

# Precancerous Cervical Lesions Among HIV-Infected Women Attending HIV Care and Treatment Clinics in Southwest Ethiopia: A Cross-Sectional Study

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**Background:** Despite being one of the few cancers that can be prevented with simple testing, cervical cancer is the fourth most common cancer in women. HIV-positive women showed a median three-fold higher incidence of cervical lesions.

**Aim:** This study aims to assess the prevalence and factors associated with precancerous cervical lesions among HIV-infected women attending care and treatment clinic in selected hospitals of Southwestern Ethiopia.

**Methods:** Institution-based cross-sectional study was conducted from February 1 to July 30, 2018. A systematic random sampling technique was employed to select 454 HIV-infected women. Pretested interviewer-administered questionnaire and medical record review were used for data collection. Visual inspection with Acetic acid was done for participants to detect precancerous cervical lesions. Data were analyzed by SPSS version 20. Binary and multiple logistic regression analyses were done. The presence and strength of association were determined using AOR with its 95% CI. Variables with a P value of less than 0.05 were considered as statistically significant.

**Results:** The prevalence of precancerous cervical lesion was 18.7% [95% CI; (15.1–22.4%)]. Currently, not being on highly active antiretroviral treatment [AOR= 2.31, 95% CI: 1.23–4.39], age (20–29 years) [AOR= 0.185, 95% CI: 0.036,0.939], has no history of sexually transmitted infection [AOR=0.026, 95% CI: 0.006–0.116], has no history of genital wart [AOR= 0.261, 95% CI: 0.073–0.934] and having one lifetime sexual partner [AOR=0.133, 95% CI: 0.024–0.726] were found to be significantly associated with precancerous cervical lesion.

**Conclusion:** The prevalence of Precancerous Cervical lesion was found to be high in this study. Expansion of screening services and undertaking preventive measures against sexually transmitted infection need to be emphasized.

**Keywords:** precancerous cervical lesion, HIV positive, prevalence, factors, Ethiopia

## Introduction

In 2018, cervical cancer was the fourth most common cancer in women and the ninth overall, with an estimated 569,847 new cases. There were an estimated 311,365 deaths from cervical cancer worldwide. Nine out of ten (90%) cervical cancer deaths occur in low- and middle-income countries.<sup>1</sup> This can be explained by a lack of access to effective screening services that facilitate early detection and

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treatment.<sup>2</sup> In Ethiopia, cervical cancer was the second leading cancer diagnosis among adult women, with an estimated 6,294 new cases and 4,844 deaths annually.<sup>3</sup>

Despite being one of the few cancers that can be prevented with simple testing, cervical cancer is affecting women in the prime of their lives, causing suffering and death in a critically important segment of the world's population.<sup>4</sup> In urban populations at increased risk for both diseases, cervical cancer is a crucial Acquired Immuno Deficiency Syndrome (AIDS)-defining illness and maybe the most common AIDS-related malignancy in women.<sup>5</sup> Women infected with the Human Immunodeficiency Virus (HIV) showed a median three-fold higher incidence of cervical lesions than uninfected women.<sup>6</sup> Different studies in Africa indicated the varied prevalence of Precancerous Cervical Lesions (PCCL) among HIV-infected women, ranging between 4.4%-42.4%.<sup>7-13</sup> Similarly, the various prevalence of PCCL among HIV-infected women were reported on limited studies conducted in Ethiopia, such as 22.1% in southern Ethiopia,<sup>14</sup> 20.2% in northwest<sup>15</sup> and 9.9% in Amhara Regional State.<sup>16</sup>

Invasive cervical cancers are usually preceded by a long phase of the preinvasive disease, which can be detected early with different screening techniques. The screening techniques include cervical cytology, Visual Inspection, or Human Papillomavirus (HPV) Testing.<sup>17</sup> In low- and middle-income countries, because of the required resources, skilled personnel, need for referral to distant health facilities for diagnostic and treatment services, and the long waiting times before cytology, the "Screen-and-treat" approach is an alternative approach. In such approach, the treatment decision is based on a screening test, and treatment is provided soon or, ideally, immediately after a positive screening test.<sup>18</sup> Currently, this single-visit approach is being applied in the study area. However, data on the prevalence of precancerous cervical lesion lack especially among the high-risk group, HIV infected women. Therefore, this study aimed at assessing the prevalence and factors associated with PCCL among HIV infected women attending care and treatment clinics in selected hospitals of Southwestern Ethiopia.

## Methods

### Study Design, Setting, and Participants

An institution-based cross-sectional study was conducted from February to July 2018 in randomly selected hospitals of Southwestern Ethiopia. The selected hospitals were Mizan-Tepi University Teaching Hospital, G/tsadik

Shewo Memorial Hospital, and Tepi General Hospital, found in Bench Maji, Keffa, and Sheka zone, respectively. The hospitals apply a single visit approach and offer VIA screening for all voluntary eligible women free of charge. All HIV-infected women aged 18 years and above attending care and treatment clinic during the study period were eligible for enrollment. However, women with prior total hysterectomy, who has a history of Cervical cancer, and pregnant women were excluded.

### Sample Size and Sampling Technique

Sample size was calculated using single population proportion formula by taking account of the proportion of precancerous cervical lesion,  $P=22.1\%$ ,<sup>14</sup>  $CI=95\%$ , margin of error  $=4\%$  and non-response rate  $=10\%$ . A total of 454 HIV-infected women attending HIV care and treatment clinic at selected hospitals during the study period were invited to participate. A systematic random sampling technique was employed to select study participants. The total number of women who visit CTC (N) was estimated by considering the immediate previous six-month record. Lottery method was used to select the first participant (the first sampling unit). Then, after every 2nd unit included until the required sample reached. The sample size for each institution was distributed proportionally.

### Data Collection Tool and Procedures

Data on participants' demographic, reproductive, behavioral, and HIV-related care were collected using pretested, interviewer-administered structured questionnaires, and reviewing medical records. VIA was done for all participants for the detection of precancerous cervical lesion. Trained midwives working in the screening and treatment center collect the data and conduct the screening procedure supervised by three BSc midwives. Before the actual data collection, a pretest was done on 5% of women in another hospital, and necessary corrections were made accordingly. After informed consent was obtained, relevant obstetric and gynecological history was obtained and recorded. Women were reassured that the procedure was painless. A step-by-step procedure for cervical screening using VIA was applied based on A Practical Manual on Visual Screening for Cervical Neoplasia. Results of VIA were classified according to the International Agency for Research Against Cancer Manual<sup>19</sup> and recorded after each test. Women with confirmed VIA positive results eligible for cryotherapy were treated with cryotherapy. A patient with a cervix suspicious for cancer or PCCL ineligible for cold coagulation referred to the gynecology clinic.

**Table 1** Sociodemographic Characteristics of HIV-Infected Women Attending HIV Care and Treatment Clinics in Selected Hospitals of Southwest Ethiopia; 2018 (n=444)

Variables		Number	Percent
Age	20–29	111	25
	30–39	274	61.7
	>40	59	13.3
	Mean ( $\pm$ Std. Deviation)	34.43 ( $\pm$ 5.722)	-
Residence	Urban	325	73.2
	Rural	119	26.8
Educational status	No education	113	25.4
	Primary	189	42.6
	Secondary	82	18.5
	College/university	60	13.5
Marital status	Married	189	42.6
	Single	90	20.3
	Widowed	85	18.9
	Divorced	80	18.2
Occupation	Self-employee	152	34.2
	Unemployed	128	28.8
	Government employee	68	15
	Farmer	48	11
	Trader	48	11

## Data Analysis

Data were analyzed by SPSS version 20. Descriptive statistics were computed. Binary logistic regression analysis was done, and all explanatory variables with a p-value less than 0.2 were entered into multiple logistic regression model. The second analytical step used a stepwise backward model. Then, association was assessed using AOR and its 95% CI. And p-value of <0.05 was considered statistically significant. The goodness of model fitness was tested by using Hosmer and Lemeshow test.

## Results

### Sociodemographic Characteristics

Data were analyzed from 444 women making a response rate of 97.8%. The mean age of the participants was 34 (SD $\pm$ 5.72). Around three fourth (73.2%) of respondents were urban residents. Near to half (42.6%) were married, self-employed (34.2%), and attend primary education 189 (42.6%) (Table 1).

### Sexual and Reproductive Characteristics

The mean age at first sexual intercourse was 15.24 years (SD $\pm$ 1.437). More than half (52.7%) of participants had their first sexual intercourse before 15 years. The mean age at first pregnancy was 19.99 (SD $\pm$ 3.102) years. Two-third (68%) of participants had more than a one-lifetime sexual partner. Around three-fourth of the participants had given birth at least once (71.2%) and ever used oral contraceptives (72.7%). Nearly two-thirds (64.1%) of the participants had no history of abortion. More than a quarter of women (30.2%) had a history of sexually transmitted infection (STI) (Table 2).

### Immunological and Behavioral Characteristics

More than two-thirds of the study participants (63%) were on Highly Active Antiretroviral Treatment (HAART). The mean baseline CD4 count of the participants while initiating HAART was 130.9 copies/mm<sup>3</sup> (SD $\pm$ 52.4), and the

**Table 2** Reproductive Health Characteristics of HIV-Infected Women Attending Care and Treatment Clinics in Selected Hospitals of Southwest Ethiopia; 2018 (n=444)

Variables		Frequency	Percentage
Age at first sexual intercourse)	<15	234	52.7
	15–17	188	42.3
	>18	22	5
	Mean ( $\pm$ SD)	15.24 ( $\pm$ 1.437)	
Parity (n=351)	0	16	4.6
	1–4	250	71.2
	>5	85	24.2
Lifetime number of sexual partners	One	142	32
	Two or more	302	68
Ever history of STI	Yes	134	30.2
	No	310	69.8
Ever history of genital wart	Yes	90	20.3
	No	354	79.7
Ever use of oral contraceptive	Yes	323	72.7
	No	121	27.3
Time of last menstrual period	< 12 months ago	396	89.2
	$\geq$ 12 months ago	48	10.8
History of abortion (N=351)	Yes	126	35.9
	No	225	64.1

recent mean CD4 count was 312.93 copies/mm<sup>3</sup> (SD  $\pm$ 219.38). Only 32 (7.2%) participants had a history of cigarette smoking (Table 3).

## Prevalence of PCCL

Among 444 HIV-infected women screened for precancerous cervical lesions, 83 (18.7%) were found to be positive. Two women had suspicious invasive cervical cancer and sent to a gynecologic clinic.

## Factors Associated with Precancerous Cervical Lesion

Age of participant, being on HAART, history of STI, number of lifetime sexual partner, and history of genital wart was significantly associated with PCCL.

Younger women aged 20–29 years were 81.5% less likely to be positive for PCCL than older women (>40 yrs) [AOR=0.185, 95% CI: 0.036–0.939]. Women who were not on HAART were about 2.31 times more likely to develop PCCL [AOR= 2.31, 95% CI: 1.23–4.39]. Those women who had one-lifetime sexual partner were 86.67% less likely to be positive for PCCL [AOR=0.133, 95% CI: 0.024–0.726]. HIV-infected women with no prior history of genital wart were 73.9% less likely to develop PCCL

**Table 3** Immunological Characteristics of HIV-Infected Women in Three Screening Centers, Southwest Ethiopia, 2018 (N=444)

Variables		Frequency	Percentage
Current use of HAART	Yes	280	63
	No	164	37
Current HAART use duration (N=280)	< 12 months	58	20.7
	12–36 months	99	35.3
	>36 months	123	44
Base line CD4 count before HAART (N=280)	<200	245	87.5
	>200	35	12.5
	Mean ( $\pm$ Std. Deviation)	130.9(SD $\pm$ 52.4)	
Recent CD4 count after HAART (N=280)	<200	72	25.7
	>200	208	74.3
	Mean ( $\pm$ Std. Deviation)	312.93(SD $\pm$ 219.38)	
Ever history of smoking	Yes	32	7.2
	No	412	92.8
Who clinical stage	Stage one	335	75.5
	Stage two	64	14.4
	Stage three	45	10.1

[AOR= 0.261, 95% CI: 0.073–0.934]. Also, those women who had no STI history were 97.4% less likely to be positive for PCCL [AOR=0.026, 95% CI: 0.006,0.116] (Table 4).

## Discussion

Various studies have shown a high prevalence of PCCL, indicating Cervical cancer and HIV infection are major public health problems facing women in developing countries like Ethiopia. This study aimed to assess the prevalence and factors associated with PCCL at three selected hospitals in Southwest Ethiopia. In this study, the prevalence of PCCL among HIV positive women was 18.7% (95% CI: 15.1–22.4). This finding is comparable with a study in southern Ethiopia.<sup>14</sup> However, it is lower than a study in Tanzania (26.8%).<sup>7</sup> This might be due to the difference in the sexual characteristics of participants. In such study, the participants had a higher number of lifetime sexual partners.<sup>8</sup> That might increase their exposure to HPV infection, the predominant cause of PCCL. The prevalence of PCCL in this study was also found to be lower than a study in Kenya.<sup>8</sup> This can be due to variation in the WHO clinical stage of participants. The majority of participants in Kenya were on stage III & IV. The advanced stage of HIV might increase their risk of PCCL.<sup>20</sup> The prevalence of PCCL in this study is higher than a study in Northern Ethiopia.<sup>16</sup> It is also higher than a study in cote d'Ivoire (9.0%)<sup>12</sup> and in Uganda (3%).<sup>21</sup> The variation can be possibly explained by the difference in characteristics of study participants. The higher prevalence of PCCL in this study highlights the need to expand the screening service throughout the health service facilities in the region and provision of health education regarding cervical cancer and its screening for the vulnerable community.

This study revealed that women who were not on HAART were about 2.31 times more likely to develop PCCL. This is consistent with the study done in Kenya,<sup>8</sup> Tanzania<sup>11</sup> and Southern Ethiopia.<sup>14</sup> This attributes to the reason that being on HAART boosts women's immunity and reduce the tendency to develop PCCL. It can also be explained by the fact that HAART lowers HPV acquisition, and increases clearance via immune reconstitution.<sup>22</sup> This finding supports the current practice of early initiation of HAART for all HIV positive individuals regardless of CD4 count and WHO clinical stage. Those women who had no history of STI were 97.4% less likely to be positive for VIA screening test. This finding is similar to a study conducted in Tanzania,<sup>23</sup> North Uganda<sup>21</sup> and Southern

**Table 4** Logistic Regression Analysis of Factors Associated with PCCL in a Selected Hospital, Southwest Ethiopia, 2018

Variables		PCCL		COR (95% CI)	AOR (95% CI)	p-value
		No n(%)	Yes n(%)			
Age	20–29	97(87.4)	14(12.6)	0.079(0.016,0.15)	0.185(0.036,0.939)*	0.04
	30–39	241(87.6)	33(12.4)	0.074(0.015,0.084)	0.019(0.005,0.081)*	0.01
	>40	21(35.5)	38(64.5)			
Age at first sexual intercourse	<15	165(68.9)	69(31.1)	0.896(0.023,1.545)	1.348(0.222,8.204)	0.17
	15–17	179(95.5)	9(4.5)	0.107(0.002,0.65)	0.123(0.015,1.029)	
	>18	15(40)	7(60)			
Life time number of sexual partners	One	131(92.2)	11(7.8)	0.258(0.141,0.542)	0.133(0.024,0.726)*	0.04
	Two or more	228(75.5)	74(24.5)			
Current use of HAART	Yes	235(83.9)	45(16.1)			0.026
	No	124(75.6)	40(24.4)	1.684(1.120,2.956)	2.31(1.23–4.39) *	
Ever history of STI	Yes	56(41.8)	78(58.2)			0.001
	No	303(97.7)	7(2.3)	0.016(0.005,0.028)	0.026(0.006,0.116) *	
Ever had history of genital wart	Yes	50(55.5)	40(44.5)			0.001
	No	309(87.2)	45(12.8)	0.182(0.071,0.217)	0.261(0.073,0.934)*	

**Note:** \*Statistically significant at  $P < 0.05$ .

Ethiopia.<sup>14</sup> This can be explained by the fact that HPV infection is more prevalent in STI patients due to its sexually transmitted nature.<sup>24</sup> However, a contradicting finding was reported on a study in Mekelle, which indicated that STI's history was not significantly associated with PCCL.<sup>25</sup> In this study, those women who had one-lifetime sexual partner were less likely to be positive for PCCL. It is supported by different studies.<sup>7,14,25,26</sup> The increased number of sexual partners increases the chance of acquiring HPV infection, the predominant cause of PCCL.<sup>3</sup> A significant association was obtained between PCCL and age; older women were more likely to acquire precancerous cervical cancer lesion than younger ones. Similar results were found in the study done in China.<sup>27</sup> This might attribute to the quality of life of the youth and the time required for a cervical precancerous lesion to develop. Women with no history of genital warts were less likely to develop precancerous cervical lesion. This finding goes with a study conducted in Tanzania.<sup>23</sup>

## Limitations

In this study, the prevalence of PCCL was assessed by VIA result only as a result, visually inapparent PCCL could have been missed due to its limited sensitivity and specificity. The results may not be generalizable to HIV negative women.

## Conclusions

The prevalence of precancerous cervical lesion was found to be high in this study. Preventive measures against sexually transmitted infection are required. Further studies which address large population regardless of their HIV status using highly sensitive and specificity screening techniques are needed.

## Data Sharing Statement

The data sets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Ethics Approval and Consent to Participate

This study was conducted in accordance with the Declaration of Helsinki. Ethical clearance obtained from Mizan-Tepi University research and community support officers. Before this survey, a formal letter was submitted to heads of the respective zonal health offices and health facilities. The study's objective, benefit, and risks were explained to the participants before data collection and obtained written informed consent from all respondents. The study participants were assured of the attainment of confidentiality, and the information they give us will not be used for any purpose other than the study.

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## Author Contributions

All authors made a significant contribution to the work reported. Whether in the conception, study design, execution, acquisition of data, analysis, interpretation, or in all these areas. They took part in drafting, revising, or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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## Disclosure

The authors declare that they have no conflicts of interest for this work.

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