

Factors associated with invasive cervical carcinoma in
Jimma University Specialized Hospital, South Western
Ethiopia: a case control study.

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**A THESIS REPORT SUBMITTED TO JIMMA UNIVERSITY, COLLEGE OF
PUBLIC HEALTH AND MEDICAL SCIENCES, DEPARTMENT OF
EPIDEMIOLOGY FOR THE PARTIAL FULFILMENT OF THE
REQUIREMENTS OF MASTERS DEGREE OF PUBLIC HEALTH IN
EPIDEMIOLOGY (MPHE).**

**DECEMBER, 2010
JIMMA UNIVERSITY**

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DECEMBER, 2010

ABSTRACT

Background: Cervical cancer is the most common cancer in women of the developing world. The etiological factors of cervical cancers have been described in many populations of the world but very few researches have targeted sub-Saharan populations. Various modifiable risk factors may have influence in women with invasive cervical carcinoma and this type of risk factors assessment has not been reported in Ethiopia.

Thus, this study attempted to assess some of the risk factors related to invasive cervical carcinomas in southwestern part of Ethiopia.

Methods and materials: Unmatched case control study was conducted within Jimma University Specialized Hospital from April to September 2010 where a sample size of 180 study participants (60 cases and 120 controls) was included in the study. Cases were women who have had cervical carcinoma based on pathological examinations where as, controls were those women who had other diseases other than cervical cancer. Data were collected by use of a pretested structured questionnaire. Punch cervical biopsies for the suspected cases were delivered to Pathology unit within Department of Laboratory sciences and pathology. Data were analyzed by use of SPSS version 13.0 statistical soft ware package. P-Value was considered significant when it was less than 0.05.

RESULTS: The independent predictor variables identified in this study were parity for more than 4 children AOR =8.2, (95% CI, 1.5-42.6; p-value, 0.012), the age at first full term delivery (more than 25 years of age) AOR= 4.5, (95% CI= 1.2=16.4; p-value =0.024) as well as study participants' occupation (farming) AOR =4.7, (95% CI 1.6-13.5). The most common reason for late coming to JUSH for both cases and controls was ignorance 82 (55.8%). Seven (11.7 %) of cases have ever heard of cervical cancers and only 2 (3.3%) of them had history of PAP smear tests done.

CONCLUSION Parity and the age at first full term pregnancy were among the most important risk factors for the development of invasive cervical cancers in this study. The age at first full term pregnancy was an independent predictor at older (>25) age in contradistinction of some studies but, compounded by narrowing the intervals among succeeding child births may help fasten the development of invasive cervical carcinomas in the study population. Thus, it can be extrapolated in that not only the increasing parity that is important for the development of cervical cancer but also the timing of intervals among children need to be considered as an important variable for invasive cervical cancer studies in the future. On the other hand, awareness of cervical cancer, and availability of effective screening programmes could reduce cervical cancer burden among susceptible women.

Keywords: invasive cervical carcinomas, risk factors, southwestern Ethiopia

Acknowledgement

I extend my most sincere gratitude to my advisors, Dr Amare Deribew, Ato Fasil Tessema and Dr HaileMariam Segni for their constructive comments, support and courtesy. My special thanks also go to Ato Wondwossen Kassahun for his extraordinary remarks.

I also express my best regards and utmost respects to the staffs of the Department of Epidemiology and biostatistics for letting me select one of my nominated topics.

List of abbreviation (Acronyms)

- JUSH**..... Jimma University Specialized Hospital
- ICC**..... Invasive cervical cancer
- CIN**.....Cervical intraepithelial neoplasia
- CIS**.....Carcinoma in situ
- FIGO**..... Federation of International Gynecology and Obstetrics
- STI**.....Sexually transmitted infection
- IARC**..... International agency for research on cancer
- OPD**.....Out patients Department
- HPV**.....Human papillomavirus
- PCR**.....Polymerase chain reaction
- HSIL**.....High-grade squamous intraepithelial lesions
- PAP**-----Papanikolaou smear (test)

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CHAPTER ONE: INTRODUCTION

Background

Cancer is a class of malignant neoplasms (carcinomas and sarcomas) and malignant neoplasms of epithelial cell origin, derived from any of the three germ layers, are called *carcinomas* (1).

In 20th century, approximately 100 million people died from cancer and currently, more than 24 million people suffer from cancers. Cancer patterns in Africa is low (6.0% of the global total) however, in a population of 965 million, cancer is diagnosed in 650 000 people annually but by 2020, is expected to be more than 1 million new cases of cancer every year. Cancer however, claims more lives each year than AIDS, tuberculosis and malaria put together (1, 2, 3, 4, 5). The incidence of all cancers is increasing all over the world and the increase is occurring more rapidly in Sub Saharan Africa that had hitherto enjoyed low incidence. With increasing industrialization and westernization of dietary and other sociobehavioral attitudes in developing countries, it is estimated that the burden of cancer in these countries will increase to epidemic proportions in the 21st century (6). Knowledge of cancer patterns in Africa is woefully based primarily on the work of pioneering clinicians and pathologists who described the composition of series of cancer patients encountered in their professional lives (7, 8). Despite a growing wealth of information and scientific data, most people in the developing countries remain unaware of how they can reduce their risk of developing cancer. Cancer has emerged as a major public health problem in developing countries, mainly due to increase in life expectancy and also to current trend of unhealthy lifestyles (9). Among women cancers, cervical cancer is predominantly a disease of poor and disenfranchised women. Of the estimated 500,000 incident cases per year worldwide and the 250,000 deaths that are attributed to cervical cancer, 80% occur in low-resource countries. Data collected on women's health tend to focus on maternal health, leaving problems endemic to older women—such as cervical

cancer—out of the picture entirely. Given these circumstances, cervical cancer rates are presumably underreported. The areas of the globe with the highest incidence rates include sub-Saharan Africa, Latin America and the Caribbean, Melanesia, India and other parts of Asia, with age-standardized incidence rates (ASR) of 20 to 40 cases per 100,000 women. Cervical cancer is the primary cause of cancer related deaths in women in developing countries. In industrialized countries, systematic or even opportunistic cervical cancer screening programs have led to a successful and dramatic decline in cervical cancer rates. However, even in countries where the rates are low, cases not identified early enough for prevention (with early treatment of pre-cancers) are almost exclusively marginalized women with inadequate access to preventive services. Developing country data also describe stratification in services received, with differences appearing along lines of race, class and location. Cervical cancer is the leading cancer-related cause of years of lives lost for women in South-central Asia, sub-Saharan Africa, and Latin America and the Caribbean (3).

Problem Statement

Cervical cancer as the most common cancer in women in developing countries is a preventable and curable disease, preventable by vaccination and screening and curable if identified at an early enough stage. It is gradually becoming a rare disease in many developed countries; this is not the case with many countries in sub-Saharan Africa. Cervical cancer is the most common cancer in women in sub-Saharan Africa and accounts for 22.2% of all cancers in women and it is also the most common cause of cancer death among Sub Saharan women. About 60–75% of women in sub-Saharan Africa who develop cervical cancer live in rural areas, and mortality is very high. Many of the women who develop cervical cancer are untreated, mostly due to lack of access (financial and geographical) to health care. Women in sub-Saharan Africa lose more years to cervical

cancer than to any other type of cancer. Unfortunately, it affects them at a time of life when they are critical to the social and economic stability of their families (10, 11).

Developing countries contribute more than three-quarter of women death in cervical cancer every year and Ethiopia contributes substantially to this figure due to inadequate health care and virtual nonexistent screening mechanisms for early detection (1)

The cause of invasive cervical cancer has been the subject of numerous studies over the last 50 years. However, most of the epidemiologic research has been done in developed countries where cervical cancer incidence has declined significantly in the last three decades.' Africa is a high-risk area for invasive cervical cancer, but few studies have analyzed the role of risk factors (12). Of all cancers, cervical cancer is a serious public health problem in women globally. More than 272,000 women in poor countries died of cervical cancer in 2007 alone, accounting for 85 percent of the global total.

While infection with high-risk types of the human papillomavirus (HPV) is the major cause of cervical cancer, there is limited evidence about the extent to which other risk factors are shared. Cervical cancer is also the most common cancer in women in Ethiopia. The average age specific incidence rate (for cervical cancer) for sub-Saharan countries is 31.0/100,000 populations but, for Ethiopia it is 35.5/100,000 populations (13). As a result, this health problem brings to bear graver morbidity and mortality in Ethiopian women. Even though, high-risk human papillomavirus (HPV) infection is a necessary cause, only a small proportion of HPV infected women go on to develop squamous intraepithelial lesions or invasive cancer. Hence, there must be co-factors to HPV infection that lead to the development of cervical cancer and there is limited evidence about the extent of which of these cofactors are shared in a developing country like ours (13,14).

Thus, the purpose of this case control study is to assess the risk factors associated with invasive cervical carcinoma in Jimma University Specialized Hospital (JUSH) in southwestern part of Ethiopia.

CHAPTER TWO: Literature review

Introduction

Various risk factors may be related to invasive cervical cancer and those risky variables included into this study were sociodemographic variables, reproductive variables as well as medical and environmental variables and described sequentially as follows.

a) Sociodemographic variables and invasive cervical carcinoma

Cervical cancer is the seventh most common cancer, overall, and the third most common in women, in whom it comprises 9.8% of all cancers. In general terms, it is much more common in developing countries, where 80% of cases occur and where cervical cancer accounts for 15% of female cancers, with a lifetime risk of about 3%, whereas in developed countries it accounts for only 4.4% of new cancers, with a lifetime risk of 1.1%. The highest incidence rates are observed in Latin America and the Caribbean, sub-Saharan Africa, and Southern and Southeast Asia. In developed countries, the incidence rates are generally low, with age-standardized rates less than 14 per 100,000 (15). Based on diverse evidence provided by a variety of studies, cervical cancer can be considered a disease of poverty. Mortality rates are higher in low socio-economic population groups. High incidence rates and mortality due to cervical cancer mainly affect women living in poor countries, which frequently have deficient early detection programs for cancer. Cervical cancer incidence rates can be up to 15 times higher in poor countries, as compared to industrialized countries. Factors such as illiteracy and multiparity are associated in a direct, proportional manner to cervical cancer incidence, and these factors predominate in marginalized areas in poor countries. In geographic regions with high cervical cancer incidence and mortality rates, there are areas of endemic human papilloma virus infection (HPV) that produces high prevalence of infection in women and men. Place of residence is

a social variable, and a higher cervical cancer mortality risk in relation to residency reflects, at a great extent, health inequalities. For example, there are huge differences between urban and rural areas in terms of coverage of cervical cancer early detection programs and limited access to health services to a great extent, these factors constitute an indicator of treatment opportunity. In sum, marginalization and poverty are two socio-economic variables that increase cervical cancer mortality risk (16, 17). Previous studies of the relationship between socio-economic status and cervical cancer are primarily from developed countries; however, the major burden of cervical cancer is in developing countries. The study therefore pooled the data from previously reported case-control studies of cervical cancer or dysplasia, which contain individual-level information on socioeconomic characteristics to investigate the relationship between cervical cancer, social class, stage of disease, geographical region, age and histological type. It was found that an increased risk of approximately 100% between high and low social class categories for the development of invasive cervical cancer. No clear differences were observed between younger and older women. These results indicate that both cervical infection with human papillomavirus, which is linked to both female and male sexual behaviour, and access to adequate cervical cancer screening programmes are likely to be important in explaining the large cervical cancer incidence rates observed in different socioeconomic groups, and that the importance of these factors may vary between different geographical regions (18). According to population-based surveys in industrialized countries, men of low socioeconomic status report fewer sexual partners than men of high socioeconomic status but there is no clear indication that the same is true of women of low socioeconomic status (17). In the case-control studies in Spain and Colombia, the human papillomavirus and all other sexually transmitted diseases were more prevalent among women in low socioeconomic strata. Number of sexual partners and particularly contacts with prostitutes were higher among husbands of women of low socioeconomic status. Other potential risk factors for the disease, such as smoking and oral contraceptive use, and cervical cancer

screening (Pap smears), were more common in women of high social strata. Women with no schooling had a threefold higher risk in Spain and a fivefold higher risk in Colombia of having cervical cancer compared with women who had achieved a higher educational level. Men's sexual behaviour and particularly contacts with prostitutes might be a major contributor to the higher prevalence of HPV infection among the poor (17). In general, an association between lower socioeconomic status (measured by literacy) and cervical cancer risk showed a very negative association with social status, family income, and educational attainment (19)

Reproductive variables and invasive cervical carcinomas

Risk of invasive cervical carcinoma increased with lifetime number of sexual partners (P for linear trend <0.001). The relative risk for ≥ 6 versus 1 partner, conditioned on age, study, and age at first intercourse, was 2.27 [95% confidence interval (95% CI), 1.98-2.61] and increased to 2.78 (95% CI, 2.22-3.47) after additional conditioning on reproductive factors. The risk of invasive cervical carcinoma increased with earlier age at first intercourse (P for linear trend <0.001) (20). A recent meta-analysis by the International Collaboration of Epidemiological Studies of Cervical Cancer including 24 studies conducted worldwide found elevated risk of cervical carcinoma with both oral and injectable contraceptives, increasing with duration of use (21). Eight case control studies on invasive cervical cancers (ICC) and two studies on carcinoma in situ (CIS) from four continents suggest that compared to women who had never given birth, those three or more full term pregnancies had 2.6 times the risk of developing cervical cancer; women with seven or more births had 3.8 times the risk (20). A case control study revealed an association of invasive cervical carcinomas with the number of full term pregnancies after adjustment for sexual and socioeconomic variables. Risks rise steadily to 5.1 (95% confidence interval 2.7-9.7) for those with 14 or more pregnancies and the relation of risk to multiparity was observed in all four countries (21). There is a profound association between

number of births and cervical neoplasia and a study in Mozambique revealed multiparity as a significant predictor of risk as the risk increased with the numbers of births (22).

Cervical cancer is the most prevalent cancer of women in Ethiopia and sexually transmitted diseases are highly prevalent in the country. In order to establish a possible cause and effect relationship between sexually transmitted diseases and cervical cancer, likely etiological socio-economic factors for these two conditions have been analyzed. While residence, income, age at first coitus, age, number of sexual partners, marital status/profession and duration of sexual life affect both conditions, there is a significant difference between the most important factors in the etiology of the separate conditions. This study results indicate that STI per se is unlikely to be a primary cause of cervical cancer (CC) in Ethiopia. It appears probable that the etiology of cervical cancer in Ethiopia is multifactorial. Early exposure of the immature cervical epithelium to STI, the trauma of repeated childbirth, and multiple sexual partners in women whose defense factors are impaired by chronic malnutrition, add up to a major medico-socio-economic factor (23).

In common with many African countries, Ethiopia has a very limited cytological diagnostic service. A clinical and cytological investigation of 2111 women attending hospitals and clinics in Addis Ababa: 33 invasive or microinvasive cancers and 10 dysplasias (CIN) were detected. The prevalence of invasive cervical cancer in that population was 15.6/1000. Risk factors were shown to be age over 35 (especially over 50), parity over six (especially more than 10), very low income or subsistence economy, particularly in those from the rural areas, and prostitution. Less significant factors, possibly related to age, were sexual activity of more than 20 years and first coitus before the age of 15; and more than five sexual partners (24, 25).

c) Other variables and Cancer awareness versus invasive cervical carcinoma

Alcohol drinking has rarely been reported as an independent risk factor for cervical cancer. In a study in Lesotho, South Africa, comparing cervical cancer cases with controls, found a significant increased risk (RR=3.3) for consumption of indigenous alcohol (19). A study in Latin America showed that the frequency of washing the genital was associated with increasing risk, which may reflect increased sexual activity and it has been suggested that hygiene practices may be related to risk of cervical cancer, but no consistent associations with risk have been established for specific practices (12).

Awareness to cervical cancer and its screening practices were reported low (52.8%) among undergraduate University students in Nigeria where poor publicity on cervical cancer was considered responsible. It was also found that the screening program for cervical cancer was also very low (5.2%) (26). Even though, cancer is growing in Ethiopia, it appears to be a neglected problem in the country. The level of awareness of the community about cancer is very low. There is neither national cancer control program nor cancer registration in Ethiopia, as a result cancer morbidity data is lacking. Cancer is known in Ethiopia as a deadly disease without cure. Due to misinformation, people believe that cancer is not a treatable disease, which actually has a negative impact on treatment outcomes (1).

In conclusion, cervical cancer is a deadly cancer that affects women by the time when they are socially and economically most important to their families and communities as a result the control and prevention of this cancer through identified modifiable risk factors is of paramount importance.

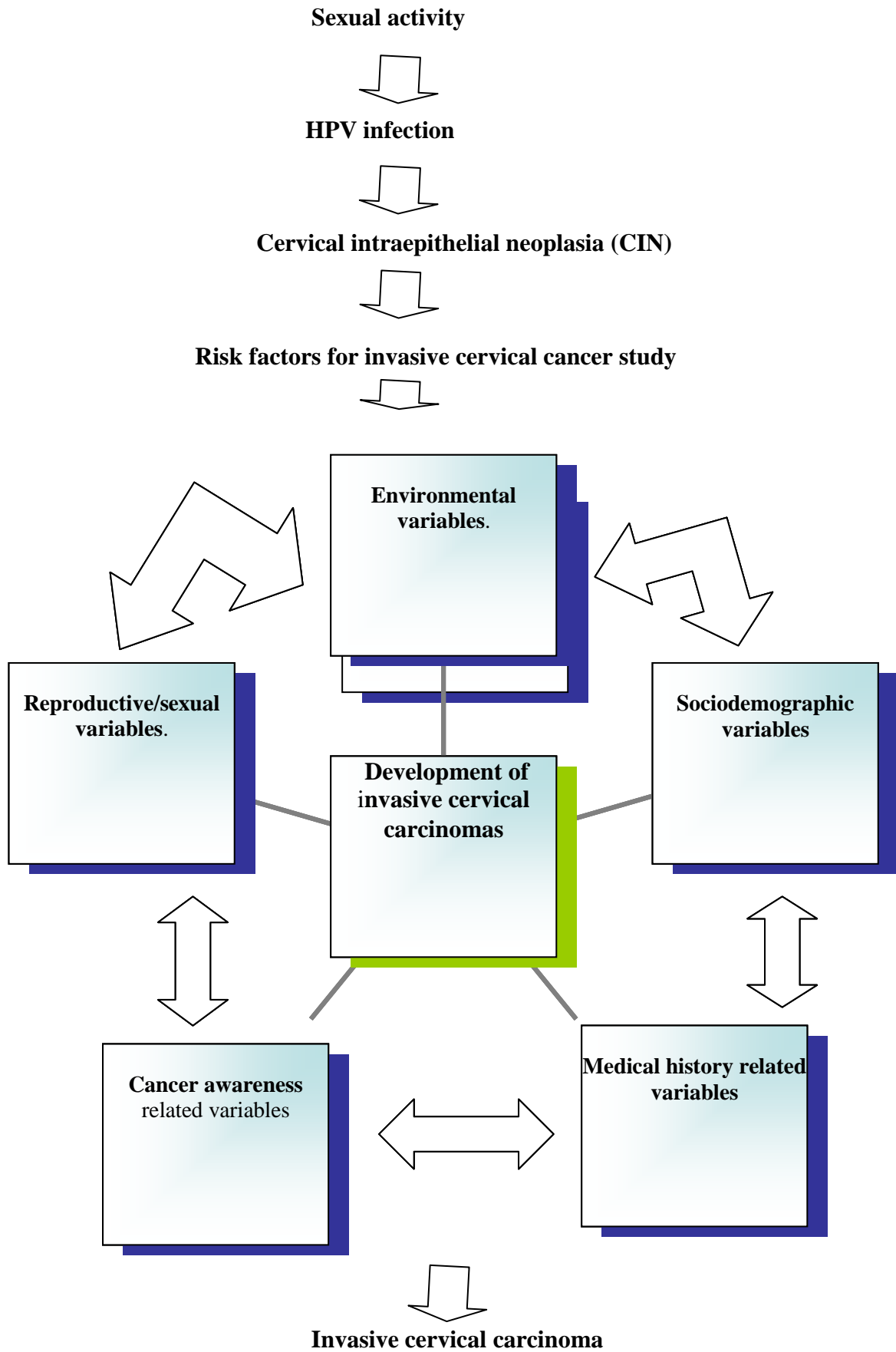


Fig. 2. Conceptual framework for the invasive cervical carcinoma study variables

CHAPTER TREE: Significance of the study

Our knowledge on cancer in Africa in general and in Ethiopia in particular is limited. There is an almost entire lack of valid mortality statistics by cause, and few registries have published incidence data in readily accessible sources. Study of cancer risk in relation to such factors, as reproductive/sexual, and sociodemographic variables as well as screening programs, etc should therefore provide valuable clues to understanding the etiology of human cancer. It is estimated that one-third of deaths from cancers can be prevented. Cervical cancer is thus, a preventable and curable disease, preventable by vaccination (two-third) and screening (one-half) of cases) and curable if identified at an early enough stage. Despite these dramatic improvements in early diagnosis and treatment, cervical cancer continues to be one of the major causes of cancer-related deaths in women, particularly in the developing world. The etiological factors of cervical cancers have been described in many population of the world but very few researches have targeted sub-Saharan populations. Various modifiable risk factors may have influence in women with invasive cervical carcinoma, and this type of risk factors assessment has not been reported in Ethiopia and hence, this study attempted to identify some of the risk factors related to the cervical cancer in southwestern part of Ethiopia.

CHAPTER FOUR: Research Hypothesis

Hypothesis: Those parous study participants having more than two children are more likely to develop invasive cervical carcinomas than individuals that have two or less than two children.

Objectives of the study

General objective

To assess risk factors related to invasive cervical carcinomas in JUSH.

Specific objectives

To identify sociodemographic variables associated with invasive cervical carcinoma

To list out reproductive variables related to cervical carcinoma

To describe those medical and environmental variables related to cervical carcinoma

To assess the level of cervical cancer awareness among study participants

CHAPTER FIVE: Methods and Study subjects

5.1 Study area and period:

This study was undertaken at Jimma University specialized hospital (JUSH) in Jimma town, , Jimma Zone, Oromia national state, south western Ethiopia located 352 Km southwest of Addis Ababa.. Jimma is the main city in southwestern Ethiopia, having a population of 120,000 populations according to the 2007 National census. This part of the country is well known for coffee cash crop nourished with its equatorial climate, at an average altitude of 1600mts above sea level. The city contains of Jimma University Specialized Hospital (JUSH), that have a catchments area of about 250 Km radius serving more than 12 million people in the southwestern part of Ethiopia. The hospital has todate the only diagnosing services for gynecologic and surgical specimens and hence virtually all specimens including suspected cancer cases are diagnosed within the Hospital. The JUSH also contain various types of specialty clinics including gynecologic clinic that serve all gynecologic disorders coming from the catchments areas. The data collection (specimens for cases and questionnaire filling for both cases and controls) of this study was performed from March 2010 to September 2010.

The specimen taking procedures were specifically conducted at gynecologic outpatients' clinic, within Department of Gynecology and obstetrics, JUSH and the labeled containers containing fresh formalin and the cervical specimens were sent to Pathology unit within Department of Medical Laboratory Sciences and Pathology for diagnosing the cases. Concomitantly, the case and control participants were interviewed with prepared questionnaires by the time of their Gynecologic OPD visits.

5.2 Study design

An unmatched case control study.

5.3 SOURCE POPULATION

All female patients attending JUSH during the study period were considered as the source population.

5.3.1 STUDY POPULATION

All females older than 20 years of age attending the obstetrics and gynecology clinics of the hospitals during the study period were considered as study population.

5.3.2 STUDY UNIT

Individual subjects recruited as cases and controls are the study units. All patients diagnosed with invasive cervical carcinomas were considered as cases and those females without any evidence of invasive cervical carcinomas were recruited as controls.

5.4 Inclusion and exclusion criteria

5.4.1. Inclusion criteria

a) For cases

Cases in this study were those classified as incident invasive cervical carcinomas based on hospital pathology reports. The diagnostic criterion for the cases was described microscopically as cervical carcinomas that breach or break cervical epithelial tissue basement membrane and invade the nearby sub epithelial tissues. Histological classification of cancers was based on that described by the World Health Organization (WHO) for tumors of the uterine cervix used as diagnostic criteria for cases.

b) For controls

Controls were those individuals who attended gynecologic clinic for other than cervical carcinomas. The control patients were screened for not having any evidence of cervical abnormalities including cervical cancers macroscopically on vaginal examinations (for sake of avoiding misclassification biases). Controls are recruited from same study population as to the cases.

5.4.2 Exclusion criteria

a) For Cases

Those cervical lesions including benign cervical neoplasms as well as non-invasive cervical carcinomas /cervical intraepithelial neoplasm (CIN), non-epithelial cervical cancers (sarcomas, etc) and metastatic cancers to the cervix uteri were excluded from being cases.

b) For Controls

Those less than 20 years of age, terminally ill patients and those refused to participate in the study as well as those without any cervical abnormalities on vaginal examinations were excluded from being controls.

5.5 Sample size determination and sampling technique

The sample size for this unmatched case-control study is calculated by using WinPEPI (statistical software for epidemiologists) using the following assumptions.

- The desired confidence level 95%,
- Power 80%,
- proportion of controls who had 5 or more parity of (63%) (Ref. 25),
- Odds ratio (3.0) and
- Case to control ratio (1:2).

This gives a total sample size of 180 individuals. (60 cases and 120 controls).

5.6 Sampling Technique

Cases were identified at gynecologic OPD in Jimma University Specialized Hospital hence when each case identified, two consecutive controls were subsequently recruited into the study until the required sample size was met.

5.7. Study variables

5.7.1 Independent variables:

Sociodemographic variables: age, residence, ethnicity, marital status, income, etc.

Reproductive variables: age of menarche, parity, oral pills, hormonal therapy, infertility, STI, etc.

Medical variables: familial history of cancer, etc

Environmental variables: staple diet, exposure to pesticides/herbicides, etc.

Cancer awareness variables: heard of cervical cancer?, where first being treated?, etc

5.7.2 Dependent variable

Invasive cervical carcinoma

5.8 Measurements

5.8.1 Data collection tools

For each case and corresponding controls, data were extracted using pre-tested semi structured questionnaire prepared in English and translated to Afan Oromo and back to English for sake of consistency. Both study participants (cases and controls) responded to the questionnaires in an isolated room for securing confidentiality and privacy of data collection process. The questionnaire was partly adapted from (women's interview study of Health {WISH} NCI, 1990's).

Data were collected by three residents from obstetrics and gynecology Department and two nurses at gynecology clinic, JUSH. Data were collected through face to face interviewing technique. The questionnaire was set in accordance with the objectives of the study and contained sociodemographic, as well as reproductive, medical and environmental and cancer awareness variables containing categories that have had relevance to the current cervical cancer study.

One supervisor supervised data collection for proper conduct of the data collection process and the principal investigator verified serial case identifications with the subsequent selection of controls weekly.

5.9 Pathology specimens' collection procedure

Cervical tissue specimens are delivered from obstetrics and Gynecology Department to pathology unit in the Department of Medical laboratory sciences and pathology. The bottle labeling containing the cervical specimens and the respective request form were crosschecked for sameness. The tissues were also checked for well fixation with formaldehyde fixative and the cervical specimens were then put in a tissue cassette where it underwent dehydration, clearing and impregnation steps within automatic tissue processor. Subsequently, tissues were removed from the processor and embedded with paraffin wax. The specimens were cut to a 4-5 μ m thickness with microtome machine and the sectioned ribbons are flattened onto water bath and then put it onto a dried clean slide where staining with hematoxylin and eosin procedures were undertaken prior to visualization under light microscopy. Finally, these reports were sent to the obstetrician and gynecologists Departments' residents working at the gynecologic OPD.

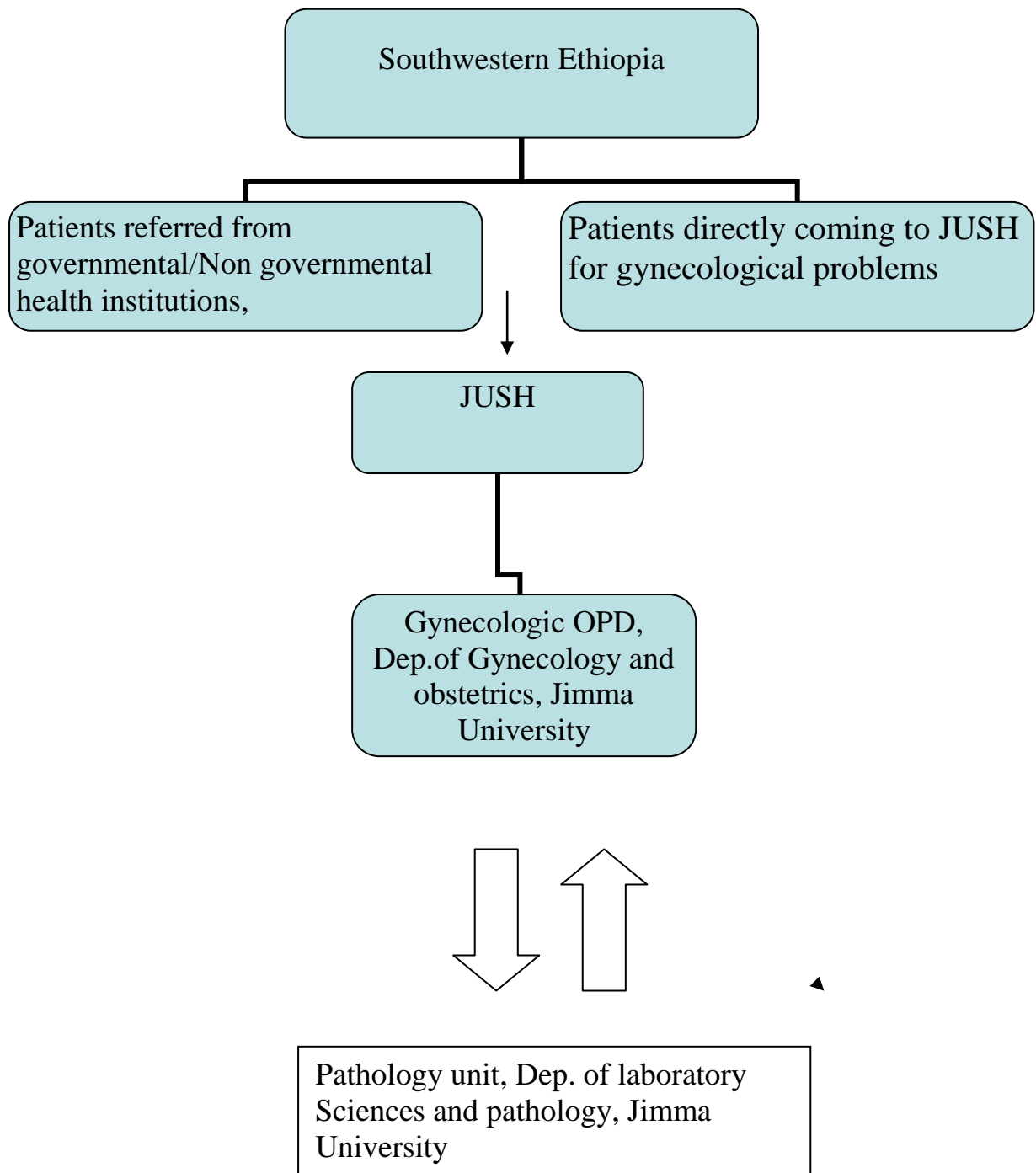


Fig. 2. Cervical tissue specimens' delivery and reports submission procedures

5.10. Data analysis

The data were cleaned, coded, and entered into a computer with the help of SPSS version 13.0 statistical software. Univariate analyses descriptive statistics (frequency distributions), as well as bivariate analyses (cross tabulations and Chi-square tests and Odds Ratios) were utilized in this study. Those variables that were significant in the bivariate analyses were considered further in the multivariable analyses by use of logistic regression to identify independent predictor variables by [backward stepwise (likelihood ratio)]. Tests of association among categories were assessed by P-value less than 0.05 as a cut-off point for statistical significance.

5.11 Data quality

- i) For sake of standardizing the process of data collection, experienced staff members were selected from Gynecologic OPD.
- ii) Those data with inconsistent questionnaire responses were discarded and replaced with new ones
- iii) Two pathologists for goodness of diagnostic reliability examined some of the histologic diagnoses.

5.12 Ethical consideration

The ethical clearance committee of college of public health and medical sciences, Jimma University, reviewed and allowed the research proposal to be enforced. Afterwards, written consent forms were secured from the Director of the JUSH and the Head of gynecologic and obstetrics Department. Subsequently study participants were recruited into the study on volunteer basis after securing their verbal consents. The procedure of this study per se was routine activities done in aseptic and orderly manners and thus, there are no risks to the participants. The information acquired remained confidential.

5.13 Operational Definitions

Cancer is any malignancy (epithelial or non-epithelial)

Carcinoma is cancer arising from epithelial tissues.

Cervical cancer and *cervical carcinoma* can be used interchangeably in this study.

Study participants were patients attending JUSH during the study period.

Invasive cervical carcinoma ---is cancer that spreads beyond cervical epithelial basement membrane.

CIS (carcinoma in-situ) is cervical intraepithelial carcinoma (non invasive carcinoma) that did not spread beyond basement membrane.

CIN (Cervical intraepithelial neoplasm) is a disordered growth in cervical epithelium that did not spread beyond cervical basement membranes.

Study participants were those patients who attended to JUSH during the study period

Urban residents were those who came from Jimma city only.

Rural residents were those residents who came other than Jimma city, southwestern Ethiopia).

Non menopausal – those having normal or near normal menses at time of data collection

(Post) menopausal women were those who did not have menses for many months prior to data collection.

Nonviable pregnancies were defined here to mean history of abortions and still birth.

5.14 Dissemination plan

The final study report is presented to epidemiology Department, college of public health and medical sciences, Jimma University and the research output is considered for publication on a local or international journal.

CHAPTER SIX: RESULTS

One hundred and eighty study participants (60 cases and 120 controls) were recruited into this study.

Sociodemographic variables

The mean ages were 47.7years $SD \pm 10.8$ and 35.5 years $SD \pm 10.5$ years for the cases and controls respectively. Study participants aged between 40-59 years were more than four times more likely to develop cervical cancer than the younger ones $AOR = 4.3$ (95%CI; 1.8-10.2) and increasing risk was documented with advancing age.

Forty-five (75.0%) cases and 67 (67.3%) controls were rural residents with on association for cervical cancer $AOR = 0.85$ (95% CI; 0.32-2.2). Thirty-three (55.0%) cases and 87 (72.5%) controls were housewives whereas, 33 (55.0%) cases and 12 (10.0%) controls were farmers by occupation and this study depicted that being female farmer carried significant association as compared to housewives $AOR = 9.3$ (95% CI; 3.3-25.7). The most common husband occupation among cases 43 (71.7%) and controls 64 (53.3%) was farming (farmers) and followed by 6 (10.0%) cases and 21 (17.5%) controls merchants where there were no associations between husbands occupation and invasive cervical cancer $AOR = 0.4$ (95% CI ; 0.16-1.1).

Most cases 52 (86.7%) and controls 114 (95.0%) were married; moreover, history of more than one husbands for the study participants was documented more commonly among cases 24 (40.0%) than controls 25 (20.8%) but, this did not show any association rather the adjusted odds ratio revealed a confounding effect $AOR = 0.73$ (95% CI; 0.38-1.9). Husbands' marriages for more than one wives was 28 (46.7%) among cases and 26 (21.7%) among controls where husbands' having more than one partners in life were 2.6 times more likely to develop cervical cancer than those having single partners $AOR = 2.6$ (95% CI; 1.1-6.6). Thus, age, the study participants' occupation (farming) and the numbers of husbands' partners were significant statistically.

The median income for the cases was 840 Birr, range 100-3100; and for controls 1000.00 Birr/month range 100-8000. The first quartile for cases earned 342 Birr per month whereas 427 Birr per month for controls. Moreover, thirty-seven (61.7%) of cases earned less than 1000.00 birr per month whereas, 63 (52.5%) of the controls had a monthly income greater than 1000 Birr per month. Hence, level of income was not found to be associated to cervical cancer in this study Table 1.

Table 1. Sociodemographic variables, case control study, JUSH, 2010.

Variables	Cases(%)	Control (%)	COR (95% CI)	AOR (95% CI)
Age				
<40	16 (26.7)	84(70.0)	1.00 ---	1.00 --
40-59	34(56.7)	33 (27. 5)	4.7 (2.3-9.6)	4.3 (1.8- 10.2)
>/=60	10(16.7)	3(2.5)	16.2(4.0-65.4)	13.9 (2.1-90.0)
Residence				
Jimma	15(25.0)	39(32.5)	1.00	1.00
Outside Jimma	45(75.0)	81(67.3)	1.4(.7-2.9)	0.85 (0.32-2.2)
Participants' occupation				
Housewife	20 (33.3)	87 (72.5)	1.00 ---	1.00 ----
Farmer	33 (55.0)	12 (10.0)	11.9 (5.2-27.1)	9.3 (3.3-25.7)
Others	7 (11.7)	21 (17.5)	1.4 (0.54-3.8)	1.3 (0.34-5.2)
Husbands' Occupation				
Farmer	43 (71.7)	64 (53.3)	1.00 ---	1.00 ----
Merchant	6 (10.0)	21 (17.5)	0.42 (0.16-1.1)	1.5 (0.41-5.9)
Government employees	11 (18.4)	22 (18.3)	0.45 (0.21-1.0)	1.3 (0.38-4.7)
participants' partners				
One	36 (60.0)	92 (76.7)	1.00	1.00
More than one	24 (24.0)	25 (20.8)	2.0 (1.0-3.9)	0.73 (0.27-1.9)
Husbands' partners				
One	30 (51.7)	84 (76.4)	1.00	1.00
More than one	28 (48.3)	26 (23.6)	3.0 (1.5-5.9)	2.6 (1.1-6.6)
Levels of income in Birr				
>/=1000	37 (61.7)	57 (47.5)	1.00	1.00
<1000	23 (38.3)	63 (52.5)	0.87-(0.47-1.6)	0.96 (0.42-2.2)

The majority cases 51 (98.3%) and controls 110 (91.7%) had experienced at least one full term pregnancies. Five (8.3%) cases and 44 (36.7%) controls had history of one to two live deliveries whereas, 40 (66.7%) cases and 34 (28.3%) controls had more than four live deliveries and this displayed more than 12 times more likely to develop invasive cervical cancers than those with one to two deliveries AOR= 12.4 (95% C.I.; 2.4-64.2). The age at first full term, delivery was greater than 25 years in 23 (28.3%) cases and 9 (7.5%) controls as compared to those less than 20 years of age in 21 (35.0%) cases and 73 (60.9%) controls. This relationship was more than three times stronger statistically for invasive cervical cancer at age greater than 25 years as compared to those less than 20 years of age AOR=3.7 (95% CI; 1.89-15.3). About a third of cases 20 (33.3%) and similar proportion of controls 41 (34.2%) had reported history of nonviable pregnancy (abortion or stillbirth) during their reproductive lives. The timing for the discontinuation of sexual intercourse during pregnancy for both cases and controls was at the beginning of the second trimester 23 (38.3%) and 46 (38.3 %) respectively. Thus, non-viable pregnancies, and the discontinuation of sexual activity during pregnancy were statistically insignificant. However, the timing for resumption of sexual activity after delivery was most common between the third and fourth months among cases 22 (36.7 %) and controls 46 (38.3%) where it had an ambiguous statistical relevance with a 5.5 chance of acquiring cervical cancer for those resuming sexual activity after four months than those less than two months after delivery AOR=5.5 (95%CI; 1.0-30.5). Fifty study participants from both groups declined to respond for the above set of questions and subsequently not incorporated into the analysis Table 2.

Table 2. Pregnancy related reproductive variables, JUSH, 2010.

Variables	Cases (%)	Control (%)	COR (95% CI)	AOR (95% CI)
No of full term pregnancy				
1-2	5(8.3)	44(36.7)	1.00	1.00
3-4	14(23.3)	30(25.0)	4.1(1.3-12.6)	4.7 (0.83-27.2)
>4	40(66.7)	34(28.3)	10.3 (3.6-29.0)	12.4 (2.4-64.2)
Status of nonviable delivery				
No	40(66.7)	79(65.8)	1.00	1.00
Yes	20(33.3)	41(34.2)	1.0 (.53-2.0)	1.8 (0.70-5.0)
Age at 1 st full term delivery				
<20	21 (35.0)	73 (60.9)	1.00	1.00
20-25	15(25.0)	25(20.8)	2.0 (0.93-4.6)	2.0 (0.70-5.7)
>25	23(38.3)	9(7.5)	8.8 (3.5-22.0)	3.7 (1.8-15.3)
Discontinuation of sexual intercourse during pregnancy				
1st trimesters	4(6.7)	10(8.3)	1.00	1.00
2nd trimesters	23(38.3)	46(38.3)	1.2 (0.35-4.4)	1.8 (0.35-9.3)
3rd trimesters	11(18.3)	18(15.0)	1.5 (0.38-6.0)	1.0 (0.16-6.0)
Continuation of the intercourse after pregnancy				
<2 months	5(8.3)	22(18.3)	1.00	1.00
3 rd to 4 th months	22(36.7)	46(38.3)	2.1 (0.70-6.2)	1.7 (0.52-5.9)
>/= 4 th month	13(21.7)	9(7.5)	5.7 (1.6-20.4)	5.5 (1.0-30.5)
Total*	60(100.0)	120(100.0)		

* Total numbers may or may not count to the stated number

History of sexually transmitted infections (STI) were more commonly reported among 22 (15.0%) controls than 5 (8.3%) cases and STI was reported as a risk factor in this study (AOR=6.4 (95% CI; 1.2-33.6).

Twenty-three cases (38.3%) and 25 (20.8%) controls admitted that their husbands have had other marriage(s) while being married to them. However, 7 (11.7%) cases and 39 (32.5%) controls could not be sure whether their husbands currently had another sexual partner or not AOR=0.3 (95%CI =.09-1.0). The age group between 15 and 20 years was the most common for the first age of sexual intercourse for both cases 35 {58.3%} and controls 70 {58.3%} and this relationship did not show a significant relation among different age groups except in those between 15 and 20 years of age as compared to those less than 15 years of age AOR=0.21 (95% CI= 0.6-0.75). Family planning practice was exercised in 19 (31.7%) cases and 43 (35.8%) controls whereas, the antenatal care (ANC) was utilized by 17 (28.3%) cases and 70 (58.3%) controls where both family planning practice and ANC were not statistically significant for invasive cervical carcinomas. Post menopausal status of the study participants however, showed more than three times more chance of contribution to cervical cancer risk than non menopausal counterparts AOR=3.3 (95% C.I.; 1.1-9.2) Table 3.

Table 3. Reproductive/ Sexual variables, JUSH, 2010*

Variables	Cases (%)	Controls (%)	COR (95% C.I)	AOR (95% CI)
History of STI				
Yes	5(8.3)	22(15.0)	1.00	1.00
No	55(91.7)	98(81.7)	2.4 (.88-6.8)	6.4 (1.2-33.6)
Husband's no sexual partners				
Yes	23(38.3)	25(20.8)	1.00	1.00
No	30(50.0)	56(46.7)	1.7 (.86-3.6)	1.9 (0.69-5.6)
Unknown	7(11.7)	39(32.5)	.32 (.13-.81)	0.30 (0.09-1.0)
Age of 1 st sexual intercourse				
<15			1.00	1.00
15-20	42 (70.0)	84 (70.0)	.48 (.18-1.2)	.21 (.06-.75)
21-30	11(18.3)	3 (2.5)	1.9 (.49-7.9)	.61 (.09-3.9)
>30	1 (1.7)	5 (4.2)	.22 (.02-2.2)	.17 (.01-3.5)
Use of family planning				
Yes	19(31.7)	43(35.8)	1.00	1.00
No	41(68.3)	77(64.2)	1.2 (.62-2.3)	0.47 (0.16-1.4)
ANC follow-up				
Yes	17(28.3)	70(58.3)	1.00	1.00
No	43(71.7)	50(41.7)	3.5 (1.8-6.9)	2.6 (0.90-7.8)
Age of menarche				
<15	23(38.3)	54(45.0)	1.00	1.00
>/=15	21(35.0)	50(41.7)	.98 (.48-1.9)	1.0 (0.40-2.5)
Pattern of menstrual flow				
Regular	55(91.7)	106(88.3)	1.00	1.00
Irregular	5(8.3)	14(11.7)	0.68 (0.23-2.0)	0.68 (0.14-3.2)
Menopausal status				
Non menopausal	23(38.3)	96(80.0)	1.00	1.00
Menopausal	37(61.7)	24(20.0)	6.4 (3.2-12.7)	3.3 (1.1-9.2)
Total*	60(100%)	120(100%)		

* Total numbers of cases per variable may or may not attain 60 cases and 120 controls

Sixty-four (35.6%) of all study participants used different types of contraceptive methods as a family planning method (29 reported for oral pills and 15 for injection forms). However, among non- users the most common reasons for not practicing family planning methods for both groups were ignorance 40 (22.2%), need for more children 35 (19.4%), and husband refusal 14 (7.8%). These findings were also statistically insignificant Figure 3.

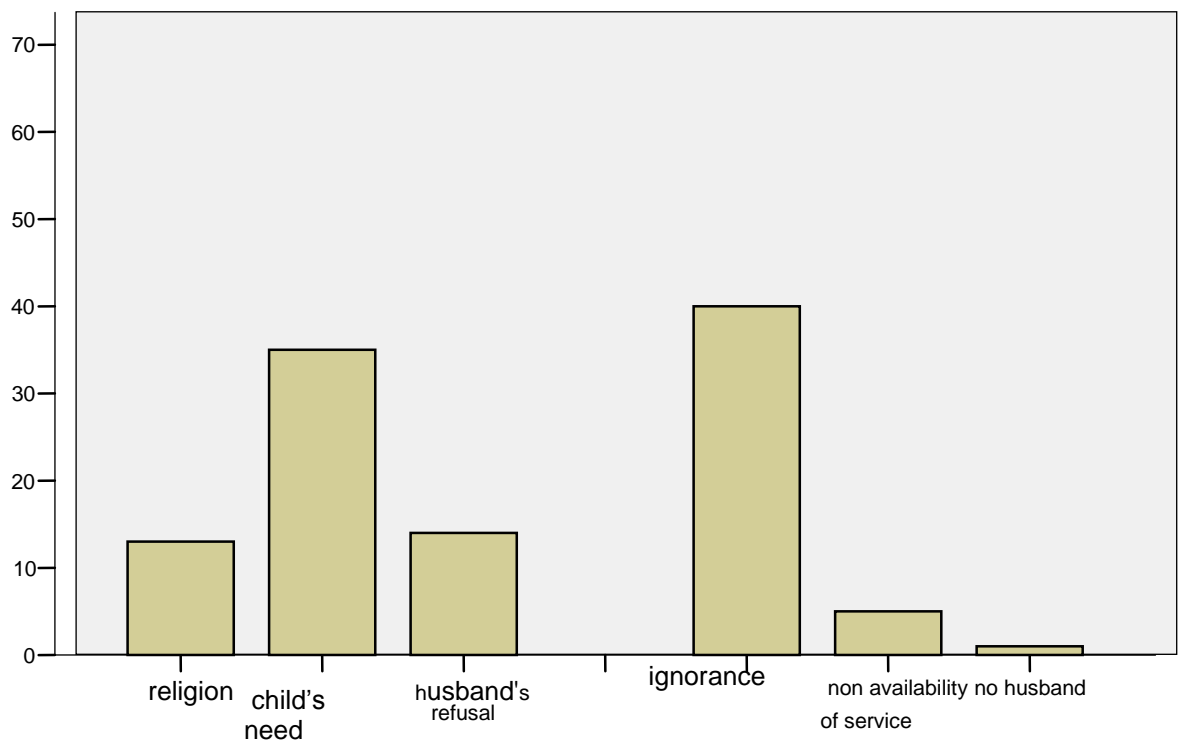


Figure3. Reason for not using family planning methods

(P-Value =.0.761)

History of operations (surgical or gynecologic) and chronic medical illnesses were more commonly recalled among controls than cases but all these variables failed to show any significant difference for invasive cervical carcinomas

Neither history of operations (surgical or gynecologic) nor chronic medical illnesses recalled by the study participants were statistically significant. However, there were four cases (two renal and one anemic and one peptic ulcer) and 18 labeled controls (nine anemic and, nine hypertensive) with presumed diseases. History of cancer though, difficult to tell among family members only one case and four controls were documented. All these variables failed to show any significant difference for invasive except the marginal significance for patients with chronic diseases Table 4.

Table 4. Variables related to past medical disorders, JUSH, 2010.

variables	Case (%)	Control (%)	COR (95% CI)	AOR (95% CI)
History of operations				
No	54(90.0)	99(82.5)	1.000	1.00
Yes	6(10.0)	21(17.5)	1.9 (0.72-5.0)	1.7 (0.67-4.7)
History of chronic diseases				
No	56(93.3)	98(81.7)	1.000	1.00
Yes	4(6.7)	22(18.3)	3.1 (1.0-9.5)	3.0 (0.98-9.2)

Twenty-nine (16.1%) of the study participants came to the hospital in the first instance, however, among the remaining participants the most common reasons for late presentation to gynecologic clinic were ignorance (considering it as a simple disease) 33 (67.3%) followed by financial 11 (22.4%) and distance 3 (6.1%) among cases P- value = 0.000

Table 5.

Table 5. Reasons for late presentation, JUSH, 2010

Variables	Cases (%)	Controls (%)	Total (%)
Distance problem (inaccessibility)	3 (6.1)	15 (15.5)	18 (12.2)
Fear of being treated	2 (4.1)	26 (26.5)	28 (19.0)
Ignorance-considering simple	33 (67.3)	49 (50.0)	82 (55.8)
Financial problem	11 (22.4)	8 (8.2)	19 (12.9)
Total	49(100.0)	98 (100.0)	147 (100)

Thirty-three (55.9%) cases and 60 (50.4%) controls had history of having their bodies washed for at least once per week and this was not statistically significant differences between groups. History of alcohol intake or exposures to environmental pollutants did not show any relevance to invasive cervical cancers as well Table 6.

Table 6. Environment related variables to cervical cancers, JUSH, 2010.

variables	Case (%)	Control (%)	COR (95%C.I.)	AOR (95% CI)
Frequency of body washing				
>1x/week	36(65.1)	70(58.8)	1.00	1.00
</=1x/week	24(37.3)	55 (45.3)	0.74 (0.39-1.4)	1.2 (0.66-2.5)
Alcohol intake				
No	52(86.7)	108(90.0)	1.00 --	1.00
Yes	8(13.3)	12(10.0)	.72 (.27-1.87)	1.2 (0.49-3.4)
History of contact with environmental pollutants				
No	56(93.3)	103(85.7)	1.00 --	1.00
Yes	4(6.7)	17(14.3)	2.3 (0.74-7.2)	0.45 (0.14-1.4)

Only 7 (11.7 %) of study participants with invasive cervical cancers heard of cervical cancer whereas the rest 55 (88.3%) cases failed to know nothing about cancers. Only 2 (3.3%) cases and 7 (5.8%) controls participants had history of PAP smear tests. The most frequent reasons for not attempting to use PAP smear tests were “ignorance” in both cases 19 (31.7%) an controls 40 (33.3%) followed by “not feeling at risk of developing cervical carcinomas” 17 (28.3%) cases and 21 (17.5%) controls and no symptoms felt 2 (3.3%) cases and 28 (23.3%) controls where the last one was statistical significant Table7.

Table 7. Reasons for not having PAP smear examination, JUSH

Variables	Characteristics	Cases (%)	Controls (%)	P- value
Heard of cancer?				P Value= 0.000
	Yes	7(11.7)	58(48.3)	
	No	53(88.3)	62(51.7)	
Did u have history of PAP smear done?	Yes	2(3.3)	7(5.8)	P-value = 0.000
	No	58(96.7)	113(94.2)	
If not tested, why?	Not feeling at risk	17(28.3)	21(17.5)	P-value = 0.000
	No symptoms	2(3.3)	28(23.3)	
	Fear of vaginal exam	1(1.7)	7(5.8)	
	Lack of interes	6(10.0)	10(8.3)	
	Unavailability of test	13(21.7)	7(5.8)	
	Ignorance	19(31.7)	40(33.3)	

Table 8. Independent predictors of invasive cervical carcinoma, JUSH, 2010

Variables	Cases (%)	Controls (%)	p-values	AOR (95% CI)
Numbers of full term pregnancies				
1-2	5(8.3)	44(36.7)	-	-
3-4	14(23.3)	30(25.0)	0.05*	5.4 (95% CI; 1.0-30.5)
>4	40(66.7)	34(28.3)	0.012**	8.2 (95% CI; 1.5-42.6)
Age of full term pregnancy				
<20	21 (35.0)	73 (60.9)	-	-
20-25	15(25.0)	25(20.8)	0.164	0.74-5.9)
>25	23(38.3)	9(7.5)	0.024**	4.4 (95% CI; 1.2-16.4)
Study participants' occupation				
Housewife	20 (33.3)	87 (72.5)	-	-
Farmer	33 (55.0)	12 (10.0)	0.004*	4.7 (1.6-13.5)
Others	7 (11.7)	21 (17.5)	0.106	3.2 (0.77-13.5)

* = Significant ones

DISCUSSION

Some of the limitations of this study were procrastination of the study period where data collection was protracted for some more months for lack of adequate case detections. The study also failed to perform HIV and HPV tests because of lack of reagents and equipment respectively that were needed badly by then before the start of the study.

Women in sub-Saharan Africa lose more years to cervical cancer than to any other type of cancer. Unfortunately, it affects them at a time of life when they are critical to the social and economic stability of their families (11). Thus, this is the first case control study conducted on invasive cervical cancer in Ethiopia. The independent predictor variables identified in the study were numbers of full term deliveries, as well as the age of first full term delivery and occupation of the study participants and are discussed in due locations.

To start with, this case control study depicted a mean age for the cases 47.7 years (± 10.8) where three quarters of cases were older than 40 years. Similar studies described comparable mean ages- 46.7 years (27, 28). In most countries cervical cancer risk maximizes at about 50 years of age however, the age maximum incidence may however be rather late in African populations to 50-65 years (27, 28). About two-third of our study participants came from relatively rural parts of the country and it was also reported that 60% to 70% of women in sub Saharan Africa who developed cervical cancer live in the rural areas (11, 29).

Those wives having history of more than one husbands in lifetime had more no extra risk for the development of cervical cancer than those with monogamous ones OR= 0.73 (C.I. =0.27-1.9). On the other hand, husbands with more than one wives were 2.6 times more likely to contribute for females' cancer than those with one partner AOR=.2.6 (C.I. = 1.1-6.6). Thus, this study clearly showed the relationship of cervical cancer to the number of sexual partners (marriages); likewise, study conducted in Hong Kong reported that those

women with three or more than three partners had a two to three fold increase risk of developing cervical cancer compared with those who reported only one partner (30, 31).

Women reporting three or four lifetime sexual partners were at a significant increased risk of cervical cancer compared to women reporting one or none but there was no significant trend of increasing risk with increasing numbers of sexual partners. The sexual behaviour of the male partners of these women may also be an important risk factor for cervical cancer with marginal significance (32).

The median income for the cases and controls were 840 Birr and for 1000.00 Birr respectively. Thirty-seven (61.7%) of cases and 57 (47.5%) of the controls earned less than 1000.00 birr per month however level of income was not found to be statistically significant ($P=0.181$) in this study. In other studies, it was stated that education, occupation and income are indicators to evaluate the socioeconomic differences that have been widely used in public health studies and have been proved useful in identifying groups of people at a higher risk for a specific disease. Income level was not related to cervical cancer and income level may be more likely to be misreported (33). Thus, the relation between the socioeconomic status and cervical cancer is still controversial. Some researches have shown that there is relationship between the socioeconomic status and cervical cancer nevertheless; others reported a negative relationship between them (34) and this study was in agreement with the latter findings.

Two thirds of cases and nearly one-thirds of controls had history of full term viable deliveries in excess of four children and this was 12 times more risky to develop cervical cancer than those that have one or two children $OR= 12.4$ ($CI= 2.4-64.2$). Different studies depicted that multiparty is strongly related for the development of cervical cancer. The

effects of parity in cervical cancer development seem to be mainly detectable in countries with high fertility rates and are rarely found in low parity countries. Parity is probably a good marker of normal estrogen environment throughout the fertile years of women as well as a marker of repeated cervical trauma among highly parous women (25, 34, 35). Age of first full term delivery older than 20 years of age was reported in (63.3%) among cases but younger than 20 years among controls in (60.9%) and this may suggest that it is not the age of first full term delivery that may matter most but the intervals among deliveries might be more important for the disposition of cervical cancer. Related research finding uncovered that women who married late but give birth to a large number of children were generally found to be suffering from cervical cancer. These results support the hypothesis that it is not so much parity per se that enhances the risk, but the rapidity of multiple pregnancies that matters. These findings warrant serious consideration in the future studies given the obvious implications for prevention (36).

Discontinuation of sexual activity was documented for most at the beginning of the second trimester and its resumption was acted mostly three months after delivery for both groups and the latter appeared to be related for the development of cervical cancer in those who resumed sexual activity after four months of discontinuation as compared to those restarted after two months. In this study, many study participants more than a quarter of all participants failed to answer to these questions. This could be ascribed to conservative attitudes towards sex related questions that are usually untold in the cross sections of our communities. Overtime this may be improved through health education for the betterment of personal and societal well being as well as for healthy reproductive health matters.

A third of cases and a quarter of controls believed that their respective husbands currently

may have had other sexual partners besides them and this finding was marginal statistical significance AOR= 0.30 (CI= 0.09-1.0). It was reported from Singapore, where male sexual behavior was broadly recognized to play an important role in the women's exposure to causative agents for cervical cancer (32, 37).

More than two-thirds of all participants had their first sexual intercourse before the age of twenty in this study. Most epidemiologic studies on cervical cancer have reported increased risk for women who initiated sexual activity during adolescence and it has been hypothesized that the adolescent cervix is particularly susceptible to the effects of coitus – related carcinogens. However, it is not clear if the effect of age at first intercourse is due to a particular vulnerability of the young cervix or to the fact that women who start sexual activity earlier have longer exposure to coitus related carcinogens (12, 34). Those participants who lack of ante natal care (ANC) follow-up did not show any increased risk the development of invasive cervical cancer than those utilizing ANC AOR= 2.6 (C. I.= 0.90-7.8) however, when it was combined with other variables it was found to be a confounding effect.

About two-third of study participants (64.4%) failed to utilize any form of family planning methods and among these the most common reason for failure in family planning methods was ignorance. The contraceptive coverage (35.6%) in this study did not show any significant statistical association to cervical cancer and recently completed studies in developed and developing countries on the relationship between cervical cancer and oral contraceptive pills were also inconclusive (34). Being in post menopausal status carried three fold risk for the development of cervical cancer than non menopausal women

AOR= 3.3 (95% C.I.; 1.1-9.2). This could be explained by the advancing age when cancers can be caught more easily than in younger ages of life.

Among medical and environmental factors, the most common medical complaint was vaginal bleeding in both case and control groups OR=.308 (95% C.I.; .107-.888) followed by vague abdominal complaint OR= 1.533 (95% C.I.; .490-4.795). History of operations (surgical/gynecological) as well as chronic medical illnesses and exposures to environmental pollutants were not associated statistically to cervical cancer in this study.

There were no statistically different results in those who washed their bodies less than four times per week as compared to those more than four times per week in both cases and controls nevertheless, female farmers were more vulnerable to cervical cancer than housewives and poorer hygiene could be speculated as a contributing factor clinically for cervical cancer development in this study. There were however conflicting reports regarding female hygiene. Poor hygiene may be one of the explanations of the observations that low socioeconomic status is consistently found as a risk factor for cervical cancer in developing countries that is in contradistinction to affluent societies where poor genital hygiene is reported as a rarity (35, 38). While, some researchers have speculated that poor hygienic practices or conditions may increase risk of HPV infection, however, there is no consistent evidence to support hygiene habits and cervical cancer (12, 39).

Cervical cancer awareness was very low in this study because the overwhelming majority of the study participants were ignorant to most questions forwarded to them on cervical cancer awareness questions. This finding hinted a very wide gap on cancer awareness in our set-up. In Sub Saharan Africa, cervical cancer is yet to be recognized as an important public health problem. Several studies have shown poor knowledge of the diseases in

Africa. Among 500 attendants of a maternal and child health in Nigeria, only 4.3% were found to be aware of cervical cancer (11). In 2004 in Lagos 81.7% of 139 patients, advanced cervical cancer had never heard of cervical cancer before. Almost all (98.0%) believed that their advanced disease was curable. Similar studies in Kenya and Tanzania as well as in USA also reported very poor knowledge of the disease in patients (30, 40). The seriousness of the gap in awareness/ knowledge on cervical cancer was further aggravated when health professional were equipped with little cancer knowledge as was reported in one study where majority of health professionals were not adequately equipped with knowledge concerning cervical cancer in Pakistan (41).

In this study, only 3.3% of the cases and 5.8% of the controls had Papanecolous (PAP) smears done and likewise, 2.6% among case and 0.5% among controls were subjected to PAP smear examination under one Kenyan study (42). Countries that have high coverage of cervical cancer screening have reduced invasive cervical cancer incidence by about 70-90%. Although, about 40-90% of women in developed countries are screened for cervical cancer, less than 5.0% of women in developing countries undergo cervical screening. In a situational analysis for cervical cancer diagnosis and treatment in the east, central and Southern African countries it was found that, though 95% of health care facilities had the infrastructure for cervical cancer screening, very few women are screened due to lack of policy guidelines, infrequent supply of basic materials and lack of suitable qualified staff (43). Among those who did not have had PAP smears the most frequent reason for not considering PAP smears was ignorance accounting at least a third of cases and controls each. Thus, promotion and provision of such type of awareness activities will salvage many women who may likely develop invasive cervical cancers at a critical point in time when

they become most important socioeconomically to their families and communities. In a study conducted to assess the knowledge, attitudes, and assumption of cervical cancer by women living in Maroua, the capital of the Far North Province of Cameroon it was found that out of 171 women, 48 (28%) had prior knowledge of cervical cancer as compared with 123 of 171 (72%) women who were uninformed about cervical cancer. Despite the awareness of cervical cancer by 28% of women, only a minority of them, 4 of 48 (8.3%), underwent a preventative screening test. The awareness of cervical cancer by women in Cameroon is still inadequate. Thus, to avoid deaths from cervical cancer, a curable and preventable disease, the need of an aggressive campaign to make the country's women aware of cervical cancer and its prevention is needed (44).

Among reasons, why the study participants fail to come to Jimma University Specialized Hospital was that of distance and financial problems in both cases and control groups. Similar study in Nigerian depicted that many of the women who developed cervical cancer were untreated due to lack of financial or geographic access to the health care services (11). The most important factors hindering the use of available cervical cancer screening services in a Nigerian study were lack of knowledge (49.8%) and the feeling that they had no medical problems (32.0%). There is very poor knowledge and practice of cervical cancer screening among women. Effective female education and free mass screening are necessary for any successful cervical cancer screening programme in Nigeria (45)

In most developing countries, priority for cancer care is rated low, as more emphasis is placed on the control of communicable diseases and improving environmental sanitation. With improvements in the control of communicable diseases and the concomitant increase in life expectancy, the proportion of deaths attributable to cancer, which has been increasing, will continue to do so in the future. Developing countries are liable to be exposed to further risks of cancer with increasing industrialization, urbanization and

intensification of agriculture in the course of development. It is therefore important that they pay attention to their cancer problems and prepare to meet the challenges of the future through setting up appropriate cancer control programmes and purposeful research that might produce useful and meaningful information in respect of various malignant conditions including cervical cancers (6) .

CHAPTER EIGHT: CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Parity and the age at first full term pregnancy were among the most important risk factors for the development of invasive cervical cancers in this study. The age at first full term pregnancy was an independent predictor at older (>25) age in contradistinction of some studies but, compounded by narrowing the intervals among succeeding child births may help fasten the development of invasive cervical carcinomas in the study population. Thus, it can be extrapolated in that not only the increasing parity that is important for the development of cervical cancer but also the timing of intervals among children need to be considered as an important variable for invasive cervical cancer studies in the future. On the other hand, awareness of cervical cancer, and availability of effective screening programmes could reduce cervical cancer burden among susceptible women in our part of the world.

RECOMMENDATIONS

- 1). Much of cervical cancers are due to known risk factors that are potentially avoidable. Therefore, public health actions on strong risk factors particularly on reproductive lifestyles could preclude a proportion of invasive cervical cancers cases and death in southwestern part of the country.
- 2). Most people remain unaware of how they can reduce their risk of developing cervical cancers and very little has been done to change this by public health agencies in most developing countries including Ethiopia and thus, Public health action could help prevent invasive cervical cancers by health education, early detection and treatment and in due time by vaccination.

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Annex 1: Cervical cancer questionnaire

INTRODUCTION: read the following statements to the respondents

This study is conducted by an MPH student as a partial fulfillment for masters in Epidemiology. The objective of the research is to assess risk factors related to invasive cervical carcinoma. Cervical carcinoma is the commonest cancer-affecting women in developing countries in general and in Ethiopia in particular. This interview is going to be important for identifying some of the strong risk factors that affect the health of susceptible individuals. The questions are directed towards your sociodemographic, reproductive, medical, environmental factors as well as on awareness levels on cervical cancers. Your participation and completion of the questionnaire will be of great value to the research findings. Your participation is voluntary and we appreciate for your response. All the information collected will be kept completely confidential.

Are you willing to participate in the study?

YES _____

NO _____

Interviewer's name _____

Signature _____, Date _____

General instruction

Please write the appropriate answers for open ended questions and encircle for closed ended questions. If the respondent does not know write 098 and if does not want to respond write 055.

NAME OF INTERVWER _____

ID Number of Patient _____

SECTION 1: Sociodemographic variables

No	Questions	Response	Remark
Q101.	Date of birth	____ / ____ / ____	
Q102.	Age (completed years)		
Q103.	Place of birth	Jimma1 Outside jimma(specify)_____2	
Q104.	Ethnicity	Oromo.....1 Amhara.....2 Kaffa.....3 Dawro.....4 Tigri.....5 Others (specify)_____	
Q105	Religion	muslem 1 orthodox 2 protestant 3 catholic 4 others (specify)_____5 none-----098	
Q107	Husband's level of education	_____	
Q108.	Your occupation	housewife.....1 farmer.....2 merchant.....3 government employee...4 student.....5 Others (specify)_____6 No098	
Q109	Your husband's occupation	_____	

Q110.	Marital status	married,..... 1 widowed,.....2 separated.....3 divorced.....4 single, (never married) ,,,,,,5	
Q111.	If married, how many times have you married?	_____	
Q112	How many times your husband married?	_____	
Q113.	Yearly income of the family in Birr or quintals	Birr_\$ _____ or Quintals Teff _____ Maize _____ Sorgum _____ Coffee _____ Others (specify) _____	

SECTION 2 : REPRODUCTIVE VARIABLES.

No	Question	Response	
Q201	Have you ever been pregnant?	Yes1 No2	
Q202	If yes Number of full term pregnancy	_____	
Q203	Numbers of still birth, abortion (if any)	Stillbirth _____ Abortion _____	
Q204	Discontinuation of sexual activity during pregnancy	First trimester _____ Second trimester _____ Third trimester (specify month)___	
Q205	When did you resume sexual activity after delivery	After _____month(s)	
Q206.	Age of first full term delivery if any	>25.....1 20-24....2 15-19.....3 <15.....4 None _____	
Q207.	Have you ever had pregnancy while you were diagnosed with cervical cancer	Yes.....1 No.....2	
Q208	Have you ever visited a doctor, clinic, or hospital because of difficulty becoming pregnant?	YES 1 NO 2	
Q209.	Did you ever take any medication or hormone to help in becoming pregnant or to maintain a pregnancy?	YES....1 No.....2	
Q210.	Have you ever acquired STI in lifetime?	YES.....1 NO.....2	I
Q211.	If yes,	specify the diseases _____	
Q212.	Age of menarche	≤13.....1 14.....2 ≥15.....3	

Q213.	Pattern of menstrual cycle	regular.....1 Irregular.....2	
Q214	if your menstrual cycle was irregular in what way did you try to make it regular?	_____	
Q215	Have you ever taken birth control pills?	YES.....1 NO.....2	
Q216.	Menopausal status	premenopausal.....1 menopausal.....2	
Q217.	If menopausal, since when,	_____ months/years ago	
Q218.	Age of first sexual intercourse	_____ I don't know.....098	
Q219	Do you think it was your partner's first time to you	Yes No I don't know	
Q220.	Number of sexual partners you have in life	_____	
Q221.	Did your partner have any other sexual partners/wife before he met you or during the time you were together	YES NO I don't know	
Q222.	If yes how many	_____	
Q223.	First, did you and a partner ever use any family planning methods?	Yes.....1 No.....2	
Q224.	If yes,	What types of family planning _____	
Q225.	What was the main reason you never used birth control pills as a method of birth control?	_____	
Q226.	Sometimes women are given birth		

	control pills for reasons other than birth control, for example, for irregular menstrual periods or acne. Did you ever take birth control pills for a reason other than birth control?	YES.....1 NO.....2	
Q227.	If yes could you tell us the reason		
Q228.	Have you ever had ante natal follow-up in your reproductive years	Yes.....1 No.....2	
Q229.	If yes in which pregnancies		
SECTION C MEDICAL HISTORY			
This next section is about certain diseases, conditions, and surgeries you may have had.			
Q301	Did you ever have any surgery involving removal, either partial or total, of one or both of your ovaries, uterus (womb), or tubes?	YES 1 NO 2	
Q302.	if yes, could you mention the type of surgery that you have taken?	_____ _____ _____	
Q303.	Have you ever acquired any of the following diseases?	(write YES or NO) Hypertension_____ Diabtesmelliatus_____ Renal diseases_____ Anemia_____ CANCERS_____ Etc_____	
Q304.	Chief complaint of your current illness?	_____	
Q305	Where did you first go for medical help	Health institutions.....1_____ Traditional healers.....2_____ Others (specify)_____	
Q306.	How long being treated there	_____ months	
Q307	Where else, have you gone before you come to JUSH.	_____ _____	

Q308.	Why did not you come to JUSH in the first instance?	_____	
Q309.	Have your immediate family members been diagnosed with any cancer disease?	YES.....1 NO.....2 Don't know....098	
Q310.	If yes, specify the lesion	_____	
	SECTION 4. ENVIRONMENTAL variables		
No	Question	Response	
Q401.	Have you ever engaged yourself in any form of physical work (farming, etc)	Yes.....1 No.....2	
Q402	How often you bath/shower yourself	>4x/week 1-4x/week >1x/2weeks None	>1x/month
D403.	Do you have history of mental stress following your current disease?	YES.....1 No.....2	
Q404	If yes, what symptoms	_____	
Q405	Have you <u>ever</u> drunk alcoholic beverages such as beer, wine, or local drinks, etc ?	YES.....1 No.....2	
Q406.	Have you ever smoked?	Yes.....1 No.....2	
Q407.	What is your staple diet?	_____	
Q408.	Have you ever had any contact to the following substances either at work place, residence, or other wise?	Write yes or no Pesticides/herbicides _____ Painting materials _____ Chemical fertilizers _____ Or others (specify)_____	

SECTION 5: Knowledge and attitude (awareness) questions on cervical cancers?

		Response	
Q500	Have you heard of cancer	Yes...1 No.....2	If no skip tp Q 504 to Q506
Q501.	Can cervical cancer be preventable?	YES.....1 NO.....2 I don't know...098	
Q502	If yes, how is it preventable	_____	
Q503.	Do you know factors that may predispose to cervical cancer?	_____	
Q504.	Does HIV infection can expose females to cervical cancer	Agree.....1 Disagree.....2 I don't know.....098	
Q505.	What are the routes of HIV transmission?	_____	
Q506.	How can you prevent yourself from acquiring HIV infection?	_____	
Q507.	Can cervical a curable disease?	Agree.....1 disagree.....2 I don't know...098	
Q508.	Is cervical cancer a public health concern	Agree.....1 Disagree...2 I don't know..098	
Q509	Can cervical cancer be transmitted from one person to another	Agree.....1 Disagree...2 I don't know...098	
Q510.	Is cervical cancer easy to diagnose	YES.....1 NO.....2 I don't know....098	
Q511.	Did you think that you were vulnerable to cervical cancer?	Agree.....1 Disagree...2 I don't know...098	
Q512.	If agree, why vulnerable?	why_____	
Q513.	Has your male partner ever thought that you are susceptible to cervical cancer?	Yes.....1 No.....2 I don't know.....098	

Q514.	If YES how did you know that	Because_____	
Q515	Have you ever had PAP smear done to you?	Yes.....1 No.....2	
Q 516.	If YES,	where,_____	
		When_____	
		How often_____	
Q517	If no, why you failed screening?	Not feeling at risk.....1 Lack of symptoms....2 Carelessness.....3 Fear of vaginal examination...4 Lack of interest.....5 Test being unpleasant...6 Test not available.....7 Others (specify_____	
Q518.	Have you had vaginal examination?	Yes.....1 No.....2	
Q519.	If yes,, have you ever used speculum examination	Yes.....1 No.....2	
Q520	What are your reasons for not presenting with your present problem earlier?	Inaccessibility to health services..1 Afraid of being treated.....2 Considering it as a simple disease that can cure itself.....3 Aggravated while being treated by traditional healers....4 Others (specify)_____	

Annex 2 Cervical cancer qestionnere

SEENSA Himoota armaan gadii gaaffatamtootaaf dubiissii

Qorannoon kun kan hojjatamu barattoota MPH epidemiology dhaan maastarsii (digri 2ffaa) guuttachuu hojjataudha. kaayyoon guddaan qo'annoo kanaa wantoota kaamarii sarveksii kaanssarii (cevical cancer) fidan wajjiin walqabatan sakkatta'anii addaa basuudhaan walumaagalatti kaamarii sartveksii biyyoota guddaachaa jiran keesatti (Ethiopia dabalate) baay'inaan dubartoota irratti kan mul'atuu fi isa dursaati gaaffilee armaan gaditti dhiyatan kun wantota kanssarii fidan wajjin walqabatan addaan basuuf baay'ee balrbaachisadha. Gaaffileewaniis haala jireenyaa hawwasuummaa walhoormaata fayyaa naannoo akkasumas beekumsa fi ilaalcha isiin kaanssarii servekii irraatti qabdan wajjii kan walqabateedha hirmaannaan keessan qo'annaa argamuuf baay'ee barbaachisaadha . hirmaannaan keessaan feedhii irraatti kan hundaa'eedha. Deebii isiin nuuf kennitaniis isiin dinqisiifannaa .Odeeffannoon isiin irraa funaanamu huundinuu iccitiidhaan isiinif qabama.

Qoa'ana irratti hirmaachuuf fedhii qabduu?

Eyyee_____

Lakkii _____

Qajeelfama waliigaltee

Gaaffilee armaan gadii banaa ta'aniif deebii sirri ta'e barreessi. gaaffilee cufaa ta'aniif immoo deebii sirrii ta'e itti maruun deebisii gaaffilee deebistoonii hin beekneef 098 barreessi yoo deebisuu hin barbaadne immoo 055 barreessi

Maqaa Gaafataa _____

Kutaa 1 ;Sociodemographic variables (jjijjiiramtoota)

Lakk	Gaaffilee	Deebii	Yaada
G101	Guyyaa dhaloota	-----/-----	
G102	Umrii(wagaa xuumuurraa)		
G103	Iddoo dhalootaa	Jimaa1 Jimmaan ala Caqasi -----	
G104	Saba	Oromoo----1 Amaaraa---2 Kafaa -----3 Dawroo ----4 Tigree -----5 Kan biraa (caqasi)-----	
G105	Amantiii	Musliima ----1 Ortoodoksii --- 2 Prooteestaantii –3 Katoolikii -----4 Kan biraa (caqasii) 5 Hinqabu ----- 98	
G107	Sadarkaa baruumsaa Abbaa manaa keesanii	-----	
G108	Hojii keessan --1	Hojii mana keessa –1 Qonnaan bulaa –2 Daldalaa -----3 Hojjettuu mootummaa --- 4 barattuu -----5 kan biraa (caqasii) ----6 hin qabu ----98	

G109	hojii abba namaa kessaani	-----	
G110	Haala fuudhaa fi heerumaa	Heerumaniiru ---- 1 Abbaan manaa irraa du'e .2 Iddoo garaagaraa jiraatuu 3 Walhiikan -----4 heerumanii hin beekan ..5	
G111	Yoo heerumtan Yeroo meeqaaf heerumtee?	-----	
G112	Abbaan manaa keessan yeroo meeqaaf fudhan?	-----	
G113	Galii keessan kan waggaa qarshiidhaan ykn kuntaalaan	Qarshii -----ykn Kuntaala Xaafii _____ Boqqoollo _____ Mishingaa _____ Kan biraa (caqasi).....	

Kuutaa 2 : wal Hormaata

Lakk	Gaafilee	Deebii	Yaada
G201	Kana dura ulfooftanii beektuu?	Eeyyee ---1 Lakkii ----2	
G202	Deebiin keessan eyyee yoo ta'e ji'a isaa guutee kan dhalate meeqa?	-----	
G203	Du'aan kan dhalate ykn kan isiin irra ba'e (yoo jiraate)	Du'aa dhalate----- Isii iraa ba'e----- (j'I isaa otoo hinn guutiin)	
G204	Yeroo ulfa keessanii walqunnamti saalaa yoom dhiistuu ?	Ulffa ji'a 1-3 Ulffa ji'a 3-6 Ulffa ji'a 6- 9	
G205	Erga deesanii kaatanii booda walqunnatii saalaa yoom jalqabdu?	Ji'a ----- booda	

G206	Umrii jalqaba itti deesanii	>25-----1 20-24-----2 15-19-----3 <15-----4 Hin jiru	
G207	Kana dura kaansarii serveksiin (cervical cancer) qabmtanii	Eeyyee---1 Lakki -2	
G108	Kana dura ulfaa'uu dadhabuu keessan irra kan ka'e gara doktorii ykn kilinikii ykn immoo hospitaala deemuun ilalamtani beektuu ?	Eeyyee---1 Lakki -2	
G209	Kana dura ulfa'uuf ykn ulfa tursiisuuf qorichaa ykn hormoonii fudhatte jira ?	Eyyee ---1 Lakkii2	
G210	Kana dura dhukkuboota walqunnamtii saalaan daddarbanii qabamtee beektaa?	Eyyee -----1 Lakkii -----2	

G211	Deebbii keessan eye yoo ta'ee dhukkubichii maalturee?	
Q212	Umruun itti gahelaa tatnii meeqa ?	Waggaa <13----1 14----2 >15----3	
Q213	Marsanii xurii lagu keessanii malii fakkate?	Ji;a eggee dhuufaa----1 Ji;a eggee hin dhuufuu--2	
Q214	Laguun (xuriin kee dhaabbataa yoo hin taane dhaabbataa godhuuf wantii yaaltee jiraa	-----	
Q215	Mala ittiin da'umsa ittisan fudhattee beektaa?	Yes ---1 No---2	
216	Sadarkaa marsaa lagu	Lagu xumuraa jala dhiyaachuun1 Lagu xumuraa arguu ..2	
Q217	Yoo lagu(xurii) xumuree egaltee ta'e yoom?ji;a ykn waggaa	
Q218	Umrii yeroo jalqabaaf waqlqunnamtii saalaa itti jalqa	----- Hin beekuu----98	
Q219	Waqunamtii jalqabaa jaalallee kee wajiin turee	Eyyee Miti Hinbeeku	
220	Umrii kee keessatti hiriyyaa walqunnamtii saalaa meeqa qabdate	
Q221	Hiriyyaa kee jalallee biraa qabaa oso siin wal hin argin erga siin wal jalatte booda	Eyyee Miti Hinbeeku	
Q222	Eye yoo ta'e meeqa	-----	
Q223	Atiif Abban hiriyya kee mala ittin da'uumsa ittisa fayyadamtani beekatu	Eye ----1 Miti ----2	
Q224	Yoo eyyee	Qusannaa maatii bifa akkmii	
Q225	Sababnii guddaan ati mala ittisa da'uumsaa piilsiti hin fayyadamneef maalii?	----- 76 -----	
Q226	Yeeroo took tokko dubartoni piilii da'umsaa dhaqqamu gahelaa	Eyyee----1 Miti ----2	

Kutaa 5: gaaffiiwwan hubannoo fi ilaalcha kansarii mormaa gadameessaa

	Gaaffii	Deebiisaa	
G 500	Kasarii dhagattee bakkataa?	Eyyee -----1 Miti -----2	
G501	Kanasarii mormaa gadamessa ittisuun danda'ama?	Eyyee -----1 Miti -----2	Yoo miitii Q504 yaangaQ506
G502	Yoo eeyyee ta'e akkamiin ittifama	
G 503	Wantoota kanasarii mormaa gadamessafi saaxila nama baasa beektaa?	
G504	Dhukkubni HIV kansari mormaa gadamessati saaxil basa	Eeyee-----1 Miittii-----2 Hin beekuu-----3	
G 505	HIVn karaa kamiin dadarbuu?	
G506	Dhukkuba HIV irraa akkamiin ofi ittifta?	
G507	Kansaroiin moraa gadamessaa ajjeesuu danda'aa?	Eyyee -----1 Mitii -----2 Hin beekuu ..3	
G508	Kansariin mormaa gadamessaa dhimmi fayyaa hawasichaati?	Eyyee -----1 Mitii -----2 Hin beekuu.....3	
G509	Kansariin mormaa gdamessaa salphaatti beekkamuu danda'ama? Ykn qoratauun danda'aaa?	Eyyee -----1 Mitii -----2 Hin beekuu..3	
G510	Kaanasarii sarueekssii sulphaadhan yaalemuu danda aa?	Eyyee -----1 Mitii -----2	
G511	Ani kansari mormaa	Eyyee -----1	

	gadamessaafi saacila bahaadha jettee yaaddettaa?	Mitii -----2	
G512	Yoo eeyyee ta'e maaf?		
G513	Jaalalleen dhiira kee ati kansarii morma gadamessaa saxila bahuu kee yaadee beekaa?	Eyyee -----1 Mitii -----2	
G514	Yoo eeyyee ta'e akkamitti beeke	Sababi -----	
G515	PAP ismiiriin (PAP smear) siif hojjatamee beekaa?	Eyyee -----1 Mitii -----2	
G516	Yoo eeyyee ta'e	Eessatti -----1 Yoomi -----2- Harka meeqa-----3	
G517	Yoo miti ,ta'e maaf laallamuu dide?	Waan hin saaxilamnee fi ----1 Allattoo hin qabu -----2 Dantadhbeessa -----3 Buqqushaa (qaama saala) ilaallamuu sodadhee fi -----4 Feedhii waan hion qabneef ----5 Qorannaan isaa namatti hin toluu ----6 Kan biraa (ibis)-----	
G518	Buqushaa (qaamni saalaa) si qaratamee beekaa?	Eyyee -----1 Mitii -----2	
G519	Yoo eeyyee ta'e ispekulami (speculum) Fayyaasamtee beektaa?	Eyyee -----1 Mitii -----2	
G520	Sababin rakkina kee kana yoowwaan (hatattaaan) hin beeksifneef maalii?	Tajaajita fayyaa waan hin jirreff----1 Yaala sodadhee ti -----q Dhukkuba salphaa ofumaan fayyaa (bada) jedheeti -----3 Osomaa karaa aadaatiin wall'anamu yoo yaalamuu jalqabe itti jabaata (natti cima) jedheeti -----4 Kan biraa (ibsii)	

