

Oesophageal Cancer Magnitude and Presentation in Ethiopia

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Abstract

Background Although oesophageal cancer is a public health problem in Ethiopia, there are limited data on the magnitude and distribution of the disease in the country. The aim of this study is to assess the magnitude, socio-demographic and clinical characteristics of oesophageal cancer patients in selected referral hospitals of Ethiopia.

Methods A retrospective document review was employed in ten referral hospitals in different regions of Ethiopia. Data were extracted from clinical care records of all clinically and pathologically confirmed oesophageal cancer patients who were diagnosed and treated in those hospitals from 2012 - 2017. A structured data extraction tool was used to collect important variables. Descriptive statistics such as median, interquartile range (IQR) and percentages were computed to describe the regional and national distribution of the disease.

Results Over the past six years, a total of 777 oesophageal cancer cases were identified and the median age of these patients was 55 years with IQR of 19. More than half 428 (55.1%) of the cases were males and majority of them were reported from Oromia and Somali regional states with 388 (49.9%) and 202 (25.9%) respectively. The highest number of oesophageal cancer cases were recorded in 2016 with a total number of 185 (23.8%) while the lowest 98 (12.6%) was in 2012. Eighty percent of oesophageal cancer cases were diagnosed at late stage of the disease. More than one-fourth 210 (27.0%) of patients were operated with the majority 156 (74.3%) to insert a feeding tube followed by trans-hiatal oesophagostomy 23 (10.9%). Of the 118 results analysed, squamous cell carcinoma and adeno carcinoma were the predominant histologic type with 67(56.7%), and 43(36.4%) respectively. One fourth 194 (25.0%) of the patients were alive and more than two third 557 (71.7%) patients' current status were unknown at the time of the review.

Conclusions In referral hospitals of Ethiopia, many oesophageal cancer patients came at late stage of the disease and needed palliative care measures. The number of patients seen in Oromia and Somali region hospitals by far exceeds hospitals of the other regions thus postulating possibly unique risk factors in those geographic areas.

Background

Oesophageal cancer is the leading cause of cancer related mortality due to its subtle disease course and poor prognosis [1]. According to GLOBOCAN 2018 report approximately 572,034 new cases and 508,585 deaths from oesophageal cancer were estimated worldwide [2]. Esophageal cancer incidence varies globally, with its highest across the "esophageal cancer belt" (Countries of the East and South Africa and Asia), [3,4]. The two main types of oesophageal cancers are squamous cell carcinoma and adenocarcinoma [5]. Squamous cell carcinoma is more common in Central, Eastern, and Southern parts of Africa; with the African oesophageal squamous cell carcinoma (ESCC) corridor stretching from the Southern part of Sudan to the Eastern Cape province of South Africa [6,7]. Ethiopia is one of oesophageal

cancer belt countries. A study in the largest referral hospital in Ethiopia indicated that, oesophageal cancer was more common among patients from Arsi and Bale areas as compared to other regions [6].

There is no final consensus on the list of risk factors for oesophageal cancer, but in many studies smoking and alcohol drinking showed a strong association with squamous cell carcinoma [8–12]. Exposure to silica, asbestos fiber, ionizing radiation, polycyclic aromatic hydrocarbon and pesticides were also observed to increase the risk [13–18]. In addition, the consumption of hot food and beverages was associated with an increased risk of ESCC [19–23].

Stage of cancer at diagnosis determines the disease prognosis. The overall oesophageal cancer survival rate is low because ESCC is often diagnosed late because the disease is asymptomatic at its early stage. In nearly 50% of the cases the lesions are metastasized at the time of diagnosis [24]. The delay at diagnosis is even more prominent in developing countries with a limited access to cancer care. At one of the referral hospitals in Ethiopia, oesophageal cancer operation rate was 56%, where only 24% were suitable for esophagectomy and the post-operative mortality was also considerably high at 28% [25]. Coupling early case identification with prompt treatment helps improve patient survival and quality of life.

Despite its high prevalence little is known about oesophageal cancer in Ethiopia. The existing few facility-based studies are inconclusive and don't give a clear account of the disease at a national level. This study aims to generate a national estimate of the magnitude of oesophageal cancer, describe the clinical presentation and identify the treatment outcomes in tertiary hospitals.

Methods

Study design and setting

The study team went to twelve selected hospitals all over Ethiopia and reviewed the registry books of these hospitals in order to identify oesophageal cancer cases over the past six years. Out of these hospitals, data were collected from ten referral hospitals which are located in seven regional states and one city administration; Amhara, Oromia, Southern Nations' Nationality People Region (SNNPR), Tigray, Afar, Harari, Somali and Dire Dawa. The largest referral hospital was selected for those regions which have more than one referral hospitals. From Oromia regional state, three hospitals by name, Aira general hospital, Goba referral hospital and Arsi University referral hospital were purposively selected since previous studies indicated that oesophageal cancer is common in those areas. Addis Ababa city administration was not included in this study because a similar study was conducted at Tikur Anbessa specialized hospital one year ago. Initially, it was also planned to include two general hospitals from Benishangul and Gambella regional states. However, it was not possible to find a single oesophageal cancer case either suspected or referred despite all the efforts exerted in reviewing the logbooks in collaboration with the matron nurse, Health Management Information System (HMIS) focal person and surgeons in the two hospitals. Therefore, no data was collected from these two sites and they were not

included in the analysis of the present study since the reason for non-documentation was not clear (lack of cases or un-documented cases).

Data sources and study population

Secondary data were collected from the aforementioned hospitals registry books and oesophageal cancer patients' cards from 2012 to 2017. The inclusion criteria were all clinically and pathologically confirmed oesophageal cancer cases that were diagnosed and treated in those selected hospitals during the study period. Suspected cancer cases were included in the study because majority of the hospitals do not have confirmatory diagnostic techniques for oesophageal cancer. Data was not extracted from oesophageal cancer patients' card with incomplete basic personal information such as age, sex, date of first diagnosis and type of treatment received during data collection.

Data collection tools and procedures

A structured data extraction tool was used to collect important variables like socio demographic factors (age, sex, marital status, level of education, religion, residence, occupation) clinical characteristics of patients such as date of diagnosis, chief complaint at first presentation, stage and histologic type of cancer, type of treatment provided, current status and last date of follow up. Health professionals who have first degree and work experiences in data collection were recruited for data collection and supervision. A day long training was given for these health professionals on the purpose of the study, content of the questionnaire and field procedures. In addition to this, supervisors were trained in data quality control procedures and fieldwork coordination. At the end of the training, each data collector conducted pre-tests in order to make him/herself familiar with the data extraction tool.

Data Management and Analysis

Various precaution measures were taken to ensure the quality of the data. Field supervisors and coordinators were checking the completeness and consistency of the collected data at the end of the day during the data collection phase. The data were entered and cleaned using Epi data version 3.2 and transferred to SPSS version 23.0 for analysis. Descriptive statistics such as proportions (percentages), measures of central tendency and measures of dispersion were computed to describe oesophageal cancer cases by person, place and time. All clinical characteristics of oesophageal cancer patients were presented in the form of frequency tables and figures. Ethical clearance was obtained from Institutional Review Board (IRB) of college of health sciences, Addis Ababa University.

Results

Socio-demographic characteristics

The median age of total 777 oesophageal cancer patients whose cards were reviewed was 55 years with IQR 19 years. More than half 428 (55.1%) of them were males, 342 (44.1%) were Muslims and 113 (14.5%) were Orthodox Christians. However, 305 (39.3%) patients' religion was not recorded. The patient card review showed that 137 (17.6%) were illiterate, 45 (8.4%) attained primary education, and 35 (4.5%) attained secondary education or above. Half 392 (50.5%) of the oesophageal cancer patients were married while more than one third (38.5%) of patients' marital status was not recorded. With respect to the occupational status of those patients, most 528 (68.0%) of the study participants occupational status were not recorded. However, 103(13.3%), 99 (12.7%) and 12 (1.2%) of the patients were housewives, farmer and factory workers respectively (Table 1).

Table 1 about here

Concerning the geographic distribution of oesophageal cancer cases, three fourth 590 (75.9%) of them were reported from Oromia and Somali regions with a total of 388 (49.9%) and 202 (25.9%) cases respectively. The remaining one fifth of cases were reported from SNNPR 64 (8.2%), Tigray 59 (7.6%) and Afar regions 34 (4.4%) (Figure 1).

Figure 1 about here

With regard to the magnitude of oesophageal cancer over the past six years, the highest oesophageal cases were reported in 2016 with a number of 185 (23.8%), followed by 161 (20.7%) cases in 2017, while the lowest was reported in 2012 with a total of 98 (12.6%) cases (Figure 2).

Figure 2 about here

Medical characteristics of oesophageal cancer patients

Of the total patients diagnosed and treated during the study period, 692 (90.6%) presented to the hospital with a chief complaint of difficulty of swallowing, followed by weight loss 374 (49%) and heartburn 233 (30%). In this study, only 98 (12.6%) of oesophageal cases had comorbid illness like 75 (76.5%) hypertension and diabetics mellitus 43 (43.3%) (Table 2).

Table 2 about here

Of the total number of patients included in this study, nearly two third 479 (61.6%) of patients' physical examination results were not recorded or not done at all. The reviewed patients' cards revealed that respiratory findings 124 (52.1%) and neck mass 92(38.6%) were the commonest findings in physical examination. Of various methods of diagnosis in place, more than one third 316 (40.7%) of oesophageal cancer patients were diagnosed using endoscopy. Out of the total number of patients who had endoscopic diagnosis for oesophageal cancer, 118 (37.3%) patients' histopathological results were obtained. Of the 118 results analysed for histopathological subtype, squamous cell carcinoma accounts 67(56.7%), followed by adeno carcinoma with 43(36.4%). Of the patients underwent endoscopy, two third

of the patients 209 (66.1%) site of mass was located. Of the site of mass located, oesophageal cancers were found in the middle thoracic in 98(31%), followed by lower thoracic with 75(23.7%) patients. From the total 123 patients whose cancer stage was recorded, 98(80%) of them were at the stage III and IV during their first presentation (Table 2).

Treatment pattern and outcome

The patient cards' review revealed that 210 (27.0%) patients had surgical treatment and the common type of surgery performed was feeding tube 156 (74.3%) followed by trans-hiatal oesophagostomy 23(10.9%) and thoracotomy/laparotomy 19 (9.0%). However, near to one third 246 (31.0%) of the patients' file did not describe whether they had surgery or not. Diaphragm 17 (2.2%), pericardium 9 (1.2%), pleura 8 (1%) were the most frequently reported adjacent structures based on the intra operative finding or imaging results of the patients' profile. However, it was found that most 718 (92.4%) of the patients' profile had no information related to adjacent site involvement.

Out of the 777 patients' chart reviewed, only 39 (5.0%) patients had received chemotherapy. However, most of the patients 557 (71.9%) had no information on the status of taking chemotherapy. The most provided regimen was cisplatin/5-FU 22(56.4 %) and cisplatin/paclitaxel 15 (38.4 %). Out of the patients in chemotherapy follow up, 20 (51.2%) had taken from cycle 2–5 treatment whereas 15 (38.5%) completed the 6 cycle of treatment. From all reviewed cases, 365 (47.0 %) had 2–5 times history of visit to the hospital and 260 (33.5%) of patients only visited once. We found that 194 (25.0%) of the patients were alive and 26 (3.3%) had died and more than two third 557 (71.7%) patients' current status was unknown at the time of the review (Table 3).

Table 3 about here

Discussion

A total of 777 oesophageal cancer patients' cards, diagnosed between 2012- 2017, were reviewed for this study. Out of the total number of patients' cards reviewed, fifty five percent of the patients were male, the mean age of the patients whose card was reviewed was 52.9 years, 90.6 % of oesophageal cancer cases patients came to the hospital with complaint of difficulty of swallowing, from the analysed histopathological findings 56.7% were squamous cell type of carcinoma, 50% of oesophageal cancer cases were reported from Oromia region and at the time of presentation 80% of patients were diagnosed at late stage.

In most cases oesophageal cancer is three to four times more common in male than females [25, 26]. A systematic review conducted in sub-Saharan African countries also showed that male predominance in oesophageal cancer cases with ratio of 2:1 [26]. A systematic review and a meta-analysis conducted in 36 African countries revealed that being male was a risk factor for oesophageal cancer cases (1.7; 95% CI: 1.4, 2.0) [27]. In opposite to these findings, a study conducted in Sudan showed that 1:1.8 male to

female ratio of oesophageal cancer cases [28]. In the present study male to female ratio is 1: 1.3 which was not as high as studies conducted in many developed countries and African countries. The difference could be in most countries the risk factor for oesophageal cancer is tobacco smoking and alcohol. While the prevalence of cigarette smoking and alcohol consumption were low among oesophageal cancer patients in Ethiopia with 5% and 2% respectively [29].

While most oesophageal cancer patients in Ethiopia were not smokers and alcohol users. Based on this study finding, the reason why still a high proportion of men were diagnosed for oesophageal cancer could be related to better health seeking behaviour of men compared to females.

This study indicated that the mean age of the study participants was 52.9 years. A systematic review in Sub Sahara Africa region indicated that the median age of the oesophageal cancer patients was 59 years [26]. Another study conducted in Ghana indicated the mean age of the oesophageal cancer patients was 57.8 years [30]. This finding can be explained by the fact that the chance of getting oesophageal cancer cases increase with age. However, generally the mean age of oesophageal cancer patients can vary from country to country as often the mean age highly depends on the underlying population structure.

In the present study, of the 118 results analysed for histopathological subtype, squamous cell carcinoma consists of 67 (56.7%). This finding is consistent with studies conducted in Kenya, North Sudan, Uganda which all showed a higher prevalence of ESCC as compared to Adenocarcinoma [31, 32]. A systematic review in Africa region showed that squamous cell sub type is the pre-dominant histology in Africa [27]. Generally, from the two common sub-types of oesophageal cancer, squamous cell carcinoma is the commonest worldwide and especially it is common among black men [33].

In this study almost 50% of oesophageal cancer cases were found from Oromia region in which for this study data were collected from Bale, Arsi and Wellega. Ethiopia is one of oesophageal cancer belt countries; Arsi and Bale are part of hot spot areas [6] which is similar to the study done at Tikur Anbessa hospital where most oesophageal cancer cases were higher among patients from Arsi and Bale areas as compared to other regions [34]. In Ethiopia most oesophageal cancer patients come from rural area mainly from South and Eastern part of Ethiopia. Most of the risk factors indicated for oesophageal cancer like smoking and alcohol were not present in most oesophageal cancer cases in Ethiopia [29]. This could indicate potentially preventable nutritional factors such as porridge and kocho as a cause. This could be the main reason why most cases are from the similar region and it needs a further study for the risk factors of the diseases in these places.

Of the patients who underwent endoscopy, the majority of patients 209 (66.1%) site of mass was located. Of the site of mass located, oesophageal cancers were found in the middle thoracic in 98 (31%) and this finding is similar with five years card review study at Tikur Anbessa Hospital where the middle lower part was the site for the mass in 49% of oesophageal cancer cases [31]. The approximate anatomical distribution of tumours within the oesophagus is <20% in the upper third, 30–70% in the middle third and 20–50% in the lower third [35–36]. The middle third of the oesophagus is the commonest site for squamous cell carcinoma and the lower third is the commonest site for adenocarcinoma [37–40]. In

contrary to this a study in Ghana showed that 84.9% of cases anatomical site for oesophageal cancer, the mass was found at the distal third part [31].

Of the total patients seen during the study period, 692 (90.6%) presented to the hospital with complaint of difficulty of swallowing, followed by weight loss 374 (49%). Studies in different part of Africa, including Ethiopia revealed that most patients come to health facility with difficulty of swallowing and weight loss [37–38]. The disease is asymptomatic at early stage and most patients seek health care after experiencing increase of clinical manifestation. This is also true for other type of cancers, especially in country where awareness and access to health facilities is low.

From the patient whose cancer stage was recorded, 98(80%) of the patients were at the stage 3 and 4 during their first-time presentation. This finding is similar with the study in Kenya where 70–80% of patients diagnosed at late stage [27]. This could be because most oesophageal cancer were asymptomatic at early stage and diagnosed at late stage when the outcome of the treatment is poor [33]. A review on data from the six continents indicated that more than 50% of oesophageal cancer patients come to the health facilities when they have metastatic disease [40]. In Ethiopia patients diagnosed at black lion hospital also revealed the same problem. A five-year review of the oesophageal cancer showed that 56% were operated and only 24% were suitable for esophagectomy; and the mortality after operation was 28% [34].

Strength And Limitation Of The Study

In Ethiopia there are few studies conducted on oesophageal cancer; most of the studies are based on one hospital data. This study was conducted at 10 hospitals which are found in 6 regions and one city administration of Ethiopia. The results from this study can give a better picture about the magnitude of oesophageal cancer in major hospitals in the country. One of the limitations of this study was the inclusion of suspected cancer cases because of unavailability of confirmatory diagnostic techniques in the majority of the hospitals included in this study.

Conclusion

Since most of oesophageal cancer cases were diagnosed at late stage of the disease, palliative treatment options such as oesophageal stent implantation is urgently needed. This applies especially for the regions where higher numbers of patients are received in the hospitals such as Oromia region. More public awareness could possibly lead to early detection with higher cure rates even though the disease has high fatality rates even in higher resource settings.

Recommendation

Further research is required to assess the risk factors for oesophageal cancer in Oromia region where the disease is more prevalent. A data recording system should be improved in all hospitals in Ethiopia.

Abbreviations

ESCC: Oesophageal Squamous Cell Carcinoma, HMIS: Health Management Information System, IQR: Interquartile Range, IRB: Institutional Review Board and SNNPR: Southern Nations' Nationality of People Region.

Declarations

Ethics approval and consent to participate: Ethical clearance of this study was obtained from the Research Ethics Committee of School of Public Health and Institutional Review Board of College of Health Science, Addis Ababa University.

Consent for publication: Not applicable

Availability of data and material: The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests: The authors declare that they have no competing interest

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Authors' contributions

All authors conceived and designed the study. AW, SH, MG, SG, RY, TD, BD, JD supervised the data collection. AW, MG, SG, WA performed the data analysis and interpretation of the findings. AW, SH, RY, SW drafted the manuscript. AA, MK, MA, AJ, EK actively involved in the data interpretation and critically reviewed the manuscript. All authors read and approve the final manuscript.

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References

1. Short MW, Burgers KG, Fry VT. Oesophageal Cancer. American Family Physician. 2017; 95 (1): 22-28
2. Global cancer statistics. GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. 2019. Visited July 07, 2019

<http://gco.iarc.fr/today/data/factsheets/cancers/6-Oesophagus-fact-sheet.pdf>

3. Denver H, Parker M. Oesophageal Cancer in Africa. IUBMB Life. 2002; 53: 263-268, 2002
4. International agency for research on Cancer (IARC). Biennial Report. 2012. visted July 14, 2019 <http://governance.iarc.fr/SC/SC50/Biennial%20Report%202012-2013.pdf>
5. Abbas G, Krasna M. Overview of esophageal cancer. Ann Cardiothorac Surg. 2017; 6 (2): 131-136
6. Hutt M, and Burkitt, D. Geographical distribution of cancer in East Africa: a new clinicopathological approach. Br. Med. J. 1965; 2:719-722.
7. Bane A, Ashenafi S, Kassa E, 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
8. Peng Q, Chen H, Huo J. Alcohol consumption and corresponding factors: A novel perspective on the risk factors of esophageal cancer. Oncol Lett. 2016; 11(5): 3231-3233
9. Yang X, Chen X, Zhuang M, Yuan Z, Nie S, Lu M et al. Smoking and alcohol drinking in relation to the risk of esophageal squamous cell carcinoma: A population-based case-control study in China. Sci Rep. 2017; 1724.
10. Tai S, Wu I, Wu D, Su H, Huang J, Tsai H, et al. Cigarette smoking and alcohol drinking and esophageal cancer risk in Taiwanese women. World J Gastroenterol 2010. 16(12): 1518-1521
11. Vioque J, Barber X, Bolumar F, Porta M, Santibanez M, Hera M, et al. Esophageal cancer risk by type of alcohol drinking and smoking: a case-control study in Spain. BMC Cancer. 2008; 8: 221
12. Freedman N, Abnet C, Leitzmann M, Mouw T, Subar A, Hollenbeck A. A Prospective Study of Tobacco, Alcohol, and the Risk of Esophageal and Gastric Cancer Subtypes. American Journal of Epidemiology. 2007; 165(12): 1424-1433
13. Berry G NM, Wagner JC. Mortality from all cancers of asbestos factory workers in east London 1933-1980. Occupational and Environmental Medicine. 2000;57(11):782-5.
14. Wernli KJ, Fitzgibbons ED, Ray RM, Gao DL, Li W, Seixas NS et al. Occupational risk factors for esophageal and stomach cancers among female textile workers in Shanghai, China. Am J Epidemiology 2006;163(8)
15. Fillmore CM, Petralia SA, Dosemeci M. Cancer mortality in women with probable exposure to silica: a death certificate study in 24 states of the U.S. Am J Ind Med 1999;36(1):122-8.

16. Pan G Takahashi K,, Feng Y, Liu L, Liu L, Zhang S, et al. Nested case-control study of esophageal cancer in relation to occupational exposure to silica and other dusts. *Am J Ind Med* 1999;35(3):272-80.
17. Bitz R. Radiation exposure and cancer mortality in uranium processing workers. . *Epidemiology* 1999;10(5): 531-8.
18. Roshandel G SS, Malekzadeh R, Dawsey SM . Polycyclic aromatic hydrocarbons and esophageal squamous cell carcinoma. *Arch Iran Med.* 2012;15(11):713 - 22.
19. Islami F, Boffetta P, Ren JS, PedoeimL, KhatibD. High-temperature beverages and foods and esophageal cancer risk-a systematic review. *Int J Cancer* 2009; 125: 491- 524.
20. Andrici J, Eslick GD. Hot food and beverage consumption and the risk of esophageal cancer: a meta-analysis. *Am J Prev Med*2015; 49: 952- 60.
21. Tran GD, Sun XD, Abnet CC, FanJ, DawseyS, Dong Z, et al. Prospective study of risk factors for esophageal and gastric cancers in the Linxian general population trial cohort in China. *Int J Cancer* 2005; 113: 456- 63.
22. Kinjo Y, Cui Y, Akiba S, Watanabe S,Yamaguchi N, Sobue T et al. Mortality risks of oesophageal cancer associated with hot tea, alcohol, tobacco and diet in Japan. *J Epidemiol*1998; 8: 235- 43
23. IslamiF. Poustchi H. Pourshams A. Khoshnia M. Gharavi A. Kamangar F. et al. A prospective study of tea drinking temperature and risk of esophageal squamous cell carcinoma.
- 24 Helena Kollarova, Lucie Machova, Dagmar Horakova, et al: Epidemiology of Esophageal Cancer. *Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub.* 2007, 151(1):17-28.
25. John R. Global Cancer Facts & Figures 4 th Edition-Special section,the obesity epidemic. *Am Cancer Soc.* 2018;76.
26. Kachala R. Systematic review: epidemiology of Oesophageal Cancer in SubSaharan Africa. *Malawi Med J.* 2011;22(3).
27. Middleton DRS, Bouaoun L, Hanisch R, Bray F, Dzamalala C, Chasimpha S, et al. Esophageal cancer male to female incidence ratios in Africa : A systematic review and meta-analysis of geographic , time and age trends. *Cancer Epidemiol [Internet].* 2018;53(November 2017):119-28. Available from: <https://doi.org/10.1016/j.canep.2018.01.020>

28. 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 J Cancer Prev.* 2015;16(15):6481-90.
29. Shewaye AB, Seme A. Risk factors associated with oesophagel malignancy among Ethiopian patients: A case control study. *East Cent. Afri.J.Surg.* 2016; 21(2): 33-39.
30. 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. *Pan Afr Med J.* 2012;13:1-7.
31. Alema ON, Iva B. Cancer of the esophagus: histopathological sub-types in northern Uganda, Department of Surgery, endoscopy unit and Histopathology, African Health sciences. 2014; (14): 1
32. Kirtika P, Johnston W., Simeon M. et al, Esophageal Cancer, the Topmost Cancer at MTRH in the Rift Valley, Kenya, and Its Potential Risk Factors, Hindawi Publishing Corporation *ISRN Oncology.*2013: 503249.
33. Zhang Y. Epidemiology of esophageal cancer. *World J Gastroenterol.* 2013;19(34):5598-
- 34.
35. Ali, T. Ersumo, O. Johnson, Oesophageal carcinoma in Tikur Anbessa Hospital, Addis Ababa, *East Afr. Med. J* 75 (1998) 590-593
36. McCormack VA, Menya D, Munishi MO, Dzamalala C, Gasmelseed N, Leon Roux M, et al. Informing etiologic research priorities for squamous cell esophageal cancer in Africa: A review of setting-specific exposures to known and putative risk factors. *Int J Cancer.* 2017;140(2):259-71.
36. Brown LM SC, Gridley G, et al. Dietary factors and the risk of squamous cell esophageal cancer among black and white men in the united states. *Cancer causes and control.* 1998;9:467-4.
37. Renehan AG, Tyson M, Egger M, Heller RF, Zwahlen M. Body-mass index and incidence of cancer: a systematic review and meta-analysis of prospective observational studies. *Lancet* 2008; 371: 569-578 [PMID: 18280327 DOI: 10.1016/S0140- 6736(08)60269-X].
38. Denver H, Parker M. Oesophageal Cancer in Africa, *IUBMB Life.* 2002; 53: 263-268
39. Mengesha B, Ergete W, Staple Ethiopian diet and cancer of the esophagus. *East Afr Med J.*2015;82(7): 353-6

40. Thomas w, Rice, Deepa T et al, 8th edition AJCC/UICC staging of cancers of esophagus and Esophago Gastric Junction: application to clinical practice, annals of cardiothoracic surgery. 2017: 2

Tables

Due to technical limitations, tables are only available as a download in the supplemental files section

Figures

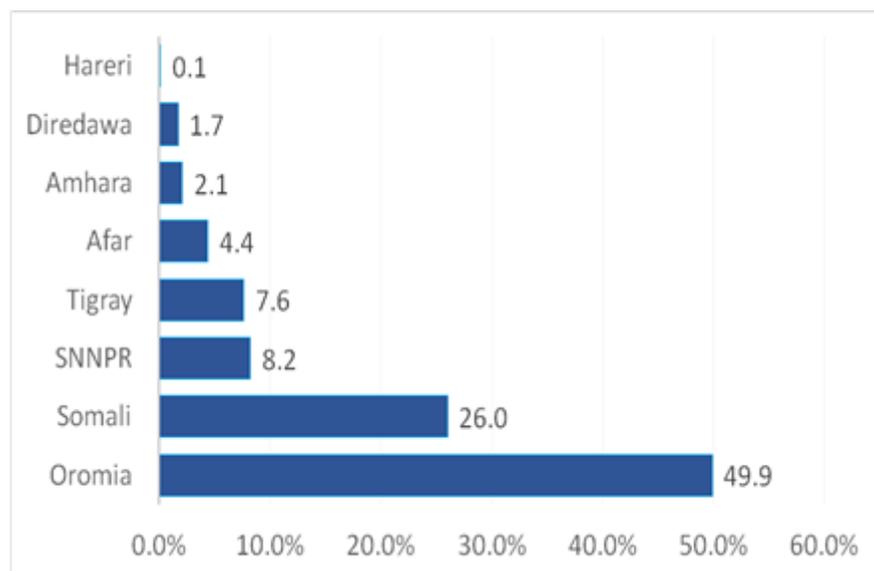


Figure 1

Distribution of Oesophageal cancer patients in different regions of Ethiopia, 2018

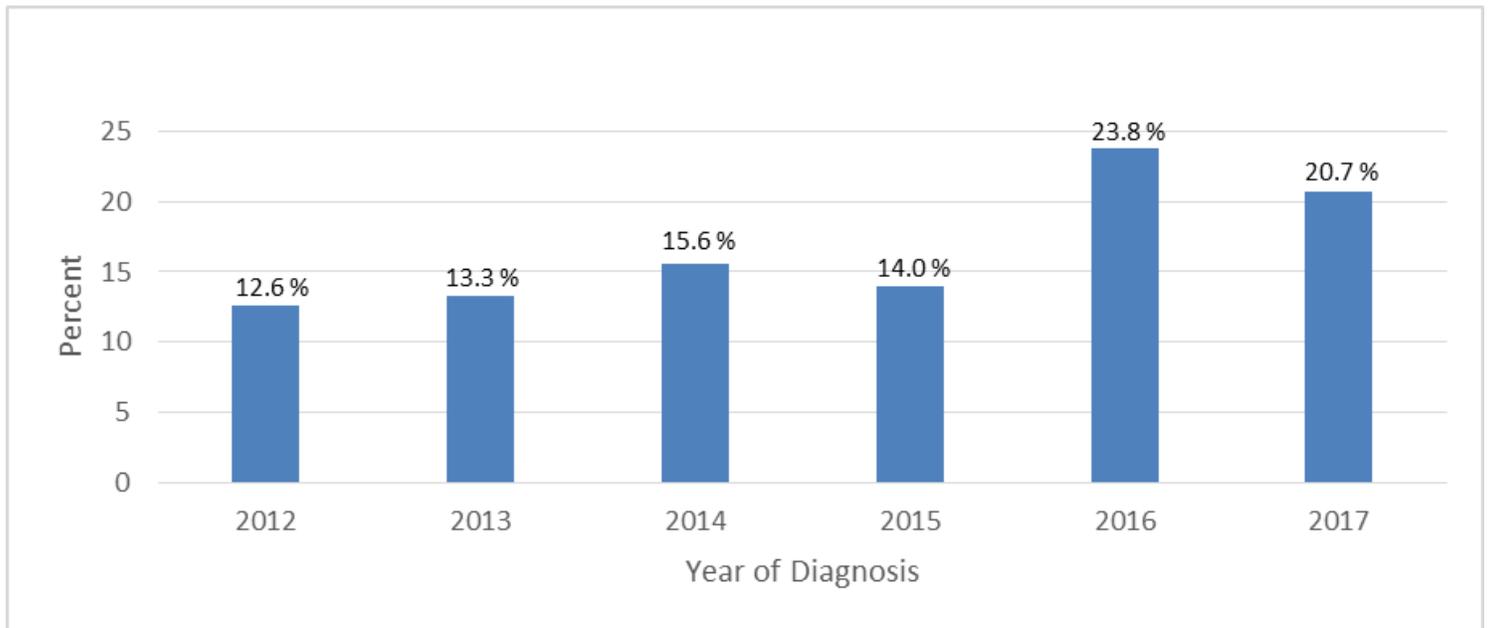


Figure 2

Oesophageal cancer cases in the past seven years (2012 - 2017) in Ethiopia, 2018

Supplementary Files

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