the United States, Germany, and the United Kingdom, while developing nations, especially in sub-Saharan Africa, report lower levels of awareness and knowledge.

In Ethiopia, studies have revealed a significant disparity in HPV vaccine uptake and levels of knowledge across various regions. While towns like Minjar-Shenkora and Ambo demonstrate relatively higher uptake rates (66.5% and 44.4%, respectively), other areas such as Bahirdar and the South West Shoa Zone report much lower uptake rates (16% and 31.65%). Common barriers to vaccination include lack of information, fear of side effects, being absent during vaccination campaigns, and limited parental support. Despite the lack of knowledge, many adolescents display positive attitudes toward vaccination, believing in its role in preventing cervical cancer.

2.3 Conceptual Framework

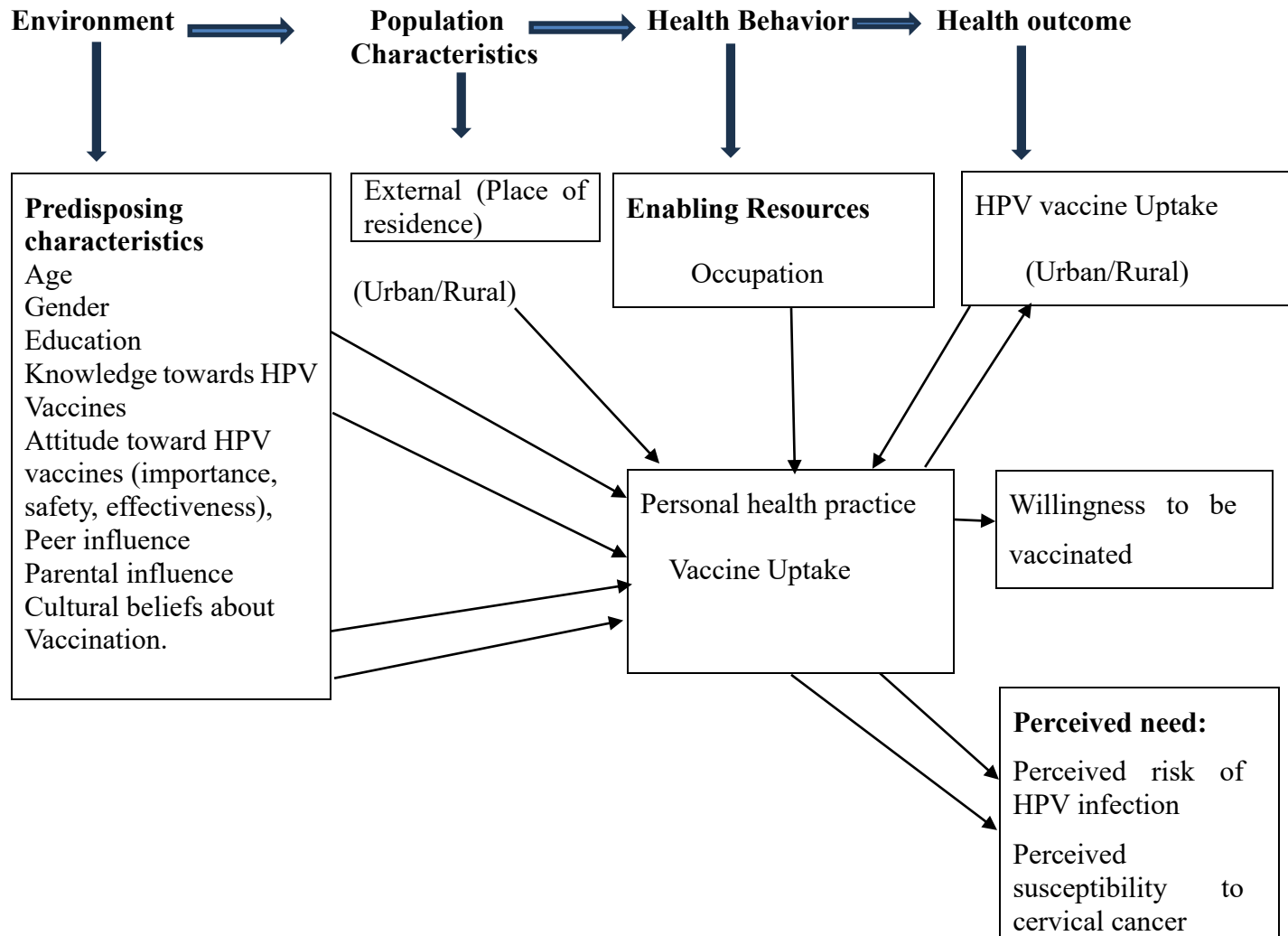


Figure 1 : Adapted Andersen's Health Service Utilization Behavioral Model of potential factors associated with HPV vaccine uptake among female adolescent school students in Chole woreda, Arsi zone, Oromia, Ethiopia, 2025(41).

3. OBJECTIVES

3.1 General objective

- ✓ To assess the level of Human Papillomavirus vaccination uptake and identify its associated factors among female adolescent school students in Chole woreda, Arsi Zone, Oromia Region, Ethiopia, 2025.

3.2 Specific objectives

- ✓ To determine the level of HPV vaccination uptake among female adolescent school students in Chole woreda, Arsi Zone, Oromia Region, Ethiopia, 2025.
- ✓ To identify socio-demographic, behavioral, and contextual factors associated with HPV vaccination uptake among female adolescent school students in Chole woreda, Arsi Zone, Oromia Region, Ethiopia, 2025.

For Qualitative part

- ✓ To explore behavioral and contextual factors associated with HPV vaccination uptake among female adolescent school students in Chole woreda, Arsi Zone, Oromia Region, Ethiopia, 2025.

4. METHODS

4.1. Study area

The study was conducted at the Chole woreda, Arsi zone, and Oromia regional state. Chole is one of the woredas in Arsi Zone of the south east Oromia, which is located 226 km away from Addis Ababa and 175 km from Asella. The district has a total population of 142,322, of whom 70,8027 are women. The woreda is administratively divided into 20 Kebeles, of which 2 are urban and 18 are rural. The district has 4 health centers and 18 health posts. It has 20 primary schools and a total of 5 secondary schools. 17 of the primary schools are located in rural locations, while the remaining 3 are located in urban areas.

4.2. Study design and period

A school-based cross-sectional quantitative study design supplemented with qualitative method were employed to assess HPV vaccination uptake and its associated factors among adolescent school students in Chole woreda, Ethiopia, from September to November, 2025. A qualitative method was included to describe various aspects of behaviors, feelings, perceptions, and experiences related to the HPV vaccination program.

The qualitative method was explored in detail cultural, behavioral, and social factors that might affect HPV vaccine uptake. Accordingly, health professionals working on the HPV vaccination program at Chole district health offices and health facilities, school teachers who were participated in HPV vaccination program, and a purposively selected parents were sample for the qualitative inquiry.

4.3. Source and study population

4.3.1. Source population

All-female adolescent girls aged 9-14 years who live in Chole woreda.

For the qualitative portion: parents and professionals working on the HPV vaccination program at Chole woreda, including school teachers who participated in the vaccine campaign.

4.3.2 Study population

All adolescent school girls aged 9-14 years who are enrolled and attending selected primary schools in the Chole woreda during the data collection period.

Inclusion criteria: -

- Female students attending the selected schools who are willing and available in class during the data collection period were included in this study.

Exclusion criteria: -

- Those girls who did not agree to participate in the study and those who were absent during data collection period after two separate visits were excluded.

4.4. Sample size determination and Sampling technique /Sampling procedures

4.4.1. Sample size determination

The sample size for the quantitative study was calculated by using a single population proportion formula based on the following assumptions. The proportion of HPV vaccination practice was estimated to be 77.3%(42).(School-based cross-sectional studies from a previous study conducted in Woliso Town, Ethiopia, which gives a maximum sample size.

Based on a previously published study in Woliso Town, Oromia Region, the estimated HPV vaccination uptake was 77.3%(42). Using this proportion, the sample size was calculated with the following parameters:

$$n = \frac{(Z_{\alpha/2})^2 p(1-p)}{d^2}$$

$$n = \frac{(1.96)^2 * (0.773) (1-0.773)}{(0.05)^2}$$

$$n = 269.6 \approx 270$$

$$n = 270 * 1.5 (\text{Design effect}) = 405$$

By using 1.5 design effect and adding 10% non-response rate:

$$\text{Final sample size} = 405 + (0.10 * 405) = 445.5 \approx 446$$

Final Required Sample Size: 446 students

By considering a 95% level of confidence and a 5% margin of error, the largest sample size was found to be 446 students. For the qualitative part, approximately 10 in-depth and key informant interviews were conducted.

Table 1: Table showing the sampling procedure for qualitative part, Chole district, Arsi, Oromia, Ethiopia, 2025.

Participant type	Estimated interviews
Health professionals	2
Teachers involved in HPV program	2
Students (9-14 years)	5
Community leaders	3
Parents	2
Total	13 interviews

Since qualitative research seeks depth over breadth, we used purposive sampling to select participants who were likely to provide rich and varied insights. We conducted around 13 interviews across key groups, and the final number depended on data saturation.

4.4.2. Sampling procedures

The multi-stage sampling techniques were used to recruit participants for the study. First, primary schools were classified into urban and rural, and then, using a simple random sampling procedure, six out of seventeen rural schools and two out of 3 urban schools were selected. Billa Shulli School, Chole Primary School, Dodoti School, Koru Gugu School, Magna Derartu School, Moye School, Tullu Yai School, and Zuria School were the selected schools. The resulting sample size was then distributed proportionally to the selected schools. The rosters or name lists of students were utilized as a sampling frame to pick study subjects from each grade level. The total number of the study population from the selected school was 1008 (N=1008), where 309 were urban, and the rest 699 were in rural areas.

Table 2:Table Showing the Sampling procedure, Chole woreda, Arsi, Oromia, Ethiopia,2025.

School N=1008 n=446	Grade levels	Number of students in each grade level total	Sample size from m each grade level
Billa shulli N=122 n=55	Grade 4	22	10
	Grade 5	17	8
	Grade 6	24	11
	Grade 7	27	12
	Grade 8	32	14
Chole primary school N=159 n=69	Grade 4	37	16
	Grade 5	35	15
	Grade 6	28	12
	Grade 7	25	11
	Grade 8	34	15
Dodoti school N=127 n=56	Grade 3	32	14
	Grade 4	26	12
	Grade 6	18	8
	Grade 7	23	10
	Grade 8	28	12
Koru gugu school N=123 n=55	Grade 4	33	15
	Grade 5	22	10
	Grade 6	28	12
	Grade 7	18	8
	Grade 8	22	10
Magna derartu school N=119 n=53	Grade 4	23	10
	Grade 5	15	7
	Grade 6	26	12
	Grade 7	32	14

	Grade 8	23	10
Moye school N=114 n=60	Grade 4	18	8
	Grade 5	22	10
	Grade 6	25	11
	Grade 7	26	11
	Grade 8	23	10
Tullu yai school N=94 n=42	Grade 4	22	10
	Grade 5	17	8
	Grade 6	15	7
	Grade 7	21	9
	Grade 8	19	8
Zuria school N=150 n=66	Grade 4	28	12
	Grade 5	32	14
	Grade 6	25	11
	Grade 7	31	14
	Grade 8	34	15

4.5. Study variables

4.5.1. Dependent variables

HPV Vaccination

4.5.2. Independent variables

Socio-demographic factors

- Age
- Gender
- Parental education
- Residence

Knowledge related factors

- Awareness of HPV, HPV vaccine, and cervical cancer.
- Misconceptions (E.g Cervical cancer is not preventable disease).
- Perceived risk of HPV infection, Lack of pre information.
- Perceived safety and side effects.

Attitude related factors

- Willingness to receive the vaccine.
- Loss of confidence in its benefit.
- Negative attitude towards the vaccine.

Environmental Factors

- Cultural beliefs about vaccination,
- Peer influence,
- Parental Influence

4.6. Operational definitions

Human papilloma virus: A virus that infects the skin or mucous membranes such as the genitals or inside the mouth of humans which can cause cervical cancer or warts

Knowledge: defined as an accurate perception of the risk of cervical cancer, HPV infection and their preventive measures. Based on the total score, respondents were categorized as either knowledgeable or not knowledgeable, using the mean score as a cut -off point.

Knowledgeable/ *good*/ satisfactory *knowledge*: referee to respondents who score equal to or above the mean value.

Not knowledgeable/ *poor*/ unsatisfactory *knowledge*: refers to respondents who score below the mean were considered as not knowledgeable.

HPV vaccine: Vaccine that prevents infection of certain types of human papillomavirus.

Attitude: Refers to an individual's Opinion or way of thinking, and in this study, it is defined as a tendency toward intentional risk-seeking or risk-averse behavior in relation of HPV infection and vaccination. Attitude was assessed using a series of questions measured on Likert's scale and the mean score was calculated to use as a cut point

Positive/ *favorable* attitude: Refers to respondents who scored equal to or above the mean.

Negative/ *unfavorable* attitude: Refers to respondents who scored below the mean.

For questions assessing knowledge, a score of one and zero was given for correct and incorrect responses respectively. For each area of knowledge, the scores of the responses were summed-up and the total divided by the number of questions, giving a mean score. By asking 16 knowledge-

related questions a score less than the mean was classified as poor knowledge and a score greater than the mean classified as good knowledge(25).

Attitude towards HPV vaccination will be measured using a 5-point Likert scale as individuals responding strongly with a favorable attitude were given a score of 5. One was allocated to those who responded strongly in disagreement. The scores of the items were summed-up and divided by the number of the items, giving a mean score. A score greater than a mean was considered as favorable attitude and a score less than the mean score was classified as unfavorable attitude(25).

4.7. Data collection procedures

Structured questionnaires were prepared in English, translated into Afaan Oromo, and then translated back into English to check for consistency. The questionnaires were adapted through reviewing different literature and previous similar studies. The adapted questionnaire was developed using kobo tool box and the selected group of data collectors collected the data. The questionnaire tool has seven sections that were developed to assess socio-demographic characteristics, knowledge about cervical cancer, HPV infection and vaccination, perceptions, attitudes towards HPV vaccination, presence of promotion, and sources of information about HPV vaccination and HPV vaccine uptake. Data were collected using Kobo collect app, 8 teachers as data facilitators (experienced data collector) and 2 Nurses as supervisors were recruited. The training was given for one day on the objective, relevance of the study, confidentiality of information, respondent rights, informed consent, and techniques of interview. For the qualitative data, open-ended questions were prepared by focusing on the types of information required from the participant. Data were collected through an in-depth interview. One interviewer for each in-depth interview will be recruited to conduct the interview. An in-depth interview was conducted for adolescents and a key informant interview were conducted on those who know the issue of the concern, an expert opinion, and can give a variety of perspectives about HPV vaccination. The interview was recorded on tapes, which were later be transcribed.

4.8. Data processing and analysis

The quantitative data were checked for completeness and consistency and exported from kobo collect app to Statistical Package for Social Sciences (SPSS) version 26 for cleaning, editing, and analysis. The data were checked for missed values and outliers. Descriptive analysis (like frequencies, tables, percentages, means, and standard deviation) were done to describe variables.

Both bivariate and multivariable logistic regressions were performed to identify significant factors associated with HPV vaccine uptake. Those variables with $p < 0.25$ in bivariate analysis were considered for multivariable logistic regression analysis. Multivariable logistic regression at the 95% confidence level was used to identify the determinants. A significance level of 0.05 was taken as a cutoff value for all statistical significance tests. Multi-collinearity was checked between independent variables using the variance inflation factor (VIF) for each variable.

Data from an in-depth interview were audiotaped and recorded, then transcribed verbatim, coded, arranged by themes, and analyzed thematically. Tape-recorded notes obtained from the in-depth interview were transcribed carefully by investigators into the Afaan Oromo language word by word and arranged with the written notes taken at the time of the interview.

The information was translated into English. Thematic content analysis was employed to describe the ideas obtained from the in-depth interview. Through this process, a verbatim quotation was used to illustrate responses on relevant issues and themes. Finally, it was incorporated with the quantitative findings to provide comprehensive and complete information

4.9. Data quality assurance

In order to maintain the quality of the data for the quantitative approach, supervisors and data collectors received training on data collection techniques. Before actual data collection time, the questionnaire (tool) was pretested for validity and reliability on 5% of the sample in schools not selected for the actual data collection to assess instrument simplicity, flow, and consistency.

The principal investigator and supervisors were made spot checks and reviewed all the completed questionnaires to ensure completeness and consistency of the information collected. The data collectors were supervised by three supervisors. Data entry was done by the principal investigator to ensure the accuracy of the data.

For the qualitative section, data quality was ensured by enhancing the trustworthiness and rigor of the study findings. The in-depth interview record and note-taking were transcribed immediately after the interview was conducted. The recorded tapes were listened to and the transcriptions were read and re-read several times carefully. From the potentially important and provisional notes, the researcher noted the interrelationships, connections, and patterns that emerged in the data. These were developed into themes.

4.10. Ethical consideration

Ethical clearance was obtained from Arsi University, College of Health Sciences, Ethical Review Committee (ERC). Informed oral consent was obtained from each respondent after explaining the purpose and procedure of the study. Written informed assent was obtained separately from parents to ensure their legal preparation on behalf of their children for adolescents aged 18 and below. To keep the confidentiality of any information provided by study subjects, the data collection procedure was anonymous. Participation was voluntary, and withdrawal from the study at any time during data collection was considered. No name or other identifying information was included in the questionnaire.

4.11. Dissemination plan

The final findings and recommendations will be disseminated to the College of Medicine and Health Sciences, Post Graduate Library, Chole District Health Office, and Chole Woreda Education Bureau. Finally, this study will be submitted for publication in reputable peer reviewed journals.

5. RESULT

5.1 Socio-demographic characteristics of respondents

A total of 409 participants were included in the study, yielding a 92% response rate. The age of respondents ranged from 9 to 14 years with a mean age of 11.91(SD=1.6). Regarding parental educational status, 155 (37.9%) and 122 (29.8%) of the respondents' mothers and fathers had no formal education, respectively. The majority of respondents, 387(94.6%), live with their parents. More than half of the respondents, 259(63.3%), were born in rural areas. Regarding occupational status, more than half of the fathers, 233(57%), were active farmers, and 225(55%) mothers were housewives (Table 3).

Table 3: Table showing socio-demographic characteristics of the respondents in Chole Woreda, Oromia, Ethiopia, 2025.

Sociodemographic Characteristics	Frequency	%
Age		
9-11	149	36.4
12-14	260	63.6
Fathers educational level		
No education	122	29.8
Primary education	146	35.7
Secondary education	41	10
College diploma and above	100	24.4
Maternal educational level		
No education	155	37.9
Primary education	147	35.9
Secondary education	27	6.6
College diploma and above	80	19.6
Fathers' occupation		
Merchant	18	4.4
Governmental employee	118	28.9
Private-employee	40	9.8
Farmer	233	57
Mothers' occupation		
Merchant	5	1.2
Governmental employee	90	22
Private-employee	44	10.8
Farmer	45	11
House wife	225	55
Place of birth		
Urban	150	36.7
Rural	259	63.3

5.3 Respondents' level of knowledge about cervical cancer, HPV infection, and HPV vaccine

More than three-fourths of girls, 333(82.9%) had heard about CC and the HPV vaccine 315(77%), respectively. On the other hand, about 312(76.3%) do not know the method of prevention of Cervical cancer. However, compared with this 324(79.2%) hadn't heard about HPV infection. Nearly three-fourths 336(82.2%) of respondents don't know recommended doses of HPV vaccine. The overall knowledge of HPV infection and HPV vaccine was 9(2.2%) and 61(14.9%), respectively (Table 4).

Table 4: Table showing respondents' level of knowledge about cervical cancer, HPV infection, and HPV vaccine, in chole woreda, Oromia, Ethiopia

Variables	Category	Frequency	%
Knowledge of cervical cancer Have you ever heard cervical cancer?	Yes	339	82.9%
	No	70	17.1%
Cervical cancer is common cause of female cancer	Do not know	377	90.7%
	Know	32	9.3%
Organs affected by cervical cancer	Do not know	197	48.2%
	Know	212	51.8%
Mode of acquisition of cervical cancer	Do not know	337	82.4%
	Know	72	17.6%
Risk factors for cervical cancer	Do not know	217	53.7%
	Know	192	46.9%
Sign and symptoms of cervical cancer	Do not know	333	81.4%
	Know	76	18.6%
Over all knowledge score of cervical cancer	Poor	345	84.4%
	Good	64	15.6%
Knowledge towards HPV infection			

Have you ever heard of HPV infection	Yes	85	20.8%
	No	324	79.2%
Who can contract HPV infection	Know	0	0%
	Do not know	409	100%
Diseases caused by HPV	Know	83	20.3%
	Do not know	326	79.7%
Method of prevention of HPV infection	Know	97	23.7%
	Do not know	312	76.3%
Risk factors for HPV infection	Know	76	18.6%
	Do not know	333	81.4%
Over all knowledge score towards HPV infection	Poor	400	97.8%
	Good	9	2.2%
Knowledge of HPV vaccine			
Have you ever heard about HPV vaccine before	Know	315	77%
	Do not now	94	23%
Who should get the HPV vaccine	Know	0	0%
	Do not know	409	100%
Benefit of HPV vaccine	Know	201	49.1%
	Do not know	208	50.8%
Recommended dose of HPV vaccine	Know	73	17.8%
	Do not know	336	82.2%
The ideal time of HPV vaccine	Know	138	33.3%
	Do not know	271	66.7%
Over all knowledge score of HPV vaccine	Poor	348	85.1%
	Good	61	14.9%

On the other hand, an in-depth interview identified that Several participants demonstrated limited understanding of the purpose of HPV vaccination. Some students believed the vaccine “helps to cure diseases” or “prevents pregnancy,” indicating misconceptions about its function. However, trust in health professionals influenced positive attitudes and vaccine uptake. Students who heard about HPV vaccination from health workers expressed confidence in its benefits and willingness to encourage peers.

5.4 Level of attitude of respondents toward HPV vaccination

More than one-thirds of the respondents, 179(43.8%) have the view that the HPV vaccine helps to prevent cervical cancer. More than half 272(66.5%) of the respondents agreed that CC is a deadly disease. About, 197(48.2%) out of 409 participants confirmed their own belief as the vaccine could save lives and improve health. Though, on the other hand, about 247(59.2%) had a parental concern about having the vaccine. More than half 273(66.7%) of the respondents have a favorable attitude toward HPV vaccinations (Table 5).

Table 5:Table showing level of attitude of respondents toward HPV vaccination, in Choleworeda, Oromia, Ethiopia

Variables	Attitude towards HPV vaccine			
	Unfavorable Attitude		Favorable Attitude	
	Frequency	%	Frequency	%
Cervical cancer is a deadly disease	137	33.5	272	66.5
The vaccination was beginning to minimize cervical cancer	230	56.2%	179	43.8
Thinks vaccination helps to prevent some diseases	335	81.9	74	18.1
May your parents let you have a vaccine	242	59.2	167	40.8
HPV vaccine saves lives and improves health	212	51.8	197	48.2
Whether you recommend the vaccine to others or not	227	55.5	182	45.5
Over all attitude towards HPV vaccine	140	33.3	273	66.7

An in-depth interview identified that Parents reported minimal awareness and limited engagement in the vaccination process. Some expressed that they were only told “it prevents cancer in the future,” without adequate explanation. They also emphasized the need for permission, stating that “without our consent, it is impossible to vaccinate our child.” These views highlight the importance of informed parental participation and transparent communication.

5.5 The perception of respondents toward CC, HPV infection, and HPV vaccination

The study revealed that 127(31.1%) of the respondents were found to have low perceived susceptibility; while 36(8.8%) has low perceived severity of the diseases (Table 6).

Table 6:Table showing the perception of respondents toward CC, HPV infection, and HPV vaccination, in Chole woreda, Oromia, Ethiopia,2025.

Variables	Strongly Disagree N (%)	Disagree N (%)	Neutral N (%)	Agree N (%)	Strongly agree N (%)
Any women are susceptible to face cervical cancer, do you agree	31(7.6)	76(8.6)	126(30.8)	150(36.7)	26(6.4)
How much are you worried of contracting HPV infection	16(3.9)	67(16.4)	142(34.7)	149(36.4)	35(8.6)
If you don't get vaccinated, how much you worried of contracting in the future	22(5.4)	91(22.2)	122(29.8)	148(36.2)	26(6.4)
Being infected with HPV; would have major consequences	3(0.7)	41(10)	117(28.6)	214(52.3)	34(8.3)
Being infected with HPV; would be devastating	2(0.5)	20(4.9)	109(26.7)	239(58.4)	39(9.5)
It would be very serious if someone became infected	0	22(5.4)	112(27.4)	240(58.7)	36(8.6)
If you get vaccinated, you can reduce your risk of cervical cancer	11(2.7)	68(16.6)	141(34.5)	159(38.9)	30(7.3)

If you get vaccinated for HPV, you can reduce vaginal cancer	17(4.2)	98(24)	258(63.1)	34(8.3)	2(0.5)
Getting vaccinated will decrease your chances of getting genital wart	22(5.4)	115(28.1)	251(61.4)	20(4.9)	1(0.2)
Concerns about possible side effects	34(8.3)	118(28.9)	173(41.3)	63(15.4)	21(5.1)
Concerns about safety and effectiveness	43(10.5)	128(31.3)	199(48.7)	34(8.3)	5(1.2)
Parental concern	17(4.2)	126(30.8)	124(30.3)	109(26.7)	33(8.1)
Needle phobia	38(9.1)	145(35.5)	114(27.9)	65(15.9)	47(11.5)
Miss understanding about HPV vaccine	5(1.2)	44(10.8)	162(39.6)	121(29.6)	77(18.8)
Lack of information	4(1)	33(8.1)	198(48.4)	133(32.5)	41(10)

However, those who have a high perceived benefit of the HPV vaccine was about 279(68.2%). Especially, those who perceived getting vaccination can reduce the risk of Cervical cancer was about 189(46.2%) (Table 7).

Table 7:Table Showing perception of respondents in chole woreda, Oromia, Ethiopia,2025.

Variables	Poor perception		Good perception	
	Frequency	%	Frequency	%
Perceived Susceptibility	127	31.1	282	68.9
Perceived Severity	36	8.8	373	91.2
Perceived Benefit	130	31.8	279	68.2
Perceived Barrier	250	61.1	159	38.9

5.6 Uptake of the HPV vaccine

Less than half 161(39.4%) had not received any dose of the HPV vaccine, 230(56.2%) had received one dose and 18(4.4%) had received two doses. The proportion of the HPV vaccine uptake in the study area was 60.6% (Figure 2).

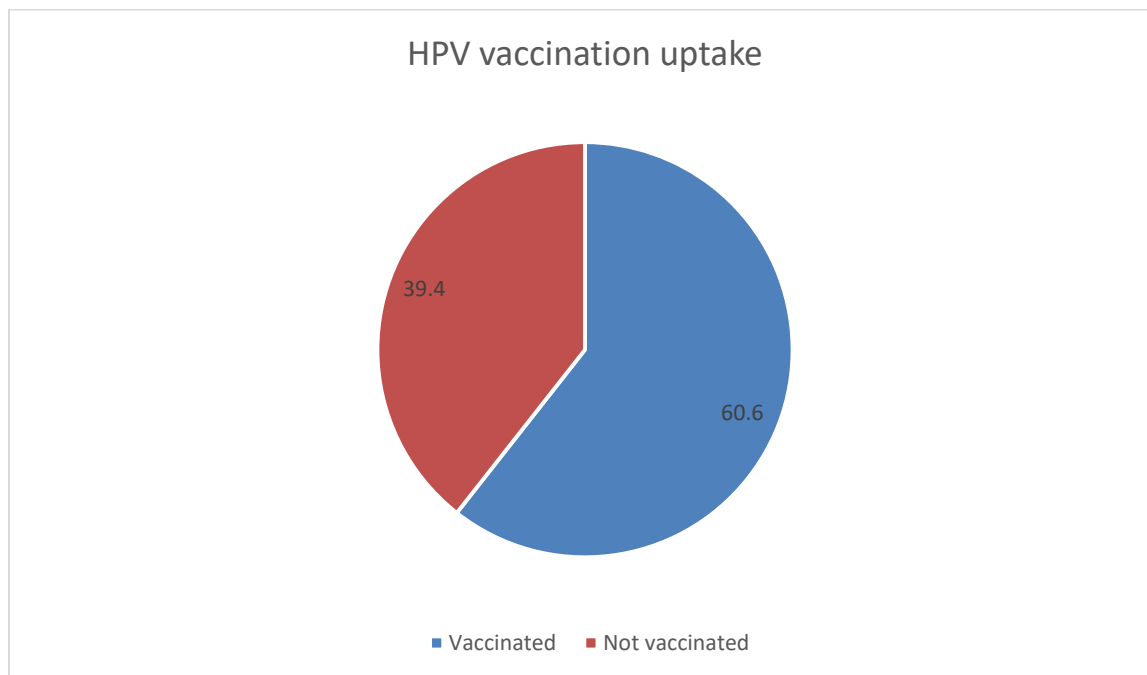


Figure 2: Figure showing vaccination uptake in Chole woreda, Oromia, Ethiopia2025.

The main reasons mentioned by the respondents for being vaccinated were having encouragement from health workers 140(34.2%), believing that it has benefits 111(27.1%), pre-information 70(17.1%), parental influence 22(5.4%), peer influence 22(5.4%) and free provision 8(2%). On the other hand, social pressure 109(24.4%), parental concern 99(24.2%), having negative attitude for the vaccinations 88(21.8%), fear of needle injection 38(9.3%), having no information 33(8.1%), and being absent at vaccination day 31(7.6%), fear of side effects 22 (5.4%), less believe in its benefit 13(3.2%) and peer influence 2(0.5) were the barriers of HPV vaccination.

An in-depth interview identified that misconceptions were persistent across participant groups. About three students, two health professionals, one community leader, and a teacher reported that “many people believe the vaccine prevents pregnancy or is a form of family planning.” Fear of injection was another psychological barrier, particularly among students. These myths and fears contributed to hesitancy and low uptake in some areas.

5.7 Source of information, the existence of promotion and pre-information on HPV vaccination

About 123(89.7%) of the adolescent school girls reported the unavailability of promotion and health education regarding the HPV vaccine at school, and 114(83.2%) of the girls responded that promotion regarding the HPV vaccine by health workers through community outreach is lacking. However, 77(55.1%) of the respondents reported the availability of providing full information about HPV vaccines before vaccination. Regarding the potential source of information about the HPV vaccine, health workers 78(36.8%), mass media 71(33.5%), school 51(24%), internet, friends and parents accounts for the rest percent were the main sources of information.

Conversely, an in-depth interview found that teachers and health professionals are key sources of information. Many students said that “teachers encouraged us to get vaccinated,” showing the influence educators have on vaccine acceptance. Participants highlighted that awareness should reach parents and communities, suggesting that “raising awareness among parents” could improve vaccine coverage.

5.7 Factors associated with uptake of human papillomavirus vaccination

The study identified the association between uptake of HPV vaccination and some presumed factors for the respondents. On bivariate logistic regression, fathers’ and mothers’ level of education, and occupation, parental concern, attitude, and knowledge towards the HPV vaccine, and place of birth were found to be associated with the HPV vaccine uptake.

During multivariable logistic regression analysis, factors associated with HPV vaccination uptake were identified. In this study, attitude towards HPV vaccination, Fathers' educational level, knowledge level about cervical cancer, place of birth, and occupational status of the mother were found to be significantly associated with HPV vaccination uptake.

Adolescents who had unfavourable attitudes towards HPV vaccination were 97.1% less likely to receive the vaccine compared to those with favourable attitudes (AOR = 0.03; 95% CI: 0.01,0.08; $p < 0.001$).

Compared to students whose fathers had a college diploma or above, those whose fathers were unable to read and write were 97.8% less likely to have been vaccinated (AOR=0.02; CI:0.00,0.28, $p<0.01$).

Compared to students whose fathers had a college diploma or above, those whose fathers were able to read and write were 92.4% less likely to have been vaccinated (AOR=0.08 CI: 0.00,0.72, $p<0.05$).

From qualitative inquiry, Parental lack of detailed information and the requirement for parental permission were recurring themes. Parents described being only briefly informed (“it prevents cancer”) and asked for more comprehensive engagement before consenting to vaccinate their daughters.

Knowledge level about cervical cancer was also found to be an independent determinant of HPV vaccination uptake. Adolescents who had poor knowledge about cervical cancer were 81.2% less likely to receive the HPV vaccine compared to those who had good knowledge (AOR = 0.19; 95% CI: 0.06,0.59; $p < 0.01$).

The place of birth of the adolescents was significantly associated with vaccination uptake. Those who were born in rural areas were 69.8% less likely to be vaccinated compared to those who reside in urban areas (AOR = 0.30; 95% CI: 0.10,0.92; $p < 0.05$).

The occupational status of the mother was also found to have a significant association. Girls whose mothers' private employees were 94.8% less likely to be vaccinated compared to those whose mothers were government employees (AOR = 0.05; 95% CI: 0.01,0.44; $p < 0.01$).

Girls whose mothers house housewives were 86.2 % less likely to be vaccinated compared to those whose mothers were government employees (AOR = 0.14; 95% CI: 0.02,0.85; $p < 0.05$) (Table 10).

Table 8: Table showing bivariate and multivariable logistic regression analysis result for variables associated with HPV vaccination uptake among school aged girls in Chole woreda, Oromia, Ethiopia,2025.

Variables	Uptake		P-value	COR(95%CI)	AOR (95%CI)	P-Value
	Received	Not Received				
Attitude level towards HPV vaccination						
Favorable	218	55		1	1	
Unfavorable	30	106	.00	0.071(0.043-0.118)	0.029(0.011-0.080)	.00**
Fathers educational level						
College diploma and above	97	3		1	1	
Unable to read and write	15	26	.00	0.018(0.005-0.66)	0.022(0.002-0.284)	0.004*
Able to read and write	37	44	.00	0.026(0.008-0.089)	0.076(0.008—0.723)	.025*
Primary education	67	79	.00	0.026(0.008-0.087)	0.122(0.013-1.099)	0.061
Secondary education	32	9	.002	0.110(0.028-0.431)	0.101(0.011-0.913)	0.041*
Knowledge level towards Cervical cancer						
Good	58	6		1	1	
Poor	190	155	.00	0.127(0.053-0.302)	0.188(0.060-0.588)	0.004*
Place of birth						
Urban	131	19		1	1	

Rural	142	117	.00	8.368(4.877-14.357)	0.302(0.099-0.922)	0.036*
Occupational status of mother						
Government employee	85	5		1	1	
Merchant	3	2	0.018	0.088(0.012-0.654)	0.074(0.001-3.654)	0.190
Private employee	27	17	0.00	0.093(0.032-0.277)	0.052(0.006-0.436)	0.006*
Farmer	16	29	0.00	0.032(0.011-0.096)	0.067(0.008-0.555)	0.012*
House wife	117	108	0.00	0.064(0.025-0.163)	0.138(0.022-0.849)	0.033*

* Statistically significant $P < 0.05$

** Highly statistically significant $P < 0.001$

6. DISCUSSION

This study assessed HPV vaccination uptake and associated factors among school aged girls in Chole woreda, Arsi zone, Oromia, Ethiopia, 2025. The overall HPV vaccination uptake in this study was 60.6%. About 66.7% of the respondents had a favourable attitude toward HPV vaccination uptake, whereas only 14.9% had good overall knowledge. Several factors were significantly associated with HPV vaccination uptake, including place of birth, level of knowledge about cervical cancer, attitude toward HPV vaccination, fathers' educational level, and mothers' occupational status.

In this study the overall HPV vaccination uptake was 60.6%. The finding was consistent with a finding from a similar study in Minjar -Shenkora, North Shoa(66.5%)(22)the similarity might be due to the study population.

Moreover, this result is significantly lower than the study done in Hadya, which is 84.9%(43) , in Woliso, in which the uptake level was 77.3%(42)however, the result was higher than the study conducted among female students in Ambo, in which the uptake level was 44.4%(25), in Arba Minch 50.4%(23), in Bahirdar 45.3%(9), in South West Shoa 31.65%(24).The difference between the findings and the previous study might be due to study area, study period, and sociodemographic factors.

From African countries, it is less than Mozambique's 91%(44), and more than Senegal's(28%)(45) This could be due to differences in sample size and study population.

Globally the overall HPV vaccination uptake of this study was lower than the results from Jinan, China (66.9%(46)) Taiwan (91%) and Scotland (94.4%)(4) but higher than the results from Hong Kong, China (36.5%)(47).The difference between the findings and the previous study might be due to stronger national vaccination program. socio-economic status, study area, study period, and sociodemographic factors.

6.1 Attitude towards HPV vaccination

This study revealed that the overall favorable attitude towards HPV vaccination was 66.7%. This finding was higher than the study conducted in Dire Dawa (40.3%)(20) , in Nekemte town, Oromia region of Ethiopia (53.9%) (26), in Bahir Dar City, Amhara Region, Ethiopia (58%)(9) . This could be due to improved community exposure to information. This finding was lower than the study conducted in Debre Markos town, North West Ethiopia (77.4%)(28).

In our study, adolescents with an unfavourable attitude toward HPV vaccination were substantially less likely to receive the vaccine (AOR = 0.03; 95% CI: 0.01,0.08; $p < 0.05$). This indicates that a strong positive attitude is critically important for uptake. The finding aligns with the systematic review conducted in Ethiopia, which found that a positive attitude about the HPV vaccine was significantly associated with uptake (AOR = 2.04; 95%CI: 1.51,2.74)(48)

A favourable attitude likely reflects belief in the benefit of vaccination, trust in its safety, and willingness to act. Conversely, unfavourable attitudes may reflect misconceptions, fear of side effects, or a low perceived benefit.

From the qualitative inquiry, students who participated in this study repeatedly reported incomplete knowledge and specific misconceptions, notably the belief that the HPV vaccine prevents pregnancy or is a form of family planning, despite some students expressing positive attitudes and actual uptake when health professionals or teachers recommended vaccination. Similar patterns of limited knowledge, fertility-related myths, and fear of side effects have been documented among Ethiopian adolescents and caregivers; qualitative work in Addis Ababa and quantitative syntheses across Ethiopia report misinformation and insufficient knowledge as key barriers to acceptance. This indicates that knowledge gaps remain a major determinant of vaccine hesitancy in Ethiopian settings(49).

6.2 Place of residence

The place of birth of the adolescents was significantly associated with vaccination uptake. Those who were born in rural were 69.8% less likely to be vaccinated compared to those who reside in urban areas (AOR = 0.30; 95% CI: 0.10,0.92; $p < 0.05$). This is consistent with a study done in Nekemte (AOR=3.46)(26) whereas living in a rural location dramatically decreased the odds of uptake in Minjar-Shenkora and South West Shoa (AOR=0.12 and 0.25, respectively)(22, 24). This could be a reduced access to health information, cultural beliefs, and limited school health facility linkage in rural settings.

6.3 Knowledge of cervical cancer

Our analysis showed that adolescents with poorer knowledge about cervical cancer were significantly less likely to receive the vaccine (AOR = 0.19; 95% CI: 0.06,0.59; $p < 0.05$). The link between knowledge and uptake is consistently seen in Ethiopian studies: one meta-analysis showed that good knowledge was associated with much higher odds of vaccination (OR $\approx$ 6.70; 95% CI:3.43,13.07) in the Ethiopian context(48). This may be due to knowledgeable students better understand the purpose of the vaccine, recognize the severity of cervical cancer, and are less influenced by misinformation.

Parental lack of detailed information and the requirement for parental permission were recurring themes. Parents described being only briefly informed (e.g., “it prevents cancer”) and asked for more comprehensive engagement before consenting to vaccinate their daughters. This mirrors Ethiopian study showing that parental awareness and involvement are critical for successful school-based vaccination programs when parents are inadequately engaged, uptake is reduced. Thus, targeted community and household-level sensitization, including explicit discussions about safety and purpose, is essential(49).

Strengths and Limitations of the Study

The study employed a mixed study design to gain detailed data from the research participants. Therefore, the problem has been addressed by both quantitative and qualitative research approaches. The study was limited to school facilities; it was difficult to generalize to all adolescents of similar age groups living outside the area.

7. CONCLUSION AND RECOMMENDATIONS

In this study, attitude towards HPV vaccination, parental concern, knowledge level about cervical cancer, place of birth, and occupational status of the mother were found to be were found to be statistically significant with HPV vaccine uptake. The main barriers to HPV vaccination were social pressure, parental concern and having negative attitude for the vaccinations.

Overall, both quantitative and qualitative findings emphasize that improving knowledge, addressing misconceptions, and strengthening multi-sector collaboration are vital to enhance HPV vaccination uptake in Chole woreda. Ensuring continuous vaccine availability, effective community engagement, and evidence-based policy decisions will accelerate progress toward national cervical cancer prevention goals.

Recommendations

For the Ministry of Health and Regional Health Bureau

- Strengthen comprehensive community awareness campaigns:

Develop and implement continuous, community-based education programs on HPV vaccination focusing on dispelling myths that link the vaccine to infertility or family planning and highlighting its role in cervical cancer prevention.

- Ensure sustainable vaccine supply and distribution:

Address logistical barriers by maintaining adequate vaccine stocks and delivering vaccination services regularly rather than through short-term campaigns.

- Engage parents and community leaders:

Promote dialogue with parents, religious leaders, and local elders through community meetings and media outlets to build trust and improve informed parental consent.

For the Woreda Health Office and Health Facilities

- Enhance training for health professionals and teachers:

Provide updated training on HPV, vaccination benefits, and communication strategies so that teachers and health workers can act as reliable sources of information for adolescents and parents.

- Expand outreach beyond schools:

Combine school-based vaccination with community outreach to reach out-of-school girls and households in remote rural areas.

- Monitor and evaluate program performance:

Establish a local monitoring system to track vaccine coverage, identify barriers, and provide timely feedback to improve program delivery.

- Address vaccine hesitancy and fear of injections:

Introduce adolescent-friendly counselling before vaccination and provide clear explanations about side effects to reduce fear and anxiety.

For Schools and Teachers

- Establish school health clubs:

Form and support health clubs that regularly disseminate accurate information about HPV vaccination, reproductive health, and cancer prevention among students.

- Use peer education approaches:

Encourage trained students to share information with classmates and their families to strengthen peer influence and sustain awareness.

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9. ANNEXES

Annex 1: English version Information Sheet and Consent Form

INFORMED PARENTAL ASCENT FORM

I invite you and your child to take part in a research study being conducted by Bekalu Tsegaye who is a student at Arsi University College of medicine and health science for his partial fulfillment of Master of public health, as part of his research study/thesis. The study, as well as your rights as a participant, is described below.

Description: This study will examine adolescents' reactions to Human papillomavirus vaccination among adolescent Girls in _____ School of chole district. Adolescents will be interviewed with structured questionnaires compiled for Human papillomavirus uptake and its associated factors posed by the investigator about their background knowledge, practice, perception and attitude. Your child's interview will be videotaped for use in standard research procedures (e.g., analysis of responses, presentation at professional conferences, etc.) Your child's identity will not be revealed to anyone but the principal investigator(s) and her designated research associates.

Confidentiality: Children's answers will be not associated with their name. Rather, each child will be given an identification number on the interviewer's sheet. The videotape of your child's participation will be destroyed after it has been transcribed.

I agree to the researchers using my child's real name in this research and any publications _____ the results from the research.

Signature

I agree to have you audio/videotape my child during this study. I understand this audio/video will only be used for the purposes of research (e.g., analysis of responses, transcriptions of responses, etc.) and will not be available to anyone aside from the researcher:

Signature

Risks & Benefits: There are no risks to your child's safety. You may opt to preview the videotape or watch it with your child. The story raises no sensitive or controversial issues and does not contain elements typically frightening to children. Nevertheless, a copy of the videotape has been reviewed by the Ethics Review Board and approved for use in this research. Because the interview

engages children in thinking about non-violent conflict resolution, there are potential benefits to your child's ability to handle real-life situations of conflict.

Freedom to Withdraw or Refuse Participation: I understand that my child has the right to stop watching the tape at any time, or to refuse to answer any of the interviewer's questions without prejudice from the investigator.

Grievance Procedure: If I have any concerns or am dissatisfied with any aspect of this study, I may report my grievances anonymously if desired to the Human Subjects Institutional Review Board, c/o Dean of post graduate research coordinator office phone Number: _____.

Questions? Please feel free to ask the investigator any questions before signing the consent form or at any time during or after the study.

Principal Investigator: Bekalu Tsegaye, Arsi University, college of Medicine and Health Science; Advisors: Dr. Ayalneh Demissie and Mr. Abdurehman Kalu, Arsi University, college of Medicine and Health Science, office phone Number: _____.

Informed Consent Statement

I, _____, give permission for my child, _____ to participate in the research project entitled, "Knowledge, attitude, human papillomavirus vaccination Practice and its associated factors among school aged girls in Chole district." The study has been explained to me and my questions answered to my satisfaction. I understand that my child's right to withdraw from participating or refuse to participate will be respected and that his/her responses and identity will be kept confidential. I give this consent voluntarily.

Parent/Guardian Signature:

Signature

Date

Investigator Signature:

Signature

Date

Question for key informant interview

Interview number _____

Date of interview / /

Interview location _____

Interviewer _____

Time begins: _____

Time end: _____

Annex 2: English version of Questionnaire

PART-I: Key informant interview guide for key informants which consisting health professionals, parents, community volunteer workers and teachers (whom expected to have knowledge of the issue on Immunization services/program)

1. Tell me a little bit about yourself
 - a. What is your role at the clinic?
 - b. How long have you been working here?
2. One of the prominent services given in this clinic is vaccination program. Have you involved in HPV vaccination in this clinic/ as outreach campaign?
3. Do community outreach for awareness creation available? How do you see it?
4. How do you see awareness of HPV infection and HPV vaccination among adolescents?
5. How would the existence of promotion look likes in relation to the HPV Vaccination services/program?
6. What are the major problem did you observe while HPV vaccination?
7. What are existing barriers for the implementation of the HPV Vaccination services/ program?
8. What barriers did you observe that made adolescents refuse to accept HPV vaccine during vaccination? ▪ What factors most repeatedly mentioned?
9. How do you describe perception in relation to HPV vaccination among adolescents and their parental concerns?
10. How do you describe attitude of adolescents and their parents in relation to HPV vaccination?
11. What would you recommend to be improved in relation to HPV vaccination in the feature?

In-depth interview guide for adolescent Girls who are eligible to have HPV vaccination other than those involved in quantitative

“Hello my name is _____ I am from Arsi University and this is my colleague, _____, who is assisting me. Thank you so much for giving up some of your time to talk with me today. As you know, the purpose of this interview is to learn about your opinion and experience of vaccination to explore barriers and factors affecting Human papillomavirus vaccination among adolescent Girls in _____ kebeles of Chole District.

I am recording our talk, just as a way to take notes, but afterwards, the recording will be transcribed, and the tape will be deleted. No names will be used in the report. So please feel free to speak frankly.

Do you have any questions about the process of this interview? Would you prefer to speak alone, or can (assistant) remain to observe and make some written notes?”

Interview number _____

Date of interview / /

Interview location _____

Interviewer _____

Time begins: _____

Time end: _____

Question for in-depth interview

1. Can you tell me a little bit about yourself?
2. Have you ever heard about the HPV vaccine? If yes, from whom you heard it? If yes, where and what have you heard about it?
3. How do you see adolescents HPV vaccination?
4. Have you received HPV vaccination?
 - If you received, what would influence you to get the HPV vaccine?
 - If you haven't received, what would keep you from getting the vaccine (have you any concern regarding to the vaccine?
 - Had your parents had any concern about the vaccine?
5. What barriers do you think that prevents from taking HPV vaccine?
 - How do you see perception of adolescents and their parents in relation to HPV infection and cervical cancer? What is your perception/ how do you perceive HPV infection and cervical cancer?
 - How do you see behaviors of adolescents and their parents in relation to HPV vaccination?
 - Is there any concern beyond this?

6. Have you ever recommended about HPV vaccination from your parents/friends/others? If you were recommended about it, please specify it _____

7. Do you intend to receive HPV vaccination?

▪ If yes, why? _____

▪ If no, why? _____

8. Would you recommend others?

□ If yes, why? _____

□ If no, why? _____

9. What do you think would be necessarily before vaccination?

10. Is there any gap you feel with HPV vaccination program that you recommend as all?

Section A: Information about your socio-demographic characteristics			
S.N	Questions and filters	Coding categories	Skip to
1	How old are you?	In years _____	
2	What is your Level of education?	In Grade _____	
3	What is your religion?	1. Orthodox 2. Protestant 3. Catholic 4. Muslim 5. No religion 6. Other _____	
4	What is your fathers' level of education?	1. Unable to read and write 2. Able to read and write 3. Primary education 4. Secondary education 5. College diploma and above	
5	What is your mothers' level of education?	1. Unable to read and write 2. Able to read and write 3. Primary education 4. Secondary education 5. College diploma and above	
6	What is the occupation of your father?	1. Merchant 2. Governmental employee 3. Private-employee 4. Farmer 5. If other, specify__	
7	What is the occupation of your mother?	1. Merchant 2. Governmental employee 3. Private-employee	

		4. Farmer 5. House wife 6. If other, specify_	
8	With whom you are living?	1. Together with parents 2. Relatives 3. With friends 4. Alone 5. Other _____	
9	Your place of birth	1. Urban 2. Rural	

Section B: Knowledge of study participant about cervical cancer			
10	Have you ever heard cervical cancer?	1. Yes 2. No	If No (skip to Q-116)
11	Cervical cancer is common female cancer	1. Yes 2. No 3. I don't know	
12	Organs affected by cervical cancer	1. Cervix 2. Breast 3. I don't know 4. Others, specify_____	
13	Mode of acquisition of cervical cancer	1. Sexual transmission 2. History of cancer in a family 3. I don't know 4. Others, specify_____	
14	Which do you think is/are the risk factor/s for cervical cancer? (More than one answer possible)	1. Human papillomavirus infection 2. Promiscuity	

		3. Early age onset of sexual activity 4. Tobacco smoking 5. History of sexually transmitted infection 6. I don't know	
15	When do you recognize sign and symptom of cervical cancer? When there is:	1. Abnormal Vaginal bleeding 2. Vaginal discharge 3. Dyspareunia 4. I don't know	

Section C: Knowledge towards HPV infection			
16	Human papillomavirus (HPV) is a virus that causes a sexually transmitted infection, have you ever heard of it?	1. Yes 2. No	If no skip to q121
17	Who can contract HPV infection?	1. Only men 2. Only women 3. Men and women 4. I don't know	
18	Which of these diseases are caused by HPV infection? (More than one answer possible)	1. Cervical cancer 2. Penile cancer 3. Oropharyngeal cancer 4. Anal cancer 5. Genital warts 6. I don't know	
19	Which one do you think that Ways of preventing HPV diseases (more than one answer possible)	1. Practicing abstinence 2. Vaccination 3. By using Condoms 4. Cannot be prevented 5. I don't know	

20	What are risk factors for HPV infection? (More than one answer possible)	1. High frequency of sex partner exchange 2. Genital skin to skin contact 3. Body fluids(bloods) 4. I don't know	
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Section D: Knowledge towards HPV vaccination			
21	Human papillomavirus vaccine is a vaccine used to prevent Human papillomavirus infection, have you ever heard of it?	1. Yes, I have 2. No, I haven't	If no skip to Q-126
22	Who should get the HPV vaccination?	1. Only Men 2. Only Women 3. Men and women 4. I don't know	
23	The HPV vaccine helps to:	1. Prevent cervical cancer 2. Prevent vaginal cancer 3. Prevent vulva cancer 4. I don't know 5. Other specify__	
24	Recommended doses of HPV-Vaccine	1. One dose 2. Two doses 3. I don't know	
25	The ideal time HPV Vaccine best recommended is:	1. Less than 9-years 2. 9–14 years 3. Can be provided at any age 4. I don't know	

Section E: Perception towards cervical cancer, HPV infection and HPV vaccination						
Susceptibility						
26	Any women are susceptible to face cervical cancer and victim of its severe health out come through her life, do you believe?	1. Very untrue of what I believe 2. Untrue of what I believe 3. Neutral 4. True of what I believe 5. Very true of what I believe				
27	How much are you worried of contracting HPV infection?	1. Very untrue of me 2. Untrue of me 3. Neutral 4. True of me 5. Very true of me				
28	If you don't get vaccinated for HPV, how likely is it that you'll become infected with genital HPV; get cervical cancer; get genital warts in the future?	1. Very unlikely 2. Unlikely 3. Neither unlikely nor likely 4. Likely 5. Very likely				
Severity						
	Questions	Likerts scale Range				
		Stro ngly disa gree	Disa gree	Neith er disagr ee nor agree	Agree	Strong ly agree
29	Being infected with HPV; having cervical cancer; having genital warts would have major consequences on life; do you agree?					

30	Being infected with HPV; having cervical cancer; having genital warts would be devastating; do you agree?					
31	It would be very serious if someone became infected with HPV; had cervical cancer; had genital warts; do you agree?					
Benefit						
32	If you get vaccinated for HPV, you can reduce your risk of HPV infection and cervical cancer					
33	If you get vaccinated for HPV, you can reduce the risk of vaginal cancer					
34	Getting vaccinated for HPV will decrease your chances of getting genital warts					
Barriers						
How much the following factors couldn't prevent you from getting vaccinated for HPV?						
35	Concerns about possible side effects					
36	Concern about safety and effectiveness					
37	Parental concern					
38	Needle phobia					
39	Miss understanding about HPV vaccine					
40	Lack of information					
Section F: Attitude towards HPV vaccination						

41	Cervical cancer is a deadly disease, do you agree?					
42	The vaccination of the HPV was beginning to minimize [even to terminate] HPV infection and cervical cancer, do you accept?					
43	Do you think vaccination helps to prevent some diseases?					
44	May your parents let you have a vaccine?					
45	HPV vaccine saves life and improve health, do you agree?					
46	Do you think that it is important to have vaccination and you recommend others to have HPV vaccination?					
47	Having the HPV Vaccine could not made you sexually promiscuous					
Section G: Presence of promotion and sources of information about HPV vaccination						
48	Have you ever heard about HPV vaccine before?	1. Yes, I have 2. No I haven't				If No, Skip to Q-155
49	If yes, from whom you heard? (More than one answer is possible)	1. Mass media 2. Health Workers 3. School 4. Internet 5. Friends 6. Parents/Family 7. Other__				
50	Is there any available promotion at your area?	1. Yes 2. No				
51	Have you been thought about HPV or cervical cancer at school?	1. Yes 2. No				

52	Do health workers thought you about cervical cancer or HPV through community outreach/other means?	1. Yes 2. No	
53	Do providers provide full information about HPV Vaccine prior to vaccination?	1. Yes 2. No 3. I don't know	
54	Do you feel you need more information about HPV vaccination?	1. Yes 2. No	If No, Skip to Q-157
55	If yes, from whom you prefer? (More than one answer is possible)	1. Mass media 2. Health Workers 3. School 4. Internet 5. Friends 6. Parents/Family 7. Other	
Section H: HPV vaccine uptake			
56	Have you received HPV vaccination?	1. Yes, I have 2. No; I haven't	If No, skip to Q-160
57	If yes, how many doses of the Vaccine?	1. 1 2. 2	
58	If you receive, what helps you to receive? (Possibly more than one answer)	1. Pre information 2. Believes on its benefit 3. Encouragement from health worker 4. Parental influence 5. Pear influence 6. Because its cost free 7. Other, specify _____	

59	If you haven't taken HPV vaccine before, why? (Skip if you received)	1. I have no information about the vaccine 2. I have negative attitude for the vaccine 3. Being absent at vaccination day 4. Fear of side effect 5. Fear of needle injection 6. Parental concern 7. Peer influence 8. Less believe on its benefit 9. Access 10. Social pressures/rumors 11. Other, specify____	
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Key: HPV- Human papillomavirus infection

Annex 3: Afaan Oromo version questionnaire

KUTAA-I: Gaaffilee afaaniffaan qaamota odeeffannoo qo'annoo kanaaf dhiyoo jiran irraa sassaabuuf qophaa'e

1. Seensaaf, maqaa fi gahee hojiikee naaf himuu dandeessaa?
2. Tajaajilli beekamaan akka Buufata fayyaa keessaniitti kennamu tokko tajaajila kittibaata daa'immaniiti (kittibaata kaanserii balbala gadameessaas dabalatee). Ati kaampeenii mana barnootaatti kittibaata kaanserii balbala gadameessaaf kennamu irratti hirmaatteetaa?
3. Hubannoo barattootni shamarranii kittibaatichaaf qaban akkamitti ilaalta?
4. Kittibaaticha akka fudhataniif barumsi hubannoo dabaluu(kakaasuu) kennameeraa?
 - Yoo kennameera tahe eenyuun?
 - Eessa fa'itti?
 - Hawaasa baldhaa keessatti gadi bu'amee kennamee beekaa?-yoo hin kennamne tahe maaliifi?
5. Rakkoowwan gurguddoo (ijoo) ta'an kan ati yeroo kittibaatichi kennamu argite maali?
 - o Gama ijoolleetiin(barattootaatiin/warra fudhataniitiin)?
 - o Gama warra ogeessota faayyaatiin (qindeessitootaatiin)?
6. Prograamichi(sagantichi) akka hin milkooofne waantotni taasisan maali?
7. Waantota (ilaalchota) akka ijoolleen kittibaaticha hin fudhanne godhan kan ati argite maali?
 - o Ilaalchota sanniin keessaa kan irra deddeebiin simudate jiraa?
8. Hubannoo fi ilaalchi maatiin isaanii (hawaasni) kittibaatichaaf qaban maal fakkaata?
9. Kittibaaticha waliin waqabatee maaltu fooyya'uu qaba jettee yaadda?
10. Walumaagalatti waanti itti dabaluu barbaaddu yoo jiraate

KUTAA -2. Gaaffilee Afaan Oromootiin

Kutaa A: Odeeffannoowwan dhimma hawaasummaa kee irratti xiyyeeffatan			
Lakk.	Gaaffiiwwan	Filannoo	Irra Darbi
1	Umuriin kee meeqa?	waggaan _____	
2	Kutaa meeqa baratta?	kutaa _____	
3	Amantaa kee maali?	1. Kiristaana 2. Musliima 3. Hin qabu 4. Kanbiraa _____	
4	Aabboon/Abbaan/ kee barnoota ni qabuu?	1. Dubbisuu fi barreessuu kan hindandeenye 2. Dubbisuu fi barreessuu kan hindandeenye 3. Barnoota Sad. 1ffaa 4. Barnoota Sad.2ffaa 5. Dippiloomaa fi isaa ol	
5	Aayyoon/Haati kee barnoota ni qabuu?	1. Dubbisuu fi barreessuu kan hindandeenye 2. Dubbisuu fi barreessuu kan hindandeenye 3. Barnoota Sad. 1ffaa 4. Barnoota Sad.2ffaa 5. Dippiloomaa fi isaa ol	
6	Hojiin Aabboo/Abbaa keetii maali?	1. Daldalaa 2. Hojjetaa mootummaa 3. _____ Hojjetaa mitmootummaa/dhuunfaa 4. Qonnaan bulaa 5. Kan biraa yoota'e, barreessi	
7	Hojiin Aayyoo/Haadha keetii maali?	1. Daldaltuu 2. Hojjettuu mootummaa	

		3. Hojjettuu mit-mootummaa/dhuunfaa 4. Qonnaan bultuu 5. Haadha manaa 6. Kan biraa yoota'e, barreessi	
8	Eenyu waliin jiraataa jirta?	1. Maatii wajjin 2. Haadha /Abbaa qofa 3. Obboleessa/obboleettii qofa 4. Fira/Aantee 5. Hiriya/hiriyoota 6. Kophaa 7. Kan biraa _____	
9	Bakki dhaloota kee	1. Magaala 2. Baadiyyaa	
Kutaa B: Gaaffii beekumsa kaanserii fiixee Gadameessaa irratti			
10	Kaanserii fiixee Gadameessaa yeroo jedhamu dhageessee beektaa?	1. Eeyyee 2. Lakki	Yoo lakki jette gaaffii 116-ffatti ce'i
11	Kaanseriin fiixee Gadameessaa dubartoota miidhuun beekama	1. Eeyyee 2. Lakki 3. Hin beeku	
12	Qaamotni Kaanserii fiixee Gadameessaatiin miidhamuu danda'an	1. Gadameessa 2. Harma 3. Kan biraa 4. Hin beeku	
13	Karaan ittiin namni tokko Kaanseriin fiixee Gadameessaatiin qabamuu danda'u/ namaa namatti darbu	1. Karaa quunnamtii saalaa 2. Maatii irraa 3. Kan biraa 4. Hin beeku	

14	Kanneen keessaa kamtu Kaanserii fiixee Gadameessaatiif nama saaxila (Deebii tokkoo ol kennuu dandeessa)	1. ‘Human papillomavirus’ infeekshinii 2. Hiriya saal-qunnamtii baay’isuu 3. Saalquunnamtii ijoollumman eegaluu 4. Tamboo aarsuu 5. Seenaa dhukkuboota saalqunnamtiin daddarban qabaachuu 6. Hin beeku	
15	Mallattoo kaansarii gadameessaa yoom adda baafta? Yeroo jiran:	1. Dhiigni qaama saalaa kan hin baramne 2. Dhangala'aa qaama saalaa 3. Dhukkubi yeroo wal qunamtti saala 4. Hin beeku	

Kutaa C: Beekumsa ‘Human papillomavirus’ infeekshinii fi kittibaata isaa irratti			
16	‘Human papillomavirus’ infeekshiniin vaayirasii karaa quunnamtii qaama saalaatiin daddarbu tahuu isaa dhageessee beektaa?	1. Eyyee 2. Lakki	
17	Eenyutu ‘Human papillomavirus’ infeekshiniin qabamuu danda’a?	1. Dhiira qofa 2. Dhalaa qofa 3. Dhiiraa fi dhalaa 4. Hin beeku	

18	Dhukkuboota kanniin keessaa kamtu ‘Human papillomavirus’ infeekshiniin dhufuu danda’a? (Deebii tokkoo ol kennuu dandeessa)	1. Kaanserii fiixee Gadameessaa 2. Kaanserii qaama saala dhiiraa 3. Kaanserii Laagaa 4. Kaanserii qaawa bobbaa 5. Shiffee qaama saalaa 6. Hin beeku	
19	Tooftaalee/ maloota kanniin keessa kamtu ‘Human papillomavirus’ infeekshinii ittisuuf/hirdhisuuf oola? (Deebii tokkoo ol kennuu dandeessa)	1. Saalqunnamtii irraa ofqusachuu 2. Kittibaata 3. Kondomii fayyadamuu 4. Ittifamuu hin danda’u 5. Hin beeku	
20	‘Human papillomavirus’ infeekshiniin akka nama qabuuf waantoti haala mijeessan? (Deebii tokkoo ol kennuu dandeessa)	1. Hiriya Saalqunnamtii baay’isuu 2. Tuttuqqii gogaa kan naannoo qaama saalaatti taasifama 3. Dhangala’oo qaamaa(Dhiiga) 4. Hin beeku	

Kutaa D: Beekumsa kittibaata ‘Human papillomavirus’ infeekshinii irratti			
21	Kittibaati Human papillomavirus infection dhukkuba infeekshinii ‘huumaan paappillooomaa vaayirusiitiin’ dhufu ittisuuf akka oolu dhageessee beektaa?	1. Eeyyee 2. lakki	Yoo ‘hindhaga’in’ gara gaaffii 126-ffaatti darbi
22	Eenyutu kittibaata ‘Human papillomavirus’ infeekshinii/kaanserii fiixee gadameessaa/ dhorku fudhachuu qaba?	1. Dhiiraa fi dhalaa 2. Dhalaa qofa 3. Dhiira qofa 4. Hin beeku	

23	Waa'ee kittibaata 'Human papillomavirus' infeekshinii/kaanserii fiixee gadameessaa maal beekta?	1.Kaanserii fiixee gadameessaa ittisuuf oola 2. Kaanserii keessoo qaama saalaa/Buqushaa/ ittisuuf oola 3. Kaanserii ala qaama saalaa/Buqushaa/ ittisuuf oola 4. Hin beeku 5. Kan biraa yoo beekte ibsi_	
24	Kittibaati 'Human papillomavirus' infeekshinii/kaanserii fiixee gadameessaa si'a meeqa kennama?	1. Si'a tokko 2. Si'a lama 3. Hin beeku	
25	Kittibaati 'Human papillomavirus' infeekshinii/kaanserii fiixee gadameessaa ittisu yoom kennama?	1. Waggaa-9 gaditti 2. Waggaa 9–14 3. Waggaan hin daangessu 4. Hin beeku	
Kutaa E: Akkaataa hubannoo kaanserii fiixee gadameessaa, 'Human papillomavirus' infeekshinii fi kittibbaata isaa			
Carraa qabamuu/Saaxilamuu/Susceptibility			
26	Dubartiin kamiyyuu 'Human papillomavirus' infeekshinii /kaanserii fiixee gadameessaatiif/ fi miidhaa isaatiif saaxilamtuudha; itti amantaa?	1. Tasallee itti hin amanu 2. Itti hin amanu 3. Hin amanus hin faallessus 4. Haga tokko itti amana 5. Baay'een itti amana	
27	Hangam tokko 'Human papillomavirus' infeekshinii /kaanserii fiixee gadameessaatii fi miidhaa isaatiif saaxilamu sodaatta?	1. Tasallee hinsodaadhu 2. Hin sodaadhu 3. Sodaas/ofitti amantaas hin qabu	

		4. Hanga tokko nin sodaadha 5. Baay'een sodaadha	
28	Yoo kittibaata 'Human papillomavirus' infeekshinii /kaanserii balbala gadameessaa hinfudhanne ta'e hangam dhukkubichaaf carraa saaxilamuu qaba jettee yaadda?	1. Tasayyuu carraa saaxilamuu hin qabu 2. Carraa saaxilamuu hin qabu 3. Qabaachuu fi dhiisuun koo natti hin muldhatu 4. Hanga tokko carraa saaxilamuu qabaachuu mala 5. Carraa saaxilamuu baay'ee qabaachuu mala	
Cimina miidhaa dhukkubichaan dhufu/Severity			
29	'Human papillomavirus' infeekshiniin /kaanserii fiixee gadameessaa fi dhukkuboota isaan walqabataniif saaxilamuun jiruu namaa irratti dhiibbaa guddoo geessisa; itti waliigalaa?	1. Tasayyuu itti walii hin galu 2. Itti walii hin galu 3. Itti walii hin galus hin mormus 4. Ittin waliigala 5. Baay'een itti waliigala	
30	'Human papillomavirus' infeekshiniin /kaanserii fiixee gadameessaa fi dhukkuboota isaan walqabataniin qabamuun dhukkuba cimaaf nama saaxila; itti waliigalaa?	1. Tasayyuu itti walii hin galu 2. Itti walii hin galu 3. Itti walii hin galus hin mormus 4. Ittin waliigala 5. Baay'een itti waliigala	
31	'Human papillomavirus' infeekshiniin /kaanserii fiixee gadameessaa fi dhukkuboota isaan walqabataniin	1. Tasayyuu itti walii hin galu 2. Itti walii hin galu	

	qabamuun baay'ee sukkaneessadha; itti waliigaltaa?	3. Itti walii hin galus hin mormus 4. Ittin waliigala 5. Baay'een itti waliigala	
Bu'aa kittibaata isaa/Benefit			
32	Kittibaata fudhachuun carraa 'Human papillomavirus' infeekshiniif saaxilamuu kee ni hirdhisa	1. Tasayyuu itti walii hin galu 2. Itti walii hin galu 3. Itti walii hin galus hin mormus 4. Ittin waliigala 5. Baay'een itti waliigala	
33	Kittibaata fudhachuun miidhaa kaanserii fiixee gadameessaatiin sitti dhufuu malu ni hirdhisa	1. Tasayyuu itti walii hin galu 2. Itti walii hin galu 3. Itti walii hin galus hin mormus 4. Ittin waliigala 5. Baay'een itti waliigala	
34	Kittibaaticha fudhachuun shiffee naannoo qaama saalaatti bahu ni hirdhisa	1. Tasayyuu itti walii hin galu 2. Itti walii hin galu 3. Itti walii hin galus hin mormus 4. Ittin waliigala 5. Baay'een itti waliigala	
Haalota akka hin fudhanne gochuu malan/Barriers			
Kanneen armaan gaditti eeraman hangam tokko kittibaata kaanserii fiixee gadameessaatiif kennamu akka ati hin fudhanne si dhorkuu malu?			
35	Yaadoo dhiibbaa badaa/side effect/ kittibaatichi geessisuu malu akka ati hin fudhanne si dhorkaa?	1. Baay'ee na dhorka 2. Hanga tokko na dhorka	

		3. Na hin dhorkus na hinfudhachiisus 4. Na hin dhorku 5. Tasayyuu na hin dhorku	
36	Shakkii qulqullinaa fi bu'a qabeessummaa kittibaatichi qabaachuu malu akka ati hin fudhanne si dhorkaa?	1. Baay'ee na dhorka 2. Hanga tokko na dhorka 3. Na hin dhorkus na hinfudhachiisus 4. Na hin dhorku 5. Tasayyuu na hin dhorku	
37	Ilaalchi/yaaddoon maatii kee kittibaatichaaf qaban akka ati hin fudhanne si dhorkaa ?	1. Baay'ee na dhorka 2. Hanga tokko na dhorka 3. Na hin dhorkus na hinfudhachiisus 4. Na hin dhorku 5. Tasayyuu na hin dhorku	
38	Sodaan ati lilmoo/Marfee waraannachuuf qabdu akka ati hin fudhanne si dhorkaa ?	1. Baay'ee na dhorka 2. Hanga tokko na dhorka 3. Na hin dhorkus na hinfudhachiisus 4. Na hin dhorku 5. Tasayyuu na hin dhorku	
39	Hubannoon sirrii hin taane kan ati kittibaatichaaf qabdu akka ati hin fudhanne si dhorkaa ?	1. Baay'ee na dhorka 2. Hanga tokko na dhorka 3. Na hin dhorkus na hinfudhachiisus 4. Na hin dhorku 5. Tasayyuu na hin dhorku	
40	Odeeffannoo gahaa dhabuun akka ati hin fudhanne si dhorkaa ?	1. Baay'ee na dhorka 2. Hanga tokko na dhorka	

		3. Na hin dhorkus na hin fudhachiisus 4. Na hin dhorku 5. Tasayyuu na hin dhorku	
Section F: Ilaalcha ‘Human papillomavirus’ infeekshinii/ kaanserii fiixee gadameessaa fi kittibaata isaaf qabdu			
41	Kaanseriin fiixee gadameessaa dhukkuba baay’ee hammaataadha, itti waliigaltaa?	1. Tasayyuu itti walii hin galu 2. Itti walii hin galu 3. Itti walii hin galus hin mormus 4. Hanga tokko ittin waliigala 5. Baay’een itti waliigala	
42	Kittibaati dhukkuba kanaaf kennamu carraa dhukkubichaan qabamuu hirdhisuuf/dhabamsiisuuf kannama; itti waliigaltaa?	1. Tasayyuu itti walii hin galu 2. Itti walii hin galu 3. Itti walii hin galus hin mormus 4. Hanga tokko ittin waliigala 5. Baay’een itti waliigala	
43	Kittibaati dhukkuboota ittisuuf kennama; itti amantaa?	1. Tasayyuu itti hin amanu 2. Itti walii hin amanu 3. Itti walii hin amanus hin mormus 4. Hanga tokko ittin amana 5. Baay’een itti amana	
44	Matiin kee akka ati kittibaata kaanserii fiixee gadameessaa fudhattu fedha qabuu?	1. Tasayyuu hin fedhan 2. Hanga tokko hin fedhan	

		3. Fedhii qabaachuu fi dhabuu waanti beekamu hin jiru 4. Hanga tokko ni fedhu 5. Baay'ee fedhu	
45	Kittibaatichi baay'ee mishaa fi bu'a qabeessadha; itti waliigaltaa?	1. Tasayyuu itti walii hin galu 2. Itti walii hin galu 3. Itti walii hin galus hin mormus 4. Hanga tokko ittin waliigala 5. Baay'een itti waliigala	
46	Kittibaaticha fudhachuun barbaachisaa akka ta'ee fi namoota biroon illee akka fudhataniif ni jajjabeessitaa?	1. Tasayyuu hin jajjabeessu 2. Hin jajjabeessu 3. Hin jajjabeessus hin mormus 4. Hanga tokko nan jajjabeessa 5. Baay'een jajjabeessa	
47	Kittibaaticha fudhachuun akka fedhan akka hiriya saalquunnamtii baay'isan nama taasisan	1. Baay'een itti waliigala 2. Hanga tokko ittin waliigala 3. Itti walii hin galus hin mormus 4. Itti walii hin galu 5. Tasayyuu itti walii hin galu	
Kutaa G: Madden odeeffannoo fi kaka'umsaa/piroomooshinii/ kittibaata kaanserii fiixee Gadameessaa irratti jirachuu fi dhiisuu isaa			
48	Waa'ee kittibaata kaanserii fiixee Gadameessaa dhageessee beektaa?	1. Eyyee 2. Lakki	Yoo 'Lakki' jette gara

			154-ffaatti ce'i
49	Yoo dhageesseetta ta'e eenyurraa dhageesse? (Deebii lamaa ol kennuu dandeessa)	1. Maas-miidiyaa 2. Ogeeyyii fayyaa 3. Mana barnootaa 4. Interneetii 5. Hiriyoota kee irraa 6. Maatii kee irraa 7. Kan biraa yoo jiraate ibsi_____	
50	Kittibaaticha akka fudhataniif ijoollee kakasuun ni jiraa naannoo kee?	1. Eyyee 2. Lakki	
51	Mana barnootaatti waa'ee kittibaata kaanserii fiixee gadameessaa barattee/dhageessee/ beektaa	1. Eyyee 2. Lakki	
52	Ogeeyyiin fayyaa hawaasa naannoo kee keessatti gadi ba'anii(bu'anii) waa'ee kaanserii fiixee gadameessaa barsiisanii beekuu?	1. Eyyee 2. Lakki	
53	Warri kittibaaticha kennan osoo hin kennin dursanii odeeffannoo (barnoota) ga'aa waa'ee kittibaatichaa irratti ni kennuu?	1. Eyyee 2. Lakki	
54	Waa'ee kittibaata kaanserii fiixee gadameessaa irratti odeeffannoo (barnootni) dabalataa na barbaachisa jettee yaaddaa?	1. Eyyee 2. Lakki	'Lakki' yoo jette Gaaffii 156-ffaatti ce'i
55	Yoo odeeffannoo (barnooti dabalataa si barbaachisa ta'e, qaama kamiin yoo siif kenname filatta? (Deebii lamaa ol kennuu dandeessa)	1. Maas miidiyaa 2. Ogeeyyii Fayyaatiin 3. Karaa Mana Barnootaa 4. Interneetii	

		5. karaa hiriya keetiin 6. karaa maatii 7. kan biraa yoo feete, ibsi	
Kutaa H: Gaaffii Kittibaata kaanserii fiixee Gadameessaa fudhachuu kee fi fedhii fudhachuuf qabdu adda baasuuf qophaa'an			
56	Kittibaata kaanserii fiixee gadameessaa fudhattee beektaa?	1. Eyyee 2. Lakki	Lakki' yoo jette Gaaffii 158-tti ce'i
57	Kittibaata kaanserii fiixee gadameessaa fudhattee beekta yoo ta'e, si'a meeqa fudhatte?	1. 1 2. 2	
58	Kittibaata kaanserii fiixee gadameessaa fudhattee beekta yoo ta'e, maaltu akka ati fudhattuuf si gargaare? (Deebii lamaa ol kennuu dandeessa)	1. Odeeffannoo gahaa waan argatteef 2. Bu'aa isaatti waan amanteef 3. Ogeeyyiin fayyaa waan sideeggaraniif 4. Maatiin kee akka fudhattu waan si jajjabeessaniif 5. Hiriyootti kee akka fudhattu waan si jajjabeessaniif 6. Kittibaatichi tolaan waan kennamuuf 7. Kan biraa yoo jiraate, ibsi	
59	Kittibaaticha hin fudhanne yoo tahe, akka ati hin fudhanne maaltu sigodhe? (Fudhatteeta yoo tahe irra darbi)	1. Odeeffannoo gahaa waanin hin argatiniif	

		2. Ilaalchi ani kittibaatichaaf qabu sirrii miti 3. Guyyaa kittibaati keenamu ani hin turre 4. Sodaa miidhaa sann booda dhufuu danda’u irraa maddu 5. Soda lilmoo waraannachuu waanin qabuuf 6. Maatiin koo akkan ani fudhadhu hin fedhan waanta’eef 7. Dhiibbaa Hiriya 8. Bu’aa isaatti hin amanne 9. Hanqina kittibaataatu ture 10. Wanta hawaasa keessatti odeeffamu 11. Kan biraa yoo jiraate, ibsi_____	
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Thesis Approval Sheet

This is to certify that the thesis entitled:

Human papillomavirus vaccination uptake and its associated factors among female adolescent school students in Chole Woreda, Arsi Zone, Oromia Regional State,

Ethiopia, 2025. submitted by Bekalu Tsegaye, ID No. 0479/15, has been reviewed and approved by the undersigned, based on the comments and suggestions provided during the thesis proposal defense.

Student Declaration

I, the undersigned, declare that I have incorporated the comments and suggestions of my advisors and examiners into the final version of my thesis proposal.

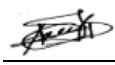
Name of Student: Bekalu Tsegaye

Signature:



Date: 10/12/2025

Advisors' Approval

1. Name: Dr. Ayalneh Demessie Signature:  Date: 09/12/2025

2. Name: Mr. Abdurehman Kalu Signature:  Date: 10/12/2025

Examiners' Approval

1. Name: _____ Signature: _____ Date: _____

2. Name: _____ Signature: _____ Date: _____

Department Head Approval

I hereby confirm that the student has submitted the final version of the thesis duly signed by the advisors and examiners.

Name: _____ Signature: _____ Date: _____