PREVALENCE AND FACTORS ASSOCIATED WITH PRECANCEROUS CERVICAL LESIONS AMONG CLIENTS SCREEENED AT FAMILY GUIDANCE ASSOCIATION OF ETHIOPIA, SOUTH WEST AREA OFFICE, JIMMA MODEL CLINIC, JIMMA, 2013.

BY

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A THESIS TO BE SUBMITTED TO DEPARTMENT OF EPIDEMIOLOGY, COLLEGE OF PUBLIC HEALTH AND MEDICAL SCIENCES, JIMMA UNIVERSITY, IN PARTIAL FULFILLMENT FOR THE REQUIRMENTS OF MASTERS OF PUBLIC HEALTH (MPH).

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Summary

Background: *Cervical cancer is the 2nd most frequent and top killer cancer among women in Ethiopia. As part of alleviating the problem, screening using visual inspection with acetic acid and treatment with cryotherapy has been started in Ethiopia on September 2010 although the service is still not popular and factors associated with precancerous cervical lesions is not studied at the study clinic.*

Objective: *The objective of this study was to assess prevalence and factors associated with precancerous cervical lesions among clients screened at Family Guidance Association of Ethiopia, south west area office, Jimma model clinic, Jimma.*

Methods: *A cross-sectional study was conducted at Family Guidance Association of Ethiopia, south west area office, Jimma model clinic, Jimma from September 11,2013 to October 11, 2013 G.C. Pertinent data of all the 334screened clients were transferred from client evaluation form for cervical cancer prevention service to Epidata version 3.1using checklist, double data entry verification done and exported to SPSS version16.0.After cleaning the data, descriptive analysis was done to describe variables involved in the study and logistic regression model was used to identify predictors of precancerous cervical lesions. Statistical Significance was declared at P<0.05.*

Result: *Out of 334 screened clients, 43(12.9%) had precancerous cervical lesions. Early initiation of sexual intercourse, at age less than 16years ,was found to be an independent predictor, increasing the risk of precancerous cervical lesion by 2.2times as compared to clients who started sexual intercourse at the age of 16 or more years (AOR [95%CI] =2.2[1.1, 4.3]).*

Conclusion and recommendation: *Early initiation of sexual intercourse was an independent predictor of precancerous cervical lesion in this study. Thus, any cervical cancer prevention and control effort should address the problem of early initiation of sexual intercourse.*

Key words: Cervical cancer, Precancerous cervical lesion, visual inspection with acetic acid, cryotherapy.

Acknowledgement

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Acronyms and Abbreviations

AOR – Adjusted Odds Ratio

CCP – Cervical Cancer Prevention

CI – Confidence Interval

COR – Crude Odds Ratio

DNA – Deoxyribonucleic Acid

FIGO- International Federation of Gynecology and Obstetrics

FGAE - Family Guidance Association of Ethiopia

FMOH – Federal Ministry of Health

HAART – Highly Active Antiretroviral Therapy

HIV/ AIDS - Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome

HPV- Human Papilloma Virus

IARC – International Agency for Research on Cancer

JMC **-** Jimma Model Clinic

JUSH_ Jimma University Specialized Hospital

LBC **–** Liquid Based Cytology

LMICs _ Low and Middle Income Countries

PAP – Papanicolau smear

PLWHA – People Living With HIV/AIDS

RR – Relative Risk

SCJ – Squamo-Columnar Junction

SNNPR – Southern Nations and Nationalities Peoples Region

SPIRES – Stanford University program for International Reproductive Education and Service

SPSS- Statistical Package for Social Sciences

SRH – Sexual and Reproductive Health

STI- Sexually Transmitted Infection

SVA – Single Visit Approach

SWAO - South West Area Office

WHO - World Health Organization

VIA – Visual Inspection With Acetic Acid

Chapter I

1.1 Background

Cervical cancer is a disease in which the cells of the cervix become abnormal and start to grow uncontrollably, forming tumors[1].It is caused by the sexually transmitted human papilloma virus (HPV) infection which has been detected in up to 99% of women with squamous cervical carcinoma[2].There are numerous risk factors for HPV acquisition and cervical cancer: young age at first intercourse (<16 years), multiple sexual partners, cigarette smoking and high parity. According to International Federation of Gynecology and Obstetrics (FIGO), there are four stages (I,II,III&IV) of cervical cancer with sub classifications within each stage(Ia,Ib, IIa, IIb, III a,III b,IV a&IV b)[1].

Cancer of the cervix is the second most common cancer among women worldwide, with about 530,000 new patients diagnosed and over 270,000 deaths every year. It is a major cause of morbidity and mortality among women in low and middle income countries (LMICs) where more than 85% of the global burden and deaths occur because of poor access to screening and treatment services[3,4].

In Africa, most recent estimates indicate that every year 80,400 women are diagnosed with cervical cancer (second most frequent) and 50,300 die from the disease (leading cause of cancer death).Rates vary substantially across regions, with the incidence and death rates in East Africa (the region Ethiopia belongs to) and West Africa five times as high as the rates in North Africa[5].

In Ethiopia, the annual number of new cervical cancer cases was 4648 and 3235(69.6%) die from the disease making it the 2nd most frequent and top killer cancer among women in Ethiopia according to an estimate made by International Agency for research on cancer (IARC)[4].However, the figures likely significantly under-represent actual number of cases and deaths, given the low level of awareness, cost, limited access to screening and treatment services and lack of a national cancer registry[6].

1.2 Statement of the problem

In spite of effective screening methods, cervical cancer continues to be a major public health problem. Majority of cancers (>80%) in sub-Saharan Africa are detected in late stages, predominantly due to lack of information about cervical cancer and prevention services[7].Late-stage disease is associated with low survival rates after surgery or radiotherapy. In addition, these treatment modalities may be lacking altogether, or too expensive and inaccessible, for many women in low-resource countries. However, cervical cancer is potentially preventable and effective screening programmes can lead to a significant reduction in the morbidity and mortality associated with this cancer[8].Screening women once in their lifetime at 35 years of age will reduce the lifetime risk of cervical cancer by approximately 25-36% and it will further reduce the risk by an additional 40 percent(totally >65%) with two screenings at 35 and 40 years of age[9].

World Health Organization (WHO) recommends comprehensive approach to cervical cancer prevention and control the core principle of which is to act across the life course using the natural history of the disease to identify opportunities in relevant age groups to deliver effective interventions as shown in figure 1 below[3].This could reduce cervical cancer deaths in LMICs to the very low levels currently observed in many high income countries[10].
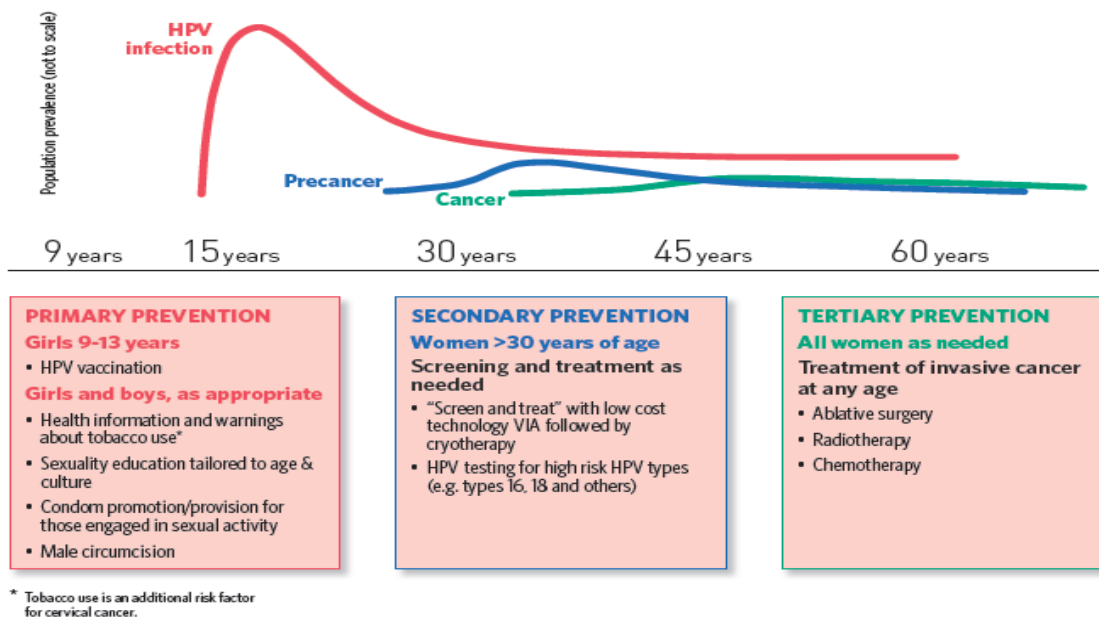
Figure 1: Overview of programmatic interventions over the life course to prevent HPV infection and cervical cancer.

Three different types of tests are currently available for cervical cancer screening: Conventional (Pap) and liquid based cytology (LBC),Visual inspection with Acetic Acid (VIA) and HPV testing for high risk HPV types (e.g. types 16 and 18)[3].

Each of the available screening method has its own strengths and limitations. The critical issue for screening programs is to select the test that is most appropriate for their situation and which can help their programs achieve high screening coverage, high quality testing and reliable follow-up and care for women —an effective screening program[11].

In high-resource settings, regular screening with a Pap smear has been shown to effectively lower the risk for developing invasive cervical cancer, by detecting precancerous changes. However, in LMICs, only approximately 5% of eligible women undergo cytology-based screening in a 5-year period[12].This is because there are too few trained and skilled professionals to implement such a programme effectively in addition to the competing health care priorities and unavailable healthcare resources to sustain such a programme[3].

HPV DNA testing is the most sensitive screening exam (88%)in identifying women who have abnormal precancerous lesions[13].Unfortunately, there are disadvantages to using the current HPV test in low-resource settings—test takes at least 4.5 hours to run (single-visit approach would not be feasible),requires a laboratory, sophisticated equipment, refrigeration, and trained technicians who are usually found only in well-resourced, urban settings[11,14].

Visual inspection with acetic acid (VIA) performs better than cervical cytology in accurately identifying precancerous lesions with sensitivity of 80%[15].It is also cheap, non-invasive and can be done in a low level health facility[16]. More importantly, VIA provides instant results and those eligible for treatment can receive treatment of the precancerous lesions using cryotherapy on the same day and in the same health facility(Screen-and-Treat approach or sometimes called as single visit approach [SVA] to Cervical Cancer Prevention [CCP])[17].

Eligibility criteria for cryotherapy include: acetowhite lesion <75% of cervix, lesions that do not extend onto the vaginal wall and lesions which extend<2 mm beyond the diameter of the cryoprobe[18].

Secondary prevention of cervical cancer through screening and treatment of precancerous lesions of the cervix using Screen-and-Treat approach is associated with an overall reduction of morbidity and mortality due to cancer of cervix in low resource settings[9,18].

However, there is no organized cervical cancer prevention program in Ethiopia until September 2010 when service provision of VIA and cryotherapy for people living with HIV/AIDS (PLWHA) began in 14 health institutions in the regions of Addis Ababa, Amhara, Oromia, Tigray, and Southern Nations, Nationalities, and People's Region (SNNPR)with the collaborative effort of Pathfinder International, Federal Ministry of Health (FMOH) of Ethiopia and the Stanford University Program for International Reproductive Education and Services (SPIRES)[6,19].Moreover,assessment of precancerous cervical lesions is limited in Ethiopia and this could limit cervical cancer prevention efforts as evidence based decision making is important.

ChapterII

2.1 Literature Review

While infection with a high-risk HPV is the underlying cause of cervical cancer, most women infected with high-risk HPV do not develop cancer. Most cervical HPV infections, regardless of type, are short-lived, with only a small number persisting and even fewer progressing to precancerous lesions or invasive cancer[20].

2.1.1 Prevalence of precancerous cervical lesions diagnosed by VIA.

VIA-positive rates varied in WHO demonstration project in six African countries from as high as 28.0% in Zambia to as low as 5.7% in Nigeria(11.3% in Madagascar, 12.4% in Malawi,5.7% in Nigeria, 9.7%in United Republic of Tanzania,7.8% in Uganda and 28% in Zambia)[21] although the overall rate of approximately 10.1% positive result is in agreement with large study from India[22].VIA-positive rate in a pilot studies involving 44& 100 participants in Bangladesh and Sudan was 18.2%[23] and 16%[24] respectively. Studies in Latin America and Thailand reported 12%[25] and 13.3%[26] respectively. Ethiopian study among people living with HIV/AIDS (PLWHA) found a rate of 11%[27].

2.1.2Socio-demographic factors associated with precancerous cervical lesion

A pilot study done in Sudan, Khartoum showed parity (AOR [95%CI]= 5.78[1.41,23.7])[24] as risk factor for precancerous cervical lesion similar to Tanzanian study which showed higher risk of precancerous cervical lesion among grand multipara (AOR[95%CI] =3.19[1.84,5.48]) and widowed/separated (AOR[95% CI] =1.41[1.17,1.66]) women[28]. Kenyan study showed higher risk of precancerous cervical lesion among older women (AOR[95%CI]=3.9[1.1,13.6])[29] similar to Chinese study which showed higher risk at age of 50-54 years (*OR*[95%CI]=1.68 [1.09,2.58])[30].

2.1.3 Behavioral factors associated with precancerous cervical lesion

Kenyan study showed higher risk of precancerous cervical lesion among HIV patients (AOR[95% CI] =4.8[1.8,12.4]), those having multiple sexual partners (AOR[95%CI] =3.8[1.1,13.5%])[29] and HIV patients not on antiretroviral therapy (HAART) (AOR[95% CI) = 2.21[1.28,3.83][31].A case-control study from the United states showed higher risk among women having multiple sexual partners (RR for >5 partners =5.0) and who use oral contraceptives (RR for > 10 years use =1.4)[32].

Study of prevalence and factors associated with precancerous cervical lesion will help in designing evidence-based strategy for prevention and control of cervical cancer. However, to the best of my knowledge, such study hasn't been done in south west Ethiopia and of course at the study clinic.

2.2 conceptual framework

Sociodemographic factors

- Age
- Parity
- Marital status

Precancerous cervical

lesion

Behavioral factors

- Contraceptive use
- STI
- Age at onset of sexual intercourse
- Number of Sexual partners
- HIV sero-status
- Smoking
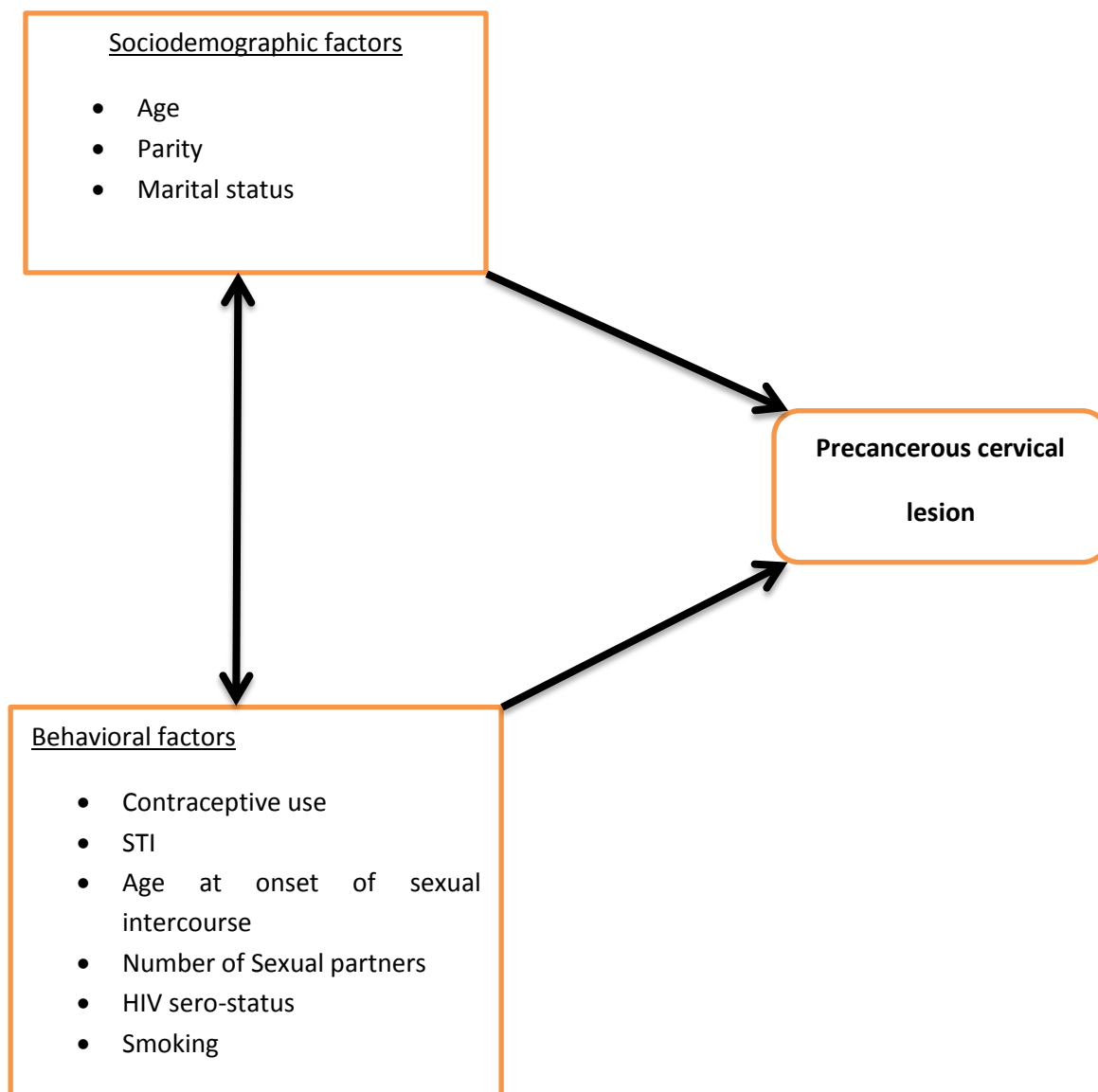
Figure 2: Conceptual framework showing socio-demographic and behavioral factors affecting precancerous cervical lesions of the cervix. (Designed after literature review)

2.3 Significance of the study

LMICs take the lion share of the global burden and death related to cervical cancer as a result of their poor access to screening and treatment services. Ethiopia is one of those LMICs suffering from the problem. Addressing the problem, service provision of VIA and cryotherapy for cervical cancer prevention among PLWHA (prioritized) had been started on September 2010 with collaborative effort of Pathfinder International, Federal Ministry of Health (FMOH) of Ethiopia and the Stanford University Program for International Reproductive Education and Services (SPIRES).However, the service is still not popular among Ethiopians and studies on prevalence and factors associated with precancerous cervical lesions were also limited. But, study on prevalence and factors associated with precancerous cervical lesions can help to bring at least the bird's eye view of this unpopular service to the scientific community, policy makers, program managers, health professionals and the population at large.

Hence, this research was primarily designed to assess prevalence and factors associated with precancerous cervical lesions among clients at the study clinic. Thus, the findings of this research will help in understanding the magnitude of precancerous cervical lesions and associated factors which could be used as baseline information in making evidence – based decisions with regard to preventive measures.

Chapter III

3.1 Objectives of the study

3.1.1 General Objective

- To assess prevalence and factors associated with precancerous cervical lesions among clients screened at the study clinic.

3.1.2 Specific Objectives

- To determine prevalence of precancerous cervical lesions.

- To assess socio-demographic factors associated with precancerous cervical lesions.

- To assess behavioral factors associated with precancerous cervical lesions.

Chapter IV

Methods and Materials

4.1 Study Area

Founded in 1966, Family Guidance Association of Ethiopia (FGAE) is one of the leading non-governmental providers of sexual and reproductive health (SRH) care in Ethiopia. FGAE has 20 SRH clinics, 8 higher and 12 medium, and 27 youth centers across Ethiopia. This study was conducted in one of the 8 higher SRH clinics of FGAE, Jimma model clinic (JMC), which is located in Jimma town, 350km southwest of Addis Ababa, Ethiopia's capital. The catchment area of the clinic was Jimma town and surrounding woredas. The clinic started opportunistic screening of females aged 25-45 years on September 2012 as per Cervical Cancer Prevention Guidelines for Low- Resource settings. Thus, after proper counseling of clients aged 25-45 years who came for medical or reproductive health services, those with free will were screened with 5% acetic acid and test positive cryotherapy eligible clients treated with cryotherapy while cryotherapy ineligible clients and those with lesions suspicious for cancer were referred to Jimma University specialized hospital (JUSH).

4.2 Study Period

The secondary data was collected from September 11, 2013 to October 11,2013G.C from a primary data which was collected from September 2012 to October 11, 2013G.C.

4.3 Study Design

The study design was cross sectional study design.

4.4 Population

A. source population-all women aged 25-45years, who had been screened with VIA at the study clinic from September 2012 to October 11, 2013G.C.

B. study population–all women aged 25-45years, who had been screened with VIA at the study clinic. This included all the recorded data from the time service was started at the clinic, September 2012, till the end of study period, October 11, 2013G.C.

Inclusion Criteria:

- A record on women aged 25-45 years screened with VIA where SCJ is visible.

Exclusion Criteria:

- Incomplete data of VIA test result
- Out-of-range numbers for quantitative data
- Clients with unknown HIV sero- status for analyzing logistic regression.
- Clients with unknown age at first intercourse for analyzing logistic regression

4.5 Sample size

Single population proportion estimation was used with an assumption of 95% confidence level(CI),5% margin of error and 11% proportion of patients with positive VIA from a study among PLWHA in Ethiopia[27].

$n = Z^2 \, p \, (1\text{-}p) \, / \, d^2$, Where n =Sample size

Z =level of confidence, 1.96 for 95%CI

P=proportion, 11% from Ethiopian study among PLWHA

d=margin of error.

Thus, n = $\underline{(1.96)^2(0.11) \, (1\text{-}0.11)/ \, (0.05)}$ = 150

But, sample size values obtained from formulas or software are generally inflated to allow for expected dropout or loss to follow up of study subjects or other sources of missing data[33].As this study was secondary data analysis, missing(incomplete) data was expected and we used all the data available during the study period for inflating the sample size to allow for the expected missing data. Further, larger sample is more representative of the source population and leads to more statistical precision. Objectively, in this study, the margin of error was decreased to 0.035 (improved precision) with an increase of sample size to 334.

$$d^2 = Z^2 \, p \, (1\text{-}p) \, /n$$

$$d = \sqrt{Z2 \, p \, (1-p) \, /n} \quad = \underline{1.96^2(0.11) \, (0.89)/334} = 0.035$$

4.6 Sampling Technique

Consecutive sampling was the type of sampling technique as we used all the data available during the study period, September 11, 2013 to October 11,2013G.C.

4.7 Study Variables

4.7.1 Dependent Variable

A. Precancerous cervical lesion status

4.7.2 Independent Variables

A. Age
B. Parity
C. Marital status
D. Current contraceptive
E. Age at first intercourse($<$16years,$\geq 16 years$)
F. History of STI
G. Number of sexual partners
H. HIV status

4.8 Data collection procedures

Primary data was registered by trained service providers, general practioner and nurse, on standard Client Evaluation form for Cervical Cancer Prevention service (see annex). All the data were collected according to an agreed set of diagnostic criteria mentioned in the operational definition and it involved registration of client identification, reproductive history, risk factors, pelvic examination finding, cervical map, VIA result, management of VIA result and referral details. Secondary data was collected on checklist for retrieving data from standard Client Evaluation form for Cervical Cancer Prevention service(see annex) and transferred to Epidata by the principal investigator.

4.9 Operational definition

1) VIA - is naked-eye inspection (i.e., without magnification) of the cervix to detect abnormalities after applying a dilute solution of acetic acid (ordinary table vinegar).

2) Positive VIA – presence of raised and thickened white plaques or acetowhite epithelium, usually near the Squamo-columnar junction (SCJ)

3) Negative VIA - presence of smooth, pink, uniform and featureless cervix; cervical ectropion; polyp; cervicitis; inflammation; and/or nabothian cyst after applying a dilute solution of acetic acid (ordinary table vinegar).

4) Eligible for cryotherapy - acetowhite lesion <75% of cervix; lesion does not extend onto the vaginal wall; and lesion extends <2 mm beyond the diameter of the cryoprobe.

5) Ineligible for cryotherapy - acetowhite lesion >75% of cervix; lesion extends into the vaginal wall; lesion extends >2mm beyond the diameter of the cryotip and lesion suspicious for cancer.

6) Suspicious for cancer –presence of cauliflower-like growth or ulcer; fungating and bleeding mass.

4.10 Data quality control

Data was checked for integrity and plausibility. It was also collected in logical sequence of VIA number. Double entry verification was done and data was thoroughly cleaned using SPSS version 16.

4.11 Data processing, analysis and interpretation

Data was entered into a computer using Epi data version3.1 and double entry verification was also made. The entered data was exported to SPSS version 16 to be cleaned and analyzed. Data was cleaned by generating frequency tables and inspecting for strange values. Descriptive analysis of variables like client identification, reproductive history, risk factors, pelvic examination, VIA result, cryotherapy eligibility and referral details was done using descriptive statistics like mean, standard deviation and proportion. Logistic regression was employed for identifying predictors of precancerous cervical lesion using the following covariates: age, current contraceptive, age at first intercourse, history of STI, number of sexual partners, HIV and HAART status. Variables with P-value less than 0.25 in the bivariate analysis were included in

the multivariable logistic regression model using backward stepwise LR method. Multicolinearity was checked for all covariates. Goodness of fit of the final model was checked using Hosmer and Lemeshow statistics. Statistical Significance was declared at P<0.05.Result was presented in form of tables and texts.

4.12 Ethical consideration

Ethical approval was obtained from ethical review board of Jimma University. A letter of support was obtained from Family Guidance Association of Ethiopia (FGAE), south west area office (SWAO), Jimma model clinic (JMC). Patient records were treated confidentially and patient name was not included in the data collection.

4.14 Dissemination plan

Study results will be submitted to Jimma University College of public health and medical sciences, department of epidemiology and presentation will be made to scientific community of the University. Discussion will be made with the relevant authorities, both governmental and non-governmental including FGAE, SWAO officials. An effort will also be made to publish in peer reviewed journal.

Chapter V

Result

5.1 Baseline characteristics of screened clients

A total of 334 clients aged 25-45 years were screened for precancerous cervical lesion by visual inspection with acetic acid (VIA) from September 2012 to October 11, 2013 at the study clinic. More than half (51.5%) of them were in the age range 25-30 years with mean age of 32.4(SD=5.4) years. Most of them were married (73.7%), Multiparous (69.2%),had only one sexual partner(73.1%) and had no history of STI(84.7%).More than half of them were HIV negative (51.2%) and reported age at initiation of sexual intercourse as greater than or equal to 16years (52.4%) with mean age at initiation of sexual intercourse, 16.7(SD=3)years. None of the screened clients smoked, used steroid chronically or had abnormal Pap smear previously. Squamo-columnar junction (SCJ) was visible in all the screened clients (Table1).

Table1. Baseline characteristics of clients evaluated for precancerous cervical lesion at Family Guidance Association of Ethiopia, South West Area office, Jimma Model Clinic, Jimma, 2013.

Characteristics		Number (%)
Age in years	25-30	172(51.5)
	31-35	79(23.7)
	36-40	61(18.3)
	41-45	22(6.6)
Educational status	Illiterate	73(21.9)
	Primary	105(31.4)
	Secondary	105(31.4)
	Tertiary	51(15.3)
Marital status	Single	11(21.9)
	Married	246(73.7)
	Divorced	38(11.4)
	Widowed	23(6.9)
	Separated	16(4.8)
Parity	Nulliparous	31(9.3)
	Primiparous	72(21.6)
	Multiparous	231(69.2)
Age at first intercourse	< 16	148(44.3)
	≥16	175(52.4)
	Unknown	11(3.3)
Current contraceptive	OCP	20(6)
	DEPO	57(17.1)
	Implanon	9(2.7)
	Jadelle	6(1.8)
	IUCD	6(1.8)
	Condom	7(2.1)
	BTL	2(0.6)
	Dual contraception	8(1.5)
	None	222(66.5)
STI History	Yes	51(15.3)
	No	283(84.7)
HIV sero-status	Unknown	28(8.4)
	Negative	171(51.2)
	Positive	135(40.4)
HIV Positives	On HAART	110(81.5)
	Not on HAART	25(18.5)
No of sexual partners	One	244(73.1)
	multiple	90(26.9)
	Yes	334(100)
SCJ seen	No	0

5.2 Prevalence of precancerous cervical lesion

Of 334 clients screened at the clinic, 43(12.9%) were found to have precancerous cervical lesion while 287(85.9%) had negative test result. The remaining four (1.2%) were found to have lesions suspicious for cancer. Fourty-two of the 43(97.7%) clients with positive VIA test result were eligible for cryotherapy while one of the clients with positive VIA test result had lesion larger than cryoprobe by greater than 2mm and thus not eligible. Thus,42 clients with positive VIA test result who were eligible for cryotherapy were treated at the clinic while one of the clients who is not eligible for cryotherapy is referred to Jimma university specialized hospital(JUSH) with the four patients who had lesions suspicious for cancer(Table2).

Table2. VIA test result, cryotherapy eligibility and reasons for referral among clients at Family Guidance Association of Ethiopia, South West Area office, Jimma Model Clinic, Jimma, 2013.

Characteristics		Number (%)
VIA test result	Positive	43(12.9)
	Negative	287(85.9)
	Suspicious for cancer	4(1.2)
Cryotherapy eligibility	Eligible	42(97.7)
	Ineligible	1(2.3)
Reasons for referral	Suspicious for cancer	4(80)
	Lesion larger than cryoprobe>2mm	1(20)

5.3 Factors associated with precancerous cervical lesions

Age at onset of intercourse was unknown in 11 screened clients & HIV-status was unknown in 28 screened clients while both age at onset of intercourse and HIV-status was unknown in 3 screened clients, resulting in exclusion of 36 screened clients from logistic regression analysis (Figure 3). Thus, of the 334 clients screened at the clinic, only 298 were eligible for logistic regression analysis. On checking Multicolinearity, correlation between the constant, marital status and parity, r=-1 and r=-0.9 respectively, were found to be high that both covariates (marital status and parity) were omitted from multivariable logistic regression analysis and the constant was retained for collecting all unexplained variances in the model for predicting precancerous cervical lesion as the Nagelkerke R Square value of 0.041 shows that only 4.1% of the variation in the precancerous cervical lesion was explained by this logistic model. The model fits as Hosmer-Lemeshow test P-value was 0.909.
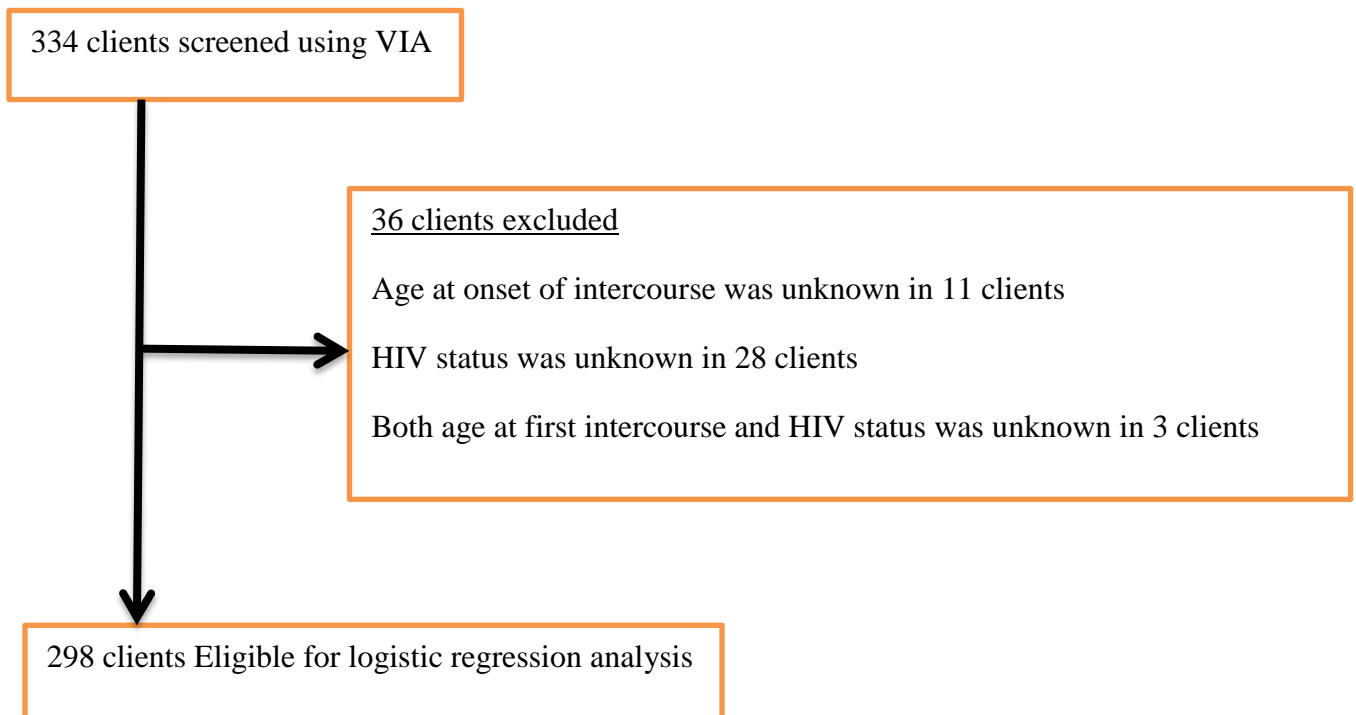
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┌─────────────────────────────┐
│ 334 clients screened using  │
│ VIA                         │
└─────────────────────────────┘
        │
        │         ┌──────────────────────────────────────────────────────┐
        │         │ 36 clients excluded                                  │
        │         │                                                      │
        │────────▶│ Age at onset of intercourse was unknown in 11 clients│
        │         │                                                      │
        │         │ HIV status was unknown in 28 clients                 │
        │         │                                                      │
        │         │ Both age at first intercourse and HIV status was     │
        │         │ unknown in 3 clients                                 │
        │         └──────────────────────────────────────────────────────┘
        │
        ▼
┌─────────────────────────────────────────────────┐
│ 298 clients Eligible for logistic regression     │
│ analysis                                         │
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Figure 3. Profile of clients screened using VIA at Family Guidance Association of Ethiopia, South West Area office, Jimma Model Clinic, Jimma, 2013.

5.3.1 Socio-demographic factors associated with precancerous cervical lesions

Significant association was observed on bivariate logistic regression between precancerous cervical lesion and age of clients 36-40 years [OR (95%CI) =0.3(0.1, 0.9)].The age of clients with other insignificant variables on bivariate logistic regression (P>0.05) were taken to multivariable logistic regression to control for confounder if any and construct the final model for precancerous cervical lesion. However, none of the socio-demographic factors were found to have significant association with precancerous cervical lesion on multivariable logistic regression (Table3).

5.3.2 Behavioral factors associated with precancerous cervical lesions

Significant association was observed on bivariate logistic regression between precancerous cervical lesion and age at first intercourse [OR (95%CI) =2(1.1, 4)]. On multivariable logistic regression, clients who started intercourse at age less than 16years were 2.2times more likely to have precancerous cervical lesion as compared to those who started intercourse at the age of 16 or more years (Table3).

Table3. Logistic regression analysis of factors associated with precancerous cervical lesion at Family Guidance Association of Ethiopia, South West Area office, Jimma Model Clinic, Jimma, 2013.

Covariates		VIA Result		COR [95%CI]	AOR [95%CI]
		Positive (No., %)	Negative (No., %)		
Age	25-30	30(17.8)	139(82.2)	1	1
	31-35	8(10.1)	71(89.9)	0.5[0.2,1.1]	0.5[0.2,1.2]
	36-40	3(5)	57(95)	0.3[0.1,0.9]*	0.4[0.1,1.1]
	41-45	2(9.1)	20(90.9)	0.4[0.1,1.9]	0.5[0.1,2.3]
Age at first Intercourse	≥16 years	17(9.7)	158(90.3)	1	1
	<16 years	22(15.3)	122(84.7)	2[1.1,4.0]*	2.2[1.1,4.3]*
Current use contraceptive	No	25(11.4)	194(88.6)	1	1
	Yes	18(16.2)	93(83.8)	1.4[0.8,2.7]	1.7[0.9,3.3]
History of STI	No	35(12.5)	245(87.5)	1	1
	Yes	8(16)	42(84)	1.3[0.6,3.1]	1.6[0.7,3.6]
Number of sexual partners	One	32(13.3)	209(86.7)	1	1
	Multiple	11(12.4)	78(87.6)	0.9[0.5,2.9]	0.7[0.3,1.6]
HIV sero-status	Negative	20(11.9)	148(88.1)	1	1
	Positive	21(15.7)	113(84.3)	0.8[0.4,1.5]	1.2[0.6,2.6]
HIV positives	Not on HAART	2(8.3)	22(91.7)	1	1
	On HAART	19(17.3)	91(82.7)	0.7[0.2,2.4]	0.7[0.2,2.6]

*P<0.05

Chapter VI

Discussion

In this study among 334 clients screened for precancerous cervical lesion, 12.9% had precancerous cervical lesion and early initiation of intercourse at less than16 years risks a women 2.2times higher as compared to those who started sex at the age of 16 or more.

The mean age at initiation of intercourse in this study was 16.7(SD=3) years and this is comparable with median age at first intercourse for women aged 25-49 years both for Oromia region (17 years) and Ethiopia (16.6 years), from Ethiopian demographic and health survey (EDHS) 2011[34].

The prevalence of precancerous cervical lesion at the study clinic, 12.9%, was similar to study finding from central Ethiopia among PLWHA's(11%)[27] but lower than study finding from southern Ethiopia among PLWHA's (22.1%)[35]. It was also similar to study finding from Madagascar(11.3%)[21],Malawi(12.4%)[21],Latin America (12%)[25]and Thailand(13.3%)[26]. However, it is lower than study findings from Nigeria(16%)[36], Sudan (16%)[24] and Bangladesh(18%)[23] although it is higher than study findings from Uganda(7.8)[21]and Tanzania (9.7%)[21].The difference in prevalence could be due to the differences in the age of study populations[35], as evidenced by the two Ethiopian studies among PLWHA in which one used the age group 30- 45years[27] while the other used 18 years and older[35] during the study, although it may also be due to factors other than disease prevalence like differences in test providers skills[37,38] and underlying prevalence of other sexually transmitted infections[38].The higher prevalence in Sudan[24],Nigeria[36] and Bangladesh[23] is due to a lower sample size in the study,100 ,125 and 44 respectively, although provision of the service by laywomen, poor test providers skills, has also contributed to the finding of Bangladesh study. Further, as a rater - dependent screening method, VIA also inherently suffers from the same challenges as other visual interpretation methods including colposcopy and cytology as evidenced by Indian study where, VIA positivity rate varied from 4% to 31% among the six gynecologists who performed the test[37].

Early initiation of intercourse increased the risk of precancerous cervical lesion by 2.2times in this study similar to study from Brazil(OR[95%CI]=1.97[1.18-3.3])[39] , Nigeria (OR[95% CI] = 3.7[1.07-12.8])[36] and India(OR[95%CI]=3.5[1.1-10.9])[40]. Early onset of sexual activity is thought to be associated with high risk because, during puberty, cervical tissue undergoes physiologic changes, transformation zone on the ectocervix is enlarged, and exposure to HPV at such times may facilitate infection which may make this area more vulnerable to development of dysplasia, a cervical squamous precancer[20].

Kenyan study has also showed higher risk of precancerous cervical lesion among HIV patients (AOR[95% CI] =4.8[1.8-12.4]), those having multiple sexual partners (AOR[95%CI] =3.8[1.1-13.5])[29] and HIV patients not on antiretroviral therapy (HAART)(AOR[95% CI] = 2.21[1.28-3.83])[31].Tanzanian study showed higher risk of precancerous cervical lesion among widowed/separated (OR[95% CI] =1.41[1.17-1.66]) and grand multipara women (OR[95% CI] =3.19[1.84-5.48][28]. South Ethiopian study reported higher risk among those with history of sexually transmitted disease (AOR[95%CI] =2.30[1.23, 4.29])[35].The role of HIV in precancerous cervical lesion is thought to be mediated through immune suppression[1]. Thus, prompt initiation of HAART through an early enrollment into care has an impact on reducing the prevalence and progression of cervical precancerous lesions[31]. Women who are separated or widowed may have higher number of lifetime sexual partners in comparison with married Women and as number of lifetime sexual partners increases, the risk of HPV infection increases and thus they are more susceptible for developing precancerous lesions[41]. High parity increases the risk of precancerous cervical lesions most likely due to repeated cervical trauma during consecutive births and hormonal adjustment during and after pregnancies which may create an entry point for the HPV virus[42]. History of sexually transmitted disease increases the risk of precancerous cervical lesions due to the sexually transmitted nature of HPV infection[43].

Strength of the study

1) The study involves larger sample size and thus it improves generalizability.

2) Double data entry verification was done to minimize data entry errors.

Limitations of the study

1) Further characterization of age at first initiation of sexual intercourse could not be done as the study was based on secondary data analysis.

2) Asking questions like history of STI, multiple sexual partners during primary data collection could potentially invade privacy of client and thus had a response with social desirability bias.

3) A response to history of STI, multiple sexual partners during primary data collection could be affected by recall bias.

4) Since the data used is secondary, other important information like economic status, CD_4 count of HIV patients were not available for assessing other factors that could affect precancerous cervical lesion.

5) Since this study was clinic based, its result may not best represent the general community.

Chapter VII

Conclusion

In this study, 12.9% of screened clients had precancerous cervical lesion and early initiation of intercourse was found to be an independent predictor of precancerous cervical lesion increasing the risk by 2.2times. However, age of the client, current contraceptive, history of STI, number of sexual partners, HIV-status and HAART-status were not found to be predictive of precancerous cervical lesion in this study.

Recommendation

Based on the result of this study, the following recommendations are forwarded.

- Policy makers

  - Introduce HPV vaccination for girls aged 9-13years as part of WHO's recommendation of comprehensive approach to cervical cancer prevention and control.

- Health professionals

  - Give sexuality education tailored to age and culture.

  - Promote delaying of age at initiation of sexual intercourse.

  - Promote and provide condom for those engaged in sexual activity.

- Researchers

  - Explore in depth the underlying reasons for early initiation of intercourse so that the root problem will be addressed.

- Religious and community leaders

  - Promote delaying of age at initiation of sexual intercourse.

  - Strengthen and advocate for the norm of virginity till marriage.

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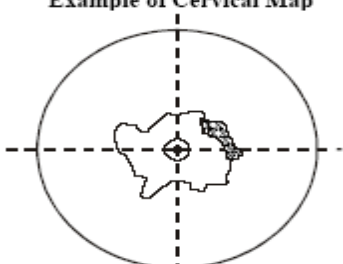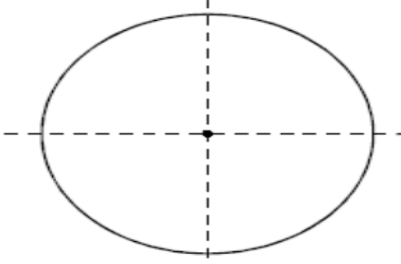
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Annexes

Standard Client Evaluation form for Cervical Cancer Prevention service

CLIENT IDENTIFICATION:MRN_____VIA register No:_____   Name of client_____ Age_____   Address_____Tele_____   Date of visit _____Time of examination: □First examination □Follow-up   Educational status(enter last grade completed)_____ □Checkbox if illiterate

REPRODUCTIVE HISTORY:
 Marital status: _____parity: _____current contraceptive(s)_____age at first intercourse:_____
 Pregnant: □ Yes □No
 Menstrual bleeding pattern: □Regular(21-35intervals) □Irregular □Menopause
 STI History: Number of sexual partner(s)of Client: _____ Of spouse_____
       History of STI   Client: □Yes   □NO   Partner: □Yes   □No
 Risk Factors(check box with [Y] if Yes and [N] if no):
 □History of smoking □Previous abnormal pap smear Chronic corticosteroid use
 HIV/AIDS testing: □Unknown   □If tested, enter chart status: □Reactive   □Non-reactive
        If reactive, is the patient currently on HAART: □Yes   □ No

EXAMINATION   Result of pelvic examination □Normal   □Abnormal(please describe details below)   Suspicious for cancer   □No   □Yes(please describe details below)   SCJ was completely seen   □Yes   □No(please describe details below)
CERVICAL MAP: Draw the cervical findings on right circle using the instructions from the left circle   Example of Cervical Map   ⌷ Outline of squamocolumnar junction (SCJ)   ⌷ White epithelium   ○ Actual cervical os   ■ Cancer
VIA RESULTS: □Suspicious for Cancer   □Negative   □Positive   **Management with VIA result:**   If **negative**, counseled to return in _____years for screening   If **positive**, cryotherapy details: □ Done immediately(same day) □Done other day □Refused cryotherapy   □Ineligible for cryotherapy(Describe reason in referral part)   **Date cryotherapy done:**_____**Return visit date**_____   □**STI suspected**: □Treatment provided:_____ □Referred
REFERRAL DETAILS: Place where client referred to:_____   **Reason for referral:** □Suspicious for cancer □Lesion larger than cryoprobe>2mm □Lesion>75%   □Client denied cryotherapy□ Lesion extended inside os   □Pregnancy□PID□Other non-gynecologic problem(please describe)
Providersname_____Signature_____

Family Guidance Association of Ethiopia — From choice, a world of possibilities

IPPF International Planned Parenthood Federation — A Member Association of

Pathfinder INTERNATIONAL — a global leader in reproductive health

Family Guidance Association of Ethiopia (FGAE), Jimma model clinic, Checklist for retrieving data from standard Client Evaluation form for Cervical Cancer Prevention service: September 2013.

A. **CLIENT IDENTIFICATION**
  1. MRN_____
  2. VIA register No:_____
  3. Age_____
  4. Educational status(enter last grade completed)_____

B. **REPRODUCTIVE HISTORY**:
  5. Marital status: _____
  6. parity: _____
  7. current contraceptive(s)_____
  8. age at first intercourse:_____

C. **RISK FACTORS**
  9. Number of sexual partner(s)of Client: _____ Of spouse_____
  10. History of STI of Client: □Yes □NO of Partner: □Yes □No
  11. HIV/AIDS testing: □Unknown □If tested, enter status: □Reactive □Non-reactive
  12. If reactive, is the patient currently on HAART: □Yes □ No
  13. History of smoking □Yes □NO
  14. Previous abnormal pap smear □Yes □NO
  15. Chronic corticosteroid use □Yes □NO

D. **PELVIC EXAMINATION**
  18. SCJ was completely seen □Yes □No

E. **VIA RESULT**: □Suspicious for Cancer □Negative □Positive

F. **CRYOTHERAPY ELIGIBILITY**: □ eligible Ineligible

G. **REASON FOR REFERRAL:** □Suspicious for cancer □Lesion larger than cryoprobe>2mm

□Lesion>75% □Client denied cryotherapy

□ Lesion extended inside os

Information recorded by------------------------------- Date---------------------------

Approved by --- Date-------------------------------

Declaration

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in this or any other University and all sources of materials used for this thesis have been fully acknowledged.

Name of the student: Dr Zewdie Mulissa (MD)

Date._____   Signature _____

APPROVAL OF THE FIRST ADVISOR:

This thesis has been submitted with my approval as University advisor.

Name of the first advisor: Dr Fessehaye Alemseged (MD, MPHE, Associate professor)

Date._____   Signature _____

APPROVAL OF THE SECOND ADVISOR:

This thesis has been submitted with my approval as University advisor.

Name of the second advisor: Mr. Henok Assefa (BSc, MSc)

Date._____   Signature _____