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Incidence and Predictors of Cervical Cancer Among Women Living with HIV/AIDS in Addis Ketema Sub-city in Addis Ababa, Ethiopia

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Abstract
Introduction: Due to limited access to prevention and treatment services, the cervical cancer trend is increasing in developing countries. There is inadequate information on the incidence and predictors of Cervical Cancer among women living with HIV/AIDS in Addis Ketema Sub-city.
Objectives: To assess the incidence and predictors of Cervical Cancer among women living with HIV/AIDS in Addis Ketema Sub-city in Addis Ababa, Ethiopia
Methods: Facility-based cross-sectional study was conducted among women with HIV/AIDs in the Addis ketema sub-city from September to October 2022. A covenant sampling technique will be employed. A total of 373 Women with HIV/AIDs screened for cervical cancer were included. Data were coded, cleaned, and entered into SPSS version 25 for analysis.
Results: The overall incidence of cervical cancer was 16 (7.6%). Overall 64 (17.2%) women had good knowledge about cervical; cancer and its prevention strategies. The majority of respondents 237 (63.5%) have a positive attitude. About two-thirds of women 244 (65.4%) were screened for cervical cancer. More than one-half of women were screened by self-initiation 123 (50.4%) followed by offered by health professionals 121 (49.6%). Having primary school complete educational status, Adjusted odds ratio (AOR) = 1.198) when compared with college and above, screening offered by health professionals, AOR = 4.453 when compared to self-initiation were positive, having good knowledge about cervical cancer screening and prevention strategies AOR = 0.475 were independently associated with the incidence of cervical cancer.
Conclusion: The prevalence of cervical cancer screening and knowledge about screening and prevention strategies was low. More than seven out of a hundred women screened have confirmed and or suspected cervical cancer. Therefore, all relevant stakeholders should work on awareness creation programs. Further research should be conducted to investigate other factors that contribute to the presence of cervical cancer by involving more strong methods.
Work plan and budget: This study will be conducted from September 1 to October 2022. A total of 27,759.60 Birr will be required for this study.
Keywords: Women living with HIV/AIDs, Incidence of Cervical Cancer, Addis ketema sub-city
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1. Introduction

1.1. Background

Cervical cancer or cancer of the cervix is due to the abnormal growth of glandular cells of the cervix that can invade another part of the body. There are 2 main types of cervical cancers, Squamous cell carcinoma (SCC) which is the most common type, accounting for 70% of cases, and Adenocarcinoma which is a less common type (about 25% of cases) (1). The primary cause of cervical pre-cancer and squamous cervical cancer is persistent or chronic infection with one or more of the high-risk (cancer-causing or oncogenic) types of Human papillomavirus (HPV) (1, 2). Other risk factors include giving birth to many children, smoking, using oral contraceptives for a long time, low immune system, and having first sexual intercourse initiation at an early age (1-3).

Trends in cervical cancer incidence in sub-Saharan Africa (Gambia, Kenya, Malawi, Mauritius, Seychelles, South Africa, Uganda, and Zimbabwe) involving a total of 21,990 cases of cervical cancer showed that Incidence rates had increased in all registries for some or all of the periods studied, except for Mauritius with a constant annual 2.5% decline (4). Data from the Global Burden of Disease study 2019 showed decreasing trends were observed in most countries/territories, particularly DALYs. However, increasing trends were detected in Lesotho, Zimbabwe, and Bulgaria (5).

The cervical cancer trend is significantly reduced in high-income countries due to early diagnosis and treatment and the trend is increasing in developing countries (6). In a population-based study on epidemiological trends of women's cancers from 1990 to 2019 at the global, regional, and national levels, in most regions especially developing countries, cervical cancer was the second most common women's cancer after breast

cancer (7, 8). Women living with human immunodeficiency virus (HIV) infection have a much higher risk of human papillomavirus infection and cervical cancer than do HIV-uninfected women (9). Cervical cancer remained a significant predictor of mortality among HIV-positive women when adjusted for age, race, and insurance coverage (10). A higher prevalence of persistent infections with multiple high-risk-HPV strains contributes to a greater risk of precancerous lesions. The natural history of cervical cancer follows a prolonged period of a pre-malignant disease stage, commonly described as CIN which can take up to 10 years before the progression to invasive cancer (11). Studies have reported that, among HIV-infected women, the risk of developing cervical cancer is 10 years earlier than in the general population, with a high rate of progression to advanced disease with a poor prognosis (12).

A comparative modeling analysis conducted in 78 low-income and lower-middle-income countries to evaluate the mortality impact of achieving WHO cervical cancer elimination targets showed the importance of acting immediately on three fronts to scale up vaccination, screening, and treatment for pre-invasive and invasive cervical cancer (13, 14). Infections caused by high-risk human papillomavirus (HPV) are responsible for 7.7% of cancers in developing countries, mainly cervical cancer. This disease is steadily increasing in sub-Saharan Africa, with more than 75,000 new cases and 50,000 deaths yearly, further increased by HIV infection. By the year 2030, cervical cancer will kill more than 443,000 women yearly worldwide, most of them in sub-Saharan Africa (15, 16).

Women living with HIV have a high prevalence of HPV infection and related diseases, including cervical cancer. HIV-related risk factors, such as immunodeficiency and chronic persistence of infection play an important role in its pathogenesis (17). Several studies showed a predominance of advanced disease at the time of diagnosis compared to the general population and a poorer treatment outcome. Furthermore, the progression from a high-grade lesion to cancer is faster in WLHA than in the general population. Peculiar features of HIV-related cervical disease are the high frequency of extensive lesions, multifocality, and a high percentage of relapses (17).

In Ethiopia, cervical cancer (CC) ranks as the 2nd most frequent cancer, and the country had 27.19 million women at risk of developing the disease though only 0.6 % of women aged 18-69 years were screened every 3 years. About 22.1% of southern Ethiopia HIV-infected Women were positive for precancerous cervical cancer (18)(12). In Ethiopia, it is estimated that 29.43 million women were at risk of developing cervical cancer, with an estimated 7,095 and 4,752 annual numbers of new cases and deaths, respectively. It is one of the second leading causes of cancer among all women and the leading cause of cancer-related deaths among women 15 to 44 old years. About 4.8% of women in the general population are estimated to harbor cervical HPV-16/18 infection at a given time, and 67.9% of invasive cervical cancers are attributed to HPV 16 or 18 (19, 20). There is inadequate information on the incidence and predictors of cervical cancer in women with HIV/AIDs in Ethiopia. Therefore, this study was conducted to assess the incidence and predictors of Cervical Cancer among women living with HIV/AIDS in Addis Ketema Sub-city in Addis Ababa, Ethiopia.

2. Method and materials

2.1. Study Area

The study was conducted in Addis Ketema Sub-city in Addis Ababa. Addis Ketema Sub-city is selected randomly. Addis Ketema Sub-city is one of the sub-cities under the Addis Ababa City administration.

2.2. Study Design and Period

A retrospective follow-up study was conducted among health facilities providing HIV/AIDs care services from September 5 to October 5/2022 in Addis Ketema Sub-city in Addis Ababa.

2.3. Population

2.3.1. Source population

The source population was all HIV-infected women aged 25 years and above living in Addis Ketema Sub-city in Addis Ababa and attending public health facilities for HIV/AIDS care

2.3.2. Study population

All HIV-infected women aged 25 years and above (i.e. cervical cancer screening recommended for people with a cervix beginning at age 25) and registered from September 5, 2021, to September 5, 2022, at ART health center and for which confirmatory cervical cancer test is done

2.4. Sampling and sample size determination

2.4.1. Sample Size Determination

The sample size for the first objective: All HIV-infected women enrolled for ART and who have cervical cancer tested in -sub city from June 5 to September 5, 2022 GC was included. Sample size calculation for the second objective for the predictor variable by using double population proportion formula considering the following

assumptions: 95% CI, power 80%, the ratio of unexposed to exposed 1:1, and parameters:
P1: is the percent of exposure with the outcome
P2: is the percent of non-exposed with the outcome to calculate the required sample size.
Finally, it is calculated by using Epi info version 7 statistical packages.
Table 1: Sample size determination by using the double population proportion formula.

The second specific objective	**Factor considered**	**P1**	**P2**	**Odds ratio**	**Sample size**	
					ni	Ni + non response rate (5%)
Factors associated with cervical cancer	Age category 38-47	73.4	43.9	0.284	100	105
	Age category >=48	73.4	37.1	0.214	68	71
	Educational status (Secondary)	68.84	46.47	0.393	170	179
	Educational status (diploma & above)	68.84	50.4	0.460	242	254

Accordingly, the maximum sample size is based on the above two objectives' estimated sample size. We take the highest sample size which was from the first objective was 373.

2.4.2. Sampling procedure

In the Addis Ketema sub-city there are five health facilities and all of them were included in the study to make the data more representative participants were assumed Homogenous based on the ART and cervical cancer test service modalities. This study conducts on the entire health facility found in this sub-city because the researcher is interested in all of them the institutions in which cervical cancer exposed HIV/AIDS-infected women's receiving cervical cancer test services.

2.4. Data Collection Tools and Procedures

The structured questionnaire was used after being adapted and modified from different kinds of literature (1, 21). The questionnaire was developed in English and translated to the local language and then back-translated to English to check for its consistency. A pre-test was done among 5% of HIV-positive mothers at ART health centers in the Gulele sub-city. Based on the pre-test, corrections were made to the questionnaire. The eligible women were interviewed from ART health centers by trained data collectors, and supervision was conducted on the process of the data collection. The data were collected by 6 BSc holder nurses and 2 supervisors who have Master's degrees in public health. The training was given to data collectors and supervisors for one day.

2.5. Inclusion and Exclusion criteria

2.5.1. Inclusion criteria

- All HIV-positive women living in Addis Ketema sub-city and attending public health facilities for HIV/AIDs care and who have a test for cervical cancer from September 5 to 2021 to September 5, 2022, and willing to participate in the study

2.5.2. Exclusion criteria

HIV/AIDS-infected women without definite or valid cervical cancer tests during the study period (from September 5 2021 to September 5, 2022) and who had no complete data also were excluded.

2.6. Study variables

2.6.1. Dependent variables

- Incidence of cervical cancer

2.6.2. Independent variables

- **Socio-demographic characteristics**: maternal age, maternal weight, maternal height, religion, marital status, educational status, occupational status, family size, residence
- **Knowledge of risk factors** (early sexual intercourse, having multiple sexual partners, use of modern oral contraceptives, and multiparty)
- **Behavioral factors** (physical activity, smoking status, alcohol drinking, and feeding practice).
- **Women's health condition (**Hypertension, Diabetes, Stress, Adequate rest during pregnancy)
- **Women's lifestyle (**Smoking status, Alcohol use, Illegal drug use, Physical activity status)

2.7. Operational definitions

Incidence is the rate of new cases or events over a specified period for the population at risk for the event. In medicine, the incidence is commonly the newly identified cases of a disease or condition per population at risk over a specified timeframe (one year). Therefore, the Incidence rate of the disease was calculated by dividing the

proportion of HIV-positive women screened for cervical cancer by the total number of women at risk (HIV-positive women) (22).

2.8. Data collection instrument and procedure

A structured interviewer administrative questionnaire and data abstraction sheet was used to collect data. Questionnaires are prepared in English and the patient interview part of the questionnaire was translated into Amharic and translated back into English to check its consistency. The Amharic version of the patient interview questionnaire and the English version of the data abstraction format were used for data collection.

2.9. Data quality control

To ensure the quality of data, a carefully designed data collection tool was prepared. A common understanding between the data collectors and supervisors of the overall study was maintained by providing two days of training. Data quality was assured by using a structured, pre-tested, and interviewer-administered questionnaire. The questionnaire was assessed for clarity, and challenging questions to understand and respond to were rephrased. Six data collectors and 2 supervisors were used to collect data and supervision. Data collectors and supervisors were trained for one day before data collection. Consistency and completeness were checked on a daily base during the interview period by supper visors and the principal investigator. Again at the end of each day, the principal investigator collected the all filled questionnaire during day time from data collectors and checked the data for completeness and consistency. The necessary feedback was given to the data collectors and supervision was conducted accordingly.

2.10. Data processing, and analysis

The collected data were checked for completeness and consistency by the principal investigator on daily basis on the spot during the data collection time. Then the data were coded, entered, and analyzed by using SPSS version 25 software. Then the result of the study was presented in tables and figures. Descriptive analyses were computed using frequency for categorical variables. Moreover, the mean (standard deviation) and median (interquartile) were computed for continuous variables. We categorized women as underweight (BMI $< 18.5\ kg/m^2$), normal weight (BM $18.5–22.9\ kg/m^2$) and overweight (BMI $\geq 23\ kg/m^2$) (23). Multicollinearity was checked to test correlation among independent variables using the variance inflation factor. Binary logistic regression analysis will be done to determine the association of each independent variable with the Incidence of cervical cancer among women living with HIV/AIDs, and then independent variables with a p-value <0.2 in the binary analysis were included in the multivariable logistic regression model to identify predictors of Incidence of cervical cancer among women living with HIV/AIDs. A p-value of <0.05 was considered statistically significant in all analyses.

2.11. Ethical consideration

An approval letter was obtained from, Addis Ababa Medical and Business College, department of public health to get permission to conduct the study. Permission was obtained from the Addis Ketema sub-city administration before data collection. The aim and protocol of the study were fully explained to all study participants included in the study and written informed consent was obtained from each participant. The confidentiality of the participants was maintained throughout the study. All methods were performed by the approved institutional guidelines.

2.12. Dissemination of Result

After the completion of the study, the result will be compiled and presented to Addis Ababa Medical and Business College, department of public health. Results will be also disseminated to the Addis ketema sub-city health office and the Ministry of Health. Also, an attempt will be made to publish the results in a peer-reviewed journal.

3. Results

3.1. Socioeconomic factors

A total of 373 women with HIV/AIDs receiving care at public health facilities participated in this study. The mean age of women was 47.41 ± 9.9 ranging from 25 to 64 years. About religion, more than one-half 194 (52.0%) followed by protestant 134 (35.9%). concerning, ethnicity Oromo, and Amhara were the two dominant ethnic groups 108 (28.9%), and 81 (21.7%). More than one-half 197 (52.8%) were earning below 2480 Ethiopian birr per month. The median monthly income of participants was 2000 ranging from 800 to 20,000 ETB (Table 2).

Table 2: Sociodemographic characteristics of women living with HIV/AIDS in Addis Ketema Sub-city in Addis Ababa, Ethiopia (n=373)

Sociodemographic characteristics		Frequency	Percent
Age	Below 40 years	81	21.7
	40- 65 years	292	78.3
Religion	Orthodox	194	52.0
	Muslim	35	9.4
	Protestant	134	35.9
	Catholic	10	2.7
Ethnicity	Oromo	108	28.9
	Amhara	81	21.7
	Gurage	99	26.5
	Tigire	38	10.2
	Sidama	21	5.6
	Wolaita	26	7.0
Marital status	Married	335	89.8
	Widowed	10	2.7
	Separated	22	5.9
	Single	6	1.6
Income	< 2480 ETB	197	52.8
	2480 ETB and Above	176	47.2
Level of Education	Primary school completed	237	63.5
	Secondary school completed	75	20.1
	College and above	61	16.4
Occupation	Employed	106	28.7
	Merchant	127	34.0
	Housewife	139	37.2

3.2. Risk exposure among participants

Less than one-half of women 161 (43.2%) reported that they know someone in a relative with cervical cancer. More than three-fourths 281 (75.3%) women had 3-5 children. The majority of women reported that they had their first sex between 21-25 years. The overall incidence of cervical cancer (confirmed and suspected) was 16 (7.6%) (Table 3).

Table 3: Cervical cancer risk exposure of women living with HIV/AIDS in Addis Ketema Sub-city in Addis Ababa, Ethiopia

Risk exposure		***Frequency***	***Percent***
Do you know anyone with CCA	Yes	161	43.2%
	No	212	56.8%
Number of children	1-2	81	21.8%
	3 – 5	281	75.3%
	Above 5	11	2.9%
Age at First intercourse	15 years and below	5	1.3%
	16-20 years	99	26.5%
	21 -25 years	248	66.5%
	26 and above	21	5.6%
Do you use contraceptive	Yes	254	68.1%
	No	119	31.9%
If yes what type (n=254)	Oral contraceptives	110	43.3%
	Injectable	22	8.7%
	Norplant	27	10.6%
	Barriers	95	37.4%
Have you screened for CCA	Yes	210	56.3%
	No	163	43.7%
What is the Recent finding (n=210)	Normal	194	92.4%
	Suspected	2	1.0%
	Positive	14	6.7%
Overall all CC prevalence (n=210)	Yes	16	7.6%

Risk exposure		***Frequency***	***Percent***
	No	194	92.4%
If suspected or positive Received treatment	Yes	10	62.5%
	No	6	37.5%
Presence of comorbidity	Yes	113	30.3%
	No	260	69.7%
Type of comorbidity (n=113)	Hypertension	50	44.2%
	Diabetes	43	38.1%
	Kidney disease	15	13.3%
	Mental illness	5	4.4%

Concerning the Cd4 count, the mean CD4 count during the screening was 377.8 ± 75.4 ranging from 220 to 570 cells/m^3 (Figure 2).

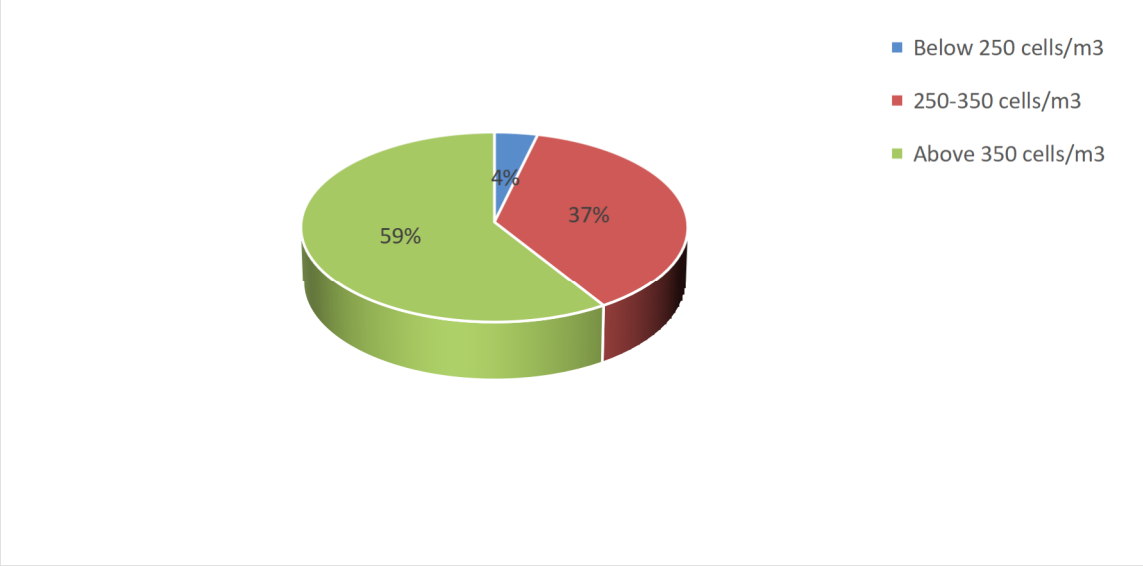

Figure 2: CD4 cell count during screening for cervical cancer among women living with HIV/AIDS in Addis Ketema Sub-city in Addis Ababa, Ethiopia (n=210)

3.3. Knowledge about Cervical cancer screening and prevention strategies

Patients were asked about sixteen cervical CA-related knowledge questions and patients who answered more than 70 percent or at least 11 questions correctly were labeled as having good knowledge and otherwise poor. Overall 64 (17.2%) women have good knowledge about cervical; cancer and its prevention strategies. The majority of women 259 (69.4%) received information from media followed by Broachers and printed materials 64 (17.2%). The majority of women 153 (41.0%) reported that vaginal bleeding is a symptom of cervical cancer followed by a foul smell of vaginal discharges 82 (22.0%) and a combination of the earlier two 64 (17.2%) (Table 4).

Table 4: Knowledge of Cervical cancer and its prevention strategies among women living with HIV/AIDS in Addis Ketema Sub-city in Addis Ababa, Ethiopia

Knowledge assessment questions		Frequency	Percent
Heard about Cervical cancer	Yes	259	69.4
	No	114	30.6
Where do you first hear about CC	News Media	259	69.4
	Health professionals	50	13.4
	Broachers and printed materials	64	17.2
What are the symptoms of CC	Vaginal bleeding	153	41.0
	The foul smell of Vaginal discharges	82	22.0
	Don't know	74	19.8
	Vaginal bleeding and foul smelling virginal discharges	64	17.2
How long have you been using	6-10	3	44.5
	Above 10	5	55.5
Are you currently using	Yes	9	5.1

Knowledge assessment questions		Frequency	Percent
contraceptive	No	5	1.3
Do you smoke	Yes	190	50.9
	No	183	49.1
How can we prevent CC	HPV vaccination	131	35.1
	Avoid multiple sexual partners	74	19.8
	Avoid Early sexual intercourse	69	18.5
	Avoid having many children	36	9.7
	Avoid using OCP for a long time	8	2.1
	Quit smoking	8	2.1
	Screening for CCA	10	2.7
	All can apply	37	9.9
Can CCA be cured at an early stage	Yes	257	68.9
	No	116	31.1
What are CC treatments	Herbal remedies	114	30.6
	Surgery	85	22.8
	Specific medicines	97	26.0
	Radiotherapy	61	16.4
	I don't know	16	4.3
How expensive is CC treatment?	It is free	114	30.6
	It is reasonably priced	85	22.8
	Moderately expensive	97	26.0
	It is very expensive	61	16.4
	I don't know	16	4.3
Are there a screening process	Yes	259	69.4
	No	114	30.6
How frequent is screening	Once a year	185	49.6
	Once every three years	171	45.8
	Once every 5 years	10	2.7
	I don't know	7	1.9
Who should be screened	Women 25 years and above	231	61.9
	Prostitutes	102	27.3
	Elderly women	20	5.4
	I don't know	20	5.4
Do you know the screening procedures	Yes	259	69.4
	No	114	30.6
Can you mention some screening methods?	VIA	231	61.9
	VILI	102	27.3
	Pap smear	20	5.4
	I don't know	20	5.4
Overall knowledge score	Good Knowledge	64	17.2
	Poor Knowledge	309	82.8

Concerning the risk factors, the majority 153 (41.0%) reported that acquiring human papillomavirus is a major risk factor for Cervical cancer followed by having multiple sexual partners 82 (22.0%) and early sexual intercourse 74 (19.8%) (Figure 2).

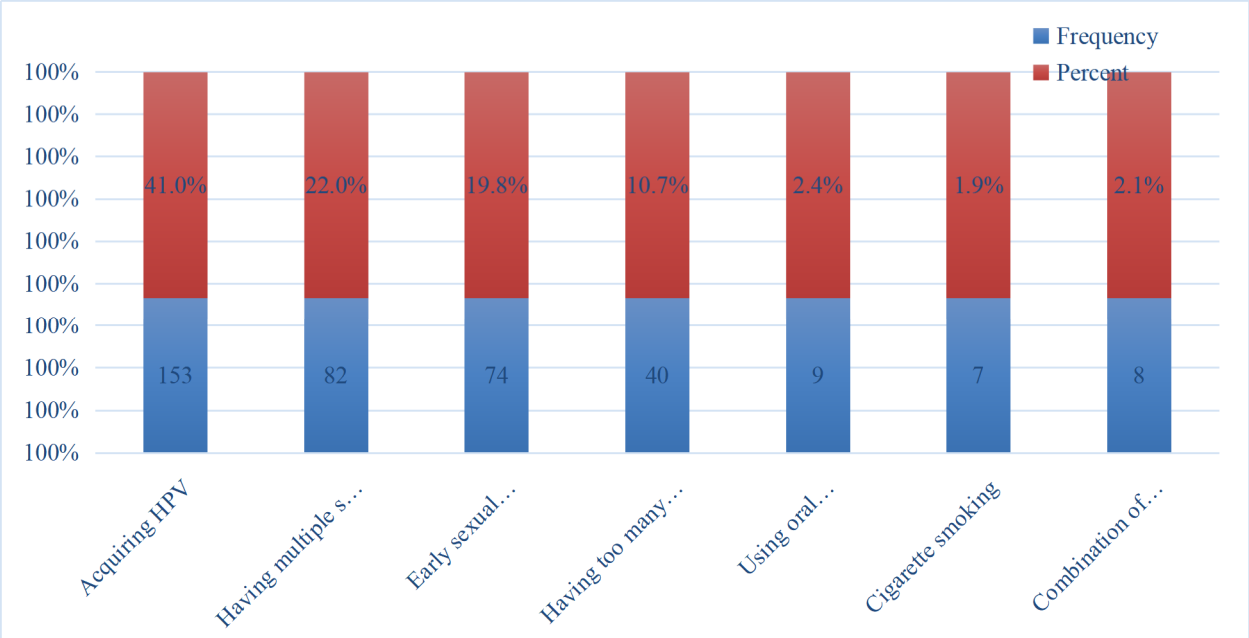

Figure 3: Reported risk factors of cervical cancer among women living with HIV/AIDS in Addis Ketema Sub-city in Addis Ababa, Ethiopia

3.4. Attitude toward Cervical cancer screening

The majority of respondents 237 (63.5%) have a positive attitude (an attitude that enhances cervical cancer prevention and control) (Table 5).

Table 5: Attitude of women against cervical cancer among women living with HIV/AIDS in Addis Ketema Sub-city in Addis Ababa, Ethiopia

Cervical cancer attitude assessment questions	Strongly agree	Agree	Neutral	Disagree
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
CCA highly Prevalent in Ethiopia	231 (61.9%)	102 (27.3%)	20 (5.4%)	20 (5.4%)
Any adult woman can acquire CCA	249 (66.8%)	89 (23.9%)	17 (4.6%)	18 (4.8%)
CCA cannot be transmitted from person to person	190 (50.9%)	98 (26.3%)	33 (8.8%)	52 (13.9%)
Screening helps CCA prevention	271 (72.7%)	68 (18.2%)	16 (4.3%)	18 (4.8%)
Screening cases no harm to clients	277 (74.3%)	64 (17.2%)	14 (3.8%)	18 (4.8%)
Screening premalignant lesions not expensive	282 (75.6%)	62 (16.6%)	11 (2.9%)	18 (4.8%)
If screening is free and has no harm you will screen	237 (63.5%)	102 (27.3%)	18 (4.8%)	16 (4.3%)

3.5. Practice toward Cervical cancer screening

About two-thirds of women 244 (65.4%) were screened for cervical cancer. More than one-half of women were screened by self-initiation 123 (50.4%) followed by offered by health professionals 121 (49.6%) (Table 4).

Table 6: Cervical cancer screening and prevention practice among women living with HIV/AIDS in Addis Ketema Sub-city in Addis Ababa, Ethiopia (n=373)

Cervical cancer screening and prevention practice		Frequency	Percent
Have heard about the screening	Yes	259	69.4
	No	114	30.6
Have you ever screened for STI	Yes	256	68.6
	No	117	31.4
Have you screened for CCA	Yes	244	65.4
	No	129	34.6
Where did you screen	Hospital	216	57.9
	Health center	28	7.5
What was indication	Self-initiation	123	50.4
	Offered by a health professional	121	49.6
When was the last screened	Within the last 3 years	244	65.4

Concerning the reason for not screening, the majority reported that they are shy 81 (62.8%) about the procedure followed by the claim they are healthy 23 (17.8%) (Figure 3).

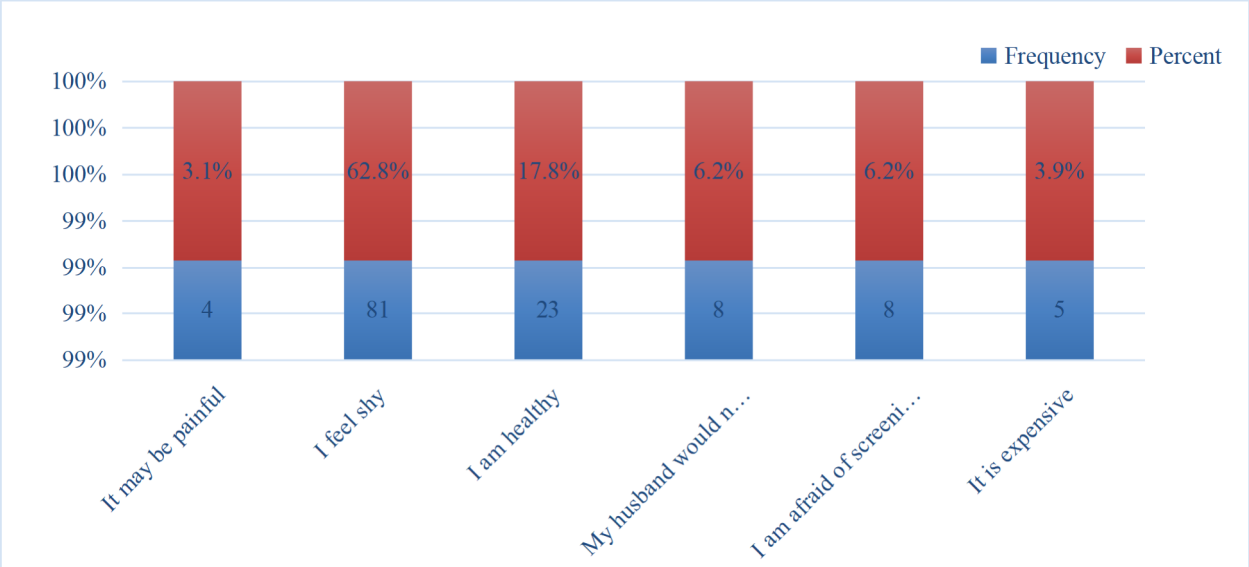

Figure 4: Reasons for not screening for cervical cancer among women living with HIV/AIDS in Addis Ketema Sub-city in Addis Ababa, Ethiopia (n=129)

3.6. Factors associated with cervical cancer

After bivariate analysis had been conducted, only four variables had a statistically significant association. Having primary school complete educational status, crude odds ratio (COR) = 6.914 (95% confidence interval (C.I) for COR, 1.966– 24.322, p = 0.00), knowing relative with cervical cancer, COR = 2.952 (95% C.I) for COR, 1.029– 8.468, p = 0.044), and screening offered by health professionals, COR = 2.826 (95% C.I) for COR, 1.767– 10.415, p = 0.019) were positively associated with presence of cervical cancer. While having good knowledge about cervical cancer screening and prevention strategies is negatively associated with the presence of cervical cancer, COR = 0.293 (95% (C.I) for COR, 0.102– 0.839, p = 0.022). Multivariable logistic regression analysis was conducted to identify independent predictors of the presence of cervical cancer. All those independent variables with p-value < 0.05 in bivariate analysis were considered for Multivariable logistic regression through forwarding and backward stepwise likelihood ratio consecutively. Having primary school complete educational status, Adjusted odds ratio (AOR) = 1.198 (95% C.I) for AOR, 1.05– 2.789, p = 0.021) when compared with college and above, and screening offered by health professionals, AOR = 4.453 (95% C.I) for AOR, 1.109– 6.890, p = 0.027) when compared to self-initiation were positively associated with the presence of cervical cancer. While, having good knowledge about cervical cancer screening and prevention strategies is negatively associated with the presence of cervical cancer AOR = 0.475 (95% C.I) for AOR, 0.284– 0.958, p = 0.019).

Table 7: Multivariable analysis showing predictors of the presence of cervical cancer among women living with HIV/AIDS in Addis Ketema Sub-city in Addis Ababa, Ethiopia (n=129)

Presence of CCA[a]			Presence of CCA		Sig.	COR	95% CI, COR		Sig.	AOR	95% CI, COR	
			Yes (16)	No (194)			Lower	Upper			Lower	Upper
	Level of Education	Primary school complete	4 (3.2%)	121 (96.8%)	.003	6.914	1.966	24.322	.021*	1.198	1.050	2.780
		Secondary school complete	4 (9.5%)	38 (90.5%)	.237	2.171	.601	7.850	.591	.652	.137	3.103
		College and above	8 (18.6%)	35 (81.45)	Ref.					Ref.		
	Know anyone with CCA in relatives	Yes	6 (4.6%)	124 (95.45)	.044	2.952	1.029	8.468	.072	.330	.098	1.105
		No	10 (12.5%)	70 (87.5%)	Ref.					Ref.		
	Knowledge score	Good Knowledge	7 (16.3%)	36 (83.7%)	.022	0.293	.102	.839	0.019 *	0.475	0.284	0.958
		Poor Knowledge	9 (5.4%)	158 (94.6%)	Ref.					Ref.		
	What was indication for screening	Self-initiation	3 (4.4%)	65 (95.6%)	Ref.					Ref.		
		Offered by a health professional	13 (12.5%)	91 (87.5%)	.019	2.826	1.767	10.415	0.027*	4.453	1.109	6.890
a. The reference category is: No. Sig; P-value; COR; Crude Odds Ratio, AOR; Adjusted Odds Ratio. CCA; Cervical cancer												
b. This parameter is set to zero because it is redundant.												

4. Discussion

4.1. General description of the study

In this study we assessed incidence and predictors of Cervical Cancer among 373 women living with HIV/AIDS in Addis Ketema Sub-city in Addis Ababa, Ethiopia. The overall prevalence of cervical cancer (confirmed and suspected) was 16 (7.6%). This is lower than findings from a retrospective study conducted to evaluate the influence of HIV/AIDS on cervical cancer from Tanzania involving 536 women showed that the prevalence of invasive cervical cancer was 8% in HIV-seronegative women and 11% in HIV-positive women (24). However, this is higher than a multi-cohort study conducted in to investigate cervical cancer risk in women living with HIV across four continents (Europe, South Africa, Latin and North America) among women living with HIV who initiated antiretroviral therapy (ART) between 1996 and 2014 showed that raw ICC incidence rates per 100,000 person years were 447 in South Africa (95% confidence interval [CI]: 382–523), 136 in Latin America (95% CI: 85–219), 76 in North America (95% CI: 48–119) and 66 in Europe (95% CI: 57–77). Compared to European women ICC rates at 5 years after ART initiation were more than double in Latin America (adjusted hazard ratio [aHR]: 2.43, 95% CI: 1.27–4.68) and 11 times higher in South Africa (aHR: 10.66, 95% CI: 6.73–16.88), but similar in North America (aHR: 0.79, 95% CI: 0.37–1.71) (25).

Knowledge about cervical screening and prevention strategies and level of self-initiated screening were low. Overall 64 (17.2%) women have good knowledge about cervical; cancer and its prevention strategies. About two-third of women 244 (65.4%) were screened about cervical cancer. More than one half of women were screened by self-initiation 123 (50.4%) followed by offered by health professionals 121 (49.6%). This is in line with, study conducted in Ethiopia showed that, data on knowledge of HIV infected women regarding cervical cancer and acceptability of screening is scarce in Ethiopia (26). This is in line with a cross sectional, questionnaire based survey conducted to assess comprehensive knowledge and uptake of cervical cancer screening is low among women living with HIV/AIDS in Northwest Ethiopia showed that , only 64 (21.2%) of respondent were knowledgeable about cervical cancer and screening and only 71 (23.5%) of respondents were ever screened in their life time (26).

4.2. Factors associated with cervical cancer in People living with HIV/AIDS

In this study variables like CD4 count and age were not associated with incidence of cervical cancer. However, a case control study conducted to determine factors associated with cervical precancerous lesions among women screened for cervical cancer in Addis Ababa, Ethiopia showed that women aged 40–49 years had 2.4-fold higher odds of precancerous lesions compared to those aged 30–39 (AOR= 2.4, 95% CI: 1.27–4.54). Women having history of sexually transmitted infections were significantly associated with cervical precancerous lesion compared to their counterparts (AOR = 3.20, 95% CI: 1.26–8.10) (27). A retrospective study conducted to evaluate the influence of HIV/AIDS on cervical cancer from Tanzania involving 536 women showed that being older than 30 years of age (OR, 11.99; 95% CI, 6.86 to 21.21; $P < .001$) (24). A cross-sectional study conducted

to evaluate epidemiology of cervical squamous intraepithelial lesions in 715 HIV infected women initiated on Antiretroviral Therapy (ART) in Kenya showed that for a one-unit decrease of CD4, we expect 1.23 log odds of increasing the severity of cervical cancer (B=1.23, P< 0.015), given that all of the other variables in the model are held constant (28). Another study also showed that overall, Incidence cervical cancer rates increased with age (>50 years *vs*. 16–30 years, aHR: 1.57, 95% CI: 1.03–2.40) and lower CD4 cell counts at ART initiation (per 100 cell/µl decrease, aHR: 1.25, 95% CI: 1.15–1.36) (25). The difference could be due to variation in population included and type of screening service applied. In our study majority of people were above 30 years of age, and the CD4 count was above 200 cells/m3. Therefore, insignificant number of young age women and those with low CD4 count were participated. This could contribute to the claimed non statistical difference in age and CD4 count.

Having primary school complete educational status, Adjusted odds ratio (AOR) = 1.198 (95% C.I) for AOR, 1.05– 2.789, p = 0.021) when compared with college and above. A cross-sectional study conducted to assess prevalence and predictor of cervical cancer screening service uptake Among Women Aged 25 Years and Above in Sidama Zone, Southern Ethiopia showed that among 838 women, only 17.8% (95% CI, 15.2%-20.5%) have undergone for cervical cancer screening. Being age of 35-39 (AOR = 5.2, 95% CI = 2.6-10.6), College and above Educational level (AOR = 3.8, 95% CI = 1.5-9.6), Ever had HIV test (AOR = 2.8, 95% CI = 1.82-4.4) and high perceived self-efficacy (AOR = 4.4, 95% CI = 1.527-12.84) were significant predictors for cervical cancer screening service uptake (1).

Screening offered by health professionals, AOR = 4.453 (95% C.I) for AOR, 1.109– 6.890, p = 0.027) when compared to self-initiation were positively associated with presence of cervical cancer. A facility based cross sectional study conducted to assess willingness and acceptability of cervical cancer screening among women living with HIV/AIDS in Addis Ababa, Ethiopia showed that the independent variables significantly associated with acceptance of screening were educational level, source of information, awareness for the test and preventability of the disease (18). A study conducted to evaluate Knowledge Attitude and Practice on Cervical Cancer and Screening among Reproductive health Service Clients, Addis Ababa, Ethiopia showed source of information from health professionals (AOR= 1.8, 95% CI (1-3.2)) were found to be statistically significant towards knowledge of cervical cancer screening and Knowing someone diagnosed with cervical cancer (AOR= 2.1, 95 CI (1.2-3.4) (3).

Having good knowledge about cervical cancer screening and prevention strategies is negatively associated with presence of cervical cancer AOR = 0.475 (95% C.I) for AOR, 0.284– 0.958, p = 0.019). This is in line with a cross sectional, questionnaire based survey conducted to assess comprehensive knowledge and uptake of cervical cancer screening is low among women living with HIV/AIDS in Northwest Ethiopia showed that age between 21 and 29 years old (AOR = 2.78, 95% CI = 1.71–7.29), perceived susceptibility to develop cervical cancer (AOR =2.85, 95% CI = 1.89–6.16) and comprehensive knowledge of cervical cancer (AOR = 3.02, 95% CI = 2.31–7.15) were found to be strong predictors of cervical cancer screening service uptake (26). A study conducted to evaluate Knowledge Attitude and Practice on Cervical Cancer and Screening among Reproductive health Service Clients, in Addis Ababa, Ethiopia showed that overall knowledge of cervical cancer was 43.8% and knowledge of cervical cancer screening was 27% and 56% of participants had a positive attitude towards cervical cancer screening. And the overall practice of cervical cancer screening was 3.5%. Being knowledgeable of cervical cancer (AOR=5.0,95% CI;2.7-3.0) was found to be statistically significant towards knowledge of cervical cancer screening and Knowing someone diagnosed with cervical cancer (AOR= 2.1, 95 CI (1.2-3.4)) and being knowledgeable of cervical cancer (AOR=3, 95%CI (1.8-5.3)) were statistically significant predictors for a positive attitude towards cervical cancer screening (3).

5. Conclusion and recommendations

In conclusion, the prevalence of cervical cancer screening and knowledge about screening and prevention strategies was low. More than seven out of a hundred women screened have confirmed and or suspected cervical cancer. Having primary school complete educational status, screening offered by health professionals, and having good knowledge about cervical cancer screening and prevention strategies were associated with the presence of cervical cancer.

Based on the above conclusion, the following recommendation are forwarded: To improve cervical cancer screening and knowledge about screening and prevention strategies, all relevant stakeholders, including the Ministry of Health, Addis Ababa Health, bureau, and respective public health facilities should work on awareness creation programs. Health professionals offered counseling and screening for cervical cancer should also be encouraged. Further research should be conducted to investigate other factors that contribute to the presence of cervical cancer by involving more strong methods.

6. References

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Abbreviations and Acronyms
CC: Cervical Cancer
CCS: Cervical Cancer Screening
FMOH: Federal Ministry of Health
HC: Health Center
KAP: Knowledge Attitude Practice
LBC: Liquid-Based Cytology
PLWH: People Living With HIV/AIDS
VIA: Visual Inspection with Acetic acid
VILI: Visual Inspection with Lugol's iodine
WHO: World Health Organization