Cervical cancer: Analysis of diagnostic and therapeutic facility in public health institutions in Addis Ababa, Ethiopia

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ABSTRACT

Background: Cervical cancer is the second most common cancer in women globally and the leading cause of cancer deaths in women in low income countries. The majority of cervical cancer related deaths occur in the developing world which is mainly the result of weak or non-existent cervical cancer control strategies. It is also an important public health problem in Ethiopia, a country without well established control program for the disease. This study describes the diagnostic and therapeutic facility in Addis Ababa public health institutions which can ultimately be used as an input to develop suitable control strategies and to visualize the amount of resources required.

Methods: A cross-sectional study was conducted including all public health institutions (8 hospitals and 26 health centers) in Addis Ababa in August 2010. In the assessment of awareness of cervical cancer, a sample of health providers directly involved in the care of cervical cancer patients were included taking one individual from the various reproductive health units in each institution. For each hospital or health center a checklist was used to register the available diagnostic and therapeutic infrastructure. Data was computerized using Excel and analyzed using STATA. Demographic data is presented as frequency and the difference in the awareness of different professions was analyzed using ANOVA. The data on infrastructure is presented as frequency data.

Results: The awareness of 101 health providers was analyzed. The median age of the participants was 29 years. All health providers responded that they had heard about cervical cancer. Half of the participants were able to identify the common symptoms of the disease described on available literature. Only 23% of the study participants mentioned HPV as the primary cause of cervical cancer. A significant difference in awareness was also seen between different groups of professions. Absence of the necessary skilled manpower, equipments and proper documentation for the diagnosis and treatment of cervical cancer was reported in the majority of the institutions.

Conclusion: This study highlighted the tremendous skilled man power, infrastructure and communication gap in public institutions in Addis Ababa indicating the requirement for a great deal of resources for future establishment of effective control programs.

Keywords: Public health institutions, cervical cancer, analysis, infrastructure, awareness

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LIST OF ABBREVIATIONS

Abbreviation	In plain text
ANOVA	Analysis of variance
AU	African Union
CIN	Cervical Intraepithelial Neoplasia
DNA	Deoxyribonucleic Acid
ECC	Endocervical Curettage
GDP	Gross Domestic Product
GNP	Gross National Product
HIV	Human Immunodeficiency Virus
HPV	Human Papilloma Virus
IARC	International Agency for Research on Cancer
LEEP	Loop Electrosurgical Excision Procedure
NGO	Non-governmental Organization
OAU	Organization of African Unity
VIA	Visual Inspection with Acetic acid
VILI	Visual Inspection with Lugol's Iodine
WHO	World Health Organization

INTRODUCTION

Overview of cervical cancer

Epidemiology

Cervical cancer is the second most common cancer in women globally and the leading cause of cancer deaths in women in low income countries. It is a disease of unfortunate inequities but also of unprecedented opportunities. [1] In the year 2005, there were, according to World Health Organization (WHO) projections, more than half-million incident cases of cervical cancer, of which over 90% were in developing countries (Figure 1). Current estimates show that over one million women worldwide have cervical cancer, most of whom haven't been diagnosed, or have no access to diagnostic or therapeutic services that could cure them or prolong their life. [2] The highest incidence rate in the world is reported from Recife, Brazil and Cali, Colombia (70/100,000). [3] In most of the countries in North America and Western Europe, the incidence of cervical cancer has been declining, although recently at a much slower rate. However, in many low and middle income countries the incidence of cervical cancer has changed little, with the exception of those countries that have achieved the epidemiological transition with increasing affluence from industrialization. [4]

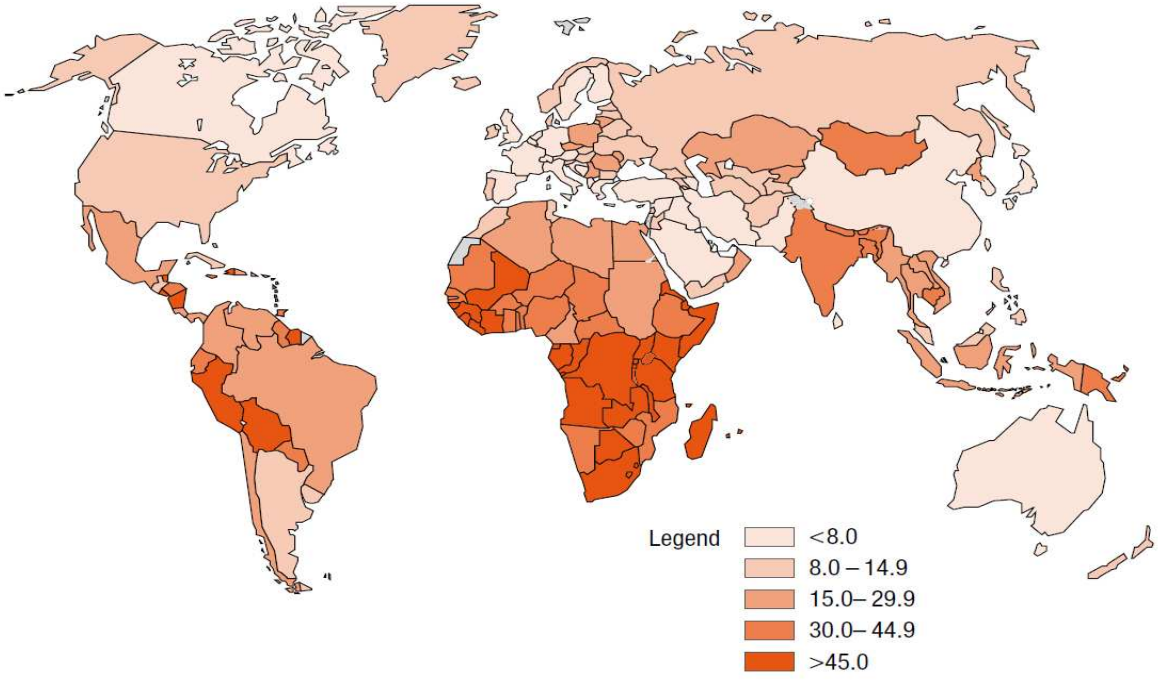

Figure 1.Worldwide incidence rates of cervical cancer per 100,000 females (all ages), age-standardized to the WHO standard population (2005). Source: [2]

The majority of cervical cancer related deaths occur in the developing world (Figure 2) which is mainly the result of weak or non-existent cervical cancer control strategies. The reduction in mortality in North America and Europe with the implementation of different control strategies in the past few decades shows the huge opportunity to save the lives of millions of women in low income countries.

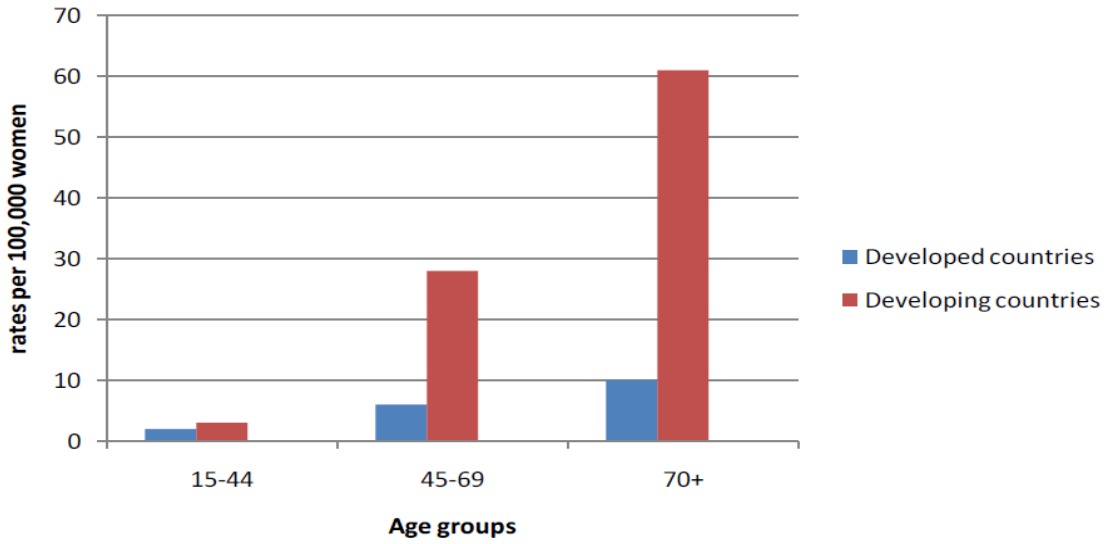

Figure 2. Age-standardized mortality rates of cervical cancer in developed and developing countries (2005). Source: [2]

In sub-Saharan Africa in the year 2000 there were 57,000 cases constituting 22% of all female cancers corresponding to an age-adjusted incidence of 31/100,000. [5] It was highest in the eastern and southern Africa (30-40/100,000) while the rest of the sub-Saharan Africa had a lower incidence (20-30/100,000), and North Africa had the lowest incidence (12/100,000). [6] The disease is among the major causes of cancer related mortality in the continent which is mainly due to late presentation and poor access to diagnosis and treatment.

In Ethiopia studies on the epidemiology of cancer in general and cervical cancer in particular are scarce. The institutional recording and reporting of cancer related mortality and morbidity lacks completeness. In the year 2010, Ethiopia had an estimated population of 20.9 million women aged 15 years and older who were at risk of developing the disease. [7] In the same year, the age-specific incidence of cervical cancer in Ethiopia was higher than the world average for women of age 55 and above (Figure 3). According to a recent WHO report, cervical cancer ranks as the second most common cancer among women in Ethiopia.

Currently, it is estimated that 4648 women are diagnosed with cervical cancer and 3235 die from the disease annually. [7]

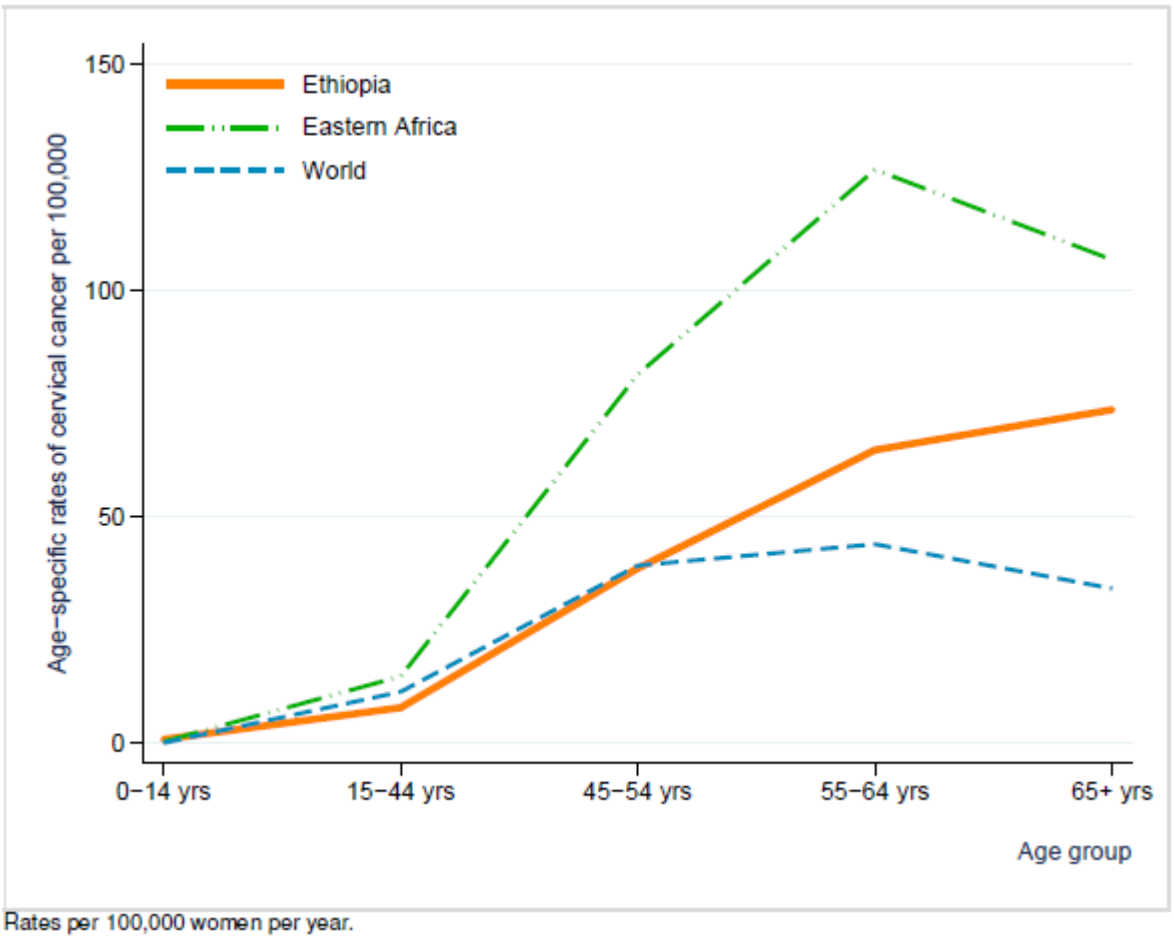

Figure 3. Age specific incidence rates per 100,000 of cervical cancer in Ethiopia compared to Eastern Africa and the world (2010). Source: [7]

Natural history of cervical cancer

Cervical cancer begins with abnormal cervical epithelial cell change which is known as cervical intraepithelial neoplasia[1] (CIN) which subsequently transforms to malignancy. Human papilloma virus (HPV) is the main etiologic factor in the development of CIN. [8] HPV is sexually transmitted with the highest risk of infection occurring soon after the start of sexual activity as result of immature cervical epithelial cells which can easily be breached by the virus. CIN is classified by degree of severity namely mild (CIN I), moderate (CIN II) and severe (CIN III). In addition to the degree of dysplasia, it is likely that the course of a specific

[1]Abnormal proliferation of cells

lesion is also .influenced by a number of other factors, such as HPV type (number 16, 18, 31, 39, 45, 56, 58, 59, & 68 being the high risk), the patient's immune competence, or smoking habits. [8,9] These early lesions, if undetected and untreated, may continue traversing the basement membrane and ultimately invade cervical stroma over a period of 5-20 years with possible distant metastasis through lymphatic and blood vessels. [9] Individuals who have persistent HPV infections, especially with high viral loads, have a higher chance of developing CIN and subsequent cervical cancer. However, over 90% of women with normal immunity will have a spontaneous resolution of their HPV infection over a two year period and only about 5% will have cytologically detectable CIN. [8]

Table 1. Approximate rates of spontaneous regression, persistence and progression of CIN.

	CIN		
	I	II	III
Regression to normal	60%	40%	30%
Persistence	30%	35%	48%
Progression to CIN III	10%	20%	-
Progression to cancer	<1%	5%	22%

Source: [8]

Clinical presentation

CIN usually has no signs and symptoms and the diagnosis is usually based on biopsy findings following an abnormal routine cervical cytology smear. The most common symptom of invasive cancer is abnormal vaginal bleeding and may take the form of leukorrheal[1] discharge mixed with blood, minute or profuse bleeding. A history of bleeding after sexual intercourse may be elicited on specific questioning. A unilateral pelvic pain which radiates to the hip or thigh is a manifestation of advanced disease, as is the involuntary loss of urine or feces through the vagina, a sign of fistula formation. [2, 8] Anemia, weight loss and weakness are usually the characteristic of far advanced disease, although acute blood loss and anemia may occur in an ulcerating early stage lesion. [2] On physical examination, infiltrative cancer produces enlargement, irregularity, and a firm or hard consistency of the cervix and eventually of the adjacent structures. [8]

[1] A thick whitish or yellowish vaginal discharge.

Diagnosis

Biopsy and microscopic examination of tissue obtained are crucial for the diagnosis of cancer or its therapy. Where to biopsy is important. As dead tissue and inflammatory elements are present in bleeding, possibly invasive cancer of the cervix, biopsies from an ulcerative area may be useless or difficult to interpret. Therefore, it is wise to obtain biopsies from the edge of the lesion, where normal and malignant tissue gives a contrast. This may be facilitated by the Schiller test which is based on the fact that aqueous solutions of iodine stain the surface of the normal cervix brown due to the glycogen content of normal cervical epithelial cells. Malignant cells within the epithelium over the cervix do not contain glycogen, and will not be stained when Schiller's solution or Lugol's solution is applied. Subsequent biopsy of Schiller-positive lesions as well as granular, nodular or papillary lesions usually will confirm invasive cancer when it is present. The use of colposcopy may identify possible early invasive carcinoma in an area of CIN thus useful for staging. [10]

Treatment

Treatment of CIN is based on the available resources, results of the cervical cytology smear, findings at colposcopy, biopsy, and endocervical curettage results, as well as individual patient characteristics, such as HIV infection, pregnancy and the likelihood of compliance with management recommendations. [2, 8] In general the treatment falls into one of two main categories: procedures that destroy the abnormal tissue and do not produce a tissue specimen for additional pathological examination and procedures that excise the area of abnormality, allowing for further histologic study. If the intraepithelial lesion is limited to the ectocervix, treatment options such as cryotherapy, laser ablation, or a superficial excision by the loop electrosurgical excision procedure (LEEP) are suitable. If the lesion goes further into the cervical canal, the endocervical curettage contains dysplastic epithelium, or the colposcopic examination is otherwise unsatisfactory, the endocervical canal must be included in the treatment by a deeper LEEP or cone biopsy. [8]

Treatment of invasive cancer depends on the stage. At an earlier stage, the disease can possibly be treated with either radical hysterectomy plus pelvic lymphadenectomy or with primary radiation with concomitant chemotherapy. Patients with locally advanced cervical cancer are best treated with primary radiation with concomitant chemotherapy. Disseminated disease is mainly treated by chemotherapy despite its drawbacks. [8]

Prevention

Primary prevention can be accomplished by avoiding exposure to the virus through abstinence from sexual activity or through mutual monogamy forever, provided both partners are consistently monogamous and were not previously infected. HPV is highly infectious and scrotal and labial contact may suffice for transmission. As a result, the protective efficacy of condoms when used correctly and consistently is about 70%. Vaccination against HPV is also another mode of primary prevention. Currently vaccines are not widely used due to high cost, several challenges and uncertainties around ‘’who’’ and ‘’when’’ to vaccinate. [1, 9]

Secondary prevention is achieved through screening and treatment of detected premalignant lesions. Screening is directed towards sexually active - or formerly active - women to determine whether they are at increased risk of developing cervical cancer. This can be made by microscopic examination of the exfoliated cells of the cervix using the Papanicolaou (pap) smear, examining the surface layer of the cervix through visual inspection using different reagents, or detecting HPV DNA. There are two kinds of visual tests to identify premalignant cervical lesions: visual inspection with acetic acid (VIA) and visual inspection with Lugol’s iodine (VILI). [1, 11]

If resources permit, cytology-based screening is linked to treatment through an intermediary diagnostic step using colposcopy, followed by confirmatory biopsy when indicated. Endocervical smear can be prepared by using endocervical curette which helps to determine the extent of the lesion. Microscopic assessment of the tissue samples obtained by biopsy confirms the presence or absence of premalignant lesions. [11]

Cervical cancer control

Cervical cancer control has four main components: primary prevention, early detection through increased awareness and organized screening program, diagnosis and treatment, and palliative care for advanced disease.

An organized implementation of the control program (mainly under the national cancer control program) resulted in huge achievements in many countries. A remarkable reduction in the incidence of cervical cancer has taken place after the introduction of organized screening programs in the Nordic countries and British Columbia. The incidence of invasive cervical cancer was similar in Finland and Norway during the early 1960s. The age

standardized incidence was reduced by 80% in Finland from the early 1960s to the early 1990s, and within this period Sweden and Denmark found a reduction of 55% and 51%, respectively. A 78% reduction was also seen in British Columbia. [12] Despite the availability of clear technical guides and ample evidence on the success of the control strategies, many developing countries still face high incidence and mortality due to the disease as a result of

1. Lack of awareness of cervical cancer among the general population, health care providers and policy makers
2. Absence or poor quality of screening program for premalignant lesions and early-stage cancer. For the majority of the women cancer tends to be diagnosed in its later stages, when it is less easily treatable
3. Limited access to health care services
4. Lack of functional referral systems [2]

Ethiopia

Geography and population

Ethiopia is located in the horn of Africa. It is bounded by Eritrea in the North and North-East, Kenya in the South, Somalia and Djibouti in the South-East and Sudan in the West (Figure 4). The land area of the country is estimated at 1.1 million km^2. The current weather is characterized by tropical monsoon with wide topographic induced variation. Central mountain range with high plateau divided by Great Rift Valley are the features of the terrain. The country is landlocked as the entire coastline along the red sea was lost after the independence of Eritrea on 24 May 1993. [13]

According to the 2007 census, the country has a total population of 74 million (50.5% males and 49.5% females). The population grew at an average annual rate of 2.6% between 1994 and 2007. Administratively, the country is sub-divided into nine regional states and two city administrations. Addis Ababa, the capital, is one of the city administrations. [14]

Figure 4. Map of Ethiopia.

Source: CIA: The world fact book. Available at; https://www.cia.gov/library/publications/the-world-factbook/geos/et.html . Last accessed: on January 3rd 2011.

Economy

Ethiopia is one of the least developed countries in the world with per capita gross national income of $870 in 2008. [15] The country's economy is mainly based on agriculture, accounting for about 45% of the gross domestic product (GDP), and 85% of the total employment. Frequent drought and poor cultivation has been affecting the agricultural sector for generations. Coffee is a major contributor to the Ethiopian economy with exports of some $350 million in 2006, but historically low prices have made many farmers switch to "Khat"[1] to supplement income. [13] A steady economic growth has been noticed in Ethiopia in the past few years. The real GDP growth was estimated to have reached 8% in 2009/10. [16]

Health system

The health system in Ethiopia is underdeveloped, and transportation problems are severe. The majority of the population resides in rural areas and has little access to any type of modern health institution. It is estimated that about 75% of the population suffers from some

[1]Sceintifically known as Catha edulis Forssk. It is a plant which has stimulating effect and produces euphoria.

type of communicable disease and malnutrition, which can be prevented by various measures. [17] In Ethiopia the health policy aims at achieving access for all segments of the population to a basic package of primary health care services through a decentralized state system of governance. The health service package includes basic curative services, disease prevention and health promotion services. [18]

The health service is financed by the government, out-of pocket contribution and through external donation. Between 1997 and 2001 the government expenditure for health ranged from 35% to 40% of the total health expenditures. Out-of-pocket were approximately of the private health spending. Overall, the external resources for health increased from 9% in 1997 to 34% in 2001. [19]

The health care delivery system comprises of three levels. [20]

- *Primary level health care:* differs between urban and rural areas. In urban areas it includes health centers which are expected to serve 40,000 people. In rural areas it includes health post, rural health center and primary hospital. Health posts give service to 3,000-5,000 people, rural health centers give service to 15,000-25,000 people and primary hospitals to 60,000-100,000 people.

- *Secondary level health care:* includes general hospitals in both rural and urban areas. General hospitals serve 1-1.5 million people.

- *Tertiary level health care:* includes specialized hospitals in both urban and rural areas. Specialized hospitals serve 3.5-5.0 million people.

Health indicators and health service coverage

Ethiopia has several poor health outcome indicators (Table 2). Life expectancy at birth (60 years for females and 57 years for males) has been stable in recent years. It is lower than the global average of 70 years for females and 66 years for males. [15] Only 6% of the births are attended by trained health providers (physician, nurse or midwife), as compared to the sub-Saharan African average of 42 %. [19]

The country suffers from a severe shortage of both health personnel and accessible facilities. Approximately 30% of the households were estimated to live more than 10 kilometers from the nearest hospital, health center or health station. In contrast, urban areas with 4-6% of the total population have 44% of all health facilities. [19]

Table 2. Selected health indicators for Ethiopia (2008). Source: [15]

Indicator	Estimate
Neonatal mortality rate (per 1000 live births)	39
Infant mortality rate (per 1000 live births)	69
Under five mortality rate (per 1000 live births)	109
Life expectancy at birth (both sexes in years)	58
Maternal mortality ratio (per 100,000 live births)	720
Adult mortality rate (per 1000 adults 15-59 years)	307
Total fertility rate (per women)	5.3
Adult literacy rate (%)*	36
Prevalence of HIV among adults* (per 1000 adults 15-49)	21
Prevalence of tuberculosis (100,000 population)	560
GNP (purchasing power parity in $)	870

*Country data refers to 2007.

Rationale of the study

Lack of adequate information is one of the major problems in developing countries to design control strategies for various diseases. e.g. Knowledge of the diagnostic and therapeutic infrastructure of cervical cancer in Ethiopia is lacking. As cervical cancer is a treatable and preventable disease shown by recent available evidence which is practically demonstrated in different parts of the world, developing countries (most of which have high mortality and morbidity due to the disease) are trying to adopt suitable cervical cancer control strategies. [12] For the implementation of any of the strategies some base line data is required.

In Ethiopia there was a recent attempt to introduce cervical cancer diagnosis and treatment services (control programs in general) after the development of the national reproductive health strategy in 2006. [21] As there is limited knowledge of the awareness of providers, available infrastructure and referral systems, this work will contribute to plan a cervical cancer control program.

Aims

General

- To identify the factors that affect the diagnosis and treatment of cervical cancer in public health institutions in Addis Ababa.

Specific

- To describe the health providers awareness of cervical cancer.
- To describe available diagnostic and therapeutic infrastructure for cervical cancer.
- To describe the referral system for cervical cancer.

SUBJECTS AND METHODS

Study area

Basic characteristics

The study was conducted in the capital of Ethiopia which is located in the eastern part of Africa (horn of Africa). As one of the administrative regions of Ethiopia, Addis Ababa has the status of both a city and a state. The African Union (AU) and its predecessor Organization of African Unity (OAU) is based in Addis Ababa. The city is thereafter referred to as ''the political capital of Africa'' due to its historical, diplomatic and political significance for the continent. Geographically the city lies at an altitude of 2300 meters and is a grassland biome, located at 9°1'48"N 38°44'24"E. The city lies at the foot of Mount Entoto. From its lowest point, near Bole international airport, at 2326 meters above sea level in the Southern periphery, the city raises to over 3000 meters in the Entoto mountains to the North and has a subtropical highland climate. [22]

Addis Ababa city administration has ten sub-cities each subdivided into woredas and kebeles. According to the 2007 population and housing census, the total population of the city is 2.7 million (48% males and 52% females). The major ethnic groups are Amhara (47%), Oromo (20%), Gurage (16%) and Tigrie (6%). Many other ethnic groups reside in the city as the country constitutes more than eighty ethnic groups. [14]

The economic activities in the city are diverse. According to official statistics from the federal government of Ethiopia, manufacturing and industry, and commerce and trade employ about 22% and 23% of the working force, respectively. Other sources of income include homemaking, transport and communication. [22]

Health care system

In the health care system the primary health care constitutes the lowest level, general hospitals the secondary level, and specialized hospitals the tertiary level. Private hospitals or clinics and clinics supported by non-governmental organizations are also available to serve the population.

Table 3. Number of health institutions in Addis Ababa in 2010 by type of ownership and level.

Type by ownership	Type by level			
	Specialized hospitals	General hospitals	Health centers	Clinics
Public	3	5	26	55*
Private	0	28	0	451
NGO	0	0	0	175

*public clinics mainly serve as vaccination and family planning units and sites for outreach activities. They do not give diagnostic and therapeutic services.

Source: [23]

According to the national guideline for referrals, all patients first should visit the health center in their area and will be referred based on the following criteria:

- When a patient needs an expert advice as determined by the attending health professional
- When technical examination is required that is not available at the referring facility
- When a technical intervention that is beyond the capabilities of the facility is required
- When patients require inpatient care that cannot be given at the referring facility
- When the referring facility no more accept patients due to shortage of beds and unavailability of professionals
- Referrals are also made to the lower level health facilities and community based organizations [20]

Health centers are staffed by nurses, health officers, general practitioners and other paramedics. They mainly give outpatient services for common ailments with additional emergency care for minor injuries and medical conditions that do not require an expert advice. General hospitals have also a similar staff mix but they have many general practitioners and specialists in various fields. They also give inpatient care and have the facility for major surgery. Specialized hospitals have professionals with sub-specialties in various fields and mainly serve as teaching hospitals.

Study design

A cross-sectional study was conducted including all public hospitals and health centers in Addis Ababa to identity the factors that affect the diagnosis and treatment of cervical cancer in August 2010.

Sample procedure and sample size

All the public hospitals and health centers were included in the study (Figure 5). For each hospital or health center a checklist was used to register the available diagnostic and therapeutic infrastructure. The head of the hospital or health center guided the data collector during this process.

In the assessment of awareness of cervical cancer, only those directly involved in the care of cervical cancer patients were included i.e. in hospitals, the director, one provider from gynecology outpatient department, one provider from gynecology ward and one provider from the antenatal care or family planning unit. Family planning and antenatal care are normally given in one unit. If there are two or more professionals working in a unit, one of them will be selected randomly which was performed by assigning unique numbers using cards to all the providers working in the unit followed by picking one of the cards by the data collector. The provider whose assigned number corresponds to the number written on the card was selected for the study. In health centers, the head of the health center, one provider from the general outpatient department and one provider from antenatal care or family planning unit were invited to participate in the study. In health centers there is no separate gynecology department and all kinds of patients are seen in the general outpatient department and there is no gynecology ward as well. If there was more than one provider in a unit, the same kind of random selection procedure was applied like the hospitals.

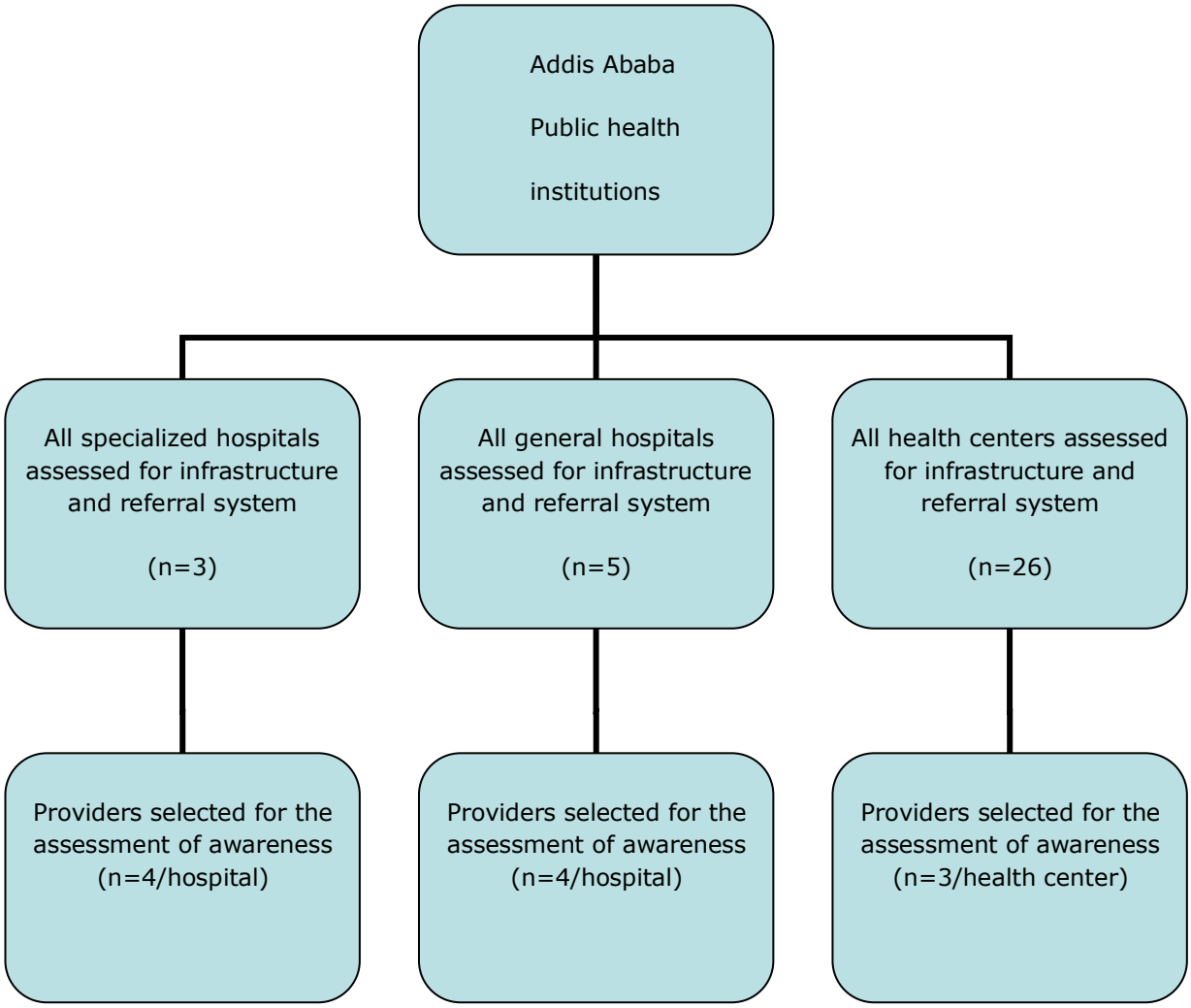

Figure 5. Selection of health institutions and study participants - schematic presentation.

Measure instrument

A self-administered questionnaire (Appendix C) was used to assess the awareness of providers working in gynecology (or in a related) department and a checklist was used to assess the available infrastructure. Both the self-administered questionnaire and the checklist were designed based on the study objectives, taking help from the previous literature and similar studies of the same topic. Among them are a study conducted by Ali et al (2010) in Karchi, Pakistan with the topic "Knowledge and awareness about cervical cancer and its prevention amongst interns and nursing staff in tertiary care hospitals" and a study conducted by Chirenje et al (2001) with the topic "Situational analysis for cervical cancer diagnosis and treatment in East, central and Southern African countries." The questionnaire

on awareness had two parts. The first part contained general information about the participants including demographic characteristics and their specific type of work. The second part contained a mix of closed and open ended questions on awareness of cervical cancer diagnosis and treatment. The providers awareness of symptoms of cervical cancer was assessed by listing the common symptoms of the disease (mainly four) mentioned in standard text books of gynecology. The questionnaire lists the common symptoms and participants were asked to say ''yes'' if they are able to identify the symptom. They were labeled as they are aware of the symptoms if they could identify all the symptoms listed on the questionnaire. The check list for the assessment of diagnostic and therapeutic infrastructure began with identification of the institution and lists the infrastructure required for the diagnosis and treatment of cervical cancer.

Data collection

As the study requires identification of instruments and documents, the principal investigator recruited data collectors based on their professional health-related background. The principal investigator also participated in the data collection. The data collectors were trained in two days to orient them concerning the objectives of the study, the methods used, the instrument and the steps they should follow during the data collection. The questionnaire was tested in four of the selected health institutions to assess the reliability of the instruments used and of the data collectors' performance thereafter necessary modifications were made.

During the data collection process, the data collector introduced himself to the head of the health institution and handed over a letter from the regional health bureau which asked for support of the data collection process and showed the ethical clearance. Thereafter the participants were selected. Subsequently the objective of the study was explained to the participants. After receiving consent from the participants, the questionnaire was handed over to them. Participants were informed to ask for any ambiguity on the questionnaire. After collecting the filled questionnaire, the data collector assessed the infrastructure accompanied by the head of the institution. Assessment was mainly based on interviewing the head of the institution and looking at available documents and equipments. Equipments which were functional were labeled as available.

Data analysis

The collected data was checked for completeness and consistency and seven questionnaires were excluded. Data was computerized using Excel and analyzed using STATA. Demographic data was presented as frequency and the difference in the awareness of different professions was analyzed using ANOVA. The data on infrastructure was presented as frequency data. The level of statistical significance was set at $P<0.05$.

Ethical considerations

The study proposal was submitted to the regional health bureau for ethical approval. The data collection process started after ethical permission. During the data collection, the objectives of the study and anonymity of their response was explained to the participants and their consent was secured. Subsequently the results of the study will be communicated to the responsible bodies and necessary efforts will be made to disseminate the findings through scientific journals with the aim of service improvement and better patient care.

RESULTS

Health service providers' awareness on cervical cancer

Out of 110 health providers invited to participate in the study two refused and further seven were excluded due to incompleteness, thus 101 questionnaires could be analyzed. Additionally, the diagnostic and therapeutic infrastructure for cervical cancer was assessed in all of the institutions.

In total 40 women with the median age 26 years and 61 men with a median age of 32 years responded to the questionnaire (Table 4). One third worked at hospitals and two third at health centers. None of the gynecologists but more than half of the nurses were females (56%).

Table 4. General characteristics of the study participants by sex.

Characteristic	Women	Men	Total
Age (years):			
20-29	30	22	52
30-39	4	25	29
≥40	6	14	20
Profession:			
Gynecologist	0	9	9
General practitioner	6	16	22
Health officer	11	18	29
Nurse	23	18	41
Place of work:			
Hospital	9	23	32
Health center	31	38	69
Total	40	61	101

All health providers responded that they had heard about cervical cancer. Half of the participants were able to identify the common symptoms of the disease described on available literature. The majority of the participants believed that cervical cancer is preventable and also treatable depending on stage of the disease. 80% of the men and 60% of the women believed cervical cancer is preventable. 70% of those working in health centers and all providers working in hospitals had seen a patient with cervical cancer even though they may or may not be involved in the care of the patient. 72% of the participants working in hospitals and 51% of the participants working in health centers were able to identify the symptoms of the disease. Similarly, 81% of those working in hospitals and 68% of those working in health centers believe cervical cancer is preventable; and 97% of those working in hospitals and 70% of those working in health centers believe cervical cancer is treatable. The difference in awareness among different groups of professions was found to be significant ($P<0.05$) (Table 5).

Table 5. Awareness by gender, place of work and profession with test of difference in awareness between different groups of providers using ANOVA.

General characteristics	Description of awareness					
	Heard about cervical cancer	Seen a patient	Know the common symptoms	Believe cervical cancer is preventable	Believe cervical cancer is treatable	Performed or ordered any of the screening methods
Sex:						
Male (n=61)	100%	85%	59%	82%	87%	20%
Female (n=40)	100%	70%	55%	58%	65%	8%
P-value	-	0.066	0.69	0.007	0.009	0.094
Place of work:						
Hospital (n=32)	100%	100%	72%	81%	97%	22%
Health center (n=69)	100%	70%	51%	68%	70%	11%
P-value	-	<0.001	0.046	0.17	0.002	0.18
Profession:						
Gynecologist (n=9)	100%	100%	89%	100%	100%	78%
GP (n=22)	100%	100%	82%	91%	100%	27%
HO (n=29)	100%	69%	38%	69%	79%	0%
Nurse (n=41)	100%	71%	51%	59%	61%	5%
P-value	-	0.007	0.002	0.009	<0.001	<0.001

GP = General Practitioner, HO = Health Officer

Overall, only 23% of the study participants mentioned HPV as the primary cause of cervical cancer. More than half (55%) of the medical doctors (including both general practitioners and gynecologists), only 10% of the health officers and 7% of the nurses mentioned HPV as a primary cause for cervical cancer.

The main modes of cervical cancer prevention are health education on the association of early sexual initiation and the disease, safe sexual practice, periodic screening and the use of vaccines if available. Out of those participants who said cervical cancer is preventable, 88% mentioned at least one of the modes of prevention and the rest said they do not remember the modes of prevention. Similarly, out of those participants who said cervical cancer is treatable, 89% mentioned at least one of the modes of treatment and the rest do not remember the treatment modalities. From the total participants 69% were able to identify at

least one of the screening methods and the rest do not know any of the cervical cancer early detection methods.

Manpower and infrastructure

Health manpower

Twelve of the health centers had general practitioners. The number of general practitioners in these twelve institutions ranged from one to two. All the health centers were mainly served by health officers and nurses both of which handle the outpatient reproductive health and other services in the health centers. The number of health officers, nurses, laboratory technicians and pharmacy technicians were similar among the health centers. There was one hospital with no gynecologist. Seven hospitals have no pathologist and do not give histopathology services. The number of general practitioners in the hospitals ranged from 12 to 200 (Table 6). All the gynecologists had the surgical skills to handle suitable cervical cancer patients. No other professionals had the surgical skills to treat cervical cancer patients. No provider was found with the basic diagnostic and therapeutic trainings such as VIA, VILI, colposcopy, cryotherapy, LEEP, and cone biopsy. Five of the pathologists working in one of the tertiary hospitals were trained on pap smear. No other providers were found with similar training.

Table 6. Percentage distribution of manpower.

Number of providers in the institution	Health center (n=26)	Hospital (n=8)
Gynecologist (n=23):		
0	100%	13%
2-6	0%	87%
Other specialties (n=131):		
0	100%	0%
1-47	0%	100%
Pathologist (n=5):		
0	100%	88%
5	0%	13%
General practitioner (n=370):		
0-2	100%	0%
12-200	0%	100%
Health officer (n=141):		
0	4%	0%
2-12	96%	100%
Nurses (n=2239):		
1-100	100%	13%
101-200	0%	88%
Laboratory personnel (n=297):		
0-10	100%	25%
11-83	0%	75%
Pharmacy personnel (n=271):		
1-10	100%	25%
11-92	0%	75%

Available services

Cervical cancer screening service and related therapeutic services like cryotherapy and loop electrosurgical excision procedures (LEEP) were not offered in all of the public institutions. Only one hospital was found to provide histopathology service performing papanicolaou smear and biopsy for diagnostic purpose. All of the hospitals give major surgical services in contrast none of the health centers give the service. Radiotherapy service was available only in one of the hospitals (Table 7).

Table 7. Number of institutions giving the service.

Services	Health centers (n=26)	Hospitals (n=8)	% of institutions giving the service, (n=34)
Gynecology out patient	26	7	97%
Gynecology in patient	0	6	18%
Antenatal care	26	7	97%
Family planning	26	7	97%
Maternity	25	7	94%
Cervical cancer screening	0	0	0%
Histopathology	0	1	3%
Colposcopy	0	1	3%
Cryotherapy	0	0	0%
LEEP	0	0	0%
Cone biopsy	0	1	3%
Surgery	0	8	24%
Radiotherapy	0	1	3%

Available infrastructure

All the hospitals and health centers were found to have clean water source and twenty four hours electricity supply. All the institutions had enough number of rooms to accommodate future introduction of cervical cancer diagnosis and treatment services. Equipments like examination couch and screen were available in all of the institutions. Cleaning equipments, protective materials, stationeries and laboratory accessories were also available in all of the institutions.

None of the institutions have cancer register (Table 8). Out of all the institutions, only one hospital was found to have protocol on cervical cancer diagnosis and treatment. During the assessment, no cryotherapy equipment and LEEP set was found in all of the institutions. Four hospitals had the necessary equipments to do biopsy of the cervix.

Table 8. Availability of diagnostic and therapeutic facility.

Facility	Number of health centers with the facility	Number of hospitals with the facility	% of institutions with available facility, (n=34)
Cancer register	0	0	0%
Protocols	0	1	3%
Colposcope	0	1	3%
Colposcope tray	0	1	3%
Specula of different sizes	15	6	62%
Vaginal sidewall retractor	10	7	50%
Endocervical specula	10	6	47%
Endocervical curette	12	6	53%
Uterine sound	12	7	56%
Facility for general anaesthesia	0	8	24%
Punch biopsy forceps	0	4	12%
Cryotherapy equipment	0	0	0%
LEEP set	0	0	0%

Referral systems

Based on the national guideline for referral systems, health centers refer patients to the nearby hospital for better service or another health center for patient's convenience. Referral

among hospitals is also possible. The communication is mainly through referral slips. All the institutions were found to have external referral slips. Only six of the health centers and none of the hospitals had internal referral slip. Nine (35%) health centers kept records of referred patients. Only one hospital was found to have a similar record. None of the institutions received feedback on referred patients. The main reasons for referral were lack of trained man power and absence of necessary equipments or drugs in all of the hospitals and health centers. Only one health center mentioned busy providers as a reason in addition to the aforementioned two reasons.

DISCUSSION

Methodological considerations

Epidemiological studies are vital tools to inform policy and manipulate the status quo. The application of the various types of study designs depends on many factors. Among them are the objective of the study, applicability and available resources to undergo the proposed study. A cross sectional study, although not the best choice to establish causation, can show prevalence of diseases and other conditions in a population. A detailed and organized description of the health status of a society has a paramount importance in understanding the existing problem which ultimately has a crucial implication in deciding appropriate solutions for that particular problem.

This study tried to describe the key factors that influence the diagnosis and treatment of cervical cancer in Addis Ababa by selecting all the public health institutions which serve the majority of the population in the city. Inclusion of all the public institutions leaves no room for random error in making any kind of inference concerning the public institutions in the city. However, conclusions made out of this design have a questionable validity for institutions and regions beyond the specified sample. Despite the aforementioned epidemiological facts, a careful understanding of the objectives and findings of this study can help us visualize the status of cervical cancer diagnosis and treatment in the capital and in the nation as a whole. Similarly, awareness was assessed by selecting providers who are responsible to handle patients with cervical cancer. This level of awareness may not directly reflect the level of awareness in all of the providers working in the institutions. Those working in the reproductive health units are assumed to be better informed about cervical cancer as their day to day encounter of related conditions may help them grasp some level of understanding. This may lead us to speculate lesser level of awareness in the rest of the providers.

The instrument used to assess awareness was designed to incorporate the simple and basic information on cervical cancer diagnosis and treatment and it was self administered to make providers freely respond to the questions and avoid a sense of "being evaluated". Some of the questions (for example: which of the following screening method do you know?) are prompted (recognition) questions. Respondents usually tend to guess with a prompted format. This may lead to slight overestimation of their knowledge. Likewise, the possibility of underestimation of providers awareness if we use open ended (recall) formats is still there. In this study both open ended and closed ended questions were used and comparability with other similar studies was also taken in to account during formulation of each question.

Awareness on the diagnosis and treatment of cervical cancer

All participants reported they had heard about cervical cancer. As one of the major causes cancer related deaths in females in Ethiopia, health providers are highly likely to hear about the disease either during training or practice. This can also be taken as a clue indicating the commonness of the problem. The finding of a study conducted by Hoque taking a sample of female Mangosuthu university technology students in South Africa (33%) is far less than the current finding. [24] This marked difference could possibly be explained by the type of training the participants of the studies received and work related experience. Cervical cancer is the third leading cause of death among women in South Africa showing the extent of the problem in unlikely to make the difference seen between the two studies. [25]

Only half of the providers were found to identify the common symptoms of cervical cancer. Although the measure is very gross and assumed to test their awareness to the minimum, the observed finding is suboptimal. This indicates the huge work that remains to be done in raising the awareness of providers. This finding could also be one of the reasons for the late presentation of cervical cancer patients which is seen in most developing countries as a result of a delay in referring for proper management. [26] The majority of the participants (72%) believe cervical cancer is preventable. This is much higher than the finding (31%) of a similar study conducted in South Africa among technology students. [24] However, a study conducted among health providers in Greece showed a higher percentage (98%) of participants saying cervical cancer is preventable. [27] The study done in Greece also revealed higher percentage participants (93%) saying cervical cancer is treatable which is more than our finding (78%). As health providers should be well equipped with medical knowledge to educate the public, our study still shows unsatisfactory level of awareness.

Cervical cancer screening service is among the worst in Ethiopia. In the years 2001 and 2002 the cervical cancer screening coverage was 1.6% in urban and 0.4% in rural areas. [28] In our study, only 15% of the providers performed or ordered screening which in a direct reflection of the poor coverage of the service. The basic reason forwarded for most developing countries for the absence of screening services is the scarce health care budget which precludes initiating and sustaining such programs even in a limited part of the countries. [29] Nowadays, all the preventive efforts to decrease the burden of cervical cancer seem to converge towards prevention of HPV infection through sexual education and vaccination. Surprisingly, only 23% of the providers mentioned HPV as a primary cause for cervical cancer in this study. The majority of the participants are unaware of the primary cause of cervical cancer which can markedly affect their effort to prevent the disease. This could be due the less emphasis given to the disease in training health providers. A study conducted in Pakistan among interns and nursing staff showed a similar result (30%). [30] Among a sample of females residing in United Kingdom, only 2.5% named HPV spontaneously as a primary cause of cervical cancer. [31]As health providers are better equipped with the necessary medical knowledge, studies among the public are expected to yield a much lower figure than those conducted among health providers.

As expected a higher proportion of medical doctors are able to spell out the cause of cervical cancer. In contrast, only 10% of the health officers and 7% of the nurses are able to mention HPV as a primary cause. Obviously, this is linked with the type of training they took. However, this information is equally needed by all the professions. Nurses are the front line health worker in most of the public health services and usually involved in health education. They need all the necessary tools to educate their patients. This finding may highlight where to act in planning further education to health providers.

Those working in hospitals are better in many of the awareness measures compared to health providers working in health centers. This could be due to the presence of highly qualified co-workers, the practical teaching offered in most of the hospitals in related disciplines, the higher chance to encounter cervical cancer patients as a result of a relatively better diagnostic facility and the referral of patients from health centers to hospitals. Similarly, a significant difference in awareness among professions was also seen. In many of the awareness measures a larger proportion of doctors did better which is a direct reflection of the type of training they took. This is in agreement with a study done in Ibadan which demonstrated a highest level knowledge in doctors followed by nurses and the lowest being among hospital maids. [32]

Manpower and infrastructure

Ethiopia, like most of sub-Saharan countries, is known by a long standing shortage of health manpower coupled with severe lack of infrastructure with a physician to population ratio of 1:42,000 which is far below WHO standard (1:10,000) and also five times below the sub-Saharan average. [33, 34] Additionally, the distribution of the limited health manpower is not uniform with the majority of the providers serving in urban areas. Our study revealed few (absent) number of highly trained providers such as gynecologists, pathologists and general practitioners in the health institutions included in the assessment. Only one hospital is found to have pathologists with histopathology laboratory and with the necessary training to do pap smear which makes wide application of cytology based screening impractical even in the capital. The absence of trained providers on VIA, VILI, colposcopy, cryotherapy and LEEP makes early detection and treatment of cervical cancer far from reality. The absence of cervical cancer diagnosis and treatment protocol in the majority (97%) of the health institutions and a total absence of national cancer register are among the problems which indicate the lack of emphasis given to cancer control in general and cervical cancer control in particular. The absence of diagnostic and therapeutic protocols can lead to sub-optimal care and clients who need thorough diagnosis and treatment will be overlooked. A similar study by Chirenje et.al demonstrated a huge infrastructure gap in East, central and Southern Africa. [35] Our study also demonstrated absence of a uniform recording of referred patients and provision of feedbacks. Several studies conducted in developing countries have also identified poor communication and feedback systems between all levels of institutions which is compounded by poor information and monitoring system. [4]

Limitations

Our study investigated awareness at its lowest level as one of the important factors which affect the diagnosis and treatment of cervical cancer. Further exploration of awareness is required to be more informative which can be considered in future studies.

CONCLUSION

It was noted that cervical cancer is an important public health problem in sub-Saharan Africa which can be controlled by an organized strategy involving primary prevention, early detection and treatment. Due to lack of political commitment and rampant poverty the issue has failed to gain the emphasis it deserves. This study highlighted the tremendous skilled man power, infrastructure and communication gap in public institutions in Addis Ababa

indicating the huge amount of resource necessary for future establishment of effective control programs. Intensive literature search in the area also revealed no similar studies conducted in the same setting. This study may stimulate professionals working in the field to go further and will also contribute to the national data base.

TIME TABLE

Activity	Time period
Preparation for the study (Request for ethical clearance, securing funds, recruitment of data collectors and materials for the study)	June 2010 – July 2010
Pilot study	Aug 2010
Data collection	Aug-Sept 2010
Data cleaning and analysis	Dec 2010 – Jan 2011
Writing the report	Feb 2011 – April 2011

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APPENDIX A

BUDGET (IN BIRR)

Item	Number	Number of days	Cost per unit	Total cost
Personnel				
Training				
Trainee: data collectors	3	3	100	900
Supervisor	1	3	150	450
Data collection				
Data collectors	3	30	100	9000
Supervisor	1	30	150	4500
Data entry				2000
Transport				
Public taxi service	4	30	150	6000
Materials				
Duplicating paper	4		70	280
Printing and photocopy				4000
Unforeseen				3000
Total				30130
Contingency (5%)				1506
Grand total				31636

APPENDIX B

INFORMED CONSENT

Dear participant,

You have been randomly selected to be part of this study and we would, therefore, like to give you a questionnaire which is going to be filled by yourself. The aim of the survey is to analyze the factors affecting diagnosis and treatment of cervical cancer in public health institutions.

The information you give is undoubtedly confidential and will not be disclosed to anyone. It will be used only for research purposes.

If you would like any further information, or would like to grasp the results of this study, please don't hesitate to contact the principal investigator through the following email address: yehu_tade@yahoo.com.

Signing this consent shows that you understand what will be expected of you and are willing to participate in this survey.

Thank you for your time and cooperation.

…… ……

Name and signature Date

APPENDIX C

QUESTIONNAIRE

1. PROVIDERS AWARENESS ON CERVICAL CANCER

1.1 General information

No.	Question	Response
1.1.1	Name of facility	
1.1.2	Address of facility	
1.1.3	Type of facility	
1.1.4	Date	
1.1.5	Position	
1.1.6	Age	
1.1.7	Sex	

1.2 Awareness on cervical cancer

No.	Question	Response	
		Yes	No
1.2.1	Have you ever heard about cervical cancer?		
1.2.2	Have you ever seen a patient with cervical cancer?		
1.2.3	If yes to Q1.2.2, how many patients do you see in a week?		
1.2.4	Can you mention the primary cause?		
1.2.5	Can you list common symptoms of cervical cancer? 1. Early disease can be assymptomatic. 2. Abnormal uterine bleeding. 3. Vaginal discharge. 4. Pelvic pain 5. Others (specify) _____		

1.2.6	Is cervical cancer preventable?		
1.2.7	If yes to Q1.2.6, what modes of prevention do you know? _____		
1.2.8	Is cervical cancer treatable?		
1.2.9	If yes to Q1.2.8, can you mention the treatment modalities? _____		
1.2.10	Which of the following screening methods do you know? 1. Visual inspection of the cervix with acetic acid (VIA). 2. Visual inspection of the cervix with lugol's iodine (VILI). 3. Pap smear. 4. HPV (human papilloma virus) test.		
1.2.11	Have you ever performed/ordered anyone of the above screening methods?		
1.2.12	If yes to Q1.2.11, which screening method did you perform/order? _____		

2. ASSESSMENT OF INFRASTRUCTURE

2.1 General information

No.	Question	Response
2.1.1	Name of facility	
2.1.2	Address of facility	
2.1.3	Type of facility	
2.1.4	Date of interview	
2.1.5	Name of interviewer	
2.1.6	Name of interviewee	
2.1.7	Position of the interviewee	

2.2 Number of health professionals working in the institution

Providers	Number
Gynecologist	
Other specialists	
Pathologist	
General practitioner	
Health officers	
Nurses	
Laboratory personnel	
Pharmacists (druggists)	

2.3 Number of providers who took training on various topics

Type of training	Number of providers trained				
	Gynecologist	General practitioner	Pathologist	Health officer	Nurses
Pap-smear					
VIA					
VILI					
Colposcopy					
Cryotherapy					
LEEP					
Cone biopsy					
Surgery					
Others					

2.4 Services available in the institution

Type of service	Response	
	Yes	No
Gynecology outpatient		
Gynecology inpatient		
Antenatal service		
Family planning		
Maternity		
Cervical cancer screening		
Histopathology		
Colposcopy		
Cryotherapy		

LEEP		
Cone biopsy		
Major surgical services		
Radiotherapy		

2.5 Available diagnostic and therapeutic facility

Available facility	Response	
	Yes	No
Cancer register		
Protocols and guidelines on cervical cancer		
Examination room		
Examination couch		
Examination screen		
Clean water and sink		
Light source		
Speculum		
Spatula		
Detergent		
Screen		
Gloves		
Sterilizers		
Kidney dishes		
Vulsellum forceps		
Glass slides		
Fixatives		
Slide holder		

Stationery		
Marker pencil		
Colposcope		
Colposcopy instrument tray		
Specula of different sizes		
Vaginal side-wall retractor		
Endocervical specula		
Endocervical curette		
Uterine sound		
Facility for general anaesthesia		
Punch biopsy forceps		
Cryotherapy equipment		
LEEP set		

2.5 Referral systems for cervical cancer

No.	Question	Response	
		Yes	No
2.5.1	Do you have an internal referral slip?		
2.5.2	Do you have an external referral slip?		
2.5.3	Do you keep records of referred patients?		
2.5.4	Where do you usually refer patients? 1. Health center 2. Hospital 3. Private clinic 4. NGO 5. Community		
2.5.5	What is the main reason for referral? 1. Lack of trained man power 2. Lack of equipments/drugs 3. Providers busy 4. Patients request 5. Other reasons		
2.5.6	Do you receive feed backs?		