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Human Papillomavirus Vaccination Practice and its Associated Factors Among Secondary School Female Students in Nekemte Town, Oromia Region, Ethiopia, 2022

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BAHIR DAR UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCES

DEPARTMENT OF PEDIATRICS AND CHILD HEALTH NURSING

**HUMAN PAPILLOMAVIRUS VACCINATION PRACTICE AND ITS
ASSOCIATED FACTORS AMONG SECONDARY SCHOOL FEMALE
STUDENTS IN NEKEMTE TOWN, OROMIA REGION, ETHIOPIA, 2022**

BY: MITIKU ABERA (BSC.)

**THESIS SUBMITTED TO THE DEPARTMENT OF PEDIATRICS AND CHILD
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FOR PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF MASTERS IN PEDIATRICS AND CHILD HEALTH NURSING**

AUGUST, 2022,

BAHIR DAR, ETHIOPIA

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ABSTRACT

Background: Human papillomavirus vaccination is a well-known global strategy for the prevention of cervical cancer. However, uptake of the vaccine varies between regions and countries of the world due to several discouraging factors. Although adolescents are at risk for cervical cancer, there are limited studies measuring human papillomavirus vaccination practice of adolescents among the study area.

Objective: To assess human papillomavirus vaccination practice and its associated factors among secondary school female students in Nekemte town, Oromia region, Ethiopia, 2022

Methods and Materials: A school-based cross-sectional study was conducted from May 13 to June 13, 2022 among secondary schools female students in Nekemte town, Oromia region, Ethiopia. A total of 423 samples were selected using a computer generated simple random sampling technique. Data was collected using a structured and self-administered questionnaire. The study participants were informed of the need for this study. Epi Data version 4.6 was used for data entry and Statistical package for social science (version 25) for data analysis. Binary logistic regression was calculated using the odds ratio with a 95% confidence interval. Variables with a p-value < 0.25 in the bi-variable analysis were taken in to multi-variable analysis. Finally, variables with a p-value < 0.05 were declared as statistically significant.

Result: The current study revealed that the prevalence of human papillomavirus vaccination practice was 52% (CI; 46.8-56.6) in the study area. Factors significantly associated with the human papillomavirus vaccination practice were: having good knowledge of human papillomavirus and its vaccine (AOR = 5.79, CI; 3.34 - 10.03), having positive attitude towards human papillomavirus vaccination (AOR = 8.36, CI; 4.67 - 14.93), higher level maternal education (college and above) (AOR = 5.47, CI; 1.68 - 17.82) and urban residence (AOR = 4.12, CI; 1.86 - 9.31).

Conclusion and Recommendation: Prevalence of human papillomavirus vaccination practice was 52% in the study area. It was on average to the global strategy to eliminate cervical cancer in the target population. Knowledge, attitude, higher maternal educational level (college and above), and place of residence were associated with human papillomavirus vaccination. Therefore awareness creation and behavioral change education is necessary to enhance optimum coverage of the Vaccine.

Keywords: female: Students, Human papillomavirus vaccination, Practice, Secondary School,

LIST OF ACRONYMS AND ABBREVIATIONS

AOR – Adjusted Odds Ratio

COR – Crude Odds Ratio

ETB – Ethiopian Birr

FDA – Food and Drug Agency

HPV – Human Papillomavirus

LMIC - Low- and Middle-Income Countries

WHO – World Health Organization

STD - Sexually Transmitted Disease

SPSS – Statistical Package for Social Science

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1. INTRODUCTION

1.1. Background

Human papillomavirus vaccination (HPV) is a well-known global strategy for the prevention of cervical cancer (1). Vaccination of adolescent girls is the most effective long-term intervention for reducing the risk of developing cervical cancer. There is also strong evidence that high HPV vaccination coverage leads to protection of unvaccinated individuals through herd immunity further enhancing the protective effect for the community (2).

There are currently three vaccines that have been prequalified by WHO. The bivalent (Cervarix) protects against the most common types of human papillomavirus (HPV16 and 18) those accounts for nearly 70% of cervical cancer was approved by United States FDA in 2009. Gardasil 9 (nine valent) targets HPV6 and 11; those cause 90 percent of genital warts in addition to HPV16 and 18 (3). All available HPV vaccines have the ability to prevent the high risk oncogenic genotypes.

HPV makes up a group of viruses that are extremely common worldwide (4). There are more than 100 types of which at least 14 cause cancer. The primary cause of precancerous and cancerous cervical lesion is infection with high-risk or oncogenic (HPV 16 and 18) serotypes. Cancers of the anus, vulva, vagina, penis and oropharynx are also caused by certain types of HPV infections (5).

Even though HPV is mostly spread sexually, infants, children, and adults can contract both high-risk and low-risk infections through birth or close contact (6). It is estimated that 3 in 4 people can be infected with HPV at some point in their lives. By the age of 50, at least 80% of women will be infected with HPV infection. Majority of sexually active women and men are highly vulnerable (7)

1.2.Statement of the Problem

Cervical cancer is one of the most serious public health problems facing women around the world. With an estimated 604,000 new cases and 342,000 deaths worldwide in 2020, it was the fourth leading cause of cancer deaths in women (8). Cervical cancer has an incidence rate of more than 40 cases per 100,000 population in East Africa (9). In Ethiopia 7, 445 new cases and 5,338 deaths were approximated from cervical cancer each year. It is the second most common malignancy and third leading cause of death among women aged 15 to 44 (10).

More than 85% of those affected are young, uneducated women living in the poorest countries of the world. Many are also mothers to young children whose lives are shortened by the untimely deaths of their mothers (11). A history of STI, multiple sexual partners, and having sex at a young age are all important risk factors (12).

For the first time world health organization (WHO) launched global strategy to eliminate cervical cancer in November, 2018. To accelerate the process, WHO warns all countries should fully vaccinate 90% of girls by age 15, screen 70% of women with a high-power test by age 35 and retest by age 45, and identify 90% of those women with cervical disease receiving treatment are to accelerate the process (13).

Human papillomavirus vaccination coverage was inequitably distributed across geographical settings and income levels with higher income countries achieving higher vaccine coverage. Several challenges played a vital role for the observed discrepancy. High vaccine price constrained the ability of many countries to introduce the HPV vaccine into their national immunization programs and to ensure its sustainability (14). As of 2020, less than 25% of low-income (LI) and less than 30% of lower-middle-income countries had introduced the HPV vaccine into their national immunization schedules (13).

Ethiopia launched and made an informed decision to vaccinate a single-age cohort of all 14-year-old girls until the vaccine supply stabilizes and allows for multiage cohort vaccinations to girls' ages 9 through 13 for the first time in 2018. The vaccine was given at 6- month intervals using quadrivalent HPV vaccine through school-based campaigns. Over 2 million of 14-year-old girls were immunized against HPV across the country in two schedules.

Monitoring HPV vaccination uptake allows public health practitioners to identify unvaccinated populations and to develop targeted interventions to increase vaccine coverage. Conducted studies in different parts of the world observed significant variations in acceptability and uptake rate of the vaccine among in school adolescents of different geographical regions and nations (15).

Lack of knowledge and information about HPV, cervical cancer and its preventions as well as a negative attitude towards HPV vaccination have contributed for the low acceptability and uptake rates of HPV vaccine (16). In addition lack of awareness or misconceptions regarding the vaccine among parents played significant influence on acceptability and actual practice of the vaccination. Cited evidences have also showed several Sociodemographic factors associated with uptake of HPV vaccination.

Adolescents will be better equipped to make informed decisions about HPV-related cancer preventions if they have more information about the virus (17). School-based health interventions given for adolescents have made a big difference in terms of increasing awareness and knowledge of HPV related diseases as well as readiness to get vaccinated against HPV (18).

Even though adolescents represent a unique population at risk for cervical cancer, there were limited studies measuring HPV vaccination practice of in school adolescents in Ethiopia; particularly in the study area. Therefore this study aimed to assess human papillomavirus vaccination practice and its associated factors among secondary school female students in Nekemte town, Oromia region, Ethiopia, 2022.

1.3. Significance of the study

Undertaking such study may identify those factors influencing uptake rate of HPV vaccine and show areas where to intervene to ensure the optimum coverage of the vaccine.

Therefore the finding of this study will help Nekemte zonal health managers and educational sectors to intervene on the factors that can be modified. In addition it will contribute to plan and give age appropriate health education for adolescents on HPV, cervical cancer and its preventions. It may also help future researchers to further generate evidences on the limitations of this study.

2. LITERATURE REVIEW

2.1. Prevalence of Human Papillomavirus Vaccination Practice

HPV vaccination coverage varies across different geographies and income levels. In countries those started with high vaccination coverage, there is a significant drop in uptake over time while those started with low uptake have not made a major increase. LMICs need major efforts in rolling out vaccination programs and monitoring its uptake (15).

Studies conducted among high school adolescents in USA and Brazil reported that 42.8% and 22.8% had received HPV vaccine respectively (19, 20). Another similar study conducted in Germany and Spain also reported that 17.4% and 71.5% respectively had received HPV vaccine (21, 22). Published literature in Asian countries; Malaysia (89.8%) and Indonesia (50.7%) reported(21, 23). According to studies under taken in Africa: Uganda and Nigeria, 17.8% and 2.8% had been vaccinated for HPV (24, 25). In Ethiopia, a single study done among primary schools in Amhara region showed that 65.5% of adolescent girls practiced HPV vaccine which is still below the target coverage to eliminate cervical cancer (26).

2.2. Factors Associated with Human papillomavirus Vaccination Practice

2.2.1. Sociodemographic Factors

Several studies have searched socio demographic factors associated with HPV vaccination since the introduction of the vaccine to date (27-29). According to studies conducted in Malaysia and Uganda, age was significantly influenced the practice of HPV vaccination. According to these studies the odds of HPV vaccination were higher among girls age 11, 13, and 14 years compared to girls aged 10 years (30, 31).

Place of residence was also having significant impact on health seeking behavior of individuals. According to study conducted in China and Uganda place of residence was significantly associated with HPV vaccination. In China it was reported that urban hometown was a significant influencing factor of HPV vaccination (32). However study done in Minjar shinkora district of Amhara regional state of Ethiopia found that being in rural resident was negatively associated with HPV vaccination practice (26).

Cultural norms and religious beliefs can have an impact on health behavior and HPV vaccination practice (33). Study conducted in Sweden and Uganda reported that HPV vaccination was

significantly associated with ethnicity (31, 34). These studies reported that girls with non-European background and girls with a less educated mother were less likely to have received the vaccine.

Maternal educational level is an important factor which governs the perception of parents regarding vaccination and hence the uptake of vaccination. Conducted studies in German, USA and Sweden showed that having a mother with high education or medium education versus basic education was a significant predictor for having been vaccinated (34-36).

Parental occupation showed significant association with HPV vaccination according to study done in Uganda (24). Family income was also another influencing factor of HPV vaccination. According to study conducted in German; medium versus low socio-economic status were significantly associated with having been vaccinated (21). However, study undertaken in Sweden showed that HPV vaccination was associated with higher socio-economic status (37).

2.2.2. Knowledge Factors

Adolescents will be better equipped to make informed decisions about HPV-related cancer prevention health interventions if they have more information about HPV virus. Studies conducted in Latvia and Nigeria showed that having heard of HPV and HPV vaccine were significantly associated with uptake of HPV vaccine (38, 39). Studies conducted in China, Brazil and Uganda showed that having knowledge of HPV and its vaccine was significantly associated with HPV vaccination (24, 32, 40). These studies reported that high level of knowledge was positive predictor of vaccine uptake while limited knowledge about the HPV vaccine was the primary and most common reason for refusing vaccination and not recommending the vaccine to others.

In Ethiopia, study conducted in Minjar Shenkora district of Amara region also revealed that being knowledgeable on HPV and its vaccine was significantly associated with the practice of HPV vaccination (26). According to this study, the odds of being knowledgeable students were 8.65 times more likely to practice HPV vaccination than not being knowledgeable.

2.2.3. Attitude Factors

Studies done in China and Brazil showed that positive attitude was significantly associated with HPV vaccination practice (40, 41). According to study conducted in Uganda, having a positive

attitude towards the HPV vaccination was a strong predictor of HPV vaccine uptake (24). This study showed that the prevalence of practice of HPV vaccine was 3 times higher among adolescents with positive attitudes towards the HPV vaccine compared to those with negative attitudes. Study conducted in Amara regional state of Ethiopia also reported that primary school female students who had a positive attitude towards HPV vaccination were practiced HPV vaccination (26).

2.3. Conceptual frame work

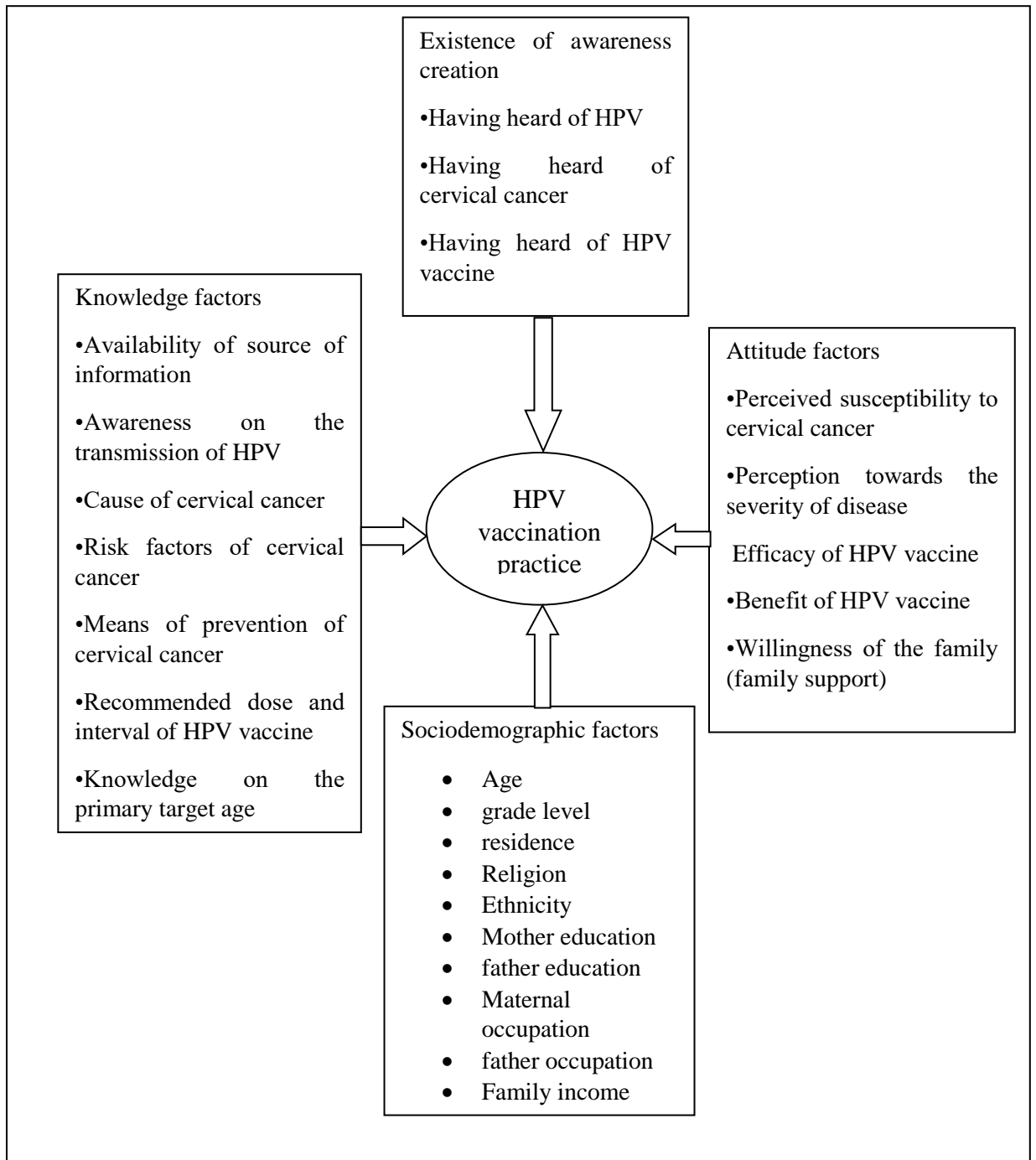


Figure 1. Conceptual frame work adapted on human papillomavirus vaccination practice and its associated factors among secondary school female students in Nekemte town, Oromia region, Ethiopia, 2022

3. OBJECTIVE

3.1. General Objective

To assess human papillomavirus vaccination practice and its associated factors among secondary school female students in Nekemte town, Oromia region, Ethiopia, 2022

3.2. Specific Objectives

1. To determine prevalence of human papillomavirus vaccination practice
2. To identify factors associated with human papilloma virus vaccination practice

4. METHODS AND MATERIALS

4.1. Study Setting and Period

The study was conducted in Nekemte town, which is located 341 km far from Addis Ababa, the capital city of Ethiopia. Nekemte town is capital town of East Wollega zone in Oromia regional state. The town has 6 sub cities with the total population of 110688 from which 54,350 were females. There was 1 specialized comprehensive public hospital, 1 specialized university teaching hospital, 3 health centers and 6 health posts providing health services. Nekemte town has 15 primary schools from which, 10 are public, 12 secondary schools from which 8 were public. According to data obtained from Nekemte educational office, total number of students enrolled in secondary schools for the academic year 2022 in the town was 10,091 from whom female students were 4,758. The study was conducted from May 13-June 13, 2022.

4.2. Study Design

School based cross-sectional study was conducted.

4.3. Population

4.3.1. Source Population

All female adolescents aged 14-18 years enrolled in secondary schools in Nekemte town, Oromia region, Ethiopia.

4.3.2. Study Population

All randomly selected female adolescents in the selected secondary schools in Nekemte town, Oromia region, Ethiopia

4.4. Inclusion Criteria

Those female adolescents aged 14-18 years and were present at the time of data collection

4.5. Exclusion criteria

Those female adolescents, who were ill at the time of data collection, not volunteer to participate in the study and who were without parents or guardians to get assent.

4.6. Sample Size Determination and Sampling Technique

4.6.1. Sample Size calculation

The sample size was determined using the single population proportion formula by estimating magnitude of HPV vaccination practice at 50% to get large sample size, $Z = 95\%$ confidence interval, normal distribution value is $Z \alpha / 2 = 1.96$, the margin of error (d) = 5% and the alpha value was 0, 05. Assuming 10% as the non-response rate, the final total sample size was 423 study participants.

$$n = \frac{\left(\frac{Z\alpha}{2}\right)^2 p(1-p)}{d^2}$$

$$n = \frac{(1.96)^2 0.5(1-0.5)}{(0.05)^2}$$

$n=384$, by adding 10% non-response rate the final sample size will be 423

4.6.2. Sampling Technique

From total, 12 secondary schools found in the town (both private and public), 4 secondary schools were selected by lottery method. Then the calculated sample size was allocated to each school proportionally after getting eligible adolescent girls from rosters of their homeroom teachers. The name of the students with their sections was listed to prepare sampling frame to that school, then study participants of a given high school were obtained by computer generated simple random sampling method. Finally, selected study units for given schools were requested to be in one of the sections at break time and fill the questionnaire through the guidance of data collectors (**Figure 2**).

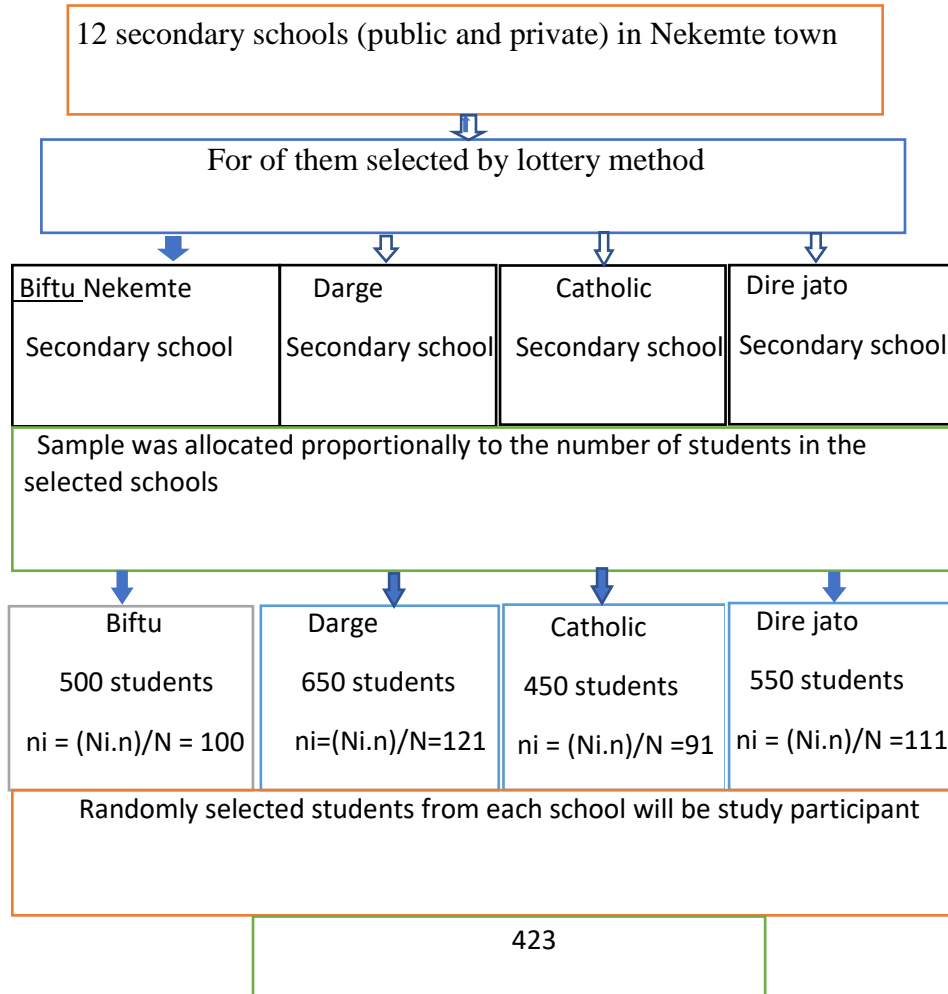


Figure 2. Sampling technique for assessment of human papillomavirus vaccination practice and its associated factors among secondary school female students in Nekemte town, Oromia regional, Ethiopia, 2022 (n =423)

4.7. Study Variables

4.7.1. Dependent Variable

Human papillomavirus vaccination practice

4.7.2. Independent Variable

Socio demographic variables: Age, grade level, place of residence, religion, ethnicity, maternal education level, father education level, maternal occupation, father occupation, family income

Knowledge factors:

- Availability of source of information
- Awareness on the transmission of HPV
- Cause of cervical cancer
- Risk factors of cervical cancer
- Means of prevention of cervical cancer
- Recommended dose and interval of HPV vaccine
- Knowledge on the primary target age

Attitude factors:

- Perceived susceptibility to cervical cancer
- Perception towards the severity of disease
- Benefit of HPV vaccine
- Safety of the vaccine
- Willingness of the family (family support)

4.8. Operational Definitions

HPV vaccination Practice- A student who ever received HPV vaccine at least once and measured as a binary outcome; practiced and not practiced

Good knowledge: From eight knowledge-based questions, those who answered 5-8 knowledge score were considered as having good knowledge on HPV and its vaccine (knowledgeable)

Poor knowledge: Knowledge score 0-4 was considered as not knowledgeable on HPV and its vaccine (poor knowledge). The same approach has been used in other studies to measure knowledge level ([42](#)).

Positive attitude: From five attitude based statements those students who scored 3-5 were considered as having positive attitude for HPV vaccination and those who scored < 3 were considered as having negative attitude towards HPV vaccination (24).

4.9. Data Collection Tool and Procedures

Structured and self-administered questionnaire was used for this study. The questionnaire was adapted from a review of relevant literatures (24, 26, 42). It assessed Sociodemographic data knowledge, attitude and HPV vaccination practice of study participants whether they have ever received the vaccine or not. In addition reasons (barriers) for the vaccine rejections for those who haven't received were assessed. The tool was prepared by English version and translated to the local language Afan Oromo. To avoid missing important information then translated back to English for analysis. Eight teachers were selected for data collection and two experienced nurses for supervisory purpose. Selected female students were assembled in one of the sections at break time in the selected schools on the day of the study. Each female student selected for the study filled the questionnaire under close supervision of data collectors.

4.10. Data Processing and Analysis

Each questionnaire was checked for completeness, coded and entered in to Epidata version 4.6. Then data was exported to SPSS version 25 for cleaning, editing and analysis. Data was checked for missed values and outliers. Descriptive analysis like frequencies, tables, percentages and cross tabulations were done to describe the required variable. In scoring knowledge eight questions were asked as a composite variable and one point was awarded for every correct answers (Yes) and zero for every in correct (No) answers. Attitude of respondents was measured by five attitude-based statements using three-point Liker scale (1- agree, 2- neither agree nor disagree and 3- disagree) and one point was awarded for every agree responses and zero for every neither agree nor disagree and disagree responses. Binary logistic regression was employed to infer factors associated with outcome variable. All explanatory variables with a p value less than 0.25 were taken in to multivariable analysis to control the effect of cofounders. Hosmer and Lemeshow goodness of fit statistics was tested. Multi co-linearity among independent variables was checked: thus, all variables have variance inflation factor (VIF) of less than ten. The analysis result of VIF was checked at the result part of the study. Finally, variables with a p value less than 0.05 were considered as statistically significant.

4.11. **Data Quality and Assurance**

Data collectors and supervisors were trained in data collection procedures for one day. Questionnaires were pre-tested for simplicity, clarity and sequence on 5% of samples in secondary school. Data collectors were supervised by four supervisors. Principal investigator and supervisors carried out on-site checks and reviews of all completed questionnaires.

4.12. **Ethical Consideration**

Prior to data collection, proposal was sent for Bahir Dar University, College of Medicine and Health Sciences Institutional Review Board (IRB) for approval. After the approval, official letter of cooperation was written to concerned bodies by academic and research directorate. Supportive letter was written by Nekemte town educational office for those selected secondary schools to collect the required data. Selected study participants were adequately informed about the aim of the study, procedures, anticipated benefits and risks by data collectors. Assent was taken from family of study participants and informed consent from study participants.

4.13. **Dissemination of the Result**

The findings of this study will be submitted to Bahir Dar University, College of Medicine and Health Science, Department of Pediatrics and Child Health Nursing. It will also be disseminated to Nekemte town zonal health managers and others health stake holders. Finally the study will be published on scientific journal.

5. RESULT

5.1. Sociodemographic Characteristics

Total of 423 students participated in the study with response rate of 100%. About 278 (67.5%) were at the age of 14-15. Majority of the respondents 292 (6410 (96.9%) were from Oromo ethnic group, 371 (87.7%) were urban residents and about 289 (68.3%) were followers of protestant.

Regarding mothers' educational status of respondents, 194 (45.9%) reported elementary school and 45 (10.6%) were reported college and above. The most responded father's educational status was elementary school 184 (43.5%). With regard to maternal occupation of respondents, 154 (36.4%) reported private owned business and 145 (34.3%) responded house wife. Concerning father's occupation, 146 (34.5%) of study participants responded private owned business. The most mentioned family income per month was <2000 EB (**Table 1**).

Table 1. Sociodemographic characteristics of secondary school female students in Nekemte town, Oromia region, Ethiopia, 2022 (n = 423)

Variable	Category	Frequency	Percent
Age	14 – 15	145	34.3
	16 – 18	278	65.7
Grade level	9 – 10	292	69.0
	11 – 12	131	31.0
Place of residence	Urban	371	87.7
	Rural	52	12.3
Religion	Protestant	289	68.3
	Orthodox	106	25.1
	Muslims	28	6.6
Ethnicity	Oromo	410	96.9
	Amhara	7	1.7
	Gurage	6	1.4
Mother's education	No formal education	119	28.1
	Elementary	194	45.9
	Secondary	65	15.4
	College and above	45	10.6
	Father's education	No formal education	59
Mother occupation	Elementary	184	43.5
	Secondary	109	25.8
	College and above	71	16.8
	House wife	145	34.3
Father occupation	Private business	154	36.4
	Government employee	32	7.6
	Farmer	92	21.7
	Daily laborer	66	15.6
Family income	Private business	146	34.5
	Government employee	79	18.7
	Farmer	132	31.2
	<2000 EB	148	35.0
Family income	2000-4000 EB	146	34.5
	>4000 EB	129	30.5

5.2. Knowledge about Human Papillomavirus and Its Vaccine

Majority 300 (70.9%) of the respondents had heard about the HPV. More than half 230 (54.4%) of the respondents had the knowledge one can contract HPV infections through sexual contact but only 130 (30.7%) of study participants knew that HPV is the major cause of cervical cancer. About 261 (61.7%) of respondents had the knowledge having multiple sexual partners predispose to cervical cancer. About 92 (21.7%) knew that HPV infections can heal without treatment. 264 (62.4%) of them knew cervical cancer have vaccine. 262 (61.9%) of them knew recommended dose and intervals of HPV vaccine. However 265 (62.6%) didn't know primary target age group of HPV vaccine (**Table 2**).

Table 2. Knowledge about HPV and its vaccine among secondary school female students in Nekemte town, Oromia region, Ethiopia, 2022 (n = 423)

Knowledge status	Frequency	Percent
Have heard about HPV virus	300	70.9
Knowledge one can get HPV through sexual contact	230	54.4
Knew the major cause of cervical cancer is HPV	130	30.7
Knowledge having multiple sexual partners can increase the chance of getting cervical cancer	261	61.7
Knew HPV infections can heal by itself without treatment	92	21.7
Knowledge of cervical cancer have vaccine	264	62.4
Knew the recommended dose and intervals of HPV vaccine	262	61.9
Knew primary target age group for HPV vaccine	158	37.4

5.2.1. Primary Source of Information

On investigation of sources of information regarding HPV and its vaccine, 114 (27%) of study participants responded health professionals as their primary source of information, 82 (19.4%) received their information from schools, 57 (13.5%) from mass media (television and radio), 39 (9.2%) responded printed materials, and the least reported sources 8 (1.9%) were peers and social media (**figure 3**).

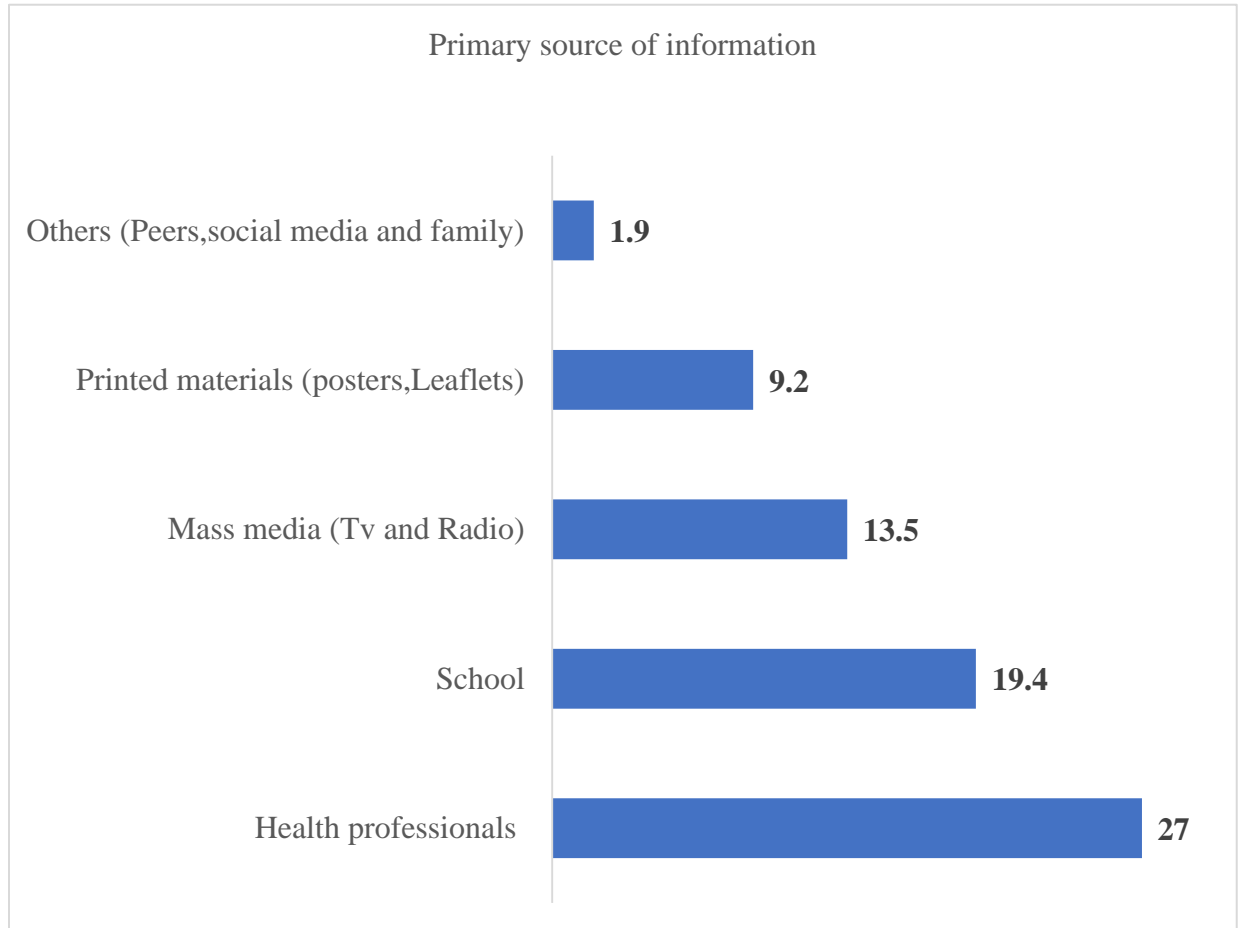


Figure 3. Primary sources information about HPV and its vaccine among secondary school female students in Nekemte town, Oromia region, Ethiopia, 2022 (n =423)

5.3. Attitude towards Human Papilloma Virus vaccination

More than half 246 (58.2%) of respondents agreed to the perception they may have cervical cancer in the future while less than one fourth 78 (18.2%) of the students neither agree nor disagree about the chance of susceptibility to cervical cancer in the future. About 307 (72.6%) study participants agreed to the perceived severity of cervical cancer and less than one fourth 39 (9.2%) of respondents neither agree nor disagree to the perceived severity of cervical cancer. 239 (56.5%) of respondents agreed that HPV vaccine effectively prevents cervical cancer. Majority 228 (53.9%) of the respondents agreed to the view I think taking HPV vaccine will keep me safe and healthy. About 139 (32.9%) agreed their parents were the one who decide whether to receive HPV vaccine (**Table 3**).

Table 3: Attitude towards HPV vaccination of secondary female students in Nekemte town, Oromia region state, Ethiopia, 2022 (n = 423)

Variable	Category	Frequency	Percent
I may have cervical cancer in the future	Agree	246	58.2
	Disagree	99	23.4
	Neutral	78	18.4
I perceive cervical cancer is a severe disease	Agree	307	72.6
	Disagree	77	18.2
	Neutral	39	9.2
HPV vaccine is effective in preventing cervical cancer	Agree	239	56.5
	Disagree	89	21.0
	Neutral	95	22.5
I think taking HPV vaccine will keep me safe and healthy	Agree	228	53.9
	Disagree	117	27.7
	Neutral	78	18.4
My parents support me to take HPV vaccine.	Agree	139	32.9
	Disagree	181	42.8
	Neutral	103	24.3

5.4. Human Papillomavirus Vaccination Practice

From total of 423 students participated in the study; 220 (52%), CI: 46.8 - 56.6) had ever received HPV vaccine. Out of whom 100 (23.4%, CI: 38.5% - 52.3) had received one dose and 120 (28.8% - , CI: 47.7 – 61.5) had received two doses of the vaccine (**Figure 4**)

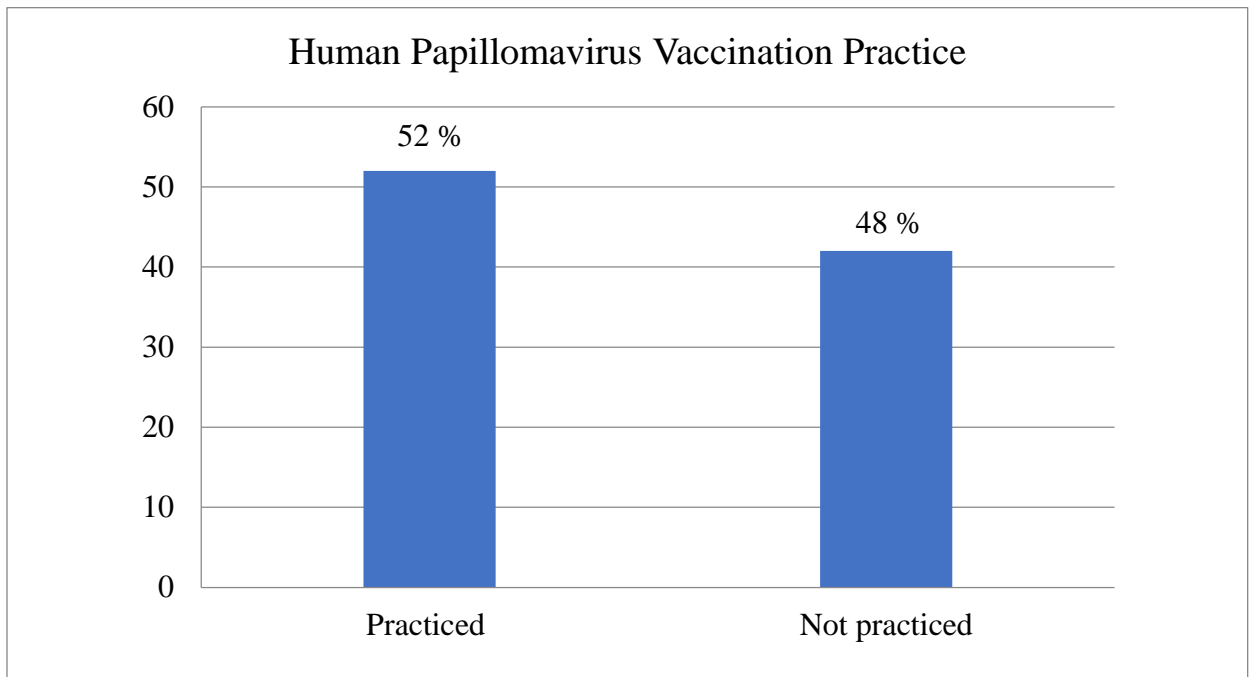


Figure 4. Human papillomavirus vaccination practice among secondary school female students in Nekemte town, Oromia region, Ethiopia, 2022 (n = 423)

5.4.1. Reasons (Barriers) for not Vaccinated Human Papillomavirus Vaccine

Two hundred three (48%) of them had not received any dose of the vaccine and they were responding the reason not to take the vaccine were; 96 (22.7%) of the students responded lack of information about the HPV vaccine, 53 (12.5%) of the students reported needle phobia, 39 (9.2%) concerns about possible side effects of the vaccine and 17 (4%) of them of them didn't know where to get the vaccine (**Figure 5**).

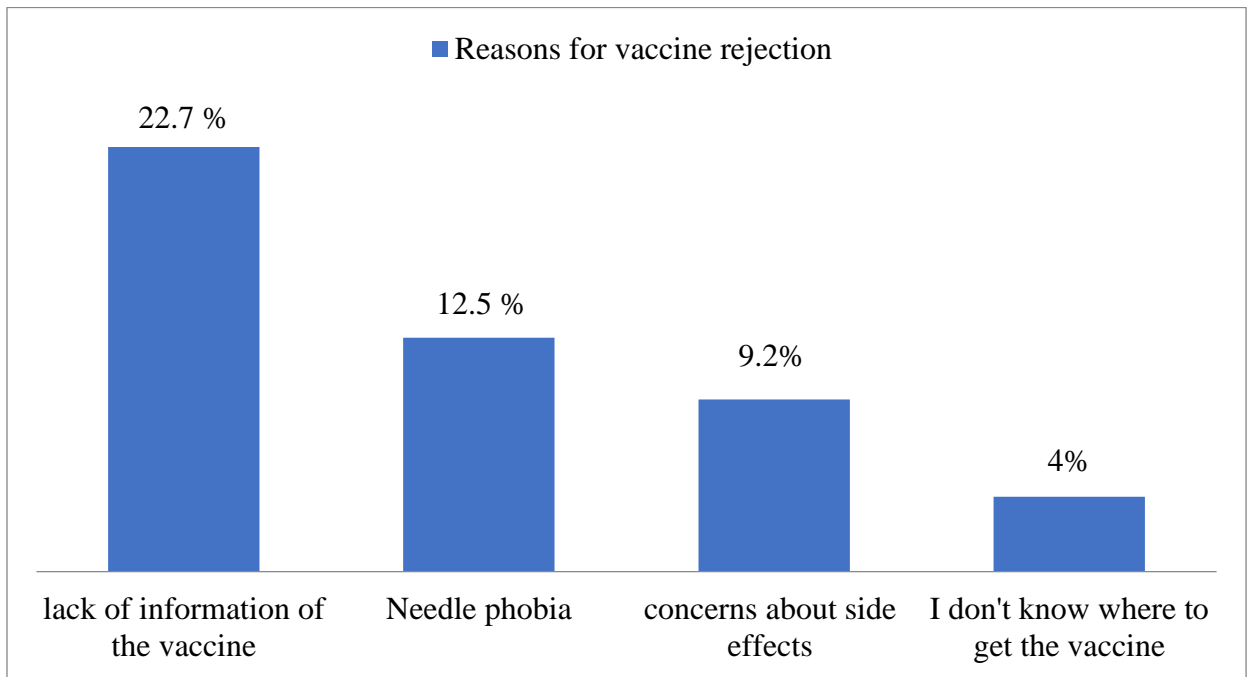


Figure 5. Reasons for vaccine rejection among secondary school female students in Nekemte town Oromia region, Ethiopia 2022 (n =423)

5.5. Factors Associated with Human Papillomavirus Vaccination Practice

Place of residence, mother's educational level, father's educational level, father's occupation, knowledge and attitude were associated with HPV vaccination practice in binary logistic regression analysis at p-value < 0.25. After multivariable logistic regression being in urban resident, having mother with higher educational level college and above), having good knowledge on HPV vaccine, and having positive attitude were significantly associated with human papillomavirus vaccination practice at p-value < 0.05.

The likely hoods of practicing HPV vaccination were 5.7 (AOR, 5.79, CI; 3.34-10.03) times among students who had good knowledge of HPV and its vaccine than students who experienced poor knowledge. The odds of practicing HPV vaccination were 8.3 (AOR, 8.36, CI; 4.67-14.93) times among students who had positive attitude than students who revealed negative attitude. Respondents whose mother with higher education (College and above) were 5.4 (AOR, 5.47, CI; 1.68-17.82) times practiced HPV vaccination than their counter parts. Students from urban residents were 4.1 (AOR, 4.12, CI: 1.86-9.31) times more likely to practice HPV vaccination when compared to students from rural resident (**Table 4**).

Table 4: Factors associated with secondary school female students' HPV vaccination practice in Nekemte town, Oromia region, Ethiopia, 2022 (n = 423)

Variable	HPV vaccination practice		COR (95% CI)	AOR (95% CI)	P-value
	Practiced	Not practiced			
Residence					
Urban	202(47.75%)	169 (39.95%)	2.26 (1.23-4.14)	4.12 (1.86-9.31)	0.001
Rural	18 (4.26%)	34 (8.03%)	1		
Mother education					
Elementary	96 (22.67%)	98 (23.17%)	1.35 (.85-2.14)	1.51 (0.78-2.89)	
Secondary	39 (9.22%)	26 (6.15%)	2.07 (1.11-3.83)	1.82 (0.79-4.2)	
College and above	35 (8.27%)	10 (2.36%)	4.83 (2.18-10.65)	5.47 (1.68-17.82)	0.003
No formal education	50 (11.82%)	69 (1.31%)	1		
Father education					
Elementary	87 (20.57%)	97 (22.93%)	1.40 (0.77-2.55)	0.92 (0.40-2.09)	
Secondary	63 (14.89%)	46 (10.87%)	2.14 (1.12-4.09)	1.69 (0.68-4.17)	
College and above	47 (11.11%)	24 (5.67%)	3.07 (1.49-6.28)	1.10 (0.37-3.26)	
No formal education	23 (5.44%)	36 (8.51%)	1		
Father occupation					
Private business	77 (18.20%)	69 (8.51%)	1.51 (0.84-2.72)	0.94 (0.42-2.12)	
Government employee	50 (11.82)	29 (6.86%)	2.34 (1.19-4.56)	1.17 (0.44-3.09)	
Farmer	65 (15.36%)	67 (15.84%)	1.32 (0.72-2.38)	1.49 (0.67-3.34)	
Daily laborer	28 (6.62%)	38 (8.98%)	1		
knowledge					
Good	178 (42.1%)	50 (11.8%)	12.97(8.15-20.62)	5.79 (3.34-10.03)	0.001
Poor	42 (9.9%)	153 (36.2%)	1		
Attitude					
Positive	185 (43.7%)	62 (14.7%)	12.02(7.52-19.21)	8.36 (4.67-14.93)	0.001
Negative	35 (8.3%)	141 (33.3)	1		

NB: COR: Crude Odds Ratio, CI: Confidence Interval, AOR: Adjusted Odds Ratio, 1: Used as a reference category

6. DISCUSSION

The current study estimated that 52 percent (CI: 46.8-56.6) of the study participants had received an HPV vaccination. This result was consistent with research done in Indonesia (50.7%) and China (47.2%) ([43](#), [44](#)), less than studies done in Malaysia (89.8%), Australia (89.9%) and Spain (89.3%) ([23](#), [45](#), [46](#)). The observed discrepancy can be explained as these countries have good accessibility of HPV vaccine and they have conducted routine vaccination. On the other hand the finding was higher than study conducted in Uganda (17.1%) ([24](#)). Possible justification for this can be difference in operational definition that three dose completions were defined in Uganda whereas the current study used in receiving at least one dose.

The study also identified factors associated with HPV vaccination practice. Accordingly, the current study found that being urban resident was positively and significantly associated with practicing of HPV vaccination. This finding was supported by study conducted in China in which urban home town was significantly associated with the uptake of HPV vaccine ([32](#)). This suggests poor delivery of information about HPV and its prevention in rural areas and study done in USA also realized that rural individuals were less likely to be aware of HPV and the HPV vaccine compared to urban counterparts ([46](#)).

In this study there was higher odds of practicing HPV vaccination among respondents who had mother with higher level of educational status (college and above) than their counter parts. This finding was supported by study conducted in Hong Kong which reported that a higher level of maternal education was positively associated with the uptake of the HPV vaccine ([47](#)). Girls whose mothers had higher level of education (college and above) were being more than five times more likely to be vaccinated against HPV than those with less educated mothers. This can be realized that educated mothers feel confident to have their daughter vaccinated against HPV virus by retrieving medical information on risks of contracting HPV infections on their own without consulting health care providers ([16](#)).

This study also found that female students who demonstrated good knowledge of HPV and its vaccine had five times more practiced than students with poor knowledge. This finding was supported by research conducted in china and Brazil, ([32](#), [40](#)). The most responded source information was health professionals. This was similar with study conducted among secondary school students in rural areas of Negeri Sembilan, Malaysia (41.3%) ([23](#)). This could be because

ethical conduct requires health professionals to explain about the objective of vaccination before it takes place. Health care providers are typically a trusted source of medical guidance. People trust and follow health related suggestions from their provider's expertise (48).

In another direction, high odds of HPV vaccination practice were observed among respondents who had positive attitude towards HPV vaccination than who experienced negative attitude. Published study in Amhara regional state of Ethiopia also reported similar finding (26). Similarly, Study done in Brazil realized that having positive attitudes towards HPV vaccination reinforces the appropriate practice of vaccination (40). This can be explained by the fact that motivating factors of adolescents' practice are generated from their positive attitude which can be concluded as the impact of attitude on behavior.

In addition, this study identified reasons for vaccine rejection for those respondents who haven't practiced the vaccination. Lack of information about HPV vaccine, needle phobia and fear of side effects of the vaccine were among the main barriers responded. The finding in the current study was similar with studies conducted in Nigeria and Canada (49, 50). Qualitative study conducted in Colombia among school girls and their parents also confirmed that lack of information, fear of the adverse effects of the vaccine and fear of needles were reported (51).

7. STRENGTH AND LIMITATION OF THE STUDY

7.1. Strength

The study was able to survey a random sample of female students, thereby increasing the generalizability of the findings to other eligible students. This study used a self-administered questionnaire which increases the likelihood of respondents answering openly.

7.2. Limitation of the study

Human papillomavirus vaccine reception was based on self-report of respondents. Therefore being self-report can lead to information bias. Furthermore, the study was mainly focused on individual factors and quantitative based. It lacks qualitative aspects to deal with in-depth community and health systems related factors.

8. CONCLUSION AND RECOMMENDATION

8.1. Conclusion

In this study the prevalence of HPV vaccination practice was 52%. Factors like urban residential area of respondents, maternal educational status (college and above), having good knowledge of HPV and its vaccine and having positive attitude towards the HPV vaccination were significantly associated with HPV vaccination practice. Identified barriers of HPV vaccination practice were lack of awareness about HPV vaccine, needle phobia and fear of the side effects of the vaccine.

8.2. Recommendation

1. For Nekemte zonal health bureau

In an attempt to reduce the risks of cervical cancer and to increase its vaccination behavioral change education is vital as this study have indicated that knowledge and attitude have influenced HPV vaccination practice. Therefore it is better to promote targeted implementation of health education program in schools.

2. For Nekemte educational office

It is better to include information about HPV, cervical cancer and its vaccine in the planning of school lectures and school health services since school is the main source of knowledge and behavioral change for students. As a result high vaccine coverage will be achieved.

3. For researchers

Scholars who have interest to generate evidences on similar topic will better to conduct on the limitations of the current study.

9. REFERENCES

1. Human Papillomavirus Vaccines: WHO Position Paper, May 2017-Recommendations Vaccine. 2017; 35(43):5753-5.
2. Droplet m is pérez n, brisson m on behalf of the hpv vaccination impact study group. Population-level impact and herd effects following the introduction of human papillomavirus vaccination programmes: updated systematic review and meta-analysis. Lancet. 2019; 394(10197):497–509
3. Sadiković a, iljazović e, konrad čustović m, karasalihović z, avdić s. prevalence of high risk human papillomavirus infection and cervical cytology abnormalities among women up to age 40 in the tuzla canton, bosnia and herzegovina. acta dermatovenerol alp pannonica adriat. 2020;29(4):175-9.
4. Kombe kombe aj, li b, zahid a, mengist hm, bounda ga, zhou y, et al. Epidemiology and burden of human papillomavirus and related diseases, molecular pathogenesis, and vaccine evaluation. Front public health. 2020;8:552028.
5. De Martel c pm, Vignette j, Frances chi s. worldwide burden of cancer attributable to HPV by site, country and HPV type. International journal of cancer. 2017;141(4):664–70.
6. Sabeena S, et al. Possible non-sexual modes of transmission of human papilloma virus. Obstet Gynaecol Res. .2017;. 43: p. (3):429-35.
7. Saslow D, Andrews KS, Manassaram-Baptiste D, Smith RA, Fontham ETH. Human papillomavirus vaccination 2020 guideline update: American Cancer Society guideline adaptation. CA Cancer J Clin. 2020;70(4):274-80.
8. Sung H, Ferlay J, Siegel R, Laversanne M, Soerjomataram I, Jemal A, et al. Global cancer statistics. GLOBOCAN estimates of incidence and mortality worldwide for. 2020;36.
9. Abila DB, Wasukira SB, Ainembabazi P, Wabinga H. Burden of Risk Factors for Cervical Cancer Among Women Living in East Africa: An Analysis of the Latest Demographic Health Surveys Conducted Between 2014 and 2017. JCO Global Oncology. 2021;7:1116-28.

10. Bruni L, Barrionuevo-Rosas L, Albero G, Serrano B, Mena M, Gómez D, et al. Human papillomavirus and related diseases report. ICO/IARC Information Centre on HPV and Cancer (HPV Information Centre). 2019.
11. Mailhot Vega RB, Balogun OD, Ishaq OF, Bray F, Ginsburg O, Formenti SC. Estimating child mortality associated with maternal mortality from breast and cervical cancer. *Cancer*. 2019;125(1):109-17.
12. N WC, A S. Associated Risk Factors of STIs and Multiple Sexual Relationships among Youths in Malawi. *PLoS One*. 2015;10(8):e0134286.
13. Global strategy to accelerate the elimination of cervical cancer as a public health problem. Geneva: World Health Organization. 2020.
14. Crager SE. Improving global access to new vaccines: intellectual property, technology transfer, and regulatory pathways. *American journal of public health*. 2018;108(S6):S414-S20.
15. Dorji T, Nopsopon T, Tamang ST, Pongpirul K. Human papillomavirus vaccination uptake in low-and middle-income countries: a meta-analysis. *EClinicalMedicine*. 2021;34:100836.
16. Loke AY, Kwan ML, Wong Y-T, Wong AKY. The uptake of human papillomavirus vaccination and its associated factors among adolescents: a systematic review. *Journal of primary care & community health*. 2017;8(4):349-62.
17. Patel H, Jevé YB, Sherman SM, Moss EL. Knowledge of human papillomavirus and the human papillomavirus vaccine in European adolescents: a systematic review. *Sexually transmitted infections*. 2016;92(6):474-9.
18. Thanasis I, Lavranos G, Gkogkou P, Paraskevis D. The Effect of Health Education on Adolescents' Awareness of HPV Infections and Attitudes towards HPV Vaccination in Greece. *International Journal of Environmental Research and Public Health*. 2022;19(1):503.
19. Carvalho AMCd, Araújo TMed. Factors associated with adolescent compliance with human papillomavirus vaccine: a cross-sectional study. *Texto & Contexto-Enfermagem*. 2021;30.

20. Barrett C, Scoular S, Borgelt LM. Knowledge, Perceptions, and Uptake of the Human Papillomavirus Vaccine in a Sample of US High School Adolescents. *The Journal of Pediatric Pharmacology and Therapeutics*. 2020;25(8):697-704.
21. Schülein S, Taylor KJ, König J, Claus M, Blettner M, Klug SJ. Factors influencing uptake of HPV vaccination among girls in Germany. *BMC public health*. 2016;16(1):1-8.
22. Navarro-Illana P, Diez-Domingo J, Navarro-Illana E, Tuells J, Alemán S, Puig-Barberá J. Knowledge and attitudes of Spanish adolescent girls towards human papillomavirus infection: where to intervene to improve vaccination coverage. *BMC public health*. 2014;14(1):1-8.
23. Jalani FFM, Rani MDM, Isahak I, Aris MSM, Roslan N. Knowledge, attitude and practice of human papillomavirus (HPV) vaccination among secondary school students in rural areas of Negeri Sembilan, Malaysia. *International journal of collaborative research on internal medicine & public health*. 2016.
24. Kisaakye E, Namakula J, Kihembo C, Kisakye A, Nsubuga P, Babirye JN. Level and factors associated with uptake of human papillomavirus infection vaccine among female adolescents in Lira District, Uganda. *Pan African Medical Journal*. 2018;31(1).
25. Fehintola OF, Fehintola AO, Ogundele OA, Adegbenro CA, Olowookere SA, Afolabi OT. Predictors and acceptability of human papilloma virus vaccine uptake among senior secondary school students in Ile-Ife. *Sanamed*. 2019;14(2):153-61.
26. Kassa HN, Bilchut AH, Mekuria AD, Lewetie EM. Practice and Associated Factors of Human Papillomavirus Vaccination Among Primary School Students in Minjar-Shenkora District, North Shoa Zone, Amhara Regional State, Ethiopia, 2020. *Cancer Management and Research*. 2021;13:6999.
27. Sims A, Archie-Booker E, Waldrop RT, Claridy M, Gerbi G. Factors associated with human papillomavirus vaccination among women in the United States. *ARC journal of public health and community medicine*. 2018;3(1):6.
28. Jungbauer RM. HPV Vaccination, Sociodemographic Variables, and Physician Recommendation in Select US Areas: Walden University; 2017.
29. Jeudin P, Liveright E, Del Carmen MG, Perkins RB. Race, ethnicity, and income factors impacting human papillomavirus vaccination rates. *Clinical therapeutics*. 2014;36(1):24-37.

30. Nanyunja Z. Factors Affecting Uptake of Human Papilloma Virus (HPV) Vaccination among in-School Adolescent Girls in Wakiso District, Central Uganda. *Student's Journal of Health Research Africa*. 2020;1(12):20-.
31. Isabirye A, Mbonye M, Asiimwe JB, Kwagala B. Factors associated with HPV vaccination uptake in Uganda: a multi-level analysis. *BMC Women's Health*. 2020;20(1):1-11.
32. Liu Y, Di N, Tao X. Knowledge, practice and attitude towards HPV vaccination among college students in Beijing, China. *Human Vaccines & Immunotherapeutics*. 2020;16(1):116-23.
33. Bowyer HL, Forster AS, Marlow LA, Waller J. Predicting human papillomavirus vaccination behaviour among adolescent girls in England: results from a prospective survey. *Journal of Family Planning and Reproductive Health Care*. 2014;40(1):14-22.
34. Grandahl M, Larsson M, Dalianis T, Stenhammar C, Tyden T, Westerling R, et al. Catch-up HPV vaccination status of adolescents in relation to socioeconomic factors, individual beliefs and sexual behaviour. *PLoS One*. 2017;12(11):e0187193.
35. Sahu V. An Assessment of Selected Factors Associated with HPV Vaccination Completion among the African American Adolescents in United States: 2012 National Immunization Survey-Teen. 2014.
36. Healths ceaBP. Factors influencing uptake of HPV vaccination among girls in Germany. 2016 16:995.
37. Fernández de Casadevante V, Gil Cuesta J, Cantarero-Arevalo L. Determinants in the uptake of the human papillomavirus vaccine: a systematic review based on European studies. *Frontiers in oncology*. 2015;5:141.
38. Patel H, Pčolkina K, Strazdina K, Viberga I, Sherman SM, Tincello DG, et al. Awareness of HPV infection and attitudes toward HPV vaccination among Latvian adolescents. *International Journal of Gynecology & Obstetrics*. 2017;137(2):138-44.
39. Oluwole EO IO, Adejimi AA, Balogun MR, , GE O. Knowledge, attitude and uptake of human papillomavirus vaccination among female undergraduates in Lagos State, Nigeria. *Care . J Family Med Prim*. 2019;8:3627-33.

40. Galvão MPSP, Araújo TMEd, Rocha SSd. Knowledge, attitudes, and practices of adolescents regarding human papillomavirus. *Revista de Saúde Pública*. 2022;56.
41. Ma Y, Wang C, Liu F, Lian G, Li S, He Q, et al. Human papillomavirus vaccination coverage and knowledge, perceptions and influencing factors among university students in Guangzhou, China. *Human Vaccines & Immunotherapeutics*. 2021;17(10):3603-12.
42. Yingnan Liu NDXT. Knowledge, practice and attitude towards HPV vaccination among college students in Beijing, China, *Human Vaccines & Immunotherapeutics*. 2020 16(1):116-23.
43. Leung JTC, Law C-k. Revisiting knowledge, attitudes and practice (KAP) on human papillomavirus (HPV) vaccination among female university students in Hong Kong. *Human vaccines & immunotherapeutics*. 2018;14(4):924-30.
44. Prayudi PKA, Permatasari AAIY, Winata IGS, Suwiyoga K. Impact of human papilloma virus vaccination on adolescent knowledge, perception of sexual risk and need for safer sexual behaviors in Bali, Indonesia. *Journal of Obstetrics and Gynaecology Research*. 2016;42(12):1829-38.
45. Vujovich-Dunn C, Wand H, Brotherton J, Gidding H, Sisnowski J, Lorch R, et al. Measuring school level attributable risk to support school-based HPV vaccination programs. *BMC public health*. 2022;22(1):1-10.
46. Anuforo B, McGee-Avila JK, Toler L, Xu B, Kohler RE, Manne S, et al. Disparities in HPV vaccine knowledge and adolescent HPV vaccine uptake by parental nativity among diverse multiethnic parents in New Jersey. *BMC public health*. 2022;22(1):1-8.
47. Li SL, Lau YL, Lam TH, Yip PSF, Fan SYS, Ip P. HPV vaccination in Hong Kong: uptake and reasons for non-vaccination amongst Chinese adolescent girls. *Vaccine*. 2013;31(49):5785-8.
48. McLendon L, Puckett J, Green C, James J, Head KJ, Yun Lee H, et al. Factors associated with HPV vaccination initiation among United States college students. *Human Vaccines & Immunotherapeutics*. 2021;17(4):1033-43.
49. Oluwole EO, Idowu OM, Adejimi AA, Balogun MR, Osanyin GE. Knowledge, attitude and uptake of human papillomavirus vaccination among female undergraduates in Lagos State, Nigeria . *Journal of Family Medicine and Primary Care*. 2019;8(11):3627.

50. Stratoberdha D, Gobis B, Ziemczonek A, Yuen J, Giang A, Zed PJ. Barriers to adult vaccination in Canada: A qualitative systematic review. *Canadian Pharmacists Journal/Revue des Pharmaciens du Canada*. 2022.
51. Cordoba-Sanchez V, Tovar-Aguirre OL, Franco S, Ortiz NEA, Louie K, Sanchez GI, et al. Perception about barriers and facilitators of the school-based HPV vaccine program of Manizales, Colombia: A qualitative study in school-enrolled girls and their parents. *Preventive medicine reports*. 2019;16:100977.

10. ANNEXES

Annex 1. English Version Participant Information Sheet for Female Students

Good morning/ afternoon? How are you? I am ----- . I work as a data collector at Nekemte secondary schools from May 13- June 13, 2022. The research area involves four secondary schools found in Nekemte town. The study focuses on practice and associated factors of human papilloma virus vaccination among secondary school female students in Nekemte town, Oromia regional state, Ethiopia 2022. Mr. Mitiku Abera is a master's degree candidate in the department of pediatrics and child health nursing at Bahir Dar University, College of Medicine and Health Sciences. I humbly request that you allow me to explain the study and consider you as a study participant.

The study title: Practice and associated factors of human papilloma virus vaccination among secondary school female students in Nekemte town, Oromia regional state, Ethiopia, 2022.

Aim of the study: To assess practice and associated factors of human papilloma virus vaccination among female students attending secondary school in Nekemte town, Oromia regional state, Ethiopia, 2022.

Procedure and duration: Structured and self-administered questionnaire will be given for you. The questionnaire has four parts and each part has its own instruction to give your answer. So please follow the instructions given on the questionnaire and don't hesitate to ask if there is something not clear for you. It will take you 30 minutes. So, I kindly request you to fill this questionnaire.

Advantages and risks: Participating in this study which will only take a few minutes of your time carries no risks. Although there is no financial incentive for participation, it is good to increase human papilloma virus vaccination rate of adolescents to decrease the burden of cervical cancer and other cancers transmitted by human papilloma virus.

The questionnaire will be coded in order to protect the participants' privacy. The information you will provide to me will be kept strictly confidential. There will no information that will be used to identify you. The study's findings will be generalized to the entire study population and will not apply to any individual participants.

Rights: After data collectors will explain the study's goal, you have the right to participate in this school-based study. You have the option of not participating in this study, and you also have the right to withdraw at any time during the study if you are not voluntarily participating, and you have the right to ask any questions not clear for you before and during data collection.

Contact address: If there are any questions or enquires at any time about the study or procedures, please contact by the following address.

Principal investigator: Mitiku Abera

E -mail: mitikuabera2019@gmail.com

Mobile: 0920411025

Are you willing to participate?

If 'yes', thank you for your willingness to participate in my research and continue to fill the questioner.

Annex 2. Informed consent form

I hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participate voluntarily in the research project. I understand that I have freedom to refuse to participate in this study at any time.

Signature of participant _____ Date _____

Name and signature of Investigator _____ Date _____

Name and signature of data collector _____ Date _____

Informed assent form

I confirm that I have read the content of this document and the nature of the research project and I agree my child to participate in the research project. I understand I can make him/her withdraw from the project at any time.

Signature of parent/s (legal guardian).....Date.....

Name and signature of supervisor.....Date.....

Name and signature of data collector.....Date.....

Annex 3. Questionnaires

Encircle to the best of your possible answer for multiple choices, and fill your answer for blank spaces

Part 1. Socio demographic characteristics		
No	Items	Category and responses
101	How old are you?	----- years
102	How many grade do you learn?	-----
103	Where do you live?	1. urban 2. rular
104	Which religion do you follow?	1. Protestant 2. Orthodox 3. Muslims 4. Catholic 5. Others specify-----
105	What is your ethnicity?	1. Oromo 2. Amahra 3. Gurage 4. Others specify-----
106	What is your educational status of your mother?	1. No formal education 2. Elementary 3. Secondary 4. College and above
107	What is educational status of your father?	1. No formal education 2. Elementary 3. Secondary 4. College and above
108	What is occupation of your mother?	1. House wife 2. Farmer 3. Private owned business 4. Governmental employee

		5. Others specify
109	What is occupation of your father?	1. Daily laborer 2. Private owned business 3. Government employee 4. farmer 5. Others specify
10	How much birr your family earn monthly?	-----ETB
Part 2. Assesment of knowledge of HPV and source of information		
201	Have you ever heard about HPV and its vaccine before this study from any source?	1. Yes 2. No
202	What was your source of information?	1. Printed materials (posters, leaflets etc.) 2. Health professionals 3. Teachers 4. Advertisiments (television/radio) 5. Others
203	Do you know that you can contract HPV through sexual contact?	1. Yes 2. No
204	Do you know that Human papiloma virus is the major cause of cervical cancer	1. Yes 2. No
205	Do you think having multiple Sexual partner increase the chance of getting cervical cancer?	1. Yes 2. No
206	Do you think human papilloma virus infections heal by it self without treatment?	1. Yes 2. No
207	Do you know cervical cancer has vaccine?	1. Yes 2. No
208	HPV vaccine is recommended in 2-3	1. Yes

	dose with in 6 month intervals	2. No		
209	Primary target age for HPV vaccine is 9-14 years before first sexual debut	1. Yes 2. No		
Part . Attitude questions				
Mark '✓' symbol in the box under the responses you choose in the next table to show your level of agreement with the stated sentences				
		Agree	Neutral	Disagree
301	I may have cervical cancer in the future			
302	I percieve cervical cancer is a severe disease			
303	HPV vaccine is effective in preventing cervical cancer			
304	I think taking HPV vaccine will keep me safe and healthy			
305	My parents are the one who decide whether to take HPV vaccine or not			
Part 4. Vaccination practice variables				
401	Have you ever received HPV vaccine?	1. Yes 2. No		
402	If your answer for question number 401 is "Yes", how many dose have you received?	1. One dose 2. Two dose		
403	If your answer is "No" for question number "401", what is your possible reason/s not to take the vaccine?	1. Concerns about possible side effects 2. Needle phobia 3. Lack of information of the vaccine 4. I don't know where to get the vaccine 5. Others specify		
404	Do you recommend the HPV vaccine to your friends/relatives?	1. Yes 2. No		

405	If your answer for question number 404 is “No”, what is /are your reason not to teach?	<ol style="list-style-type: none">1. It is not my duty2. I am afraid3. I have no awareness about the vaccine4. Others, specify
-----	--	---

Gaaffilee Waraqaa Qu’annoo Afaan Oromootiin Qophaa’e

Nagaa keeti/keessanii?

Maqaan koo ----- jedhama. Caamsaa 13 hanga waxabajjii 13 bara 2022 akka lakkofsa Awurooppaatti qu’annoo obbo Mitikkuu Abarraa mata duree “Itti fayyadama talaallii humaan paappiloomaa vaayrasii fi wantoota itti fayyadama talaallichaarratti dhiibbaa uumsuu danda’an adda baasuuf geggeessaa jiran irratti odeeffannoowwan (ragaalee) sassaabuudhaanin tajaajilaa jira. Obbo Mitikkuu Abarraa yeroo ammaa barnoota digrii lammaffaa isaanii Yuunivarsiitii Baahir Daar, Muummee Ogummaa Saayinsii, Dippaartmantii Fayyaa Ijoolleefi Daa’immanitti, gosa barnootaaa fayyaa ijoolleefi daaimmaniirratti hordofaa (barachaa) jira/jiru.

Raagaaleen (odeeffannoon) qu’annoo kanaaf gargaaran kan sassaabaman, maneen barnootaa sadarkaa lammaffaa magaalaa Naqamtee keessatti argaman baayinaan afur ta’an irraa yoo tau, gaaffileen armaan gaditti dhihaatan mata duree armaan olitti eerame ilaalchisuudhaan kan qophaayaniidha. Kabajamtuu/kabajamtoota barattuu/ barattootaa gaaffilee kanneen deebisuuf fedhiifi heyyama keessan isin gaafadha. Gaaffii deebisuu hin barbaadne, dhiisuu ykn irra darbuu ni dandeessa/dandeessu. Haa ta’u malee, tokkoo tokkoon gaaffilee dhihaatanii qu’annoo kana geggeessuu keessatti hedduu fayyadu waan ta’eef odeeffannoo sirriifi beekumsa keessan irratti hundaaye akka naaf kennitan kabajaan isin gaafadha. Odeeffannoon dhimma Kanaan wal qabatee naaf kennitan hunduu iccitiin isaa kan eegamuufi bu’aa qorannoo kanaaf qofa kan oolu yommuu ta’u, maqaa keessan barreessuu hin barbaachisu.

Mata duree qu’annoo: Itti fayyadamaa talaallii kaansarii balbala gadameessaa fi wantoota itti fayyadama isaarratti shamarraan manneen barnotaa sadarkaa lammaffaa baratan irratti dhiibbaa dhiibbaa uumsuu danda’an

Kaayyoo qu’annichaa: itti fayyadama talaallii kaansarii balbala gadameessaafi wantoota itti fayyadama isaarratti dhiibbaa uumsuu danda’an adda baasuu

Akkaataa fi yeroo qu’annichaa: waraqaan qu’annoo qindaa’aa ta’ee fi filannoowwan deebiif keessaa filachuu dandeessuu waliin siif/isiniif kennama. Waraqichi kutaalee afur of kessaa qaba. Qajeelfamni debiif ta’u kutaalee arfan mata duree isaaniirratti barreeffamee jira. Kanaafuu qajeelfamicha hordofuudhaan gaaffilee dhihaatan kan guuttu/guuttan taa’a. waraqaa qu’annoo

kana guuttee/guuttanii fixuuf daqiiqaa soddoma qofa sitti/isinitti fudhata. Wanti siif hin galle/isiniif hin galle yoo jiraate sodaa tokko malee gaafachuu dandeessa/dandeessu.

Faayidaa fi miidhaa qu’annichaan wal qabatu: Qu’annoo kana keessatti hirmaachuun wal qabatee miidhaan si mudatu tokkoyyuu hin jiru. Yeroo kee xiqqoo garuu aarsaa gochuu si gaafata. Bu’aan ati kallattiin qu’annoo kanarraa argattu ykn maallaqni siif kaffalamu hin jiru. Haa ta’u malee, haguuggii talaallii kaansarii balbala gadameessaa guddisuudhaan kaansarii balbala gadameessaa fi kanneen humaan paappiloomaa viyrasiin dhufan ittisuu keessatti ga’ee guddaa qaba.

Icciiitiin odeeffannoo (ragaa) naaf kennituu/kennitaanii koodii dhoksaa ta’een kan cufamuufi kan eegamuu dha. Odeeffannoon akka dhuunfaatti siin adda baasu hin jiru. Bu’aan qu’annoo kanaan argamuu qooda fudhattoota kanneen qu’annoo kana keessatti hirmaataniifi umurii eerame gidduutti argaman hunda bakka bu’a.

Mirgakee: Erga kaayyoon qu’annichaa siif ibsamee booda qu’annoo kana keessatti hirmaachuuf mirga qabda. Hirmaachuu dhiisuufis mirga qabda. Yeroo kamittiyyuu mirga addaan kutuufi gaaffii siif hin galle gaafachus ni qabda.

Odeeffannoo dabalataaf: Wanti ifa siif/isiniif hin taane yoo jiraate; tessoowwan armaan gadiitti fayyadamaa.

Abbaa qu’annichaa: Mitiku Abera

Email: mitikuabera2019@gmail.com

Lakkoofsa bilbilaa: 0920411025

Kanaafuu, qu’annoo kana irratti hirmaachuuf fedhii qabdaa/qabduu?

1. Eyyee 2. Lakki

Deebiin kee/keessan “eyyee” yoo ta’e, itti fufaa

Waan hirmaataniif baay’ee galatoomaa!

Unka Walii Galtee Hirmaattoota Qu'annichaa Waliin gGdhamu

Kaayyoo fi qabiyyee qu'annicha gadi fageenyaan hubadheera. Qu'annicha keessatti hirmaachuuf fedhii kootiin walii galeera. Yeroon fedhetti qu'annicha addaan kutuuf mirga akkan qabu hubadheera.

Mallattoo hirmaattuu qu'annichaa _____ Date _____

Mallattoo geggeessaa qu'annichaa _____ Date _____

Mallattoo nama odeeffannoo sassaabuu _____ Date _____

Unka walii galtee maatii barattootaa waliin taasifamu

Kaayyoo fi qabiyyee qu'annicha gadi fageenyaan hubadheera. Qu'annicha keessatti mucaan/ daa'imni koo akka hirmaattu fedhii kootiin walii galeera. Yeroon fedhetti qu'annicha addaan kutchisiisuuf mirga akkan qabu hubadheera.

Maqaa maatii _____ Date _____

Maqaa to'ataa/suppervaayizeraa _____ Date _____

Maqaa nama odeeffannoo sassaabuu _____ Date _____

Gaaffilee armaan gaditti siif dhihaatan kanneen deebii filannoof ta’u qaban lakkoofsa filannookee agarsiisuu itti maruudhaani fi kanneen bakka duwwaa ta’an ammo itti guutuun deebisi.

Kutaa 1ffaa. Gaaffilee haala jiruufi jireenya hawaasaa (Sociodemographic Characteristics) wajjin wal qabatan		
Lakk.	Gaaffilee	Ramaddii deebiif kenname
101	Umuriin kee meeqa?	Waggaa -----
102	Sadarkaa barnoota kee meeqa?	Kutaa -----
103	Bakki jireenyaa kee eessa?	1. Magaalaa 2. Baadiyyaa
104	Amantaa kam hordofta?	1. Pirootestaantii 2. Ortodoksii 3. Musliima 4. Kan biro yoo jiraate ibsi - -----
105	Gosti/sabni kee kami?	1. Oromo 2. Amaaraa 3. Gurage 4. Kan biroon yoo jiraate ibsi -----
106	Sadarkaa barnootaa haadha/harmee keetii meeqa?	1. Barnoota idlee hin qabdu 2. Barnoota sadarkaa duraa (1-8) 3. Barnoota sadarkaa lammaffaa (9-12) 4. Koolleejjiifi isaa ol
107	Sadarkaa barnootaa abbaa keetii meeqa?	1. Barnoota idlee hin qabu 2. Barnoota sadarkaa duraa/jalqabaa

		<ol style="list-style-type: none"> 3. Barnoota sadarkaa 2ffaa 4. Koolleejjii fi isaa ol
108	Gosti hojii haadha/ harmee keetii maali?	<ol style="list-style-type: none"> 1. Haadha manaa/warraa 2. Hojii biizinasii (daldala) dhuunfaa 3. Hojjetuu mootummaa 4. Hojii qonnaa 5. Kan biroon yoo jiraate, ibsi -----
109	Gosti hojii abbaa keeti maalii?	<ol style="list-style-type: none"> 1. Hojii humnaa 2. Hojii daldala (biizinasii) dhuunfaa 3. Hojjetaa mootummaa 4. Hojii qonnaa 5. Kan biroon yoo jiraate, ibsi-----
10	Galiin maatiin kee argatan ji'aan meeqa taa'a?	Qarshii _____
<p>Kutaa 2ffaa. Gaaffilee hubannoo fi beekumsaan wal qabatan</p> <p>Gaaffilee armaan gadii beekumsa kee irratti hundaa'uun, lakkoofsa filannookee agarsiisu itti maruudhaan deebisi</p>		
201	Kanaan dura waa'ee humaan paappillomaa viiyasii (HPV) dhageessee beektaa?	<ol style="list-style-type: none"> 1. Eeyyee 2. Lakki
202	Deebiin kee gaaffii 201 "eyyee" yoo ta'e, maddi odeeffannoo keeti maali?	<ol style="list-style-type: none"> 1. Poosterii (barreeffamoota maxxanfaman) 2. Ogeessa fayyaa irraa 3. Mana barumsaa irraa 4. Beeksisa karaa televiiziyinii fi raadiyoo darbu irraa 5. Kan biroon yoo jiraate

		ibsi		
203	Deebiin kee gaaffii 201 “lakki” yoo ta’e sababni akka hin bekne si taasisu maali?	1. Madda odeeffannoo dhabuu 2. Dhibbaa karaa amantii 3. Dhibbaa karaa hawaasummaa		
204	Wal quunnamtii saalaa raawwachuu dhaan humaan paapillomaa viyrasiin ni darba jettee ni yaaddaa?	1. Eeyyee 2. Lakki		
205	Sababni guddaan kaansarii balbala gadameessaa humaan paapillomaa viyrasii ta,uu ni beektaa?	1. Eeyyee 2. Lakki		
206	Wal quunnamtiin saalaa nama baay’ee waliin gochuun dhibee kaansarii balabala gadameessaaf nama saaxila jettee ni yaaddaa?	1. Eeyyee 2. Lakki		
207	Dhibeen human paapilomaa viyrasiin dhufan wallaansa ykn dawa malee ni fayya jettee ni yaaddaa?	1. Eeyyee 2. lakki		
208	Kaansariin balbala gadameessaa talaallii qabaachuu isa ni beektaa?	1. Eeyyee 2. Lakki		
209	Talaalliin dhibee balabala gadameessaa doosii 2-3 tu marsaa ji’a jaha jahaan kennama	1. Eyyee 2. Lakki		
210	Sadarkaa duraatti talaalliin kaansarii balbala gadameessaa shamarran umriin isaanii waggaa 9-14 ta’eef kennama	1. Eyyee 2. Lakki		
Kutaa 3 ffaa Gaaffilee ilaalcha waliin wal qabatan				
Himoota/gaaffilee armaan gadiitti ibsaman itti waliif galuu ykn dhiisuu kee maallattoo “✓” bakka duwwaa siif kenname keessatti guutuun agarsiisi				
		waliin	Hinmormu/	walii

		gala	hin deggeru	hin galu
301	Gara fuulduraatti dhibeen kaansarii balbala gadameessaa na qabuu danda,a			
302	Dhibeen kaansarii balbala gadameessaa dhibee cimaadha			
303	Talaalliin Huumaan Paappiloomaa Vaayrasii dhibee kaansarii balbala gadameessaa haala gaarii taen ni ittisa			
304	Talaallii dhibee kaansarii balbala gadameessaa fudhachuun carraa dhibee kanaaf saaxilamuu koo ni hambisa			
305	Maatiin koo talaallii dhibee kaansarii balbala gadameessaa akkan fudhadhuuf ni eeyyamu			
Kutaa 4ffaa. Gaaffilee itti fayyadama talaallichaan wal qabatan				
401	Kanaan dura talaallii dhibee kaansarii balbala gadameessaa fudhattee ni beektaa?	1. Eyyee 2. Lakki		
402	Deebiin kee gaaffii lakkoofsa 401, “eeyyee” yoo ta’e; yeroo (marsaa) meeqaaf fudhattee?	1. Yeroo tokko qofa 2. Yeroo lama		
403	Deebiin kee gaaffii lakkofsa 401, “Lakki” yoo ta’e; sababni akka ati hin fudhannee si taasise maaliidha?	1. Miidhaa cinaa talaallichaan wal qabatee mudachuu danda’un sodaadha 2. Dhukkubbii lilmoo waraanaachuun wal qabatun sodaadha 3. Hubannoo gahaa talaallicha faana wal qabatu waan hin qabneef 4. Bakka talaallicha itti fudhatan hin beeku 5. Kan biroon yoo jiraate ibsi- -----		

404	Hiriyoota kee waa'ee dhibee kaansarii balbala gadameessaa ni barsiiftaa?	<ol style="list-style-type: none"> 1. Eyyee 2. Lakki
405	Deebiin kee gaaffii lakkoofsa 405, "lakki" yoo ta'e, sababni kee maali?	<ol style="list-style-type: none"> 1. Barsiisuun gahee koo waan hin taaneef 2. Waanin sodaadhuuf 3. Odeeffannoo gahaa waanin hin qabneef 4. kan biroon yoo jiraate, ibsi -----

Annex 4: Declaration form

I the undersigned declare that this thesis is my original work in partial fulfillment of the requirement for degree of Master of Pediatrics and Child Health Nursing. It has never been presented in this or any other University, and that all the resources and materials used for the research, have been fully acknowledged.

Name: Mitiku Abera Beyena

Signature:

Place of submission: Bahir Dar University, College of Medicine and Health Sciences
Department of Pediatrics and Child Health Nursing

Date of submission: August 1, 2022

FINAL APPROVAL OF RESEARCH THESIS REPORT SHEET
BAHIRDAR UNIVERSITY, COLLEGE OF MEDICINE AND HEALTH SCIENCES,
DEPARTMENT OF PEDIATRICS AND CHILD HEALTH NURSING

I hereby certify that I have examined this thesis report entitled by human papillomavirus vaccination practice and its associated factors among secondary School Female adolescents in Nekemte town, Oromia region, Ethiopia, 2022. We recommend and approved the thesis report for a degree of "Master of Pediatrics and Child Health Nursing".

Board of Examiners

External examiner

Name _____ Signature _____ Date _____

Internal examiner

Name Shiferaw Birhanu Signature [Signature] Date 09/12/14

Department head

Name _____ sig _____ date _____

