RESEARCH ARTICLE

Knowledge and practice towards Cervical Cancer prevention, and its associated factors among female students of Mizan-Tepi University, southwest Ethiopia

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Abstract

Background: Cervical cancer is preventable and, most often curable, if identified earlier. Young women, including university students, should be aware of and implement cervical cancer prevention methods. However, limited studies were done about knowledge and practices of cervical cancer prevention among the female population of Ethiopia particularly in the study setting. Thus, this study was aimed to assess the knowledge and practice towards cervical cancer prevention and associated factors.

Methods: An institution-based cross-sectional study was conducted among female students of Mizan-Tepi University, southwest Ethiopia from January to February 2020. A two-stage cluster sampling technique was used to select a total of 715 samples. Data was collected using a pretested self-administered questionnaire. Binary and multivariable logistic regression was conducted to identify associated factors of knowledge and practice towards cervical cancer prevention. The strength of association was determined by Adjusted Odd Ratio (AOR) with 95% confidence interval (CI) and statistically significant variables were identified based on P-value < 0.05.

Result: Data was collected from 665 female students with a 93% response rate. Among the respondents, 31.4% of study participants had good knowledge and 13.5% had a good practice towards cervical cancer prevention. The college where students were studying ($AOR = 34.91$; 95% $CI = 21.03$-57.96) and previous history of cervical cancer screening ($AOR = 3.49$; 95% $CI = 1.52$-8.01) were predictors of good knowledge. Knowledge of how HPV infection is acquired ($AOR = 3.68$; 95% $CI = 1.60$-8.47), age of screening ($AOR = 0.07$; 95% $CI = 0.01$-0.34) and frequency of screening ($AOR = 2.63$; 95% $CI = 1.03$-6.70) were found factors associated with good practice.

Conclusion: Most study participants had poor knowledge and practice towards cervical cancer prevention. Colleges, previous cervical cancer screening experience were found to be associated with student's knowledge. Knowing how HPV infection is acquired and knowing the age and frequency of cervical cancer screening were found predictors of overall cervical cancer prevention practice.

Keywords: Cervical cancer prevention, Female students, Knowledge, Mizan-Tepi University, Practice

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Background

Globally, cancer has become the second cause of death, following cardiovascular disease; with more than 8.7 million deaths. Up to 60% of this death occurs in low-income countries [1,3]. Although the incidence of cancer is common among men population of developed nations, a higher incidence of cancer was also seen among women of less developed countries [2].

Cervical cancer is among the commonest cancers in the world with an estimated 300,000 deaths annually [4]. About 85% of morbidities and mortalities related to cervical cancer occur in resource-limited countries [5]. According to estimates of cancer incidence in Ethiopia done in 2015 using population-based registry data, new cases of all cancers combined were twice among women than men. The difference is mainly due to the higher incidence of breast and cervical cancer among women. In women at the age of 15 and above, cervical cancer was the second most common cancer (22%) following breast cancer, constituting 23% of all cancers in females [3]. Also, in the country, about 7,600 are diagnosed and 6,000 dies of the disease [6].

Human Papilloma Virus (HPV), the most common cause of cervical cancer, is a sexually transmitted infection (STI) and is higher in developing countries [7-10]. Studies have indicated susceptibility to cervical cancer is higher among women with a previous history of multiple sexual partners, early sex archer, early age of marriage and childbirth, multiparity, poor living standard, long term use of hormonal contraceptives, history of STI, and smoking history [11-13].

Cervical cancer is a controllable disease through primary and secondary prevention strategies. An important strategy for primary prevention and control of cervical cancer would include the administration of the HPV vaccine into the national immunization program targeting adolescent girls [14,15].

In developed countries, the incidence of cervical cancer and related deaths has been significantly lowered due to secondary prevention programs such as the Papanicolaou (Pap) smear test for screening cervical premalignant lesion [16]. However, in developing countries, screening services are not accessible for a large portion of the population [17].

In most cases, cervical cancer can be effectively prevented as well as cured if diagnosed earlier [5]. In developing countries, evidence showed that the majority of deaths due to cervical cancer occur in women who were often seek screening services at later stages, or never treated [6,13]. As secondary prevention, the progression of cervical cancer into its later stages can be prevented through timely screening and treatment of premalignant lesions [15,16].

Knowledge and practice towards cervical cancer prevention were found to be inadequate among women including higher institution students in low resource countries [18-21]. Information is important for better knowledge about HPV and cervical cancer [22]. Inadequate information and lower socioeconomic status were cited as barriers to receiving HPV vaccination and cervical cancer screening [21,23].

Studies suggested that young women, including female university students, should be aware of the effective prevention and early treatment of cervical cancer [19,22,24,25]. However, limited studies were done about knowledge and practices of cervical cancer prevention among the female population of Ethiopia, particularly in the study setting. Thus, the study aimed to assess knowledge and practice towards cervical cancer prevention, and its associated factors among female students of Mizan-Tepi University, southwest Ethiopia.

Methods and Materials

Study Design and Setting

A cross-sectional study was conducted among female students of Mizan-Tepi University (MTU) from January to February 2020. Mizan-Tepi University is one of the public universities located in the southwestern part of the country, Ethiopia. The university was established in 2006 and has two campuses found in two towns namely Mizan Aman and Tepi town. Currently, the university is offering education and training for more than 11,600 students (i.e. 4,167 female and 7,433 male) in its 6 colleges (i.e. college of business and economics, college of agriculture and natural resource, college of other social science and humanity, college of medicine and health sciences, college of natural science, and college of engineering and technology), two schools (i.e. school of law and School of Computing & information), 38 departments [26].

Study Population

Selected regular undergraduate female students were included in the study. However, female students who were attending summer, weekend, and distance education, and those who were sick during the data collection period were excluded from the study.

Sample Size Determination

Initially, sample size (n_0) was calculated by using single population proportion formula [27]. Based on a study done among female students of Debre Birhan University of Ethiopia [22], we inferred that the proportion (P) of female university students with good knowledge on cervical cancer and its prevention would be 35.6% ($p=0.356$) assuming a 95% confidence level and a 5% margin of error (d).

$$n_0 = \frac{(Z_{\alpha/2})^2 p(1-p)}{d^2}$$
$$n_0 = \frac{(1.96)^2(0.365)(1-0.365)}{(0.05)^2} = 352$$

Then, since the total number of female students of Mizan-Tepi University was less than 10,000 ($N=4,167$), we applied finite population correction factor to calculate the final sample size (n_f) [28].

$$n = \frac{n_0)}{1+\frac{n_0}{N}} = \frac{352)}{1+\frac{352}{4,167}} = 325$$

The study participants were selected by using a two-stage clustered sampling technique. Thus, the sample size was multiplied by two by considering the design effect (D=2) and then 10% of the non-response rate was added. Finally, the minimum sample size required for this study was 715.

Sampling Procedure

A two-stage cluster sampling technique was conducted to select the students. First, all colleges and schools were categorized as Health and Medical Science College and Non-Health Science Colleges. Then, one college (college of medicine and health sciences) was selected purposely, and four colleges (i.e. college of business and economics, college of agriculture and natural resource, natural science and college of other social science and humanity) and 1 school (school of law) were selected using simple random sampling from Non-Health Science Colleges. Second, Eight departments were selected by simple random sampling technique. Namely, the department of Nursing and Midwifery selected from the College of Medicine and Health Sciences; General forestry, Biology, Management, Natural Resource Management, Sociology, and School of the law were selected from the Non-Health Science Colleges. Finally, the total sample size was divided proportionally to each selected department, based on the number of students found. A list of the students from year one to year five was obtained from each selected department. Then study participants were selected from each year of the selected departments by simple random sampling method using computer-generated random numbers.

Data Collection Tool and Procedure

The data was collected by using a pretested, structured, and unstructured self-administered questionnaire. The questionnaire was prepared by investigators after reviewing related literature [19,22,24,25,29-31]and made it suitable to assess female university students' knowledge and practice towards cervical cancer prevention. The questionnaire was initially prepared in the English version and then translated to the Amharic language for those who cannot understand the English version of the question. Approximately 10-15 minutes were used to complete the instrument.

Most of the questions were closed-ended with predetermined options such as "Yes", "No", and as well as "I don't know". Some questions were developed with multiple options, and few open-ended questions were also included. The questionnaire has two parts. The first part contains general information, including socio-demographic characteristics of students such as age, college, year of study, the residence of origin (rural vs. urban), marital status. The second part contains questions regarding the student's knowledge and practice on cervical cancer prevention.

Before the actual data collection, one orientation was given to those who facilitate the data collection process. A pre-test was done on 5% (36) of the sample among non-study participants from the department of pharmacy and animal science students, and necessary modification was done. Finally, the questionnaire was distributed to the study participants by five data collectors, and two personnel supervised the data collection process.

Operational Definition

Knowledge assessment: Respondent's comprehensive knowledge of cervical cancer prevention was assessed by using 11 questions with responses. The knowledge assessment focused on having information about HPV, cervical cancer, and screening method. Also, knowledge about cervical cancer risk factors, symptoms, and prevention methods was included.

Those who responded "Yes" response to at least 6 questions of all 11 questions were considered as having "Good Knowledge towards cervical cancer prevention" and those who respond "Yes" response to < 5 questions of all 11 questions was considered as having "Poor Knowledge towards cervical cancer prevention"

Practice assessment: Five questions were used to determine the respondent's practice towards cervical cancer prevention. Having a sexual partner, cigarette smoking habits, condom use, previous history of cervical cancer screening, and vaccination against HPV were mainly considered to categorize students' practice. Those who responded "Yes" for questions such as condom use, History of cervical cancer screening and vaccination against HPV; and "No" response to having a sexual partner, smoking habits were considered an appropriate response of good practice. Thus, those who responded > 3 appropriate responses of good practice out of the total five practice questions were considered to have "Good practice".

On the contrary, those who respond "No" for the answer to questions such as Condom use, screening for cervical cancer, and vaccination against HPV; and "Yes" response to having a sexual partner, smoking habits were considered as an indicator of poor practice. Thus, those who mentioned > 3 of poor practice out of the total five practice questions were considered to have "poor practice".

Data Processing and Analysis

After the data collection, filled questionnaires were checked for completeness. The data were coded, entered, and cleaned using Epidata software (Version 3.1) and exported to SPSS version 23 for analysis. First descriptive statics such as the frequency and percentage were done. Then,

binary logistic regression analysis was conducted to measure the potential association between the outcome and each determinant variable. Crude odds ratio (OR) and probability value (P-value) were identified for each independent variable and then all independent variables with a p-value of less than 0.05 were entered into multivariate logistic regression. Finally, multivariate analysis was conducted to identify the factors associated with the level of knowledge and practice on cervical cancer prevention. The strength of association was determined by Adjusted Odd Ratio (AOR) with 95% confidence interval (CI) and statistically significant variables were identified based on P-value < 0.05. Hosmer-Lemeshow goodness of fit test was used to test the model fitness for the final multivariate analysis.

Results

Socio-demographic and Academic Characteristics of the Respondent

Data was collected from 665 female students with a 93% response rate. The age of the students ranges from 18 to 39 years with a mean age ($\pm$ SD) of 21.12 years ($\pm$ 2.02). The majority of students (472/71%) were from non-health science colleges and 285 (42.9%) were 2nd year students. More than half, 362 (54.4%), of the students came from urban areas and 607 (91.3%) were single (Table 1).

Table 1 Sociodemographic and academic characteristics of respondents, Mizan-Tepi University, Southern Ethiopia, 2020 ($n= 665$)

Variables	Frequency	Percentage (%)
Age category		
$\leq$20	315	47.4
21-25	330	49.6
$\geq$26	20	3.0
Colleges		
Medical and health sciences	193	29.0
Non-health science	472	71.0
Year of study		
Year 1	165	24.8
Year 2	285	42.9
Year 3	122	18.3
Year 4	82	12.3
Year 5	11	1.7
Residence		
Urban	362	54.4
Rural	303	45.6
Marital status		
Married	58	8.7
Single	607	91.3

Knowledge about Cervical Cancer Prevention

Overall, 209 (31.4%) study participants had good knowledge, whereas 456 (68.6%) had poor knowledge about cervical cancer and its prevention. About one-third, 218 (32.8%), know at least a single symptom of cervical cancer, and 104 (47.7%) of them reported abnormal vaginal bleeding as a symptom (Table 2).

Table 2 Knowledge of Cervical Cancer and its prevention among respondents, Mizan-Tepi University, Southern Ethiopia, 2020

Variables	Frequency	Percentage (%)
Ever heard about cervical cancer (n= 665)		
Yes	332	49.9
No	333	50.1
Source of information an (n=332)		
Teachers	123	35.7
Health workers	99	28.8
Mass Media	89	25.9
Family and Friends	33	9.6
Do you know the symptoms of cervical cancer?		
Yes	218	32.8
No	447	67.2
The symptoms reported by respondents (n=218)		
Abnormal vaginal Bleeding	104	47.7
Abnormal Vaginal discharge	84	38.5
Bleeding after menopause	16	7.4
Others[b]	14	6.4
Do know about the risk factors of cervical cancer? (n=665)		
Yes	286	43
No	379	57
The types of risk factors (n=286)		
Early age of sexual intercourse	71	24.8
Multiple sexual partners	56	19.6
Human Papilloma virus	52	18.2
Cigarette Smoking	33	11.5
Contraceptives	21	7.3
HIV infection	18	6.3
Others[c]	35	12.2
Ever heard about HPV, n=665		
Yes	216	32.5
No	449	67.5

Variables	Frequency	Percentage (%)
Do you know how HPV infection is acquired? (n=665)		
Yes	214	32.2
No	451	67.8
Routes of acquiring HPV infection (n=214)		
Sexually intercourse	138	64.5
Airborne	30	14
Close contact	46	21.5
Ever heard about cervical cancer screening (n=665)		
Yes	196	29.5
No	469	70.5
Perceived age to be screened for cervical cancer(n=665)		
<15 years	63	9.5
15-30 years	161	24.2
30-49 years	44	6.6
I don't know	397	59.7
Perceived frequency for cervical cancer screening (n=665)		
Every 5 years	38	5.7
Every 3 years	36	5.4
Every year	62	9.3
I don't know	529	79.5
Do you know whether cervical cancer is curable? (n=665)		
Yes	323	48.6
No	128	19.2
I don't know	214	32.2
Do you know whether cervical cancer is preventable? (n=665)		
Yes	110	16.5
No	413	62.1
I don't know	142	21.4
Do you know the means of cervical cancer prevention? (n=665)		
Yes	366	55
No	299	45
Means of cervical cancer prevention (n=366)		
Avoid multiple sexual partners	132	19.8
Vaccination against HPV infection	76	11.4
Abstain from early sexual intercourse	73	11
Quit smoking	46	6.9
Others[d]	39	5.9
Overall knowledge		
Good knowledge	209	31.4
Poor knowledge	456	68.6

[a] more than one response; Others[b]: Abdominal discomfort, pain during urination

Others[c]: Alcohol consumption, hereditary, lack of hygiene

Others[d]: Condom use, avoiding alcohol consumption, keep hygienic, consult a physician

Of the respondents, 286 (43%) know the risk factors of cervical cancer and early initiation of sexual intercourse (24.8%), multiple sexual partners (19.6%), HPV (18.2%) were mentioned as risk factors. Of all, 216 (32.5%) have heard about HPV and 138 (64.5%) stated sexual intercourse as a means of acquiring HPV infection. Of the total study participants, only 196 (29.5%) have heard about cervical cancer screening while only 44(6.6%) of the respondents reported 30 to 49 years as the appropriate age to be screened for cervical cancer. Thirty-eight (5.7%) recommended the frequency of cervical cancer screening every five years while 36 (5.4%) of them said every three years. Also, 323 (48.6%) know whether cervical cancer is curable and only 110 (16.5%) know that cervical cancer is preventable.

The majority, 366 (55.0%), of respondents, know at least one prevention method. Avoiding multiple sexual partners (19.8%), vaccination against HPV infection (11.4%), and abstaining from early sexual intercourse (11.0%) was indicated by the students as means of cervical cancer prevention.

Cervical Cancer Prevention Practice

Most of the study subjects, 636 (95.6%), were not cigarette smokers. Only 218 (32.8%) have had a sexual partner and of this number, 156 (71.6%) had one sexual partner, 154 (70.6%) had started first sexual intercourse between the age of 19-25 years and 81 (37.2%) have had used a condom consistently during sexual intercourse. Only 67(10.1%) study participants had ever screened for cervical cancer and of this proportion, 63 (94%) screened once. However, 598 respondents (89.9%) had not ever screened for cervical cancer. Very few, 52 (7.8%), were ever vaccinated against HPV, but 613 (92.2%) were not vaccinated. From the overall practice score, only 90 (13.5%) participants had good cervical cancer prevention practice (Table 3)

Table 3 Cervical cancer prevention practice among the respondents, Mizan- Tepi University, Southern Ethiopia, 2020 (n=665)

Practice items	Frequency	Percentage (%)
Do you smoke cigarettes? (n=665)		
Yes	29	4.4
No	636	95.6
Do you have a sexual partner? (n=665)		
Yes	218	32.8
No	447	67.2
How many sexual partners? (n=218)		
One	156	71.6
Multiple	62	28.4
At what age did you start sexual intercourse? (n=218)		
11-18 years	64	29.4
19-25 years	154	70.6
Do you use condoms consistently? (n=218)		
Yes	81	37.2
No	137	62.8
Have you ever screened for cervical cancer?		
Yes	67	10.1
No	598	89.9
How many times have you screened for cervical cancer? (n=67)		
Once	63	94
Twice	4	6
Why you did not screen for cervical cancer? (n=598)		
I do not about screening	277	46.3
I think unnecessary	140	23.4
I do not know where to be screened	99	16.6
Others[a]	82	13.7
Have you ever vaccinated against HPV? (n=665)		
Yes	52	7.8
No	613	92.2
Why you did not vaccinate against HPV? (n=613)		
I don't know about HPV vaccination	274	44.7
I don't know where to get an HPV vaccination	95	15.5
HPV vaccination service is not available in my locality	117	19.1
I don't think it's necessary	73	11.9
Others[b]	54	8.8
Overall Practice		
Poor practice	575	86.5
Good practice	90	13.5

Others[a]: Expensive, I don't think I am at risk, afraid; Others[b]: I think too expensive, afraid, fear of side effect

Factors associated with the level of Knowledge and Practice towards Cervical Cancer Prevention

Binary logistic regression was done for both outcome variables (level of knowledge and level of practice). As stated in the methodology part, first bivariate logistic regression analysis was conducted for each independent variable, and then statistically significant variables were entered into multivariate analysis.

Based on the COR (95% CI) and P-value, variables such as age, college, original residence, have ever screened and have ever vaccinated for HPV were associated with the level of knowledge of cervical cancer and its prevention (P<0.05).

The multivariate analysis showed that college (health vs. non-health science), and history of screening for cervical cancer were significantly associated with the level of knowledge. Students who were from medical and health science colleges were 34.91 times more likely to have good knowledge than non-health students ($AOR = 34.91$; 95% $CI = 21.03\text{-}57.96$). Also, those participants who have ever screened for cervical cancer were 3.49 times more likely to have good knowledge than their counterparts ($AOR = 3.49$; 95% $CI = 1.52\text{-}8.01$) (Table 4).

Table 4 Bivariate and multivariate analysis showing factors associated with the overall knowledge of cervical cancer and its prevention among female students of Mizan-Tepi University, Southern Ethiopia, 2020 (n=665)

Variables	Overall knowledge		COR (**95%** CI)	AOR (**95%** CI)
	Poor Knowledge n (%)	Good Knowledge n (%)		
Age category				
≤20	266(40.0)	49(7.4)	0.12(0.05-0.32)*	0.28(0.07-1.12)
21-25	182(27.4)	148(22.2)	0.54(0.22-1.36)	0.63(0.16-2.44)
≥26	8(1.2)	12(1.8)	1	1
Colleges				
Medical and health science	33(4.9)	160(24.1)	41.85(25.96-67.46)*	**34.91(21.03-57.96)***
Non-health science	423(63.6)	49(7.4)	1	1
Residence				
Urban	236(35.5)	126(18.9)	1.41(1.01-1.97)*	1.01(0.61-1.65)
Rural	220(33.1)	83(12.5)	1	1
Ever screened for cervical cancer				
Yes	23(3.5)	44(6.6)	5.02(2.94-8.57)*	**3.49(1.52-8.01)***
No	433(66.1)	165(24.8)	1	1
Ever vaccinated for HPV				
Yes	22(3.3)	30(4.5)	3.30(1.85-5.88)*	1.06(0.40-2.83)
No	434(65.3)	179(26.9)	1	1

*COR: Crude Odds Ratio; AOR: Adjusted Odds Ratio; * $P < 0.05$; Bold values are statistically significant*

Bivariate analysis done for level of practice showed that Age, college, ever heard about HPV, knowing how HPV infection is acquired, knowing the frequency of screening, knowing the age of screening, and knowing about HPV vaccine were associated with the level of cervical cancer prevention practice ($P < 0.05$). On a multivariate analysis; those students who know how HPV infection is acquired were 3.68 times more likely to have good practice than those who do

not know ($AOR = 3.68$; $95\% CI = 1.60\text{-}8.47$). Those participants who said screening frequency is every 5 years were 4.3 times more likely to have good practice than those who say 'I don't know ($AOR = 4.30$; $95\% CI = 1.44\text{-}12.80$) and similarly those who said 'every year' were 2.63 times more likely to have good practice towards

cervical cancer prevention than those who said 'I don't know' ($AOR = 2.63$; $95\% CI = 1.03\text{-}6.70$). Students who said the appropriate age of cervical cancer screening is <15 years were 93% less likely to have good practice than those who said 'I don't know' ($AOR = 0.07$; $95\% CI = 0.01\text{-}0.34$) (Table 5).

Table 5 Bivariate and multivariate analysis showing factors associated with the cervical cancer prevention practice among female students of Mizan-Tepi University, Southern Ethiopia, 2019 (n=665)

Variables	Overall practice		*COR* (95% *CI*)	*AOR* (95% *CI*)
	Poor Practice *n* (%)	Good Practice *n* (%)		
Age				
≤20	273(41.1)	42(6.3)	0.35 (0.13-0.98)*	0.79(0.22-2.74)
21-25	288(43.3)	42(6.3)	0.34(0.12-0.93)*	0.45(0.13-1.52)
≥26	14(2.1)	6(0.9)	1	1
Colleges				
Medical and health sciences	152(22.8)	41(6.2)	2.32(1.47-3.66)*	1.45(0.69-3.03)
Non-health science	423(63.6)	49(7.4)	1	1
Knows how HPV infection is acquired				
Yes	165(24.8)	49(7.4)	2.97(1.889-4.66)*	3.68(1.60-8.47)*
No	410(61.6)	41(6.2)	1	1
A perceived time interval of cervical cancer screening				
Every 5 years	27(4.1)	11(1.6)	3.12(1.47-6.61)*	**4.30(1.44-12.80)***
Every 3 years	32(4.8)	4(0.6)	0.95(0.32-2.80)	0.70(0.20-2.48)
Every year	48(7.2)	14(2.1)	2.23(1.16-4.29)*	**2.63(1.03-6.70)***
I don't know	468(70.4)	61(9.2)	1	1
Perceived age to be screened for cervical cancer				
<15 years	61(9.2)	2(0.3)	0.20(0.04-0.87)*	**0.07(0.01-0.34)***
15-30 years	139(20.9)	22(3.3)	1.00(0.59-1.71)	0.59(0.30-1.14)
30-49 years	32(4.8)	12(1.8)	2.38(1.15-4.90)*	1.41(0.581-3.44)
I don't know	343(51.6)	54(8.1)	1	1

COR: Crude Odds Ratio; *AOR*: Adjusted Odds Ratio; * $P<0.05$; Bold values are statistically significant

Discussion

In women at the age of 15 and above, cervical cancer was the second most common cancer following breast cancer, constituting nearly one-fourth of all cancers in females [3]. This makes female university students are at risk of cervical cancer unless they are aware of the risk factors of cervical cancer and involved in its prevention methods. Thus, this study tried to fill gaps

in the information about female university student's knowledge and practice on cervical cancer prevention and its associated factors.

Studies indicated that a lack of source of information about cervical cancer and its prevention was associated with poor knowledge [19,32]. According to our study, nearly half (49.9%) of the participants had ever heard about cervical cancer. Similar studies conducted in less developed countries showed that the only limited proportion of female students had ever heard about cervical cancer [18,22,25,31,33]. In contrast to this study, finding from Turkey showed more than 75% of students had awareness about cervical cancer [34,35]. This discrepancy could be the sociodemographic characteristics of the study participants. Also, this study showed that the main source of information (35.7%) was teachers. This is similar to the finding from a study conducted among Hawasa university female students, which mentioned teachers as the main source of information [29]. The similarities could be both studies include respondents from medical and health students in which their teachers can inform them about the disease and its prevention.

Knowing the symptom might be important to initiate women to seek cervical cancer screening and treatment early. In our study, 32.8% reported that they knew at least one symptom of cervical cancer. A similar result was reported in other similar studies done in Ethiopia and Iran [22,25]. However, this result was lower than the study finding from Dessie, Ethiopia (46.3%), and Eastern Uganda (82.6%) [36,37].

Less than one-third (32.5%) of our respondents had ever heard about HPV, while 64.5% of them reported sexual intercourse as a means of acquiring HPV infection. A similar study result was found from Malaysia and Iran in which sexual intercourse was mentioned as a route of transmission of HPV among 63% and 60.3% of study participants respectively [24,25]. A study done in northern Ethiopia showed that 50.6% of study

participants had heard about HPV; however, all respondents were from the College of Medicine and Health Sciences [19]. Our finding was higher than Studies done in Turkey [38] and Nigeria [18] mentioning 16% and 24% had ever heard about HPV respectively. Also, other two studies done among students revealed that 37.5% and 51% of the participants were aware of whether HPV is a sexually transmitted infection, which was lower than the current result [34,39].

According to our findings, 43% of the respondents knew at least one risk factor of cervical cancer, and 18.2% of them mentioned HPV as a risk factor. This is in line with other similar studies conducted in Ethiopia [19]. But, 80.2% of students in Malaysia and 49.7% of Hawasa town of Ethiopia indicated HPV as a cause for cervical cancer [24,29]. This difference could be the former studies were conducted only among medical and health science students. Also, a study conducted among university students in Pakistan revealed that 55% of study participants reported that HPV causes cervical cancer [39]. The possible reason for the difference might be the Pakistani study included both sex, and both undergraduate and postgraduate students.

According to the current study, less than half (48.6%) of participants knew whether cervical cancer is curable. This finding is comparable with a study result found in northern Ethiopia, which revealed 53.9% reported that cervical cancer is curable if detected early [36]. In this study, 62.1% knew that cervical cancer is preventable. This is lower than the study finding from Nigeria in which 90.5% of health students knew that cervical cancer is preventable [40]. More than half (55.0%) of our respondents knew at least one prevention method. This finding was lower than the finding of a study done among medical and health science female students of Hawasa university of Ethiopia [29].

Of the total participants, 29.5% of participants had ever heard about cervical cancer screening. This is much lower than other studies conducted

on a similar topic [23,36,41]. The difference in sociodemographic and study setting of the current and the previous studies might be the possible reason for this discrepancy. In our study, 10.1% had ever screened for cervical cancer. This might be the age of the students included in this study was below the recommended age for cervical cancer screening [42]. But this finding was higher than the study report of another Ethiopian university [19] which revealed that only 3% of the study participants had ever screened.

In this study, 7.8% had ever been vaccinated for HPV. Similarly, different studies done among female university students revealed that a lower proportion had ever been vaccinated against HPV [19,34,38].This showed that less attention was given to vaccinating young women, while most adolescent girls are willing to be vaccinated against HPV [43].

In this study, overall 31.4% of study participants had good knowledge about cervical cancer and its prevention which was low. This finding was comparable with the study finding from northern Ethiopia [22]. But, the current finding was higher than the study finding from Kenya, which showed only 19.3% had good knowledge of cervical cancer [44]. The discrepancy might be the former participants were selected from different universities and they were mainly from non-health science colleges. Surprisingly, our study finding was even lower than community-based studies conducted in Ethiopia and Uganda [32,36,37]. These showed that being a higher institution student cannot ensure better knowledge of cervical cancer and its prevention. Also, the current study was found that overall only 13.5% of participants had good cervical cancer prevention practices. Other similar studies indicated a cervical cancer prevention practice among female university students was low [19,31,34].

Our study revealed that students who were studying in medical and Health Science colleges were 34.91 times more likely to have good knowledge than non-health students. This result was in line with the study finding from Hawasa University in Ethiopia and Turkish university students [24,35]. The reason might be health science students (nurses and midwives) can get more information about the disease from their study participants and teachers than non-health science students. Also study conducted in India indicated that students from biology-major had more knowledge about cervical cancer [20]. In addition, respondents who have ever screened about cervical cancer were 3.49 times more likely to have good knowledge than their counterparts. This is obvious that previous cervical cancer screening experience could increase respondents' awareness about cervical cancer and its prevention.

Our finding showed that those students who knew how HPV infection is acquired were 3.68 times more likely to have good practice than those who didn't know. Those students who knew the risk factors of HPV infection could be easily protected from infection through good practices such as condom use or avoiding sexual intercourse before marriage.

In this study, those participants who mentioned the frequency of cervical cancer screening is every 5 years were 4.3 times more likely to have good practice than those who say 'I don't know' and those who said 'every year' were 2.63 times more likely to have good practice towards cervical cancer prevention than those who said 'I don't know. In this study, 9.5% of respondents reported less than 15 years as the appropriate age to be screened for cervical cancer. Students who perceived the appropriate age of cervical cancer screening is >15 years were 93% less likely to have good practice than those who said 'I don't know'.

Age categories and frequency for cervical cancer screening were stated in national and international guidelines. World health organization (WHO) recommended that screening programs should prioritize 30–49 years old women. Women Less than 30 years of age should not undergo

screening except for known HIV-infected women or residing in areas where the prevalence of HIV is high. The screening interval or frequency should not be less than 5 years [42]. Also, the federal ministry of health (FMOH) of Ethiopia recommends screening every five years following normal results irrespective of HIV status. Screening should be repeated in one year following abnormal screening results and/or treatment. Return to screening every five years, if follow-up cervical cancer screening is normal [45].

Conclusion

Most study participants had poor knowledge and practice towards cervical cancer prevention. Colleges, previous cervical cancer screening experience were found to be associated with student's knowledge. Knowing how HPV infection is acquired and knowing the age and frequency of cervical cancer screening were found predictors of overall cervical cancer prevention practice. The result obtained in this study indicates how useful it will be to establish health education programs to increase student's knowledge about cervical cancer prevention. Also, prevention programs such as cervical cancer screening services should be easily accessible to university students.

Assertions

Abbreviations and Acronyms

AOR	Adjusted Odd Ratio
CI	Confidence interval
FMOH	Federal Minstry of Health
HPV	Human Papiloma Virus
MTU	MizanTepi University
OR	Odds Ratio
STI	Sexually Transmitted Diseases
SPSS	Statistical Package for Social Sciences

Ethical Concern

The Helsinki Declaration was considered in the study. Before data collection, permission was obtained from Mizan-Tepi University. Informed oral consent was obtained from each respondent after providing sufficient information about the purpose of the study. Respondent's right to withdraw from the study was assured. Confidentiality of the respondents was kept by avoiding writing their name and identification number on the questionnaires.

Consent for Publication - Not applicable

Availability of Data and Materials

The datasets underlying the study are available from the corresponding author up on request.

Competing Interests

We confirm that there are no competing interests on this research work.

Author's Contributions

Daniel Shiferaw conceived the idea, involved in methodology, analysis, write up and manuscript preparation.

Abiy Tadesse involved in methodology, analysis, write up and manuscript preparation.

All authors read and approved the manuscript .

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