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Histologic Types, Treatment Pattern, Outcome and Factors associated with Treatment outcome of Esophageal Cancer Patient treated at Tikur Anbessa Specialized Hospital Addis Ababa, Ethiopia 2010-2016: A Cross-Sectional Study.

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List of abbreviation

A.A----------Addis Ababa

AACCR----------Addis Ababa City Cancer Registry

AAU----------Addis Ababa University

ACC----------Adenocarcinoma

ASCC----------Adenosquamous cell carcinoma

BE ----------Barrette's Esophagus

CI----------confidence interval

ECOG---------- Eastern Cooperative Oncology Group

EP Info ----------Epidemiological Information (software developed by CDC)

FMOH---------- Federal ministry of health

GLOBOCAN ----------global burden of cancer

HR----------Hazard Ratio

INCTR----------International Network for Cancer Treatment and Research

IRAC---------- International Agency for Research on Cancer

LMIC ----------low and middle income countries

NCDs----------Non Communicable Diseases

OR----------Odds ratio

RR ----------Relative Risk

SCC---------- Squamous cell carcinoma

SD ----------Standard Deviation

SPSS---------- Statistical package for social science

TASH----------Tikur Anbessa Specialized Hospital

Abstract

Background: Esophageal cancer is the eighth leading cancer case and the top sixth cause of cancer mortality worldwide. In Ethiopia esophageal cancer ranks the seventh and eighth as the leading cause of cancer mortality and morbidity respectively according to Globocan 2012 estimate.

Objectives: The objective of this study is to assess histologic type, treatment pattern, outcome and factors associated with treatment outcome of esophageal cancer Patients at Tikur Anbessa Specialized Hospital Addis Ababa, Ethiopia.

Methods: A retrospective cross sectional study using record review was employed at surgical oncology department, radiotherapy and chemotherapy treatment center of Tikur Anbessa Specialized Hospital. All newly confirmed esophageal cancer patients (n=349) who were registered at Tikur Anbessa Specialized Hospital from January 2010 to December 2016 were included in this study. Patients chart was reviewed and telephone interview was made to generate all variables required for the study from March to April 2017.Finally basic descriptive statistics (frequency ,mean , median and tables), bivariate and multivariable analysis was performed and statistical significance were ascertained with 95% CI at 0.05 alpha level.

Result: A total of 349 esophageal cancer patients charts were reviewed. From a total of cases that were registered during seven years period there were 287 (90.3%) cases of squamous cell carcinoma. Surgery was done for 183(52.4%) of cases, 89(25.5%) received chemotherapy and 26 (7.4%) took radiotherapy which is palliative type. From all esophageal cancer patients who were included in this study 310 (88.8%) were not alive at a time of the study period. Only Chemotherapy (AOR 2.80(95%CI of 1.22, 6.41) and surgery (AOR 0.287 (95%CI 0.126, 0.625) were found to be factors associated with death from esophageal cancer.

Conclusion: squamous cell carcinoma was the most predominant histologic type followed by adenocarcinoma affecting males and females equally. Most of the esophageal cancer patients were diagnosed in advanced stages affecting the treatment outcome of esophageal patients. Surgery was the most frequent treatment modality in the hospital, overall sex of patients, surgery and chemotherapy has significant association with treatment outcome of esophageal cancer patients.

Keywords: Esophageal Cancer, treatment pattern , Treatment Outcome, Histologic Type, TASH, Addis Ababa, Ethiopia

1. Introduction

1.1. Background

Cancer is a major burden of disease worldwide. Each year, tens of millions of people are diagnosed with cancer around the world, and more than half of the patients eventually die from it(1). Based on the global burden of cancer 2012 estimates, about 14.1 million cancer cases and 8.2 million cancer deaths are estimated to have occurred in 2012; of these, 57% of the cases and 65% of the deaths occurred in the economically developing world in spite of their relatively larger share of the population(2) . With significant improvement in treatment and prevention of cardiovascular diseases, cancer has or will soon become the number one killer in many parts of the world. As elderly people are most susceptible to cancer and population aging continues in many countries, cancer will remain a major health problem around the globe(3).

Esophageal cancer is the eighth most common cancer globally, with an estimated 456,000 new cases in 2012 (3.2% of the total), and the sixth most common cause of death from cancer with an estimated 400,000 deaths (4.9% of the total)(2). Esophageal cancer incidence rates vary internationally by more than 21-fold. The highest rates are found in Eastern Asia (16.9& 5.4 /100,000) and in Eastern (11.9&7.8/100,000) and Southern Africa (13.7&6.7/100,000)and the lowest rates are found in Western Africa (0.8&0.4/100,000) both in males and females respectively. The crude incidence and mortality rate of esophageal cancer in sub-Saharan African countries is estimated to be 14198(5.5%) and 12982(6.5%) respectively where as in Ethiopia 1622(2.7%) and 1506(3.3%) from the total incidence and mortality seen in sub Saharan Africa(2). The age standardize incidence rate and mortality rate of esophageal cancer in sub Saharan africa is 6.8 and 6.4 per 100,000 population, whereas in Ethiopia is 3.4 and 3.2 per 100,000 respectively. Esophageal cancer ranks as the seventh and eighth most frequent cancer among men and women in Ethiopia(2).

Only in the last few years have non communicable diseases, including cancer, received attention as public health issues in Ethiopia. The Federal Ministry of Health of Ethiopia recently created a task force to address the issue of non-communicable diseases. The task force design a strategic framework to prevent and control chronic non communicable diseases. One of

the priority elements of the strategy is to reduce the incidence and mortality of cancer and improve the quality of life of cancer patients. Cancer control research and surveillance is also the other essential components of the strategy(4).

1.2. Statement of the Problem

Esophageal cancer is the eighth most common cancer globally, with an estimated 456,000 new cases in 2012 (3.2% of the total), and the sixth most common cause of death from cancer with an estimated 400,000 deaths (4.9% of the total)(2). Cancer of esophagus has a very poor survival (M: I ratio of 0.88) and the geographical patterns of mortality closely follows those of incidence .mortality rates are elevated in eastern Asia (14.1per 100,000) and southern Africa (12.8per 100,000) in men, and in eastern Africa (7.3 per 100,000) and southern Africa (6.2per 100,000) in women(2) . About 57% of the cases and 65 % of the deaths due to esophageal cancer occur in developing nations(2). In sub Saharan and Eastern Africa the crude incidence rate of esophageal cancer is 24409(3.9%) and 17273(6%) from the total new cases seen globally(5).

Ethiopia one of east African countries with a population of 86,538 who are at risk of developing esophageal cancer(2). Each year an estimated 1622 men and women are diagnosed with esophageal cancer; 1506 die from the disease(2). Crude incidence rates of esophageal cancer in Ethiopian population aged 15 years or more per 100 000 population per year are estimated to be 2.4 with an age specific rate of 3.4(2). Though the problem is severe with increasing magnitude, high case fatality and poor treatment outcome in its nature .As to my knowledge, there is no study which was done before on the treatment pattern, histologic types, treatment outcome and factors associated with treatment outcome of esophageal cancer. Hence, the intended study will strive to provide evidence on treatment pattern, histologic types, treatment outcome and associated factors of esophageal cancer patients particularly in Tikur Anbessa Specialized Hospital which is the only specialized national cancer treatment center in Ethiopia.

1.3. Significance of the Study

Generating an evidence on histologic types, treatment pattern, treatment outcome of different cancers and associated factors has important practical value for patients, providers, and researchers(6). And also cancer patients may wish to know how their prognosis is changing

over time, and what their life expectancy is based on the disease status. The proper understanding of prognosis/treatment outcome may help both of the physicians and the patients decide on treatment options, balancing the personal values for quality versus quantity of life(7). Providers can make use of survival information to more objectively determine an appropriate timing of follow-up visits and aggressiveness of surveillance testing based on patient's current risk profile. When designing Clinical trials, clinical researchers may also find it useful in helping to determine sufficient follow-up times for trial endpoints (8).

Esophageal cancer is the sixth most common cause of cancer deaths globally and 80% of cases are from developing countries(9). Even though the disease is known to be fatal, there is no organized evidence on histologic type, treatment pattern, treatment outcome and factors associated with treatment outcome of esophageal cancer patients in Ethiopia. Hence, this study will assess histologic types, treatment pattern ,treatment Outcome and factors associated with treatment outcome of Esophageal Cancer Patient in Tikur Anbessa Specialized Hospital from January 2010- December 2016 Addis Ababa Ethiopia .

The result of this study would primarily benefits patients who were suffering from the stated disease by providing information about the disease prognosis ,secondly it helps for health professionals for giving accurate information on the prognosis of the disease , knowing treatment pattern and the commonest histologic type of esophageal cancer which give extra confidence in treating their patient ,finally it gives an enormous amount of information for health planners ,researcher and all concerned stake holder by making a bench mark for planning and further research undertakings.

2. Literature review

2.1. Epidemiology of Esophageal Cancer

Cancer is a leading cause of death worldwide. About half of the annual incident cancer cases occur in the developing world. There were an estimated 14.1 million new cancer cases and 8.2 million cancer related deaths in 2012(10). Of these, there were 715,000 incident cancer cases and 542,000 deaths in Africa, with increasing incidence of breast and prostate cancers. The incidence of cancer is therefore increasing worldwide and the continuing global demographic and epidemiologic transitions signal an ever-increasing cancer burden over the next decades, particularly in low- and middle-income countries (LMIC). Africa is expected to carry a major cancer burden with Incidence rates of 1.27 million with 0.97 million deaths are estimated in 2030 for Africa(11).

Esophageal cancer (EC) is characterized by a peculiar geographical distribution worldwide, particularly for the histological subtype of esophageal squamous cell carcinoma (ESCC) which pre- dominates in EC hotspots. Asia's EC belt has been extensively researched, but little research attention has been given to Africa's analogous high-incidence area. The latter affects a north- south corridor in easterly lying African countries stretching from Ethiopia and Kenya down to South Africa (12).

Notably, within the Rift Valley all of Africa's known EC hot spots of Western Kenya (Eldoret, Tenwek), Arsi/Bale regions of Ethiopia, Malawi and Northern Tanzania (Kilimanjaro region). Only South Africa's high incidence EC area of the Eastern Cape does not fall near this zone(13) .

Worldwide a higher incidence of esophageal cancer is seen in an average 3-4 fold in men for squamous cell carcinoma whereas 7-10 fold incidence rate for adenocarcinoma compared to women(14, 15) . There is ethnics/racial difference in the histological types with predominance of squamous cell carcinoma in black's populations accounting over 90% of all esophageal cancer in Africa(16), whereas Adenocarcinoma is the most common histological types in western countries(14) . In the United States of America, adenocarcinoma of the esophagus is reported to be the commonest types with the fastest growing incidence, having increased in the last three decades.

2.2. Risk factors for cancer of the esophagus

Risk factor for esophageal cancer varies with histology and geography. SCC is common around southeastern Africa, Asia, Iran and South America while AC is common in Western Europe, North America (United States) and Australia. Gender and race have also a role. SCC is common in blacks and white men while AC is common in white women. In most countries diet and nutrients plays an important role. Smoking and alcohol are found to be clear risk factor for SCC (17).The intake of certain types of drink creates hotspots of SCC of esophagus in areas of Northern France consuming Brandie, corn beer in Southeast Africa, distilled sugary drinks in Puerto Rico, or certain whiskies in Carolina, United States. In Northern China, alcohol is not consumed regularly and therefore the risk associated with this habit is not relevant (18). Foods with high content of nitrosamines are linked to SCC in china. A meta-analysis published in 5003, shows an OR of 2 for individuals who eat foods rich in such compounds compared to those who do not (18). "Chewers of areca nut" (often mixed with tobacco), are common in regions such as Southeast Asia and India and have been linked to the development of SCC. In developing countries that have significant deficits of minerals and vitamins, mainly due to low intake of foods like fruits and vegetables also have an OR of 2 (18). Regarding Ethiopia, many previous reports suggest the association of esophageal cancers with thermal injury of hot food and beverages though the association strength needs further study (19-21) .

2.3. Histologic Type, Symptoms ,Sites And Treatment Outcome

There are two important histological types of; adenocarcinoma and squamous cell carcinoma globally, the latter is the major histological type(14). The peak age of occurence of squamous cell carcinoma is believed to be in the sixth decades in most studies, although adenocarcinoma becomes commoner in males under the age of 40 years (15).

Squamous cell carcinoma is the most common histological type in black individuals and white women, while adenocarcinoma is predominant in white men ($P < 0.001$) (2). The incidence of esophageal Squamous cell carcinoma is generally higher in men than women in most countries, and black men, compared to whites in the United States (14).

The middle third of the esophagus is the commonest site for squamous cell carcinoma and the lower third is the commonest site for adenocarcinoma(15, 16, 20, 22) .Most patient present with progressive dysphagia (difficulty of swallowing) and weight loss with dysphagia being the most

important and the first symptom. as most patient seek care at advanced stage , mortality is very in evitable and even in operable tumors ,postoperative mortality is about 50%(23). The symptoms of esophageal cancer usually appear 3 to 4 months prior to diagnosis and which even vary in relation to the segment of esophagus initially involved. Difficulty of swallowing is the most common symptoms in more than 90% of cases; weight loss over 5 to 10% of body weight occurs in majority of patients and is associated with worse prognosis(24) . Les common symptoms, such as hoarseness, cough, and progressive lesions with invasion to other organs result in symptoms such as hematemesis, hemoptysis, and dyspnea and cough secondary to bronchoesophageal and tracheoesophageal fistula (23, 24).Cancer of the Oesophagus has a very poor prognosis /survival (M: I ratio is 0.88), and the geographical distribution of mortality closely follows those of incidence. Mortality rates are high in Eastern Asia (14.1 per 100,000) and Southern Africa (12.8) in men and in Eastern Africa (7.3) and Southern Africa (6.2) in women(10).

In a retrospective study done in Ghana on 152 patients, 122 of the patients were males and 30 females with a mean age of 57.8+_11.7 years, while the distribution of esophageal carcinoma by anatomical site shows 84.9 in distal third, 11.8% in middle third followed by 3.3%on upper third(25).

In a three year study on the histopathological sub types of esophageal cancer in Uganda, a total of 140patients had endoscopic examination for cancer of esophagus of this 71 patients were endoscopicically and histopathologically confirmed esophageal cancer with a female to male ratio of 1:3 ,with a mean age of 55.5years(SD+_11.8years). Squamous cell carcinoma was the most common histologic sub type accounting for 93.0% of all cases with ratio of squamous cell carcinoma to adeno carcinoma of 13:1. The lower third of esophagus was the most common followed by middle third and upper third of the esophagus(26).

On the study done in Sudan on 448 patients from 1992-2012 squamous cell carcinoma was the predominant subtype accounting for 90% of all tumor followed by adeno carcinoma (9.4%) of reported cases while the male to female ratio in this study was 1:1.8 with ratio of 1:2 for SCC and 2:1 for adeno carcinoma respectively(27).

In a retrospective study done in Nepal, a total of 106 patients received pathologic examination within three years period which revealed 68(64.1%) cases as squamous cell carcinoma and

33(31.13%) of theme adenocarcinoma including signet cell carcinoma. In this study the esophageal cancer was most common in the age group of 61 -70 years with lower third of the esophagus being the most common site followed by middle third and upper third of esophagus(14).

In a case control study done in Kenya on 159 cases and 159 controls from June 2003 to July 2006, 147 (92.45%) of all cases were squamous cell carcinoma while adeno carcinoma accounts for 12cases (7.54 %) of the cases. In this study squamous cell carcinoma develops in the middle third of the esophagus 92(57.86%) followed by 31 (31.4%) in the lower third and 17 cases (10.8%) of theme were in upper third of the esophagus .in this study the number of males who have esophageal cancer was reported 92(57.9%) of all cases and females account 67(42.1%) with a male to female ratio of 1.4:1(28).

A study done in India from January 2014 to June 2016 on 101 cases showed that 65(64.4%) of cases were males and 36(35.6%) of cases were females with a male to female ratio of 1.8: and with most cases bulked in the age group of 41-60 years .while the histopathological analysis revealed that squamous cell carcinoma the most common esophageal cancer ,61 (60.4%) followed by adenocarcinoma ,38(37.6%) and 2(2%) of them were undifferentiated carcinoma(29).

In systematic review done in sub Saharan africa of 54 publications showed that incidence of esophageal cancer is higher in males than females and is prominent among the age groups of 45-64 years age group in both sex with squamous cell carcinoma the most predominant histologic type than adenocarcinoma(19). The review concludes that esophageal cancer is on the increase in the Sub-Saharan African Region with uneven geographical distribution. Therefore, countries in the region are encouraged together with global health organizations to include esophageal cancer amongst diseases of public health importance for effective prevention, early diagnosis and effective treatment(19) .

3. Objectives

3.1. General Objective:

- To assess histologic types, treatment pattern, Outcome and factors associated with treatment outcome of Esophageal Cancer Patient treated at Tikur Anbessa Specialized Hospital from January 2010- December 2016 Addis Ababa Ethiopia .

3.2. Specific Objectives

- To describe the histologic type of esophageal cancer patients treated at Tikur Anbessa Specialized Hospital Addis Ababa Ethiopia
- To describe treatment pattern of esophageal cancer patients treated at Tikur Anbessa Specialized Hospital Addis Ababa Ethiopia
- To determine the outcome of esophageal cancer patient treated at Tikur Anbessa specialized hospital Addis Ababa Ethiopia.
- To identify factors associated with outcome of esophageal cancer patients treated at Tikur Anbessa specialized hospital Addis Ababa Ethiopia.

4. Methods and Materials

4.1. Study Area

The study was conducted at Tikur Anbessa specialized Hospital (TASH) in Addis Ababa, Ethiopia. TASH is a teaching and tertiary referral hospital with approximately 800 inpatients beds. It is the largest public hospital which was built in the early 1960's(30) . TASH cancer treatment center was established 17 years ago. The clinic is housed in a separate building consists of three floors with three examination rooms, physicians' offices, waiting room, pharmacy, and radiation vaults; a floor for the inpatient ward; and a floor for meeting rooms.

4.2. Study Period

The study was conducted from April 15 to May 15 2017.

4.3. Study Design

A health facility based, retrospective cross sectional study using record review was conducted.

4.4. Source Population

All esophageal cancer patients who were treated at Tikur Anbessa Specialized Hospital.

4.5. Study Population

All biopsy proven esophageal cancer patients in TASH who were registered between January, 2010 to December, 2016 and who fulfilled the eligibility criteria.

4.6. Inclusion & Exclusion Criteria

Inclusion criteria

- Esophageal cancer patients attended TASH from January 2010 to December 2016
- Patients registered with full information including age, sex, diagnosis, stage, Region, in the registration book or in the chart are considered to be eligible for the study.

Exclusion criteria

- Patients with incomplete information at registration
- Patients with no histopathology confirmation

4.7. Sample Size

All esophageal cancer patients in the seven years period starting from January 2010 to December 2016 were targeted to be included in the study.

4.8. Sampling Procedure

All eligible patients of esophageal cancer whose chart was found during the data collection period were included in this study.

4.9. Variables of Study

4.9.1. Dependent Variables /Outcome Variables

- Treatment outcome(survival)

4.9.2. Independent Variables

- Age of patient at diagnosis
- Sex of patient
- Marital status patient
- Stage of cancer at diagnosis
- Histologic grade of cancer
- Place of residence
- Family history of cancer
- Histologic type
- Treatment pattern

4.10. Operational Definition

- Treatment pattern: In this study treatment pattern is defined as the frequency of esophageal cancer patient treatment with chemotherapy, radio therapy or surgical treatment in Tikur Anbessa specialized Hospital.
- Treatment outcome: In this study treatment outcome is defined as death or alive (survive). After starting any modality of cancer treatment ascertained by phone call from the patients or their relatives.

4.11. Data Collection Tools and Procedures

14.11.1. Data Collectors

Before the actual data collection starts the principal investigator assessed patients 'chart for relevant variables on patients chart and based on data extraction tools were prepared .The data was extracted and collected by an oncology resident working in the treatment center.

14.11.2. Data Collection Procedure

Before collecting the data, the charts of patients to be reviewed was identified by their medical record number and then, an onchology resident who were working at the cancer treatment center extracted and reviewed the charts. Finally the principal investigator made a phone call to each patient to collect data on vital status, history of Ciggarate smoking, alcohol intake, khat chewing and family history of cancer which were not explicitly recorded in the patient charts.

4.12. Data Quality Control

Discussion was made to an oncology resident (data collector) regarding the tools, objectives of the research and how to maintain the quality of the data for two days before data collection time. The principal investigator supervised every aspect of the review. The Review checklist filled were collected in daily basis and checked for completeness by the principal investigator closely.

4.13. Data Processing & Analysis

Data were entered using EpiData version 3.1 and exported to SPSS version 21 for analysis. Basic descriptive analyses like frequency, proportion, mean and median was done. And also bivariate and multivariable logistic regression was done to determine factors associated with treatment outcome at p-value of 0.05.

4.14. Ethical Considerations

An ethical clearance for the proposed study was obtained from the research ethical committee of school of public health, Addis Ababa University. Consent from medical director and cancer treatment center focal person of Black Lion Hospital were secured. In addition informed verbal consent was obtained from patients /their family members before starting the phone interview after getting permission and phone numbers from the cancer registry. Confidentiality of the information were maintained throughout the study by using medical record number as identification in the data extraction form and the data was used only for the purpose of the proposed study.

5. Result

5.1. Description of socio demographic characteristics

A total of 349 esophageal cancer patients diagnosed from 2010 to 2016 in Tikur Anbessa Specialized Hospital. Out of this 143 (49%) were males and 206(51%) were females .the male to female ratio was 0.69:1. The mean age was 51 years(18-95) with SD of 11.9years , the mean age for female patients was50.5 years (+_10.9 SD) whereas the mean age for male patients was 52.7years (+_ 13.1SD), minimum age of 18years and maximum age of 95 years. Majority (32.4%) of esophageal cancer patients were in the age range of 50 -59 years (n=113). Almost all (97.1%) of esophageal cancer patients were ever married (married, divorced and widowed), majority (56.9%) of esophageal cancer patients came from Oromia at the time of diagnosis as shown in (Table 1).

Table 1.Socio demographic characteristics of esophageal cancer patients treated in TASH from 2010-2016 Addis Ababa Ethiopia (n=349)

Variables	n	%
Age group		
<19	1	0.3
20-29	11	3.2
0-39	30	8.6
40-49	91	26.1
50-59	113	32.4
60-69	75	21.5
70-79	24	6.9
>=80	4	1.1
Sex		
Male	143	41
Female	206	59
Marital status		
Ever Married	339	97.1
Single	10	2.9
Region		
Tigray	4	1.1

Afar	3	0.9
Amhara	26	7.4
Oromia	198	56.9
Somali	5	1.4
SNNPR	54	15.5
Gambella	1	0.3
Harari	2	0.6
Diredawa	2	0.6
Addis Ababa	54	15.5

5.2. Trends of Esophageal cancer patients based on years of diagnosis in TASH

When we look at the year to year difference in terms of diagnosis and occurence of death 81 (23.1%) of esophageal cancer patients were diagnosed in the year 2011 and almost 75 (21.4%) of the total death from esophageal cancer also occurred in same year followed by 63(17.9%) esophageal cancer cases were also diagnosed in the year 2016 and 45 cases (12.8%) of the total death occur in the year 2016(figure 1)

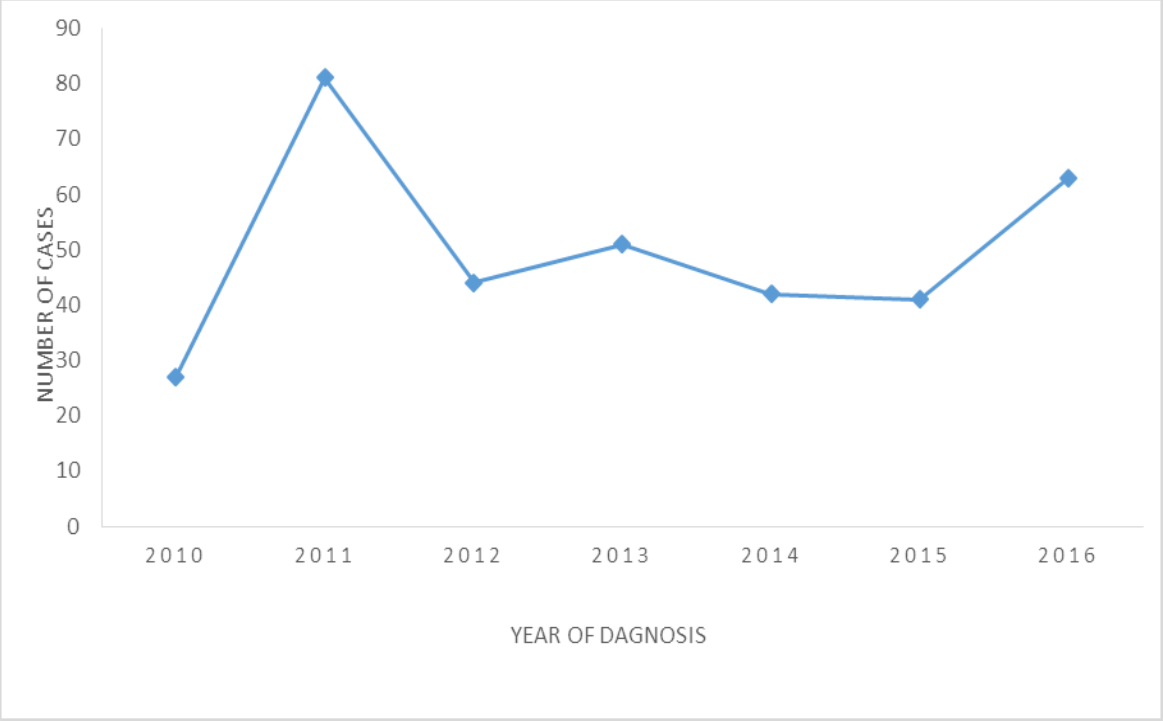

Figure 1.Trends of esophageal cancer patients based on year of diagnosis from 2010 to 2016 in TASH Addis Ababa, Ethiopia

5.3. Histologic types, anatomic site and stage of esophageal cancer

Out of 349 esophageal cancer diagnosed in the year 2010 to 2016 in TASH a total of 318 esophageal cancer patients have documented histologic type and only 57 patients have document about histologic grades. Accordingly 90.3% (n=287) of the study participants had squamous cell carcinoma and the second most common type was adenocarcinoma. One hundred eighty six (54.1%) of the cases had at the lower third of esophagus whereas 105 cases (30.5%) had the cancer at the middle third. 269(77.1%) of patients who had document concerning stage at diagnosis , 188(69.9%) were diagnosed as stage four followed by 51(19.0%) as stage three as shown in (Table 2).

Table 2.Distribution of histologic types and histologic grades of esophageal cancer patients seen in TASH 2010 to 2016 Addis Ababa, Ethiopia

Variables	N	%
Histologic type (n=318)		
SCC	287	90.3
AC	30	9.4
ASCC	1	0.3
Tumor location (n=344)		
Upper third	53	15.4
Middle third	105	30.5
Lower third	186	54.1
Histologic grade (n=57)		
Well differentiated	38	66.7
Moderately differentiated	10	17.5
Poorly differentiate	6	10.5
Undifferentiated	3	5.3
Stage at diagnosis (n=269)		
Stage I	3	1.1
Stage II	27	10.0
Stage III	51	19.0
Stage IV	188	69.9

5.4. Personal and family characteristics of esophageal cancer patients

Out of 349 esophageal cancer patients seen in 2010 to 2016 only eighteen percent of them had history of alcohol and khat chewing (n=62 for each) and almost all of the patient have no known family history of cancer (Table 4)

Table 3.Characteristic /risk factors of esophageal cancer patients seen in TASH from 2010 to 2016 Addis Ababa, Ethiopia (n=349).

Variables	n	%
History of alcohol drinking		
Yes	62	17.8
No	289	82.2
History of khat chewing		
Yes	62	17.8
No	289	82.2
History of cigarette smoking		
Yes	22	6.3
No	327	93.7
Family history of cancer		
Yes	2	0.6
No	347	99.4

5.5. Clinical characteristics of esophageal cancer patients

Nearly all (n=349) of esophageal cancer patients were present initially with complaint of difficulty of swallowing followed by forty percent (n=143) of esophageal cancer patients complain of significant weight loss with mean duration of complaint of 5.9 months before diagnosis (Table 5)

Table 4.Initial complaint of esophageal cancer patients seen in TASH from 2010 to 2016 Addis Ababa, Ethiopia (n=349).

Variables	n	%
Difficulty of swallowing		
Yes	347	99.4
No	2	0.6
Pain during swallowing		
Yes	19	5.4
No	330	94.6
Weight loss		
Yes	142	40.7
No	207	59.3
Heartburn		
Yes	23	6.6
No	326	93.4
Cough		
Yes	20	5.7
No	329	94.3
Vomiting		
Yes	39	11.2
No	310	88.8
Chest pain		
Yes	6	1.7
No	343	98.3

5.6. Functional status of Esophageal Cancer patients at Date of diagnosis

More than half (n=178) of the esophageal cancer patients diagnosed have documentation on initial functional status at the time of diagnosis, half (n=91) of the esophageal cancer patients were in ECOG I followed by ECOG II as shown below in (Table 7)

Table 5.Describes initial functional status of esophageal cancer patients in TASH from 2010 to 2016 Addis Ababa, Ethiopia (n=178).

Variables	n	%
ECOG 0	11	6.2
ECOG I	91	51.1
ECOG II	45	25.3
ECOG III	26	14.6
ECOG IV	5	2.8

5.7. Description of methods used to diagnose esophageal cancer patients in TASH

Most of the esophageal cancer patients in TASH seen in the year 2010 to 2016 were diagnosed using combination of Biopsy, endoscopy and Barium swallow respectively (Table 7)

Table 6.Show description of methods of diagnosis used in TASH during 2010 to 2016 Addis Ababa Ethiopia (n=349)

Variables	n	%
Barium swallow		
Yes	294	84.2
No	55	15.8
Computed tomography		
Yes	165	47.3
No	184	52.7
Endoscopy		
Yes	313	96.3
No	36	3.7
Biopsy		
Yes	336	96.3
No	13	3.7
Chest X-ray		
Yes	340	97.4

No	9	2.6
Ultrasonography		
Yes	343	98.3
No	6	1.7

5.8. Description of Pattern of treatment used to treat esophageal cancer patients in TASH

Out of 349 esophageal cancer patients who were diagnosed in TASH in the year 2010 to 2016 183cases(52.1%) were treated with surgical procedure particularly using Trans Hiatal Oesophagectomy followed by Trans Thoracic Oesophagectomy ,112 cases (31.9%) of esophageal cancer patients were used feeding gastrostomy . Only 89cases (25.5%) of the esophageal cancer patients took chemotherapy of which majority of these patients took adjuvant chemotherapy whereas, only 26 cases (7.7%) esophageal cancer patients were treated with radiotherapy particularly palliative type (Table 8).

Table 7.Pattern of treatment modality given for esophageal cancer patients in TASH 2010 to 2016 Addis Ababa, Ethiopia (n=349).

	Treatment outcome					
	Alive		**Dead**		**Total**	
Variable	**n(39)**	**%**	**n (310)**	**%**	**n(349)**	%
Surgery						
Yes	15	4.3	168	48.1	183	52.4
No	24	6.9	142	40.7	166	47.6
Type of surgery						
THE						
Yes	19	5.4	126	35.9	145	41.3
No	20	5.7	184	52.7	204	58.5
TTE						
Yes	2	0.6	27	7.7	29	8.3
No	37	10.6	283	81.1	320	91.7

GTT						
Yes	13	3.7	99	28.4	112	32.1
No	26	7.4	211	60.5	237	67.9
Laparotomy						
Yes	6	1.7	65	18.6	71	20.23
No	33	9.5	245	70.2	278	79.7
Chemotherapy						
Yes	18	5.2	72	20.3	89	25.5
No	21	6.0	240	68.5	260	74.5
Type of chemotherapy						
Neaoadjuvant	0	0	3	3.3	3	3.3
Adjuvant	14	15.6	56	62.2	70	77.8
Palliative	4	4.4	13	14.4	17	18.9
Radiotherapy						
Yes	6	1.7	20	5.7	26	7.4
No	33	9.5	290	83.1	323	92.6
Type of radiotherapy						
Adjuvant	0	0	2	7.7	2	7.7
Radical	0	0	1	3.8	1	3.8
Palliative	6	23.1	17	65.4	23	88.5
Total	6	23.1	20	76.9	26	100

THE- Trans hiatal esophagectomy, TTE- Transthoracic esophagectomy, GTT-gastrostomy tube

5.9. Bivariate and multivariable analysis result

Bivariate logistic regression was done at 20% level of significance. After adjusting for age of esophageal cancer patients and year of patients diagnosed Surgery, sex, chemotherapy and radiotherapy was found to be significant and included in multivariable analysis and adjusted for age of patients and year of diagnosis for esophageal cancer. Only chemotherapy (AOR 2.80(95%CI 1.22, 6.41) and surgery (AOR 0.287 (95%CI 0.126, 0.625) was significantly associated factors with death from esophageal cancer patients (Table 8).

Table 8.Result of bivariate and multivariable analysis of factors associated with treatment outcome of esophageal cancer patients at Tikur Anbessa specialized hospital from 2010-2016 Addis Ababa, Ethiopia

	Outcome of EC patients				
Variables	Alive	Dead	COR	AOR***	95%CI
Sex					
Female	30	176	2.54	2.132	0.91,5.01
Male **	9	134	1.0	1.0	
Chemotherapy					
Yes	18	71	2.88	2.80	1.22,6.41*
No **	21	239	1.0	1.0	
Radiotherapy					
Yes	6	20	2.64	2.86	0.89,9.26
No **	33	290	1.0	1.0	
Surgery					
Yes	15	168	0.53	0.287	0.126,0.625*
No **	24	142	1.0	1.0	

*-statistically significant at p-value <0.05, ** -Reference group for comparison, ***-adjusted for age, year of diagnosis of esophageal cancer patients

6. Discussion

In this study the commonest histologic type of cancer found was squamous cell carcinoma (90.3%), a male to female ratio of 0.6:1 with a mean age of 51.4years. lower third of the esophagus was the commonest tumor site with dysphagia and weight loss commonest symptoms while surgery was most frequent treatment modality sought by the patients .310 (88.8%) of esophageal cancer patients were died at the time of study period while only surgery and chemotherapy has association with treatment outcome of esophageal cancer patients.

The mean age at diagnosis of esophageal cancer in this study was 51.4years with age range of 18-95 years. This is almost similar with the mean age(57.8+_11.7SD) in a retrospective study carried out in Ghana(25) . The mean age of 140 esophageal cancer patients in Uganda was 55.5 years (26). In this study majority of esophageal cancer patients was in the age group of 50-59 years which is similar with the finding, a systematic review of esophageal cancer in sub Saharan Africa, in which esophageal cancer was prevalent among the age group of 45-65 years in both sexes(19).

The sex ratio (male to female) globally shows significant difference ranging from 0.85 in northern Iran(31) to as high as 20.5 in Hispanics(32). The male to female ratio in our study was 0.69 which was slightly equal in both genders. The highest male to female ratio was seen in Hispanic (20.5) and the lowest in black (7.0) compared with (10.8) in whites (32).

Though we are unable to calculate the incidence rate of esophageal cancer the mere figure looks stable over the years in this study. The conclusion from the review of esophageal cancer in sub Saharan Africa clearly shows that esophageal cancer incidence is controlling the sub region(19) which supports our findings.

The distribution of esophageal cancer patients based on their region showed that 198(56.7%) from oromia followed by SNNPR and Addis Ababa (table1). This finding was consistent with the previous study done in Tikur Anbessa (TASH) but the high proportion of esophageal cancer patients from oromia might be explained by proximity of the region to Tikur Anbessa specialized hospital and lack of tertiary hospital which give cancer treatment service(20).

The most common histopathological type in our study was squamous cell carcinoma (90.3%). This figure is similar in studies from Kenya, Uganda and Sudan ,where more than 90% of

patients diagnosed with esophageal cancer had squamous cell carcinoma, but this finding was against the findings of studies done in Nepal and north India which was nearly 60% of all esophageal cancer cases(14, 29) .This disparities might be explained due to the geographical difference and the life style of the patients.

The distribution of esophageal cancer by tumor location in this study was 186(53.3%) in the distal third, 105(30.1%) in the middle third and 53(15.4%) in the upper third. This finding was similar with finding in Kenya in which the lower third of esophagus was the most common location for the tumor, followed by closely middle third of the esophagus (14, 25). Most studies done in Africa shows the lesion are more common in the middle third including studies done in Sudan(27) Kenya(28) and Uganda(26).

In this study most of esophageal cancer patients reported difficulty of swallowing 347(99.4%),and weight loss 142(40.7%) with the reported duration ranging from 30 days to 5years with a median duration of 150 days . this long duration dysphagia and weight loss indicates that patients tend to seek or receive care only at late stage. In this study most of esophageal cancer patients were diagnosed as stage IV disease 188(69.9%) and stage three 51(19.9%) which is compatible with earlier findings of our study as well and explained that patients usually seek medical care when the disease is severe due to its complication This finding is almost similar with the findings of a research done in Kenya in which more than sixty three percent of esophageal cancer patients presents with progressive dysphagia of 1-4 month duration(33) .

In our study the proportion of esophageal cancer patients survived throughout the study period was 39(11.2%) and 310(88.8%) out of all esophageal cancer patients died at the time of the study period. This finding can be explained that most of the esophageal cancer patients seek care when their disease become advanced as noted above. In addition there is only on cancer specialty center which can give the treatment in the country which makes the cancer survival poor/poor treatment outcome which show the necessity of scaling up the early diagnosis and treatment of esophageal cancer patients throught the country.

In this study from the total 349 patients who sought care in the hospital 183(52.4%) were operated and 89(25.5%) took chemotherapy whereas only 26(7.4%) had radiotherapy at the time the study period. In the multivariable analysis of factors sought to be associated with treatment

outcome radiotherapy and sex of esophageal cancer were not statistically significant when adjusted for age and year of diagnosis of esophageal cancer patients.

In this study chemotherapy had significant association with outcome of esophageal cancer patients in which patients who had no chemotherapy was 2.80 time more likely to die from esophageal cancer compared to patients who took chemotherapy, this finding is consistent with scientific facts in which chemotherapy and radio therapy were the most effective treatment modalities now a days improving treatment outcome of esophageal cancer patients compared to surgery(6, 23).Furthermore patients who had no surgery were 28.7% less likely to die from esophageal cancer compared to patients who had surgery. This finding could be explained that most patients were sought care at advanced stage while terminally ill and the post-surgery complication usually end up with poor treatment outcome due to the fact that when there is post-surgery complications the patients deprived nutritionally and this will speed up the tendency of dying from the complications for patients underwent to surgery.

7. Strength and limitation of the study

Strength of the study

- Compared to other similar studies done in Africa, this study is done with large sample size which increase the power of the study
- Phone interview was done to ascertain the status of the patients

Limitation of the study

- Since data were collected from charts, some number of variables were missed and difficult to collect.
- We were unable to record the status of few number of patients who did not have phone number on the record.
- Due to the nature of the study we were unable to calculate incidence rate in this study

8. Conclusion

Squamous cell carcinoma was the predominant histologic type of esophageal cancer affecting males and females equally. Overall cancer of the esophagus mainly affects the lower 2/3 of esophagus with the majority in the lower third. Fifty to fifty nine years age groups are the most affected age groups. Esophagectomy is the most common type treatment modality. Most of the esophageal cancer patients seek medical care at late stages and this contributes for poor treatment outcome. Having surgery and chemotherapy has significant association with treatment outcome of patient with esophageal cancer. Almost all esophageal cancer patients died irrespective of treatment modalities they took in the hospital.

9. Recommendation

The following recommendations are made from this study.

FMOH

- Improvement in comprehensive esophageal cancer care program including possible prevention, early detection, treatment & palliative care is mandatory
- Improve access to esophageal cancer diagnosis on high incidence area
- To create awareness in collaboration with public medias about esophageal cancer
- Further study to identify potential risk factors /causes on high incidence area.

TASH

- The need to improve early detection and prompt treatment using feasible and effective regimens, especially to immediately initiate radiotherapy for those who complete chemotherapy as per the standard
- To include detailed patient characteristics in the patients follow up chart and cancer registry data is important.
- Since the oncology center is serving as only data source for cancer research ,it is mandatory to establish electronic data recording for all patients in the department

Researchers

- Further studies on survival time, risk factors of esophageal cancer patients using prospective study and devise strategies to improve completeness by use of complementary active methods

10.Reference

1. Ma X, Yu H. Global burden of cancer. The Yale journal of biology and medicine. 2006;79(3-4):85-94.
2. Ferlay J, Soerjomataram I, Ervik M. Cancer Incidence and Mortality World Wide International Network for Cancer Treatment and Research. 2013;GLOBOCAN2012 V.1.0.
3. Society Ac. Cancer facts and figures http://wwwcancerorg. 2016.
4. MOH. Strategic frame work for the prevention and control of NCDs. 2012;1.
5. WHO. cancer incidence and mortality world wide. International agency for research on cancer GLOBOCAN 2012http://globocaniarcfr/. 2013.
6. Blanke C, Shwartz R, Bonin S. Cancer management : a multidisciplinary approach 2005;9.
7. Kato I, Severson RK, Schwartz AG. Conditional median survival of patients with advanced carcinoma: surveillance, epidemiology, and end results data. 2001;92(8):2211-9.
8. Wang SJ, Emery R, Fuller CD, Kim JS, Sittig DF, Thomas CR. Conditional survival in gastric cancer: a SEER database analysis. 2007;10(3):153-8.
9. cancer incidence and mortality world wide [Internet]. International Agency for Research on Cancer 2012.
10. Ferlay J. Cancer incidence and Mortality Worlid Wide GLOBOCAN 2008. 2012;v1.0.
11. Ferlay J. Cancer Incidence and Mortality Worlid wide GLOBOCAN 2012. 2013;V1.0(IRAC cancer Base No.11).
12. Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C, Rebelo M, et al. Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. International journal of cancer. 2015;136(5):E359-86.
13. Joy E, Ander E, Young S, Black C, Watts M, Chilimba A. Dietary mineral supplies in Africa. Physiol Plant 2014;151:208-29.

14. Pun C, Aryal G, Basyal R, Shrestha S, Pathak T, Bastola S, et al. Histopathololological pattern of esophageal cancer at BP Koirala memorial cancer hospitalin Nepal: a three year retrospective study. Jornal of Pathology of Nepal. 2012;2:277-81.
15. Schlansky B, Dimarino AJ, Jr., Loren D, Infantolino A, Kowalski T, Cohen S. A survey of oesophageal cancer: pathology, stage and clinical presentation. Alimentary pharmacology & therapeutics. 2006;23(5):587-93.
16. Pindiga HU, Akang EE, Thomas JO, Aghadiuno PU. Carcinoma of the oesophagus in Ibadan. East African medical journal. 1997;74(5):307-10.
17. María José Domper Arnal, Ángel Ferrández Arenas, Ángel Lanas Arbeloa. Esophageal cancer: Risk factors, screening and endoscopic treatment in Western and Eastern countries World J Gastroenterol 2015 July 14;21(26):7933-43 ISSN 1007-9327 (print) ISSN 2219-840 (online).
18. Xiang Y, Zhang T, Zhang H, Hu A, Guo W, Y W. Comparison of lifestyle and environment among high risk immigrant and low risk host residents: implications for esophageal cancer etiology. Asian Pacific J Cancer Prev. 2010 Jul;11:1-6. PubMed PMID: 21338241
19. Kachala R. Systematic review: epidemiology of Oesophageal Cancer in SubSaharan Africa. Malawi Medical Journal 2010;22(3).
20. Ali A, Ersumo T, Johnson O. Oesophageal carcinoma in Tikur Anbessa Hospital, Addis Ababa. East African medical journal. 1998;75(10):590-3.
21. A. B, S. A, E. K. Pattern of upper gastrointestinal tumors at Tikur Anbessa Teaching Hospital in Addis Ababa, Ethiopia: a ten-year review. Ethiop Med J. 2009 Jan; 47(1):33-8.
22. Wakhisi J, Patel K, Buziba N, Rotich J. Esophageal cancer in north rift valley of Western Kenya. African health sciences. 2005;5(2):157-63.
23. Czito B, Albers D, Christopher G, Willeett R. Esophageal cancer. In Perez and Brady's, Principles and practice of radiation oncology. 5th edition ed. Philadelphia: Lippincott Williams and Wilkins2008.
24. Lao-Sirieix P, Fitzgerald RC. Screening for oesophageal cancer. Nature reviews Clinical oncology. 2012;9(5):278-87.

25. Tettey M, Edwin F, Aniteye E, Sereboe L, Tamatey M, Ofosu-Appiah E, et al. The changing epidemiology of esophageal cancer in sub-Saharan Africa - the case of Ghana. The Pan African medical journal. 2012;13:6.
26. Alema ON, Iva B. Cancer of the esophagus: histopathological sub-types in northern Uganda. African health sciences. 2014;14(1):17-21.
27. Gasmelseed N, Abudris D, Elhaj A, Eltayeb EA, Elmadani A, Elhassan MM, et al. Patterns of Esophageal Cancer in the National Cancer Institute at the University of Gezira, in Gezira State, Sudan, in 1999-2012. Asian Pacific journal of cancer prevention : APJCP. 2015;16(15):6481-90.
28. Patel K, Wakhisi J, Mining S, Mwangi A, Patel R. Esophageal Cancer, the Topmost Cancer at MTRH in the Rift Valley, Kenya, and Its Potential Risk Factors. ISRN oncology. 2013;2013:503249.
29. Gupta V, Bhardwaj S, Bhagat O. Pattern of Esophageal cancer in teritiary care Hospital in North Inddia: a clinicopathological study Int J Res Med Sci. 2017;5:1405-9.
30. Amha G, Aster T, Aziza S, Marcia L. Partner Profile International Network for Cancer Treatment and Research. 2012.
31. Pedram A, Mahmodlou R, Enshayi A, Sepehrvand N. Esophageal cancer in northwestern Iran. Indian J Cancer. 2011;48(2):165-9.
32. Nordenstedt H, El-Serag H. The influence of age, sex, and race on the incidence of esophageal cancer in the United States (1992–2006). Scandinavian Journal of Gastroenterology. 2011;46(5):597-602.
33. D. G. Gatei, P. A. Odhiambo, D. A. O. Orinda, F. J. Muruka, A. Wasunna. Retrospective Study of Carcinoma of the Esophagus in Kenya. cancerresaacjournallsorg. 1978;38:303-37.

11.Annexes

Annex I . Data Extraction Tools

Ser. No	**Part one: Socio demographic characteristics**		Remark
100	Medical Registration number	----------	
101	Cell phone number	----------	
102	Age	----------years	
103	Region	----------	
104	Place of residence(zone)	----------	
105	Religion	1. Orthodox 2. Protestant 3. Catholic 4. Muslim 5. Others	
106	Marital status	1. Single 2. Married 3. Widowed 4. Divorced	

	Part two: Social and Behavioral history		
201	History of alcohol drinking		
202	History of khat chewing	1. Yes 2. No	
203	History of tobacco chewing	1. Yes 2. No	
204	History of Ciggarate smoking	1. Yes 2. No	
205	Family history of cancer	1. Yes 2. No	
	Part three : Past medical history		
301	Patient age at diagnosis	----------years	
302	Date of diagnosis (dd/mm/yy)	-------/------/----------	
303	Patient complaint at initial visit	1. Difficult of swallowing 2. Pain during swallowing 3. Weight loss 4. Vomiting 5. Heart burn 6. Cough 7. Chest pain 8. Hoarseness of voice 9. Other	
304	Initial functional status	1. ECOG 0 2. ECOG I 3. ECOG II	

		4. ECOG III 5. ECOG IV	
305	Method of diagnosis	1. Barium swallow (Yes/No) 2. CT –scan (Yes /No) 3. Endoscopy (Yes/No) 4. Biopsy (Yes/No)	
306	Histologic type	1. SCC 2. AC 3. ASCC 4. Others	
307	Histologic grade of cancer	1. Well differentiated 2. Moderately differentiated 3. Poorly differentiated 4. Undifferentiated 5. Unknown	
308	Stage of cancer at diagnosis	1. Stage I 2. Stage IIA 3. Stage IIB 4. Stage III 5. Stage IVA 6. Stage IVB 7. Unknown	
309	Location of lesion	1. Upper 3rd 2. Middle 3rd 3. Lower 3rd 4. Unspecified	
310	History of dyspepsia	1. Yes 2. No	

311	History of GERD	1. Yes 2. No	
312	Concomitant diagnosis of Bes	1. Yes 2. No 3. Unknown	
313	History of GERD	3. Yes 4. No	
314	Concomitant diagnosis of Bes	4. Yes 5. No 6. Unknown	
315	Hgb level at diagnosis	----------mg/dl	
316	Hgb level at start of treatment	----------mg/dl	
317	Hgb level at last follow-up day	----------mg/dl	
318	History of HTN	1. Yes 2. No	
319	History of DM	1. Yes 2. No	
320	HIV status of patient	1. Positive 2. Negative 3. Unknown	
Part IV. Treatment and treatment outcome related questions			
401	Surgery	1. Feeding GS(Yes/No) 2. THE(Yes/No) 3. TTE(Yes/No)	
402	Chemotherapy	1. Neaoadjuvant	

		2. Adjuvant 3. Not given	
403	Chemotherapy regimen	1. 5FU+Cisplatin 2. Other	
404	Radiotherapy	1. Adjuvant 2. Radical 3. Palliative	
405	Radiotherapy Dose	1. Adjuvant -----Gy #----- 2. Radical -----Gy #------- 3. Palliative-----Gy #-----	
406	Date started treatment(dd/mm/yy)	--------/------/---------/	
407	Duration of treatment	----------months	
408	Last date of follow up(dd/mm/yy)	----------/----------/---------	
409	Status of patient	1. Alive 2. Died	
410	If alive ,functional status	1. ECOG 0 2. ECOG I 3. ECOG II 4. ECOG III 5. ECOG IV	
411	If died ,date of death(dd/mm/yy)	----------/----------/----------	
412	If lost to follow up, date (dd/yy/mm)	----------/----------/----------	

Annex -II Patient Information Sheet (English Version)

This patient information collection sheet is intended to assess treatment pattern ,histologic types, treatment outcome and associated factors of esophageal cancer patients and started treatment in Tikur Anbessa specialized hospital. The study will be conducted through reviewing secondary data. The study will give some evidence and information for governmental and non -governmental organizations which work in the area of non-communicable disease specifically on esophageal cancer at national, regional and district level by providing basic information on treatment pattern, histologic types, treatment outcome and associated of esophageal cancer. Information which is necessary for the study will be taken from medical outpatient log book. As the study will be conducted through review of medical records alone, the individual patients will not be subjected to any harm as far as the confidentiality is kept. To preserve the confidentiality, nurses working in cancer treatment center of Tikur Anbessa specialized hospital will extract the data from the medical records. Moreover, no personal identifiers will be used on data collection form.

Date of review----------

Day---------- month---------- year----------

Name of reviewer---------- Signature----------

Time started---------- Time ended----------

Total number of records reviewed----------

Result; (A) complete (B) incomplete (C) excluded

Action taken for incomplete data----------

Name of supervisor----------

Signature----------

Principal investigator address: 0912618775

Annex-III Consent Form (English Version)

My name is _____, I am onchologic clinic nurse working in Tikur Anbessa specialized hospital cancer treatment center and now I am collecting data from our patients medical outpatient logbook for the research being conducted to assess treatment pattern ,histologic types ,treatment outcome and associated factors of esophageal cancer patients in Tikur Anbessa specialized hospital , by Mr. Mohammed Ahmed who is the MPH student in Addis Ababa University. You are selected as one of study subject by chance**.** The investigator employed me (from this cancer treatment clinic) for this data collection to maintain your data strictly confidential, We believe that the findings of this study will have some evidence and information for governmental and non -governmental organizations which work in the area of non-communicable diseases specifically on esophageal cancer at national, regional and district level by providing basic information treatment pattern ,histologic types ,treatment outcome and associated factors of esophageal cancer. Information which is necessary for the study will be taken from your medical. As the study will be conducted through review your medical records alone, it will not cause any harm as far as the confidentiality is kept. The information will be taken when you give permission, participation is totally voluntary.

Your willingness for your medical record information to be utilized in this study will help us achieve the stated benefits of the study. Your name and other personal identifiers will not be recorded on data collection form and the information that you give us will be kept confidential and will also be used for this study purpose only. You have full right not to let your information on medical record to be used for this study. But the information that would be taken will be quite useful for the study. You will not face any problem if you do not allow the information to be taken from your records and you will not also be denied of getting any medical services from the hospital. If you have any questions about this study you may ask me or the principal investigator Mohammed Ahmed: Tel: 0912618775 E-mail: jemsmoh@gmal.com

Are you willing to let your information to be used for this study? 1. Yes 2. No

Signature of the interviewer which shows that the respondent has consented (verbally) to take part in the study _____

Annex-IV Consent Form (Amharic Version) /ለጥናቱ ተሳታፊዎች የፈቃደኝነት መጠየቂየ ቅጽ

ስሜ _____ ይባላል፡፡ በዚህ ሆስፒታል በካንሰር ህክምና ክሊኒክ ውስጥ የምሠራ የጤና ባለሙያ ስሆን አሁን በጉረሮ ካንሰር አይነቶች፣የህክምናዉ የሚያመጣዉ ዉጤት እንዲሁም ተያያዥ ምክንያቶች በሚል ርዕስ በአዲስ አበባ ዩኒቨርሲቲ ድህረ ምረቃ ተማሪ የሆኑት ለሚሰሩት ጥናት መረጃ ከካንሰር ታካሚዎች መዝገብ ላይ እየሰበሰብኩ ነው፡፡ አንተ/ቺ የጥናቱ አካል በመሆን ተመርጠሃል/ሻል፡፡ አጥኚው እዚሁ መዝገብ ላይ የሚሠራውን እኔን ለመረጃ ሰብሳቢነት ሲመርጠኝ የመረጃውን ምስጢራዊነት ለመጠበቅ ብሎ ነው፡፡ ማለትም ከክሊኒኩ ውጪ ያሉት በመረጃ ስብሰባ ወቅት ስምዎንና ሌሎች መረጃዎችን እንዳያዩ ሲባል ነው፡፡

የጥናቱ ውጤት ሳይንሳዊ ሂደትን የተከተለ መረጃ በማ

ቅረብ የካንሰር በሽታ መከላከያና መቆጣጠሪያ ፕሮግራሞችን መረጃ ለመስጠትና ተቸማሪ ጥናት እና ምርምር እንዲደረግ ብሎም ለታካሚዎች የተለየ ጥንቃቄ እንዲደረግ አስተዋጽኦ የጐላ እንደሚሆን ይታመናል፡፡ በመሆኑም ለጥናቱ አስፈላጊ የሆኑ መረጃዎች ከእርስዎ የህክምና ማህደር ላይ ይወሰዳል፡፡ ጥናቱ የሚደረገው ከካነሰር ሕክምና ማህደር ላይ ስለሆነ በእርስዎ ላይ ምንም ዓይነት ጉዳት አያመጣም፡፡ መረጃዎ እንዲወሰድ መፍቀድ ለተጠቀሰው የጥናቱ ዓላማ መሳካት የጐላ አስተዋጽኦ ይኖረዋል፡፡ ከሕክምና መዝገብዎ ላይ መረጃ ሲወሰድ የእርስዎን ማንነት የሚገልጽ ስም እና ሌላ ምንም ዓይነት ነገር ወደ መጠይቁ አይሞላም፡፡ የተወሰደውም መረጃ ምስጢራዊነቱ ተጠብቆ ሙሉ በሙሉ ለምርምር ሥራ ብቻ ይሆናል፡፡ የሕክምና መረጃዎ ለምርምር ሥራ እንዳይውል የማድረግ መብት አለዎት፡፡ ነገር ግን መረጃዎ ለምርምር ሥራው ቢውል ጠቀሜታው የጐላ ነው፡፡ በጥናቱ ለመሳተፍ ፈቃደኛ ባይሆኑ በሕክምናዎት ላይ ምንም ዓይነት ጉዳት አይፈጠርም፡፡ በሌላ በኩል መረጃዎን በመስጠትዎ የሚያገኙት የተለየ ጥቅም አይኖርም፡፡ ጥናቱን በተመለከተ ጥያቄ ካለዎት እኔን ወይም አጥኚውን አቶ መሀመድን መጠየቅ ይችላሉ፡፡

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መረጃው ለምርምር ሥራ ቢውል ፈቃደኛ ነዎት?1. አዎ 2. አይደለም

መረጃቸውን ለጥናቱ ሥራ እንዲውል ፈቅደዋል፡፡

የመረጃው ሰብሳቢ ስምና ፊርማ_____

Annex V. Conceptual Frame Work

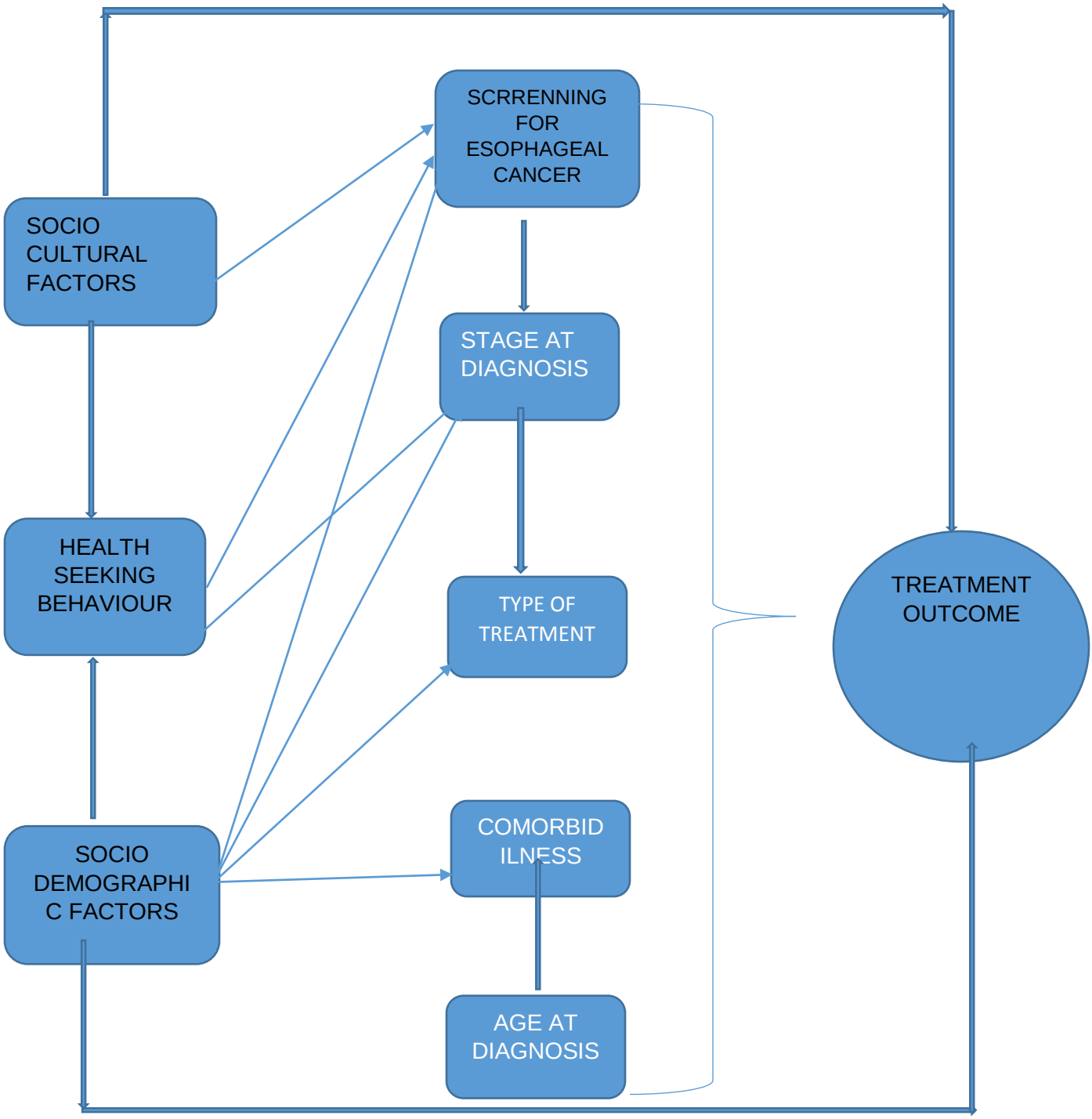

Figure 1.Conceptual frame work for the Assessment of treatment outcome and associated factors among esophageal cancer patients at TASH, A.A Ethiopia, 2012- 2016

Annex VII: Assurance of investigator

I, the undersigned senior MPH candidate agree to accept responsibility for the scientific, ethical and technical conduct of the research project and for provision of required progress reports as per terms and conditions of the research and publications office of the Addis Ababa University.

Name of the Investigator: Mohammed Ahmed (B.Sc., PH)

Signature_____ Date_____/_____/_____

Approval of the Primary Advisor

Advisor Name: Dr. Adamu Addissie (MD, MA, MPH, PhD), Associate professor

Signature_____ Date _____/_____/_____

CURRICULUM VITAE

Personal Information	
First Name /Surname	Mohammed Ahmed Teka
Date of Birth	11/9/1985G.C
Marital Status	Married
Children	Two daughter
Address	Addis Ababa, Ethiopia Email: jemsmoh@gmail.com or mariyahmo30@gmail.com
Telephone	+251912618775/+251913894347
Educational Background	BSc in Public Health(Public Health Officer)
Work Experience	Total of nine years and five month experience
Date	Oct 1/2008 –Nov30 2009
Position Held	Clinician in OBGYN department
Name of Employer	Addis Ababa City Administration Health Bureau Yekatit 12 Hospital
Major Activities and Responsibilities	Evaluating OBGYN patients Admitting and following of OBGYN patients Following ANC , Delivery and PNC clients Performing Diagnostics MVA, E&C, D&C etc. Performing incomplete abortion and post abortion care Assisting C-section in emergency OR Performing instrumental delivery with indication Assisting different gynecologic operation in major OR

	Evaluating and laboring mother to delivery ward Admitting and Discharging OBGYN patients
Date	Dec 1/2009-May 30/2010
Position Held	Lecturer and Department Head of Public Health Nursing
Name of Employer	SNNPR RHB, Benchmaji Zone ,Aman College of Health Science
Major activities and Responsibilities	Lecturer of Anatomy &Physiology ,Pediatrics ,MCH ,CDC, Epidemiology, Pharmacology, Nutrition and Health Education Preparing Lecture note series for the college Member of Academic Committee Evaluating academic performance Scheduling professional practices for year I,II and III public health nurse Organizing special class for females
Date	Jun 1/2010-Jun 30/2011
Occupation /position held	Outpatient clinician
Name and Address of employer	AACARHB Bole Sub City ,Bole 17 Health center ,Addis Ababa ,Ethiopia
Main activities and Responsibilities	Diagnose and treat outpatient Illness Admit patient and follow the progress
Date	July 1/2011-Jan 30 2011
Occupation or position Held	ART clinician and ART focal person

Name and Address of the employer	AACARHB Bole Sub City ,Bole 17 Health center ,Addis Ababa ,Ethiopia
Main Activities and Responsibilities	Enrolling HIV positive patients to chronic care Diagnosing and treating OI's Identifying and treating drug adverse effect Assessing HIV/AIDS patient for malnutrition and managing in line with National Guidelines Leading MDT team Meeting Participating in monthly catchment meeting Assisting ART case managers and counselors in skill ,knowledge and practice of adherence counseling for patient Admitting and managing severely ill ART clients and follow their progress Coordinating the ART case team for better chronic /acute care service etc.
Date	Feb 1/2011-Jan 30 2011
Occupation and Position held	Clinician at under five clinics
Name and address of employer	AACARHB Bole Sub City ,Bole 17 Health center ,Addis Ababa ,Ethiopia
Main activities and Responsibilities	Assessing under five children for malnutrition and enrolling to FBP program Diagnosing and treating their illness as per IMNCI Following HIV Exposed infants in the clinic

	Linking DBS positive infants to pediatrics ART units Performing DBS for exposed infants and enrolling to exposed infant care
Date	Feb 1/2012-June 30 /2013
Occupation or Position Held	ART focal person and onsite clinical mentor of the health center
Name and Address of Employer	AACARHB Bole Sub City ,Bole 17 Health center ,Addis Ababa ,Ethiopia
Main activities and Responsibilities	Treating HIV/AIDS patients Admit patient and follow their progress Enrolling newly diagnosed clients to chronic/acute care Filling different formats of chronic care Diagnosing and treating OI's Identifying and managing drug adverse effects Assessing patients for malnutrition and intervention Leading MDT meeting Participating in monthly catchment meeting Assisting case managers and counselors in skill and knowledge Leader of the ART case team Onsite mentor of the health facility Performing minor surgery

Date	Jan 1/2014-Jan 2016
Occupation or Position held	Preventive sub process owner ,clinician in ART clinic Hospital/health center base clinical mentor of the regional health bureau in collaboration with ICAP-Ethiopia
Name and Address of Employer	AACARHB Kirkos Sub City ,Meshalekiya Health center ,Addis Ababa ,Ethiopia
Main activities and Responsibilities	Hospital/health center based clinical mentor of the sub city Treating HIV/AIDS patient Admit patient follow their progress Enrolling newly diagnosed RVI patient to chronic care Filling different formats of chronic care Diagnosing and treating OI's Identifying and treating Drug adverse effects and or reactions Assessing HIV/AIDS patient for malnutrition and managing as per the national guide lines Leading MDT meeting Coordinating the ART case teams Onsite clinical mentorship of the ART case teams Offsite clinical mentorship of four health centers Performing minor surgery Preparing weakly case presentation Coordinating monthly mainstreaming

Language Proficiency ,Skills and Competencies	Amharic mother tongue Excellent writing ,listening and speaking skill of English Good in listening and speaking of Afan Oromo
Social skills and Competencies	Excellent in maintaining team sprite Excellent ability in adapting multicultural environment gained through my work experience Excellent team leadership quality
Computer skill	Good command of Microsoft office tools Trained in EPI info ,SPSS and ARCGIS software and GPS application Trained on basic computer data management ODK software for Surveillance data compilation Trained in Cispro software application usage(EPIH for health service data collection
Consultancy work and Research activities	Institution based cross sectional study on assessment of KAP of HIV/AIDS patient towards adherence to Antiretroviral drugs among adult HIV/AIDS patient in Hawassa university referral Hospital Currently working on epidemiologic distribution ,treatment outcome/survival time and histologic type of esophageal cancer in Tikur Anbessa specialized hospital from 2011-2016 Addis Ababa ,Ethiopia
Training and workshops attended	1. Certification of completion on Eight weeks emergency operation training 2. Certificate of completion on ART and Management of opportunistic infections based on IMAI guidelines

	3. Certificate of participation on TB/HIV/Malaria related workshops 4. Certificate completion on provider initiated counseling and testing and rapid tests 5. Certificate of completion of training on infant and young child feeding (IYCF) 6. Certificate of case management course on IMNCI 7. Certificate of participation on youth friendly service 8. Certificate of completion of the course clinical system mentorship 9. Certificate of completion on Comprehensive training on Management of HIV/AIDS Care and Treatment for Children ,Adolescents and Adults 10. Certificate of Training of trainers of on "Clinical System Mentorship" organized by FMOH in Collaboration ICAP-Columbia University in Ethiopia 11. Certificate of participation on mental health training 12. Certificate on Basic Pain Management Training
Reference	• Professor Yifru Berhan (MD, Specialist in OBGYN, Professor on OBYGN , Minister of Ethiopian Federal Ministry of Health) Email :Email: yifrub@yahoo.com Mobile :0911405812 • Dr. Mohammednur Ali (MD, Radiologist) Email :mnur2008@yahoo.com Phone:0913269356 • Abdulhalik Workicho (B.Sc,MPH,PhD researcher)Assistant Professor of epidemiology ,Jimma University College of Health Science Department of

	Epidemiology Email abdulhalikw@gmail.com Mobile :0913407305 • Dr. Adamu Addisie(MD,MA, MPh ,PhD) :Associate professor ,AAU School of Public health) Email : addamuaddis@yahoo.com Mobile : 0911404954