



Knowledge, Preventive Practice and Associated Factors About Cervical Cancer Among Female Nurses Working in West Amhara Referral Hospitals, Ethiopia

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Abstract: Introduction: Cervical cancer knowledge and preventive practices among female nurses have not been thoroughly assessed. Objective: This study aimed to assess knowledge, preventive practice, and associated factors of cervical cancer among female nurses working in West Amhara referral hospitals, Ethiopia. Methods: From March 1-31, 2021, an institution-based cross-sectional study was carried out. The data was collected using a pretested structured self-administered questionnaire on 412 female nurses working in West Amhara Referral Hospitals. The data were entered using Epi Info version 7.1 and then exported to SPSS version 23 for analysis. We ran descriptive and logistic regression analyses. Factors with a p-value < 0.05 were considered as predictors of the outcome. Results: Of 412 proposed female nurses, 392 of them participated which gives a response rate of 95.1%. Although 211 (53.8%) of respondents were knowledgeable about cervical cancer, only 83 (21.2%) of them have cervical cancer preventive practice. Having a family history of cervical cancer (AOR: 3.383, 95% CI: 1.144-10.003) and working in intensive care units (AOR: 0.308, 95% CI: 0.119-0.794) were significantly associated with knowledge of cervical cancer. Being diploma holders (AOR: 2.136, 95% CI: 1.132-4.030), ever being diagnosed with cervical cancer (AOR: 3.265, 95% CI: 1.290-8.266) and taking care of a patient with cervical cancer (AOR: 3.006, 95% CI: 1.639-5.514) were significantly associated with the preventive practice of cervical cancer. Conclusion: Although half of the female nurses were knowledgeable about cervical cancer, their preventative practices were very low. The government should organize periodic seminars and training to improve their knowledge and preventive skills on cervical cancer. Further study should be conducted at the community and national levels to target all females.

Keywords: Associated Factors, Cervical Cancer, Knowledge, Preventive Practice

1. Introduction

Cancer is a condition in which the body's cells grow out of control. Cervical cancer develops when cancer begins in the cervix, and it is the most easily preventable gynecologic cancer with regular screenings and follow-ups [1]. Cervical cancer (CC) is a sexually transmitted infection caused by high-risk Human Papillomavirus (HPV) types 16 and 18. These are the two high-risk HPV types that most commonly cause CC. Precursor lesions typically take 10–20 years to develop into invasive CC and most CC can be prevented by early detection and treatment of precancerous lesions. Cervical pre-cancer is defined by a change in the epithelial cells of the cervix's transformation zone; the cells start to develop abnormally. Some of the symptoms of CC include pelvic pain, painful coitus, foul-smelling vaginal discharge, blood-stained vaginal discharge, bleeding after sexual intercourse, and any bleeding after menopause [2].

HPV is not a sufficient cause of cervical cancer. Multiple sexual partners, early initiation of sexual activity, a history of Sexually Transmitted infection (STI), cigarette smoking, HIV infection, other kinds of immunosuppression, multiparity, and long-term oral contraceptive use are all necessary for progression from cervical HPV infection to cancer [3, 4]. Cervical cancer is one of the world's most serious threats to women's lives, ranking as the second most common female cancer in women aged 15 to 44 years. It is estimated that 528,000 new cases of CC were diagnosed with 266,000 women dying from the disease, nearly 90% of whom lived in low- and middle-income countries [5, 6].

Cervical cancer is the most frequent malignancy among women in Sub-Saharan Africa (SSA). The high burden of CC in SSA is due to a combination of factors including high prevalence of HPV infection, low awareness about CC, and poor screening practices [7]. In Ethiopia, cytology-based CC screening coverage is estimated to be very low, at 1.6 percent in urban areas and 0.4 percent in rural regions [8]. According to research from Ethiopia, there are 27.19 million women aged 15 and older who are at risk of having CC, and each year about 7,095 women are diagnosed with the disease with 4732 dying from it [9]. Of the top 10 cancers diagnosed at Black Lion Hospital, CC has been recognized as the major cause of morbidity and mortality among Ethiopian women from all cancers [10].

Primary prevention, which includes vaccination, and secondary prevention, which includes screening, are the two types of CC prevention [11]. Cervarix, a bivalent HPV-16/18 VLP vaccination, and Gardasil, a quadrivalent HPV-6/11/16/18 VLP vaccine, are the two types of HPV vaccines available. Although the age of sexual debut varies by country, the World Health Organization recommends vaccination for 9–13-year-old girls who have not yet become sexually active. Additionally, a pelvic examination is one of the preventive methods for cervical

cancer by detecting abnormal growth or tumor [12, 13]. The best-proven way to prevent CC is screening to find pre-cancers before they can turn into invasive cancer. The Papanicolaou (Pap) test is the most common method to do this. Because of its cost-effectiveness and ease of use, visual inspection with acetic acid (VIA) is the test of choice in low-income countries [14, 15]. All women between the ages of 30 and 49 should be checked for CC at least once, and every 5–10 years [16]. CC is treated with surgery, radiotherapy, and chemotherapy, which may be used in combination depending on the stage of the disease, the woman's overall health, and the availability of resources [17, 18].

Nurses are among the health professionals who can provide reliable information to patients and the general community on cervical cancer. They were expected to know more about cervical cancer than men or women in other professions. Nurses have an important role in the education of women about prevention measures because women feel female nurses more closely to ask something about the symptoms and screening of sex-related diseases. They can play a crucial role in developing awareness, confidence, and compliance for women, or they can have a significant influence on women's behavior, but they must be knowledgeable about CC and the need for early detection [19–21]. Because of their crucial roles, it is interesting and important to assess the nurses' knowledge and preventive practices about cervical cancer since this could indirectly influence their patients' understanding and prevention practice of cervical cancer.

Furthermore, few published studies have been conducted in Ethiopia [16] and no study was conducted in the West Amhara region on this issue. Since the issue is not well studied, the findings of this study will serve as baseline evidence for health administrators, nongovernmental organizations, and policymakers to design prevention and control strategies for cervical cancer. Therefore, this study aimed to assess knowledge, preventive practice, and associated factors about cervical cancer among female nurses working in West Amhara referral hospitals, Ethiopia.

2. Materials and Methods

2.1. Study Design, Period, Setting and Participants

An institution-based cross-sectional study was carried out from March 1–31, 2021 among female nurses working in West Amhara Referral hospitals, Ethiopia. West Amhara region has five zones namely East Gojam, West Gojam, Bahirdar administration, North Gondar, and South Gondar. In this region, there are three referral hospitals namely: Debre Markos Hospital, Felege Hiwot Hospital, and Gondar University Hospital. All referral hospitals were included in the study and are located about 300, 565, and 750 km away from Addis Ababa, the capital city of Ethiopia respectively. In those hospitals, there were a total of 838 nurse

professionals of which 412 were female nurses. Female nurses who are working in West Amhara Referral Hospitals during the study period were included.

2.2. Sampling Size Determination

The sample size for this study was determined using single population proportion formula with a 95% confidence interval, 5% marginal error, and a proportion of knowledge on CC as 60.8% [16]. By adding a 10% non-response rate, the final sample was 403. However, the total number of female nurses working in those referral Hospitals was 412, which is equivalent to the calculated sample size, so all of them were included in the study.

2.3. Data Collection Tools and Procedures

The tools were developed and partly adapted from previous literature and guidelines [16, 22, 23]. The questionnaires were prepared in the English language by language experts. Data were collected using pretested self-administer questionnaire. Respondents were asked 17 items that measure knowledge of CC and 7 items that measure preventive practices toward cervical cancer. The questionnaire contains socio-demographic characteristics, knowledge of cervical cancer such as transmission, cause, risk factors, symptoms, treatment options, and preventive measures and preventive practices towards cervical cancer such as HPV vaccination, pelvic examination, and either Pap smear or VIA test. Six data collectors and three supervisors who are professional nurses participated in the data collection process.

2.4. Operational Definitions

Knowledgeable: respondents who scored the mean and above the mean value were considered as knowledgeable whereas below the mean were considered as not knowledgeable [16].

Practiced: respondents who had undergone at least one of the preventive practices (HPV vaccination, pelvic examination, and Pap or VIA test) for cervical cancer prevention [16].

Ever been diagnosed with cervical cancer: respondents who have been diagnosed with cervical cancer in the past.

2.5. Data Quality Assurance and Control

A day of training was given for data collectors and supervisors on the objective of the study and on how to conduct the data collection. One week before the start of actual data collection, a pretest was conducted among 5% of the total sample size on female nurses who were working in Debarq District Hospital. Then, necessary corrections were done

accordingly. The completeness of the data was checked by data collectors during data collection, and daily supervision was done for data completeness by supervisors. The overall supervision was carried out by the principal investigator.

2.6. Data Analysis and Processing

After checking its completeness, the collected data were coded and entered into Epi Info version 7.1 and exported to SPSS version 23 for analysis. Descriptive statistics such as frequencies, proportions, and mean were calculated. Moreover, tables and graphs were used for data presentation. Hosmer-Lemeshow's goodness fit test using p-value and multi-collinearity, using variance inflation factor was checked and no multicollinearity was found. Bivariable analysis was used primarily to check which variables have an association with the dependent variables individually. Variables found to have an association with the dependent variables at P-value < 0.2 were entered into multivariable regression for controlling the possible effect of confounders. Finally, variables having a p-value < 0.05 were considered significant.

2.7. Ethical Clearance

Approval to conduct the study was received from school of nursing research review committee (S/N/2021/06/2013). A letter of approval was received from each healthcare facility before the start of the data collection. Each study participant gave their written consent after being informed of the study's goals and objectives. Confidentiality was guaranteed by using anonymous data collection tool.

3. Results

3.1. Socio-Demographic Characteristics

Out of 412 proposed female nurses, 392 participated in the study which gives a response rate of 95.1%. The age range of the respondents was from 20-56 years with a mean age of 29.7 (SD±6.4). The majority, (244; 62.2%) and (240; 61.2%), of the study participants were in the age groups of 20-29 years and married respectively. Three hundred (76.5%) respondents were degree and above holders. One hundred seventy-five (44.6%) of the respondents had 5-10 years of work experience. Two hundred forty-two (61.7%) were nulliparous and 33 (8.4%) were ever been diagnosed with cervical cancer. Thirty-two (8.2%) of the respondents had a history of cervical cancer in their families. One hundred sixteen (29.6%) were involved in the care of a patient with cervical cancer and 22 (5.6%) had got training about cervical cancer (Table 1).

Table 1. Socio-demographic characteristics of female nurses working in West Amhara referral hospitals, Ethiopia, 2021 (n=392).

Characteristics	Categories	Frequency	Percent
Age (in years)	20-29	244	62.2
	30-39	114	29.1
	40-49	22	5.6
	50+	12	3.1

Characteristics	Categories	Frequency	Percent
Marital status	Single	147	37.5
	Married	240	61.2
	Divorced	5	1.3
Educational status	Diploma	92	23.5
	Degree and above	300	76.5
	Medical ward	55	14
Unit of work	Surgical ward	87	22.2
	Gynaecology	31	7.9
	Paediatrics	77	19.6
	ICU	33	8.4
	OPD	109	27.8
Parity	0	242	61.7
	1-4	118	30.1
	5+	32	8.2
	<5	148	37.8
	5-10	175	44.6
Work experience (in years)	11-15	30	7.7
	16-20	19	4.8
	21+	20	5.1
	Yes	33	8.4
Have you ever been diagnosed with CC?	No	359	91.6
Do you have a family history of CC?	Yes	32	8.2
	No	360	91.8
Have you ever taken care of a patient with CC?	Yes	116	29.6
	No	276	70.4
Have you got training on CC?	Yes	22	5.6
	No	370	94.4

3.2. Knowledge of Female Nurses About Cervical Cancer

Regarding their source of information about cervical cancer, regular nursing courses were the most common 241 (61.5%) source followed by health professionals 190 (48.5%). Additionally, 25.5%, 17.3% and 11.2% of them used

radio/TV, magazines and friends as their source of information. The mean knowledge score was 6.6 with $SD \pm 1.8$. Of 392 participated female nurses, 211 or 53.8% (95%CI: 48.9%-58.5%) of them were knowledgeable about CC (Figure 1).

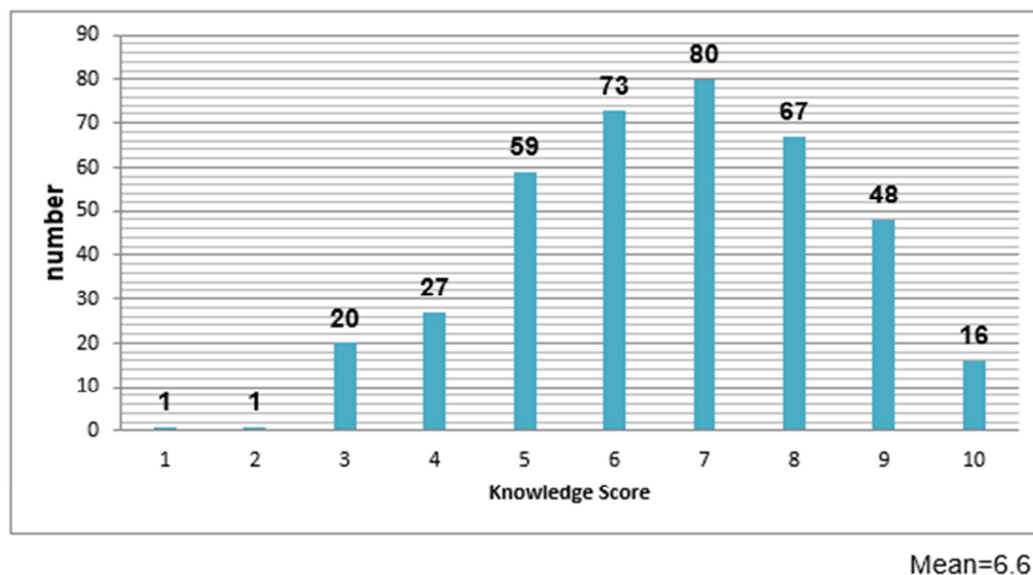


Figure 1. Knowledge score distribution of female nurses working in West Amhara referral hospitals, Ethiopia, 2021 (n=392).

3.3. Knowledge on the Cause, Transmission of HPV, and Risk Factors of Cervical Cancer

Two hundred sixty-nine (68.6%) respondents knew that the most common cause of cervical cancer is HPV. Sexual

intercourse and direct genital contact were correctly identified as modes of HPV transmission by 57.4% and 29.6% of respondents, respectively. Regarding risk factors, 354 (90.3%) respondents knew that cervical cancer has risk factors. Of those, the most frequently mentioned risk factors

were a history of HPV infection 248 (70%) (Table 2).

Table 2. Knowledge about the cause, transmission, and risk factors of cervical cancer among female nurses working in West Amhara referral hospitals, Ethiopia, 2021 (n=392).

Variables	Categories	Frequency	Percent
Cause	Smoking	64	16.3
	Oral contraceptive	39	9.9
	Human Papilloma Virus	269	68.6
	Early menarche	20	5.1
	Sexual intercourse	225	57.4
Transmission	Direct genital contact	116	29.6
	Kissing	7	1.8
	Drinking unsafe water	3	0.8
	I don't Know	126	32.1
Are there risk factors?	Yes	354	90.3
	No	18	4.6
	I don't Know	20	5.1
	Early-onset of sexual activity	156	44
	History of HPV infection	248	70
Risk factors (n=354)	Multiparity	103	29
	STI	171	48.3
	Prolong use of oral contraceptives	89	25.1
	Smoking	106	29.9
	Multiple sexual partners	182	51.4

3.4. Participants' Knowledge of Symptoms About Cervical Cancer

The most frequently mentioned symptoms were bleeding after intercourse 250 (63.8%) followed by pain during sexual intercourse 61.5%, bloodstained vaginal discharge 40.8%, offensive vaginal discharges 36.2%, post-menopausal bleeding 34.2%, abnormal bleeding between periods 18.4%

and has no symptoms 2.6%.

3.5. Participants' Knowledge on Cervical Cancer Preventive Measures

More than three-quarters of respondents (81.9%) said that cervical cancer is a preventable disease. Two hundred fifty-six (79.8%) of them said that cervical cancer could be prevented by regular screening tests (Table 3).

Table 3. Knowledge about prevention measures of cervical cancer among female nurses working in West Amhara referral hospitals, Ethiopia, 2021.

Variables	Categories	Frequency	Percent
Is cervical cancer preventable? (n=392)	Yes	321	81.9
	No	51	13
	I don't know	20	5.1
Preventive measures (n=321)	Regular screening test	256	79.8
	Pelvic examination	159	49.5
	Delaying sexual debut	60	18.7
	Being faithful	77	24
	Use of condom	83	25.8
	Vaccine	197	61.4
	Any age group	48	24.4
Recommended age group for HPV vaccine (n=197)	9-13-year-old	72	36.5
	Older age	31	15.7
	I don't Know	46	23.4

3.6. Participants' Knowledge About Cervical Cancer Screening Methods, Recommended age, and Interval of Women for Screening

The Pap/VIA test was the most commonly identified cervical cancer screening procedure, with 259 (66.1%) participants responding. However, 64 (16.3%) of respondents were unsure whether cervical cancer has a screening approach.

Concerning at what age and how frequently should be screened for cervical cancer, 251 (64%) respondents were aware of the correct time to start screening between 30-49 years of age women and 143 (36.5%) of them correctly answered that women should be screened every 5-10 years. One hundred twenty-two (31.1%) respondents correctly identified colposcopy as an investigation of abnormal cells (Table 4).

Table 4. Knowledge towards cervical cancer screening methods, recommended age and interval of women for screening in West Amhara referral hospitals, Ethiopia, 2021 (n=392).

Variables	Categories	Frequency	Percent
Screening method	Pap smear	259	66.1
	HPV DNA testing	93	23.7
	Visual inspection with acetic acid	97	24.7
	Visual inspection with Lugol's solution	50	12.8
	I don't know	64	16.3
Age of screening	Women <30 years of age	102	26
	women 30–49 years old	251	64
	After menopause only	11	2.8
	I don't Know	28	7.1
	Yearly	148	37.8
Screening Intervals	Every 5-10 years	143	36.5
	I don't Know	101	25.8
	Treatment for cervical cancer	22	5.6
Colposcopy	Investigation of abnormal cells, biopsies	122	31.1
	Test for cancer	114	29.1
	I don't know	134	34.2

3.7. Participants Knowledge on Cervical Cancer Treatment Options

When it comes to treatment, the majority (91.3%) of female nurses said that cervical cancer can be treated. Of

those who responded that cervical cancer can be treated, 250 (69.8%) of them claimed that it is treated by chemotherapy. The majority of 305 (85.2%) respondents agreed that cervical cancer can be cured if detected early (Table 5).

Table 5. Knowledge on cervical cancer treatment options among female nurses working in West Amhara referral hospitals, Ethiopia, 2021 (n=392).

Variables	Categories	Frequency	Percent
Can cervical cancer be treated? (n=392)	Yes	358	91.3
	No	34	8.7
Treatment option (n=358)	Chemotherapy	250	69.8
	Surgery	221	61.7
	Radiotherapy	143	39.9
	Treat according to the stage	168	46.9
	Early	305	85.2
Stage of diagnosis that cervical cancer can be curable (n=358)	Late	21	5.9
	Any time	13	3.6
	I don't know	19	5.3

3.8. The Preventive Practice of Female Nurses Towards Cervical Cancer

The overall cervical cancer preventive practice of female nurses was 21.2 % (95% CI: 17.9%-25.0%) that is only 1% of them have taken the HPV vaccine, about 14% underwent pelvic examination as a cervical cancer screening purpose

and 13% ever had a Pap/VIA test. About 35 (63.6%) of them undergo pelvic examination only once. The most common reason for not having the Pap/VIA test was fear of the procedure, which accounted for 120 (35%). When asked what they would do if they had abnormal vaginal bleeding or bleeding after intercourse, the majority of 331 (84%) female nurses said they would go to a health facility (Table 6).

Table 6. Preventive practices on the HPV vaccine, pelvic examination, screening test, and reasons given for not doing a screening test female nurses working in West Amhara referral hospitals, Ethiopia, 2021 (n=392).

Variables	Frequency	Percent
Ever vaccinated for Human Papillomavirus		
Yes	3	1
No	389	99
Ever had a pelvic exam for cervical cancer screening?		
Yes	55	14
No	337	86
Ever had either a Pap smear or a VIA test		
Yes	52	13
No	340	87
Reasons for not having a screening test (n=340)		
Virginity	32	9
Fear of the procedure	120	35

Variables	Frequency	Percent
Fear of outcome	58	17
Cultural /religious reason	9	3
I'm not ill so it's not necessary	64	19
Not suggested by my doctor	31	9
No service	26	8
What do you do if you develop an abnormal vaginal bleeding		
Visit health facilities	331	84
Go to religious places/holly Water	13	3
Use herbal/traditional medicine	17	4
Ignore the symptoms and wait	31	8

3.9. Factors Associated with Knowledge of Cervical Cancer

The bi-variable logistic regression analysis showed that age, marital status, parity, family history, unit of work, year of service, training, and ever caring for a patient with cervical cancer were significantly associated with the respondent's knowledge of cervical cancer. These variables which were significant at $P < 0.2$ entered into multivariable logistic regressions. But only family history and unit of work were

shown to be significant predictors of knowledge when adjusted with other variables.

Respondents having a history of CC in their family were 3 times more likely to be knowledgeable than those who hadn't a history of CC in their family (AOR: 3.383; 95% CI: 1.144-10.003). Nurses working in intensive care units were 69% less likely to be knowledgeable than nurses working in a pediatric room (AOR: 0.308; 95% CI: 0.119-0.794) (Table 7).

Table 7. Logistic regression analyses for factors affecting knowledge towards cervical cancer among female nurses working in West Amhara referral hospitals, Ethiopia, 2021 (n= 392).

Variables		Knowledge of CC		COR (95% CI)	AOR (95% CI)
		Yes	No		
Age	20-29	118 (48.4%)	126 (51.6%)	1	1
	30-39	66 (57.9%)	48 (42.1%)	1.468 (0.937-2.299)	0.773 (0.433-1.381)
	40+	27 (79.4%)	7 (20.6)	4.119 (1.728-9.815)	1.125 (0.342-3.698)
Marital status	Unmarried	67 (44.1%)	85 (55.9%)	0.525 (0.348-0.793)	0.847 (0.498-1.442)
	Married	144 (60%)	96 (40%)	1	1
	0	115 (47.5%)	127 (52.5%)	1	1
Parity	1-4	79 (66.9%)	39 (33.1%)	2.237 (1.413-3.540)	1.440 (0.796-2.462)
	5+	17 (53.1%)	15 (46.9%)	1.252 (0.598-2.620)	0.860 (0.377-1.962)
	Yes	27 (84.4%)	5 (15.6%)	5.165 (1.946-13.712)	3.383 (1.144-10.003)
Family history	No	184 (51.1%)	176 (48.9%)	1	1
	Paediatrics	47 (61%)	30 (39%)	1	1
	Surgical	41 (47.1%)	46 (52.9%)	0.569 (0.305-1.060)	0.639 (0.328-1.246)
Unit of work	OG	21 (67.7%)	10 (32.3%)	1.340 (0.555-3.236)	1.766 (0.697-4.475)
	Medical	25 (45.5%)	30 (54.5%)	0.532 (0.264-1.072)	0.652 (0.311-1.368)
	ICU	10 (30.3%)	23 (69.7%)	0.278 (0.116-0.664)	0.308 (0.119-0.794)
Experience (in years)	OPD	67 (61.5%)	42 (38.5%)	1.018 (0.559-1.853)	1.119 (0.591-2.118)
	0-5	64 (43.2%)	84 (56.8%)	1	1
	6—10	95 (54.3%)	80 (45.7%)	1.559 (1.003-2.422)	1.410 (0.848-2.343)
Training	11+	52 (75.4%)	17 (24.6%)	4.015 (2.124-7.590)	2.465 (0.979-6.206)
	Yes	16 (72.7%)	6 (27.3%)	2.393 (0.916-6.251)	1.563 (0.534-4.576)
	No	195 (52.7%)	175 (47.3%)	1	1
Ever cared of a patient with CC	Yes	74 (63.8%)	42 (36.2%)	1.788 (1.144-2.793)	1.125 (0.676-1.872)
	No	137 (49.6%)	139 (50.4%)	1	1

Note: CC- Cervical cancer, ICU- Intensive care unit, OG- Obstetrics and gynecology, OPD- Outpatient department, 1- reference

3.10. Factors Associated with the Preventive Practice of Cervical Cancer

The bi-variable logistic regression analysis showed that age, marital status, educational level, parity, having ever been diagnosed with CC, family history, work experience, training, ever cared for a patient with CC, and knowledge about cervical cancer were significantly associated with the respondents' preventive practicing measures towards CC. These variables which were significant at $P < 0.2$ entered into multivariable logistic regressions. But only education, ever being diagnosed

with CC and ever caring for a patient with CC were shown to be significant predictors of practicing preventive measures when adjusted with other variables. Nurses with diploma holders were 2 times more likely to practice preventive measures for CC than nurses' having a degree and above (AOR: 2.136; 95% CI: 1.132-4.030). Nurses who had ever been diagnosed with CC were 3 times more likely to practice preventive measures for CC than those who didn't diagnose (AOR: 3.265; 95% CI: 1.290-8.266). Nurses who took care of a patient with CC were 3 times more likely to practice preventive measures for CC than those who hadn't been cared

for (AOR: 3.006; 95% CI: 1.639-5.514) (Table 8).

Table 8. Logistic regression analyses for factors affecting preventive practice towards cervical cancer among female nurses working in West Amhara referral hospitals, Ethiopia, 2021 (n=392).

Variables	Preventive practice		COR (95%CI)	AOR (95%CI)
	Yes	No		
Age				
20-29	40 (16.4%)	204 (83.6%)	1	1
30-39	25 (21.9%)	89 (78.1%)	1.433 (0.820-2.504)	0.866 (0.414-1.809)
40+	18 (52.9%)	16 (47.1%)	5.737 (2.700-12.194)	3.397 (0.987-11.689)
Marital status				
Married	64 (26.7%)	176 (73.3%)	1	1
Unmarried	19 (12.5%)	133 (87.5%)	0.393 (0.225-0.687)	0.829 (0.401-1.715)
Educational level				
Diploma	25 (27.2%)	67 (72.8%)	1.557 (0.906-2.675)	2.136 (1.132-4.030)
Degree & above	58 (19.3%)	242 (80.7%)	1	1
Parity				
0	37 (15.3%)	205 (84.7%)	1	1
1—4	40 (33.9%)	78 (66.1%)	2.841 (1.693-4.767)	1.735 (0.865-3.477)
5+	6 (18.8%)	26 (81.2%)	1.279 (0.492-3.320)	0.910 (0.299-2.767)
Ever been diagnosed with CC				
Yes	19 (57.6%)	14 (42.4%)	6.256 (2.981-13.129)	3.265 (1.290-8.266)
No	64 (17.8%)	295 (82.2%)	1	1
Family history				
Yes	16 (50%)	16 (50%)	4.373 (2.082-9.185)	1.633 (0.640-4.167)
No	67 (18.6%)	293 (81.4%)	1	1
Work experience (in years)				
0-5	17 (11.5%)	131 (88.5%)	1	1
6—10	42 (24%)	133 (76%)	2.433 (1.318-4.492)	1.678 (0.821-3.431)
11+	24 (34.8%)	45 (65.2%)	4.110 (2.025-8.339)	0.929 (0.301-2.871)
Training				
Yes	12 (54.5%)	10 (45.5%)	5.054 (2.100-12.162)	1.758 (0.534-5.792)
No	71 (19.2%)	299 (80.8%)	1	1
Ever cared of a patient with CC				
Yes	45 (38.8%)	71 (61.2%)	3.970 (2.392-6.588)	3.006 (1.639-5.514)
No	38 (13.8%)	238 (86.2%)	1	1
Knowledgeable about CC				
Yes	54 (25.6%)	157 (74.4%)	0.555 (0.335-0.918)	0.905 (0.508-1.612)
No	29 (16%)	152 (84%)	1	1

Note: CC- Cervical cancer, 1 = Reference

4. Discussion

This study was conducted to assess knowledge, preventive practice, and associated factors towards cervical cancer among female nurses working in West Amhara referral hospitals, Ethiopia. In this study, the most common sources of information were 61.5% from regular nursing courses, 48.5% from health professionals, 25.5% from books /magazines, 17.3% from radio/television, 11.2% from friends/relatives, and 5.6% from training. The result of this study is consistent with another study conducted in Ethiopia that stated nursing courses (75.4%) are a primary source of knowledge of CC followed by health professionals [16]. However, some studies from other countries such as Pakistan and Tanzania reported that media 63% & 47.4% respectively [11, 19] and Nigeria's periodic training (73.8%) are the primary sources of information for cervical cancer [17]. This difference might be related to the policy practices and focuses of these countries.

In this study, the overall knowledge score of the respondents

of cervical cancer is 211 (53.8%). A similar study in Ethiopia showed that 60% of respondents had better awareness about cervical cancer [16]. However, there is a stark difference between this study and similar studies conducted in Nigeria, which reported that 99% of the respondents have a better awareness of cervical cancer [24]. The possible explanation for this difference is the access to training and seminars in Nigeria and the difference in the study period.

In this study, 68.6% of respondents knew that the most common cause of cervical cancer is the Human Papillomavirus. However, the Japan and Nigeria study showed that more than 90% reported HPV as the main cause of CC [20, 21]. The difference might be more training and seminars in Japan and Nigeria than this study area that updates the nurses' knowledge.

Regarding the mode of transmission, in this study, 57.4% of the respondents answered that sexual intercourse and 29.6% direct genital contact. The result is consistent with a study from Tanzania that reports sexual intercourse (60.6%) and direct genital contact (27.7%) as a mode of transmission [19].

In this study the most frequently mentioned risk factors by

the respondents were; a history of HPV infection (70%), followed by multiple sexual partners (51.4%), sexually transmitted infection (48.3%), early onset of sexual activity (44%), smoking (29.9%), multiparity (29%) and prolonged use of oral contraceptives (25.1%). The finding is comparable with a study conducted in Ethiopia that revealed 53.5% said having multiple sexual partners, 47.3% said sexually transmitted infections, and 45.4% said the early onset of sexual activity [16]. These findings contrast with Turkey's study showed that 69.1% reported smoking, 72.2% had early onset of sexual activity, 81.4% had multiple sexual partners, and 87.6% reported sexually transmitted diseases were risk factors of CC [15]. The difference might be due to the emphasis given to cervical cancer in developed countries, which probably increased the knowledge of nurses' regarding the risk factors of cervical cancer.

Regarding the respondents' knowledge of symptoms; the most frequently mentioned symptoms were bleeding after intercourse (63.8%) followed by pain during sexual intercourse (61.5%), bloodstained vaginal discharge (40.8%), offensive vaginal discharge (36.2%), post-menopausal bleeding (34.2%), and abnormal bleeding between periods (18.4%). This study is lower than the study findings from India and Nigeria. For example, the results from India showed that 76%, 56%, and 82% of respondents reported post-menopausal or irregular bleeding, post-coital bleeding, and foul-smelling discharge respectively [18] as symptoms of CC. Moreover, a higher proportion rate of identifying symptoms correctly reported from Nigeria more than 80% of respondents identified post-coital bleeding, foul-smelling, vaginal discharge, and post-menopausal bleeding as symptoms of CC [17]. This might be due to inadequate training that updates the nurses' knowledge on CC and less exposure of nurses with patients with CC when compared with Nigeria and India.

Concerning the prevention of cervical cancer, the majority of the respondents (81.9%) reported that CC is a preventable disease and of these 79.8% said CC is prevented by the regular screening test. The result is almost similar to a study done in Ethiopia, 78.8% said can be prevented and 72.3% by screening [16].

Regarding respondents' knowledge of screening methods, Pap test (66.1%) VIA (24.7%), HPV DNA testing (23.7%), and Visual inspection with Lugol's solution (VIL), 12.8%, are mentioned as screening tests. Studies from Pakistan and Southwest Nigeria on screening methods have reported a better proportion of knowledge of screening methods than this study. For example, Pap smear as a screening test 75% and 97.6% from Pakistan and Southwest Nigeria respectively reported [11, 17]. The difference might be due to attending cervical cancer training and seminar sessions; the availability and usage of media that updates the nurses' knowledge of screening methods.

In this study, 31.1% of respondents correctly identified colposcopy as an investigation of abnormal cells. When compared with other studies conducted in South India and Southwest Nigeria, 47.6% and 40.0% respectively identified colposcopy as a diagnostic modality which has slightly higher than this finding [17, 18]. The variation might be due to

inadequate training and seminars that update the nurses' knowledge of diagnostic methods.

Regarding treatment options, the majority (91.3%) of the respondents revealed that CC can be treated if detected early. Of these respondents answered that 69.8% by chemotherapy, 61.7% by surgery, 39.9% by radiotherapy, and 46.9% can be treated according to the stage of the disease. This finding has a better report than the study conducted in Addis Ababa, 85.2% of the respondents agreed that CC can be cured if detected early and 29.6%, 37.7%, 9.2%, and 15.4% mentioned chemotherapy, surgery, radiation therapy and can be treated according to the stage of the disease respectively. This result is unexpected. It is assumed that respondents in Addis Ababa are expected to have better knowledge of treatment mechanisms for cervical cancer than people living in other parts of the country. One possible reason could be the study that was conducted in Addis Ababa has already passed some years. The result would be different today if this study were able to be reported in Addis Ababa [16].

Nurses having a history of cervical cancer in their family was more than 3 times more likely to be knowledgeable than those who had not. This finding is comparable to a study in Addis Ababa [16]. This might be nurses who have a history of cervical cancer in their family more updated their knowledge through reading different sources.

Nurses working in intensive care units were 69% less likely to be knowledgeable than nurses working in pediatric rooms. The difference might be pediatric room nurses had more working experience than nurses in the ICU rooms.

The overall preventive practice score of the respondents (HPV vaccination, pelvic examination, and Pap or VIA test) was 21.2%. The finding is consistent with a study conducted in Addis Ababa 20.9% [16]. These low findings might be less attention given to cervical cancer prevention practices in our country.

In this study, only 14% of the respondents underwent pelvic examination for CC screening which is very low. The study from Addis Ababa also reported a very low proportion of pelvic examinations, which is less than 10 percent [16]. The possible explanation might be due to personal factors like fear of the procedure, cultural influence, and low health-seeking behavior of the respondents in our country.

In this study, only 13.3% have ever gone for a Pap/VIA test as a preventive measure which is similar to findings from Addis Ababa and Tanzania 14.6% and 15.4% respectively [16, 19]. But lower than Turkey 46.4% [15]. This difference might be explained by the fact that in developing countries like Ethiopia there is a shortage of screening services in governmental health sectors, hence the service is given only to certain clients' and may also be personal factors like fear of procedure and cultural influence that most women are not comfortable undergo Pap/VIA test.

The main reasons mentioned for not screening for cervical cancer were fear of the procedure, not being ill, fear of the outcome, virginity, culture, or religion, and no service. The findings of Addis Ababa and Tanzania [16, 19] have reported quite similar reasons.

The current study showed that only 0.8% had taken the HPV vaccine for preventive measures. A similar study in Addis Ababa reported that only 6.9% of the participants have taken the HPV vaccine, which is very low [16]. This might be explained by the fact that the vaccine is still a new concept in developing countries like Ethiopia and is not included in the expanded program of immunization.

Nurses who have ever been diagnosed with CC were 3 times more likely to be practiced preventive measures than those who didn't diagnose. The finding is in line with a study in Addis Ababa with a significance level of < 0.001 [16].

Nurses who took care of a patient with CC were more than 3 times more likely to practice preventive measures than those who hadn't been nursed. The finding is again consistent with the research result conducted in Addis Ababa with a significance level of 0.019 [16]. This might be nurses who are caring for patients with cervical cancer more updated their knowledge and preventive measures through reading different sources and discussing with colleagues about cervical cancer.

Nurses with diploma holders were 2 times more likely to practice preventive measures than nurses' who have a degree and above. Again, this result is not expected. Studies showed that a higher educational level is a better predictor for preventive practices [25]. There might be some unexplained factors such as the knowledge-seeking behavior of diploma and degree holders. For instance, diploma holders might be able to seek information better which can compensate for their lesser level of education. Limitation of the study: the finding of this study could not represent the whole female population in the country because the participants in this study are relatively educated and have better exposure to healthcare information.

5. Conclusion

Half of the respondents were knowledgeable but their preventive practice on cervical cancer was very low. Among the socio-demographic and profession-related factors: family history and unit of work were shown to be significantly associated with the knowledge of cervical cancer and educational status, ever been diagnose and ever taking care of a patient with cervical cancer were shown to be significantly associated factors on the preventive practice of cervical cancer.

6. Recommendation

It is worthy that hospitals should regularly host seminars and training for female nurses on cervical cancer to raise their level of awareness. The Ethiopian ministry of health needs to collaborate with other partners to provide comprehensive information about cervical cancer and establish accessible screening services to the public in all healthcare settings. This might be accomplished by bringing together the government, NGOs, health professionals, and funders in order to finance the vaccine program jointly to increase service accessibility.

Abbreviations

AOR: Adjusted Odds Ratio; CC: Cervical Cance; COR: Crude Odds Ratio; HPV: Human Papilloma Virus; Pap: Papanicolaou; SSA: Sub-Saharan Africa; STI: Sexually Transmitted Infection; VIA: Visual Inspection with Acetic Acid; VIL: Visual inspection with Lugol's solution.

Author Contributions

YKA bring the idea and all authors (YKA, NHB, WZW, MHG, AMT, TMK, TWB, BGY, and ZBA) involved in designing the study, data collection, data analysis, drafting, and critically reviewing the research. All authors have read and approved the final manuscript.

Availability of Data and Materials

The data used to support the findings of the current study can be obtained from the corresponding author on reasonable request via zest7@yahoo.com.

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