International Journal of Scientific Reports
Mengestu AA et al. Int J Sci Rep. 2025 Nov;11(11):394-401
http://www.sci-rep.com
pISSN 2454-2156 | eISSN 2454-2164
DOI: https://dx.doi.org/10.18203/issn.2454-2156.IntJSciRep20253325

Original Research Article

Determinants of cervical pre-cancer and cancer among women attending cervical cancer clinic in Felege Hiwot Comprehensive Specialized Hospital, Northwest Ethiopia

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Received: 11 July 2025
Revised: 13 August 2025
Accepted: 11 September 2025

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ABSTRACT

Background: Cervical cancer is a leading cause of cancer-related morbidity and mortality in low- and middle-income countries, with over 85% of cases occurring in these settings. In Ethiopia, it ranks as the second most common cancer among women. This study examined determinants of cervical pre-cancer and cancer among women attending Felege Hiwot Comprehensive Specialized Hospital (FHCSH) in northwest Ethiopia.
Methods: A facility-based cross-sectional study was conducted among 350 women aged 21–65 years at FHCSH. Data on socio-demographic, reproductive, behavioral, and clinical characteristics were collected using a standardized questionnaire. Participants underwent visual inspection with acetic acid (VIA), high-risk human papillomavirus (HR-HPV) DNA testing, and histopathology. Cervical intraepithelial neoplasia grade II or worse (CIN II+) was the primary outcome. Logistic regression identified associated factors ($p<0.05$).
Results: Cervical cancer and pre-cancer prevalence were 12% and 20%, respectively. HR-HPV infection was found in 39% of participants. CIN II+ was strongly associated with HPV infection (OR=90.9), VIA positivity (OR=79.2), age ≥30 years (OR=8.1), history of sexually transmitted infections (OR=9.8), hormonal contraceptive use (OR=3.3), comorbidities (OR=2.9), early sexual debut, multiple sexual partners, non-condom use, and high parity.
Conclusion: Both modifiable and non-modifiable factors contribute to cervical pre-cancer and cancer in Ethiopia. Strengthening HPV vaccination, promoting safer sexual practices, integrating STI management, and expanding VIA and HPV testing are critical for prevention, aligning with World Health Organization (WHO's) 90-70-90 elimination strategy.

Keywords: Cervical cancer, Precancerous lesions, HPV, VIA, Ethiopia, CIN II+, Risk factors

INTRODUCTION

Cervical cancer is a major global public health issue, particularly in low- and middle-income countries (LMICs), where over 85% of cases and deaths occur.[1] It is the fourth most common cancer among women worldwide, with an estimated 604,000 new cases and 342,000 deaths annually.[2] In sub-Saharan Africa, cervical cancer is the leading cause of cancer-related mortality among women, largely due to limited access to screening and treatment.[3] Ethiopia bears a significant burden, with cervical cancer being the second most frequent cancer among women, accounting for approximately 6,000 new cases and 4,600 deaths each year.[4]

The primary etiology of cervical cancer is persistent infection with oncogenic strains of human papillomavirus (HPV), particularly types 16 and 18, which are responsible for nearly 90% of cases worldwide.[5] However, other factors contribute to disease progression, including immunosuppression (e.g., HIV coinfection), early sexual debut, multiple sexual partners, multiparity, tobacco use,

and low socioeconomic status.[6] In Ethiopia, the prevalence of HPV among women with cervical abnormalities is high, with HIV-positive women facing a fivefold increased risk of developing cervical cancer compared to their HIV-negative counterparts.[7] Despite the availability of screening methods such as visual inspection with acetic acid (VIA) and HPV testing, many Ethiopian women are diagnosed at advanced stages due to low awareness, cultural barriers, and weak healthcare infrastructure.[8] Felege Hiwot Comprehensive Specialized Hospital (FHCSH) in northwest Ethiopia provides cervical cancer screening and treatment services, yet the determinants of precancerous and cancerous lesions among women attending the clinic have not been well studied. Identifying these factors is critical for improving early detection, treatment, and prevention strategies in the region.

This study aimed to assess the determinants of cervical precancer and cancer among women attending the cervical cancer clinic at FHCSH. By examining sociodemographic, behavioral, and clinical risk factors, the findings will help guide targeted interventions to reduce cervical cancer incidence and mortality in northwest Ethiopia. The results will also contribute to national and global efforts toward the WHO's 90-70-90 elimination strategy for cervical cancer by 2030.[9]

METHODS

Study design and setting

A facility-based cross-sectional study was conducted from January to April 2025 to identify determinants of cervical pre-cancer and cancer among women attending the cervical cancer clinic at Felege Hiwot Comprehensive Specialized Hospital (FHCSH) in Northwest Ethiopia. FHCSH is one of a comprehensive referral hospital in the Amhara region that provides cervical cancer screening, diagnosis, and treatment services. The hospital serves a large population of women from urban and rural areas, making it an appropriate setting for investigating cervical cancer risk factors. A total of 350 women were enrolled in the study. Women aged 21–65 years attending the cervical cancer screening clinic at FHCSH during the study period were offered screening with partial genotyping of the HPV DNA test, visual inspection of acetic acid (VIA) and examined with pathology.

Inclusion criteria

Women aged 21–65 years attending the cervical cancer clinic during the study period were included in the study. Only women who provided informed consent were enrolled in the study.

Exclusion criteria

Exclusion criteria involved individuals with prior history of hysterectomy, previous treatment for cervical cancer, current pregnancy, or severe illness preventing participation.

Data collection tools and procedure

A standardized questionnaire was used to collect socio-demographic, reproductive, sexual behavior and clinical data. Trained gynecologists currently working on cervical cancer unit collect data using standardized questionnaire, provide gynecological, physical examinations perform VIA and collect swab for HPV DNA test and biopsy for pathological examinations.

Laboratory investigations and cervical cytology

All 350 study participants were screened for HPV DNA and VIA. HR-HPV DNA tests detect high-risk HPV DNA in vaginal or cervical swabs. DNA extraction, amplification and HR-HPV partial genotyping was performed using the Abbott Real Time HR-HPV assay (Abbott Molecular, Des Plaines, IL, USA). This is an automated process that uses micro beads technology for DNA extraction. The assay is a qualitative in-vitro test that amplifies and detects HR-HPV DNA in cervical cells. Detection of all 14 HR-HPV genotypes (HPV 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66, and 68) was achieved through a primer mix targeting the conserved L1 region of HR-HPV genomes and single stranded DNA probes.[10]

Biopsies were independently examined by two experienced pathologists. When the diagnosis differed between the two pathologists, the sample was reviewed by a third pathologist and consensus was reached. Histo-pathological diagnosis confirmed test results as negative for dysplasia/malignancy or cervical intraepithelial neoplasia (CIN) as CIN I, CIN II, CIN III or cervical cancer cases. Histopathological examination results of CIN II, CIN III and invasive carcinoma ("CIN II+") were taken as positive (Disease-positive) by gold standard definition. Histopathologic diagnoses of normal, chronic cervicitis and CIN I (CIN II–) were considered negative (disease-negative).

Data processing and analysis

Collected data were reviewed, coded, and entered into Epi info version 7.2.5 and exported to statistical package for the social sciences (SPSS) version 26.0 for further analysis. Descriptive statistics such as frequency and cross tabulation were performed to summarize the data. Bivariate logistic regression analysis was performed to test the relationship between individual variables and the outcome variable.

Odds ratios (OR) and the corresponding 95% confidence intervals (95% CI) were calculated to assess the degree of association between independent and dependent variables. Finally, variables with a p value of less than 0.05 were considered statistically significant.

Ethics approval and consent to participate

Ethical approval was obtained from Institutional Review Board (IRB), Bahir Dar University. Written informed consent was ensured from all study participants to take part in the study voluntarily after they get informed about the objective and purpose of the study. This study was performed in accordance with the Declaration of Helsinki.

RESULTS

Socio-demographic, sexual and reproductive characteristics of study participants

In this study, a total of 350 women were participated. Of these, 88% were with CIN II NEG (n=308) and 12% were with CIN II+ POS (n=42). Of 350 participants, 39% of them were HPV positive, 20% of them were VIA positive, 85% of them were illiterate, 65% of them were married, 64% of them were rural residents, 65% of them had greater than two current sexual partner, 63% of them had life time sexual partner, 56% of them did not use condom during sexual intercourse, 27% of them had co-existing diseases and 33% of them had a history of sexually transmitted infections.

Of 42 participants with CIN II+ participants, 98% of them were infected with HPV, 90% of them were VIA positive, 95% of them were age greater than 30 years, 64% of them had children between 4 and 6, 74% of them had lived in rural, 55% of them were married before age less than 18 years, 52% of them had first sexual debut before age less than 18 years, 81% of the study participants had greater than 2 current sexual partners, 76% of them had greater than 2 life time sexual partners, 71% of them did not use condom during sexual intercourse and 79% of them had a history of sexually transmitted infections.

The socio-demographic, sexual and reproductive characteristics of study participants are summarized in Table 1.

Risk factors associated cervical pre-cancer and cancer

The risk factors found to be significantly associated with pre-cancer and cancer were HPV infections, VIA Positivity, age ≥, history of sexually transmitted infections, hormonal contraceptive use, comorbidity, early sexual debut (<18 years), multiple current sexual partners (≥2), no condom use and high parity (4–6 children). HPV+ women had 90.9 times higher odds of CIN II+. VIA+ women had 79.2 times higher odds of CIN II+. Women ≥30 had 8.1 times higher odds of CIN II+ (COR=8.1, 95% CI: 1.9–34.4).

Women with STIs had 9.8 times higher odds of CIN II+ (COR=9.8, 95% CI: 4.5–21.3). Hormonal contraceptive users had 3.3 times higher odds of CIN II+ (COR=3.3, 95% CI: 1.7–6.6). Women with comorbidities had 2.9 times higher odds of CIN II+ (COR=2.9, 95% CI: 1.5–5.6). Women who started sex after 20 had 26% lower odds of CIN II+ (COR=3.8, 95% CI: 1.4–10.5).

Women with ≥2 current sexual partners had 2.5 times higher odds of CIN II+ (COR=2.5, 95% CI: 1.1–5.7). Condom users had 36% lower odds of CIN II+ and Women with 4–6 children and greater than 6 had 3.4- and 3.3-times higher odds of CIN II+ respectively. The details are presented in Table 2.

Table 1: Socio-demographic, sexual and reproductive characteristics of study participants.

Variables	Histology results		
	CIN II NEG (n=308)	CIN II POS (n=42)	Total (%)
HPV result			
Negative	213	1	214 (61)
Positive	95	41	136 (39)
VIA results			
Negative	275	4	279 (80)
Positive	33	38	71 (20)
Age (in years)			
<30	89	2	91 (26)
≥30	219	40	259 (74)
Educational status			
Illiterate	262	34	296 (85)
Primary	25	4	29 (8)
High school and above	21	4	25 (7)
Monthly income			
<2000	62	11	73 (21)
2000-5000	17	114	131 (37)
>5000	14	132	146 (42)

Continued.

Variables	Histology results		
	CIN II NEG (n=308)	CIN II POS (n=42)	Total (%)
Marital status			
Single	39	9	48 (14)
Married	203	26	229 (65)
Widowed/divorced	66	7	73 (21)
Parity			
<3	110	6	116 (33)
4 to 6	142	26	168 (48)
>6	56	10	66 (19)
Occupation			
Employed	117	17	134 (38)
Others	191	25	216 (62)
Residence			
Rural	192	31	223 (64)
Urban	116	11	127 (36)
Age at first marriage (in years)			
<18	106	23	129 (37)
18-20	111	14	125 (36)
>20	91	5	96 (27)
Age at first sexual debut (in years)			
<18	107	22	129 (37)
18-20	108	15	123 (35)
>20	93	5	98 (28)
Number of current sexual partners			
≥ 2	193	34	227 (65)
1	115	8	123 (35)
Number of life time sexual partner			
≥ 2	189	32	221 (63)
1	119	10	129 (37)
Use of Condom during sexual intercourse			
No	165	30	195 (56)
Yes	143	12	155 (44)
Hormonal contraceptive use			
No	256	25	281 (80)
Yes	52	17	69 (20)
Personal hygiene			
No	221	27	248 (71)
Yes	87	15	102 (29)
Comorbidity			
No	234	22	256 (73)
Yes	74	20	94 (27)
Have you heard about cervical cancer			
No	211	27	238 (68)
Yes	97	15	112 (32)
History of cervical cancer screening			
No	241	30	271 (77)
Yes	67	12	79 (23)
Family history of cervical cancer			
No	284	38	322 (92)
Yes	24	4	28 (8)
History of STI infection			
No	224	9	233 (67)
Yes	84	33	117 (33)

Table 2: Risk factors associated cervical pre-cancer and cancer.

Variables	Histology results		P value	COR	Lower 95% CI	Upper 95% CI
	CIN II$^-$(n=308)	CIN II $^+$ (n=42)				
HPV result						
Negative	213	1				
Positive	95	41	<0.01	0.01	0.001	0.080
VIA results						
Negative	275	4	<0.01	0.003	0.001	0.022
Positive	33	38	<0.01	79.2	26.6	235.8
(in years)						
<30	89	2				
≥30	219	40	<0.05	8.13	1.92	34.4
Educational status						
Illiterate	262	34				
Primary	25	4	0.71	0.811	0.26	2.47
High school and above	21	4	0.51	0.681	0.22	2.104
Monthly in-come						
<2000	62	11				
2000-5000	114	17	0.68	1.19	0.52	2.69
>5000	132	14	0.23	1.67	0.72	3.89
Marital status						
Single	39	9				
Married	203	26	0.16	1.80	0.78	4.14
Widowed/divorced	66	7	0.15	2.17	0.75	6.30
Parity						
<3	110	6				
4 to 6	142	26	<0.01	3.36	1.34	8.42
>6	56	10	<0.05	3.28	01.13	9.49
Occupation						
Employed	117	17				
Others	191	25	0.76	1.11	0.56	2.14
Residence						
Rural	192	31	0.15	1.70	0.82	3.51
Urban	116	11				
Age at first marriage (in years)						
<18	106	23				
18-20	111	14	0.14	0.58	0.28	1.19
>20	91	5	<0.01	0.25	0.09	0.69
Age at first sexual debut (in years)						
<18	107	22				
18-20	108	15	0.28	0.68	0.33	1.38
>20	93	5	<0.01	0.26	0.09	0.71
Number of current sexual partner						
≥2	193	34	<0.05	2.53	1.13	5.66
1	115	8				
Number of life time sexual partner						
≥2	189	32	<0.06	2.01	0.96	4.25
1	119	10				
Use of Condom during sexual intercourse						
No	165	30				
Yes	143	12	<0.01	0.36	0.17	0.76
Hormonal contraceptive use						
No	256	25				
Yes	52	17	<0.01	3.34	1.69	6.64

Continued.

Variables	Histology results		P value	COR	Lower 95% CI	Upper 95% CI
	CIN II$^-$(n=308)	CIN II $^+$ (n=42)				
Personal hygiene						
No	221	27				
Yes	87	15	0.32	0.71	0.36	1.39
Comorbidity						
No	234	22				
Yes	74	20	<0.01	2.87	1.48	5.56
Have you heard about cervical cancer						
No	211	27				
Yes	97	15	0.58	1.21	0.62	2.37
History of cervical cancer screening						
No	241	30				
Yes	67	12	0.32	1.44	0.69	2.96
Family history of cervical cancer						
No	284	38				
Yes	24	4	0.69	1.25	0.41	3.78
History of STI infection						
No	224	9				
Yes	84	33	<0.01	9.78	4.49	21.29

DISCUSSION

The most prevalent cancer that disproportionately affects women in underdeveloped countries, such as Ethiopia, is cervical cancer.[11] The objective of this study was to determine the prevalence and associated factors of cervical pre-cancer and cancer among women attending the cervical cancer unit of Felege Hiwot Comprehensive Specialized Hospital.

In this study, the prevalence of cervical cancer and pre-cancer lesions was 12% and 20% respectively; these findings were similar to a study in Ethiopia that reported in Sub-Saharan Africa, the combined prevalence of cervical cancer was 10.29% (95% CI: 7.77, 11.26), with considerable variation between nations.[12] Another study conducted in Ethiopia reported the percentage of Ethiopian women with cervical lesions was 14.1%.[13] This study identified several key risk factors significantly associated with cervical intraepithelial neoplasia grade 2 or worse (CIN II+), including HPV infection, VIA positivity, older age (≥30 years), history of sexually transmitted infections (STIs), hormonal contraceptive use, comorbidities, early sexual debut (<18 years), multiple current sexual partners (≥2), lack of condom use, and high parity (4–6 children).

In the current study, the strongest association was observed with HPV infection, where HPV-positive women had 90.9 times higher odds of CIN II+ compared to HPV-negative women. This finding is consistent with numerous studies confirming that persistent high-risk HPV (HR-HPV) infection is the necessary cause of cervical pre-cancer and cancer.[14-16] Specifically, HPV16 and HPV18 account for approximately 70% of CIN2+ cases worldwide.[17-19] Our study reinforces the critical need for HPV vaccination programs and HPV-based screening, particularly in low-resource settings where cytology (Pap smears) may not be widely available. In our study, VIA-positive women had 79.2 times higher odds of CIN II+, supporting its use as a cost-effective screening method where advanced diagnostics are lacking. However, prior studies note that VIA has variable specificity (50–70%), leading to false positives.[20,21] While VIA remains useful in low-income regions, HPV DNA testing (or co-testing with VIA) improves detection accuracy and should be prioritized where feasible.

In this study, women aged ≥30 years had 8.1 times higher odds of CIN II+, consistent with global data showing peak CIN2+ incidence between 30–45 years.[22] This likely reflects cumulative HPV exposure, slower viral clearance with age, and hormonal changes affecting cervical immunity. Screening programs should prioritize women ≥30, as they are at higher risk of progression to cancer. In the present study, a history of STIs increased CIN II+ risk by 9.8 times, corroborating studies showing that genital infections promote HPV persistence by causing chronic inflammation and immune suppression.[23] HIV-positive women, in particular, have a 5-fold higher risk of CIN2+ due to impaired immune surveillance.[24] These findings underscore the importance of integrated STI and cervical cancer screening programs, especially in high-HIV-prevalence regions.

The findings of the present study indicated that hormonal contraceptive users had 3.3 times higher odds of CIN II+, supported by a study that indicated the proposed mechanisms include progesterone-induced upregulation of HPV oncogenes (E6/E7) and reduced cervical mucosal immunity.[25] Women on long-term hormonal contraception should be encouraged to undergo regular cervical screening. A study in Ethiopia had also confirmed that the risk of precancerous lesions was almost five times higher

for women who used oral contraceptives for more than five years.[26]

The findings of the present study indicated that later sexual debut (age >20) is significantly associated with lower odds of CIN II+, while multiple sexual partners (≥2) doubled the risk, and condom use during sexual intercourse reduced risk by 36%. These findings are consistent with another study in Ethiopia which reported that having several sexual partners (AOR=1.83, 95% CI: 1.21–3.29) and starting sex early in life (AOR=1.38, 95% CI: 1.20–5.13) were linked to cervical cancer.[27]

In this study, women with 4–6 children had 3.4 times higher odds of CIN II+, in agreement with a systematic review and meta-analysis conducted in Ethiopia that reported parity and precancerous cervical lesions are significantly correlated. Women with parity more than two had a 4.97-fold (POR=4.97; 95% CI: 3.17, 7.78) higher chance of developing a precancerous cervical lesion than women with parity less than or equal to two.[28]

Limitations

This study has some limitations. First, as the study was facility-based and conducted in a single tertiary hospital, the findings may not be generalizable to all women in the general population, particularly those who do not access healthcare services. Second, information on some behavioral and reproductive factors relied on self-report, which may be subject to recall bias or social desirability bias. Additionally, although histopathological examination was used as the gold standard for diagnosis, sampling and laboratory errors cannot be entirely ruled out. Finally, the study did not assess certain potential confounders such as HIV viral load or immune status, which could influence cervical cancer progression.

CONCLUSION

This study highlights a substantial burden of cervical pre-cancer and cancer among women attending the cervical cancer unit at Felege Hiwot Comprehensive Specialized Hospital, with a prevalence of 12% for cancer and 20% pre-cancer. Several socio-demographic, sexual, and reproductive characteristics were significantly associated with CIN II+, notably HPV infection, VIA positivity, older age (≥30 years), history of sexually transmitted infections, use of hormonal contraceptives, presence of comorbidities, early sexual debut, multiple sexual partners, lack of condom use, and high parity (≥4 children). Among these, HPV infection and VIA positivity were the most potent predictors. These findings reaffirm the pivotal role of persistent high-risk HPV infection as the primary etiological agent in the development of cervical cancer. The study also emphasizes the importance of behavioral and reproductive health factors, many of which are modifiable. Therefore, strengthening HPV vaccination coverage, expanding access to accurate screening methods such as VIA and HPV DNA testing, and promoting awareness on safe sexual practices, contraceptive counseling, and early screening are essential strategies in reducing the incidence and progression of cervical cancer. Additionally, the results underscore the need for integrated reproductive health services that include STI treatment, education about cervical cancer, and targeted interventions for high-risk groups, especially women living in rural areas with limited access to health education and preventive care. Tailoring cervical cancer prevention and control strategies to these socio-demographic and behavioral risk profiles will be critical for achieving long-term reductions in cervical cancer morbidity and mortality in Ethiopia and similar low-resource settings.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. World Health Organization (WHO). Cervical Cancer Fact Sheet. 2023. Available at: https://www.who.int/newsroom/factsheets/detail/cervical-cancer. Accessed on 20 August 2025.
2. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global Cancer Statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2021;71(3):20949.
3. Bruni L, Albero G, Serrano B, Mena M, Collado JJ, Gómez D, et al. HPV and Related Diseases Report. ICO/IARC Information Centre on HPV and Cancer. 2023. Available at: https://hpvcentre.net/statistics/reports/XWX.pdf. Accessed on 20 August 2025.
4. International Agency for Research on Cancer (IARC). Ethiopia Cancer Fact Sheets. Globocan. 2022. Available at: https://gco.iarc.who.int/media/globocan/factsheets/populations/231-ethiopia-fact-sheet.pdf. Accessed on 20 August 2025.
5. Arbyn M, Weiderpass E, Bruni L, de Sanjosé S, Saraiya M, Ferlay J, et al. Estimates of incidence and mortality of cervical cancer in 2020: A worldwide analysis. Lancet Glob Health. 2020;8(2):e191203.
6. Okunade KS, Sun K, Okunade A. Risk factors for cervical cancer among African women: A systematic review. J Glob Oncol. 2022;6:1-12.
7. Bayu H, Berhe Y, Mulat A, Alemu A. Cervical cancer screening service uptake and associated factors among age-eligible women in Ethiopia: A systematic review and meta-analysis. PLoS One. 2021;16(10):e0258209.
8. Getachew S, Getachew E, Gizaw M, Ayele W, Addissie A, Kantelhardt EJ, et al. Cervical cancer screening knowledge and barriers among women in Addis Ababa, Ethiopia. BMC Womens Health. 2020;20(1):1-8.
9. World Health Organization (WHO). Global Strategy to Accelerate the Elimination of Cervical Cancer as a Public Health Problem. 2020. Available at:

https://www.who.int/publications/i/item/9789240014107. Accessed on 20 August 2025.
10. Rantshabeng P, Kasvosve I, Ndlovu A, Gaseitsiwe S, Moyo S. Prevalence of high-risk human papilloma virus in women with high-grade squamous cell intraepithelial lesions in Botswana using Abbott RealTime HPV assay. PLoS One. 2019;14(1):1-9.
11. Derbie A, Mekonnen D, Nibret E, Abebe T, Biadglegne F, Mihret A, et al. Cervical cancer in Ethiopia: a review of the literature. Cancer Causes Control. 2023;34:1-11.
12. Hailegebireal AH, Bizuayehu HM, Tirore LL. Far behind 90-70-90's screening target: the prevalence and determinants of cervical cancer screening among Sub-Saharan African women: evidence from Demographic and Health Survey. BMC Cancer. 2024;24(1):1050.
13. Temesgen T, Adhena G, Figa Z. Precancerous cervical lesion among women in public hospitals of Addis Ababa, Ethiopia. Cancer Res J. 2020;8(4):94-9.
14. Kabir I, Ribeiro RM. HPV and cervical cancer: From molecular diagnostics to emerging treatment approaches (Review). World Acad Sci J. 2025;7(4):58.
15. Downham L, Jaafar I, Rol ML, Stanczuk G, Kelly H, Michelow P, et al. Accuracy of HPV E6/E7 oncoprotein tests to detect high-grade cervical lesions: a systematic literature review and meta-analysis. Br J Cancer. 2024;130:517-25.
16. Zhang R, Xu W, Yang S, Li Z, Chen X, Wang Y, et al. Prevalence of high-risk human papillomavirus infection, associated risk factors, and relationship with cervical precancerous lesions in perimenopausal and older women in an area with high cervical cancer incidence in China. Cureus. 2024;16(4):e58081.
17. Lagos M, Van De Wyngard V, Poggi H, Caceres L, Meza G, Vargas J, et al. HPV16/18 genotyping for the triage of HPV positive women in primary cervical cancer screening in Chile. Infect Agents Cancer. 2015;10:43.
18. Sierra MS, Tsang SH, Hu S, Porras C, Herrero R, Kreimer AR, et al. Risk factors for non–human papillomavirus type 16/18 cervical infections and associated lesions among HPV DNA–negative women vaccinated against HPV-16/18 in the Costa Rica vaccine trial. J Infect Dis. 2021;224(3):503-16.
19. Kelly H, Jaafar I, Chung M, Michelow P, Greene S, Strickler H, et al. Diagnostic accuracy of cervical cancer screening strategies for high-grade cervical intraepithelial neoplasia (CIN2+/CIN3+) among women living with HIV: a systematic review and meta-analysis. EClinicalMedicine. 2022;53.
20. Baena A, Mesher D, Salgado Y, Martínez S, Villalba GR, Amarilla ML, et al. Performance of visual inspection of the cervix with acetic acid (VIA) for triage of HPV screen-positive women: results from the ESTAMPA study. Int J Cancer. 2023;152(8):1581-92.
21. Bogale AL, Teklehaymanot T, Kassie GM, Medhin G, Ali JH, Belay NB. Performance of visual inspection with acetic acid for cervical cancer screening as compared to human papillomavirus DNA testing among women with HIV in Ethiopia: a comparative cross-sectional study. Cancer Control. 2022;29.
22. Bruni L, Albero G, Serrano B, Mena M, Collado JJ, Gómez D, et al. Human Papillomavirus and Related Diseases in Ethiopia. Summary Report 22 October 2021. ICO/IARC HPV Information Centre. 2023. Available at: https://hpvcentre.net/statistics/reports/ETH.pdf. Accessed on 20 August 2025.
23. Mekuria M, Edosa K, Endashaw M, Tadesse S, Alemayehu D, Belay F, et al. Prevalence of cervical cancer and associated factors among women attending cervical cancer screening center at Gahandi Memorial Hospital, Ethiopia. Cancer Inform. 2021;20.
24. Stelzle D, Tanaka LF, Lee KK, Khalil AI, Baussano I, Shah AS, et al. Estimates of the global burden of cervical cancer associated with HIV. Lancet Glob Health. 2021;9(2):e161-71.
25. Rani J, Yadav S, Yadav R, Chhabra R. Hormonal dynamics of cervical cancer: role of estrogen and progesterone. Cell Biochem Funct. 2025;43(5):e70082.
26. Teklehaimanot DA, Mekuria AD, Dadi AF, Terefe MW, Kassa GM, Asmare TA, et al. Precancerous lesion determinants in women attending cervical cancer screening at public health facilities in North Shoa Zone, Amhara, Ethiopia: an unmatched case-control study. BMC Womens Health. 2024;24:271.
27. Mekuria M, Edosa K, Endashaw M, Tadesse S, Alemayehu D, Belay F, et al. Prevalence of cervical cancer and associated factors among women attending cervical cancer screening center at Gahandi Memorial Hospital, Ethiopia. Cancer Inform. 2021;20.
28. Ferede YA, Tassew WC, Zeleke AM. Precancerous cervical lesion and associated factors among HIV-infected women in Ethiopia: systematic review and meta-analysis. BMC Cancer. 2024;24:678.

Cite this article as: Mengestu AA, Yemenu MA. Determinants of cervical pre-cancer and cancer among women attending cervical cancer clinic in Felege Hiwot Comprehensive Specialized Hospital, Northwest Ethiopia. Int J Sci Rep 2025;11(11):394-401.