

## ORIGINAL RESEARCH OPEN ACCESS

# Cervical Cancer Screening Practice and Associated Factors Among School Teachers in Bahir Dar City, North West Ethiopia: A Cross-Sectional Study

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## ABSTRACT

**Background and Aims:** Despite its prioritization by the World Health Organization, improving access to cervical cancer screening remains a challenge in Ethiopia. Educated individuals, particularly teachers, are viewed as key influencers in promoting healthy lifestyles among youth and can significantly contribute to cervical cancer prevention. However, there is a notable gap in research regarding cervical cancer screening practices among female educators in the studied region. This study aimed to assess the cervical cancer screening practices and associated factors among female school teachers in Bahir Dar, Ethiopia, 2024.

**Methods:** A school-based cross-sectional study was conducted from May 27 to June 28, 2024, involving 561 female school teachers in Bahir Dar City, using a stratified multistage sampling method. Data were gathered through a pretested structured questionnaire, entered in Epi-data version-4.6, and analyzed with SPSS version-23. Bi-variable and multivariable binary logistic regression analyses were performed, considering variables with  $p$  values  $< 0.05$  as statistically significant. Multicollinearity was assessed, and the Hosmer–Lemeshow test evaluated the model's fit.

**Results:** The proportion of female school teachers practicing cervical cancer screening was 14.6% (95% CI: 11.57%–17.66%). Significant factors associated with screening included having more than one lifetime sexual partner (AOR = 2.96, 95% CI: 1.48–4.92), a history of gynecological examinations (AOR = 2.59, 95% CI: 1.28–5.23), a fair understanding of cervical cancer (AOR = 2.16, 95% CI: 1.12–4.17), a positive attitude toward screening (AOR = 3.23, 95% CI: 1.65–6.33), and a high perceived susceptibility to cervical cancer (AOR = 2.57, 95% CI: 1.34–4.93).

**Conclusions:** Cervical cancer screening rates among female school teachers in Bahir Dar City fall short of the HSTP-II target. Independent predictors of screening include having multiple sexual partners, a history of gynecological exams, knowledge of cervical cancer, attitudes toward screening, and perceived susceptibility. To improve these rates, initiatives should focus on raising awareness and fostering positive attitudes among teachers about cervical cancer and health-seeking behavior.

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## 1 | Introduction

Cervical cancer is a major global health issue, ranking as the fourth most common cancer among women. In 2020, there were 604,000 new cases and 342,000 deaths due to this disease. Approximately 70% of cases are linked to persistent high-risk HPV infections, especially types 16 and 18 [1, 2]. Risk factors include early sexual activity, multiple partners, and compromised immunity. However, cervical cancer is preventable through HPV vaccination, lifestyle changes, early detection via screening, and timely treatment. These strategies can significantly reduce both the incidence and mortality associated with cervical cancer [2, 3].

Cervical cancer screening aims to identify the disease in asymptomatic individuals at an early stage. This process includes follow-up screenings for those who test positive, treatment for confirmed cases, and regular testing for eligible populations [3, 4]. Three primary screening methods are currently utilized: molecular screening, cytology-based screening, and visual inspection screening. Each method has its own advantages and limitations, making it crucial to choose the appropriate approach based on available resources and population needs [5].

The World Health Organization (WHO) recommends cervical cancer screening for women aged 30–49 in the general population and for HIV-positive women aged 25–49, with testing intervals of 5 and 3 years, respectively. The 2020 guidelines from the American Cancer Society (ACS) suggest that individuals with a cervix begin screening at age 25, with primary HPV testing every 5 years until age 65 [5, 6]. In 2020, WHO launched a global strategy to eliminate cervical cancer, aiming to screen 70% of eligible women twice by 2030 [7]. In Ethiopia, visual inspection with acetic acid has been available since 2009, with plans to increase screening rates from 5% to 40% among women aged 30–49 by 2025 through comprehensive collaboration [8, 9].

Expanding cervical cancer screening in low- and middle-income countries (LMICs) offers substantial health and economic benefits. Population-based programs every 3–4 years have cut cervical cancer incidence and mortality by up to 80% in developed nations. Increasing screening in LMICs could prevent an estimated 1.9 million cases and 1.3 million deaths over 10 years, making it a worthwhile investment [10–12]. Schools provide an effective platform for health education, with teachers playing a crucial role in promoting health awareness. Their influence extends beyond the classroom, impacting students and their families. Through effective communication and motivation, teachers can help foster healthy behaviors and contribute to cervical cancer prevention initiatives [13].

Cervical cancer significantly affects women's physical, emotional, and social well-being, causing pain, discomfort, and complications. It can negatively impact mental health, disrupt personal relationships, and strain support systems. This disease disproportionately affects women in resource-limited settings, highlighting the urgent need for improved preventive measures, including increased screening efforts [14–16].

Despite some progress, cervical cancer screening globally faces significant challenges, particularly in LMICs. While high-income nations have seen reductions in cervical cancer incidence due to effective screening programs, access remains inequitable in LMICs. A 2020 survey revealed that only 44% of women in low-income countries were screened, compared to over 60% in high-income nations [10, 17, 18]. In Sub-Saharan Africa, screening rates are alarmingly low, with only 12.87% participating. Notably, Southern countries have just 7.65% screening, while Eastern countries show 14.13%. In Ethiopia, despite free services and campaigns, only 13.46% of eligible women were screened in 2020. This is concerning given Ethiopia's high disease burden of 7445 cases and 5338 deaths annually, coupled with limited healthcare infrastructure for advanced cancer treatment [8, 9, 19–21].

Numerous studies have highlighted awareness gaps as significant barriers to cervical cancer screening. Educational public health initiatives are crucial for addressing these issues, and schools are ideal venues for such programs [22–28]. However, most research has focused on general populations and healthcare providers, leaving a critical gap in understanding screening practices among female school teachers. Educated individuals, particularly teachers, are viewed as key influencers in promoting healthy lifestyles among youth and can significantly contribute to cervical cancer prevention. Currently, there is limited evidence regarding the cervical cancer screening practices of these teachers. Previous studies have explored knowledge and prevention practices but have not specifically examined screening behaviors or the attitudes influencing them [19, 29–34]. This study aims to fill this gap by assessing cervical cancer screening practices and associated factors among female school teachers in Bahir Dar City, Northwest Ethiopia, in 2024. This research involved a comprehensive literature review focusing on two main themes: the extent of cervical cancer screening practices and the factors associated with them. Following this review, a conceptual framework was developed, with potential predictors categorized under four key themes: socio-demographic factors, knowledge, perceptions and attitudes, and sexual and reproductive health factors.

## 2 | Methodology

### 2.1 | Study Design and Setting

A school-based cross-sectional study was conducted in Bahir Dar City from May 27 to June 28, 2024. Located 565 km northwest of Addis Ababa, Bahir Dar is the capital of the Amhara Region, with a population exceeding 221,991. The city has 90 primary and 20 secondary schools, with 46 primary and 10 secondary being private, while 44 primary and 10 secondary are governmental. Of the 3035 teachers in both sectors, 1400 are female, making up 46% of the teaching workforce, with 1116 in primary schools and 284 in secondary schools [35, 36].

### 2.2 | Population

All female school teachers in Bahir Dar city, Amhara region, were the source populations. While the study populations were

all female school teachers in the randomly selected schools of Bahir Dar city.

### 2.2.1 | Eligibility Criteria

All female school teachers aged between 30 and 49 were included in the study.

### 2.3 | Sample Size

The maximum sample size for this study was determined using Epi Info software version 7.2.6.0, applying a double population proportion formula. The calculations were based on taking age as a factor: the outcome percentage in the unexposed group (16.7%) from a study conducted in Tigray [37], an odds ratio (OR) of 2.15, a study power of 80%, a 95% confidence interval (CI), a 10% nonresponse rate, and a design effect of 1.5. Considering these factors, the final sample size was 561. However, the sample size was also calculated using a single population proportion formula, but this resulted in a smaller value (395) compared to the calculation using Epi Info. Hence, the final sample size was 561, calculated using Epi Info.

### 2.4 | Sampling Procedure

A stratified multistage sampling approach was used to select participants for the study. First, a complete list of all schools in the city was obtained from the Bahir Dar City Administration Education Office. The schools were then stratified into primary and secondary levels. From these categories, 30 schools were proportionally allocated and randomly selected. The sample size was distributed accordingly among the strata. A sampling frame of female teachers from the selected schools was created, and a simple random sampling method was employed to recruit participants. If a chosen teacher was ineligible, another eligible teacher from the same school was selected as a replacement.

### 2.5 | Variable

The outcome variable was “Cervical cancer screening practice,” which was measured as a dichotomous variable. The independent variables included socio-demographic factors, sexual and reproductive health variables, as well as knowledge, attitudes, and perceptions.

### 2.6 | Data Collection Tools and Procedures

Data was collected from study participants in selected schools using a self-administered structured questionnaire. This questionnaire was developed after an extensive review of relevant literature and tailored to align with the study’s objectives [34, 38, 39]. Both face validity and content validity were assessed. Public health experts, particularly those with expertise

in sexual and reproductive health, were involved in reviewing and confirming the validity of the tool.

The questionnaire consisted of six sections: socio-demographic characteristics, sexual and reproductive factors, knowledge assessment, attitude assessment, perception assessment, and screening practice assessment, totaling 58 items. Initially prepared in English, the questionnaire was translated into Amharic and then back-translated to ensure consistency. Five newly graduated female BSc nurses were assigned to distribute and collect the questionnaires while the primary investigator supervised the process. To enhance the response rate, three visits were conducted. A fourth visit was made if necessary, and questionnaires were distributed during recess to allow teachers to fill them out at their convenience, either at school or at home. Participants absent during these visits were recorded as nonrespondents.

To ensure data quality, facilitators received a 1-day orientation from the primary investigator on study objectives, eligibility criteria, confidentiality, and participant rights. A pretest was conducted with 28 participants (5%) to evaluate the clarity and completeness of the questionnaire. No Corrections were needed to the tool thus proceeded to the actual data collection process. The primary investigator closely supervised the data collection process through both onsite and remote monitoring, providing support as required. Each questionnaire was assigned a unique code, and collected data was reviewed for completeness, with corrective actions taken as necessary.

### 2.7 | Measurement

#### 2.7.1 | Cervical Cancer Screening Practice

Female school teachers who reported having been screened for cervical cancer within the past 5 years were classified as practicing screening. Those who had not been screened in that timeframe were categorized as not practicing [9].

#### 2.7.2 | Knowledge About Cervical Cancer

Knowledge was evaluated using 16 structured questions, where correct answers were scored as 1 and incorrect answers as 0, resulting in a maximum score of 16 and a minimum of 0.

- *Good Knowledge:* Teachers scoring above 12 (75%) were considered to have good knowledge.
- *Fair Knowledge:* Teachers scoring between 8 (50%) and 12 (75%) were classified as having fair knowledge.
- *Poor Knowledge:* Teachers scoring below 8 (50%) were deemed to have poor knowledge [40].

#### 2.7.3 | Attitude Toward Screening

This refers to beliefs and behaviors related to cancer screening, assessed through 9 Likert scale questions (1 = *strongly disagree* to 5 = *strongly agree*), yielding a highest score of 45 and a lowest of 9.

- *Favorable Attitude*: Teachers scoring 25 or above were said to have a positive attitude toward cervical cancer screening.
- *Unfavorable Attitude*: Teachers scoring below 25 were categorized as having a negative attitude [39].

#### 2.7.4 | Perceived Susceptibility to Cervical Cancer

This measures an individual's belief regarding their personal risk of developing cervical cancer, assessed with 7 Likert scale questions, giving a maximum score of 35 and a minimum of 7.

- *High Perceived Susceptibility*: Teachers scoring 20 or above were considered to have high perceived susceptibility.
- *Low Perceived Susceptibility*: Teachers scoring below 20 were deemed to have low perceived susceptibility [11].

#### 2.7.5 | Perceived Barriers to Cervical Cancer Screening

Beliefs about tangible and psychological constraints to screening were evaluated using 9 Likert scale questions, resulting in a maximum score of 45 and a minimum of 9.

- *High Perceived Barrier*: Teachers scoring 25 or above were classified as having high perceived barriers to screening.
- *Low Perceived Barrier*: Teachers scoring below 25 were categorized as having low perceived barriers [11].

### 2.8 | Data Processing and Analysis

Data was coded, cleaned, and entered into Epi Data software version 4.6, then exported to SPSS version 23 for further analysis. Descriptive statistics for various variables were presented using frequency tables and bar charts. Binary logistic regression was employed, starting with bivariate analysis to assess the association of each independent variable with the outcome variable, generating crude ORs with 95% CIs for each variable. Independent variables with a *p* value less than 0.20 were included in multivariable logistic regression models to evaluate their effects on the outcome variable. A *p* value of less than 0.05 was considered statistically significant, and adjusted ORs with a 95% CI were calculated to assess the strength and direction of associations. The multicollinearity among the predictors was assessed using the variance inflation factor, with results ranging from 1.06 to 2.8. This clearly indicates a very low correlation between the predictors.

Overall, the model accurately predicted 87.1% of the outcomes. The Hosmer–Lemeshow test yielded a significance level of 0.366, while the omnibus test of model coefficients showed significance at 0.00, indicating a good model fit.

### 2.9 | Ethical Approval and Consent to Participate

Ethical approval to initiate this research was granted by the Institutional Research Review Board at the Bahir Dar

University, College of Medicine and Health Sciences, School of Public Health (protocol number 972/2024). Subsequently, an official request for support was sent to the city educational bureau. A letter of cooperation for the 32 school administrations was secured from the bureau administrator, and permission was obtained from each school administration. All study participants were informed about the study's purpose, their right to decline participation, and assured of confidentiality. Both verbal and written consent were obtained before data collection. To protect confidentiality, personal identifiers were not used, and participant data was secured with encryption and passwords, accessible only to the principal investigator.

## 3 | Results

### 3.1 | Socio-Demographic Characteristics of Women and Their Husbands

A total of 520 female school teachers from primary and secondary schools in Bahir Dar city participated in the study, resulting in a response rate of 92.7%. The median age of the participants was 42 years ( $\pm 4$  years), and their median monthly income was 7855 ETB ( $\pm 1915$  ETB). Among the participants, 274 (52.7%) held a Bachelor's degree, and a majority (89.8%) were married (Table 1).

### 3.2 | Reproductive Characteristics of Female School Teachers

Of the female school teachers surveyed, 423 (81.3%) were multiparous. A total of 451 (86.7%) reported a history of modern contraceptive use, with 375 (72.1%) utilizing injectables. Additionally, 452 (86.9%) indicated that they had only one sexual partner in their lifetime (Table 2).

### 3.3 | Knowledge Toward Cervical Cancer and Screening

According to an assessment of 16 knowledge questions on cervical cancer, 61.3% of female school teachers demonstrated poor knowledge, while 31.5% had fair knowledge and 7.1% exhibited good knowledge. Approximately 291 (56.0%) recognized foul-smelling vaginal discharge as a symptom of cervical cancer, and 433 (83.3%) understood that screening is a preventive measure. However, 423 (81.3%) did not identify HPV infection as a risk factor for cervical cancer, and 342 (65.8%) were unaware of the recommended frequency and target population for cervical screening. The respondents identified various sources of information about cervical cancer, with 311 (59.8%) citing health professionals as their primary source. Additionally, 147 (28.3%) reported gaining information from TV and radio, while 63 (12.1%) mentioned family and friends. Printed materials were noted by 31 (6.0%), and 19 (3.7%) referred to the internet and social media as sources of information (Table 3).

**TABLE 1** | Socio-demographic characteristics of female school teachers in Bahir Dar city, Amhara Region, Ethiopia, 2024 ( $n = 520$ ).

Variable	Category	Frequency (N)	Percentage (%)
Age	≤ 39	129	24.8
	40–44	197	37.9
	45–49	194	37.3
Religion	Orthodox	487	93.7
	Protestant	19	3.7
	Other Christians <sup>a</sup>	10	1.9
	Muslims	4	.8
Educational status	Diploma	211	40.6
	Degree	274	52.7
	MSc Degree	35	6.7
Marital status	Married	467	89.8
	Single <sup>b</sup>	53	10.2
School type	Primary	399	76.7
	Secondary	121	23.3
Average monthly income in Ethiopian birr <sup>c</sup>	< 9000	473	91.0
	≥ 9000	47	9.0
Exposure to mass media	Yes	485	93.3
	No	35	6.7

<sup>a</sup>Catholic & 7th Adventist.<sup>b</sup>Never married/divorced/widowed.<sup>c</sup>During the data collection period, the exchange rate was 1 USD = 57.739 Ethiopian Birr.**TABLE 2** | Reproductive characteristics of female school teachers in Bahir Dar city, Amhara Region, Ethiopia, 2024 ( $n = 520$ ).

Variable	Category	Frequency (N)	Percentage (%)
Parity	1	57	11.0
	2–4	423	81.3
	≥ 5	40	7.7
History of modern contraceptive use (lifetime)	Yes	451	86.7
	No	69	13.3
Type of modern contraceptive used <sup>a</sup>	Depo–Provera	375	72.1
	Implant	153	29.4
	OCP	100	19.2
	IUCD	24	4.6
	Tubal Ligation	1	0.2
Lifetime number of sexual partners	Single	452	86.9
	Multiple	68	13.1
History of STI	Yes	70	13.5
	No	450	86.5
History of gynecological examination	Yes	353	67.9
	No	167	32.1
Family history of cervical cancer	Yes	12	2.3
	No	508	97.7

<sup>a</sup>Multiple responses indicate OCP-oral contraceptive pills and IUCD-intrauterine contraceptive devices.

**TABLE 3** | Knowledge of female school teachers toward cervical cancer and screening, in Bahir Dar city, Amhara Region, Ethiopia, 2024 (*n* = 520).

Knowledge toward cervical cancer and screening		Frequency	(%)
Having multiple sexual partners is a risk factor for cervical cancer	Yes	313	60.2
	No	207	39.8
Being infected with HPV is a risk factor for cervical cancer	Yes	97	18.7
	No	423	81.3
Early initiation of sexual intercourse is a risk factor for cervical cancer	Yes	144	27.7
	No	376	72.3
Long-term oral contraception is a risk factor for cervical cancer	Yes	74	14.2
	No	446	85.8
Cigarette smoking increases the risk of cervical cancer	Yes	231	44.4
	No	289	55.6
Abnormal vaginal bleeding is one of symptom of cervical cancer	Yes	291	56.0
	No	229	44.0
Painful coitus is one of the symptoms of cervical cancer	Yes	122	23.5
	No	398	76.5
Foul smelling vaginal discharges is one of the symptoms of cervical cancer	Yes	379	72.9
	No	141	27.1
Unexplained weight loss is one of the symptoms of cervical cancer	Yes	161	31.0
	No	359	69.0
Vaccination against HPV is one of the prevention methods of cervical cancer	Yes	174	33.5
	No	346	66.5
Persistent condom use is one of the prevention methods of cervical cancer	Yes	127	24.4
	No	393	75.6
Avoiding multiple sexual partners is one of the prevention methods of cervical cancer	Yes	311	59.8
	No	209	40.2
Screening is one of the prevention methods of cervical cancer	Yes	433	83.3
	No	87	16.7
Know how frequent cervical screening should be done	Yes	178	34.2
	No	342	65.8
Know cervical cancer screening is being provided free of charge in public health facilities	Yes	252	48.5
	No	268	51.5
Know who are recommended candidates to be screened for cervical cancer	Yes	300	57.7
	No	220	42.3
Overall knowledge of cervical cancer and screening	Poor	319	61.3
	Fair	164	31.5
	Good	37	7.1

### 3.4 | Attitude Toward Cervical Cancer and Screening

Two hundred ninety-six (56.9%) of female school teachers exhibited a favorable attitude (95% CI: 52.65%–61.19%). However, 136 (26.2%) strongly disagreed with the necessity of screening in the absence of signs or symptoms. Additionally, only 63 (12.1%) expressed willingness to undergo screening in the near future, and just 51 (9.8%) planned to be screened within the next 5 years (Table 4).

### 3.5 | Perceived Susceptibility Toward Cervical Cancer and Screening

Only 201 (38.7%) of female school teachers reported a high perceived susceptibility to cervical cancer (95% CI: 34.45%–42.85%). In contrast, 109 (21.0%) believed that God would protect them from the disease, while 167 (32.1%) felt that their precautions would sufficiently safeguard them. Additionally, 68 (13.1%) strongly agreed that the absence of signs or symptoms meant they were free from cervical cancer (Table 5).

**TABLE 4** | Attitude of female school teachers toward cervical cancer and screening, in Bahir Dar City, Amhara Region, Ethiopia, 2024 (N = 520).

Statement about cervical cancer screening	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Screening can decrease risk of cervical cancer	77 (4.8%)	129 (24.8%)	140 (26.9%)	98 (18.8%)	76 (14.6%)
Screening can help to diagnose cervical cancer early	21 (4.0%)	31 (6.0%)	109 (21.0%)	239 (46.0%)	120 (23.1%)
Screening can decrease the chance of dying from cervical cancer	100 (19.2%)	121 (23.3%)	136 (26.2%)	85 (16.3%)	78 (15.0%)
Screening is necessary even in the absence of sign or symptoms	136 (26.2%)	132 (25.4%)	74 (14.2%)	83 (16.0%)	95 (18.3%)
Screening can empower women to take control of their own health	24 (4.6%)	26 (5.0%)	159 (30.6%)	143 (27.5%)	168 (32.3%)
Regular screening causes no harm to the woman	39 (7.5%)	74 (14.2%)	250 (48.1%)	89 (17.1%)	68 (13.1%)
Willing to undergo cervical cancer screening in the future	115 (22.1%)	137 (26.3%)	139 (26.7%)	66 (12.7%)	63 (12.1%)
Plan to be screened within the next 5 years	86 (16.5%)	162 (31.2%)	179 (34.4%)	42 (8.1%)	51 (9.8%)
Recommend cervical cancer screening to friends or family members	13 (2.5%)	22 (4.2%)	119 (22.9%)	206 (39.6%)	160 (30.8%)
Overall attitude toward cervical cancer screening			Unfavorable	Frequency	Percentage (%)
			Favorable	224	43.1
				296	56.9

### 3.6 | Perceived Barriers Toward Cervical Cancer and Screening

Regarding perceived barriers to cervical cancer screening, 306 (58.8%) of the teachers indicated low perceived barriers (95% CI: 54.60%–63.09%). Specifically, 278 (53.5%) agreed that health facilities were physically accessible for screening, and 161 (31.0%) considered the service affordable. However, 167 (32.1%) felt it was shameful and embarrassing to undergo screening, and 218 (41.9%) preferred female healthcare providers to conduct cervical cancer screenings rather than male providers (Table 6).

### 3.7 | Cervical Cancer Screening Practice of School Teachers

A total of 93 female school teachers reported ever being screened for cervical cancer, with only 76 (14.6%) having been screened within the last 5 years (indicating practice) (95% CI: 11.57%–17.66%). Among those who had ever been screened, 52 (56%) received counseling from health professionals, 17 (18%) initiated screening on their own, 12 (13%) sought screening due to feeling unwell, 10 (11%) were encouraged by friends or family, and 2 (2%) cited other reasons. The most commonly mentioned reason for not getting screened was feeling healthy, while the least cited reason was fear of pain associated with the procedure.

### 3.8 | Factors Associated With Cervical Cancer Screening Practice

After assessing the assumptions for binary logistic regression, including multicollinearity, outliers, and observed versus expected values in the cross-tabulations of each independent variable, bivariate logistic regression analysis was conducted to identify variables associated with cervical cancer screening practice. Out of 16 independent variables, 10 were found to have a significant association with screening practice, including age, educational status, marital status, history of contraceptive use, history of gynecologic examinations, lifetime number of sexual partners, knowledge about cervical cancer, perceived susceptibility to cervical cancer, attitude toward screening, and perceived barriers, all with a *p* value of less than 0.20. These variables were subsequently included in the multivariable analysis to determine statistical significance. In the multivariable logistic regression, five variables showed a significant association with cervical cancer screening practice, all with a *p* value of less than 0.05. The Hosmer–Lemeshow test yielded a significance level of 0.366, while the omnibus test of model coefficients showed significance at 0.00, indicating a good model fit.

Female school teachers with a history of multiple sexual partners had 2.96 times higher odds of engaging in cervical screening practice compared to those without such a history (95% CI: 1.48–5.92). Similarly, those who had undergone gynecological examinations had 2.59 times higher odds of being screened compared to their counterparts (95% CI: 1.28–5.23).

**TABLE 5** | Perceived susceptibility of female school teachers toward cervical cancer and screening, in Bahir Dar City, Amhara Region, Ethiopia, 2024 (N = 520).

<b>Statement about perceived susceptibility to cervical cancer</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly agree</b>
My genetic predisposition will not expose me to cervical cancer	131 (25.2%)	126 (24.2%)	229 (44.0%)	19 (3.7%)	15 (2.9%)
With my current age it is unlikely to develop cervical cancer	67 (12.9%)	82 (15.8%)	273 (52.5%)	62 (11.9%)	36 (6.9%)
If I don't have any sign and symptoms means I am free of cervical cancer	114 (21.9%)	172 (33.1%)	105 (20.2%)	61 (11.7%)	68 (13.1%)
God's protection is enough for me to avoid cervical cancer	100 (19.2%)	139 (26.7%)	101 (19.4%)	109 (21.0%)	71 (13.7%)
preventive actions I am currently taking will definitely protect me from cervical cancer	28 (5.4%)	44 (8.5%)	163 (31.3%)	167 (32.1%)	118 (22.7%)
I consider myself to be at a lower risk of cervical cancer	93 (17.9%)	174 (33.5%)	176 (33.8%)	46 (8.8%)	31 (6.0%)
I do not worry about the possibility of developing cervical cancer	204 (39.2%)	149 (28.7%)	103 (19.8%)	34 (6.5%)	30 (5.8%)
Overall perceived susceptibility to cervical cancer				Frequency	Percentage (%)
Low				319	61.3
High				201	38.7

**TABLE 6** | Perceived barriers of female school teachers toward cervical cancer and screening, in Bahir Dar City, Amhara Region, Ethiopia, 2024 (N = 520).

<b>Statements about perceived barriers to cervical cancer screening</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly agree</b>
Cervical cancer is not curable whether screened or not	101 (19.4%)	143 (27.5%)	204 (39.2%)	64 (12.3%)	8 (1.5%)
it is shameful and embarrassing to undergo cervical cancer screening and show your private part	69 (13.3%)	48 (9.2%)	144 (27.7%)	167 (32.1%)	92 (17.7%)
I assume The procedure for cervical cancer screening is painful	128 (24.6%)	123 (23.7%)	230 (44.2%)	31 (6.0%)	8 (1.5%)
Most people including myself don't know where to get the screening service	230 (44.2%)	157 (30.2%)	93 (17.9%)	22 (4.2%)	18 (3.5%)
Cervical cancer screening takes too much time	126 (24.2%)	147 (28.3%)	231 (44.4%)	12 (2.3%)	4 (0.8%)
It costs too much to be screened for Cervical cancer	110 (21.2%)	161 (31.0%)	230 (44.2%)	13 (2.5%)	6 (1.2%)
health facilities are not close enough to home to go for screening	278 (53.5%)	159 (30.6%)	66 (12.7%)	11 (2.1%)	6 (1.2%)
I prefer female health care providers to	27 (5.2%)	24 (4.6%)	114 (21.9%)	218 (41.9%)	137 (26.3%)
I probably would be stigmatized by my spouse if i test positive for cervical cancer	102 (19.6%)	81 (15.6%)	185 (35.6%)	109 (21.0%)	43 (8.3%)
Overall perceived barriers to cervical cancer screening				Frequency	Percentage (%)
High				214	41.2
Low				306	58.8



Teachers with a fair level of knowledge about cervical cancer had 2.16 times higher odds of screening compared to those with poor knowledge (95% CI: 1.12–4.17). Additionally, those with a favorable attitude toward cervical cancer screening were 3.23 times more likely to participate in screening than those with an unfavorable attitude (95% CI: 1.65–6.33). Finally, female school teachers with high perceived susceptibility to cervical cancer had 2.57 times higher odds of engaging in screening compared to those with low perceived susceptibility (95% CI: 1.34–4.93) (Table 7).

#### 4 | Discussion

The study found that only 76 (14.6%) [95% CI: 11.57%–17.66%] female school teachers reported having undergone cervical cancer screening within the past 5 years. This result aligns with findings from studies conducted among high school female teachers in Hawassa [34] and primary school teachers in Iraq [41], where screening rates were 11.2% and 12.6%, respectively. However, it is slightly lower than rates reported among female

school teachers in Dar es Salaam, Tanzania [38], and Nigeria [13], where approximately 21% and 22.7% of teachers had been screened, respectively. The differences in screening rates may stem from variations in measurement methods; the studies in Tanzania and Nigeria assessed lifetime screening practices, potentially capturing more participants who had been screened at any point in their lives, whereas this study focused specifically on screenings conducted within the past 5 years. Furthermore, Nigerian female school teachers reported a much higher favorable attitude toward cervical cancer screening (91.6%), which likely contributed to their higher screening rates.

In contrast, this study indicated a slightly higher screening rate compared to cross-sectional studies among female school teachers in India [42] and Saudi Arabia [43], where only 8.3% and 5.7% had been screened, respectively. These differences may be attributed to smaller sample sizes in those studies (397 and 387 participants, respectively), with a significant proportion being Muslim. Notably, none of the Muslim school teachers in the Indian study had ever undergone screening, suggesting that cultural factors may create barriers to screening in Islamic communities, which is likely also true in Saudi Arabia. Moreover, approximately 83% of female

**TABLE 7** | Bivariable and multivariable analysis of factors associated with cervical cancer screening practice among female school teachers in Bahir Dar city, Amhara Region, Ethiopia, 2024 ( $n = 520$ ).

Variables	Category	Screening practice		Crude OR (95% CI)	AOR (95% CI)
		Yes	No		
Age group	45–49	32	162	1.76 (0.89–3.51)	1.83 (0.84–3.97)
	40–44	31	166	1.67 (0.84–3.32)	1.47 (0.67–3.23)
	≤ 39	13	116	1	1
Educational status	MSc	7	28	2.04 (0.81–5.21)	1.72 (0.58–5.11)
	Degree	46	228	1.65 (0.97–2.82)	1.58 (0.86–2.93)
	Diploma	23	188	1	1
Marital status	Married	72	395	2.23 (0.78–6.38)	2.13 (0.66–6.88)
	Single <sup>#</sup>	4	49	1	1
Ever used modern Contraceptive	Yes	70	381	1.93 (0.80–4.63)	1.41 (0.52–3.84)
	No	6	63	1	1
Number of sexual partners (ever)	Multiple	25	43	4.57 (2.58–8.11)	2.96 (1.48–5.92)*
	One	51	401	1	1
Gynecological examination	Yes	64	289	2.86 (1.50–5.46)	2.59 (1.28–5.23)*
	No	12	155	1	1
Knowledge about cervical cancer	Good	10	27	4.55 (1.97–10.51)	1.84 (0.68–5.00)
	Fair	42	122	4.23 (2.46–7.29)	2.16 (1.12–4.17)*
	Poor	24	295	1	1
Attitude toward screening	Favorable	62	234	3.97 (2.16–7.31)	3.23 (1.65–6.33)*
	Unfavorable	14	210	1	1
Perceived barrier toward screening	Low	59	247	2.77 (1.56–4.90)	1.85 (0.97–3.52)
	High	17	197	1	1
Perceived susceptibility to cervical cancer	High	54	147	4.96 (2.91–8.46)	2.57 (1.34–4.93) <sup>a</sup>
	Low	22	297	1	1

<sup>a</sup> $p$  value less than 0.05.

<sup>b</sup>Never married/divorced/widowed.

school teachers in the Saudi study had never heard of cervical cancer, highlighting a significant awareness gap that likely contributed to the low screening rates.

This study identified multiple sexual partners as a predictor of cervical cancer screening practice. Female school teachers with more than one sexual partner were positively associated with screening compared to those with a single partner. This finding is supported by community-based cross-sectional studies among women aged 30–49 in Mekele [44], Debre Markos [45], and a study among female school teachers in DareSalaam, Tanzania [38]. It is possible that individuals with multiple sexual partners may visit gynecologists more frequently for routine check-ups, STI screenings, and contraception, during which they may be advised to undergo cervical cancer screening as well [46].

A history of gynecologic examinations was also found to be associated with cervical cancer screening practice. Female school teachers who had previously undergone gynecologic examinations were more likely to be screened than those without such a history. This finding is supported by research conducted in Jimma [11]. The rationale for this association may be that women who are accustomed to having their private areas examined by health professionals are less likely to feel embarrassed about undergoing cervical cancer screening [47].

Additionally, the study revealed that a fair level of knowledge about cervical cancer is significantly associated with higher screening rates. This is supported by cross-sectional studies in Shabadino District [46], Gondar [48], and East Gojjam [33]. Similar results have been observed in studies involving female teachers in India [42] and Malaysia [49]. Teachers with greater knowledge of the disease and its prevention are likely more aware of the benefits of screening and, therefore, more inclined to get screened to protect themselves.

Moreover, a positive attitude toward cervical cancer screening was strongly associated with higher screening practices. This finding is corroborated by an institutional-based cross-sectional study in Ambo town [50] and a community-based study among reproductive-age women in Durame town [24]. Additional support comes from a cross-sectional study among female teachers in India [42] and a case-control study among women aged 25–60 years in Laos [51].

Finally, teachers' perceptions of their potential susceptibility to cervical cancer emerged as a crucial factor in predicting screening practice. Female school teachers who perceived themselves to be at high risk for developing cervical cancer were more likely to undergo screening compared to those with low perceived susceptibility. This is supported by cross-sectional studies among women aged 30–49 in Jimma [11], Mekele [44], and Gondar [48]. It can be inferred that those who feel more susceptible to the disease may have greater motivation to seek screening as a protective measure.

## 5 | Conclusions and Recommendations

The prevalence of cervical cancer screening practice among female school teachers is alarmingly low compared to the

targets set by the Health Sector Transformation Plan II (HSTPII). Common reasons for not undergoing screening include a perception of being healthy. Independent predictors of cervical cancer screening practice identified in the study include having multiple sexual partners, a history of gynecologic examinations, knowledge about cervical cancer, attitudes toward screening, and perceived susceptibility to the disease. To address these issues, it is recommended that the Bahir Dar City Health Bureau and Education Bureau collaborate on initiatives to raise awareness among female school teachers about cervical cancer, alongside ongoing vaccination campaigns in schools. Healthcare providers should implement outreach programs aimed at educating female teachers about cervical cancer. Additionally, researchers are encouraged to conduct further studies using qualitative methods to gain a deeper understanding of variables such as knowledge and perceptions related to cervical cancer.

## 6 | Strengths and Limitations

This study encompassed female teachers from primary and secondary schools, both governmental and private, enhancing its representativeness. Data collection was conducted using a self-administered questionnaire, which helps reduce social desirability bias. Additionally, participants who had not been screened were advised to seek screening and informed that the service was available free of charge at public health facilities in the city following data collection. As this study relied on primary data, the possibility of misreporting regarding screening history cannot be discounted. Furthermore, due to a lack of sufficient literature, some comparisons were made with different populations, which may limit the validity of the findings.

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### Author Contributions

**Bezawit Getachew Nega:** conceptualization, investigation, writing—original draft, methodology, writing—review and editing, formal analysis, data curation, project administration. **Zemenu Shiferaw Yadita:** conceptualization, methodology, validation, writing—review and editing, software, project administration, supervision. **Agernesh Dereje Misker:** writing—review and editing, software, methodology. **Ammar Bishaw Ebrahim:** methodology, writing—review and editing, software. **Melash Belachew Asresie:** conceptualization, writing—review and editing, methodology, validation, software, project administration, supervision.

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### Consent

The authors have nothing to report.

## Conflicts of Interest

The authors declare no conflicts of interest.

## Data Availability Statement

All data supporting the findings are included in the manuscript. The data set for this article is openly available without restriction upon request from the corresponding author.

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