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Research Article

Determinants of Precancerous Cervical Lesions Among Women Screened for Cervical Cancer at Adama Public Health Facilities, Adama, Ethiopia

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Abstract

Introduction: Precancerous cervical lesion is the potential risk factors of invasive cervical cancer. However, factors associated with premalignant cervical lesions remain poorly documented in general population in Adama town. The previous studies had their own methodological gaps which lead to generalizability limitations. Therefore, it is critical to identify the associated factors with precancerous cervical lesions for comprehensive and integrated screening services. *Objective:* To identify the determinants of precancerous cervical lesions among women screened for cervical cancer at Adama town public health facilities Adama, Oromia, Ethiopia, 2024. *Method:* Health facility based unmatched case control study design was carried out in selected public health facilities in Adama town. The public health facility participants were selected through simple random sampling techniques. The sample size of cases 84 and control 252 were collected by systematic random sampling. The data were entered and analyzed with Epi info 7.2.6 and SPSS 27. Variables with P-value < 0.25 in the binary logistic analysis were included in the multivariate logistic regression model. An odds ratio with its 95% CI and P value less than 0.05 was used to decide about the presence of association. *Result:* The median age of the participants was 36 years ±8 IQR years. This study revealed that the odds of being positive for precancerous cervical lesion were higher among women who were widowed (AOR =10.679, 95% confidence interval CI: 3.049-37.405), with lower family income (AOR =4.662: 95% CI: 1.767-12.302), youngest first marriage age (AOR =5.005: 95% CI: 1.847-13.563), practicing sexual intercourse before age 16 (AOR =11.190: 95% CI: 1.280- 97.867), history of STIs (AOR =5.188: 95% CI: 1.689-15.934), partner history of STIs (AOR=5.324: 95% CI (1.521-18.630) and lifetime multiple sexual partners history (AOR=3.389: 95% CI: 1.438-7.987). *Conclusion:* Most of the determinants of precancerous cervical lesions were modifiable and mainly related to women's socio-demographic related factors, reproductive, clinical and sexual behavior related. Therefore, strengthening awareness on safe sexual practices and healthy life styles through behavioral change communication would decrease the incidence of precancerous cervical lesions.

Keywords

Precancerous Cervical Lesion, Screened, Cervical Cancer, Determinants, Adama

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1. Introduction

Cervical cancer is a malignant tumor of the cervix, the lowermost part of the uterus. Compared with other gynecologic malignancies, cervical cancer develops in a relatively younger population. Early-stage cervical cancer may create a watery, blood-tinged vaginal discharge and have a foul odor. Human papillomavirus (HPV) is central to the development of cervical neoplasia and can be detected in 99.7 percent of cervical cancers [1, 2]. Cervical intraepithelial neoplasia (CIN) is characterized by cellular changes in the transformation zone of the cervix and potential risk factors of cervical cancer. It may exist at any one of three stages: CIN1, CIN2, or CIN3. If left untreated, CIN2 or CIN3 (collectively referred to as CIN2+). The progressive potential increases with CIN grade [1, 3]. Typically, it takes 15-20 years for abnormal cells to become cervical cancer, but in women with weakened immune system, such as untreated HIV, this process can be faster and take 5-10 years. Risk factors for cancer progression include the grade of oncogenicity of the HPV type, immune status, the presence of other sexually transmitted infections, number of births, young age at first pregnancy, hormonal contraceptive use, and smoking [4].

Globally, cervical cancer is the fourth most common cancer in women, with 662,301 new cases and 348,874 deaths in 2022. About 94% of the 350 000 deaths caused by cervical cancer occurred in low- and middle-income countries. The highest rates of cervical cancer incidence and mortality are in sub-Saharan Africa (SSA), Central America and South-East Asia [5]. As on Globocan's estimates for 2022, Ethiopia had 8,168 newly diagnosed cases of cervical cancer and 5,975 cervical cancer fatalities. These figures represent approximately 15.5% and 17.09% of all female cancer cases and deaths, respectively. It ranks second in Ethiopia for both the frequency of cancer diagnoses and the number of cancer-related deaths [6].

Cervical cancer is usually developed after a prolonged phase of pre-invasive lesions in the cervix. Therefore, early identification and treatment at its pre-invasive stage may benefit the clients and decrease the burden of morbidity and mortality resulting from cervical cancer [7]. VIA is encouraging the connection between screening and treatment. This "see and treat" approach lowers the possibility that women will become lost in the referral system and guarantees treatment compliance shortly after diagnosis. In low resource settings, VIA in conjunction with cryotherapy or thermal ablation, ideally a single visit approach (SVA), is an efficient and successful technique for secondary prevention of cervical cancer [8, 9].

Cervical cancer is a major global health concern, disproportionately affecting women in developing countries [10]. In Ethiopia, women are tragically dying of cervical cancer due to the silent nature of the disease until it becomes quite advanced and the presence of large gaps on responsible factors [11]. In Ethiopia, six in every ten cervical cancer cases are diagnosed at the late stage of the disease [8]. Poor awareness about cervical cancer and its treatment, long patient delay to seek care, and rural residence were positively associated with late–stage diagnosis [12]. Cervical cancer has an enormous socioeconomic impact on patients in terms of social discrimination, loss of body image, loss of sexual functioning, loss of femininity, loss of income, financial distress, and work and employment challenges [13]. To address this serious public health problem, Ethiopia adopted SDG and WHO strategies and designed the National Cancer Control Plan [14].

In 2020, the cervical cancer screening coverage was only 259,706 (3%) among female 35-49 aged group in Ethiopia and which is far from the target for clearly unknown reason. To reach the target set by WHO, conducting research and surveillance to identify the associated factors among the general solution [8]. There was a variation of evidence reported on the effect of associated factors on precancerous cervical lesions like women's age, education, occupation, residence and age at first sexual intercourse [15].

A different study was done on the associated factors of intraepithelial cervical neoplastic in some parts of the country. However, factors associated with premalignant cervical lesions remain poorly documented in general population in Adama town. In addition, the two studies were conducted in the study area. However, the two studies had their own methodological gaps which lead to generalizability limitation. The first study was retrospective record review unmatched case control design and skipping incomplete recorded client cards which leads to selection bias. The second research was cross-sectional design; temporal sequence between exposure and disease can‘t be established. Both the studies were done on single health facility.

The current study will fulfill the mentioned gaps by identifying the associated factors, conducting data collection from primary sources, using unmatched case control design and conducting study on multiple public health facilities. This study, therefore, aimed to find out the determinants of precancerous lesion among women of reproductive age group who was screened for cervical cancer at the cervical screening center at Adama public health facilities.

2. Methods and Materials

2.1. Study Area

The study was conducted in selected Adama town public health facilities (which has the cervical cancer screening service), which is found in Oromia Regional State, located at a distance of 99km from Addis Ababa. According to the 2016 E.C population projection, the town has a total population of 656,072. Adama town has two public hospitals (Adama hospital medical college and Wonji hospital) and thirteen public health centers. The two public hospitals and seven public

health centers are providing routine cervical cancer screening. Adama hospital medical college and Wonji Primary hospital started cervical cancer screening in 2010 E.C and 2013 E.C respectively, and serves as referral centers for surrounding health centers. These public health facilities provide cervical cancer screening services with VIA for women aged 15-49 years.

2.2. Study Design and Period

Health facilities based unmatched case control study was carried out from July 1, 2024 to November 1, 2024.

2.3. Population

Source of Population

The source of population was all women of reproductive age group (15-49 years old) who attending at Adama public health facilities cervical cancer screening centers for which providing routine cervical cancer screening service.

Study population

Cases – All reproductive age group (15-49) women who had VIA positive cervical cancer screening result in selected Adama public health facilities during the study period.

Controls – All reproductive age group (15-49) women who had VIA negative cervical cancer screening result at selected Adama public health facilities during the study period

Eligibility Criteria Inclusion criteria

Cases - study participants who had positive results for the VIA test. Control - study participants who had negative results for the VIA test.

Exclusion Criteria-All adult women with history of hysterectomy, severely ill and unable to communicate patient, biopsy proven cervical cancer and refusal were excluded from the study during the study period.

2.4. Sample Size Determination

Two population proportion sample size calculation formula was used to estimate the required sample size using Epi Info version 7.2.6 with the assumption of 95% CI, power =80% with control to case ratio of 3:1. Being HIV positive from Woliso study [16], use of oral contraceptive from Adama town [17], age of first exposure to sexual intercourse <15, and history of STI, which was taken from the previous study done in Amhara regional referral hospital [18].

Table 1. *Sample size determination by EPI-INFO version 7 for factors associated with Precancerous Cervical Lesions.*

Variable	AOR	Ratio control	% of Cases exposed	% of Control exposed		Sample size	Total sample	References
Age of first exposure to sexual intercourse<15	3.15	3	38.8	18	44	132	176	[18]
History of STI	3.73	3	44.8	17.3	34	101	135	[18]
Being HIV positive	3.85	3	31.4	7	57	171	228	[16]
Use of oral contraceptive	2.342	3	58.7	74.5	77	231	308	[17]

*STI-sexually transmitted infection, HIV-Human immunodeficiency virus

The maximum sample size is 308. Taking 10% of nonresponse rate, the final sample size was 339. The case sample size is 85 and the control participants sample size is 254. The ratio control to case is 3:1.

2.5. Sampling Techniques and Procedure

Out of the 15 total public health facilities in Adama, 9 health facilities provide cervical cancer screening service. The study was conducted in 5 of those health facilities. The two hospitals (AHMC and Wonji primary hospital) and three health centers (Adama health center, Geda health center and Kuriftu health center) were selected using simple random sampling (lottery method) from nine Adama public health facilities for which providing routine cervical cancer screening.

Based on the two months cervical cancer screening report before data collection, the average monthly report for AHMC 116 with 30 positive for PCL, Wonji hospital 64 with 15 positive for PCL, Adama health center 39 with VIA positive 11, Geda health center 60 out of this VIA positive was 18 and Kuriftu health center 18 and VIA+ was 6 with total of 297 were screened for cervical screening and total VIA positive was 80. Therefore, by using the proportional allocation method to select the representative from each selected health facilities by the proportional allocation formula.

ni = n÷N× (Ni)… = 1, 2, 3, 4, 5

nAHMC = 133, nWH = 73, nGHC =68, nAHC =45, nKHC =20

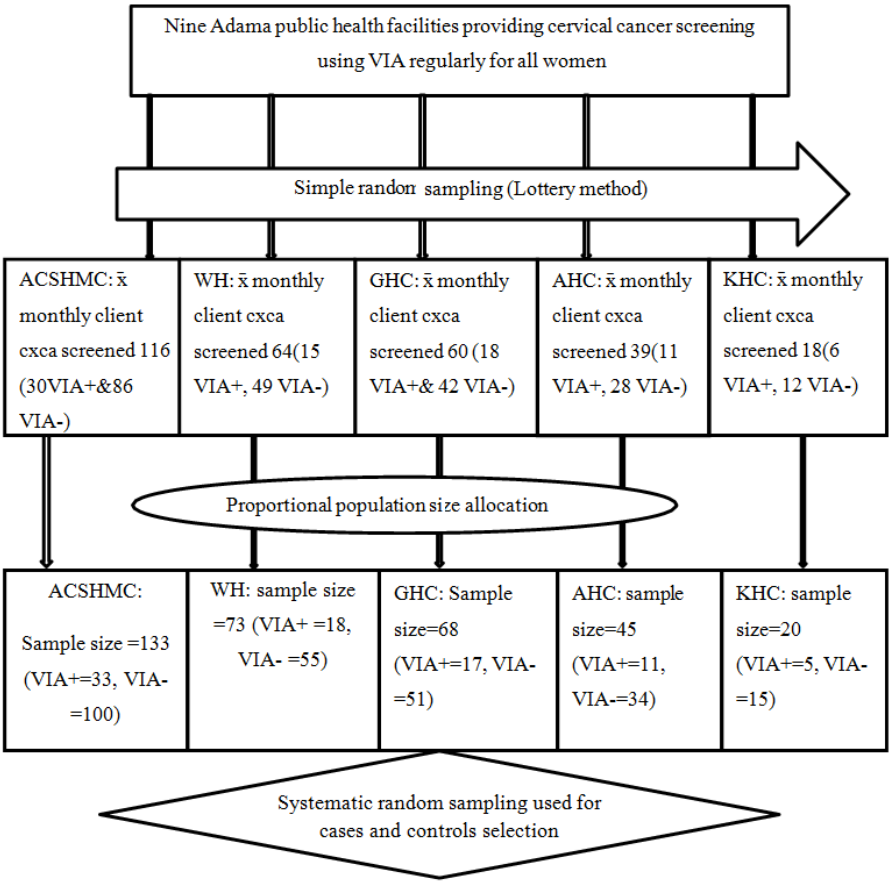

Figure 1. *Two hospitals and three health centers were selected based on provision of pre-cervical lesion screening among Adama town public health facilities, 2024.*

Keys*: x̄ Average, ACSHMC-Adama comprehensive specialized hospital medical college, WH- Wonji hospital, GHC-Geda health center, AHC-Adama health center

Finally, systematic sampling method was used to select the study participants from each facility. Cases (positive visual inspection with acetic acid screens) selected every 2nd interval as they were diagnosed to have precancerous cervical lesion until the required sample size was obtained. For each case, three controls (negative visual inspection with acetic acid screens) were selected every two interval from the same health facilities.

2.6. Data Collection Procedure and Data Quality Control

A structured interviewer questionnaire was constructed by reviewing similar articles. Data were collected from the primary data sources by data collectors. Data were collected through face to face interview by using a structured questionnaire. The primary data sources were voluntarily consented reproductive age group women who would come at ACSHMC, Wonji primary hospital and three health centers (Adama health center, Geda health center and Kuriftu health center) cervical cancer screening units for cervical screening service. Data collection was collected by and screening using VIA was done by five already trained health professions, two Bsc nurses, and three Bsc midwives who have experience more than two years cervical cancer screening and treatment. One supervisor with MPH for supervision and have more than 3 years' experience in research. First explained briefly on the data collection and then, the voluntarily consent was taken using written consent form tool before the interview start. It contains means of identification (age, educational status, socio-economic status occupational status and other socio-demographic statuses like marital status and place of residence), reproductive history (parity, abortion, age of first sexual intercourse, age of marriage,), and clinical and behavioral related factors (HIV status, history of STI, history of multiple sexual partners, history of smoking, history chronic corticosteroid use, ART status).

Each woman was received an explanation of the process prior to the VIA test being administered. The urethral entrance was examined for discharge and the external genitalia. The glands of skene and Bartholin were palpated. The cervix was examined with a speculum to check for signs of infection

(cervicitis), such as mucopus, ectopy, ulcers, grossly apparent tumors, or nabothian cysts. A clean cotton swab was used to remove any mucus, discharge, or blood from the cervix. Next, a clean swab was soaked in a diluted 3-5% acetic acid solution was be applied to the cervix, and the area was carefully examined for any raised and thickened white plaques or aceto-white epithelium. The cervix was also carefully examined for easily bleeds. The area was examined closely to look for any aceto-white epithelium or elevated, thicker white plaques.

Training was given for two days on the way of interviewing and filling the questionnaire. The training also was given on the VIA test. The questionnaire was designed attentively and prepared in the English language first and then was translated into Afan Oromo. And was translated into Amharic by language professions and Afaan Oromoo and Amharic version was translated back to English by other persons to make it consistent. The questionnaire was pretested before actual data collection in 16 women in Modjo hospital which is out of the study facilities. Strict supervision was maintained during the VIA testing and data gathering phases. Every day, completed surveys were examined for consistency and completeness and addressed.

2.7. Study Variables

The dependent variable for the study was VIA results (VIA positive and negative). Socio- demographic characteristics of the study participants like age, marital status, socioeconomic status, occupation, educational level and place of residence were used. Others like number of children, early marriage, age of first intercourse, number of sexual partners, number of abortion, contraceptive use, and smoking, chronic corticosteroid use, history of sexual transmitted infections and women's HIV status were also considered as independent variables in the study.

2.8. Data Processing and Analysis

Data was cleaned, coded, entered in to Epi version 7.2.6 and exported to and analysed by SPSS version 27. Descriptive statistics were computed for all data and presented as frequencies and percentages in tables. Quantitative data was checked for normality using Shapiro–Wilk's test. Normally distributed continuous variables were presented as mean ± standard deviation (SD) while skewed continuous variables were expressed as the median and interquartile range (IQR). Binary and multiple logistic regression analysis were used to measure the association between dependent and independent variables. Variables with P-value < 0.25 in the binary logistic analysis were included in the multivariate logistic regression model. An odds ratio with its 95% CI and P value less than 0.05 was used to decide about the presence of association. Multicollinearity between independent variables was assessed using the variance inflation factor

(VIF) before entering the variables into the final model. The final model of multiple binary logistic regressions was fitted using a backward method with Hosmer and Lemeshow goodness of fit test.

2.9. Ethical Approval

Ethical clearance letter and approval were obtained from Adama Comprehensive Specialized Hospital Medical College Institutional Ethical Review Committee - (Protocol number: 0605/K- 373/16). The lead investigator was then submitting a letter of authorization to the public health facilities that have been chosen as well as the Adama City Health Office. Additionally, consent from the chosen healthcare facilities was requested prior to data collection. Participants' right to autonomy shall be upheld. There was no adverse effect on research participants from this study. It was also being made clear to participants that participation is entirely optional. After informing study participants of the study's purpose, their written agreement was obtained.

2.10. Result Dissemination Plan

The primary research findings will be published, presented, and submitted in hard copy, soft copy and other formats to the relevant parties. Adama Comprehensive and Specialized Hospital Medical College and Adama Health Bureau will receive a hard copy of the entire research thesis. Lastly, in an effort to reach a larger audience, it will also be published in scholarly journals.

3. Result

3.1. Socio-demographic Characteristics of the Study Participants

A total of 84 cases and 252 controls from 15 to 49 years were interviewed making a response rate of 99.11%. The median age of the participants was 36 years ± 8 IQR years. The mean age of cases with their standard deviations was 34.71 ± 6.019 years. The median age of cases with their IQR was 36.5 ± 8 years. Among the study participants, 65 (77.4%) of cases were found to be in the age group of more than 30 years and 19 (22.6%) of cases were found to be in the age group of less than 30 years. 211 (83.4%) of controls were found to be in the age group of more than 30 years and 41 (16.3%) of controls were found to be in the age group of less than 30 years. Seventy six (90.5%) cases and 224 (88.9%) controls were from urban residences. Regarding marital status, one third 27 (32.1%) of cases and nearly two third than, 162 (64.3%) of controls were married. Less than half 37 (44.0%) of cases and more than one third 91 (36.1%) of controls, were attended primary (1-8) education. Among study participants, 39 (46.4%) of cases and 109 (43.3%) of controls were non-employed. Nearly half 44 (52.4%) of cases and 199(79.0%) of controls had a monthly income of greater than

2500 birr. Nearly half participants, 39(46.4%) of cases and 109(43.3%) of controls were self-employed (Table 2).

Table 2. *Socio-demographic characteristics of women screened for cervical cancer at Adama Public Health Facilities, 2024.*

Variables	Category	Case	Control
Place of residence	Rural	8(9.5)	28(11.1)
	Urban	76(90.5)	224(88.9)
Marital status	Divorce	25(29.8)	49 (19.4)
	Married	27(32.1)	162(64.3)
	Unmarried	13(15.5)	30(11.9)
	Widowed	19(22.6)	11(4.4)
Education level	Don't write and read	9(10.7)	18(7.1)
	Only read and write	11(13.1)	27(10.7)
	Primary (1-8)	37(44.0)	91(36.1)
	Secondary (9-12)	14(16.7)	56(22.2)
	Diploma or technical/vocational	11(13.1)	36(14.3)
	Higher (bachelor and above)	2(2.4)	24(9.5)
Age	≤ 30	19(22.6)	41(16.3)
	>30	65(77.4%)	211(83.7)
Occupational status	Female sexual worker	13(15.5)	8(3.2)
	Governmental employee	6(7.1)	51(20.2)
	Non-governmental employee	26(31.0)	84(33.3)
	Self-employed	39(46.4)	109(43.3)
Income	≤ 2500	40(47.6)	53(21.0)
	>2500	44(52.4)	199(79.0)

3.2. Reproductive Related Factors

Thirty-six (72.0%) of cases and 138 (69.3%) of controls have two or more children. Among the study participants, 54(64.3%) of cases and 196(77.8%) of controls had not history of abortion. The median age of first sexual intercourse of the women positive for precancerous cervical lesion was 17 ±2 IQR years. The median age of first sexual intercourse of the women negative for precancerous cervical lesion was 18 ±2 IQR years. Out of the participants more than half of the women 197 (58.6%) had first sexual intercourse below the age of 18 years. The median age at first marriage of women who positive for precancerous cervical lesion was 20 years ±2 IQR years. The mean age at first marriage of women who negative for precancerous cervical lesion was 23 years ± 5 IQR years. Fifty two (76.5%) of the respondents started their first sex at the age of 18 and below years old. Nearly nine in ten 78(92.9%) of cases and 178(70.6%) of controls had history of modern family planning usage. The foremost contraceptive method used by participants was implant 34(44.2%) of cases and 90(50.8%) of controls followed by injectable 14 (18.2%) of cases and 53(29.9%) of controls.

Table 3. Reproductive related factors of women screened for cervical cancer at Adama Public Health Facilities, 2024.

Variable	Category	Case, n (%)	Control, n (%)
Birth history	Yes	51(60.7)	200(79.4)
	No	33(39.3)	52(20.6)
Number birth	> 3	20(39.2)	51(25.6)
	≤ 3	31(60.2)	148(74.4)
Abortion history	Yes	30(35.7)	56(22.2)
	No	54(64.3)	196(77.8)
Number of abortion	≥2	20(66.7)	13(25.0)
	<2	10(33.3)	39(75.0)
Age of first sexual	≤ 15	16(19.0)	11(4.4)
intercourse	16-20	66(78.6)	195(77.4)
	≥21	2(2.4)	46(18.3)
First marriage age	≤ 18	52(76.5)	69(31.1)
	> 18	16(23.5)	153(68.9)
Contraceptive usage	Yes	78(92.9)	178(70.6)
history	No	6(7.1)	74(29.4)
Contraceptive	Implant	34(44.2)	90(50.8)
Methods	Injectable	14(18.2)	53(29.9)
	Oral contraceptive pills	27(35.1)	13(7.3)
	Others	2(2.6)	21(11.9)

3.3. Clinical Related Factors

Concerning participants' HIV/AIDS status, 51 (60.7%) of cases and 212(84.1) of controls were negative for HIV. More than half 50 (59.5%) of the cases and 37 (14.7%) of the controls had history of sexual transmitted infections. Among the respondents 79(94.0%) of cases and

250(99.2%) of controls had not history of corticosteroid usage. Majority of cases 81(96.4%) and controls 242(96.0%) had no family history of cervical cancer.

Table 4. Clinical related factors of women screened for cervical cancer at Adama Public Health Facilities, 2024.

Variable	Category	Case, n (%)	Control, n (%)
HIV status	Positive	29(34.5)	23(9.1)
	Negative	51(60.7)	212(84.1)
ART status	Yes	27(84.4)	23(71.9)
	No	5(15.6)	9(28.1)
History of STI	Yes	50(59.5)	37(14.7)
	No	34(40.5)	215(85.3)
Partner history of STI	Yes	26(31.0)	17(6.7)
	No	58(69.0)	235(93.3)

Variable	Category	Case, n (%)	Control, n (%)
Corticosteroid usage	Yes	5(6.0)	2(0.8)
history	No	79(94.0)	250(99.2)
Corticosteroid usage	≥4	4(80.0)	2(100)
duration	<4	1(20.0)	0(0.0)
Family history	Yes	3(3.6)	10(4.0)
	No	81(96.4)	242(96.0)
Chronic non	Bronchial	4(4.8)	2(0.8)
communicable diseases	Asthma		
	Diabetes	11(13.1)	7(2.8)
	mellitus		
	Hypertension	3(3.6)	34(13.5)
	Hypertension	0(0.0)	6(2.4)
	and diabetes		
	mellitus		
	No NCD	65(77.4)	203(80.6)
	Others	1(1.2)	0(0.0)

*NCD-Non-communicable chronic disease, HIV-human immunodeficiency virus, ART-Antiretroviral therapy, STI-sexually transmitted infection

3.4. Behavioral Related Factors

Among the study participants, having lifetime multiple sexual partner among cases and controls was 47 (56.0%) and 44 (17.5%), respectively. Similarly, about one third of the participants' partners had two or more other lifetime sexual partners. Nine in ten, 76(90.5%) of cases and 246(97.6%) of controls had not the history of smoking.

Table 5. *Behavioral related factors women screened for cervical cancer at Adama Public Health Facilities, 2024.*

Variable	Category	Case	Control
Smoking history	Yes	8(9.5%)	6(2.4)
	No	76(90.5)	246(97.6)
Smoking duration	≥3	7(87.5)	1(16.7)
	<3	1(12.5)	5(83.3)
Life time multiple sexual	Yes	47(56.0)	44(17.5)
partner	No	37(44.0)	208(82.5)
Sexual partner number	≥3	4(13.8)	8(24.2)
	<3	25(86.2)	25(75.8)
Life time multiple sexual	Yes	30(35.7)	35(13.9)
partner of partner	No	54(64.3)	217(86.1)
history			
Sexual partner of partner	≥3	32(71.1)	15(35.7)

Variable	Category	Case	Control
number	<3	13(28.9)	27(64.3)

3.5. Determinants of Precancerous Cervical Lesion

In Bivariate logistic regression analysis, age, marital status, income status, occupational status, age at first sex, first marriage age, lifetime multiple sexual partner, HIV status, history of STIs, Partner`s lifetime multiple sexual partners of participants', smoking history, corticosteroid usage history, partner history of STIs, birth history and abortion history of the respondents were found to have a p-value of ≤0.25. To control the effect of other confounding factors they were entered into multivariable logistic regression analysis. In the multivariable logistic regression analysis, marital status, income status, first marriage age, age at first sex, history of STIs, partner history of STIs, birth history and partner life time multiple sexual history were found to be a significant predictor of precancerous cervical lesion in women with precancerous cervical cancer.

The odds of being positive for cervical pre-cancerous lesion was found to be10.679 times (AOR =10.679, 95% CI: 3.049-37.405) higher among widowed women compared to married women. Women with family income were 2500 or less birr had 4.662 times (AOR =4.662: 95% CI: 1.767-12.302) higher odds of being positive for cervical pre-cancerous lesion compared to their counterpart. Marital age showed significant relation with cervical pre-cancerous lesion. The odds of being positive for pre-cancerous cervical lesion was found to be 5.005 times (AOR =5.005: 95% CI: 1.847-13.563) higher among women with first marriage age at young age compared to their counterpart. Those participants who started practicing sexual intercourse before age 16 were 11.190 times more likely to have positive for the pre-cancerous cervical lesion compared to those who started after 21 (AOR =11.190: 95% CI: 1.280-97.867). Women who had history of STIs had 5.188 times (AOR =5.188: 95% CI: 1.689- 15.934) higher odds of being positive for pre-cancerous lesion compare to those who had no history of STI. Women whose partner had history of STIs had 5.324 times (AOR =5.324: 95% CI: 1.521-18.630) higher odds of being positive for pre-cancerous cervical lesion compare to their counterpart. Those having lifetime multiple sexual partners history were3.389 times (AOR=3.389: 95% CI: 1.438- 7.987) higher to develop precancerous cervical cancer compared to those who had no lifetime multiple sexual partners.

Table 6. *Determinants of precancerous cervical lesions among women screened for cervical cancer at Adama Public Health Facilities, 2024.*

Variables		Case, n (%)	Control, n (%)	COR (CI95%)	AOR (CI95%)	P-value
Marital status	Married	29(34.5)	162(64.3)	1	1	
	Unmarried	17(20.2)	30(11.9)	3.16(1.55-6.47)	1.99(0.59-3.342)	0.996
	Divorced	25(29.8)	49(19.4)	2.85(1.53-5.31)	2.163 (0.827-5.658)	0.116
	Widowed	13(15.5)	11(4.4)	6.6(2.698-16.2)	10.679 (3.049-37.405)	0.000
Age	≤ 30	19(22.6)	41(16.3)	1	1	
	>30	65(77.4)	211(83.7)	0.66(0.36-1.22)	0.563 (0.191-1.656)	0.297
Income status	> 2500			1		
	≤ 2500	40(47.6)	53(21.0)	3.41(2.02-5.76)	4.662 (1.767-12.302)	0.002
Occupational status	Governmental	8(9.5)	51(20.2)	1	1	
	Job less	38(45.2)	110(43.7)	2.20(0.959-5.0)	0.489 (0.138-1.735-)	0.268
	Non-	25(29.8)	84(33.3)	1.897(0.796-4.524)	0.679 (0.186-2.482)	0.558
	Governmental	13(15.5)	7(2.8)	11.8(3.6-38.65)	1.371 (0.180-10.433)	0.761
Abortion	No	54(64.3)	196(77.8)	1		
history	Yes	30(35.7)	56(22.2)	1.94(1.14-3.32)	1.611 (0.619-4.195)	0.329
First marriage	>18	44(64.7)	207(93.2)	1	1	

Variables		Case, n (%)	Control, n (%)	COR (CI95%)	AOR (CI95%)	P-value
age	≤ 18	24(35.3)	15(6.8)	7.5(3.66-15.5)	5.005 (1.847-13.563)	0.002
First sexual	>20	2(2.4)	46(18.2)	1		
intercourse age	16-20	66(78.6)	195(77.4)	7.78(1.83-32.9	2.028 (0.326-12.609)	0.448
	≤ 15	16(19.0)	11(4.4)	33.4(6.6-167.4)	11.190 (1.280-97.867)	0.029
HIV status	Negative	55(65.5)	229(90.9)	1		
	Positive	29(34.5)	23(9.1)	5.25(2.82-9.77)	1.715 (0.623-4.718)	0.296
STI history	No	39(40.5)	215(85.3)	1		
	Yes	50(59.5)	37(14.7)	8.55(4.89-14.9)	5.188 (1.689-15.934)	0.004
Partner STI	No	58(69.0)	235(93.3)	1		
history	Yes	26(31.0)	17(6.7)	6.2(3.15-12.2)	5.324 (1.521-18.630)	0.009
Steroidal use	No	77(91.7)	248(98.4)	1		
history	Yes	7(8.3)	4(1.6)	5.6(1.61-19.76)	1.252 (0.152-10.323)	0.834
Multiple sexual	No	37(44.0)	208(82.5)	1		
partner	Yes	47(56.0)	44(17.5)	6.0(3.50-10.30)	3.389 (1.438-7.987)	0.005
multiple sexual	No	54(64.3)	217(86.1)	1		
partner of partner	Yes	30(35.7)	35(13.7)	3.44(1.95-6.10)	0.932 (0.303-2.865)	0.902
history Smoking	No	76(90.5)	246(97.6)	1		
history	Yes	8(9.5)	6(2.4)	4.31(1.45-12.8)	1.187 (.0.166-8.491)	0.864
Birth history	No	33(39.3)	52(20.6)	1		
	Yes	51(60.7)	200(79.4)	0.4(0.236-0.68)	0.179 (0.068-0.471)	0.000

*FSW-Female sexual worker, HIV- Human immunodeficiency virus, STI-Sexually transmitted infections

4. Discussion

Early detection and treatment of pre-cancerous cervical lesions is critical to prevent the progression of cervical cancer. This study indicates that widowed women are associated with an increased risk of developing precancerous cervical lesions compared to married women. The finding is comparable with a study conducted in Gabon, Tigray regional state, and Arsi zone sude district, further validating the relationship between being widowed women and cervical health outcomes [19-21]. This implies that women who have started sexual practice and have widowed and or without having a permanent husband are likely to be exposed to multiple sexual partners; which increases the risk of HPV infection.

The result of the current study indicates that low income status is significant association with PCL. This study evidence is supported by the study done in Arizona, south Ethiopia and Addis Ababa [22-24]. This consistency to the South Ethiopia study may be due to the similarities in the study designs, and the study participants. One possible reason may be low-income women's limited access to health care services, which could have an impact on their health by depriving them of routine tests or education regarding the detrimental health impacts of risk factors associated with their lifestyle. Moreover, women under tough economic situations and material needs engaged in commercial sexual work, early marriage, early sexual debut and with multiple sexual partners to fulfill their and family's needs which increases chance of HPV infection and others STIs. HPV infection could lead the PCL through immature squamous cells and leaves infected cells vulnerable to malignant transformation by loss of cell-cycle control, cellular proliferation, and accumulation of DNA mutations over time by degrading tumor suppressors' proteins such as P53 and Retinoblastoma [1]. This study highlights the importance of improving of every family income to prevent and enable early detection of precancerous cervical lesions.

In the current study, women who married at young age of were five times more likely to be positive for PCL compared to their counterpart. This finding is align with the conducted at Saints Paul's Hospital and Millennium College [25], and in Nepal [26] which revealed that women married before 20 years associated with cervical precancerous lesions compared to the counter parts. However, this significance was not sup-

ported by another study conducted in the Sude district, Arsi, which found no association between early marriage and precancerous cervical lesion [20]. This discrepancy may be due to variations in the study design and sample size. The reason of this association may be, at a young age, the cervix has immature squamous cells, thus making it more susceptible to etiological agents, particularly high-risk types of HPV [1]. The findings have implications for the implementation evidence based strategies to delay early marriage that educate families and community members on the dangers of early marriage, provide girls with education and life skills, and offer legal services.

Our analysis revealed that women who initiated sexual intercourse before the age of 16 were eleven times more likely to develop precancerous cervical lesions compared to those who began sexual activity after the age of 16 and late. This study finding consistent with the studies conducted in China, Amhara North Shoa and Harar [27-29]. The cervical membranes of younger women are immature enough to be susceptible to oncogenic agents which may put the girls at higher risk of contracting STIs more particularly HPV infections. This is resulting uncontrolled epithelial cells proliferation through degrading the host's tumor suppressor genes by HPV's oncogenes [1]. This finding highlights the importance of youth and adolescent health program in health facilities and community advocacy to prevent and delay the early coitharche.

Sexually Transmitted Infections (STIs) represent another significant determinant factor for the development of precancerous cervical lesions among women, as evidenced by this study. Women with a history of STIs were found to have 5.188 times more likely developing precancerous cervical lesions compared to those without such a history. This study finding is consistent with the studies conducted in Uganda, Amhara regional referral hospital and Woliso town [16, 18, 31]. The possible reason for the association might be due to the fact that infection with the herpes virus was thought to be the initiating event in cervical neoplastic lesion; however, infection with human papillomavirus (HPV) was determined to be the causal agent in the development of cervical neoplastic lesions, with herpes virus and Chlamydia trachomatis likely acting as cofactors ending in cervical neoplastic lesions due to disruption of apoptosis and DNA repair [30]. The findings have implications for the implementation of public health education that may reduce the development of cervical neoplastic lesions such as awareness creation on safe sexual activity and expand safe and highly effective vaccines.

Women who had partners with a history of Sexually Transmitted Infection were also showed

5.324 times more likely higher odds of positive for precancerous cervical lesion compared to the opponents. This finding is in line with study done in Cameroon [31]. This evidence also agreed other studies conducted in Gojjam and west Wollega which validating that partner sexually transmitted infections strongly associated with cervical lesions [30, 32]. This may be due to the direct transmission of the causative agent (HPV) and other STIs causing agents that aggravate the chance of occurring precancerous cervical lesions by the mechanism of epithelial cell cycle disruption [33]. This implies that the health of partner is important for health of woman.

Moreover, there is a positive association between multiple sexual partner and PCL. The odds of being positive for PCL were 3.389 times higher among women having multiple sexual partners than monogamous women. The result of the current study is comparable with the study conducted in Nigeria, Amhara regional state and Dukem [18, 34, 35]. The reason for this could be having sex with multiple partners may increase the chance of transmission of HPV, resulting in cervical neoplastic lesions through the mechanism of epithelial cells cycle deregulation [36]. The finding has implications for the implementation of public health education that may reduce the development of cervical neoplastic lesions such as practicing safe sex, avoiding multiple sexual intercourses and encouraging early screening for cervical cancer.

The other determinant was birth history. Women who had history of gave birth 82.1% less likely develop precancerous cervical lesion compared to those women who had not history of gave birth. However, another studies done in west Wollega, and Cameroon showed that having history of gave birth was found to be risk factor compared to having not history of gave birth [30, 37]. The reason for the difference might be the small number of women with history of birth in our study compared to other studies. Because of this conflicting finding, future research with a large sample size in this area might be needed to identify the association between parity and precancerous cervical lesion.

Limitations of the Study

This study is conducted on selected health facilities and is thus difficult to generalize for the general population. Because of the study design was retrospective, there was recall bias. Moreover, there may be social desirability bias since the study assessed the lifestyle and sexual behavior of the participants.

5. Conclusion and Recommendation

5.1. Conclusion

Most of the determinants of precancerous cervical lesions were modifiable and mainly related to women's socio-demographic related factors, reproductive, clinical and sexual behavior related. Therefore, strengthening awareness on safe sexual practices and healthy life styles through behavioral change communication would decrease the incidence of precancerous cervical lesions.

5.2. Recommendations

For policy makers

The significant determinants of cervical neoplastic lesions

were mainly modifiable which leads to cervical HPV infection. In order to prevent cervical neoplastic lesions, the government should prioritize funding for HPV vaccine supply and vaccination, age-appropriate comprehensive sexuality education, advocacy to prevent early marriage, early coitarche, and STIs. The Ministry of health should also expand HPV DNA test and Pap smear screening services. It is important that the government promote poverty elimination and increase universal health access.

For Adama health office

The majority of the variables that predicted precancerous cervical lesions were changeable and mostly connected to the socio-demographic characteristics, sexual habits, and clinically relevant factors of women. Adama health office should strengthen age-and culturally-appropriate sexuality education, along with primary prevention measures like vaccination of girls, regular condom distribution, and screening for people who have a history of multiple sexual partners, low income, widowed women, women who have a history of early marriage, started sexual intercourse at young age, women with a history of STIs, and women with a history of partner/husband STIs.

Health Facilities

The health facilities conduct advocacy meetings at different levels, such as women groups and promote advocacy campaigns at district, village and community levels. The health facilities administer HPV vaccination for eligible girls as per the national immunization schedule. They should encourage community for health promotion and health education to prevent early marriage, and STI. Promoting the health of community by providing sexuality education tailored to age and culture.

For community: Advocate delaying of early marriage to mitigate the preventive and controllable cause of cervical cancer.

For mass media: Prepare consistent mass campaign for cervical cancer screening and diagnosis as it is vital to track the cases early.

For researchers: Further research is needed to identify community awareness in relation to risk factors of precancerous cervical lesions and cervical cancer and importance of cervical cancer screening.

Abbreviations

ACSHMC	Adama Comprehensive and Specialized Hospital Medical College
ART	Anti Retroviral Therapy VIA- Visual Inspection with Acetic Acid
CIN	Cervical Intraepithelial Neoplastic COR-Crude Odd Ratio
DNA	Deoxyribonucleic Acid
FMOH	Federal Ministry of Health FSW-Female Sexual Worke
GLOBOCAN	Global Cancer Observatory
HIV	Human Immunodeficiency Virus
HPV	Human Papilloma Virus
IUCD	Intrauterine Contraceptive Device PCL-Precancerous Cervical Lesion
SNNP	Southern Nation and Nationalities People
SPSS	Statistical Package for Social Sciences
SSA	Sub-Saharan Africa
STI	Sexual Transmitted Infection SVA- Single Visit Approach
WHO	World Health Organization

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Author Contributions

Tolosa Lemma: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing

Abebe Megerso: Writing –review & editing

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Ethics Approval

Ethical Approval was obtained from Adama hospital medical college, Adama woreda Health Office.

Key Message

Original data is available on request.

Conflicts of Interest

The authors declare that they have no competing interests.

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