ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

Factors Associated With Cervical Precancerous Lesion among Women Screened for Cervical Cancer in Addis Ababa, Ethiopia 2016

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List of Acronyms and Abbreviations

AOR……..Adjusted Odds Ratio

ART……..Antiretroviral Therapy

CI……..Confidence Interval

CIN……...Cervical Intraepithelial Neoplasia

CIS……Carcinoma in Situ

CSA……...Central Statistical Agency

DNA……..Deoxyribonucleic Acid

EDHS……Ethiopia Demographic and Health Survey

HIV……..Human Immunodeficiency Virus

HPV…….Human Papilloma Virus

HSIL…….High Grade Squamous Intraepithelial Lesion

LEEP…….Loop Electrosurgical Excision Procedure

LSIL……..Low Grade Squamous Intraepithelial Lesion

OC…….Oral Contraceptive

OR…….Odds Ratio

SCJ……Squamocolumnar Junction

SIL……Squamous Intraepithelial Lesion

SPSS……....Statistical Packages for Social Sciences

STD……..Sexually Transmitted Disease

STI……Sexually Transmitted Infection

VIA……..Visual Inspection with Acetic Acid

WHO……World Health Organization

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Abstract

Background: Cervical cancer is the second most prevalent cancer among women in the developing countries including Ethiopia. Identifying the factors associated with cervical precancerous lesion may help us to address the cervical cancer related problem. Studies on the issues of factors associated with cervical precancerous lesion in women are limited in Ethiopia.

Objective: To determine factors associated with cervical precancerous lesion among women screened for cervical cancer in Addis Ababa.

Methods: Hospital based unmatched case control study was conducted in selected health facilities of Addis Ababa city from March to April 2016. Data was collected from 114 cases and 229 controls using interviewer administered questionnaire and entered to Epi Info version 7 and exported to SPSS version 20 for analysis. The odds ratio with their 95% confidence interval and two-tailed P value were calculated. Variables with P value ≤ 0.2 in the bivariate analysis were included in the multivariate logistic regression. Statistical significance was declared if P value < 0.05.

Result: The magnitude of cervical precancerous lesion was 12.8%. Being in the age group of 40-49 years (44.9%) were significantly associated with cervical precancerous lesion than being in age group of 30-39 years (39.07%) (AOR=2.40, 95%CI (1.27-4.54)). Women having history of sexually transmitted infections (18.08%) were significantly associated with cervical precancerous lesion than those who did not have history of sexual transmitted infection (81.92%) (AOR=3.20, 95%CI (1.26-8.10)). Women who had two or more lifetime sexual partners (AOR= 2.17 95%CI (1.01-4.67)) and those whose husband had two or more other lifetime sexual partners (AOR=3.03, 95%CI (1.25, 7.33) were significantly associated with cervical precancerous lesion.

Conclusions: Age group of 40-49 years, lifetime history of sexual transmitted infections, two or more life time sexual partners of the women and two or more other lifetime sexual partners of the husband were increasing risk of cervical precancerous lesion. Women above the age of 40 years, with history of sexually transmitted infections and history of multiple sexual partners should be encourage to be screened for cervical cancer.

Key Words: cervical cancer, cervical precancerous lesion, Addis Ababa and Ethiopia.

1. Introduction

1.1. Background

Cervical precancerous lesion is a lesion which begins in the cell lining of the cervix**,** which grow and replicate in an abnormal and uncontrolled way (1)**.** The transformation zone or squamocolumnar junction (SCJ) is the commonest place where cervical precancerous lesion starts to grow; Under microscopic examination cervical precancerous lesion are two main types: Squamous cell carcinoma about 80-90% of cervical cancer and the remaining type is adenocarcinoma (2). Histologically cervical precancerous lesion is graded in to three cervical intraepithelial neoplastic (CIN) stages; those are CIN I, CIN II & CIN III an abnormalities either regress or progress gradually into cervical cancer (1). Cervical precancerous lesion is not yet cancer but there is a higher chance to become cancer if it is not treated; It may take 10 years or more to change into cancer, but occasionally this happens in less time (3). Cervical cancer is preventable in most cases and curable if identified and treated in its precancerous stage (4).

Cervical cancer is the second most prevalent cancer among women in the developing countries including Ethiopia, and the largest killer cancer among women in those countries (5). Worldwide 874 million women age of 15 years and older are at risk of cervical cancer; 530,232 new cervical cancer cases are diagnosed and 275,008 cervical cancer deaths occur annually. About 86% of the global cervical cancer burden occurs in less developed countries (6). Out of 20 countries globally with highest age standardised mortality rate from cervical cancer sixteen of them are African countries like Malawi, Mozambique, Zambia, Zimbabwe, Tanzania and Swaziland etc. Ethiopia is one of the countries with highest mortality from cervical cancer by absolute number (7).

Human papilloma virus (HPV) infection is the main risk factor for cervical cancer and rarely without this risk factor develops cervical cancer (8, 9). There are several risk factors increase chance of getting cervical cancer like; immunosuppressant (HIV and others), long term use of birth control pills, starting sexual activities at age of 16 years or less, smoking, poverty, give birth before the age of 17 years, lack of screening, having multiple full term pregnancies, multiple sexual partners and/or partner who have multiple partners, and family history (2, 10).

Screening with visual inspection with acetic acid (VIA) in resource limited settings is commonly preferable method than HPV test and cytologic or Pap smear. This is because it does not need testing requirements (trained cytotechnicians or pathologists and other programmatic requirement) (11). Recently, in Ethiopia cervical cancer screening centers are being established to provide screening services for all women. Screening women for cervical cancer is important because these women were found to be a high-risk group for developing invasive cervical cancer and asymptomatic at the early stage, and they have difficulty to take the action. (12).

1.2. Statement of the problem

Cervical precancerous lesion is a slowly progressive disease which starts with mild form then grows to the cancer stage (5). Ethiopia has a population of 27.19 million women age of 15 years and older who are at risk of developing cervical cancer; Every year 7095 women are diagnosed with cervical cancer and 4732 die from cervical cancer (13). Cervical cancer causes highest mortality rate compared to other types of cancers among the women in Ethiopia (14). A five year follow up shows that as stage of the cancer increase the percentage of mortality increase and better survival shows among women identify the risk factors and treat early with different treatment modality (15). The causes of high mortality rate and low survival are poor access to medical facilities, poor nutrition and co-morbid conditions and lack of screening practice at the early stage (16). Moreover, a study done in Addis Ababa shows low knowledge about risk factors and prevention methods limit the cervical cancer screening practice (17). And study conducted in Jimma shows poor knowledge was observed on cervical cancer and associated risk factors (18).

Lack of funds for investigations and treatment was a risk factor for poor prognosis of cervical cancer and many patients presented to the health facilities at the late stage of the disease this is another factor that negatively affect the outcome management (19).

In Ethiopia the total fertility rate was 4.1 children per women, median age at first sexual intercourse was 16 years, among women age 15-24 who had sex before age 15 was 16%, and high HIV prevalence and the low socioeconomic status were that makes the women at risk of developing cervical cancer (13, 20). However study conducted among HIV infected women in Southern Ethiopia shows being on ART and having only one lifetime sexual partner were protective factors, history of sexually transmitted diseases was risk factor for cervical precancerous lesion (21).

Even though the risk of cervical cancer strongly linked to the human papilloma virus infection (8). Evidence indicates that significant portion of the burden of cervical cancer is potentially prevented by early screening and treatment or reducing and eliminating of the risk factors (3, 8, 22). However, the risk factors of cervical precancerous lesion are not well identified in our setup. So, this research was conducted to address the factors associated with cervical precancerous lesion.

1.3. Significance of the study

Knowing factors associated with the cervical precancerous lesion among screened women helps to take an action in each factor to decrease the morbidity and mortality of cervical cancer. And allocate resources at the policy level so as to control the problem and concurrent losses coming with the disease burden. Studies on the issue of factors associated with cervical precancerous lesion among screened women in Ethiopia are limited. Studies done in Ethiopia are limited to assess the cost and its predictors of cervical cancer treatment, prevalence and predictors of pap smear cervical epithelial cell abnormality, risk factors associated with invasive cervical carcinoma, knowledge about cervical cancer, HPV prevalence, prevalence of precancerous cervical cancer lesion and determinant factors of visual inspection with acetic acid among HIV positive women (18, 21, 23-25).

In Ethiopia the prevention and control of cervical cancer is now a top priority in the national health agenda (12, 26). Therefore, this study has importance to assess the factors associated with cervical precancerous lesion that may strengthen the existing cervical cancer prevention and control programs. In addition, the study will give insight and serve as a resource for researchers and planning of other intervention plan like; health education and promotion regarding cervical precancerous lesion care activities.

Research question:

- What are the factors associated with cervical precancerous lesion among women screened for cervical cancer?

2. Literature Review

2.1. Magnitude of cervical precancerous lesion

Cervical cancer is the most common malignancy in women and among cancers it is leading cause of mortality in Africa, while its prevalence vary by region where the highest is in sub-Saharan Africa and eastern region; in east Africa the annual number of deaths and new cases is 28,197 and 45,707 respectively (27). In Africa, the prevalence of HPV infection is 21.3%, with significant regional variation 33.6% in East Africa, 21.5% in West Africa and 21% in Southern Africa (10).

In Ethiopia 534,000 women age of 15 year and above lives with HIV, those are the most vulnerable to cervical cancer (28). Women living with HIV are more readily infected with certain types of HPV and more vulnerable to rapid development of the precancerous lesion than HIV negative women (29). A comparative cross-sectional study in Northwest Ethiopia revealed that higher prevalence of epithelial cell abnormality 17.8% were observed in HIV positive women than HIV negative women 10.3% (23). Cross sectional study in southern Ethiopia shows that the prevalence of cervical precancerous lesion among HIV infected women is 22.1 % (21).

2.2. Lifestyle and sexual behavior factors

The main risk factor related with cervical cancer is human papilloma virus infection which is generally occurs in sexual active individuals (30). Starting sexual activities from the age of 15 years in girls of Sub Saharan Africa is high and this predisposes such girls to high risk of cervical precancerous lesion (31). The HIV epidemic in the Sub Sahara countries has further increase the risk of cervical precancerous lesion as those infected have rapid progression of the disease and usually have poorer outcome (10, 31).

HIV-positive women have a higher possibility of cervical precancerous lesions than HIV negative women (29). A case-control study in South Africa shows that the association between HIV infection and abnormal cytology report of cervical neoplasia with adjusted odds ratios were 7.4 (95% CI=3.5-15.7) and 5.8 (95% CI=2.4-13.6) for LSIL and HSIL respectively as compare with non HIV infected women (32).

Study in Kenya shows that being on ART is protective, non-ART patients were 2.2 times more likely to have cervical precancerous lesion than those patients on ART (33). Given the efficacy of antiretroviral treatment (ART) and growing number of HIV positive women who are living longer, special attention was focused on screening and treatment for cervical precancerous lesion (28).

A case control study in Zimbabwe suggest that having more than one sexual partner, being HIV positive, early sexual debut (<15years), history of any form of STI and being single were significant risk factors for cervical precancerous lesion (34).

There are more than 100 different strains of HPV, More than one-third of them can be sexually transmitted, and two particular types HPV 16 and HPV 18 are strongly associated with cervical cancer (35, 36). Chronic HPV infection and cervical precancerous lesion are associated with other factors such as, age at first intercourse and number of sexual partners are most likely indicators of risk of HPV exposure rather than independent risk factors (13).

Study in Mali shows that having husband with more than two wives is risk factor for cervical cancer (37). Study in southwest Ethiopia shows that more than one husband and husband with more than one wife in lifetime was risk factor for invasive for cervical cancer but history of STI and early age at first sex not significantly associated (18). Early age at first coitus, showing maximum risk in women who reported their first intercourse at 12 years of age, compared to that of women at 18 years (38).

In Ethiopia 11% of young women had sexual intercourse before the age of 15 years old (39). Age at first sex is an important indicator of exposure to sexual transmitted infection (STI) especially to HPV infection(40). Young female who initiate sex at an early age face a higher risk of contracting an STI than young female who delay initiation of sexual activity (41). A case control study in Thailand revealed that decreasing age at first intercourse, increasing number of sexual partners, history of venereal disease and no history of previous screening are increasing the risk of cervical cancer (42).

A Study reported that age at first sexual intercourse of 16 or less years increase the risk of cervical cancer when compare with the age of 21 and above years, women who ever had sexually transmitted infection risk factor for cervical cancer compared without reproductive

infection, and late commencement of sexual activity and use of barrier contraceptive method decreased risk for cervical cancer (41).

Cross-sectional study in Jimma Ethiopia shows initiation of sexual intercourse before the age of 16 years was a risk factor for developing cervical precancerous lesion (43). A study done in Brazil shows first sexual intercourse before 16 years of age was significantly associated with CIN I lesions or worse (40). Promotion of use of condom can help in reducing the main risk factors transmission (31).

A cross sectional study shows that being positive HIV status, early sexual debut and previous pap smear screening, smoking are risk factors not significantly associated with cervical cancer (44). Study in Nigeria reported that age at first sexual intercourse not significantly associated with cervical cancer screening positivity (45).

A meta-analysis finding shows passive smoking increases 73% risk of cervical cancer among women who exposed (46). Study conducted in South Africa revealed that being HIV positive and low CD4 cell counts was significantly associated with cervical precancerous lesion and cervical cancer (47).

Cross sectional study in china shows presence of trichomonas vaginalis infection, cervical inflammation and genital warts were risk factors for high-grade squamous intraepithelial lesions (48). The presence of vaginal wall abnormalities were associated with screening positivity or invasive cancer diagnosis (45).

2.3. Reproductive health related factors

Long term oral and injectable contraceptive use possible risk factor for cervical cancer (49, 50). However, it is unclear whether this association is driven by hormonal contraceptive effect on carcinogenesis or on upstream subclinical endpoints of other risk factors (50).

Exposure to genital human papilloma virus (HPV) is significantly related to contraceptive method; with condom use preventing or cures the infection. Long-term (> 5 years) use of oral contraceptive associate with cervical cancer and long term users of oral contraceptive deserve specific targeting for cervical cancer screening program (23, 49, 51). A case control study in Nigeria shows that there is no significant association between hormonal contraceptives use and abnormal cervical epithelial cytology (52). A cross sectional study among previously unscreened HIV infected women in western Kenya shows that use of

combined oral contraceptive and implant (Jadelle) for 90 days preceding the study increase risk of CIN II. Use of injectable (Depo Provera) and Intrauterine device in place not significantly associated with CIN II, and implant use increase odds of detecting CIN II among women not on ART (53).

Most women with high number of children resulting in worsening poverty and associated with increasing incidence of cervical cancer (31). Case control study in Thailand shows increasing number of live births increasing risk of cervical cancer (42). A case control study in mail reported that risk factor for cervical cancer was parity more than ten children (37). Having history of bleeding after intercourse was risk factor squamous intraepithelial lesions (48).

A case control study in Southwest Ethiopia show that having more than 4 children, age greater than 25 years at first full term delivery and old age were statistically significant associated with invasive cervical cancer (18). Study among HIV-infected Nigerian women reviled that having had five or more abortions were associated with screening positivity or invasive cancer diagnosis (45).

Being young age at first birth increases the risk of both cervical cancer and cervical intraepithelial neoplastic among grand multiparty women less than 50 years of age; Multiparity women and short birth interval associate with cervical intraepithelial neoplastic risk among postmenopausal grand (54). Spacing between two children less than 2 years and age at marriage less than 18 years are significantly associated with cervical cancer (55).

Study reported from Nigeria shows having five or more abortions increase cervical cancer screening positivity and multiple pregnancies shows no association (45). Cervical cancer runs in some families; women with history of her mother or sister with cervical cancer, the chance of developing the disease is 2 to 3 times than women without the family history (2).

2.4. Socio demographic and economic factors

Many low-income women do not have ready access to adequate health care services and they may not get screened or treated for cervical precancerous lesion (42). In India the incidence of cervical cancer high (55%) in females belongs to the rural areas; this high incidence attributed due to low educational and socioeconomic status, ever smoking and

reproductive behavior which contribute to the progress of the disease (56). Illiteracy and low socioeconomic status are risk factors significantly associated with cervical cancer (55).

As the age of the patients increase, education got higher and being married or monogamy decreases risk for cervical cancer (41, 47). Being in age group of 46–55 years was risk factor for high grade squamous intraepithelial lesions compared with the 25–35 age group and high education level (college and above compared with junior middle school or lower) was protective (48). A study shows higher education and non-married women decrease risk of cervical cancer (41).

2.5. Cervical cancer prevention and screening

The primary prevention of cervical cancer is reduction of known risk factors and when available takes an anti-HPV vaccine. And secondary prevention of cervical cancer is screening, early detection and treatment of precancerous lesion (3). According to the American cancer society, cervical cancer screening begins three years after the initiation of vaginal intercourse. Screening should begin at 21 years of age and above (57). But it is obvious obtain appropriate preventive care is important.

There are different methods of screening and treatment depends upon the availability of resources in a given setting. Screening with visual inspection with acetic acid (VIA) covers a wider section of the target groups; it is affordable and efficient for disease prediction; this procedure is usually simple and painless test and the results are provide immediately (58).

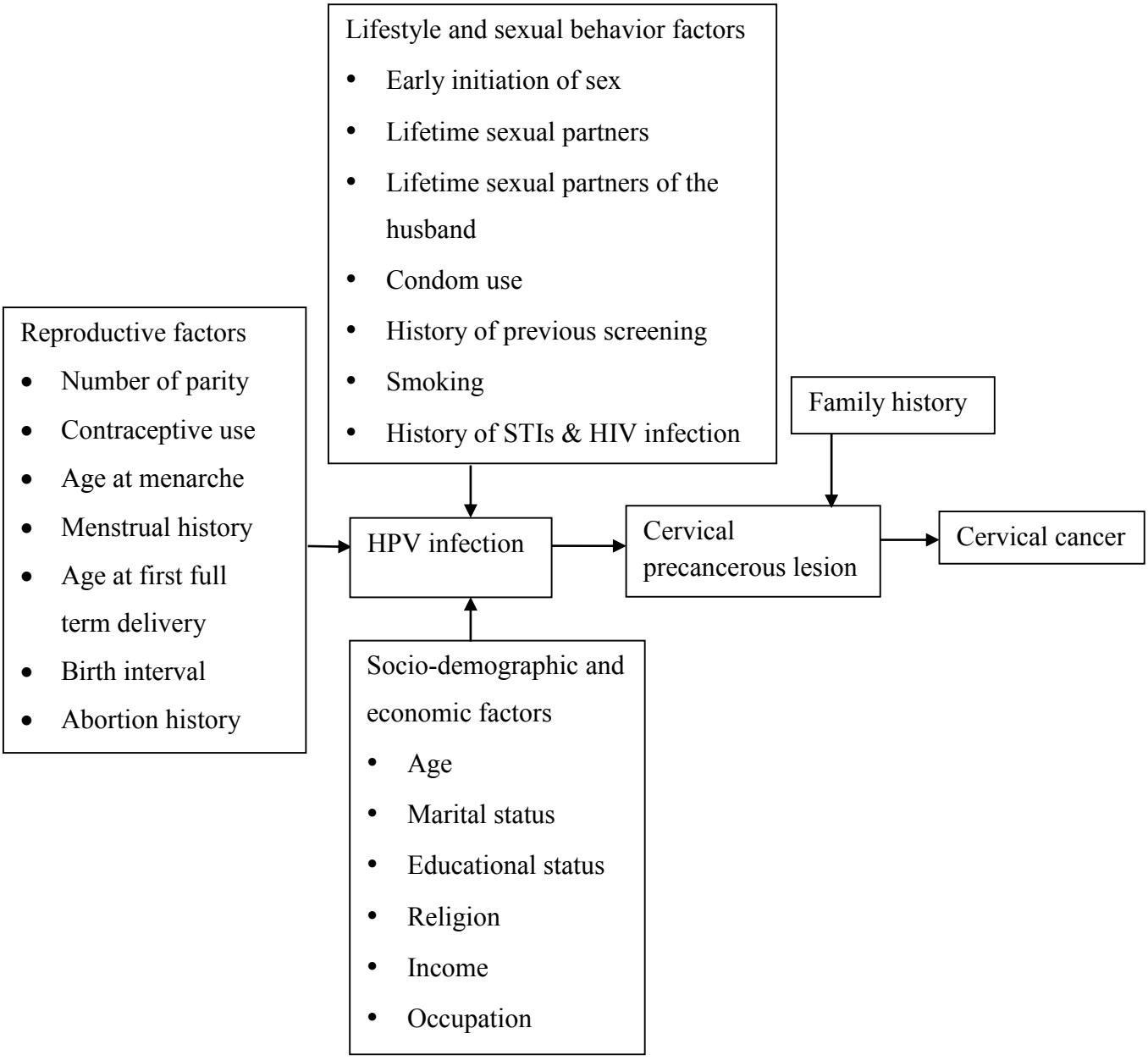
In resource permitted setting screen with HPV test and treat with cryotherapy is the first choice for women who have screened positive and those who fulfilled the eligibility criteria for cryotherapy (when the entire lesion is visible, the squamocolumnar junction is visible, and the lesion does not cover > 75% of the ectocervix) (11).

The sensitivity of the HPV test is 96.0% and it is superior compared with the sensitivity of cytologic diagnosis or Pap smear 83.6%; in resources limited settings screening with an HPV test is not feasible, screen with VIA and treat with cryotherapy is an option (11, 59).

The VIA sensitivity range from 65% to 96% and its specificity range from 64% to 98% (60). The sensitivity pap smear or cytology is similar with VIA but it is used to a large extent in developed countries because it needs testing requirements (61).

Figure 1: Conceptual framework

The conceptual framework describes the relationship between risk factors and cervical precancerous lesion (21, 25, 34).



3. Objective

3.1. General Objective

- To determine factors associated with cervical precancerous lesion among women screened for cervical cancer in Addis Ababa.

3.2. Specific Objectives

- To assess the socio-demographic characteristics of the women who screened for cervical cancer in Addis Ababa.
- To identify risk factors associated with cervical precancerous lesion among women screened for cervical cancer in Addis Ababa.

4. Methods

4.1. Study area and period

The study was conducted in Addis Ababa, the capital city of Ethiopia. According to CSA estimate for 2015 the population size was 3,384,569 of which 52.4% of them were females (39). Females in reproductive age group constitute 35.5% of total population. Addis Ababa consists 10 sub cities and totally it has 11 governmental hospitals, 31 private hospitals and nongovernmental clinics and 89 health centers. Out of the total health facilities 11 health facilities provided cervical cancer screening service. The study was conducted in 6 health facilities. The health facilities generally give preventive and curative services to the people. The health service coverage in Addis Ababa with regard to geographical accessibility is almost 100%. The study was conducted from March to April 2016.

4.2. Study design

Hospital based unmatched case-control study design was employed to determine predicator of cervical precancerous in study area.

4.3. Source population

All women screened for cervical cancer screening residing in Addis Ababa.

4.4. Study population

All women screened for cervical cancer screening, who were attending cervical cancer screening centers in Addis Ababa.

4.5. Eligibility criteria

Inclusion criteria: Women who had underwent screening for cervical precancerous lesion using visual inspection with acetic acid. Sexually active women who ranging from the age of 21-49 years.

Exclusion criteria: Women who had very ill, who have hysterectomy, previous or currently diagnosis with cervical cancer and pregnant women.

4.6. Case definition

Case: A case was a women aged 21 to 49 years with positive VIA finding of acetowhite lesion around squamocolumnar junction of the cervix (11).

Control: A control was a women aged 21 to 49 years with negative VIA finding of non acetowhite lesion around squamocolumnar junction of the cervix (11).

4.7. Sample size calculation

Sample size was calculated using double population proportion formula for four different variables (age, marital status, multiple sexual partner and early initiation of sexual intercourse) and then the larger sample size was taken. Based on the following assumptions; 95% level of confidence, 80% power, taking two to one ratio of controls to case (2:1).

- Sample size was calculated using 6.2% proportion of women above the age of 45 year among population of Ethiopia (20). Taking the odds ratio of being above the age of 45 years were 3.14 times more likely to have cervical cancer (47).

$$n = \left(\frac{r+1}{r}\right)\frac{(\overline{P})(1-\overline{P})(Z_{\beta}+Z_{\alpha/2})^2}{(P_1-P_2)^2}$$

Where: n = Sample size

r = Proportion of control to case

P_1 = Proportion of case exposed = $\frac{OR*P_2}{P_2*(OR-1)+1}$

P_2 = Proportion of control exposed

$\overline{P}$ = The average of case and control = $\frac{P_1+rP_2}{r+1}$

$Z_{\alpha/2}$ = Probability that if the two samples differ this reflects a true difference in the two populations (confidence level)

Z_{β}= Probability that if the two populations differ, the two samples will show a significant difference (power)

Alternatively, using Epi info version 7 the total number of cases and controls are 107 and 214, respectively.

- Using 25.4% proportion of unmarried women (20). Taking the odds ratio of being unmarried is 2.3 times more likely to have cervical precancerous lesion (34). Using Epi info version 7 the total number of cases and controls are 84 and 168, respectively.
- Using 41.3% proportion of multiple sexual partners (39). Taking the odds ratio of multiple sexual partners are 2 times more likely to have cervical cancer (18). Using Epi info version 7 the total number of cases and controls are 108 and 216, respectively.

- Using 44.3% proportion of starting sexual intercourse before age of 16 years (43). Taking the odds ratio of starting sexual intercourse before age of 16 years are 2.2 times more likely to have cervical precancerous lesion (43). Using Epi info version 7 the total number of cases and controls are 86 and 172 respectively.
- Finally the sample size with larger number of cases and controls were selected which is 108 and 216 respectively; adding non response rate 10% then the final sample size was 120 cases and 240 controls.

Table 1: Summary of the sample size calculation.

Variable of interest	CI (%)	Power	Proportion of exposure	OR	Control to case ratio	Sample size
Age above 45 year	95	80	6.2%	3.14	2	107+214=321
Unmarried women	95	80	25.4%	2.3	2	84+168=252
Multiple sexual partner	95	80	41.3%	2	2	108+216=324
Start sexual intercourse before the age of 16 years	95	80	44.3%	2.2	2	86+172= 238

4.8. Sampling procedure

The health facilities were selected purposively; where routine cervical cancer screening using visual inspection with acetic acid is given, provide the service for all women (with HIV and non HIV women) and long period year of establishment in Addis Ababa. The health facilities were; Woreda 09, Family Guidance clinic, Zewditu hospital, Kolfe health center, Lideta health center and Mary Joy clinic. The total sample size was allocated using probability proportionate to size according to the proportion of average monthly client flow reviewed from registration book.

The study subjects were selected from those screened with visual inspection with acetic acid. Cases were all women positive for VIA who screened within three months before and during the data collection period were included in the study until the required sample size is obtained. The cases were those screened within three months before data collection time was selected from the registration book, and were requested through cell phone to come to the health facility

for interview. Controls were selected alternatively from women negative for VIA who screened during data collection period.

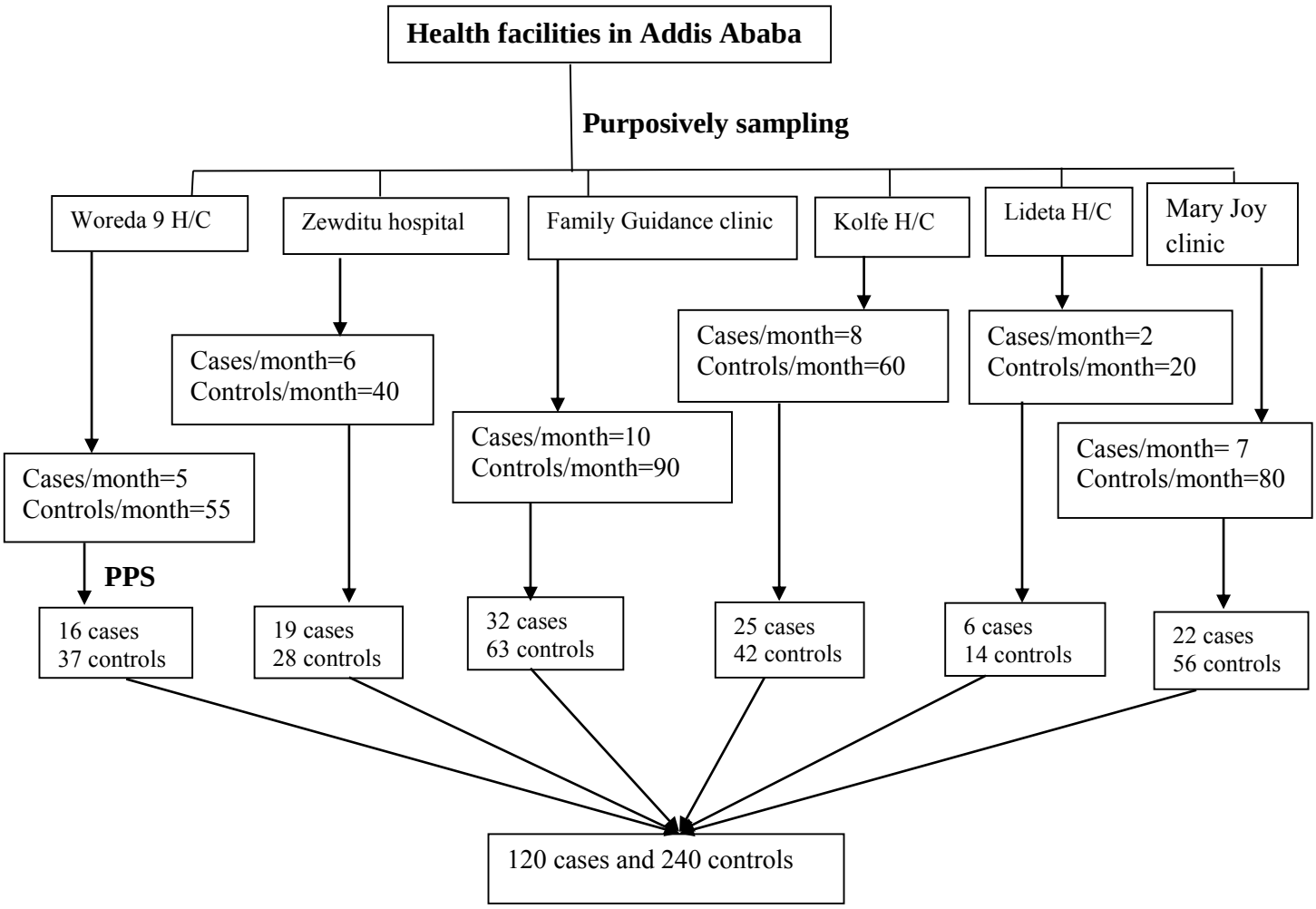


Figure 2: Schematic presentation of the sampling procedure.

4.9. Study variables

Dependent variable: Presence and absent of cervical precancerous lesion

Independent variables: Age, marital status, educational status, income, occupation, religion, contraceptive use, age at menarche, menstrual history, age at first full term delivery, parity, birth interval, history of abortion, family history of cervical cancer, age at first sex, lifetime sexual partners of the women, lifetime sexual partners of the husband, age at first marriage, condom use, history of pelvic infection, history of STIs and HIV infection, and history of smoking.

4.10. Operational definition

Acetowhite: Abnormal white area on cervix after application of 5% acetic acid indicating possible precancerous stages (28).

Positive for VIA: If there is acetowhitish lesion on the area stained with 5% acetic acid solution and it is the character of precancerous lesion (11).

Negative for VIA: If there is no acetowhitish lesion on the area stained with 5% acetic acid solution (11).

Contraceptive use: Defined as use either of the contraceptives: oral contraceptives (pills), injectable, implants, IUCD for more than or equals one month period (51).

Cervical precancerous lesion: An abnormal cellular change located around the cervix, which was not progressed to cervical cancer (2).

Sexually active: Having at least one episode of sexual intercourse in their lifetime (10)

Sexually transmitted infections: Ever been told you that you had a sexually transmitted infections or treated by health professionals other than HIV.

Multiple sexual partners: Having lifetime partners greater than two (20).

Multiparity: Having parity greater than two (20).

Early initiation of sex: Starting first sexual intercourse before the age of 18 years (56).

4.11. Data collection procedure

Questionnaire

An interviewer administered semi structured questionnaire was adapted by reviewing similar studies (21, 25, 34, 43), to assess socio-demographic and economic, reproductive, lifestyle and sexual behavior. The questionnaire was first prepared in English then translated to Amharic and pre-tested. Data was collected by 6 trained nurses that deliver cervical cancer screening service at the time of data collection. Data was collected from the clients after getting verbal consent through informed consent in the health facility.

Cervical cancer screening

Routine cervical cancer screening was provided to all women by trained nurses. According to the WHO guidelines for screening and treatment of precancerous lesions for cervical cancer prevention the result can be interpreted as; positive when an acetowhitish lesion with well-defined margins observed with in the vicinity of the transformation zone, or if the whole cervix turned white (VIA - positive), negative when there is no acetowhitish lesion (VIA- negative), suspicious for cancer when there is visible ulcerative cauliflower like ulcer, oozing and bleeding on touch (11). A woman with suspicious finding was not included in the study.

4.12. Data analysis

Data was entered to Epi Info version 7 then transported to SPSS version 20. Data was cleaned by running simple frequency distributions, summary statistics and cross tabulation. Descriptive and summary statistics was used to describe the data in relation to relevant variables. Odds ratio with their 95% confidence interval and two-tailed P value were calculated to identify the presence and strength of association. Variables with P value ≤ 0.2 in the bivariate analysis were included into a multi-variable logistic regression analysis to control the confounding effect among the variables. The model was fitted using enter method among variables and identify independent significant association. Statistical significance was declared if P value < 0.05. Data were presented using tables and figures.

4.13. Data quality control

The Amharic version of the questionnaire was back translated to English to check for any inconsistencies or distortion in meaning and concepts of the words by another person. The questionnaire was pre-tested among 30 women attending cervical cancer screening center of the health facilities, some modifications concerning clarification of the content and simplification of the wording was considered necessary after the pre-testing of the questionnaire. The data collectors and supervisor were trained before the actual data collection period regarding the approach, objective of the study and ethical issue. Selection of controls was done using similar criteria as in selection of cases in order to minimize selection bias. All questionnaires were checked for completeness every day by the principal investigator and supervisor. The entered data was checked for completeness at the beginning and middle stage of the work. Data cleaning was conducted at the end of the data entry.

4.14. Ethical considerations

Prior to study ethical clearance was obtained from the ethical committee of Addis Ababa University College of Health Science School of Public Health. Ethical clearance form was written to each health institutions from Addis Ababa Region Health Bureau. The respondents were informed about the objective and purpose of the study. Verbal consent was obtained from the study subjects through informed consent. Confidentiality of information was assured and informed that if they preferred not to continue, they can withdraw from the study any time they wish. Transport cost for those cases who were called to the facility for the interview purpose was compensated. The study does not have any harm to the study participant. The result of the study will be useful to the prevention and control programs on the risk factors of cervical precancerous lesion which could be beneficiary for the study participants and also for the overall community.

4.15. Plans for dissemination and utilization of results

The finding will be presented to Addis Ababa University College of Health Science School of Public Health. Copies of the finding will be given to Addis Ababa Regional Health Bureau; the finding of this study will be disseminated through presentation and publication. Additionally, information will be provided as necessary to other relevant bodies.

5. Results

A total of 120 cases and 240 controls were enrolled after fulfilling the inclusion criteria, out of which 17 women; 6 cases and 11 controls refused to participate, which makes the non-response rate 4.70 %. The reported reason for non-participation was lack of time for interview. Complete data were obtained from 343 women; out of this 114 were cases of cervical precancerous lesion and 229 controls. The magnitude of cervical precancerous lesion among women screened for cervical cancer was 12.79%.

5.1. Socio-demographic characteristics

Among the study participants 70 (61.40%) of the cases and 84(36.68%) of the controls were found to be in the age group of 40-49 years old, the mean and standard deviation of the age were 42.26 ± 6.50 years for cases and 37.48 ± 7.55 years for controls (Table 2).

Thirty two (28.07%) of the cases and 94(41.05%) of the controls attended college and above, while 28(24.56%) of the cases and 40(17.47%) of the controls were never attended formal education and the rest attended primary and secondary school (Table 2).

At the time of this study, 90(78.95%) of the cases and 187(81.66%) of the controls were married, 4(3.51%) of the cases and 5(2.18%) of the controls were single and the rest were widowed and divorced. More than half 61(53.51%) of the cases and 119(51.96%) of the controls were house wife followed by governmental employee 16(14.04%) and 45(19.65%) of the cases and controls respectively. The median income per month was 2500 birr which ranges from 400 to 20000 birr. Thirty four (29.82%) of the cases and 46(20.09%) of the controls had average monthly income less than 1000 birr. Seventy two (63.16%) of the cases and 161(70.30%) of the controls were identified as Orthodox Christian religion follower 24(21.05%) of the cases and 34(14.85%) of the controls were Muslim (Table 2).

On bivariate analysis, socio-demographic factors between cases of cervical precancerous lesion and controls; there was no significant difference between cases and controls on difference in educational status, marital status, occupation, income and religion. However, being in age of 40-49 years old were found to be significantly associated with cervical precancerous lesion as compare with those who are aged 30-39 years old. (Crude OR= 2.55 95 % CI (1.54, 4.23)) (Table 2).

Table 2: Socio-demographic characteristics of women screened for cervical cancer in Addis Ababa, Ethiopia, 2016.

Variables	Cases n (%)	Controls n (%)	COR(95% CI)	P value
Age (years)				0.00*
21-29	11(9.65)	44(19.21)	0.76(0.36-1.65)	0.50
30-39	33(28.95)	101(44.10)	1.00	
40-49	70(61.40)	84(36.68)	2.55(1.54-4.23)	0.00
Educational status				0.11
No formal education	28(24.56)	40(17.47)	1.00	
Primary education	33(28.95)	60(26.20)	0.79(0.41-1.50)	0.46
Secondary/preparatory	21(18.42)	35(15.28)	0.86(0.42-1.77)	0.68
College or above	32(28.07)	94(41.05)	0.49(0.26-0.91)	0.02
Marital status				0.80
Single	4(3.51)	5(2.18)	1.00	
Married	90(78.95)	187(81.66)	0.60(0.16-2.29)	0.46
Widowed	6(5.26)	14(6.11)	0.54(0.10-2.72)	0.45
Divorced	14(12.28)	23(10.04)	0.76 (.17-3.32)	0.72
Occupation				0.12
House wife	61(53.51)	119(51.96)	1.00	
Merchant	12(10.53)	9(3.93)	2.60(1.04-6.51)	0.04
Daily laborer	10(8.77)	17(7.42)	1.15(0.50-2.66)	0.75
Governmental employee	16(14.04)	45(19.65)	0.69(0.36-1.33)	0.27
Private/NGO employee	15(13.16)	39(17.03)	0.75(0.38-1.47)	0.40
Income per month				0.22
≤ 1000	34(29.82)	46(20.09)	1.00	-
1001-3000	45(39.47)	100(43.67)	0.61(0.35-1.07)	0.09
3001-5000	26(22.81)	57(24.89)	0.62(0.32-1.17)	0.14
≥5000	9(7.90)	26(11.35)	0.47(0.20-1.13)	0.09
Religion				0.31
Orthodox christian	72(63.16)	161(70.30)	1.00	-
Muslim	24(21.05)	34(14.85)	1.58(0.87-2.85)	0.13
Protestant or Jehovah Witness	18(15.80)	34(14.85)	1.18(0.63-2.24)	0.60

* Significantly associated with cervical precancerous lesion

5.2. Reproductive health characteristic

Among the study participant, 28(26.9%) of the cases and 52(22.7%) of the controls currently use contraceptives. Seventy one (62.28%) of the cases and 144(62.88%) of the controls have ever used one or more of the contraceptives in their life time; Among them 25.44% of the cases 20.96% of the controls reported using pill, 40.35% of the cases and 35.37% of the controls reported using injectable, 14.85% of the cases and 17.54% of the controls used implant, 10.53% of the cases and 13.54% of the controls used IUCD (Figure 3).

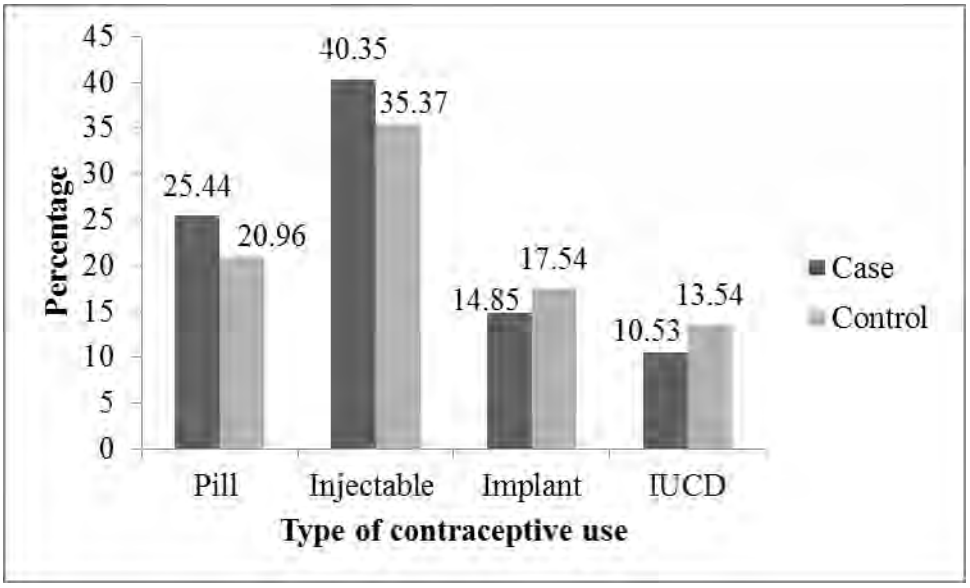


Figure 3: Description of types of ever contraceptive use among cases and controls of cervical precancerous lesion Addis Ababa, Ethiopia, 2016.

Among the study subjects, 68(59.65%) of the cases and 146(63.76%) of the controls had regular menstrual history, while 9(7.90%) of the cases and 27(11.79%) of the controls did not have menses. The mentioned reasons for not having menses was; after using injectable contraceptive 11(3.21%), age increase 4(1.17%), usage of Norplant contraceptive 1(0.29%), IUCD use 2(0.58%), after taking medication 1(0.29%), maternity 1(0.29%), unknown reason 16(4.66%) (Figure 4).

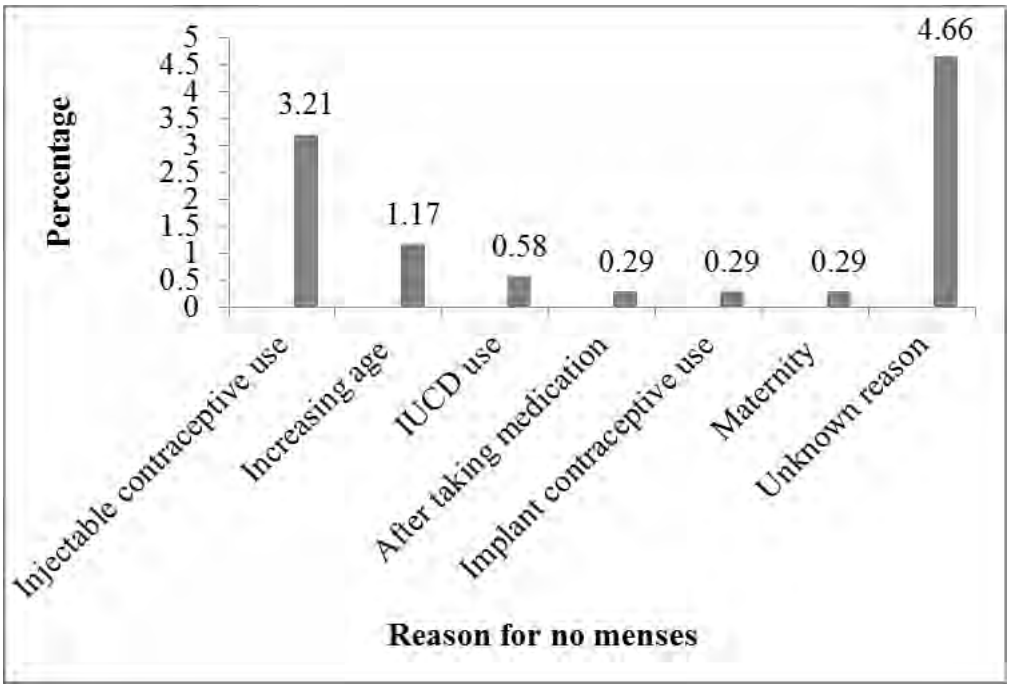


Figure 4: Description of reason for no menses among women screened for cervical cancer in Addis Ababa, Ethiopia, 2016.

The majority of respondents 59(51.75%) of the cases and 108(47.16%) of the controls their age at menarche were 13 or 14 years old, 40(35.09%) of the cases and 100(43.67%) of the controls were 15 and above years, the mean of age at menarche was similar between cases and controls, 13.93 and 14.24 years, respectively (Table 3).

Twelve (10.53%) of the cases and eleven (4.80%) of the controls had history of post coital bleeding. Among the study subjects, 47(41.23%) of the cases and 69(30.13%) of the controls had parity greater than three, 54(47.37%) of the cases and 110(48.04%) of the controls had parity three and less than three (Table 3).

Age of the respondents when they gave birth to their first child, 49(48.52%) of the cases and 89(49.72%) of the controls was less than 20 years old. There was no significant difference in the mean and standard deviation of age at first birth 21.54 ± 2.91 years and 21.42±4.59 years for cases and controls, respectively. Thirty four (41.46%) of the cases and 52(33.77%) of the controls had average birth interval less than two years, 28(34.15%) of the cases and 53(34.42%) of the controls had average birth interval 2-3 years (Table 3).

Among the participants 11(9.65%) of the cases and 12(5.24%) of the controls had history of abortion greater than three times 10(8.77%) of the cases and 11(4.80%) of the controls had family history of cervical cancer (Table 3).

On bivariate analysis, having history of post coital bleeding was significantly associated with cervical precancerous lesion as compare with those who did not have history of post coital bleeding (crude OR=2.33, 95% CI (1.00, 5.46)). Having four or greater than four parity were significantly associated with cervical precancerous lesion as compare with those who did not gave birth (crude OR= 2.62, 95% CI (1.28, 5.35)). Having greater than three history of abortion were significantly associated with cervical precancerous lesion as compare with those who did not have history of abortion (crude OR=2.46, 95% CI (1.02, 5.95)) (Table 3).

Table 3: Reproductive health related characteristics of women screened for cervical cancer in Addis Ababa, Ethiopia, 2016.

Variables	Case n (%)	Control n (%)	COR (CI 95%)	P value
Pill use				0.43
No	85(74.56	181(79.04)	1.00	
<5 year	21(18.42)	30(13.10)	1.49(0.81-2.76)	0.20
≥ 5 year	8(7.02)	18(7.86)	0.95(0.40-2.26)	0.90
Injectable use				0.38
No	68(59.65)	148(64.63)	1.00	
<5 year	30(26.32)	60(26.20)	1.09(0.64-1.84)	0.75
≥ 5 year	16(14.04)	21(9.17)	1.66(0.81-3.38)	0.16
Implant use				0.84
No	94(82.46)	195(85.15)	1.00	
<5 year	14(12.28)	25(10.92)	1.07(0.52-2.18)	0.86
≥ 5 year	6(5.26)	9(3.93)	1.37(0.47-3.96)	0.56
IUCD use				0.26
No	102(89.47)	198(86.46)	1.00	
<5 year	9(7.90)	15(6.55)	1.16(0.49-2.75)	0.73
≥ 5 year	3(2.63)	16(6.99)	0.36(0.10-1.28)	0.12
Age of menarche				0.24
≤ 12 year	15(13.16)	21(9.17)	1.00	
13-14 year	59(51.75)	108(47.16)	0.76(0.37-1.59)	0.47
≥ 15 year	40(35.09)	100(43.67)	0.56(0.26-1.19)	0.13
Menstrual history				0.24
Regular	68(59.65)	146(63.76)	1.00	
Sometimes irregular	20(17.54)	24(10.48)	1.79(0.92-3.46)	0.08
Always irregular	17(14.91)	32(13.97)	1.14(0.59-2.20)	0.69
No menses	9(7.90)	27(11.79)	0.72(0.32-1.60)	0.42
Post coital bleeding				
Yes	12(10.53)	11(4.80)	2.33(1.00-5.46)	0.05*
No	102(89.47)	218(95.20)	1.00	
Parity				0.03*
No	13(11.40)	50(21.83)	0.53(0.26-1.06)	0.07
1-3	54(47.37)	110(48.04)	1.00	
≥ 4	47(41.23)	69(30.13)	1.39(0.85-2.27)	0.19
Age at first birth				0.92
<20 year	49(48.52)	89(49.72)	1.00	
20-25 year	33(32.67)	52(29.05)	1.15(0.66-2.02)	0.62
25-30 year	15(14.85)	30(16.76)	0.91(0.45-1.85)	0.79
>30 year	4(3.96)	8(4.47)	0.91(0.26-3.17)	0.88

Average birth interval				0.39
<2 year	34(41.46)	52(33.77)	1.00	
2-3 year	28(34.15)	53(34.42)	0.81(0.43-1.52)	0.51
>3 year	20(24.39)	49(31.82)	0.62(0.32-1.23)	0.17
History of abortion				0.04*
No	47(41.23)	126(55.02)	1.00	
1-3	56(49.12)	91(39.74)	1.65(1.03-2.65)	0.04
≥ 4	11(9.65)	12(5.24)	2.46(1.02-5.95)	0.05
Family history of cervical cancer				0.16
Yes	10(8.77)	11(4.80)	1.91(0.78-4.63)	0.16
No	104(91.23)	218(95.20)	1.00	

* Significantly associated with cervical precancerous lesion

5.3. Lifestyle and sexual behavior

The life time cervical cancer screening practice was, 27(23.68%) of the cases and 40(17.47%) of the controls and only 10(35.71%) of the cases and 10(25.00%) of the controls were found positive. Seven (6.14%) of the cases and nine (3.93%) of the controls have history of smoking, concerning condom usage 91(79.82%) of the cases and 180(78.60%) of the controls were reported to never use condom in their life time (Table 4).

The mean and standard deviation of age at first marriage was 19.57 ± 4.13 for cases and 20.35 ± 5.10 for controls. Seventy four (67.27%) of the cases and 154(68.75%) of the controls were married above the age of 18 years, 19(17.27%) of the cases and 38(16.96%) of the controls were married below the age of 15 years old (Table 4).

Six out of ten (61.52%) of the respondents started their first sex at the age of 18 and above years old; among them 66(57.90%) are cases and 145(63.32%) are controls, 26(22.81%) of the cases and 44(19.21%) of the controls were age at first sex less than 15 years old (Table 4).

Among the study participants, 34(29.82%) of the cases and 39(17.03%) of the controls had history of pelvic infection, 39(34.21%) of the cases and 23(10.04%) of the controls had history of STI, 22(19.30%) of the cases and 14(6.11%) of the controls had history of STI in their husband (Table 4).

When study subjects were asked about ever HIV tested, only one (0.88%) of the cases 3(1.31 %) of the controls reported that never tested for HIV, among those ever tested 46(40.71%) of the cases and 53 (23.45%) of the controls were HIV positive and all HIV positive are on ART care. 71(62.28%) of the cases and 70(30.57%) of the controls were reported that as they had two or more lifetime sexual partners in their life time. The rest 43(37.72%) of the cases and 159(69.43%) of the controls had one lifetime sexual partner. Similarly, about one fourth of the participants' husband had two or more other lifetime sexual partners (Table 4).

On bivariate analysis, those women with history of pelvic infection were two times more likely to have cervical precancerous lesion than those who did not have history of pelvic infection (crude OR=2.07 with 95%CI (1.22, 3.51)). History of STI was significantly associated with cervical precancerous lesion (crude OR=4.66 with 95%CI (2.61, 8.31)). History of STI of the husband found to be significantly associated with cervical precancerous lesion (crude OR=3.67 with 95%CI (1.80, 7.49)). Having two or more other lifetime sexual partners of the husband were significantly associated with cervical precancerous lesion than those who did not have other sexual partner (crude OR=4.87 with 95% CI (2.75, 8.63)). Positive HIV status were significantly associated with cervical precancerous lesion (crude OR=2.24 with 95% CI (1.38, 3.64)). Those women with two or more life time sexual partners were significantly associated with cervical precancerous lesion than those who have one sexual partner (crude OR=3.75 with 95% CI (2.34, 6.01)) (Table 4).

Table 4: Lifestyle and sexual behavior characteristics of women screened for cervical cancer in Addis Ababa, Ethiopia, 2016.

Variables	Case n (%)	Control n (%)	OR (95%CI)	P value
Previous screened for cervical cancer				
Yes	27(23.68)	40(17.47)	1.47(0.85-2.54)	0.17
No	87(76.32)	189(82.53)	1.00	
Time since screening for the last time				0.40
<1 year	18(64.29)	19(47.50)	1.00	
1-3 year	7(25.00)	15(37.50)	0.49(0.16-1.49)	0.21
>3 year	3(10.71)	6(15.00)	0.53(0.11-2.43)	0.41
Result of the last screen				
Positive	10(35.71)	10(25.00)	1.67(0.58-4.78)	0.34
Negative	18(64.28)	30(75.00)	1.00	
Ever history of smoke				
Yes	7(6.14)	9(3.93)	1.60(0.58-4.41)	0.36
No	107(93.86)	220(96.07)	1.00	
Age at first marriage				0.95
< 15 year	19(17.27)	38 (16.96)	1.00	-
15-17 year	17(15.45)	32(14.28)	1.06(0.48-2.38)	0.88
≥18 year	74(67.27)	154(68.75)	0.96(0.52-1.78)	0.90
Age at first sex				0.61
<15 year	26(22.81)	44(19.21)	1.00	
15-17 year	22(19.30)	40(17.47)	0.93(0.46-1.90)	0.84
≥ 18 year	66(57.90)	145(63.32)	0.77(0.44-1.36)	0.37
Condom use				0.18
Always	9(7.90)	9(3.93)	1.00	
Sometimes	14(12.28)	40(17.467)	0.35(0.12-1.06)	0.06
Never	91(79.82)	180(78.60)	0.51(0.19-1.32)	0.16
Ever history of pelvic infection				
Yes	34(29.82)	39(17.03)	2.07(1.22-3.51)	0.01*
No	80(70.18)	190(82.97)	1.00	
Ever history of STI				
Yes	39(34.21)	23(10.04)	4.66(2.61-8.31)	0.00*
No	75(65.79)	206(89.96)	1.00	
Ever history of STI in sexual partner				
Yes	22(19.30)	14(6.11)	3.67(1.80-7.49)	0.00*
No	92(80.70)	215(93.89)	1.00	
HIV status known				
Yes	113(99.12)	226(98.69)	1.50(0.15-14.58)	0.73
No	1(0.88)	3(1.31)	1.00	
HIV status				
Positive	46(40.71)	53(23.45)	2.24(1.38-3.64)	0.00*
Negative	67(59.29)	173(76.55)	1.00	

Lifetime sexual partner of the women				
One	43(37.72)	159(69.43)	1.00	
Two or above	71(62.28)	70(30.57)	3.75(2.34-6.01)	0.00*
Other lifetime sexual partners of the husband				0.00*
No	32(28.07)	124(54.15)	1.00	
One	33(28.95)	66(28.82)	1.94(1.10-3.43)	0.02
Two or above	49(42.98)	39(17.03)	4.87(2.75-8.63)	0.00

* Significantly associated with cervical precancerous lesion

5.4. Factors associated with cervical precancerous lesion

Comparison of variables those tested in the bivariate logistic regression analysis were entered into multi-variable logistic regression analysis, those with p-value ≤ 0.2 and adjusted in table 7.

Controlling for the effect of other confounding factors age group, ever history of STI, life time sexual partners of the women, and having other life time sexual partners of the husband were found to be significantly associated with precancerous cervical cancer.

Being in the age group of 40-49 years were two times more likely to have cervical precancerous lesion than those who were 30-39 years (Adjusted OR=2.40, 95%CI (1.27-4.54)) (Table 5).

Women who had history of sexual transmitted infection three times more likely to have cervical precancerous lesion than those who did not have history of sexually transmitted infections (Adjusted OR=3.20, 95%CI (1.26-8.10)). Having two or more life time sexual partners of the women were significantly associated with cervical precancerous lesion (Adjusted OR= 2.17 95%CI (1.01-4.67)). Having two or more other life time sexual partners of the husband were significantly associated with cervical precancerous lesion (Adjusted OR=3.03, 95%CI (1.25-7.33)) (Table 5).

Table 5: Multi-variable analysis of selected variables with cervical precancerous lesion among study participants of Addis Ababa, Ethiopian, 2016.

Variables	Case n (%)	Control n (%)	COR (CI 95%)	AOR (CI 95%)
Age(years)				
21-29	11(9.65)	44(19.21)	0.76(0.36-1.65)	1.00(0.40-2.50)
30-39	33(28.95)	101(44.10)	1.00	1.00
40-49	70(61.40)	84(36.68)	2.55(1.54-4.23)	2.40(1.27-4.54)**
Educational status				
No formal education	28(24.56)	40(17.47)	1.00	1.00
Primary education	33(28.95)	60(26.20)	0.79(0.41-1.50)	0.61(0.27-1.40)
Secondary/preparatory	21(18.42)	35(15.28)	0.86(0.42-1.77)	0.86(0.31-2.35)
College or above	32(28.07)	94(41.05)	0.49(0.26-0.91)	0.56(0.21-1.50)
Occupation				
House wife	61(53.51)	119(51.96)	1.00	1.00
Merchant	12(10.53)	9(3.93)	2.60(1.04-6.51)	2.36(0.76-7.33)
Daily laborer	10(8.77)	17(7.42)	1.15(0.50-2.66)	0.83(0.26-2.63)
Governmental employee	16(14.04)	45(19.65)	0.69(0.36-1.33)	1.10(0.46-2.65)
Private/NGO employee	15(13.16)	39(17.03)	0.75(0.38-1.47)	0.63(0.26-1.53)
Income per month				
≤ 1000	34(29.82)	46(20.09)	1.00	1.00
1001-3000	45(39.47)	100(43.67)	0.61(0.35-1.07)	0.52(0.25-1.10)
3001-5000	26(22.81)	57(24.89)	0.62(0.32-1.17)	0.47(0.20-1.14)
≥5000	9(7.90)	26(11.35)	0.47(0.20-1.13)	0.70(0.21-2.28)
Parity				
No	13(11.40)	50(21.83)	0.53(0.26-1.06)	0.51(0.21-1.26)
1-3	54(47.37)	110(48.04)	1.00	1.00
>3	47(41.23)	69(30.13)	1.39(0.85-2.27)	1.46(0.77-2.78)
History of abortion				
No	47(41.23)	126(55.02)	1.00	1.00
1-3	56(49.12)	91(39.74)	1.65(1.03-2.65)	0.80(0.44-1.48)
>3	11(9.65)	12(5.24)	2.46(1.02-5.95)	1.59(0.56-4.51)
Family history of cervical cancer				
Yes	10(8.77)	11(4.80)	1.91(0.78-4.63)	2.38(0.82-6.92)
No	104(91.23)	218(95.20)	1.00	1.00
Previous screened for cervical cancer				
Yes	27(23.68)	40(17.47)	1.47(0.85-2.54)	1.02(0.51-2.06)
No	87(76.32)	189(82.53)	1.00	1.00
Condom use				
Always	9(7.90)	9(3.93)	1.00	1.00
Sometimes	14(12.28)	40(17.467)	0.35(0.12-1.06)	0.34(0.08-1.40)
Never	91(79.82)	180(78.60)	0.51(0.19-1.32)	0.41(0.12-1.46)

Ever history of pelvic infection				
Yes	34(29.82)	39(17.03)	2.07(1.22-3.51)	1.75(0.92- 3.32)
No	80(70.18)	190(82.97)	1.00	1.00
Ever history of STI				
Yes	39(34.21)	23(10.04)	4.66(2.61-8.31)	3.20(1.26-8.10)**
No	75(65.79)	206(89.96)	1.00	1.00
Ever history of STI in sexual partner				
Yes	22(19.30)	14(6.11)	3.67(1.80-7.49)	1.34(0.41-4.38)
No	92(80.70)	215(93.89)	1.00	1.00
HIV status				
Positive	46(40.71)	53(23.45)	2.24(1.38-3.64)	1.26(0.64-2.50)
Negative	67(59.29)	173(76.55)	1.00	1.00
Lifetime sexual partners of the women				
One	43(37.72)	159(69.43)	1.00	1.00
Two or above	71(62.28)	70(30.57)	3.75(2.34-6.01)	2.17(1.01-4.67)**
Other lifetime sexual partners of the husband				
No	32(28.07)	124(54.15)	1.00	1.00
One	33(28.95)	66(28.82)	1.94(1.10-3.43)	1.16(0.54-2.49)
Two or above	49(42.98)	39(17.03)	4.87(2.75-8.63)	3.03(1.25-7.33)**

** Significantly associated with cervical precancerous lesion

6. Discussion

Among the study subjects 24.56% of the cases and 17.47% of the controls were never attended formal education, however relatively high controls (41.05%) attend college or above then cases (28.07%). This relatively high attend college or above among the controls could be reduce the risk of cervical precancerous lesion as compared with the cases. Moreover, there was no difference in educational status between cases and controls. This is inconsistent with other findings (41, 48).

Ninety (78.95%) of the cases and 187(81.66%) of the controls were married; however there is no significant association between marital status and cervical precancerous lesion. This is inconsistence with other findings (25, 41). This contradictory finding may be as a result of the women was asked about their current marital status during the study period; this does not tell us about previous exposure or could be due to socio demographic difference.

This study reveals that age group of 40-49 years, history of sexually transmitted infections, having two or more life time sexual partners of the women and two or more other life time sexual partners of the husband were predictors of cervical precancerous lesion.

The study subjects have difference in age group of 40-49 years between cases and controls as compared to the age group of 30-39 years. Being in the age group of 40-49 years was significantly associated with developing cervical precancerous lesion. Though most of the cases are in the age group of 40-49 years there are still cases in the age group of 21-29 years and 30-39 years. This is similar with the study conducted in Addis Ababa, which reported that the peak incident of cervical cancer was age group of 40-49 years (62). It was also similar to study finding in this country, where old age 40-59 years was found at risk for invasive cervical cancer compared to those less than 40 years (AOR=4.3; 95% CI=1.8,10.2) (18). The age difference among the women screened for cervical cancer could be due to the long period exposure of HPV virus and due to cervical precancerous lesion takes time to

develop (3, 8). This study is inconsistent to other studies that show older age of participants was also associated with lower risk for cervical precancerous lesions (25, 63).

This study pointed out that women with cervical precancerous lesion were found with higher odds of history of STI than the control (AOR=3.03, 95% CI (1.25, 7.33)). Having history of sexual transmitted infection was risk factor for developing cervical precancerous lesion (30, 41). Moreover, this is similar with finding of a study in Zimbabwe, where history of STIs was found as risk factors (AOR=3.10; p-value=0.02) as compared to not having any STIs (34). This is also demonstrated in other studies. For instance, a study conducted in the southern Ethiopia reported that women with history of STIs were more likely to develop cervical precancerous lesion than women with no history of STIs (AOR=2.30, 95%CI=1.23,4.29) (21). This association may be because of the association human papilloma virus with both STI and cervical precancerous lesion (29).

Having two or more life time sexual partners were found to be significantly associated with cervical precancerous lesion when compared with having one partner or husband. Increase in number of sexual partners raises the risk of having the cervical precancerous lesion (10). This finding was supported with a study carried out in the northwest Ethiopia, which reported that women with history of multiple sexual partner in their life had higher risk of having cervical epithelial cell abnormalities when compared with history of one or two sexual partner (AOR 3.2, 95% CI:1.00,10) (23). This finding is consistent with a study conducted in southern Ethiopia among women living with HIV, shows that women who had one lifetime sexual partner were 67% less likely to develop precancerous cervical cancer lesion than those who had more than one life time sexual partners (21). It was also similar to study finding from southwest Ethiopia, reported that more than one husband had higher risk of developing cervical cancer compared with one husband (OR= 2.0; 95% CI=1.0,3.9) (18).

Finding on the association between two or more other lifetime sexual partners of the husband or partner and cervical precancerous lesion was found to be significantly associated; this agree with other finding (37). The risk of developing cervical precancerous lesion is higher because those women have a higher risk of acquiring HPV infection, which is the causative agent for cervical precancerous lesion and cervical cancer (13, 64).

Study conducted in Southwest Ethiopia shows having husband with more than one wife in lifetime was a risk factor for invasive cervical cancer (AOR= 2.6; 95% CI= 1.1-6.6) (18). This is due to the risk of acquiring HPV infection is increase which is the causative agent for cervical precancerous lesion and cervical cancer (13, 64).

High parity with greater than three children was not found to be significantly associated with cervical precancerous lesion. This is inconsistent with study in southwest Ethiopia shows that more than four children is risk factor for invasive cervical cancer (18). High parity is a good indicator of hormonal exposure and repeated cervical trauma, this could be predispose to the infection (37). This inconsistency could be due to the socio demographic difference.

Initiation of sexual intercourse before the age of 16 years was a risk factor for developing cervical precancerous lesion (38, 40, 43). However, in this study early initiation of sexual intercourse was not found to be predictive to cervical precancerous lesion. This difference could be due to the differences in the age distribution of study populations or could be due to the socio demographic difference (39). The mean age at first sexual intercourse for the study participants is 19.08 years, which is close to the mean age at first marriage of 20.09 years. This suggests that the women generally begin sexual intercourse at the time of their first marriage.

No difference has been found on the association of HIV status with cervical precancerous lesion in this study. HIV infection has increase the risk of cervical precancerous lesion as those infected have rapid progress of the disease through immune suppression (31). This could be due small sample size or the number of sample size for both the cases and controls were the same may be because previously the health facilities were providing cervical cancer screening for HIV positive peoples.

7. Strength and limitation of the study

Strength

- This study was conducted using case control study design among women screened for cervical cancer, and it could generate new ideas for further studies.
- Questionnaire was pre-tested and necessary modification was made, the principal investigator and supervisor were supervising the daily data collection activity**.**
- Trained nurses were used for identification of cases and controls are the other strength of the study.

Limitation

- In this study cases and controls were identified only using visual inspection with acetic acid, specificity of VIA is low.
- Respondents might not give their exact response towards a given question. Therefore, the study could be affected by social desirability biases.
- Lack of previous similar study made comparison difficult.

8. Conclusions

- Cervical precancerous lesion was most observed in married and house-wife women.
- In this study, the age group of 40-49 years has higher risk cervical precancerous lesion than age group of 30-39 years.
- The study revealed that women with a history of sexually transmitted infections have more risk of developing cervical precancerous lesion than those with no history of sexually transmitted infections.
- Having two or more lifetime sexual partners of the women were significantly associated with cervical precancerous lesion.
- Having two or more other lifetime sexual partners of the husband were significantly associated with cervical precancerous lesion.

9. Recommendations

With respect to the findings and objectives of the study, some recommendations have been made at different levels.

At federal and regional health offices level

- There is a need to design policy and guidelines on the prevention and control of cervical precancerous lesion among women particularly with history of sexually transmitted infections and history of multiple sexual partners.

Health facilities and health professionals

- Health professional should give advice to women above the age of 40 years to be screened for cervical cancer.
- Health professional should be able to encourage all clients with history of sexually transmitted infections and history of multiple sexual partners to be screened for cervical cancer.
- All stakeholders, particularly the health sector, should give priority on the promotion and provision condom for those engaged in sexual activity in order to address sexually transmitted infections.

Researchers

- National level studies in the wider population needs to be conducted to identify and evaluate the risk factors associated with cervical precancerous lesion to find possible interpretation to change them.
- Studies should be done regarding HIV and other related risk factors considering sample size and strong design.

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11. Annexs

Annex I: Information sheet

Addis Ababa University College of Health Sciences School of Public Health information sheet on the factors associated with cervical precancerous lesion among women screened for cervical cancer in Addis Ababa city.

Hello! How are you? My name is _____.I live in this city. Now I am a research team member to be conducted here by a post graduate student in public health in Addis Ababa University, supervised by School of Public Health instructors. The purpose of the study is assessing the factors associated with cervical precancerous lesion among women screened for cervical cancer in this city. If you agree to participate in the study as respondent, you will not have any risk in participating in the study except the time you spent during the interview. The study may be advantageous in identifying risk factors for cervical precancerous lesion, so it is important to develop strategies that help to improve the prevention and control methods of cervical cancer. All the genuine information obtained from you will be strictly kept confidential, your participation is surely voluntary, and no monetary incentives will be given for your participation in the study. You can withdraw any time during conducting the study, also your participation, non-participation, or refusal to answer questions will not have any effect on your life, and your name will not be recorded on this form. If you have any question Mrs Hirut Teame is the contact person. Hirut can be reached through a call at 0946415072.

Are you willing to participate in the interview and stay with us for few minutes (15-20) now?

[ ] Yes, Go to next page [ ] No, Thanks! Proceed to next eligible participant

Note: Women who undergo screening for cervical precancerous lesion, who are sexually active, women, who are from 21 to 49 years of age and women who live in Addis Ababa city for the last six months.

Annex II: Consent form

I am informed that my identity and the information I give will be treated confidentially. I have also been informed that I can refuse to participate in the study or not to respond to questions if I am not interested. Furthermore, I have been informed that I can stop responding to the questions at any time in the process. I am informed that my participation, non-participation, or refusal to answer questions will not have any effect on my life. I am informed that no monetary incentives will be given for my participation in the study. I am also informed that my response will be used to develop strategies that help to improve the prevention and control methods of cervical cancer.
If the study subject agrees to participate in the study, thank her and start the interview.

Interviewer signature certifying that informed consent has been given verbally by the respondent.
Interviewer‘s name---------- Signature----------Date----------

Note: No need of enforcing the clients to be included in the study.

Thank you!

Annex III: Questionnaire (English Version)

General information

For each question, make a circle around the spelling that corresponds to the answer; fill the blanks with the answer or mark "x".

1. Participant's code number: _____

CASE ☐ **CONTROL** ☐

Part 1: Socio-demographic characteristics

Ser. no	Question	Response	Skip
1.1	How old are you? (completed years)	_____	
1.2	What is your level of education?	A. Don't write and read B. Only read and write C. Primary(1-4) D. Primary (5-8) E. Secondary(9-10) F. Preparatory G. Diploma or technical/vocational H. Higher(bachelor degree and above)	
1.3	What is your marital status?	A. Single B. Married C. Widowed D. Divorced E. Separated	
1.4	How old were you when you first marriage? (If she is already married once)	_____	
1.5	How much is your family average monthly income(ETB)	_____	
1.6	What is your current occupation status?	A. House wife B. Merchant C. Daily laborer D. Governmental employee E. Private/NGO employee	

		F. Others (specify_____)	
1.7	What is your religion?	A. Orthodox Christian B. Muslim C. Protestant D. Catholic E. Others(specify_____)	

Part 2: Questions related to reproductive health factors

2.1	Do you use contraceptive?	A. Yes B. No	→2.4
2.2	If answer for Q 2.4 yes, which type of contraceptive do you use? (you can choose more than one choice)	A. Pill B. Injectable (Depo) C. Implant D. Others(specify_____)	
2.3	For how long have you been using contraception?		
2.4	How old were you when you menarche?	_____	
2.5	How was your menstrual history?	A. Regular B. Sometimes irregular C. Always irregular D. No menses, why _____	
2.6	Have you ever-experienced post coital bleeding?	A. Yes B. No	
2.7	Have you ever give birth?	A. Yes B. No	→2.11
2.8	If answer for Q 2.12 yes, how many times?	_____	
2.9	How old were you when you first birth?	_____	
2.10	What is the average birth interval between your births? (if she have two or more births)	_____	
2.11	Have you ever-experienced abortion?	A. Yes B. No	→2.13
2.12	If answer for Q 2.17 yes, how many times?	_____	

2.13	Do you have family (mother or sister) history of cervical cancer?	A. Yes B. No	

Part 3: Questions related to lifestyle and sexual behavior factors

3.1	Have you ever been screened for cervical cancer before?	A. Yes B. No	→ 3.4
3.2	If answer for Q 3.1 yes, when were you screened for the last time?	_____	
3.3	What was the result of that screening test?	A. Positive B. Negative	
3.4	Have you ever smoke?	A. Yes B. No	→ 3.6
3.5	If yes, how long you have been smoke?	_____	
3.6	How old were you when you first had sex?	_____	
3.7	Do you use condom whenever you are having sex?	A. Always B. Sometimes C. Never	
3.8	Have you ever been told you that you had a pelvic infection or treated by health professionals?	A. Yes B. No	
3.9	Have you had a sexually transmitted infection in your lifetime?	A. Yes B. No	
3.10	Does your partner ever have history of STIs?	A. Yes B. No	
3.11	Have you been tested for HIV before?	A. Yes B. No	→ 3.14
3.12	If answer for Q 3.20 yes, what was the result?	A. Positive B. Negative C. Unknown	
3.13	If answer for Q 3.21 positive, did you start antiretroviral therapy?	A. Yes B. No	
3.14	How many sexual partners have you had in your lifetime?	_____	
3.15	Does your partner have other partners?	A. Yes B. No	
3.16	If answer for Q 3.24 yes, how many?	_____	

Thank you!

ክፍል አንድ: መረጃ መስጫ ወረቀት

አዲስ አበባ ዩኒቨርስቲ ጤና ሳይንስ ኮሌጅ የጤና አጠባበቅ ትምህርት ቤት የማህፀን ጫፍ ቅድመ ካንሰር ጠንቆች በሴቶች በአዲስ አበባ ከተማ የሚደረግ ጥናት ነው።

ጤና ይስጥልኝ፤ ስሜ ----------ይባላል፡፡ እኔ በአዲስ አበባ ዩኒቨርሲቲ የጤና አጠባበቅ ትምህርት ቤት የማስተርስ ድግሪ የምታጠና ተማሪ ከአዲስ አበባ ዩኒቨርሲቲ መምህራንን በመታገዝ በአዲስ አበባ የማህፀን በር ቅድመ ካንሰር ተያያዥ ምክንያቶች ለማጥናት በተዋቀረው ቡድን ውስጥ አባል ነኝ፡፡ ጥናታችንም ወደ ጤና ተቋማት ለቅድመ ካንሰር ምርምራ በመጡ ሴቶች በመጠየቅ የሚከናወን ነው፡፡ እርሶም በጥናት ቡድን አማካኝነት ጥናቱ ላይ ተሳታፊ እንዲሆኑ ተመርጠዋል፡፡ እርሶ የሚሰጡትን መረጃ ከሌሎች ምንጮች ጋር ተዳምሮ የማህፀን በር ቅድመ ካንሰር ተያያዥ ምክንያቶች ለይቶ ለማወቅ ወይም የሚሻሻልበት ሁኔታ ለመፍጠር ታልሞ የተዘጋጀ ጥናት ነው፡፡ በሂደታችን ውስጥ በጥናቱ ላለመካፈል በማኛውም ወቅት ከወሰኑ በማኛውም ሰዓት መጠይቁን እናቆማለን፡፡ በጥናቱ ውስጥ ላለመካፈል በሚወስኑት ውሳኔ የተነሳ የሚደርስቦት አንዳችም ሁኔታ የለም፡፡ በቃለ መጠይቁ ወቅት የሚሰጡት መረጃዎች ለጥናቱ ዓላማ ብቻ የሚውሉና ሚስጢራዊነቱ ሙሉ በሙሉ የተጠበቀ ነው፡፡ በዚህ መጠይቅ ውስጥ ስሞትንና እርሶን ለመለየት የሚያገለግል ነገር አይጻፍም፡፡ ቃለ መጠየቁ የሚወስድብዎት ግዜ ከ 15-20 ደቂቃ ብቻ ነው፡፡ ግልጽ ያልሆነ ነገር ካለ ሊጠይቁን ይችላሉ፡፡ ማንኛውም ጥያቄ ካሎት የጥናቱ መሪ የሆኑትን ወ/ሮ ሂሩት ጠዓመ በስልክ ቁጥር 251946415072 ማግኘት ይችላሉ፡፡ ስለተባበሩን እናመሰግናለን፡፡

በቃለ መጠይቁ ተስማምቻለሁ_____ ወደ የስምምነት ቅጽ ይለፉ

በቃለ መጠይቁ አልተስማማሁም _____ አመስግነው በዚህ ያብቁ

አስታውስ፤ ተሳታፊዋ የማህፀን በር ቅድመ ካንሰር ምርምራ ያደረገች፣ ግብረ ስጋ ግንኙነት ማድረግ የጀመረች፣ ከ 21-49 ዕድሜ ክልል ውስጥ፣ ቀዋሚ የመኖሪያ ቦታ አዲስ አበባ መሆን አለባቸው ::

ክፍል ሁለት: የስምምነት ቅጽ

ተመራማሪዋ የጥናቱን አላማ በሚገባ ግልጽ በሆነ ቋንቋ አስረድተውኛል፡፡ በዚህም መሰረት የጥናቱን አላማ ስለተረዳሁ ለመሳተፍ ውሳኔዬን በሚከተለው መንገድ አረጋግጣለሁ፡፡

የመረጃ ሰብሳቢ ፊርማ በቃል ስምምነት መስጠቱን ያረጋግጣል፡፡

የመረጃ ሰብሳቢ ስም ---------- ፊርማ ---------- ቀን --------

አስታውስ፣ ተሳታፊዋ በግድ በጥናቱ እንዲሳተፍ አያስገድዱ፡፡

ክፍል ሶስት: ቃለ መጠይቅ

የተሳታፊዋ መለያ ቁጥር _____

የማህፀን በር ቅድመ ካንሰር ያላት [ ] የማህፀን በር ቅድመ ካንሰር የሌላት [ ]

ክፍል I. የማህበራዊ: ኢኮኖሚያዊና ዲሞግራፊያዊ ሁኔታዎች

ቁጥር	ጥያቄ	ምላሽ	ዝለል
1.1	ዕድሜ	_____	
1.2	የትምህርት ደረጃዎ?	ሀ. መፃፍና ማንበብ የማትችል ለ. መፃፍና ማንበብ ብቻ የምትችል ሐ. የመጀመሪያ ደረጃ (1-4) መ. የመጀመረያ ደረጃ(5-8) ረ. ሁለተኛ ደረጃ (9-10) ሰ. መሰናዶ፣ ቴክኒክ እና ሙያ (10^{+}) ሸ. ዲፕሎማ ቀ. ከፍተኛ (ዲግሪ እና ከዛ በላይ)	
1.3	የጋብቻ ሁኔታዎ?	ሀ. ያላገባች ለ. ያገባች ሐ. ባሏ የሞተባት መ. የተፋታች ረ. ተለያይተው የሚኖሩ	
1.4	የመጀመሪያ ጋብቻ ሲፈጽሙ እድሜዎት ስንት ነበር?(ያገቡ ከሆነ)	_____	
1.5	ጠቅላላ የቤተሰብዎ ወርሀዊ ገቢ ስንት ነው?	የብሩን መጠን _____	
1.6	ስራዎ ምንድን ነው?	ሀ. የቤት እመቤት ለ. ነጋዴ	

		ሐ. ቀን ሰራተኛ መ. የመንግስት ሰራተኛ ረ. መንግስታዊ ያልሆነ ሰ. ሌላ_____	
1.7	ሐይማኖት	ሀ. ኦርቶዶክስ ለ. ሙስሊም ሐ. ፕሮቴስታንት መ. ካቶሊክ ረ. ሌላ_____	

ክፍል II: ስለ ተዋልዶ ጤና ጥያቄዎች

2.1	የወሊድ መከላከያ ተጠቀመው ያውቃሉ?	ሀ. አዎ ለ. አልጠቀምም	→ 2.4
2.2	የወሊድ መከላከያ እየተጠቀሙ ከሆነ ወይም ከነበረ የትኛውን ዓይነት ነው የሚጠቀሙት? (ከአንድ በላይ መምረጥ ይቻላል)	ሀ. የሚዋጥ ኪል ለ. በመርፌ የሚሰጥ ሐ. በክንድ የሚቀበረውን መ. በማህጸን ውስጥ የሚቀመጥ ረ. ሌላ_____	
2.3	ለምን ያህል ግዜ ተጠቀሙ? (ከአንድ በላይ እየተጠቀሙ ከነበሩ ለሁሉም ይፃፉ)	_____ _____	
2.4	በስንት ዓመትዎ ነው የመጀመሪያውን የወር አበባ ያዩት?	_____	
2.5	የወር አበባዎ ዑደት እንዴት ነው?	ሀ. በየወሩ በትክክል ይመጣል ለ. አንዳንዴ ይዛባል ሐ. ብዙ ግዜ ይዛባል መ. የወር አበባ አላይም	

		ካለ፡ ለምን_____	
2.6	ከግብረ ስጋ ግንኙነት በኋላ ደም የማየት ነገር አለ?ት?	ሀ. አዎ ለ. የለኝም	
2.7	ልጅ ወልደዋል?	ሀ. አዎ ለ. አልወለድኩም	→ 2.11
2.8	አዎ ካለ፡ ምን ያህል ልጅ ወልደዋል?	_____	
2.9	በስንት አመትዎ ነው የመጀመሪያውን ልጅ የወለዱት?	_____	
2.10	በአማካይ በልጆችዎ መካከል ያለ የእድሜ ልዩነት ስንት ነው?(ሁለት እና ከዛ በላይ ልጅ ከወለደች)	_____	
2.11	ውርጃ ኖሮት ያውቃል ?	ሀ. አዎ ለ. አያውቅም	→ 2.13
2.12	አዎ ካለ፡ ስንት ግዜ?	_____	
2.13	በቤተሰብ የማህፀን ካንሰር ያለበት ሰው አለ?	ሀ. አዎ ለ. የለም	

ክፍል III: ስለ ግል ባህርያት የሆኑት ጥያቄዎች

3.1	ከዚህ በፊት የማህፀን ጫፍ ካንሰር ተመርምረው ያውቃለ?ት	ሀ. አዎ ለ. አላውቅም	→ 3.4
3.2	ለመጨረሻ ግዜ የተመረመሩት መቼ ነው?	_____	
3.3	የምርመራው ውጤቱ ምን ነበር?	ሀ. ፖዝቲቭ ለ. ነጋቲቭ	
3.4	ሲጃራ ኣጭሰው ያውቃለ?ት	ሀ. አዎ ለ. አላጨስም	→ 3.6
3.5	አዎ ካለ፡ ለምን ያህል ግዜ አጨሱ?	_____	
3.6	ግብረ ስጋ ግንኙነት ለመጀመሪያ ግዜ ማድረግ ሲጀመሩ እድሜዎት ስንት ነበር?	_____	

3.7	ግብረ ስጋ ግንኙነት በሚያደርጉበት ግዜ ኮንዶም ይጠቀማሉ?	ሀ. ሁሌ ለ. አልፎአልፎ ሐ. አልጠቀምም	
3.8	የማህፀን ኢንፌክሽን አለቦዎት ተብለው ወይም ታክመው ያውቃሉ?	ሀ. አዎ ለ. አላውቅም	
3.9	የአባላዘር በሽታ አለብዎት ተብለው ወይም ታክመው ያውቃሉ?	ሀ. አዎ ለ. አላውቅም	
3.10	ባለቤትዎ ወይም የፍቅር ጓደኛዎ የአባለዘር በሽታ አለበት ተብለው ያውቃሉ?	ሀ. አዎ ለ. አያውቅም	
3.11	የኤች አይ ቪ ምርመራ አድርገው ያውቃሉ?	ሀ. አዎ ለ. አላውቅም	→ 3.14
3.12	ከተመረመሩ ውጤቱ ምን ነበር?	ሀ. ፖዘቲቭ ለ. ነጋቲቭ ሐ. አይታወቅም	
3.13	ካለዎት የኤች አይ ቪ መድሃኒት ጀመሩ?	ሀ. አዎ ለ. አልጀመርኩም	
3.14	እስከ አሁን ድረስ ከስንት ወንዶች ጋር ግብረ ስጋ ግንኙነት አድርገው ያውቃሉ?	_____	
3.15	ባለቤትዎ(የፍቅር ጓደኛዎ) ከሌላ ግብረ ስጋ ግንኙነት አለው ወይም ነበረው ?	ሀ. አዎ ለ. የለውም	
3.16	አዎ ካሉ ከምን ያህል ሰው?	_____	

ስለ ሰጡኝ ምላሽ በጣም አመሰግናለሁ!

DECLARATION

I the undersigned, declare that this thesis is my original work, has never been presented in this or any other university, and that all the resources and materials used for the thesis development, have been acknowledged as complete references.

Name: Hirut Teame

Signature: _____

Date of submission: June 17, 2016

This thesis work has been submitted for examination with my approval as University primary advisor.

Name: Dr. Adamu Addissie

Signature: _____

Date: June 17, 2016