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Knowledge, attitude, practices, and associated factors toward cervical cancer among female health sciences students of Addis Ababa University, Addis Ababa, Ethiopia

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Abstract

Background: Cervical cancer is the most common cancer in women worldwide. Early screening and vaccination can prevent cervical cancer; however, the low levels of knowledge, attitude, and practice among the young can contribute to the high prevalence of cervical cancer.

Objective: This study aimed to assess the level of knowledge, attitude, and practice of cervical cancer and associated factors among female Health Sciences students of the College of Health Sciences at Addis Ababa University.

Design: A descriptive cross-sectional study was conducted from February 2022 to June 2022 among regular undergraduate female Health Sciences students of Addis Ababa University.

Methods: Data was collected using a self-administered questionnaire and analyzed using SPSS. Results were presented using descriptive statistics and bivariate analysis was conducted to look at the existence of significant associations and determine adjusted odds ratio. Statistical significance was declared at p-value $\leqslant 0.05$.

Results: The majority of the study participants were within the age range of 18–24 years. From the 305 female Health Sciences students, almost all had heard about cervical cancer and 93.4% of them reported that human papillomavirus is the causative agent. About 75% of the respondents recognized at least one possible symptom of cervical cancer. Furthermore, nearly 70% and 78.3% of the participants showed positive attitudes toward taking and recommending human papillomavirus vaccines respectively. Only 16.1% and 48.9% of the respondents have good knowledge, and a positive attitude respectively. Surprisingly only 1.6% and 0.3% of the respondents have taken the human papillomavirus vaccine and undergone cervical screening respectively. Radiography technology students are about 86% less likely to have good knowledge compared to students in other fields of study ($p = 0.04$). Furthermore, year 4 and above students have significantly higher knowledge (89.2%) compared to those in years 1–3 (58%; AOR: 0.14, 95% CI: 0.05, 0.35).

Conclusion: The knowledge of female Health Sciences students on cervical cancer was moderate, and about half had a positive attitude. However, their practice of human papillomavirus screening and vaccination was very low. Level of education and field of study were significantly associated with the knowledge of cervical cancer. Addressing gaps through awareness programs, and enhancing accessible health services can help empower these future health professionals.

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Plain language summary

Knowledge, attitude, practice and associated factors toward cervical cancer among female health science students of Addis Ababa University

Cervical cancer (CC) is a significant health issue affecting women worldwide and understanding how female Health Science students perceive and respond to CC is crucial for early diagnosis, prevention and treatment of the disease. This study highlights the key findings related the level of knowledge, attitudes, practices, and associated factors regarding CC among female Health Sciences students at Addis Ababa University. The authors used a cross-sectional study design to collect data from study participants using self-administered structured questionnaire. Majority of female Health Science students have a basic understanding of CC, its causes, and risk factors. More than 93% of them know that CC is caused by HPV and are aware of the importance of regular screenings. Despite their good knowledge, a small proportion of the students engaged in screening and vaccination due to lack of information or access to healthcare facilities, and considering themselves as healthy. Students with the higher level of study have better knowledge than students with lower year of study. On the other hand, radiography technology students have less CC related knowledge compared to students in other fields. Overall, female Health Science students have moderate knowledge on CC and low level of screening and vaccination practice. Educational interventions can enhance their understanding, encourage them to take action, and promote positive attitudes ultimately leading to better health outcomes for themselves and the communities they serve.

Keywords: Addis Ababa University, Attitude, Cervical Cancer, Female Health Science Students, Knowledge, practice

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Introduction

Cervical cancer (CC) is the most common cancer among women worldwide, affecting an estimated 24.6 million women.[1] According to WHO, CC is the fourth most common gynecological cancer among women globally.[2] It is the third most frequent cancer in women following breast and colorectal cancer. CC is one of the three most common cancers in women under 45 years of age in most countries with 80% of cases occurring in middle and low-income countries (LMICs)[3] and it has become the leading cause of cancer-related death among women living in third-world countries.[4]

In Ethiopia, CC is the most frequently diagnosed cancer among women and ranked as the second most common women cancer.[2,5] In eastern Africa, the region where Ethiopia belongs approximately 4.7% of women in the general population are expected to have cervical human papillomavirus (HPV) infection at any given time, and HPV subtypes 16 and 18 are responsible for 67.9% of invasive cervical malignancies.[6]

The alarming rise in CC cases in Ethiopia calls for a comprehensive approach focused on prevention, early detection, and improved access to treatment. This includes raising awareness about CC, promoting HPV vaccination for young girls, and advocating for routine screening for women, particularly in rural areas. Strengthening the healthcare system's capacity to offer affordable treatment and partnering with international and local health organizations and local NGOs can provide financial and technical support. Implementing a national vaccination program against HPV is crucial for

long-term prevention. Strengthening healthcare infrastructure and training healthcare providers in CC management are also essential components.[7–9]

CC morbidity and mortality can be minimized by properly implementing the HPV vaccine and screening as a preventive measure. Knowledge and attitudes in every given population play an important role in practices.[10] Due to their age and sexual behaviors, university students are particularly prone to HPV infections.[11] In addition, female students can play an important role beyond recommending the uptake of HPV vaccines; they can be a source of information for female relatives, parents, healthcare professionals, and the community at large.

Despite the significant implications of HPV infection, college students worldwide have a poor understanding of HPV-related diseases and complications. Various studies demonstrated knowledge, attitude, and practice (KAP) variations among students.[12,13] According to a Polish study of high school and female university students, 30.1% were uninformed about the HPV vaccine, and 91.5% had not been vaccinated.[14]

Healthcare personnel, particularly young health sciences students can play a prominent role in the prevention and management of CC caused by HPV. However, there have been reports that students in developing nations know very little about CC and screening.[15] Understanding of CC, HPV, and its vaccine is inadequate in medical students, who are on the front lines of patient care.[16] A survey conducted among university students in developing countries such as Pakistan found that more than half (53%) were unfamiliar with the HPV vaccine, and 64% were unaware of the HPV vaccine as a preventive tool against CC.[17]

Another study aimed to assess HPV knowledge, attitude, and perception among female university students in Lebanon between 2013 and 2014 found that 36.5% were uninformed about the HPV vaccine. This figure was higher than a study conducted in Nigeria, where 14.4% of female university students were unaware of the HPV vaccine and the issue might be attributed to the lack of HPV vaccination programs in the respective countries.[11]

Despite the growing number of CC cases in Ethiopia, there is still a gap in the KAP of CC prevention. In addition, there has been a lack of research and little is known specifically targeting undergraduate female students in the field of health sciences at Addis Ababa University. Therefore, the purpose of this study was to assess the KAP and associated factors of female undergraduate health science students of Addis Ababa University.

Methods and materials

Study setting and period: The study was conducted at the College of Health Sciences (CHS), Addis Ababa University. CHS was established in 2009 by the reorganization of four schools and one teaching hospital, Tikur Anbessa Specialized Hospital (TASH). The four schools under CHS are the School of Medicine, School of Pharmacy, School of Public Health, and School of Allied Health Sciences. TASH is the teaching hospital under CHS and it is the largest tertiary care specialized hospital in Ethiopia. CHS serves as a training center and provides education for more than 5000 undergraduate and postgraduate medical and other health sciences students. The study was conducted from February 2022 to June 2022.

Study design: A college-based descriptive cross-sectional study design with a quantitative approach was employed.

Source and study population: The source population of this study was comprised all undergraduate female students enrolled at CHS and the study population was randomly selected undergraduate female students from each school of CHS in proportion. Female undergraduate Health Sciences students and those who are willing to participate were included in the study. Male and female postgraduate students of CHS were excluded from the study.

Sample size determination and sampling technique: The final sample size was determined using a single population proportion formula where: n = sample size Z $\alpha/2$ = normal distribution value at 95% CI ($Z = 1.96$) p = the successful proportion of knowledge/attitude (0.5) d = margin of error (5%).

$$n = \frac{z2p(1-p)}{d2} = \frac{1.962 * 0.5(1-0.5)}{0.052} = 384$$

Since the source population is <10,000, the population correction formula was used to determine the adjusted minimum sample size of 384. The adjustment in sample size was due to the resource constraints. As the study population was small, reducing the sample size improved the accessibility, which can yield higher response rates, leading to more complete data. Reducing the sample size optimizes the balance between statistical power and practicality, helping to avoid unnecessary over-sampling.

$$nf = \frac{n}{1 + n / N} = \frac{384}{1 + 384 / 996} = 277$$

Considering a 10% nonresponse rate, provide 305 as the final sample size.

Stratification was made to select the participants of the study from different schools and levels of study. The strata were based on their school (department), stream/discipline, and year of study. The sample size was proportionally allocated for each selected School/department based on their class size in each year. Using the student list obtained from the CHS registrar as a sampling frame, the respondents were selected using a simple random sampling method proportionally. Accordingly, a sample size of 178 out of 575 for the Doctor of Medicine, 18 out of 60 for Doctor of Dental Medicine, 12 out of 39 for Medical Radiology Technology, 14 out of 47 for Anesthesia, 9 out of 32 for Medical Laboratory Technology, 12 out of 39 for Midwifery, and 41 out of 132 for Pharmacy was taken proportionally.

Data collection and management: Data were collected using self-administered structured questionnaires that were developed after reviewing various types of literature and enriched by experts. The questionnaire was developed to collect important data required to achieve the objective of the study. The questionnaire has four parts; the first part has a socio-demographic characteristic (Age, religion, Ethnicity, Level of study, School/department, Field of study/stream, and Marital status) of study participants while the rest two to four parts have a question to assess KAP respectively. For questions assessing knowledge, a score of 1 and 0 were given for correct and incorrect responses respectively. This knowledge assessment questionnaire has fifteen questions to measure female students toward CC and its vaccination. The attitude part has ten statements about the attitude toward CC and its vaccination and was measured using a 5-point Likert scale (Strongly agree (1), Agree (2), Neutral (3), Disagree (4), Strongly disagree (5)). The practice was assessed by asking respondents if they had attended a screening for CC and taking the HPV vaccine.

A pre-test was conducted on 5% of undergraduate female college Health Sciences students in Addis Ababa to make sure the questionnaire was appropriately structured and ensure its consistency. The data was collected by graduating pharmacy students after a half-day training was provided. Moreover, the principal investigator checked the completeness of the questionnaire, and incomplete and incorrectly filled questionnaires were excluded from the analysis.

Data analysis and interpretation: First, collected data were entered into Microsoft Excel (2013) and then exported to SPSS (Version 23) which is a statistical software developed by IBM for data management, advanced analytics, multivariate analysis, business intellegence, and criminal investigation utilized for conducting descriptive and inferential analysis. Descriptive statistics such as frequencies and percentages were performed and results were presented mainly in the form of tables and figures. A p-value of <0.05 was considered statistically significant for all data analysis.

Ethical considerations: Ethical clearance was obtained from the Ethical Review Board of the School of Pharmacy, Addis Ababa University (ERB/SOP/437/14/2022). The objectives of the study were explained to the participants, and consent was obtained prior to data collection. Moreover, data collectors assured the respondents' participation is fully voluntary. To ensure the confidentiality of respondents, personal identifiers were excluded from the data collection tool and data analysis.

Operational definitions

The participants' KAP were classified according to Bloom's cut-off points into "Good" (>80%), "Moderate" (60–80%), or "Poor" (<60%), while the level of attitude was categorized as positive if the score was 80%–100%, neutral if the score was 60%–79%, and negative if the score was less than 60%. In the logistic regression model, knowledge is originally classified into three tiers. To simplify

for binary logistic regression, these tiers are consolidated into two categories: "Good," which combines the "Good" and "Moderate" classifications, and "Poor," which remains unchanged. This approach dichotomizes the variable to fit the binary logistic regression framework.

Practice: Participants who have any history of HPV vaccination and CC screening at least once.

Results

Socio-demographic characteristics of the study participants

Among 305, the majority of the respondents were from the School of Medicine (64.3%) followed by the School of Allied Health (22.3%). Regarding respondent's age, about 90% of them were within the age range of 18–24 (Table 1).

Knowledge of female undergraduate health students on CC and HPV vaccine

The study showed that almost all of the study participants claimed to have heard about CC. Regarding the etiology of CC, more than 80% of them identified the virus as the causative agent. Moreover, close to three-fourths of the respondents knew the symptoms associated with CC. The survey also showed that a higher proportion of the participants well know that CC is preventable and vaccine is the modality used for prevention (Table 2). According to Bloom's cut-off point, more than half 165 (54.1) of the participants have moderate knowledge of CC (Figure 1).

Table 1. Socio-demographic characteristics of female undergraduate health science students at Addis Ababa University, Addis Ababa, Ethiopia, 2022, (*N* = 305).

Variables	Category	*N* (%)
Age (Years)	18–24	274 (89.8)
	>24	31 (10.2)
Residence status	Lives with family	98 (32.1)
	Lives in dormitory	205 (67.2)
	Lives alone	2 (0.7%)
Religion	Orthodox	175 (57.4)
	Muslim	61 (20)
	Protestant	59 (19.3)
	Catholic	7 (2.3)
	Other	3 (1)
School/Department/	School of Medicine	196 (64.3)
	School of Allied Health Sciences	68 (22.3)
	School of Pharmacy	41 (13.4)
Field of study	Doctor of Medicine	178 (58.4)
	Pharmacy	41(13.4)
	Nursing	21 (6.9)

(Continued)

Table 1. (Continued)

Variables	Category	*N* (%)
	Doctor of Dental Medicine	18 (5.9)
	Anesthesia	14 (4.6)
	Radiology Technology	12 (3.9)
	Midwifery	12 (3.9)
	Laboratory Technology	9 (3)
Year (Level) of study	Year 1	33 (10.8)
	Year 2	52 (17.1)
	Year 3	72 (23.6)
	Year 4	68 (22.3)
	Year 5	44 (14.4)
	Year 6	36 (11.8)

Table 2. Cervical cancer knowledge of female undergraduate health science students at Addis Ababa University, Addis Ababa, Ethiopia, 2022, (*N* = 305).

S. No.	Variables	Category	*N* (%)
1	Have ever heard about CC	Yes	301 (98.7)
		No	4 (1.3)
2	Source of learning about CC	Teachers/School	192 (63)
		Mass and social media	148 (48.5)
		Health institutions/Health professionals	97 (31.8)
		Internet	70 (23)
		Family	24 (8)
		Friends	15 (4.9)
		Neighbors	3 (1)
		Others	1 (0.3)
3	Etiology of CC	Virus	248 (81.3)
		Bacteria	11 (3.6)
		Fungus	1 (0.3)
		Don't know	45 (14.8)
4	HPV is the causative agent of CC	Yes	285 (93.4)
		No	20 (6.6)
5	Know the signs and symptoms of CC	Yes	223 (73.1)
		No	82 (26.9)

(Continued)

Table 2. (Continued)

S. No.	Variables	Category	*N* (%)
6	Signs and symptoms of CC	Vaginal foul-smelling discharge	20 (6.6)
		Post-coital bleeding	15 (4.9)
		Vaginal irregular bleeding	13 (4.3)
		Lower abdominal pain	6 (2)
		Combination of the above symptoms	193 (63.3)
7	Know the risk factors for HPV/CC	Yes	243 (79.7)
		No	62 (20.3)
8	Risk factors for HPV/CC	Having multiple sexual partners	31 (10.2)
		HPV infection	31 (10.2)
		Early sexual intercourse	21 (6.9)
		Cigarette smoking	1 (0.3)
		Combination of the above risk factors	199 (65.3)
9	CC is preventable	Yes	290 (95.1)
		No	15 (4.9)
10	HPV vaccine prevents CC	Yes	268 (87.9)
		No	37 (12.1)
11	CC vaccine is available in Ethiopia	Yes	223 (73.1)
		No	82 (26.9)
12	Knowledge of the type of HPV vaccine available in Ethiopia	Yes	85 (27.9)
		No	220 (72.1)
13	Required doses of HPV vaccine are 2	Yes	84 (27.5)
		No	221 (72.5)
14	The interval between HPV vaccines depends on the dosing schedule	Yes	76 (24.9)
		No	229 (75.1)
15	Sexually active women benefit the most from HPV vaccine	Yes	143 (46.9)
		No	162 (53.1)
16	Candidates for HPV vaccine	Boys	0 (0)
		Girls	226 (74.1)
		Both	61 (20)
		Don't know	18 (5.9)

CC, Cervical cancer; HPV, Human papillomavirus.

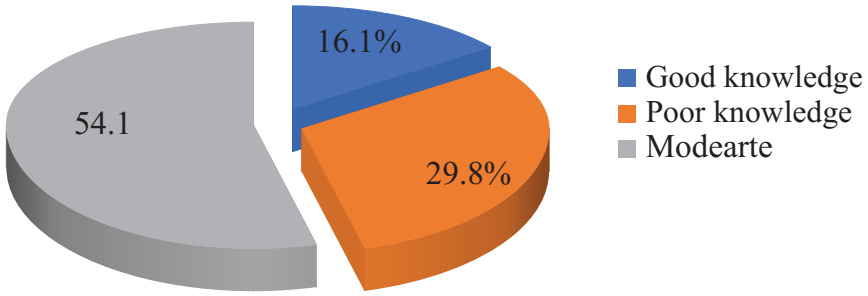

Figure 1. Level of knowledge about cervical cancer among female undergraduate health science students at Addis Ababa University, Addis Ababa, Ethiopia, 2022.

Attitude of female undergraduate health science students on CC and HPV vaccine

More than 96% of the respondents had a positive attitude toward early detection of CC. On the other hand, nearly 70% of the study participants didn't think that they had a chance of getting CC. Almost 90% of the respondents have a positive attitude toward the statement that "HPV vaccination helps in the prevention of CC." Furthermore, 69.5% and 78.3% of the respondents showed a positive attitude toward giving consent to the HPV vaccination and recommending the vaccination to their friends and colleagues respectively. The finding also showed that a significant number of the respondents were not sure whether CC can be treated or not (24%) and whether the vaccine is safe or not (26%; Table 3). Regarding the overall attitude of the respondents, about half (48.9%) and 45.9% of the respondents have positive and neutral attitudes respectively (Figure 2).

Practice of female undergraduate health science students toward CC screening and HPV vaccine

More than 95% of the study participants did not take the HPV vaccine. Lack of information about the vaccination and vaccination place were reported reasons for not being vaccinated by 36.1% and 30.5% of respondents respectively. Regarding the practice of CC screening, below 1% of respondents took the screening (Table 4).

Factors associated with the knowledge of CC screening and HPV vaccine

In this study, field of study, and year (level) of study were significant factors associated with good knowledge about CC screening and HPV vaccination. The findings showed that there are variations in knowledge levels among different fields of study. Statistically significant associations were observed for Nursing ($p = 0.05$), and Radiography Technology ($p = 0.04$). Radiography technology students are about 86% less likely to have good knowledge compared to other students in another field of study. Furthermore, year four and above students have significantly higher knowledge (89.2%) compared to those in years one to three (58%; AOR: 0.14, 95% CI: 0.05, 0.35; Table 5).

Discussion

Even though CC is among the preventable types of cancer, it is still the most common cancer among women worldwide, especially in developing countries.[1,3] Health Science students are expected to have adequate knowledge and a good perception of the prevention of CC by virtue of their training to become future healthcare providers.[12] The purpose of the study was to assess the level of KAP of CC and associated factors among female Health Sciences students of the CHS at Addis Ababa University.

In this study, more than 98% of the students had heard about CC. This finding is in line with a study conducted in Poland (98.5%), the University of Gondar, Ethiopia (90%), and Benin (88.7%).[5,18] In contrast, the percentage of female students claiming to have heard about CC is lower in a study conducted in Debre Berhan University, Ethiopia (40.5%), Nigeria (53.9%), and South Africa (58.9%).[19,20,21] This variation might be due to differences in awareness (level of exposure to CC information) among the study participants, sample size, and study site.

Table 3. Attitude on cervical cancer of female undergraduate health science students at Addis Ababa University, Addis Ababa, Ethiopia, 2022.

S. N	Variables	Strongly agree *n* (%)	Agree *n* (%)	Neutral *n* (%)	Disagree *n* (%)	Strongly disagree *n* (%)
1	It is helpful to detect/ screen for CC early	283 (92.8)	11 (3.6)	6 (2)	1 (0.3)	4 (1.3)
2	I have a chance of getting CC	48 (15.7)	51 (16.7)	79 (26)	47 (15.4)	80 (26.2)
3	CC is a cause of death	168 (55.1)	73 (23.9)	44 (14.4)	10 (3.3)	10 (3.3)
4	There are effective methods to reduce the risk of the seriousness of CC	170 (55.7)	91 (29.8)	24 (8)	12 (3.9)	8 (2.6)
5	CC can be treated	97 (31.8)	109 (35.7)	73 (24)	14 (4.6)	12 (3.9)
6	Vaccination helps in prevention of CC	212 (69.5)	62 (20.3)	20 (6.6)	6 (2)	5 (1.6)
7	HPV vaccine can prevent other cancers	49 (16.1)	40 (13)	125 (41)	46 (15.1)	45 (14.8)
8	HPV vaccine is safe	134 (44)	86 (28)	79 (26)	4 (1.3)	2 (0.7)
9	I am willing to take the vaccination	139 (45.6)	93 (30.5)	55 (18)	4 (1.3)	14 (4.6)
10	I would recommend HPV vaccine to my friends and colleagues	135 (44.3)	104 (34)	55 (18)	2(0.7)	9 (3)

CC, Cervical cancer; HPV, Human papillomavirus.

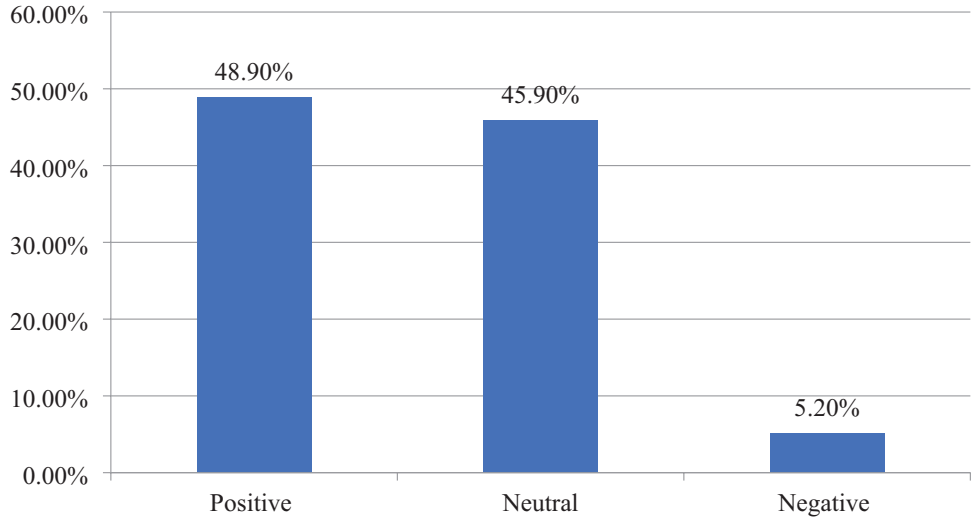

Figure 2. Level of attitude toward cervical cancer among female undergraduate health science students at Addis Ababa University, Addis Ababa, Ethiopia, 2022.

Table 4. Cervical cancer screening and HPV vaccine practices among female undergraduate health science students at Addis Ababa University, Addis Ababa, Ethiopia, 2022.

S. N	Variables	Category	*N* (%)
1	Having previous history of taking HPV vaccine	Yes	5 (1.6)
		No	300 (98.4)
2	Reasons for not being vaccinated for HPV	I am not informed about the vaccination	110 (36.1)
		I am not informed about the vaccination place	93 (30.5)
		I am healthy	67 (22)
		It may be painful	26 (8.5)
3	Previous history of screening for CC	Yes	1(0.3)
		No	304(99.7)
4	Reasons for not being screened for CC	I am healthy	151 (49.5)
		It may be painful	81 (26.6)
		I am not informed about the screening	69(22.6)
		I am not informed about the screening place	13(4)

CC, Cervical cancer; HPV, Human papillomavirus.

More than half (63%) and nearly 50% of female students got CC-related information from teachers/school and mass media, respectively, which is higher than a study conducted at Wollega University, Ethiopia, in which mass-medias (36%), and teachers (0.7%) were mentioned as sources of information.[22] This variation might be due to the time gap between the studies, as current attention given to the condition may have an impact on the prevalence. In addition, the current study participants were health science students, while the prior study was among general students. However, it is lower than a study conducted in Uganda where 70.2% of respondents obtained information through radio.[23] This difference might be due to differences in media coverage between the countries and variations in study participants.

Knowledge of the etiology of CC is crucial to prevent the occurrence of the disease. More than 80% of respondents indicated the virus as the causative agent, and 93.4% of the respondents reported HPV as the main agent. This finding is higher than a study conducted at the University of Gondar, Ethiopia, where only 40% of female students knew the primary causes of CC, and only 20% knew that HPV causes CC.[24] Similarly, a study conducted at Debre Berhan University, Ethiopia, showed that more than 80% of participants were unaware that HPV is a causal agent of CC and only 20% of them identified HPV as the primary cause of CC.[19] This discrepancy might be due to the year and field of study of the students, as the majority of students in Gondar and Debre Berhan universities were year 1 and year 2 students from non-health science disciplines.

This study also revealed that close to three-fourths (73.1%) of the respondents were aware of at least one possible symptom of CC. The finding is comparable to a study conducted at Hawassa University (67.9%) and is in contrast to a study conducted among reproductive age group women

Table 5. Factors associated with the knowledge of cervical cancer screening and HPV vaccine among female undergraduate health science students at Addis Ababa University, Addis Ababa, Ethiopia, 2022.

Variables	Overall knowledge		*p*-Value	COR (95% CI)	*p*-Value	AOR (95% CI)
	Good *N* (%)	Poor *N* (%)				
Age						
>24 Year	29 (93.5)	2 (6.5)				
18–24	194 (70.8)	80 (29.2)	0.02	0.17 (0.04, 0.72)	0.97	1.03 (0.16, 6.80)
Marital status						
Married	7 (77.8)	2 (22.2)				
Unmarried/Single	216 (73)	80 (27)	0.75	1.30 (0.26, 6.37)	0.24	0.24 (0.02, 2.64)
Field of study						
Doctor of dental medicine	12 (66.7)	6 (33.3)				
Medicine	32 (18)	146 (82)	0.32	0.4 (0.07, 2.44)	0.39	0.33 (0.03, 4.07)
Pharmacy	17 (41.5)	24 (58.5)	0.16	0.27 (0.04, 1.70)	0.28	0.24 (0.02, 3.10)
Nursing	5 (23.8)	16 (76.2)	0.03	0.1(0.01, 0.78)	0.05*	0.06 (0.004, 0.99)
Midwifery	11 (91.7)	1 (8.3)	0.91	0.91 (0.19, 4.37)	0.58	0.546 (0.06, 4.71)
Anesthesia	6 (42.9)	8 (57.1)	0.54	2.2 (0.17, 28.14)	0.88	0.79 (0.04, 15.29)
Laboratory technology	3 (33.3)	6 (66.7)	0.63	0.64 (0.10, 3.95)	0.74	0.66 (0.05, 8.13)
Radiography technology	10 (83.3)	2 (16.7)	0.02	0.14 (0.03, 0.73)	0.04*	0.09 (0.01, 0.88)
Years of study						
Year 4 and above	132 (89.2)	16 (10.8)				
Year 1–3	91 (58)	66 (42)	0.00	0.17 (0.09, 0.31)	0.00*	0.14 (0.05, 0.35)

*Indicate the presence of significant association.
AOR, adjusted odd ratio; CI, confidence interval; COR, crude odd ratio.

in Gondar town, where about 20% of the participants claimed to know the symptoms.[3,25] This variation could be due to the study participants in this study being health science students, who are deemed to be well-versed in the research topic and have favorable exposure to information.

High proportion (87.9%) of the participants responded that the HPV vaccine can prevent CC. This is higher than a study conducted in Turkish university medical and non-medical students in which 56.3% of the students did not know that HPV vaccination prevents CC. This percentage was extremely higher than the study conducted among Indian medical students (18%).[26,27] This might be due to the inclusion of non-medical students in the study population and the difference in time gap between the studies.

More than 95% of respondents agreed that early detection enables for prevention of CC. Similarly, a study conducted at Gondar University revealed that about 90% of students agreed with this statement.[5] On the other hand, only 32.4% of participants believe that they are at risk of CC. Similarly, a study conducted in Lagos, Nigeria reported that only 17.7% felt they were at risk for CC.[28] This finding is much lower than a study conducted at the University of Gondar, Northwest Ethiopia, and Mizan-Tepi University, where more than half

(56.8%) and close to half (49.3%) of the participants perceived that they could acquire the disease, respectively.[5,29] Despite having good knowledge regarding CC, participants are not aware of the chance of having CC. This finding indicates that there is a misunderstanding about CC and its prevention among the young.

More than three-fourths, (76.1%) and 78.3%) of study participants were willing to take the vaccine and agreed to recommend the vaccine to their friends, respectively. The result is in line with studies conducted in Portugal (89%), South Africa (77.3%), Nigeria (74%), and India (75%).[20,30,31,32,33,34] On the other hand, below 1% of the participants reported having CC screening. Similar to the current study, 0.5% and none of the study participants had undergone CC screening at Gondar University and Wollega University, respectively.[5,22] This is much lower than the findings from South Africa, where 18% of the respondents had the test.[21] This difference might be due to South Africa taking CC screening as a national policy, and the service is widely available. However in Ethiopia, few health institutions are offering such services. Furthermore, there is no organized cancer prevention, education, and screening program.[5]

Regarding the HPV vaccination, only 1.6% of the respondents reported taking the vaccine. This finding is consistent with the study conducted at Gondar University, in which only 1.2% of participants had been vaccinated, and lower than a study conducted in Malaysia medical students in which 3.6% of the respondents took the HPV vaccine.[5] This low vaccination rate despite the good attitude toward the vaccine could be due to the late start of HPV vaccine in developing countries, particularly Ethiopia.

In this study age, field of study, and year (level) of study were significantly associated with knowledge about CC screening and HPV vaccination. Similarly, studies conducted in different areas showed that the field of study was significantly associated with the knowledge of CC screening and HPV vaccination.[4,26,32] In the current study, there were variations in knowledge levels about CC screening and HPV vaccination among different fields of study. The study showed that students in the field of Nursing ($p = 0.05$), and Radiography Technology ($p = 0.04$) were associated with low knowledge of CC screening and HPV vaccination. Radiography technology students are about 86% less likely to have good knowledge compared to other students in another field of study. Even though health science students have relatively better knowledge about CC, risk factors, and its prevention compared to other field students, there are still gaps in knowledge within health sciences students.[32–34] This clearly indicates that women's educational backgrounds did not guarantee them a high level of knowledge about CC. Thus, attention should be given to the creation of awareness about the disease and its prevention.

Furthermore, year 4 and above students have significantly higher knowledge (89.2%) compared to those in years 1–3 (58%). Similarly, the study conducted at the Institute of Health Sciences, Universiti Brunei Darussalam showed that year 4 students have better knowledge of CC compared to year 2 and 1.[32] This suggests that when their level of education increases the students have a better understanding of CC and its risk factors. This showed that to raise the level of understanding among female students, reproductive health education programs needed to be introduced at the beginning of a study.

Limitations of the study

Even though the study brought important findings about the awareness and perception of CC and its prevention among female health science students it has some limitations. The study's cross-sectional approach prevents understanding over time (unable to indicate a causal relationship). The results about attitudes and practices toward HPV vaccination and CC screening were based on the self-reports of participants, which their answers may cause social desirability bias that may result in over or underestimates of the result. Moreover, other factors not controlled in this study such as family knowledge, income status, school teachers, peer influence, and cultural complexities may influence the knowledge, attitude, and practices toward HPV vaccination and CC screening among the students.

Conclusion

In this study, the knowledge of female health science students of the CHS at Addis Ababa

University on CC was moderate and a good proportion of the participants had a positive attitude. However, their practices such as screening for CC and taking HPV vaccine were very low. Since the impact of mass media is high, awareness creation and knowledge seeding should be established. There is a need for an intensive education program to teach the students about the need for CC screening so that they can be change agents in their future careers.

Declarations

Ethics approval and consent to participate

This study was approved by the Ethical Review Board of the School of Pharmacy, Addis Ababa University (ERB/SOP/437/14/2022). Verbal informed consent to participate was obtained from all participants. Moreover, data collectors assured the respondents' participation is fully voluntary. To ensure the confidentiality of respondents, personal identifiers were excluded from the data collection tool and analysis.

Consent for publication

Not applicable as there are no participant images/data that were reported.

Author contributions

Sisay Endale: Conceptualization; Data curation; Formal analysis; Methodology; Software; Validation; Visualization; Writing – original draft; Writing – review & editing.

Kalkidan Delelegn: Conceptualization; Data curation; Formal analysis; Methodology; Software; Validation; Visualization; Writing – original draft; Writing – review & editing.

Zenebe Negash: Data curation; Formal analysis; Methodology; Software; Validation; Visualization; Writing – review & editing.

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Competing interests

The authors declare that there is no conflict of interest.

Availability of data and materials

The raw data set used for this study is available upon reasonable request from the corresponding author.

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