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Hesitancy in Human papilloma virus vaccine uptake and its associated factors among female students in Jimma Town, Oromia, Ethiopia

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A Research thesis Submitted to the Graduate Program of Addis Ababa University, College of Health Sciences, School of Public Health in Partial Fulfillment for the Degree of Masters of Public Health with Speciality on Epidemiology and Biostatistics

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Addis Ababa, Ethiopia

Declaration

I declare that this MPH thesis is my original work, that it has not been submitted for a degree at any other university, and that all sources of material utilized for this thesis have been properly cited.

Name of student: Meron Dera

Signature: _____

Date: June, 2023

With my consent as thesis advisor, this MPH thesis has been submitted for evaluation.

Approval of the primary advisor

Name: _____

Signature: _____

Date: _____

Approval Sheet

We hereby certify that we have read and endorse the thesis entitled '**Hesitancy in Human papilloma virus vaccine uptake and its associated factors among female students in Jimma Town, Oromia, Ethiopia**'. To be evaluated is accepted as partial fulfillment in the requirements for the Degree of Master of Public Health (MPH) in Epidemiology and Biostatistics.

Approval by examining board

Name of primary advisor: _____

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Acronyms and Abbreviation

AAU	Addis Ababa University
AF	Attributable Fraction
COVID 19	Coronavirus Disease of 2019
DNA	Deoxyribonucleic Acid
FDA	Food and Drug Administration
GAVI	Global Alliance for Vaccines and Immunisation
HPV	Human Papilloma Virus
MAC	Multi-age Cohort
STI	Sexually Transmitted Infection
WLWH	Women Live With Human immunodeficiency virus
WHO	World Health Organization

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Table of Contents

List of Tables

List of figures

Abstract

Background: The human papillomavirus (HPV) vaccination strengthens the body's defenses against the viral strains that cause cervical cancer. It has contributed to a reduction in cervical cancer-related morbidity and mortality, which is one of the great public-health success stories. Despite the fact that vaccination reluctance is one of the world's top ten health challenges, there is a shortage of evidence in Ethiopia to completely understand vaccination-related hesitancy behavior. The primary objective of this thesis was to assess hesitancy of HPV vaccine uptake and associated factors among female students, in Jimma Town, Oromia, Ethiopia

Methods: An institution-based cross-sectional study was conducted on 373 respondents, using both quantitative and qualitative approaches. The Data were collected by using pretested interviewer administered structured questionnaire, and in-depth interview. Logistic regression model was utilized to find independent predictors of female students' hesitation to receive the HPV vaccine. The threshold for statistical significance was set at p-value < 0.05 for all variables. Qualitative data were done by describing parents' perceptions about HPV vaccines until reached the saturation level. Details from an indepth interview were recorded, then transcribed verbatim, coded, organized by themes, and evaluated thematically. Findings were corroborated at interpretation.

Result: The hesitancy of the HPV vaccine in Jimma Town female students were 39.02% 95% CI (34.1, 44.1). Female school students who have smart phone, (AOR=0.51, 95% CI(0.28,0.94), mothers educational status (>= Secondary) (AOR=0.53, 95% CI(1.11,2.44), older sister vaccinated (AOR=0.04, 95% CI(0.004,0.42), previously vaccinated of HPV (AOR=0.64, 95% CI(0.006,0.137), distrust in safty & efficacy of vaccine (AOR=3.21, 95% CI(1.42,13.45) , think of unnecessary to receive HPV vaccinations (AOR=2.37, 95% CI(1.20,4.67), believe in learning stress not prevent from vaccinated (AOR=0.36, 95% CI(0.16,0.81), and Not Belief in rumors (HPV vaccine ruins girls fertility) (AOR=0.21, 95% CI(0.34,0.96), were found to be statistically significant with HPV Vaccine Hesitancy. Among the key causes showed by qualitative findings were poor perception, mistrust of vaccine safety and efficacy, fear of side effects, a lack of proper information, and misinformation.

Conclusion: The study found that HPV vaccine hesitancy is influenced by factors such as smartphone ownership, education, vaccination history, learning stress, and belief in vaccine rumors. However, hesitancy is also linked to concerns about vaccine efficacy and safety, suggesting the need for increased vaccination uptake.

Keywords: Human papillomavirus; Vaccination; Hesitancy

1. Introduction

1.1. Background

Vaccines have saved more lives than any other scientific breakthrough. In 2006, the FDA authorized the first preventive HPV vaccination, Gardasil, which was sold by Merck & Co. According to a Merck press release, it had been approved in 80 countries by the second quarter of 2007, with many of them undergoing fast-track or expedited review . A number of low-income African countries, notably Ethiopia, have started giving out the HPV vaccine with the assistance of the GAVI Alliance (1).

Belonging to the Papillomaviridae family, Human papillomavirus (HPV) is the most common sexually transmitted infection (STI). More than 100 different types of viruses are included in the category of viruses known as HPV. Sexual contact can result in the transmission of over 40 different forms of HPV. The majority of HPV-positive individuals show no symptoms. Girls aged 9 to 26 are eligible to receive the HPV vaccine. Girls should have three doses of the HPV vaccination by the ages of 11 or 12, and if they did not receive any, all, or any combination of the doses when they were younger, they can get immunized from 13 through 26 (2).

HPV can cause cervical cancer, as well as malignancies of the vulva, vagina, penis, and anus. It has also been connected to throat cancer (oropharyngeal carcinoma). This consists of the tonsils as well as the base of the tongue. When administered at the recommended ages, the HPV vaccine is both safe and effective in protecting against HPV-related diseases (including cancer) (3).

Almost all cases of cervical cancer are caused by HPV, which also plays a significant role in other anogenital and oropharyngeal cancer. HPV is responsible for 4.5% of all cancers worldwide (630,000 new cancer cases each year): 0.8% of cancers in males and 8.6% in women are cancer. Women's AF rates might range from 20% to 30% in Africa's Sub-Saharan region and India. Two-thirds of cancers caused by HPV that are related to the cervix occur in less developed nations (4). According to predictions, 80% of women will develop at least one kind of HPV over the course of their lifetimes, or eight out of 10 people will catch HPV at some point in their lives (5).

There are vaccines available to guard against HPV types with a high risk of infection, as well as effective management and treatment options. As a result, cervical cancer should be among the cancers that are easiest to prevent and treat (6). According to the Director of Girl Effect in Ethiopia, there are three major barriers preventing women from receiving vaccinations. Obstacles based on gender, such as misconceptions about how immunization affects women. There are social norms-based restrictions, and females are hesitant to visit health centers. There are also logistical and educational challenges, as many people are unaware of the HPV vaccine's benefits or how to obtain it.

With assistance from Gavi, the Vaccine Alliance, 2018 saw the introduction of the HPV vaccine in Ethiopia for females 14 years old. The COVID-19 epidemic has made immunization efforts much more challenging. Ethiopia started a vaccination campaign in 2021 for girls who missed one or both doses because of school closings. Ethiopia advises HPV immunization for females aged 14 years before they start having sexual relations (8). In a 2021 study of 400 parents in Addis Abeba, more than a quarter said they knew nothing about the HPV vaccine, and more than a third said they disliked it (7) even though different barriers regarding immunization have been identified for all girls. Thus, the purpose of this study was to provide the light on the factors that led to the hesitation of the particular female student, their worries, and the factors that influenced their decision to get immunized.

The second most frequent malignancy among Ethiopian women between the ages of 15 and 44 is cervical cancer. Current estimates show that 7445 women are diagnosed with the condition every year, and 5338 of them pass away as a result of the condition (6). A prior survey in Jimma Town found that just half of respondents (52.7%) and almost one-third (31.4%) had enough understanding of and favorable perspectives on HPV vaccination, respectively (9) and the researchers say that other researchers focus on the reasons for decreasing attitudes toward the vaccine. Based on another study carried out in Jimma Town two-thirds of female school students or only two-thirds of survey participants were willing to get immunized, according to the 68.9% of respondents who indicated they would be open to receiving HPV vaccines. These Researchers strongly advised to conduct additional research focued on the reasons why they don’t want to acceptance of the HPV vaccine though freely available, in the other way there is an increamnet in the hesitancy level of the vaccine (10).

Vaccine hesitancy is one of the top 10 risks to world health in 2019, according to the WHO Vaccine hesitation is described as delay in acceptance or a refusal to accept vaccination despite the availability of the vaccine. Factors such as complacency, constraints, and confidence all have an impact on it. Immunization reluctance has a direct impact on vaccine uptake and coverage rates. Vaccine hesitancy is complex and context-specific, varying through time, space, and vaccines (11). As part of excellent program practices, nations should implement a method for measuring and handle vaccine hesitation their nationwide vaccination program. To the researcher's knowledge in the research area, as well as Ethiopia, there are no studies on the magnitude of vaccine hesitancy and related factors with relation to the HPV vaccine. So this study aimed at putting a plug in this gap and reducing the HPV morbidity (12).

1.2 Statement of the problem

HPV has the highest prevalence of all sexually transmitted diseases. Three-quarters of all sexually active persons are thought to have been infected with this virus at some point in their lives, with roughly 35% of women becoming infected during the first two years of their sexual debut (13). The diversity of groups along the spectrum of vaccination-related ideas and attitudes draws attention to "vaccine hesitancy." To support the public health objectives of widespread vaccine uptake, it is essential to comprehend the diversity of vaccine-hesitant groupings. Refusing to get vaccinated has just been discovered as an important risk factor for cervical cancer (14).

The majority of empirical research concentrated on identifying low knowledge levels, which are thought to be a contributing factor to low rates of HPV vaccine uptake in communities. But because of the gap created by the lack of research on HPV vaccine hesitancy levels in Ethiopia as a whole, we do not know the prevalence level of hesitancy (8). So this study will try to assess the hesitancy level of HPV vaccine in female students. A number of prior studies were undertaken to better understand views regarding HPV vaccines among Ethiopian female school students, with the major focus being on HPV awareness and vaccination willingness (9,15) However, the underlying causes of the hesitancy have yet to be addressed. Studies have directly examined HPV vaccine hesitancy among female school students which is important to know the reason for correcting the vaccination system and for solving the problem because

vaccine hesitancy obviously decreases the uptake level. Although cervical cancer can be prevented and avoided, its occurrence among women is rising and getting worse (16).

Studies like those conducted in the Bench-Sheko Zone demonstrate that parents' attitudes regarding immunizing their daughters against the human papilloma virus and not just the viewpoints of the girls themselves determine whether or not they are willing to receive the HPV vaccine (17). While a Gonder study focused on health professionals' willingness for the human papilloma virus vaccine to prevent cervical cancer and related factors, it also included educated female health professionals with in-depth expertise (18). Parents and medical professionals both cited lack of financial resources and knowledge gaps as determinants to HPV vaccine uptake. Those variables only served to examine the HPV vaccination uptake barrier, demonstrating that other variables were not taken into account in the study.

In Jimma Town or any other area of Ethiopia, the researcher is aware of no studies on the human papillomavirus vaccination reluctance that would show how vaccine reluctance affects the vaccination rate. As a result, the aforementioned issues provide compelling justification for conducting substantial research on the impact of hesitation on HPV vaccination on the reduction of cervical cancer. In order to close the gap, this study will assess the prevalence of HPV Vaccine hesitancy associated factors.

1.3 Rational of the study

The objective of this study was to assess HPV vaccine hesitation levels and the factors that influence them. There have been no previous studies in Ethiopia or the research area, despite the fact that the WHO has identified vaccination hesitancy as one of the top ten dangers to health, particularly in low-income countries. As a result, there is a geographical gap in Ethiopia because studies are being conducted in other parts of the world, particularly Africa. Because this study used a mixed-methods design, investigators were able to theoretically and analytically combine specific insights from qualitative research (from in-depth interviews with parents) with quantiative data that is generalizable and easily repeatable (cross-sectional interviews with female students). Furthermore, this study used WHO confirmed and standardized vaccine hesitancy tools, which constitute crucial variables to possibly determine vaccine hesitancy. Recent study indicated that the overall level of awareness and attitude about HPV vaccination

was low in jimma town. Also, there is a lack of willingness to vaccinate with the HPV vaccine in the study area in particular. As indicated in the previous study, the researchers recommended that additional researchers investigate the prevalence of hesitation and associated factors, which are helpful for improving vaccination levels; therefore this study can be seen as a next step in filling the gap left by the prior study.

1.4 Significance of the study

The best way to prevent cervical cancer is with the HPV vaccine. A highly effective vaccine must achieve high vaccination coverage in order for a nationwide HPV vaccination campaign to be successful. Vaccination hesitancy is at least partially to blame for the low uptake of HPV vaccination (19). By preventing the infections that lead to cervical cancer, HPV vaccination can significantly reduce its incidence. Cancer prevention is preferable to cancer treatment. In light of the underwhelming acceptance, research to comprehend the particular difficulties of HPV vaccination has progressed.

Understanding the condition is crucial because female schoolgirls are the main target group for the human papillomavirus (HPV) vaccine. But vaccine hesitancy might influence uptake. This study aims to measure vaccination hesitancy levels in female schoolgirls and to show how a network of factors affect vaccine hesitancy and Investigating the causes affecting HPV vaccine hesitancy can therefore help reduce hesitancy and raise vaccination acceptance.. The results of this study will provide information to the HPV vaccination program and health professionals so that appropriate actions can be taken in response to the findings to save the lives of girls by learning more.

2 Literature review

The most common STI in the world is human papillomavirus (HPV), which has a substantial detrimental influence on individual social life. Sexually active women will become infected at some point in their life, but will not necessarily acquire diseases. Low-risk HPVs that cause cutaneous and anogenital warts and high-risk HPVs that cause oropharyngeal cancers and anogenital cancers, including the most common cancer, cervical cancer, are two types of the small, double-stranded DNA virus known as HPV (20).

HPV vaccines protect against human papillomavirus (HPV) infection. Most of those cancers can be avoided by avoiding the infections that cause them. The majority of occurrences of cervical cancer can be avoided by administering this vaccine before girls or women are exposed to the virus. HPV vaccinations are classified into three types. The World Health Organization presently recommends 9-valent HPV vaccination (Gardasil 9, 9vHPV), quadrivalent HPV vaccination (Gardasil, 4vHPV), and bivalent HPV vaccination (Cervarix, 2vHPV): For girls ages 9 to 14, a one- or two-dose regimen is recommended. a one- or two-dose regimen for women and girls between the ages of 15-20 (21).

The most common STI in the world, human papillomavirus (HPV), has a significant detrimental impact on how people connect with one another. Men and women who participate in sexual activity will contract the HPV virus at least once in their lives. Human papillomavirus, the fourth-deadliest disease in women is found in more than 90% of cervical cancer cases (20). It is currently a public health concern due to the high incidence of HPV infection worldwide, particularly in women where it is the primary cause of cancer. As of 2017, there were an estimated 291 million women who tested positive for HPV globally, making it one of the most frequent viral diseases in the world (22).

Eleven to twelve percent of women globally have human papillomavirus (HPV) infection, with higher rates in Sub-Saharan Africa (24%), Eastern Europe (21%), followed by Latin America (16%). The two most prevalent types are HPV16 (3.2%) and HPV18 (1.4%). Six types of cancer, including those of the cervix, penis, vulva, vagina, anus, and oropharynx (containing the tonsils and base of the tongue), have been connected to HPV infection. In less developed areas of the world, 80.6% of HPV-associated cancers occur; one in ten women globally currently has HPV

infection; HPV infection causes 610,000 new cases of cancer each year, and one in every ten women is infected (23).

Human papillomavirus vaccinations offer defense against infection (HPV). In 60% of WHO Member States, the national regular vaccination schedule now includes the human papillomavirus (HPV) vaccine. More than 40 of the more than 200 related viruses that make up the HPV group are spread through intimate contact. Only 13% of girls worldwide are adequately safeguarded as of 2021, though. Due in large part to active demand management (a response to prior supply shortages), delays in program implementation brought on by the Pandemic (COVID-19) virus, and the availability of additional supply as an effect of increased production capacity, the risk of HPV shortages has significantly decreased over the past year. Two novel HPV vaccinations also received commercial approval. One of them has also been prequalified by the WHO (24).

To accomplish the goals of the Global Strategy to Accelerate Cervical Cancer Elimination, there will not only be an insufficient supply of HPV vaccines, but global demand for HPV vaccines will dramatically exceed supply. This will be achieved through careful phasing of multi-age cohorts (MACs) campaigns, particularly in large countries. In order to secure market sustainability, active participation from all manufacturers and control of future supply and demand will be necessary (25). A research conducted in the Bench-Sheko Zone of southwest Ethiopia found, parents with primary and higher education were more likely to receive HPV vaccination than those with no education AOR: 2.9, 95% 95% CI (1.79, 4.95). Parents with good knowledge of HPV and HPV vaccinations were more likely to vaccinate their children against HPV (AOR: 2.1, 95% CI) (1.15, 4.10). Parents who had a positive attitude toward HPV and HPV vaccination were more likely than their counterparts to be willing to vaccinate their children against HPV AOR: 2, 95% CI (1.30, 3.41) Regardless of age, residence and income showed an association (AOR>1) (17).

A study conducted in Jimma Town School found that smart phone ownership (P =.008), presence of radio or television in the home (P =.049), awarness of the HPV vaccine (P =.001), and information source (P =.025) predictors were significantly associated with knowledge of the HPV vaccine, which is beneficial for increasing the uptake of the HPV (9). Scores for confidence, complacency, constraints, and collective responsibility for four of the predictors of

vaccine hesitancy all showed statistically significant differences, according to a study conducted in South Africa on schoolgirls (higher in the vaccinated group). The average results of the two groups included in the calculation barely differed from one another (26).

According to a study conducted in Gonder, parents from the wealthiest households were 3.44 times more likely than those from the poorest households to consent to their daughters receiving the HPV vaccine [AOR= 3.44, 95% CI = (1.97, 6.01)]. Similar to this, after accounting for other factors, parents from middle-class homes were 2.04 times more likely to consent to their daughters receiving HPV vaccination than parents from the poorest households. Regarding cervical cancer knowledge, those who were well-informed on the disease's risk factors and its symptoms were 5.49 times more likely to consent to vaccination than those who were less knowledgeable (27). A meta-analysis of data from 79 trials in 15 countries, comprising more than 840 000 parents, indicated that 41.5% of parents gave their kids at least one dose of the HPV vaccine. In many nations, vaccination rates dropped in 2021. It is currently estimated that 15% of girls worldwide have received their first dose of the HPV vaccine. Comparatively speaking, this decrease from 20% in 2019 is substantial. Additionally, despite this decline, 3.5 million more girls in 2021 were not protected against the human papillomavirus (HPV) than they were in 2019 (28).

Barriers and associated factors in HPV Vaccine hesitancy

Other healthcare professionals play a crucial role in maximizing vaccination uptake. The participation of healthcare professionals is likely to be most essential of the many variables affecting HPV vaccination uptake; in fact, a healthcare provider's advice is a significant predictor of HPV vaccination. Social media is also it is now possible for social media and online sources to inform and shape vaccination attitudes, and it is possible to track and deal with vaccine reluctance. 44.45 The targeting and creation of initiatives to enhance health communication and promote vaccine uptake may be guided by analysis of health-related discussions and attitude expressed on social media (29).

In the study, South African public schoolgirls had low vaccination rates for the human papillomavirus, Is Caused by Vaccine Hesitancy, not receive atleast One dosage of the HPV vaccine had been 67.1% (1,196/1,782) of the respondents, and two doses had been received by their daughter, according to 58.5% (628/1,074) of the respondents. 1,049 out of 1,115 students

(90.8%) said they had a vaccination at school. Respondents were given the option to list multiple reasons why their daughters were not immunized. 63.1% of respondents with daughters who were not immunized responded to the question, and of the 654 reasons they provided, 53.5% stated that they were worried about the vaccine's negative effects and safety (31.9%) (26).

Each year, an estimated 70 722 new instances of invasive cervical cancer (ICC) are diagnosed, which makes about one-fourth of all female malignancies in Africa's Sub-Saharan region. Sub-Saharan Africa has one of the greatest number of ICC incidence in the entire globe, with an estimated aggregate age-standardized incidence rate (ASR) of 31.0 per 100 000 women. Different regions of Africa had higher rates of the two HPV strains that can be prevented by vaccination, 16 and 18, with 42.7 in East Africa, 38.2 in Southern Africa, 28 in Central Africa, and 29.3 in Western Africa (30).

The pooled prevalence of human papillomavirus (hr HPV) in Sub-Saharan African countries was 34% (95% CI: 29-39), according to a meta-analysis of 23 studies. Ghana has a prevalence of HPV infection of 10.7%, while Cote d'Ivoire has a prevalence of 90.8%. However, WLWH can have up to 97% of the population infected with HR HPV. Therefore, it is essential to take into account factors related to HPV infection in order to create a vaccination-based preventative plan that is effective. (31). According to an updated comprehensive investigation in Ethiopia, the detection of HPV among women chosen from the general population was between 19.9 and 23.2%. HPV prevalence ranged from 13.7 to 93% among women with diverse forms of cervical dysplasia. The majority of the HR-HPV genotypes were found in several cervical sample types. While planning vaccination and HPV-based cervical cancer screening programs in Ethiopia, special consideration should be given to HPV 16, as well as HPV 52, 35, and 18 (32).

Influence of parental knowledge and views on Kenyan parents' rejection to the HPV vaccine 183 (93.5%) of the 195 participants were over the age of 30. 34 men (46.4%) and 39 women (35.1%) were unaware that the vaccine is administered to prevent HPV infection. Despite the fact that vaccine acceptance was high (90%) and despite one-third's (37.1%) low opinion of the vaccine's efficiency, Concerns about vaccine safety are cited as reasons for vaccine rejection (76%) and the assumption that the child is too young (48%) (33). In Bahir Dar city, Amhara region, a study found that the main barriers to receiving the HPV vaccine were a lack of information from healthcare providers (79.3%), ignorance of the vaccine's safety (27.5%), ignorance of the source

of the vaccine (93.8%), and a lack of parental support (76.7%). The main barriers for HPV vaccine uptake identified were a lack of information from health care providers and a lack of knowledge about the vaccines. Based on their findings, this research discussion The primary sources of information about HPV vaccination were teachers and the media (radio, television, and the internet), followed by parents and medical professionals (8).

Despite the growing body of literature on HPV vaccination, very few studies have been undertaken in poor countries in general, and in Sub-Saharan Africa in particular, to examine the shifting perspectives of parents and other stakeholders following the introduction of HPV vaccination. Prior to the introduction of HPV vaccination, previous studies conducted in low resource settings discovered that knowledge of cervical cancer and HPV was poor, but attitudes toward cervical cancer vaccination were favourable. There were concerns regarding the quality of delivery, safety, adverse effects, and the vaccination's influence on females' fertility (34). Since Ethiopia only recently introduced the HPV vaccination, some research has been done on the subject of knowledge, attitude, and readiness to vaccinate the HPV vaccine has been done on the topic of hesitation and its underlying causes in Ethiopia and the Oromia region. Thus, these studies assess Jimma Town's HPV vaccination hesitancy prevalence for HPV and identify the factors affecting such practices.

Conceptual framework

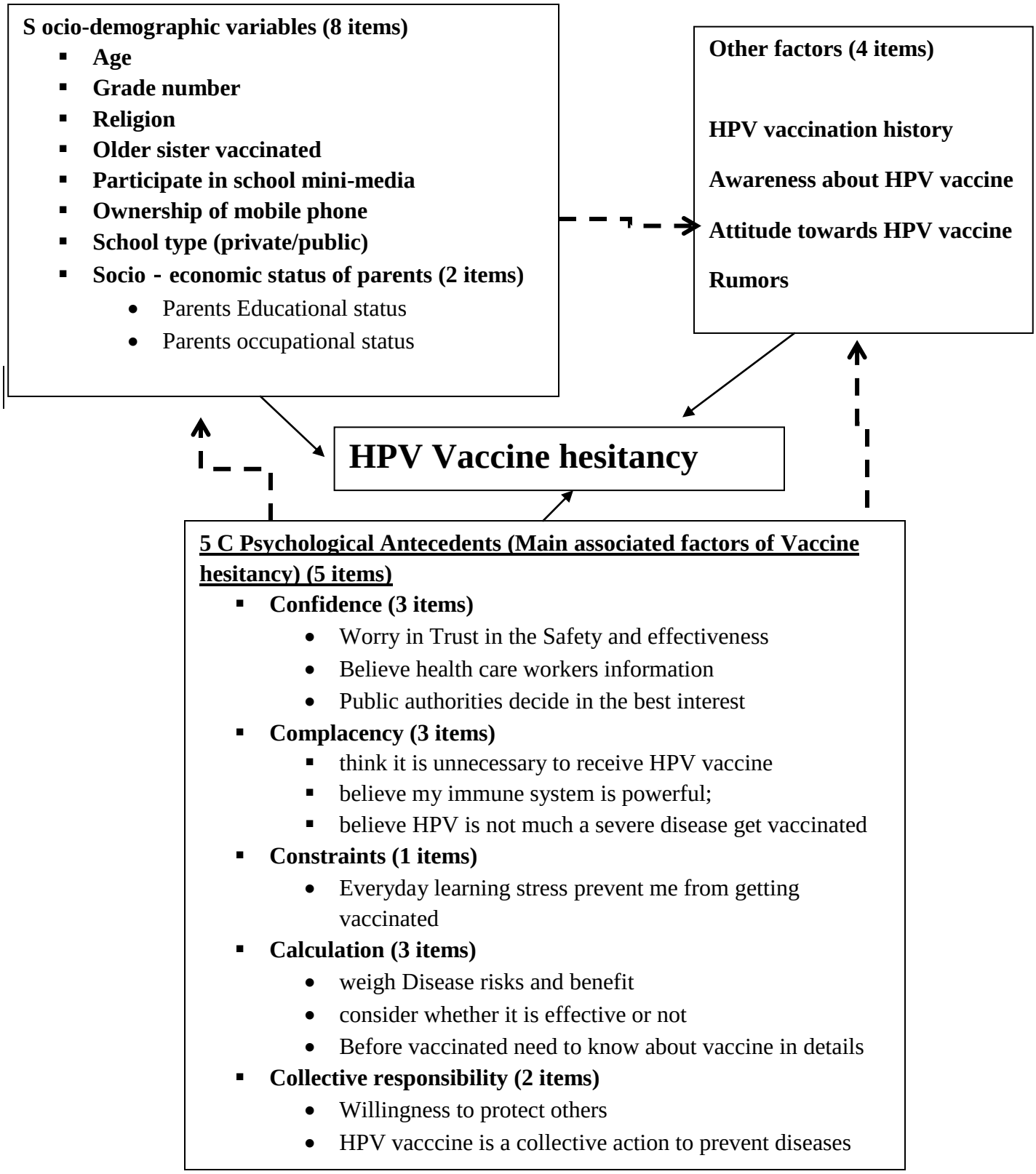

Figure 1: Conceptual frame work showing HPV vaccine hesitancy and its associated factor in Jimma Town female school students, Oromia, Ethiopia, October, 2023

3 Objectives

3.1. General objective

- To assess hesitancy of Human papilloma virus vaccine uptake and associated factors among female students, in Jimma Town, Oromia, Ethiopia, 2022/2023.

3.2. Specific objectives

- To assess Human papilloma virus vaccine hesitancy among female students, In Jimma Town, Oromia, Ethiopia.
- To identify factors associated with Human papilloma virus vaccine hesitancy among female students, In Jimma Town, Oromia, Ethiopia.
- To describe perception regarding Human Papilloma Virus vaccine hesitancy among parents of female students In Jimma Town, Oromia, Ethiopia.

4 Methods

4.1. Study area and period

The research was conducted at selected Jimma Town public and private primary and secondary schools from December 2022 up to October 2023. The largest city in the southwestern oromia area, Jimma Town, is found 352 kilometers to the southwest of Addis Abeba and has a population of 120,960, of which 60,136 were women according to the 2007 census.

Jimma town has 35 public primary and secondary schools and 37 private primary and secondary schools.

4.2. Study Design

An institution based cross-sectional study was done, using both quantitative and qualitative approach. First, an institution-based cross-sectional quantitative study design was implemented to investigating associations between reasons categories and socio demographic variables of special interest in Jimma Town school girls with the qualitative inquiry was employed indepth interview for explain reasons provided via free text responses to describe their perceptions about Human Papilloma virus, vaccination hesitancy and its associated factors in Jimma town school girl parents, oromia, Ethiopia.

4.3. Populations

4.3.1. Target & Source Population

Target population: All female populations living in Jimma Town.

Source populations: All Female students learning in selected schools in Jimma Town during the study period.

4.3.2. Study Population & Study Unit

The sample populations: Selected Female students learning in selected Jimma Town schools during the study period

The study units: The selected eligible female individual students who can vaccinate the HPV Vaccine include in the study during the study period.

4.4. Inclusion and Exclusion Criteria

4.4.1. Inclusion criteria

- ✓ The study included female students in age groups greater or equal to 14 who were available during the data collection period. In fact, the Federal Democratic Republic of Ethiopia's Ministry of Health issued guidelines for HPV vaccine administration to 14-year-old girls, but due to the COVID-19 pandemic, the vaccine service was halted, and due to a variety of factors, girls and their parents were unable to develop a positive attitude toward HPV vaccine. Thus, the current study included girls aged 14 and up who were unable to taken the vaccine for a variety of reasons.

4.4.2. Exclusion criteria

- ✓ Female students at eligible age for HPV vaccine but not getting the chance of receiving the HPV vaccine were excluded from this study.

4.5. Sample Size Determination

The method for single population proportion was used to calculate sample size based on the following criteria:

$$\boldsymbol{n_i} = Z^2_{\frac{\alpha}{2}} \frac{P(1-P)}{d^2}$$

$$= 1.96^2 \frac{0.503(1-0.503)}{0.05^2}$$

$$= 384$$

Where: n denotes the sample size.

The usual normal value $Z^2_{\frac{\alpha}{2}}$= corresponds to the acceptable level of confidence.

d denotes the precision error.

P denotes an attribute's estimated proportion.

The single population proportion calculation was applied with an assumption to determine the number of female students to be included in the study:

For specific objectives 1 Human Papillomavirus Vaccine Hesitancy Drives Low Coverage in Girls Attending Public Schools, the proportion was 67.1% in South Africa (26). A single population proportion calculation based on the following assumptions: 95% confidence interval, 5% margin of error, and participant sample size

$$n = Z^2_{\frac{\alpha}{2}} \frac{P(1-P)}{d^2}$$

$$= 1.96^2 * 0.671 * 0.329 / 0.05^2$$

$$= 339$$

After controlling for a 10% non-response rate, a sample size of 373 individuals was chosen for the study. The sample size for the second objective was calculated using the epi info version 7 software applying the double population proportion formula.

Variables (Associated Factors)	**Confidence Interval**	**Power**	**Percent in exposed**	**Adjusted Odds Ratio**	**Sample Size**
Older sister vaccinated	95 %	80 %	12.2 %	2.8	224
Previous vaccinated History	95 %	80 %	7.48 %	0.142	92
Mothers Educational Status	95 %	80 %	69 %	2.3	262

So, using the single population formula 373, select the largest sample final sample size.

4.6. Sampling technique

According to the Jimma Town Municipality, there were 13 urban kebele in Jimma Town. Based on Jimma Town's educational buero, there were 33 elementary and 4 secondary private schools, as well as 26 elementary and 9 secondary public schools. In those schools, there were 2,689 female public elementary (grades 7-8) and 542 secondary students, as well as 792 female private elementary (grades 7-8) and 103 secondary students. Four primary and two secondary public schools, as well as five primary and two secondary private schools, have been selected, a total of 13 schools chosen one from each kebele, using the lottery technique. Stratified random sampling technique was employed to recruit female school students by their school type from the thirteen schools. The sample size for each selected school was set proportionally based on the number of female students in the school. Each participant female school student was picked at random from selected schools applying a systematic random sampling by using k= N/n, where N is the number of female students in each school and n is the required number of female students, which is calculated by proportional formula.

n is calculated by using the proportional allocation formula for each selected schools =

$$= \frac{Total\ sample\ size}{Entire\ population} * Population\ of\ sub_{groups}$$

$$= \frac{373}{4656} * Female\ students\ of\ Each\ schools$$

Based on the female students in each public and private schools, the calculated sample size was allocated proportionally. **(Figure 2).**

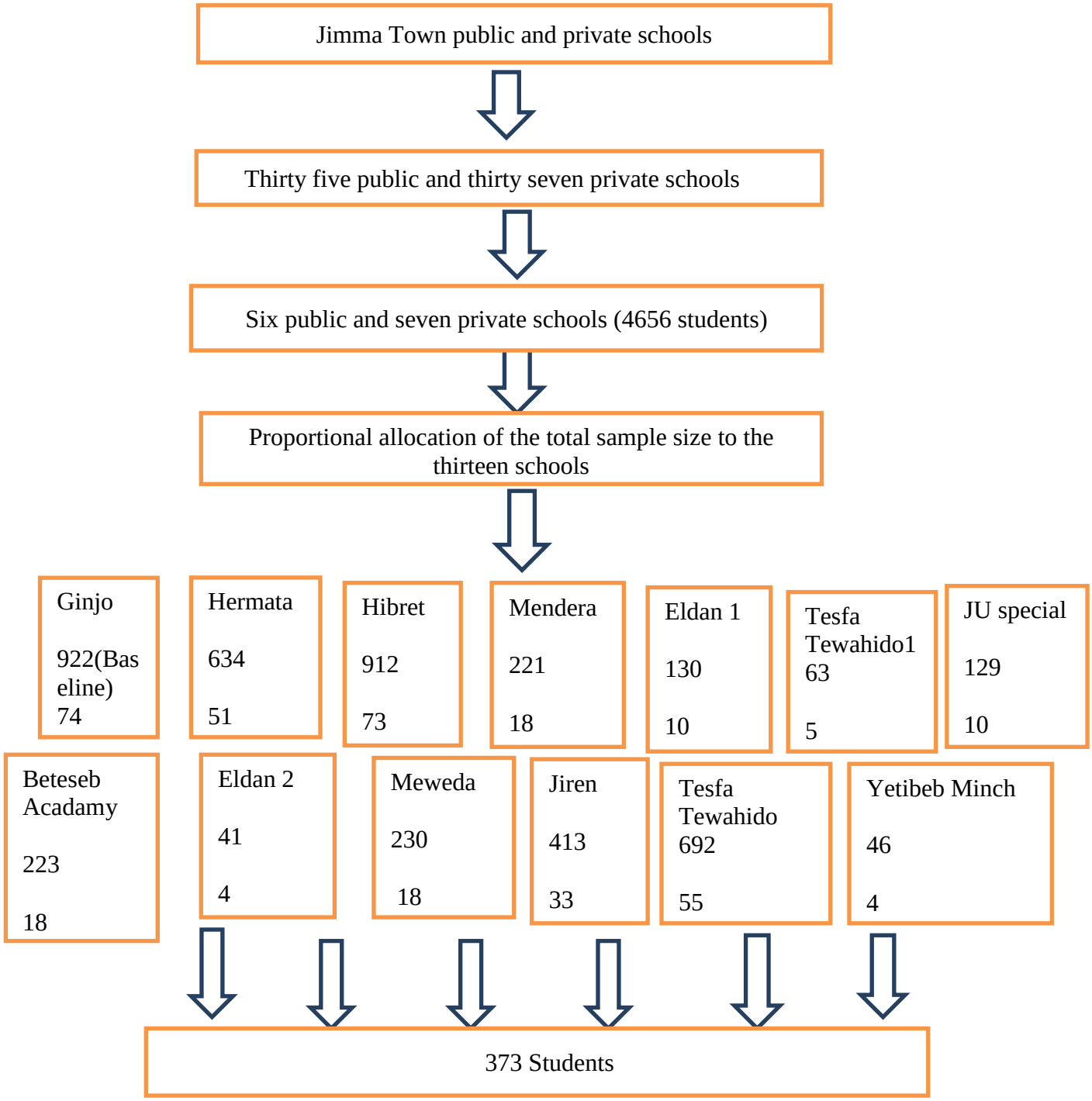

Figure 2 Schematic presentation of sampling technique for study conducted on Female school students in Jimma Town, Oromia, Ethiopia, October, 2023

4.7. Data collection tools and procedures

A structured, pre-tested interviewer-administered questionnaire and semi structured in-depth interview guide .The questionnaire was adapted from different study done elsewhere (26, 35, 36,).

In order to ensure consistency, the interview questionnaire for the female student was first translated into two native languages (Amharic and Afan Oromo) and back to English to check for its consistency. Data collectors were three collage health students and there was one public health supervisor. The following techniques were used to collect data

For quantitative data to answer objectives one and two, which are to assess the level of hesitancy and associated factors related to HPV vaccine hesitancy, the questionnaire was divided into sections. Those were created to evaluate socio-demographic factors, parents' socio-economic status, awarness about HPV vaccination, vaccination history, attitude toward the HPV vaccine, and HPV vaccine hesitancy. The 5C psychological antecedents of vaccination data were collected using interview-administered questionnaires.

4.8. Study variables

Dependent variables:

- Hesitancy of HPV vaccine

Independent variables

- Socio-demographic variables such as: Age, Religion, Grade number, parents Educational status, Parents occupation, Having older sister/older sister vaccinated, Participate in school mini-media club, Ownership of mobile phone, and School type (private/public).
- Others factors: awareness about HPV vaccine, Attitude towards the vaccine, Rumors, and vaccination history
- 5C Psychological Antecedents Confidence, Complacency, Constraints, Calculation and Collective responsibility

4.9. Operational Definition and definition of terms

Human papiloma virus (HPV): A type of virus that can cause abnormal tissue growth (for example, warts) and other changes to cells. Infection for a long time with certain types of human papillomavirus can cause cervical cancer (37).

Human papiloma virus (HPV) Vaccine: a vaccination that aids in defending the body against contracting specific HPV types. Human papillomavirus vaccines are being used to prevent some of these cancers. They are also being used to prevent genital warts and abnormal lesions that may lead to some of these cancers. Also called HPV vaccine (38).

Human papiloma virus (HPV) Vaccine Hesitancy: Delay in acceptance or refusal of HPV vaccines despite availability of vaccine services (39). From several literature sources "If you get the chance to get an HPV vaccine for free, do you want to receive the vaccination?" is a question from a questionnaire on HPV vaccine hesitancy. Answers of "yes," "no hesitancy," or "willing to accept the HPV vaccine without hesitancy," and "no," "hesitancy," or "refusal to receive the HPV vaccine," respectively, were judged to indicate hesitancy (35).

Attitude: Respondents' attitudes toward HPV infection and vaccines were categorized as follows: negative if they not answered correctly, and positive for if they answered correctly.

5C Model: Five psychological antecedents of vaccination behavior represented in the 5C Model that measures vaccines hesitancy: confidence, complacency, constraints, calculation, and collective responsibility (36, 40).

The rationale behind using the 5C model and its measurment

In 2014, the WHO released the first definition of vaccine hesitancy, building on past research that had identified the main causes of vaccine hesitancy. The 5C model has since developed into a crucial tool for determining the factors that contribute to vaccine hesitancy. It has been applied for this purpose to a variety of populations in various nations, including, American patients (41),Adults in Bangladesh (42), Swiss university students (43), Schools students in china (35), adults in Egypt, United Arab Emirates and Jordan (44), and South African female pupils (26).

The 5-point likert scale questions of the 5C Psychological Antecedents of Vaccination Scale was used for vaccines in general and modified to assess antecedents for HPV vaccines (12 total questions)

- **Vaccination confidence** is defined as trust in (i) the effectiveness and safety of vaccines; (ii) Authorities make decisions by considering what is best for the community. and (iii) Trust in healthcare workers for accurate vaccination information (12).
- **Vaccination complacency** exists where perceived risks of vaccine-preventable diseases are low and vaccination is not deemed a necessary preventive action. Has 3 questions (i) Consider that receiving immunizations is not necessary because they cannot prevent HPV (ii) feel my powerful immune system will protect me from cervical cancer and (iii) believe in Cervical cancer is not much a severe disease that I should get vaccinated against it (12).
- **Vaccination Calculation** (i) Weigh the advantages and disadvantages of getting vaccinated against cervical cancer to reach the best decision (ii) When considering

receiving a vaccination against cervical cancer, first consider whether it is effective or not and (iii) Before getting HPV vaccinated, need to know about this vaccine in details (12).

- **Vaccination Collective responsibility** (i) will receive the HPV vaccine since it will protect those with weakened immune systems. and (ii) Consider HPV vaccination as a group effort to stop the spread of illnesses (45).
- **Vaccination Constraints** (i) Everyday learning stress may prevent from getting vaccinated (39).

4.10. Data quality control

To ensure data quality, the following operations were carried out: modifying questions from Standard tools and translating them into Amharic and Afaan Oromo. Data collectors were trained on how to use kobo-tools, sampling procedures, interview tactics, and data collection processes, all while being overseen by a public health officer. The questionnaire was subjected to pre testing to determine whether the questions were clear and suitable for extracting the necessary information and checking the understandability flow and consistency by taking 5% of sample from other schools which are not included in the actual data collection to evaluate the instrument's ease of use. As a result, potential changes or modifications were evaluated at the time of data collection, and minor corrections on a few questions were included. The filled formats by kobo tool were checked.

4.11. Data management and Data Analysis

The questionnaires' consistency and completeness were checked. After data collection is done on Kobo Tool, download it in XLS format and export it to SPSS version 20 statistical software for cleaning data. Analysis was made using Stata version 17 statistical software. After exporting the prepared data, descriptive statistics such as frequency distribution and measures of central tendency and variability were computed to describe the major variables of the study, while frequencies and proportions were computed for categorical variables. Bivariate analyses were used to analyze the initial crude relationship between each independent and dependent variable, as well as the chi-square test. The independent variables with a P value of 0.25 were then transferred to multivariable analysis in order to control for cofounders. The criteria for statistical significance were a P-value of 0.05, and AOR with a 95% confidence interval was used to illustrate the strength of the link.

4.12. Qualitative study methods

4.12.1. Study design

An explanatory-qualitative study was employed with aim of getting a deeper understanding of the perception and opinion about HPV vaccine and hesitancy and factors that influence HPV vaccine servies among parents.

4.12.2. Study participants

An embedded qualitative study was conducted for the third objective. A semi-structured interview guide was used to conduct in-depth interviews, and 13 data points were gathered from 13 female student parents or caregivers who learned about each school, which was purposively selected and included in the quantitative data collection as a result, thirteen parents were interviewed. During the interview process, when no new information was received throughout the interview process, data saturation took place. Based on the researcher's evaluation of individuals who are representative of the study phenomenon, participants were specifically selected. Participants were choosen purposively with maximum variation, they variate by age, educational status, occupational status and sex.

4.12.3. Eligibility criteria

The study included people who fit the following conditions.

- ✓ Parents or caregivers of female students who met the criteria for the age of the HPV vaccination and were available during the vaccination program in selected schools
- ✓ Parents or caregivers of female students who agree to participat in this study

Excluded from this study

- ✓ Parents of female students who had never heard about HPV vaccine.

4.12.4. Sample size determination

The sample size had been determined using saturation of data (redundancy of ideas by in-depth interviews) from those interviews.

4.12.5. Sampling method

Purposive sampling technique was used based on the judgment of the researcher regarding subjects that are representative of the study phenomenon. The participants were recruited from selected schools students. The information needed to answer the third objective regarding describing perspectives of Human Papilloma Virus vaccine hesitancy among female schoolgirls.

4.12.6. Data collection tool and procedure

Semi-structured interview guide was used and face to face interview was conducted by the principal investigator in order to gain rich form of data.

The interview questions were taken from a prearranged interview guide, which also included a list of probing questions to help and steer the conversational interview in a specific direction. Since probing allowed for the elucidation of intriguing and important questions addressed by the respondent, it was an essential instrument for ensuring the validity or genuine value of the data. Based on the WHO criteria of "delay in acceptance or refusal of vaccination despite availability of vaccination services," a category for vaccine hesitancy was defined with including socio demographic questions (age, educational status, occupational status), sourse of hearing about HPV vaccine, cconserns about the vaccine, worries about the vaccine, any misinformation they heared, they getting of adequate information and the factors of vaccine hesitancy were included in the intervieew. The interviews were audio-recorded, allowing for the transcription to be prepared for analysis. As a supplement to the audio-recorded data, written notes were utilized to record information. The interview lasted a minimum of 20 minutes and a maximum of 25 minutes, after getting consent from parents, the interview was done in Amharic and Afaan Oromo at the schools and homes of selected parents.

4.12.7. Data quality control

Trust worthiness

Data trustworthiness was appraised by the following criteria's.

Credibility

During in depth interview, enough time given to participants to respond their perceptions and experiences, interviewed in comfortable place, data was collected by the principal investigator and data collector observe there facial expression to understand there nonverbal response.

Dependability

In order to assure the consistency of data from all participants in depth interview was done by two data collectors and same interview guide used for. After data collection the raw or recorded data was transcribed verbatim and then into English language.

Transferability

Hetrogenious purposive sampling was used for in depth interview

Conformability

In order to avoid researcher's bias throughout data collection, coding, and analysis, the researchers' judgments and expectations were replaced by the participants' own words.

4.12.8. Data processing and analysis

The recorded verbatim audio and memo were immediately transcribed and translated to English as initial analysis. Again interview transcript was re-read line by line and listened in order to

match a sense of what has been said by each study participant. Contradicting ideas in subsequent question were validated during interview by the respondents own word and crosschecked with memos to assure the credibility of the information. Transcribed notes and audio were coding and categorizing codes then the output was exported in to excel and report form. The researcher carefully studie the data to find common themes - topics concepts, and meaning patterns that come up repeatedly. Then thematic analysis were done, finally, the finding was explained by merging categories and themes with the quantitative finding. Finally, the finding was explained by merging categories and themes with the quantitative finding

4.13. Ethical Considerations

Maintaining the confidentiality of participants throughout the whole process of data collection was also discussed during the training. The ethical issues were considered throughout the study by considering the basic ethical research principles like informed consent, confidentiality, beneficence, non-malificence, and justice and submitting them to the ethical review committee of the AAU for approval of this research. The approval for ethical clearance was submitted to the Jimma Town Educational Bureau, who wrote a supportive letter to each public and private school and presented it to the directors of the selected schools to grant official permission to undertake research activities. Verbal informed consent was obtained from each director of the selected schools after the investigator explained the nature, purpose, and procedure of the study. Then the written informed consent form was given to each selected female school student aged 18 and under care takers to ensure legal readiness on their behalf for their children. After filling out and getting those consents, the data collection was done, and the entire family was informed that the data would be kept in private and confidential and used only for research purposes. The participants were also assured that they have the right to refuse or withdraw if they are not comfortable at any time.

4.14. Dissemination of findings

The results of this survey will be presented, distributed in print, and distributed electronically to the School of Public Health. Additionally, it will inform HPV vaccination program, the Zonal Health bureau of Jimma town, as well as each of the examined institutions. A publication attempt will be undertaken using this research.

5. Results

5.1. Socio-demographic characteristics

A total of 369 female school girls were participated, with a 98.9% response rate. Of the total participants, 249 (67.74%) were at the age of 14 and 15. The majority of female students 256 (69.37%) attending at public schools.In terms of religion, 126 (34.15%) were Muslim and 110 (29.81%) were orthodox. Most 320 (86.72%) of the study participants were living with their families, and from them, 240 (65.04%), were in grades 8 and 9. Mothers of 239 (64.77%) and Fathers of 244 (66.12%) respondents' were educated. A large percentage 246 (66.67%) of respondents, reported their parents' source of income was trade. Also more than half of students used school mini-media, and 245 (66.40%) of them own a mobile phone. Of the total participants, 190 have an older sister, and 170 were received the HPV vaccine. **(Table1).**

Table 1: Socio-demographic characteristics, Family history and parent's socio-economic status of female school students in jimma town, oromia, Ethiopia, 2023

Factors	Frequency	Percent
Age		
14 years	229	62.06
15 years	66	17.88
16 years	60	16.26
17 years	14	3.80
Religion		
Orthodox	110	29.81
Muslim	126	34.15
Protestant	107	29.00
Others	26	7.05
Grade level		
7^{th} grade	41	11.11
8^{th} grade	127	34.42
9^{th} grade	113	30.62
10^{th} grade	88	23.85
School Type		
Public school	256	69.37
Private school	113	30.63
Live with		
Parents	320	86.72
Relatives/others	49	13.28

Father Educational status		
Unable to read and write	130	35.23
Able to read and write	38	10.30
Primary (1-8)	72	19.51
>=Secondary (9-12)	68	18.43
Above 12	61	16.53
Mother Educational status		
Unable to read and write	125	33.88
Able to read and write	27	7.32
Primary (1-8)	28	7.59
>=Secondary (9-12)	132	35.77
Above 12	57	15.45
Parents source of income		
Marchent	246	66.67
Government Employee	76	20.60
Others	47	12.74
Have an older sister		
Yes	190	51.49
No	179	48.51
Older sister vaccinated HPV vaccine		
Yes	170	89.47
No	20	10.53

5.2. The overall HPV Vaccine Hesitancy status

Of the total participants, 230 (62.33%) have received the HPV vaccination before, 143 (38.75) have been vaccinated once, and the rest, 87 (23.57%), have been vaccinated twice. For measuring the prevalence of hesitancy, ask the question, "If you get the chance of getting a HPV vaccine for free, do you want to receive the vaccination?" Two hundred twenty-five (60.98%) responded "yes," considered as "no hesitancy" or willing to take up the HPV vaccine without hesitancy and one hundred forty-four (39.02%) responded "no," considered "hesitancy" or refused For getting an HPV vaccination, so according to this study the prevalence of the Hesitancy in HPV vaccine uptake in Jimma Town female school students was 39.02%.

From 144 (39.02) hesitancy levels at the age of 11–13, at grade 6-7, individuals who were not participating in school- mini-media and had no smart phone were accounts Greater than 50%.

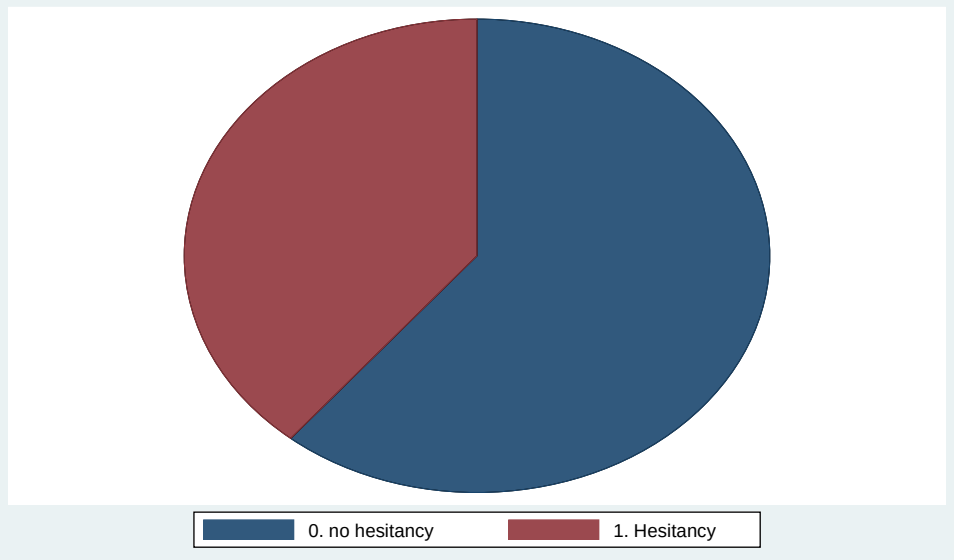

Figure 3: HPV vaccine hesitancy and nohesitancy group in jimma town female school students, Ethiopia, 2023

From Participants who stated an intention to receive HPV vaccination 225 (60.98%) the motives for going to be vaccinated were, Eighty-seven (38.66%) don't want to be infected and Eighty-three (36.88%) believe in the efficacy of the HPV vaccine.

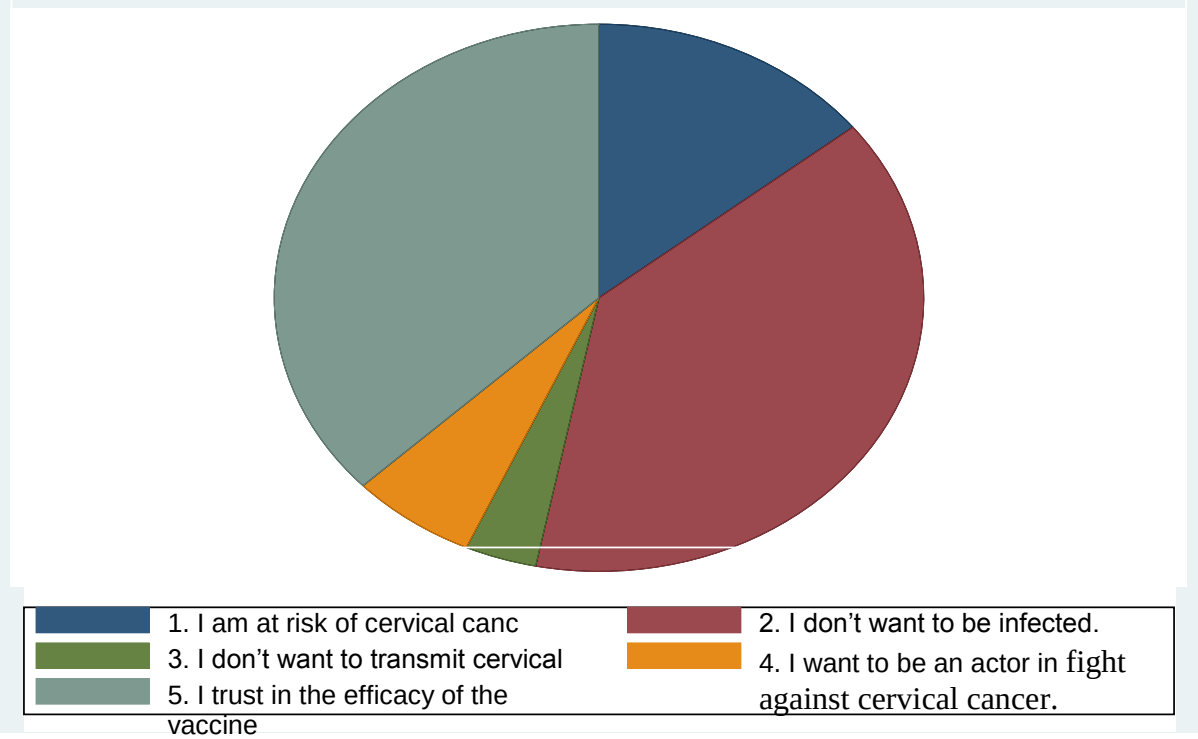

Figure 4 Reasons for receiving the HPV vaccine (acceptance) in jimma town female school students, Ethiopia, 2023

Fearful of the vaccine's mild side effects (e.g., fever, pain at the injection site) and major adverse effects (e.g., hospitalization, serious sickness), were reasons for not intended to be vaccinated in 64 (44.4%) of participants, wereas 57 (39.58%) want to wait until they have more experience with these vaccines.

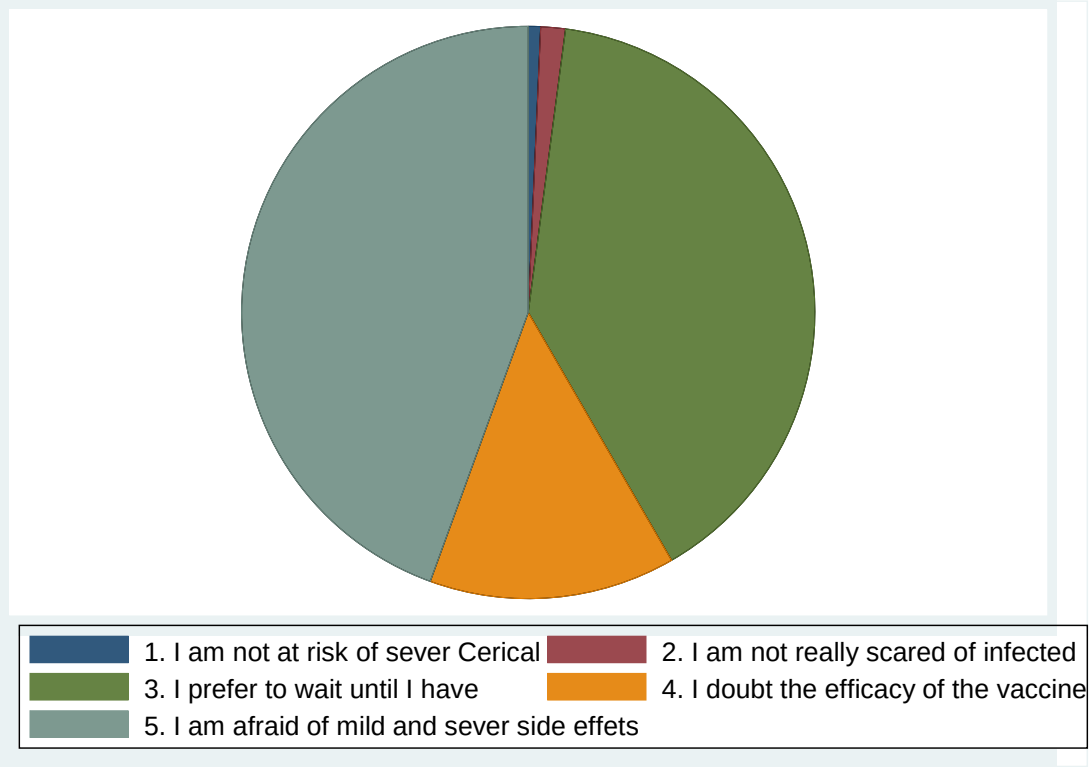

Figure 5: Reasons for not getting the HPV vaccine (hesitancy) in jimma town female school students, Ethiopia, 2023

From 230 previously vaccinated female students, the most 174 (75.65%) have "no hesitancy" (104 and 70) one times and two times vaccinated respectively, and the rest, only 56 (24.34%), have been vaccinated before in "hesitancy" status or are going to refuse if they get the chance of vaccination for the next time.

The majority two hundred fifty-five (69.10%) were surely or probably going to vaccinate, if their family or friends supported them to vaccinate with the HPV vaccine and one hundred nine (29.53%) were surely or probably not going to vaccinate even though they were supported by family or friends.

5.3 Awareness about HPV vaccine

Almost all female school students, 362 (98.10%), have had exposure to sources of data regarding the HPV vaccine of those participants, 131 (36.09%) and 103 (28.82%) heard about HPV from family or friends and schools, respectively. Regarding to cervical cancer cause 334 (90.51%) of them knew that HPV can cause the disease (**Table 2)**.

Table 2: Predictors associated Hesitancy status with source of information about HPV vaccination among Jimma town schools, oromia, Ethiopia, 2023

Source of information	**No Hesitancy (N=225)**	**Hesitancy (N=144)**	**p-value**
Heared of the HPV Vaccine			
Yes	220 (59.6%)	142(38.48%)	0.567
No	5(1.35%)	2(0.54%)	
Where do you hear about HPV vaccine			
Social medias	53(14.36%)	49(13.28%)	0.002
Schools	77(20.87%)	26(7.05%)	
Religious groups	10(2.71%)	2(0.54%)	
Health care workers	1(0.27%)	2(0.54%)	
Family/Friend	75(20.32%)	57(15.45%)	
Community member	9(2.44%)	8(2.16%)	
Heared of HPV cause cervical cancer			
Yes	202 (54.74%)	132(35.77%)	0.546
No	23(6.23%)	12(3.25%)	

5.4 Attitude towards HPV vaccination associated with Hesitancy status

From respondents, most of the 292 (79.13%) have positive attitudes towards the HPV vaccine. Of those, 181 (49.05%) are from the no hesitancy status group, and 264 (71.13%) have negative attitudes towards the HPV vaccine. The chi-square test indicates that it is significantly associated with hesitation status for the 153 (41.46) members of the no hesitancy status group.

From participants as well Regarding girls receiving the vaccine prior to their first sexual encounter and receiving the HPV vaccine that is required for adolescents, 248 (67.20) and 255 (69.10) have favorable opinions, respectively. Both are significantly associated with hesitancy

status and also Not taking the vaccine because of lack of knowledge about it, 225 (60.97), and considering the HPV vaccine as unnecessary 233 (63.14), have Positive attitudes and made up their relationship to hesitancy status was strong, **Table 3**.

Table 3: Association between attitude towards HPV Vaccination and HPV Vaccination hesitancy status among Jimma town schools, oromia, Ethiopia, 2023

The Attitude to HPV Vaccination	Category	Total N%	No Hesitancy N%	Hesitancy N%	chi-square ($\chi 2$)	p-value
Cervical cancer can be prevented using the HPV vaccine	Yes No	292 (79.13) 77 (20.86)	181 (49.05) 44 (11.91)	111 (30.08) 33 (8.95)	6.64	0.156
HPV vaccine education should be provided to school students	Yes No	105 (28.45) 264 (71.54)	72 (19.51) 153 (41.46)	33 (8.94) 111 (30.08)	10.53	0.032
Girls should get vaccinated before their first sexual encounter	Yes No	248 (67.20) 121 (32.79)	146 (39.56) 79 (21.40)	102 (27.64) 42 (11.38)	16.44	0.002
Teenagers require health information regarding the HPV vaccine	Yes No	255 (69.10) 114 (30.89)	152 (41.19) 73 (19.78)	103 (27.91) 41 (11.11)	17.47	0.002
Fell of HPV vaccine probably not work	Yes No	246 (66.66) 123 (33.33)	155 (42.00) 70 (18.97)	91 (24.66) 53 (14.36)	8.61	0.072
Don't know much about the vaccine so not take the vaccine	Yes No	225 (60.97) 144 (39.02)	134 (36.31) 91 (24.66)	91 (24.66) 53 (14.36)	21.98	< 0.001
Think of HPV vaccine not necessary	Yes No	233 (63.14) 136 (36.04)	144 (39.02) 81 (21.95)	89 (24.11) 55 (14.90)	16.61	0.002

Table 4 shows the distribution of 5Cs factors and their associations with vaccine hesitancy. According to confidence-level questions, female students are distrustful about the vaccine's

safety and efficacy. 102 (27.92%), greater than half 66 (17.88%), and 214 (57.99%) disagreed with public authorities' decisions in the best interests of the community. The hesitancy group had 132 people (35.77%), and both were statistically significant for hesitancy status. From complacency questions, All are statistically significant to hesitancy status, and from them, 202 (54.01%) believed it unnecessary to get the HPV vaccine, and 123 (33.33%) were in the hesitancy group. From the 252 people who agreed that everyday learning stress stops them from being vaccinated (68.78%), 113 (30.62) were in the hesitation group and statistically significant with hesitancy status. From 3 questions 2 and from 2 questions 1 in the calculation and collective responsibility statistical significance with hesitant status, respectively. For further details, see the table below.

Table 4 Chi-square results of 5Cs factors by hesitancy status among Jimma town schools, oromia, Ethiopia, 2023.

5C domain	Factors	Category	Total N%	No Hesitancy N%	Hesitancy N%	chi-square ($\chi 2$)	p-value
Confidence	The safety and efficacy of the vaccine.	Distrust Neutral Trust	102 (27.92) 23 (6.23) 244 (66.11)	36(9.75) 13(3.52) 176 (47.69)	66 (17.88) 10(2.71) 68 (18.42)	19.18	0.001
	The vaccine-related advice provided by medical staffs is reliable	Not-reliable Neutral Trust	266(72.07) 5(1.35) 98 (26.54)	141 (38.21) 4(1.08) 80 (21.68)	125 (33.87) 1 (0.27) 18 (4.87)	5.47	0.242
	Public authorities decide in the best interest of Community	Disagree Neutral Agree	214 (57.98) 48 (13.00) 107 (28.99)	82 (22.13) 46 (12.46) 97 (26.28)	132 (35.76) 2 (0.54) 10 (2.71)	24.00	< 0.001
	I think it is unnecessary to receive vaccinations as it cannot prevent HPV	Disagree Neutral Agree	154 (41.72) 13(3.52) 202 (54.0)	137 (37.12) 9(2.43) 79 (21.4)	17(4.60) 4(1.08) 123 (33.33)	21.26	< 0.001

Complacency	I believe my immune system is powerful; it will protect me	Disagree Neutral Agree	140 (37.93) 19(5.14) 210 (56.65)	76 (20.59) 14(3.79) 135 (36.58)	64(17.34) 1 (0.27) 64 (17.33)	18.54	0.001
	believe cervical cancer is not much a sever disease I should get vaccinated	Disagree Neutral Agree	149 (40.37) 10 (2.71) 210 (56.9)	94(25.47) 8(2.16) 124 (33.59)	55 (34.16) 2 (0.55) 86 (23.31)	24.70	< 0.001
Calculation	When I think about getting vaccinated against HPV, I weight the benefit and the risk to make best decision	Disagree Neutral Agree	146 (39.56) 13(3.52) 210 (39.83)	88 (23.84) 7(1.89) 130 (22.22)	58 (15.71) 6 (1.62) 80 (17.61)	20.70	< 0.001
	When I think about getting vaccinated against the cervical cancer first consider whether its effective or not	Disagree Neutral Agree	145 (39.29) 13(3.52) 211 (57.17)	90 (24.38) 7(1.89) 128(34.68)	55 (14.9) 6(1.62) 83(22.48)	10.85	0.028
	Before I get HPV vaccinated, I need to know more about this vaccine in details	Disagree Neutral Agree	62 (16.79) 2(0.54) 305 (82.65)	37 (10.02) 1(0.27) 187(50.66)	25 (6.76) 1(0.27) 118(31.65)	6.20	0.184
Collective responsibility	I will take HPV vaccine, because in that way I can protect people with a weaker immune system	Strongly disagree Neutral Agree	68(18.42) 28(7.58) 273 (73.97)	40 (10.83) 16(4.33) 169 (45.79)	28 (7.58) 12(3.25) 104 (28.17)	4.63	0.327

	I think vaccination against HPV is a collective action to prevent the spread of disease	Disagree Neutral Agree	147 (39.83) 15 (4.06) 207 (56.09)	90 (24.39) 10 (2.71) 125(33.87)	57 (15.44) 5 (1.35) 82 (22.22)	10.61	0.031
Constraints	Everyday learning stress may prevent me from getting vaccinated	Disagree Neutral Agree	92 (24.93) 25(6.77) 252 (68.78)	71 (19.24) 15(4.06) 139 (37.66)	21 (5.69) 10 (2.71) 113 (30.62)	23.71	< 0.001

5.5. Factors associated with HPV Vaccine Hesitancy

From binary logistic regression, Grade number, school mini media, having a smart phone, parents educational status, parents occupational status, older sister vaccinated, Vaccinated before, Opinion about HPV vaccine (think of HPV vaccine as not necessary), Attitude towards HPV vaccine (HPV vaccination is beneficial in preventing cervical cancer, and school teenagers should get HPV vaccine education), confidence (worried about the vaccines being safe and effective and public authorities deciding in the best interest of the community), Belief in rumors (the HPV vaccine ruins girls fertility) and complacence (belief in the immune system; it can protect people from cervical cancer) Cervical cancer is not a particularly serious condition, and getting vaccinated can help prevent it), constraints (belief in everyday learning stress prevents from getting vaccinated), calculation (before getting HPV vaccinated, you need to know about this vaccine in details), and collective responsibility (think vaccination against HPV is a collective action to prevent the spread of disease) were candidate variables to enter the multiple logistic regression model (at a significance level of 0.25) with HPV vaccine hesitancy.

On multiple logistic regression analysis, Have smart phone, mothers Higher educational level, older sister vaccinated, previously vaccinated of HPV vaccine, Confidence (Worried about safty & efficacy), complacency (unecessary to receive HPV vaccination), constraints (learning stress not prevent from vaccination), and unbelieve in rumors (HPV vaccine ruins girls fertility) were found to be statistically significant predictors of HPV Vaccine Hesitancy at p-value < 0.05.

Table 5: Factors associated with human papilloma virus vaccine hesitancy, in jimma Town female school students, oromia, Ethiopia, May, 2023

Factors	COR (95% CI)	p- value	AOR (95% CI)	p- value
Grade number (Rf: 6th grade)				
7th grade	0.69 (0.33, 1.42)	0.332	0.87 (0.56, 1.98)	0.582
8th grade	0.63 (0.31, 1.29)	0.211	0.78 (0.76, 1.88)	0.463
9th grade	0.57 (0.26, 1.21)	0.142	0.66 (0.45, 1.78)	0.335
Participate in school mini media (Rf: No)				
Yes	0.44 (0.29, 0.68)	< 0.001	0.48 (0.35, 1.03)	0.061
Own Smart phone (Rf: No)				
Yes	0.46 (0.29, 0.74)	0.001	0.51 (0.28, 0.94)	0.032
Mother educational level (Rf: unable to read and write)				
Able to read and write	1 (0.41, 2.41)	1	1.02 (0.56, 2.61)	0.354
Primary (1-8)	1.05 (0.44, 2.46)	0.902	0.97 (0.49, 2.64)	0.235
≥ Secondary	1.85 (1.12, 3.07)	0.016	0.53 (0.11 , 2.44)	0.013
Father educational level (Rf: unable to read and write)				
Able to read and write	1.02 (0.42, 2.47)	0.951	1.11 (0.56, 2.22)	0.783
Primary (1-8)	0.97 (0.40, 2.33)	0.943	1.14 (0.62, 2.12)	0.870
≥ Secondary	2.11 (1.27, 3.50)	0.004	2.32 (1.04, 2.54)	0.056
Parents average monthly income (Rf: < 3000 ETB)				
3000-5000 ETB	0.29 (0.06, 1.42)	0.128	0.33 (0.08, 1.32)	0.132
5000-7000 ETB	1.12 (0.68, 1.85)	0.635	1.43 (0.76, 1.92)	0.786
➢ 7000 ETB	0.53 (0.26, 1.08)	0.083	0.55 (0.52, 1.03)	0.078
Older Sister vaccinated				
(Rf: No)				
Yes	0.19(0.16,0.70)	0.012	0.04 (0.004, 0.42)	0.043
Source of Hearing about HPV vaccine (Rf: Health care workers)				
Family/Friend	0.79 (0.47, 1.33)	0.382	0.67 (0.56, 1.01)	0.056
Religious groups or places	0.23 (0.04, 1.14)	0.073	0.22 (0.03, 1.54)	0.088
Schools	0.34 (0.18, 0.62)	< 0.001	0.64 (0.45, 1.01)	0.053
Previous vaccinated status (Rf: Not vaccinated)				
Vaccinated at least One times	5.36 (3.39, 8.47)	< 0.001	0.64 (0.06 ,0.73)	< 0.001
Confidence (vaccine-related advice provided by medical staffs is reliable**)**				
(Rf: Trust)				

Neutral	2.92 (1.63, 5.19)	< 0.001	1.17 (0.76, 1.87)	0.086
Distrust	2.94 (1.53, 5.64)	0.001	1.13 (1.12, 12.34)	0.066
Confidence (Trust in safty & efficacy of the vaccine) (Rf: Trust)				
Neutral	0.89 (0.66, 8.75)	0.002	0.46 (0.37, 7.43)	0.235
Distrust	3.67 (1.60, 7.33)	0.001	3.21 (0.42, 13.45)	0.027
Complacency (think of it is necessary to receive vaccinations as it cannot prevent HPV) (Rf: necessary)				
Neutral	0.94 (0.01, 0.97)	0.024	0.77 (0.025, 23.8)	0.885
Unnecessary	0.36 (0.18, 0.70)	0.003	2.37 (1.20, 4.67)	0.013
Complacency (believe cervical cancer is not much a sever disease) (Rf: Not believe)				
Neutral	0.17(0.08, 0.55)	0.011	0.11 (0.09, 1.21)	0.092
Believe	0.35 (0.18, 0.70)	0.003	0.43 (0.23, 1.32)	0.096
Complacency (believe in my immune system, not need vaccinated) (Rf: Not believe)				
Neutral	0.38 (0.06, 1.45)	0.137	0.43 (0.32, 1.54)	0.231
Believe	1.65 (1.02, 2.66)	0.039	1.87 (0.93, 1.96)	0.057
Calculation (Before getting vaccinated, weight the benefit and the risk) (Rf: Disagree)				
Neutral	0.15 (0.07, 0.45)	0.007	0.19 (0.09, 1.21)	0.084
Agree	1.72 (1.32, 3.21)	0.004	0.98 (0.42, 2.89)	0.067
Calculation (Before I get HPV vaccinated, I need to know more about this vaccine**)** (Rf: Disagree)				
Neutral	0.58 (0.30, 1.12)	0.109	0.87 (0.43, 1.09)	0.201
Agree	0.18 (0.05, 0.66)	0.010	0.34 (0.09, 1.52)	0.054
Collective responsibility (I will take HPV vaccine, because in that way I can protect people) (Rf: Disagree)				
Neutral	0.50 (0.26, 0.98)	0.046	0.84 (0.34, 1.96)	0.051
Agree	0.25 (0.08, 0.79)	0.019	0.87 (0.45, 1.32)	0.065
Constraint (learning stress may prevent me from getting vaccinated) (Rf:prevent)				

Neutral	0.52 (0.29, 0.94)	0.032	0.66 (0.34, 1.02)	0.062
Not Prevent	0.22 (0.10, 0.46)	< 0.001	0.36 (0.16, 0.81)	0.014
Belief in rumor (Vaccine ruins girls fertility) (Rf:Agree)				
Disagree	0.66 (0.34, 1.06)	0.09	0 .21 (0.14,0.96)	0.036

Model fitting information

According to Hosmer-lemeshow interpretation the logistic regression model is fitting if p-value is greater than 0.05, on this study the p-value was 0.866 which is greater than 0.05 and close to one it indicates that a good logistic regression fit.

Here is a general rule when it comes to understanding accuracy scores: Over 90% - Very good. Between 70% and 90% - Good, on this study correctly classification is 73.44 which is good accuracy.

5.6 Qualitative study results

5.6.1. Socio-demographic characteristics of the study participant

Thirteen parents of female students eligible for HPV vaccination participated in the qualitative study. The study's participants were mostly female (76.9%). Eight (61.53%) of the study participants were between the ages of 35 and 40, with a mean age of 31. Nine (69.2%) of the participants are housewives, and eight (61.53%) cannot read or write, **Table 6**.

Table 6: Socio-demographic characteristics of Parents/caregivers of school female students in jimma town, oromia, Ethiopia, 2023 (n=13)

Variables	Category	Frequency	Percentage
Age	25 - 30	1	7.69
	30-35	2	15.38
	35-40	10	61.53
Sex	Female	8	61.53

	Male	5	38.46
Educational status	Unable to read and write	8	61.53
	Able to read and write	3	23.07
	Primary and above	2	15.38
Occupational status	House wife	9	69.23
	Private Employed	4	30.76

Themes

After coding and analysis of in-depth interview data six themes were emerged.

Theme I: Safety and Effectiveness

The participants were asked if they were concerned about the HPV vaccine, and the first theme that emerged from data analysis was the vaccine's safety and effectiveness. Except for one parent, the findings from the examination of in-depth interview revealed that practically all of the participants seriously concerned about safety. Nine (69.23%) parents were concerned about the vaccine's safety and effectiveness; their responses are as follows:

"I don't feel it is fully safe and effective, especially the vaccine given at school, which is unsafe. I am very concerned about the vaccine's long-term negative effects and expiration date, and I had no experience or knowledge of it, so I refused to allow my girls to be vaccinated with it". A 32-year-old woman with a housewife job stated *"I believe the HPV vaccine is neither safe nor effective in preventing HPV infection. Unintended outcomes are common with vaccines. These did not go away quickly after my older daughter was vaccinated; she was in pain at the time, so I did not allow my younger daughter to get vaccinated"*. The second participant, a 35-year-old woman with a job, voiced her opinion*"Cervical cancer vaccination is risky and ineffectual because cancer is uncommon in our society"*.

The following reflection was provided by a participant with the identifying numbers 3, 6, 9, and 10. *"I heard about the vaccine, but I didn't believe it is safe and effective".* A 29-year-old working woman shared the following reflection: "*I learned about the HPV vaccine through the community, but I didn't get enough information from doctors and nurses*". She has added "*I didn't think it was safe because the responsible party didn't send us a helpful message about it*".

Similarly, a 38-year-old housewife stated, "*I felt fear about the vaccine because of various rumors I heard from the community, so I didn't think it is safe*".

Theme II: concern about side-effects

The participants were inquired whether they had concerns about side effects of the HPV Vaccine
The second theme that emerged from the in-depth interview data analysis was adverse effects. Participants were asked if they were concerned about the negative and positive effects of the HPV vaccine.

Negative conceren about the side effects (n=8 61.53%)

The majority of responders react because they are concerned about the adverse effects, and their comments were as follows*"I refused to vaccinate my daughters due to concerns about the side effects. I was not inoculated with the HPV vaccination, since I was unaware of it at the time and had no cervix cancer. Only childhood immunizations, in my opinion, are necessary; otherwise, I do not believe they are beneficial"* (Participant# 3, 5 and 7). A man with a job offer remarked "*I have negative concerns about the vaccines because they are all sent from developed countries to us, but in western countries, the vaccine is given for a lot of money, so why do they give them to us for free?" In general, I believe the immunizations have expired or are no longer valid*."

A participant with identifying numbers 6, 7, 9, and 10 stated, "*I have negative concern about the side effect of the vaccine I heard about it in my community they said it causes paralysis of the injected hand and I fear about it even not fully believed about it that's why I don't want my daughter to be vaccinated against it*."

Positive concerned about the side effects (n=5 38.46%)

Participants with the identifying numbers 1, 2, 8, and 12 have expressed a favorable attitude toward HPV vaccination."*Even though my daughter is not vaccinated, every vaccine or medicine, in my opinion, has its own set of side effects. Side effects indicate that they are not severe, disappear quickly, and do not cause any long-term harm."*

Another participant, a man by gender, has employed job position reflected as follows *"In my personal opinion, all vaccines, including the cervical concer, have no serious side effects because if there is any threat to health, the government will not allow. I belive the minister of health is doing everything possible to eliminate adverse effects."*

Theme III: Awareness or information

The next data analysis theme that emerged was awareness or information. The participants were asked if they believed the health professionals in their town provided them with adequate and satisfactory information, or if they obtained information from any health professionals or accountable agencies. And the majority of people said they don't know enough about the vaccine.

Not Have/get information (n=8 61.53%)

Participants identified as 2, 4, and 5 have provided *"First, I heard about the vaccine on TV and in the community, but I have no experience with it." They added "I didn't get enough information from health professionals or other responsible entities; therefore I don't think my daughter will get vaccinated as well." Similarly, Participants marked as 3, 6, and 8 stated, "First, I heard about the vaccine on TV and in the community, but I didn't get enough information from health professionals or other responsible bodies."*

Furthermore, participants 12 and 13 stated, "Even about the vaccine I heard from my daughter last week when they came to their schools to vaccinate, I didn't hear before and I didn't know there is a vaccination against cervical cancer, and also, my daughter did not get any information about it; they simply say it is a vaccine against cervical cancer but are not giving awareness to girls in each class, so I have no awareness about it."

Have/get information (n=5 38.46%)

Participants with identifying numbers 1, 7, 10, and 11 have been identified as follows "I learned about the vaccine from TV and also read about it on social media." It is a cervical cancer vaccination administered to girls aged 9 to 14. In other nations, boys are given the vaccine. I believe I have enough information about it from the media."

Furthermore, a man who has a job offer added, "I believe I have information about this vaccine. I learned from various media sources, as well as from my neighborhood and acquaintances, that it is against the law for girls to get cervical cancer screening before engaging in sexual activity. I believe it is useful for disease prevention."

Theme IV: Rumors/misinformation

The fourth issue that arose from data analysis was concerning erroneous rumors or misinformation regarding the vaccine that they had heard. Almost all (92.3%) of parents were aware of the rumors in the neighborhood, with only one (7.69%) parent being unaware of them. Participants with the following identifying numbers: 1, 3, 4, 6, 8, 12, and 13 have stated as follows "*I had heard a lot of negative things about this vaccine in particular." The most common belief was that it causes infertility in females, which is why it is only given to females, especially in our country, because it magically increases population numbers and is utilized by governments to lower population numbers. Another myth I heard was that it caused paralysis when injected sideways and that it is an outdated vaccine that does not prevent cervical cancer. My negative reaction to the vaccine was compounded as a result of those rumors since health professionals did not offer us with enough and correct information*."

Similarly, Participants 2, 5, 7, 10, and 11 stated, "*I heard various rumors, such as it causes pain, redness, or swelling in the arm where the shot was given and causes fever, dizziness, or fainting. I also heard that it increases sexual initiation in girls*."

Theme V: Factor influencing HPV vaccine Hesitancy

The participants were asked about the variables that impact HPV vaccine hesitancy or why some parents delay or refuse to vaccinate their daughters in their opinion. There are several factors that influence HPV vaccine hesitancy among different female school students' parents or caregivers, including a lack of knowledge and information about the vaccine, concerns about long-term safety, religious factors, misinformation about the vaccine, and concerns about side effects. Some reasons connected with HPV vaccine hesitation include parents' lack of awareness that their daughter is at danger of an HPV-related condition, such as cervical cancer, and female students' lack of family support.

This finding was revealed by the following sampled responses:

Participants 1, 2, 4, and 7 said, *"In my perspective, the majority's lack of awareness and understanding about the vaccine, religious issues, and the culture of not changing the immunization program other than childhood vaccination may reduce vaccine uptake and raise hesitation."* Participants with the identification numbers 3, 6, 8, and 9 "*I believe this is due to a lack of adequate and satisfactory information from health professionals or other responsible bodies; other reasons include various rumors about vaccinations heard in the community, which*

have not been denied by any health professionals or other bodies; and finally, people do not trust the government's vaccination program, particularly those administered in schools." I believe many parents delay or refuse to vaccinate their girls for these and other reasons."

Similarly, participant 5, 10 and 12 "*In my opinion, there are other causes for HPV vaccine hesitation aside from a lack of knowledge: The outbreak of the COVID-19 pandemic there was nervousness of COVID-19 diseases at the time, and all attention focused on COVID-19 sickness rather than other diseases or vaccine-related issues*". Furthermore, participants 11 and 13 stated, "*I believe my daughter is too young, or I am unaware that she is at risk of an HPV-related condition, such as cervical cancer." Because the HPV vaccine protects against a sexually transmitted infection (STI), I won't give it to my child until he or she is sexually active*."

6. Discussion

Despite the fact that the WHO has listed vaccine hesitancy as one of the top ten risks to health, particularly in low-income countries, there have been no realistic prior studies in Ethiopia or the research area. In fact, studies have been carried out in other regions of the world, but very limited literature were published in Ethiopia specifically in the study area. Due to this fact, this study employed a mixed-methods approach, researchers were able to theoretically and analytically combine unique findings from qualitative research (from in-depth interviews of parents) and easily replicable from cross-sectional interviews with female students.

Thus, the present study has focused on assessing the prevalence of Human Papilloma Virus Vaccine Hesitancy and associated factors. In this study prevalence of hesitancy in HPV vaccine uptake was 39.02% 95% CI (34.1, 44.1). From those who did not intend to be vaccinated their reasons for refusal were afraid of mild side effects (e.g., fever, pain at the injection site) and serious side effects (e.g., hospitalization, serious illness) of the vaccine, this is consistent with research done in the central Ethiopian City of Ambo (46). This study found that concerns about side effects were the most common vaccine barriers. The discomfort of getting vaccinated was another concern (24). Similarly, 57 people (39.58%) would rather hold off until they know more about these vaccinations. According to research done at a university in China, there were a lot of people who are reluctant to get the HPV vaccine, with the rate being 10.3% (35).

The amount of hesitation shown in the present study, however, was lower when compared to a study done in South Africa on females enrolled in public schools (69.6%) (19). this mismatch may be caused by variation in sociodemographic characteristics, community knowledge, or literacy levels. A study conducted in Colombia with parents and schoolchildren found that 57.1% of participants had not started immunization, which was higher than this study (47). This difference may be due to the study's smaller sample size and different sociodemographic profiles. Youths in Switzerland participated in another research effort that revealed a prevalence of HPV vaccine reluctance of 31% (43), which is somewhat compatible with the results of the current study.

Additionally, the aforementioned variance for trials conducted outside of Ethiopia may reflect a genuine difference in the vaccine's accessibility and availability. In particular, in public schools,

the health professions simply vaccinate those who are willing and do not take any measures to influence hesitant students. As a result, those students do not trust the vaccination and the health professionals. This is evidenced during the HPV vaccination period when there is no awareness creation or giving enough information about the vaccine to increase up taking level. According to the study's qualitative findings, reluctance about the HPV vaccine was substantially correlated with confidence, which includes trust in health care providers.

Concerns over the HPV vaccine among parents are very severe. "Even about the vaccination, I heard from my daughter last week when they came to their schools to vaccinate, but I didn't hear about it before and I didn't know there is a vaccination against cervical cancer, and also, my daughter didn’t have any information about it; they simply say it is a vaccine against cervical cancer but nothing about awareness to girls in each class, so I have no awareness about it at all." The goal of this study was to identify the most significant causes of HPV vaccine hesitancy reported in the literature. Although a cause-and-effect link could be demonstrated, similar findings from other studies were reported.

Significant factors that influence the uptake of the HPV vaccine were found in this investigation. These include the following: smartphones, mothers with higher educational levels, older sisters who have received vaccinations, having received vaccinations at least once before, confidence (not believing in the safety and efficacy of the vaccine), not believing in rumors that the HPV vaccine harms girls' fertility, complacency (HPV vaccination is not necessary), and restrictions (learning stress prevents from receiving the vaccine). These studies provide important advice for the hesitation of the HPV vaccine.

Vaccine against HPV Girls who own smartphones reduce vaccine reluctance by 51% compared to those who don't, suggesting that smartphone ownership is highly connected with hesitancy. This showed that using a smartphone is a protective factor for HPV vaccination reluctance, which is connected with it or a 49 % reduced risk for HPV vaccine, and this finding was corroborated by (48). According to a variety of studies, mobile devices can make HPV vaccination decision-making aids broadly accessible on digital platforms, reducing vaccine reluctance. This is supported by the findings of a completed telephone survey study. In contrast to parents of girls without phones, who are probably more hesitant, this study indicated that parents of girls with mobile phones are more likely to get the HPV vaccine and are better aware

about it (49). A correlation between vaccine reluctance and social media knowledge about vaccinations was also suggested by other scientific theories.

Mother's educational level and the HPV vaccine hesitancy were substantially correlated. In this study, women with higher educational status (those who have completed secondary school and above) decrease vaccine reluctance by reducing the risk of HPV vaccine uptake by 53% or 47% compared to mothers with lower educational status (30). Children under the age of 16 and school girls whose parents had lower education levels demonstrated considerably higher vaccine hesitation, per this study (51). People with at least a higher education level have more opportunity to have adequate information on HPV and its vaccines, which leads to less reluctance to get the HPV vaccine. Additionally, a high level of education can considerably improve understanding, enhance the likelihood that someone will receive appropriate information, and have a protective influence on vaccine reluctance. According to science, moms with high levels of education and literacy tend to have girls who are less reluctant to get immunized. This is due to the fact that mothers who are knowledgeable about vaccinations are more inclined to insist that their kids get those (62). This is similar with the study done in minnesota state university-mankato, united-states (50). This also support by the study (51) according to this study Children under the age of 16 as well as students whose parents had lower education levels showed significantly higher vaccine hesitancy. Also, according to a study done in Weihai, Shandong, China, others with a higher education level reported higher levels of knowledge of HPV and HPV vaccines and poor hesitancy toward HPV vaccination.

In addition, a high educational level can significantly increase the knowledge and raise a chance of getting adequate information and the Responder effectiveness's protective impact on vaccine hesitancy. According to science, mothers who are highly educated and literate are associated with having daughters who are less hesitant to receive vaccinations. This is because mothers who are well-informed about vaccinations are more likely to have their children receive them.

Also the finding was best supported by qualitative finding, stated that those educated parents response indicate that have information about the vaccine getting other than health professions as described below;

"I believe I have information about this vaccine. I heard from different media and from the community and friends that it is against cervical cancer for girls before the initiation of sexual intercourse. I think it is useful for preventing a disease." [#p 9, Female, employer]

In this study the odds of those who have older sister and thus older sister vaccinated were prevent vaccine hesitancy by 4 % than those whose older sister not vaccinated. The likelihood of vaccine hesitancy is 96% lower in students whose elder sibling has had the vaccination. This is similar with the study conducted in Los Angeles (41). According to the study done in Denmark, A 7 percentage point increase in the likelihood of getting the HPV vaccine was linked to having an older sister who had already received it (52). Also, based on the study done in Atlanta, having their older sister vaccinated increased their uptake level of the HPV vaccine. (53). Above studies similarities were due to the fact that their family support increased when an older sister was vaccinated, and their knowledge about the vaccination increased, so their hesitancy chance decreased. Based on the study done by Jimma Town, those who had an older sister vaccinated were significantly more likely to have knowledge of the HPV-vaccination and the chance of vaccinated the HPV vaccine.

In qualitative study interview parents describe about why the girl not vaccinated because of her older sister also don't vaccinated this is supported by this statement

"I believe the HPV vaccine is neither safe nor efficient in preventing HPV infection. Vaccines have unintended consequences. These did not go away easily after my older daughter was vaccinated; she had discomfort at the time, so I have not permitted my younger daughter to get vaccinated." [#p2, Female, 35 years old, employer]

In this study, previous vaccinated history associated with vaccine hesitancy. Previous vaccination prevents vaccine hesitancy by 64%. Despite previous vaccination experience, the chance of vaccine hesitancy is 46% lower in a student who has previous vaccinated history. This is the same study done in Bangladesh. Respondents with previous vaccination experience had 4.79 times higher odds compared to respondents who did not have any vaccinations. According to a study done in Saudi vaccine hesitancy was significantly associated with a history of receiving the HPV vaccine. As a result, prior vaccination experience is an essential element in increasing vaccine uptake in the future. This also supported by parents in qualitative result as follow

"First, I heard about the vaccine on TV and in the community, but I don't have any experience with this vaccine. I didn't get enough information from health professionals or other responsible bodies, so I don't think my daughter is also going to vaccinate." [#Participant 3, 6 and 8**]**

According to this study, female school students' hesitancy to receive the HPV vaccine is particularly influenced by their sense of confidence, complacency, and constraints.

The odds of confidence, those girls who had Distrust in safety and efficacy were three times more had vaccine hesitancy than the other group. Which indicated that distrust in the vaccine's safety and efficacy, were the odds of 3.21 times increase in hesitancy of HPV vaccine status. In other words, individuals who not trust or worried in vaccine's safety and effectiveness, thus increase hesitancy status. According to a study done among black nations barriers for HPV were unbelieve in safety of the vaccine and mistrust of vaccines (54). Previous studies have revealed that confidence is the most relevant factor for vaccine hesitancy, and believe in safety and effectiveness were the most important factors for deciding to receive vaccination. This is similar with different study conducted in different area (34, 35, 55, 56). A key predictor of vaccine hesitancy is trust, with doubt of the government and mistrust of vaccines in general.

Most parents of those students also supported this idea in qualitative finding

"I didn't believe it was completely safe and effective, particularly the vaccine provided at school, which is not safe. I was concerned about the vaccine's long-term negative effects and expiration date, and I had no experience or knowledge of it, so I did not want my daughters to get vaccinated with it, and I did not allow for it." [#p1, Female, 32 years old, Housewife]

"I heared about the vaccine but I didn't believe it is safe and effective" [#p5, Female, 29 years old, employer]

"I learned about the HPV vaccine through the community, but I didn't obtain enough information from doctors and nurses. I didn't think it was safe because the responsible party failed to give us a helpful message about it." [#p8, female, 38 years old, House wife]

The odds for complacency, those girls who had think of unnecessary to receive HPV vaccinations were 2 times vaccine hesitancy than other groups who belived HPV vaccie is necessary. This is consistent with study done in University of Texas (57) and the study done in kenya (58), according to this study believing of the HPV vaccine is necessary increasing the uptake of the vaccine and also decrease the chance of HPV vaccine unwillingness. This associated factor also aided by the parents of those students

"*Cervical cancer prevention vaccination is unccessary, because in my point of view cancer is uncommon in our society*." [Participant #3, 6, 9 and 10]

Constraints or not believe in learning stress may preventing from HPV vaccination is prevent vaccine hesitancy by 36% compared to other groups. According to this study those the odd of vaccine hesitancy is 64% lower in students who unblieve in stress prevent from vaccinatin. This is consistant with the study done china daughters, according to this study life stress is the barriers of HPV vaccination (59).

Those who dont believe in rumors prevent vaccine hesitancy by 21 % than compared to the other group who believe in rumors about HPV vaccination, or the odds of vaccine hesitancy is 79% lower in students who unblieve in rumors, showing that don't believing in those rumors was a protective factor of vaccine hesitancy. This is similar with a study conducted in western Uganda (60) according to this study A rumor initially circulated in the communities than the HPV vaccination uptake decrease. This is also the case with the study done, where misinformation about HPV vaccines spread by Twitter rumor is a factor in lower rates of HPV vaccination and an increasing number of vaccine hesitancy (61). People who think rumors concerning the HPV vaccine and cancer are accurate are more likely to trust rumors about other topics than accurate facts, which have a significant negative impact on vaccination uptake and increases vaccine hesitancy.

This is supported by the qualitative research as well.

"I had heard a lot of negative things about this vaccine in particular." The biggest rumor was that it causes infertility in girls, which is why it is exclusively given to girls, especially in our nation, because it magically increases population numbers and is used by governments to decrease population numbers". [#Participant 1, 3, 4, 6, 8, 12 and 13]

"I heard different rumors, like that it causes pain, redness, or swelling in the arm where the shot was given and causes fever, dizziness, or fainting. Other things I heard were that it increases sexual initiation for girls that's why I was hesitating about this vaccine." [#Participant 2, 5,7,10 and 11]

"I felt fear about the vaccine because of different rumors I heard from the community, so I didn't think it was safe." [#p11, Female, 39 years old, House wife]

7. Strength and limitation of the study

Strength

The mixed approach was adopted, which provides a more comprehensive perspective than a single-study approach. To account for factors relevant to the outcome variable (vaccine hesitancy), known explanatory variables were used. The study provides a clear grasp of the issue from several perspectives (female students as well as parents or caregivers). Because the data were triangulated to support the quantitative study by the qualitative investigation, the study was internally valid and consistent. The researcher obtained credible information on the prevalence of vaccine hesitancy and the causes behind it because the data were collected during the HPV vaccination period. Despite its limitations, this is the first study of its kind to be done in Jimma Town, Oromia, Ethiopia.

Limitation

Because of research constraints, particularly in our nation, studies on HPV vaccine reluctance have not thoroughly addressed this issue. Because community girls receive the vaccine, confining the study to schoolgirls may under or overestimate the study's findings. Furthermore, this study tried to identify the most significant contributing characteristics for HPV vaccine hesitancy in the literature without looking for a cause-and-effect relationship. There could be cognitive bias: some students were aware of the HPV vaccine when the immunization program came to their schools, but did not act or were hesitant about it.

8. Conclusion

The study found high levels of HPV vaccine hesitancy in female school students, influenced by factors such as owning a cell phone, having an educated mother, having an older sister vaccinated, and having previously received the vaccine. Confidence, complacency, constraints, and unbelieve in rumor were also found to be significant. Vaccine aversion is a complex issue, and educating female school students and their parents about the HPV vaccine is crucial to improve vaccination acceptance and control cervical cancer cases. This could improve their vaccine knowledge and keep them from spreading sickness to others. Furthermore, including parents may be beneficial in reducing reluctance and increasing vaccine acceptability in the research location. Because the participants in the study were students, School-based health education may be more effective in reducing hesitation.

9 Recommendation

For HPV vaccination programmer:

- Should increase trust of the vaccination for vaccinated students and parents.
- HPV vaccine advocacy campaigns should be expanded to involve instructors from both sectors (public and private schools)

For health care professionals:

- Should create community awareness for parents and key influential community leaders to minimize bad beliefs towards the HPV vaccine.
- Should give enough and satisfactory information to school female students before going to the vaccination program.
- Concerns about vaccine safety, rumors and side effects should be acknowledged; Healthcare professionals can also provide forums for discussion to help dispel the myths that cause distrust.

For researcher:

- It is recommended that, because there are few studies on this specific topic, other scholars conduct study on it to make current research more accessible to decision-makers.
- It is also advised that since vaccine hesitancy is a major health concern, scholars should conduct research on it using community-based studies to get enough evidence on it.

10 Reference

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Annex

Questionnaires (In Three language)

ADDIS ABABA UNIVERSITY
COLLAGE OF HEALTH SCIENCE
SCHOOL OF PUBLIC HEALTH

Dear participants

You have been randomly selected for the study on "Hesitancy in Human papilloma virus vaccine uptake and its associated factors among female youth school Girls in Jimma Town, Oromia, Ethiopia".

This study is conducted in partial fulfillment of the requirements for the MPH. in Epidemology and biostatistics in Addis Ababa University. Its main objective is to determine the "Hesitancy in Human papilloma virus vaccine uptake and its associated factors among female youth school Girls in Jimma Town, Oromia, Ethiopia". The research is going to be carried out on your responses and other relevant data that could support it. The purpose of this questionnaire is to obtain your perceptions and views. This questionnaire has sections. Kindly complete every part of the questionnaire. Please fill the questionnaire as honesty as possible since this information will not be used for any other purpose apart from academic research. For purpose of confidentiality please do not indicate your name. The questionnaire is anonymous and no individual person will be identified or connected with a particular set of information or research findings. Your cooperation in completing this questionnaire is greatly appreciated.

Instructions: Indicate with a tick (√) or cross (X) in the space(s) provided.

Section 1: General Information

PART 1- Quantitative close ended questions

Section 1: Items used to measure demographic background, health status and HPV Vaccine experience.

Instruction: please encircle the number listed before the option to indicate your response

And fill the blank spaces for those without option.

Items 1	**Socio-demographic questions**	
No.	Question	Response/Option
1	Age_____(in complete years)	
2	Religion	1 Orthodox 2 Protestant 3 Muslim 4 others
3	Grade number	1 Grade 6 2 Grade 7 3 Grade 8 4 Grade 9
4	With whom do you live with	1 parents 2 relatives 3 others
5	Are you participate in school mini media	1 Yes 2 No
6	Do you have a mobile phone	1 Yes 2 No
7	Your fathers educational status	1 Unable to read and write 2 Able to Read and write 3 Primary (1-8 grade) 4 >= Secondary (9-12th) 5 Above 12
8	Your mothers educational status	1 Unable to read and write 2 Able to Read and write 3 Primary (1-8 grade) 4 >= Secondary (9-12th) 5 Above 12
9	Your parents source of income	1 Merchant 2 Governmental employer 3 Others
10	Do you have an older sister	1 Yes 2 No
11	If yes, do your older sister vaccinated HPV vaccine	1 yes 2 no

Items 2	**Source of hearing about HPV vaccine**	
12	Have you heard of the Human Papillomavirus vaccine?	1 yes 2 no
13	If yes where do you hear about it	1 social media 2 schools 3 religious groups or places 4 healthcare workers 5 Family/Friends 6 community members
14	Have you heard of the virus that caused cervical cancer	1 yes 2 no

Items 3	**Attitude, towards HPV vaccine**	Strongly disagree	disagree	Neutral	Strongly agree	agree
15	The HPV vaccine is effective to prevent cervical cancer					
16	HPV vaccine education should be given to school adolescents					
17	Girls should get the HPV vaccine before their first sexual intercourse					
18	Health information about the HPV vaccine needed for adolescents.					
19	I think vaccination is good because it will make me less worried about Cervical					
20	I believe vaccination will decrease my risk of getting infected by Cervical cancer					
21	think the complications of Cervical cancer will decrease if I get vaccinated					
22	concerns me that development of a HPV vaccine is too rushed to test its safety effectively					
23	concerned about the long-term side effects of the HPV vaccination					

Items 4	**Previous History about HPV vaccination**	
24	Do you vaccinated the HPV Vaccination before	1 Yes 2 No
25	if yes how many times do you vaccinated	1 One times 2 Two times

Items 5	**5C psychological antecedents of HPV vaccine Hesitancy**						
Items 5.1	Confidence	Strongly disagree	disagree	Neutral	agree	Strongly agree
26	I am worried about the Vaccines are safe					
27	Public authorities decide in the best interest of the Community					
28	Trust in healthcare workers for accurate vaccination information					
Items 5.2	Constraints					
29	Everyday learning stress may prevent me from getting vaccinated					
Items 5.3	Complacency					
30	Fear of being infected by HPV disease					
31	I believe my immune system is powerful; it will protect me from cervical cancer					
32	I believe Cervical cancer is not much a severe disease that I should get vaccinated against it					
Items 5.4	Calculation					
33	When I think about getting vaccinated against ervical cancer, I weigh the benefits and risks to make the best decision possible					
34	When I think about getting vaccinated against cervical cancer, I will first consider whether it is effective or not					

35	Before I get HPV vaccinated, I need to know about this vaccine in details					
Items 5.5	Collective responsibility					
36	I will take HPV vaccine because, in that way, I can protect people with a weaker immune system					
37	I think vaccination against HPV is a collective action to prevent the spread of diseases					
Items 6	**willingness to receive HPV vaccine**					
38	I intend/predict to receive vaccine against Cervical cancer					
39	I plan to receive vaccine against cervical cancer					
Item 6.1	*If you are intended to be vaccinated what motives you to be vaccinated?(TICK your answer)*					
	I am at risk of cervical cancer.					
	I don't want to be infected.					
	I don't want to transmit cervical cancer to others.					
	I want to be an actor in the fight against cervical cancer.					
	I trust in the efficacy of the HPV vaccine					
Item 6.2	*If you are not intended to be vaccinated what is your reasons of refusal?*					
	I am not at risk of sever Cervical cancer.					
	I am not really scared of being infected by cervical cancer.					
	I prefer to wait until I have more experience with these vaccines.					
	I doubt the efficacy of the vaccine.					
	I am afraid of mild side effects (e.*g., fever, pain at the injection site) of the vaccine*.					
	I fear serious side effects (*e.g., hospitalization, serious illness*) of the vaccine.					
Item 7	Overall HPV Vaccine Hesitancy					
40	If you get the chance of getting a HPV vaccine for free, Do you want to receive the vaccination	Yes No				
41	If your family or friends supporting you to vaccinate the HPV vaccine, what will	Surely I will take it Probably I will take it I will delay taking it I am not sure what I will do Probably I will not take it Surly I will not taking it				

Annex II: In depth intervieew

Addis Ababa UNIVERSITY SCHOOL OF PUBLIC HEALTH, DEPATEMENT OF REPRODUCTIVE HEALTH

Sample checklist for In-depth interview guide

I am carrying out a study of Hesitancy in HPV Vaccine uptake and its associated factors among female school girls in Jimma Town to find ways of parent's perspective to vaccinate their daughters, Hesitancy status and the reasons of hesitancy of female student caregivers. I would like to ask you some questions to get information. Please be sure that this discussion is strictly secreted, confidential and that your name is not being recorded.

May I continue? YES____ NO____ Thank You!

1. Code of the parents_____
2. Sex_____
3. Age_____
4. Educational status_____
5. Occupationa Status _____
6. Do you heared about HPV vaccine before? Where do you hear about it? _____
7. Do you think the HPV immunizations are safe for girls? What are your worries about the HPV vaccinations?
8. Are you concerned that the vaccination Have any kind of mild or serious complications? If so, what side effect do you believe the immunization going to caused?
9. Do you believe the health professionals in your town give you with enough information on the HPV vaccine? If so, what kind of information did you obtain and where did you obtain it? If not, what steps do you want the relevant body to take going forward? And what is your plan moving forward to obtain enough information?
10. What unfounded rumors or misinformation have you heard about the vaccine by girls, parents or communities?
11. In your point of view, why do some parents delay or refuse to vaccinate their girls?
12. What are the factors that have associated with HPV vaccine vaccine? Or what do you think the reason of hesitancy towards this vaccine?

የአማርኛ ቅጂ

መጠይቆች ለ
አዲስ አበባ ዩኒቨርሲት
የጤና ሳይንስ ኮሌጅ
የህዝብ ጤና ትምህርት ቤት

ውድ ተሳታፊዎች
“የየማኅጸን ነቀርሳ መከላከያ ክትባት ማመንታት እና በሴቶች ወጣቶች ትምህርት ቤት ልጃገረዶች በጅማ ከተማ፣ ኦሮሚያ፣ ኢትዮጵያ” ለሚለው ጥናት በዘፈቀደ ተመርጠዋል።
ይህ ጥናት የሚካሄደው ለ MPH መስፈርቶች በከፊል በማሟላት ነው. በአዲስ አበባ ዩኒቨርሲቲ በኤፒዲሞሎጂ እና ባዮስታስቲክስ። ዋናው አላማው "የሰው ፓፒሎማ ቫይረስ ክትባት ማመንታት እና በሴቶች ወጣት ትምህርት ቤት ልጃገረዶች ላይ በጅማ ከተማ, ኦሮሚያ, ኢትዮጵያ" ላይ ያለውን ክትትል ለመወሰን ነው. ጥናቱ በእርስዎ ምላሾች እና እሱን ሊደግፉ በሚችሉ ሌሎች ተዛማጅ መረጃዎች ላይ ይካሄዳል። የዚህ መጠይቅ አላማ የእርስዎን ግንዛቤ እና እይታ ለማግኘት ነው። ይህ መጠይቅ ክፍሎች አሉት። በደግነት የመጠይቁን እያንዳንዱን ክፍል ይሙሉ። እባክዎን መጠይቁን በተቻለ መጠን ታማኝነት ይሙሉ ምክንያቱም ይህ መረጃ ከአካዳሚክ ጥናት ውጭ ለሌላ ዓላማ ጥቅም ላይ ይውላል። ለምስጢራዊነት ዓላማ እባክዎን ስምዎን አይጠቁሙ። መጠይቁ የማይታወቅ ነው እና ማንም ሰው ተለይቶ አይታወቅም ወይም ከተለየ የመረጃ ስብስብ ወይም የምርምር ግኝቶች ጋር አይገናኝም። ይህንን መጠይቅ ለመሙላት ያደረጋችሁት ትብብር በጣም እናመሰግናለን።
መመሪያ፡ በተሰጠው ቦታ(ዎች) ላይ ምልክት (√) ወይም መስቀል (X) ያመልክቱ።
ክፍል ነ: አጠቃላይ መረጃ
ክፍል ነ- በቁጥር የተጠጋጉ ጥያቄዎች
ክፍል ነ፡ የስነ ሕዝብ አወቃቀር ዳራ፣ የጤና ሁኔታ እና የ HPV ክትባት ልምድ ለመለካት የሚያገለግሉ ዕቃዎች።
መመሪያ፡ እባክዎን ምላሽዎን ለማመልከት ከአማራጩ በፊት የተዘረዘረውን ቁጥር ይክበቡ
እና አማራጭ ለሌላቸው ባዶ ቦታዎችን ይሙሉ።
ቁጥር፡ የጥያቄ ምላሽ/አማራጭ

አባሪ
መጠይቆች (በሦስት ቋንቋ)

አዲስ አበባ ዩኒቨርሲት
የጤና ሳይንስ ኮሌጅ
የህዝብ ጤና ትምህርት ቤት

ውድ ተሳታፊዎች
“Hesitancy in Human papilloma virus ክትባት መውሰድ እና በሴት ወጣቶች ትምህርት ቤት ልጃገረዶች በጅማ ከተማ፣ ኦሮሚያ፣ ኢትዮጵያ” ለሚለው ጥናት በዘፈቀደ ተመርጠዋል።
ይህ ጥናት የሚካሄደው ለ MPH መስፈርቶች በከፊል በማሟላት ነው. በአዲስ አበባ ዩኒቨርሲቲ በኤፒዲሞሎጂ እና ባዮስታስቲክስ። ዋናው ዓላማው “በሂዩማን ፓፒሎማ ቫይረስ ክትባት መውሰድ እና ተያያዥ ምክንያቶች በጅማ ከተማ ፣ኦሮሚያ ፣ ኢትዮጵያ ያሉ ልጃገረዶች” በሴቶች ወጣት ትምህርት ቤት ውስጥ ያለውን ችግር ለመወሰን ነው። ጥናቱ በእርስዎ ምላሾች እና እሱን ሊደግፉ በሚችሉ ሌሎች ተዛማጅ መረጃዎች ላይ ይካሄዳል። የዚህ መጠይቅ አላማ የእርስዎን ግንዛቤ እና እይታ ለማግኘት ነው። ይህ መጠይቅ ክፍሎች አሉት። በደግነት የመጠይቁን እያንዳንዱን ክፍል ይሙሉ። እባክዎን መጠይቁን በተቻለ መጠን ታማኝነት ይሙሉ ምክንያቱም ይህ መረጃ ከአካዳሚክ ጥናት ውጭ ለሌላ ዓላማ ጥቅም ላይ ይውላል። ለምስጢራዊነት ዓላማ እባክዎን ስምዎን አይጠቁሙ። መጠይቁ የማይታወቅ ነው እና ማንም ሰው ተለይቶ አይታወቅም ወይም ከተለየ የመረጃ ስብስብ ወይም የምርምር ግኝቶች ጋር አይገናኝም። ይህንን መጠይቅ ለመሙላት ያደረጋችሁት ትብብር በጣም እናመሰግናለን።
መመሪያ፡ በተሰጠው ቦታ(ዎች) ላይ ምልክት (√) ወይም መስቀል (X) ያመልክቱ።

ቁጥር ነ	የስነ ሕዝብ አወቃቀር ዳራ፣ የጤና ሁኔታ እና ለማህጸን ጫፍ ካንሰር ክትባት (HPV Vaccine)ልምድ ለመለካት የሚያገለግሉ ጥያቄዎች	
ነ	የእርስዎ ዕድሜ ስንት ነው?	_____ ዓመታት
2	ሃይማኖትዎ ምንድን ነው?	ነ. ኦርቶዶክስ 2. ፕሮቴስታንት 3. ሙስሊም 4. ካቶሊክ
3	የመኖሪያ ቦታ(የምትኖርበት ቦታ)	ነ.ከተማ 2 ገጠር
4	ክፍል ቁጥር	ነ. 6 ኛ ክፍል 2. 7 ኛ ክፍል 3. 8 ክፍል 4. 9 ኛ ክፍል
5	ከማን ጋር ነው የሚኖሩት	ነ ወላጆች 2 ዘመዶች 3 ሌሎች
6	በትምህርት ቤት ሚኒ ሚዲያ ውስጥ ይሳተፋሉ?	ነ፣አዎ 2. አይ
7	ሞባይል ስልክ አለህ?	ነ፣አዎ 2. አይ
8	የአባቶቻችሁ የትምህርት ደረጃ	ነ ማንበብ እና መጻፍ አልተቻለም 2 ማንበብ እና መጻፍ የሚችል 3 የመጀመሪያ ደረጃ (ነ-8 ክፍል) 4 >= ሁለተኛ ደረጃ (9-12ኛ) 5 ከ ነ2 በላይ
9	የናቶቻችሁ የትምህርት ደረጃ	ነ ማንበብ እና መጻፍ አልተቻለም 2 ማንበብ እና መጻፍ የሚችል 3 የመጀመሪያ ደረጃ (ነ-8 ክፍል) 4 >= ሁለተኛ ደረጃ (9-12ኛ) 5 ከ ነ2 በላይ
ነ0	ወላጆችህ የገቢ ምንጭ	ነ. ነጋዴ 2. የመንግስት ሰራተኛ 3. ሌሎች

11	ታላቅ እህት አለሽ?	1፣አዎ 2. አይ				
12	አዎ ከሆነ፣ ታላቅ እህትዎ HPV ን ተከትባለች።	1፣አዎ 2. አይ				
ክፍል 2	ስለ ማህፀን በር ካንሰር ክትባት አስተያየት					
13	ስለ የማህፀን በር ካንሰር ስክትባት ሰምተሻል?	1፣አዎ 2. አይ				
14	አዎ ከሆነ ስለ እሱ የት ነው የሚሰሙት።	ነ ማህበራዊ ሚዲያ 2 ትምህርት ቤቶች 3 የሃይማኖት ቡድኖች ወይም ቦታዎች 4 የጤና ባለሙያዎች 5 ቤተሰብ/ጓደኞች 5 የማህበረሰብ አባላት				
15	የማህፀን በር ካንሰር ስለሚስከተለው ቫይረስ ሰምተሃል?	1፣አዎ 2. አይ				
ክፍል 3	ስለ ማህፀን በር ካንሰር ክትባት ያለው አመለካከት					
	ነ በጣም አልስማማም 2 አልስማማም 3 ገለልተኛ 4 እስማማለው 5 በጣም አልስማማም					
		ነ		3	4	5

17	የ ማህፀን በር ካንሰር ክትባት የማጎጸን ነቀርሳን ለመከላከል ውጤታማ ነው።					
18	የ ማህፀን በር ካንሰር ክትባት ትምህርት ለትምህርት ቤት ጎረምሶች መሰጠት አለበት					
19	ልጃገረዶች ከመጀመሪያው የግብረ ሥጋ ግንኙነት በፊት የ HPV ክትባት መውሰድ አለባቸው					
20	ለታዳጊ ወጣቶች ስለሚያስፈልገው የ HPV ክትባት የጤና መረጃ።ሰ.					
21	እኔ እንደማስበው ክትባቱ ጥሩ ነው ምክንያቱም ስለሰርቪካል ስጋት እንዳይቀንስ ስለሚያደርገኝ					
22	ክትባቱ በማህፀን በር ካንሰር የመያዝ እድሌን እንደሚቀንስ አምናለሁ።					
23	ክትባቱ ከወሰድኩ የማህፀን በር ካንሰር ውስብስቦች ይቀንሳል ብዬ አስባለሁ።					
ክፍል 4	ስለ HPV ክትባት በተነገሩ ወሬዎች ላይ መሰናክሎችን ማሰብ እና ማመን					
24	ጸሎቶቹ የማጎጸን ነቀርሳን ይከላከላሉ					
25	ክትባቶች የህዝብ ቁጥርን ለመቀነስ የሚረዱ ዘዴዎች ናቸው					
26	የ ማህፀን በር ካንሰር ክትባት የሴት ልጆችን የመራባት ችሎታ ያበላሻል					
27	የ ማህፀን በር ካንሰር ክትባት ሊያስከትል የሚችለው የጎንዮሽ ጉዳት በተለመደው እንቅስቃሴዬ ላይ ጣልቃ ሊገባ ይችላል ብዬ እጨነቃለሁ።					
28	የ ማህፀን በር ካንሰር ክትባት ውጤታማነት ያሳስበኛል።					

ክፍል 3	5ቱ ስነልቦናዊ የክትባት መቅድሞች (The 5c Psychological Antecedents Of Vaccination)					
ክፍል 3.1	በራስ መተማመን(calculation)					
29	ክትባቶቹ ደህና ናቸው የሚል ስጋት አለኝ					
30	የመንግስት ባለስልጣናት የሚወስኑት በጥቅም ላይ ነው ማህበረሰብ					
31	ትክክለኛ የክትባት መረጃ ለማግኘት በጤና አጠባበቅ ሰራተኞች አምናለው					
ክፍል 3.2	እንቅፋቶች (Constraints)					
32	የስራ ጫና ክትባትን እንዳልወስድ እንቅፋት ይንብኝ ይሆናል					
ክፍል 3.3	ውጤቱን ያላገናዘበ እርካታ(Complacency)					
33	የ ማህፀን በር ካንሰር ክትባት በሽታን መከላከል ስለማያስችል ክትባቱን መውሰድ አላስፈላጊ ነው					
34	የበሽታ መከላከል አቅሜ ጥሩ ስለሆነ የHPV በሽታን መከላከል እችላለሁ ብዬ አምናለሁ					
35	የ ማህፀን በር ካንሰር በሽታ ያን ያክል የከፋ በሽታ ስላለሆነ ክትባት መውሰድ አያስፈልግም					
ክፍል 3.4	ስሌት (Calculation)					
36	የ ማህፀን በር ካንሰር ክትባት ስለመውሰድ ለመወሰን ጥቅምና ጉዳቱን/አደጋውን አመዛዝናለሁ					
37	የ ማህፀን በር ካንሰር ክትባት ስለመውሰድ ሳስብ በመጀመሪያ ውጤታማ ነው አይደለም የሚለውን ታሳቢ አደርጋለሁ፡፡					
38	የ ማህፀን በር ካንሰር ክትባትን ከመውሰዴ በፊት ስለክትባቱ በጥልቀት ማውቅ እፈልጋለሁ					
ክፍል 3.5	የጋራ ኃላፊነት (Collective responsibility)					
39	የ ማህፀን በር ካንሰር ክትባት እወስዳለሁ ምክንያቱም ደካማ የበሽታ መከላከል አቅም ያላቸው ሰዎች እንዳይያዙ ማድረግ እችላለሁ					
40	የ ማህፀን በር ካንሰር ክትባት መውሰድ የበሽታውን ስርጭት ለመግታት ስለሚያስችል የጋራ ተግባር መሆን አለበት					
ክፍል 4	የ ማህፀን በር ካንሰር ክትባትን ለመውሰድ ያለ ፈቃደኝነት (willingness to receive HPV vaccine)					
41	የ ማህፀን በር ካንሰር ለመውሰድ አስባለሁ					
42	የ ማህፀን በር ካንሰር ክትባትን ለመውሰድ አቅዳለሁ					
43	የ ማህፀን በር ካንሰር ክትባትን ለመውሰድ ካቡ ምን አነሳሳዎት?(ምልክት በማድረግ ይመልሱ) If you are intended to be vaccinated what motives you to be vaccinated?(TICK your answer)					
	የ ማህፀን በር ካንሰር በሽታ ተጋላጭ ነኝ					
	የ ማህፀን በር ካንሰር መያዝ አልፈልግም					
	የ ማህፀን በር ካንሰር በሽታን ወደ ሌሎች ላስተላልፍ አልፈልግም					

	የ ማህፀን በር ካንሰር በሽታን በመከላከል ውስጥ ተዋናኝ/ተግባሪ መሆን እፈልጋለሁ	
	የ ማህፀን በር ካንሰር ክትባት ውጤታማነት እተማመናለሁ	
ክፍል 5	የ ማህፀን በር ካንሰር ለመውሰድ ካሰቡ ምክንያትዎ ምንድነው (If you are not intended to be vaccinated what is your reasons of refusal?)	
	ለከፋ የ ማህፀን በር ካንሰር በሽታ ተጋላጭ ነኝ ብዬ አላስብም	
	የ ማህፀን በር ካንሰር በሽታ ስለመያዝ አልፈራም	
	በክትባቱ ዙሪያ የበለጠ ልምድ እስከማገኝ እጠብቃለሁ	
	የ ማህፀን በር ካንሰር ክትባት ውጤታማነትን እጠራጠራለሁ	
	የክትባቱ መለስተኛ የሆኑ የጎንዮሽ ጉዳቶች ያስፈሩኛል (ለምሳሌ-ትኩሳት፣ ክትባቱ በሚሰጥበት ሰውነት ክፍል ህመም መሰማት)	
	የክትባቱ ከፍተኛ የሆኑ የጎንዮሽ ጉዳቶች ያስፈሩኛል (ለምሳሌ በሆስፒታል መተኛት፣ ከፍተኛ ህመም)	
ክፍል 6	የኮቪድ-19 ክትባት ስለመውሰድ ያለ ማመንታት (COVID-19 Vaccine Hesitancy)	
44	የ ማህፀን በር ካንሰር ክትባት በነጻ የማግኘት እድል ካገኘህ ክትባቱን መውሰድ ትፈልጊለሽ	1 አዎ 2 አይ
45	የ ማህፀን በር ካንሰር ክትባቱን እንድትከተቡ ቤተሰቦችዎ ወይም ጓደኞችዎ የሚደግፉዎት ከሆነ ምን ያደርጋል	1በእርግጠኝነ እወስደዋለሁ 2 ምናልባት እወስደዋለሁ 3 ለመውሰድ እዘገያለሁ 4 ምን እንደማደርግ እርግጠኛ አይደለሁም። 5 ምናልባት አልወስድም ይሆናል። 6 በእርግጥ አልወስድም።
ክፍል 7	ስለ ማህፀን በር ካንሰር ክትባት ያለፈ ታሪክ	
46	የ ማህፀን በር ካንሰር ክትባት ወስደዋል?	አዎ / አልወስድኩም
47	አዎ ከሆነ ስንት ጊዜ ነው የከተቡት	1. አንድ ጊዜ 2 ሁለት ጊዜ

አባሪ II፡ ጥልቅ ቃለ ምልልስ

የአዲስ አበባ ዩኒቨርሲቲ የሕዝብ ጤና፣ የተሐድሶ ጤና ዲፓርትመንት ትምህርት ቤት

የናሙና ማመሳከሪያ ዝርዝር ለጥልቅ ቃለ መጠይቅ መመሪያ

በኤች.ቪ.ቪ ክትባት መውሰድ እና በጅማ ከተማ ውስጥ ባሉ ሴት ትምህርት ቤት ልጃገረዶች መካከል ያለውን የወላጆችን አመለካከት ፣የወላጆችን አመለካከት ፣የማመንታት ሁኔታ እና የሴት ተማሪ ተንከባካቢዎች የማመንታት ምክንያቶችን ለመፈለግ በኤች.ቪ.ቪ ክትባት መውሰድ እና በጅማ ከተማ ውስጥ ባሉ ሴት ልጆች መካከል ያለውን ተያያዥነት ያለው ጥናት በማካሄድ ላይ ነኝ። መረጃ ለማግኘት አንዳንድ ጥያቄዎችን ልጠይቅህ እፈልጋለሁ። እባክዎን ይህ ውይይት በጥብቅ ሚስጥራዊ፣ ሚስጥራዊ እና ስምዎ የማይመዘገብ መሆኑን ያረጋግጡ።

ልቀጥል? አዎ_____ አይ_____ እናመሰግናለን!

1. የአገልግሎት ሰጪው ኮድ_____

2. ወሲብ_____

3. ዕድሜ_____

4. የትምህርት ደረጃ_____

5. የስራ ሁኔታ _____

6. ስለ HPV ክትባት ከዚህ በፊት ሰምተሃል? የት ነው የሚሰሙት? ____

7. የ HPV ክትባቶች ለሴቶች ልጆች ደህና ናቸው ብለው ያስባሉ? ስለ HPV ክትባቶች የሚያስጨንቁዎት ነገር ምንድን ነው?

8. ክትባቱ ምንም አይነት መለስተኛ ወይም ከባድ ችግር አለበት ብለው ያሳስባሉ? ከሆነ፣ ክትባቱ ምን የጎንዮሽ ጉዳት ያስከትላል ብለው ያምናሉ?

9. በከተማዎ ያሉ የጤና ባለሙያዎች ስለ HPV ክትባት በቂ መረጃ ይሰጡዎታል ብለው ያምናሉ? ከሆነ ምን ዓይነት መረጃ አገኘህ እና ከየት አገኘህ? ካልሆነ የሚመለከተው አካል ወደፊት እንዲሄድ ምን እርምጃዎችን ይፈልጋሉ? እና በቂ መረጃ ለማግኘት እቅድህ ምንድን ነው?

10. በልጃገረዶች፣ ወላጆች ወይም ማህበረሰቦች ስለ ክትባቱ ምን መሠረተ ቢስ ወሬ ወይም የተሳሳተ መረጃ ሰምተሃል?

11. ከ HPV ክትባት ክትባት ጋር የተያያዙት ምክንያቶች ምንድን ናቸው? ወይም ለዚህ ክትባት የማመንታት ምክንያት ምን ይመስልዎታል

Oromiffa version

DabalataGaaffilee (Afaan Sadiitiin) YUNIVARSIITII ADDIS ABABAKOOLEEJII SAAYINSII FAYYAAMANNI BARNOOTA FAYYAA UMMATAKabajamtoota hirmaattotaKabajamtootaQorannoo “Fudhannaa talaallii vaayirasii papiloma Namaa fi wantoota isaa waliin walqabatan Shamarran mana barumsaa dargaggoota magaalaa Jimmaa, Oromiyaa, Itoophiyaa keessatti dubaraa” irratti gaggeeffamuuf akka tasaa filatamtaniittu.

Qorannoo akaadaamii irraa kan hafe kaayyoo biraa kamiifuu kan oolu ta’a. Kaayyoo iccitii eeguuf maqaa keessan hin argisiisinaa. Gaaffiin kun maqaan isaa kan hin ibsamne yoo ta’u, namni dhuunfaa kamiyyuu tuuta odeeffannoo ykn argannoo qorannoo murtaa’e tokko waliin adda hin baafamu ykn hin hidhamu. Gaaffilee kana guutuu keessatti tumsi gootan baay'ee dinqisiifama.

Qajeelfama: Bakka(wwan) kenname keessatti mallattoo (√) ykn qaxxaamuraa (X)n agarsiisi.

Kutaa 1: Odeeffannoo Waliigalaa

KUTAA 1- Gaaffiiwwan cufaman baay'inaan

Kutaa 1: Wantoota duubbee dimogiraafii, haala fayyaa fi muuxannoo Talaallii HPV safaruuf itti fayyadaman.

Qajeelfama: deebii kee agarsiisuuf filannoo dura lakkoofsa tarreeffame marsi

Warra filannoo hin qabneef immoo bakka duwwaa guutaa.

I. Gaaffilee hawaas-dimoogiraafii

Lakk. Gaaffii Deebii/Filannoo

1 Umurii_____(waggaa guutuu keessatti)

2 Amantii 1. Ortodoksii 2. Pirootestaantii 3. Muslim 4. Kaatolikii

3 Lakkoofsa kutaa 1. Kutaa 6 2. Kutaa 7 3 Kutaa 8 4. Kutaa 9

4 Warra 1 fira 2 3 biroo waliin eenyu waliin jiraatta

5 mini media mana barumsaa irratti hirmaattaa 1 Eeyyee 2 Lakki

6 Mobaayila ni qabdaa 1 Eeyyee

2 Lakki

7 Haala barnoota abbootii kee 1 Dubbisuu fi barreessuu dadhabuu

2 Dubbisuu fi barreessuu kan danda'u

3 Sadarkaa tokkoffaa (kutaa 1-8)

4 >= Sadarkaa 2ffaa (9-12ffaa) .

5 12 ol

8 Haadholiin kee sadarkaa barnootaa 1 Dubbisuu fi barreessuu dadhabuu

2 Dubbisuu fi barreessuu danda'uu

3 Sadarkaa tokkoffaa (kutaa 1-8)

4 >= Sadarkaa 2ffaa (9-12ffaa)

5 12 ol

9 Warri kee madda galii 1. Marchent 2. Hojjetaa mootummaa 3. Kanneen biroo

10 Warri kee galii ji’aa giddu galeessaan 1. < 3000 ETB 2. 3000-5000 ETB 4. 5000-7000 ETB 5. > 7000 ETB

11 Obboleettii guddaa qabdaa 1 Eeyyee 2 Lakki

12 Yoo eeyyee ta'e, talaallii HPV obboleettiin kee guddittii talaalte 1 eeyyee 2 lakki

Beekumsa, Ilaalcha, amantaa dhuunfaa fi yaada waa'ee talaallii HPV

13 Waa'ee talaallii Human Papillomavirus dhageessaniittu? 1 eeyyee 2 lakki

14 Yoo eeyyee ta'e eessatti dhageessa 1 miidiyaa hawaasaa manneen barnootaa 2 garee ykn iddoowwan amantaa 3 hojjetoota eegumsa fayyaa 4

5 Maatii/Hiriyyoota miseensota hawaasaa 5

15 Vaayirasii fide dhageessanii jirtuu kaansarii gadameessaa 1 eeyyee 2 lakki

16 HPV vaayirasii baay'ee beekamaa miti. 1 eeyyee 2 lakki

17 Qorichi HPV ni jira. 1 Eeyyee 2 Lakki

Itmems 2.1 Ilaalcha, amantaa fi yaada dhuunfaa adda addaa talaallii HPV irratti qabu Cimsee walii hin galu Walii hin galu Giddu galeessa walii galu Cimsee walii gala

Talaalliin HPV kaansarii gadameessaa ittisuuf bu'a qabeessa.

20 Barumsi talaallii HPV ta'uu qaba dargaggoota mana barumsaatiif kennamu

21 Shamarran walqunnamtii saalaa jalqabaa isaanii dura talaallii HPV fudhachuu qabu

22 Odeeffannoo fayyaa waa’ee talaallii HPV dargaggootaaf barbaachisu.

23 Talaalliin gaarii natti fakkaata sababiin isaas waa'ee Gadameessaa akkan hin yaaddofne waan na godhuuf

24 Talaalliin carraa kaansarii Gadameessaatiin qabamuu koo ni hir'isa jedheen amana

25 Yoon talaallii fudhadhe rakkoon kaansarii Gadameessaa ni hir'ata jedheen yaada
26 jedheen yaada Talaalliin HPV tarii hin hojjetu
27 Talaallii HPV hin amanu
28 Talaalliin HPV barbaachisaa miti jedheen yaada
Items 2.2 Gufuuwwan yaaduu fi oduu waa'ee talaallii HPV odeeffamutti amanuu Cimsee walii hin galle walii hin galle Giddu galeessa walii galuu Cimsee walii gala

29 kadhannaan kaansarii gadameessaa ittisa
30 Talaalliin mala baay'ina ummataa hir'isuuf gargaaru
31 Talaalliin HPV dhala shamarranii ni balleessa
32 Miidhaan talaalliin HPV irraan gahuu danda'u sochii koo isa barame gidduu seena jedheen yaadda'a
33 Bu'a qabeessummaa talaallii HPV na yaaddessa
34 Talaallii HPV dogoggora qabu/sobaa argachuu danda'a jedhee yaaddoo qaba
35 Talaallii HPV hojjechuun nageenya isaa bu'a qabeessa ta'een qorachuuf baay'ee ariifachuun na yaaddessa
36 Miidhaa yeroo dheeraa HPVn fidu na yaaddessa talaallii

Seenaa Duraa waa'ee talaallii HPV

Qabxiilee 3 5C dursa xiinsammuu talaallii HPV Dubbachuu
Qabxiilee 3.1 Ofitti amanamummaa Cimsee walii hin galu walii hin galu Giddu galeessa walii galu Cimsee walii gala
39 Talaalliin nageenya qaba jechuun na yaaddessa
40 Abbootiin taayitaa mootummaa faayidaa Hawaasa
41 Odeeffannoo talaallii sirrii ta’eef hojjettoota eegumsa fayyaa irratti amanamuu

Qabxiilee 3.2 Danqaalee

42 Dhiphinni hojii guyyaa guyyaa talaallii akkan hin fudhanne na dhorkuu danda’a
Qabxiilee 3.3 Ofitti gammaduu
43 HPV ittisuu waan hin dandeenyeef talaallii fudhachuun waan hin barbaachifne natti fakkaata
44 Sirni ittisa qaamaa koo nan amana humna guddaa qaba; kaansarii gadameessaa irraa na eega
Kaansariin gadameessaa baay’ee dhukkuba cimaa miti kan ani talaallii fudhachuu qabu miti jedheen amana

Qabxiilee 3.4 Shallaggii

Kaansarii ervical talaallii fudhachuuf yeroon yaadu, murtoo hundarra gaarii ta’e murteessuuf faayidaa fi balaa isaa madaalee
Yeroon waa'ee talaallii kaansarii gadameessaa yaadi, jalqaba bu'a qabeessa ta'uu fi dhiisuu isaa nan ilaala
Talaallii HPV osoon hin fudhatiin dura waa'ee talaallii kanaa bal'inaan beekuu qaba

Items 3.5 Itti gaafatamummaa waloo

Talaallii HPV nan fudhadha sababni isaas, in karaa sanaan, namoota sirna ittisa qaamaa dadhabaa qaban eeguu nan danda'a

Talaalliin HPV tatamsa'ina dhukkuboota ittisuuf tarkaanfii waloo ta'e natti fakkaata

Items 4 fedhii talaallii HPV fudhachuu

Talaallii kaansarii Gadameessaa fudhachuuf yaada/tilmaama

Talaallii kaansarii gadameessaa fudhachuuf karoorfadheera

Keewwata 5 Talaallii fudhachuuf yoo yaadame maaltu talaallii fudhachuuf si kakaasa?(TIK your answer)

Kaansarii gadameessaatiin qabamuuf saaxilamaadha.

Dhukkuba kanaan qabamuu hin barbaadu.

Kaansarii gadameessaa namoota birootti dabarsuu hin barbaadu.

Qabsoo kaansarii gadameessaa irratti taphataan ta'uu barbaada.

Bu’a qabeessummaa talaallii HPV nan amana

Keewwata 5.2 Yoo talaallii fudhachuuf hin yaadamne ta’e sababni diduu kee maali?

Kaansarii gadameessaa cimaa (sever Cervical cancer) hin qabu.

Dhuguma kaansarii gadameessaatiin qabamuu hin sodaadhu.

Talaallii kana irratti muuxannoo dabalataa hangan argadhutti eeguun filadha.

Bu'a qabeessummaa talaallii kanaa nan shakka.

Miidhaa salphaa (fkn, ho'a qaamaa, dhukkubbii bakka lilmoo) talaalliin sun natti dhufu nan sodaadha.

Talaalliin kun miidhaa hamaa (fkn, hospitaala ciisuu, dhukkuba hamaa) nan sodaadha.

Keewwata 6 Walumaagalatti Talaallii HPV Dubbisuu

Carraa talaallii HPV bilisaan argachuu yoo argatte, Talaallii fudhachuu barbaaddaa 1. Eeyyee2. Lakki

Yoo maatiin kee ykn hiriyyoonni kee talaallii HPV akka talaaltu si deeggaran, maaltu 1 Dhugumatti nan fudhadha

Tarii nan fudhadha

Fudhachuu nan harkifadha

Maal akkan godhu hin beeku

Tarii hin fudhadhu

Surly hin fudhadhu

Dabalata II: In depth intervieew

MANNI BARUMSAA FAYYAA UMMATA YUNIVARSITII Addis Ababa, DEPATEMENT OF HEALTH DHUMAA

Sample checklist for In-depth interview guide

Qorannoo Dubbiin fudhachuu Talaallii HPV fi wantoota kanaan walqabatan shamarran mana barumsaa dubartootaa bara Magaalaa Jimmaa mala ilaalcha warra ijoollee durbaa isaanii talaaluu, Haala Dubbisuu fi sababoota duubatti deebi'uu barattoota dubartootaa kunuunsitoota. Odeeffannoo argachuuf gaaffii tokko tokko isin gaafachuun barbaada. Mariin kun cimsee dhoksaa, iccitii ta'uu fi maqaan keessan galmaa'uu dhabuu isaa mirkaneeffadhaa.

Itti fufuu danda'aa? EEYYE___ LAKK___ Galatoomaa!

1. Koodii dhiyeessaa tajaajilaa_____

2. Walqunnamtii saalaa_____
3. Umurii_____
4. Haala barnootaa_____
5. Haala Hojiia _____
6. Waa'ee talaallii HPV kanaan dura dhageessaniittu? Eessatti dhageessa? __
7. Talaalliin HPV shamarraniif nageenya qaba jettanii yaaddu? Talaallii HPV ilaalchisee yaaddoon keessan maali?
8. Talaalliin kun rakkoo salphaa ykn cimaa gosa kamiyyuu qabaachuu isaa isin yaaddessaa? Yoo akkas ta'e talaalliin sun miidhaa akkamii fiduuf deema jettanii amanta?
9. Ogeeyyiin fayyaa magaalaa keessan keessa jiran talaallii HPV irratti odeeffannoo gahaa isiniif kennu ni amantaa? Yoo jiraate odeeffannoo akkamii argatte, eessaa argatte? Yoo hin taane qaamni dhimmi ilaallatu gara fuulduraatti tarkaanfii akkamii akka fudhatu barbaaddu? Akkasumas karoorri keessan odeeffannoo gahaa argachuuf gara fuulduraatti tarkaanfachaa jira?
10. Waa'ee talaallii kanaa shamarran, warra ykn hawaasaan oduu bu'uura hin qabne ykn odeeffannoo dogoggoraa akkamii dhageessaniittu?
11. Wantoonni talaallii talaallii HPV wajjin walqabatan maali? Moo sababni gara talaallii kanaatti duubatti deebi'uu maal jettu?

Annex I. Information Sheet

Annex III Participants Information Sheet

: Information sheet (English version)

Research Title: Hesitancy in Human papilloma virus vaccine uptake and its associated factors among female students in Jimma Town, Oromia, Ethiopia

Name of principal investigator: Meron Dera

Name of the sponsor: Addis Ababa University

Introduction: This information sheet is prepared for Jimma city schools. The aim of the form is to make the institution clear about the purpose of the research, data collection procedures and finally to get permission to conduct the research.

Purpose of the research project: Primarily, the result of this study will be submitted to Addis Ababa University School of Public Health for the requirements to earn Masters of Public Health In Epidemiology and Biostatics. Additionally there are few studies were done so far in the area of Hesitancy in Human papilloma virus vaccine due to the fact in Ethiopia. Thus, the finding of this study will contribute its part in Filing the information gap regarding Hesitancy in Human papilloma virus vaccine and its associated factors. Therefore, it will contribute its part for policies that focus on the level of Hesitancy in Human papilloma virus vaccine uptake, and associated factors behind the hesitancy level

Procedure: We will ask you to fill out a Google Form questionnaire, which should take about 20 minutes. Participation does not include any additional obligations or restrictions on lifestyle. It is not anticipated that taking part in the research would have any negative effects or cause any discomfort

Risk and Benefit: Although there are no immediate advantages for individuals taking part in the study, it is believed that this effort will eventually contribute to the development of the Vaccination program.

Confidentiality: A person or their institution cannot be identified or identified from these data due to their anonymity.

Person to contact: This research project will be reviewed and approved Please ask to be included to our distribution list if you would want a copy of any research report that comes out of it. The scientific and ethical committees for Addis Ababa University's faculty of health science, school of public health research, and AAHR-Ethical review committee have all given their approval for this project

Addis Ababa University College of Medicine and Health Science Research Review Committee

Tel: +251-115157701 or +251-115-513-099

Contact for further information: Meron Dera (MPH Candidate) Tel. 0932-44-63-29 Email:merydera19@gmail.com

Permission: Therefore, you are kindly requested to permit and forward your permission to concerned body in your organization so that the researcher can get cooperation from data clerks and other responsible bodies.

With regards!

To be filled by School Directors:

I have properly examined the objective of the study, understood patient rights are respected Students confidentiality is assured and there will be no risks on patients related to the study.

Therefore, I gave a formal permission for the study to begin on behalf of the ---------- School

School Director Name:

Signature:

Date: