EUROPEAN ACADEMIC RESEARCH
Vol. V, Issue 8/ November 2017

Impact Factor: 3.4546 (UIF)
DRJI Value: 5.9 (B+)

ISSN 2286-4822
www.euacademic.org

Esophageal Carcinoma in Mogadishu, Somalia: A four year retrospective study

MOHAMED ABDULKADIR HASSAN-KADLE[1]
Abrar Research and Training Centre
Abrar University, Mogadishu, Somalia
Dufle Specialist Hospital, Mogadishu, Somalia
Peoples' Friendship University of Russia (RUDN University)
Moscow, Russia
AHMED MOHAMED MOALLIM MUSSE
Pathology Department, Liban Clinic, Mogadishu, Somalia

Abstract:

Background: *Esophageal carcinoma is one of the most serious cancers worldwide and the majority carcinoma of the esophagus cases occur in developing world. There is a marked variation in incidence, types, ethnicity, gender and outcome in various regions in the world. Esophageal carcinoma is the eighth most common cause of cancer death worldwide with its rapid development and fatal prognoses in most cases. Most of esophageal carcinoma types are either Squamous cell carcinoma or Adenocarcinoma. Squamous cell carcinoma is the main variant in developing countries whereas Adenocarcinoma appears more common in developed countries. Males predominate than females in worldwide. There is no previous study was conducted in Somalia according to the prevalence and incidence of esophageal carcinoma. Therefore the aim of this study was to document the characteristics of esophageal carcinoma with respect to the age and gender distribution and histopathologcial types in Mogadishu, Somalia. The study provides baseline local data for future studies.* ***Methods:*** *This retrospective study included all patients referred from*

[1] Corresponding author: Kadlesom@gmail.com

endoscopic unit of surrounding clinics and hospitals with endoscopic diagnosis of esophageal carcinoma between January 2013 and December 2016 to the department of pathology, Liban Clinic in Mogadishu, Somalia. Data were collected and analyzed from patients' case records included age, gender and histological reports of all histologically confirmed cases of esophageal carcinoma. ***Results:*** *A total of 1607 patients was admitted and referred to Liban Clinic during January 2013 to December 2016. 129 out of 1607 patients (8%) were diagnosed esophageal carcinoma. In this study was analyzed 127 cases out of 129 patients; Sixty nine out of 127 patients (54.3%) were females predominating males with their ratio male to female was 1:1.2. The commonest age group were fifth and sixth decades while the mean age of both sexes was 57 ± 15.479 (min 15 – max 90) with mean age of female being 58 ±15.441 (min 26 – mix 90) and male age 58 ±15.15.657 (min 15 – mix 84) with their youngest age was 15 and oldest age was 90 years. The most common Histopathological type of esophageal carcinoma in this study was Squamous cell carcinoma with 124 out of 127 (97.6%) (females 55.6%, male 44.3%) and 3 out of 127 (2.4%) were Adenocarcinoma (females 0%, male 100%). The peak incidence of Squamous cell carcinoma was found in the age group 41 - 80 years with 98 of 124 (79 %) while the minimum age group was below 40 years with18 of 124 (14.5%) and above 80 years with 8 of 124 (6.4%) for both sexes. The maximum number of patients with adenocaricoma age groups of 41 – 80 years for males.* ***Conclusion:*** *The Esophageal carcinoma in Mogadishu, Somalia had predominance of female gender then the men with ratio (male: female ratio =1:1.2). The most frequent type of esophageal carcinoma is Squamous cell carcinoma and more frequent in females then the men and it is followed by Adenocarcinoma which more frequent in males than the females in this study, so we needed more studies in this disease in terms of prevalence and incidence and to identify the local risk factors and the reason for apparent gander.*

Key words: Esophageal carcinoma, Histopathological Types, Female, Mogadishu, Somalia.

BACKGROUND

Esophageal carcinoma (EC) is one of the top ten cancers of worldwide; currently the EC is the eight cancer which most incident cancer in the worldwide due its extremely aggressive nature and poor rate of survival , it's a serious tumor with regard of prognosis and a fetal outcome in the majority of cases [1]. EC affects more than 442,300 new cases worldwide occurring every year and 406,800 deaths cases occurred in 2008 worldwide [2]. In the recent three decades, the prevalence of esophageal carcinoma has increased six times and its incidence is rapidly increasing between major cancers [3].

In epidemiological characteristic of esophageal carcinoma is various according the geographic distribution with high incidence found within sharply separated geographic limits with variation in ethnicity and gender [4], so the highest incidence area which higher risk area are called "Esophageal cancer belt" and extending from Northern Iran, Kazakhstan, southern Russia and Northern China, where yearly incidence rates can increased 200 per 100.000 [5]. South Africa is another area which is more for esophageal carcinoma especially among blacks[2,6]. While in USA world has much lower rate of esophageal carcinoma from 4 to 10 cases per 100,000[7]. According to the gender in the worldwide, it occurs three times more in male then female. However the male predominance is particularly tilted to the Adenocarcinoma form of the cancer. [8].

There are two main histopathological variants of esophageal carcinoma exists namely; the squamous cell carcinoma (SCC) and adenocarcinoma (ADC). The SCC of the esophagus arises from epithelium cells that undergo inflammatory, hyperplasic and dysplastic changes and occurs predominantly in the upper esophagus. SCC is being observed predominantly in developing world and it is associated factors are tobacco , infrequent intake of raw fruits and vegetables,

thermal irritations such as hot tea, salted hot beverages, malnutrition as well as diseases such as achalasia cardia and Pulmmer-vinson sysdrome[9]. Whereas adenocarcinoma arises from metaplastic intestinal types changes that replace the squmaus epithelium and it's frequently located the lower part of the esophagus. ADC is mostly found in developed world, which is mostly related to obesity, gastroesphageal reflux and Barrett's esophagus, but worldwide the Squamous cell carcinoma remains the most common histologic subtype of esophageal carcinoma [10].

The main symptom of EC is dysphagia which is frequently occurs with >60% of circumferential involvement [7] and for many patients presenting due to dysphagia necessarily late [7, 11] Adenocarcinoma dysphagia occurs late, the next symptom which is common after dysphagia is weight loss due to result of loss of ability to swallow.

There is little hospital which had Endoscopic unit that working foreign experts and there are no endoscopic experts in the county. Liban Clinic the main pathology clinic in the Somali capital which is referral the most cases of the lesions of esophagus for describing the diagnosis of the disease of the patient. In most of these patients is found in an advanced stages. There is no data that are pervious published about esophageal carcinoma that determined the prevalence and incidence of EC in Somali Republic, but there are two articles that are published in peer reviewed journals but it is not described the prevalence or the incidence of EC of the country, one study is a case report in younger age below 30 years old[12] and another is case series study [13] so this study was performed in order to document the age, gender distribution and histological types of esophageal carcinoma for last four years in Mogadishu, Somalia.

METHODS

This retrospective study included all patients referred from endoscopic unit of surrounding clinics and hospitals with endoscopic diagnosis of esophageal carcinoma between January 2013 and December 2016 to the department of pathology, Liban Clinic in Mogadishu, Somalia. Data collected from patients' case records included age, gender and histological reports of all histologically confirmed cases of esophageal carcinoma. The data were entered into statistical Package for Scientific solutions SPSS version 20 for windows and analyzed. The results were presented as frequency tables and charts. All patients with histological confirmed were enrolled in the study, except those records are incomplete such as age and gender.

RESULTS

A total of 1607 patients was admitted and referred to Liban Pathology Clinic between January 2013 and December 2016. Out of the total number of 129 (8%) patients were diagnosed esophageal cancer and we reviewed their demographics including age, gender and histological reports; after that we got some cases were missing their demographic characteristics and we could not be traced by patients, so in this study were analyzed 127 cases. The most common age group of esophageal cancer in this study was 51 – 60 years (27.6%) of total cases while the uncommon age groups were 11 – 20 years (1.6%) or 21 -30 years (4.7%) of age. The mean age of the patients was 57 years with median age was 59 years ± SD 15.479 (min 15 and max 90 years), the mean age of male was 57.83 ± SD 15.657 (min 15 – max 84 years) while in the mean age females was 57.55 ± SD 15.441(min 26 – max 90 years). The distributions of the age are shown in **Figure 1.** The male's age range with high frequency between 51 – 60 years while females' age range was similar to the male's age range and it was 51 – 60years. The

youngest patient was 15 years and the oldest patient was 90 years. The distributions of the male and female age range are shown in **Figure 2** and **Figure 3**. Of 127 cases results was analyzed, 69 (54.3%) were females and 58 (45.7%) were males. **Table 1** shows the distribution of gender. A male to female ratio was 1:1.2., so in this study there is a female predominance but when we compared the previous studies in our neighboring countries there is male predominance and in the rest of world literature as in **Table 4**.

The most common histopathological subtypes of esophageal carcinoma was Squamous cell carcinoma of esophagus with results 124 of 127 cases (97.6%) while in adenocarcinoma of the esophagus was 3 of 127 cases (2.4%). **Figure 4** shows the distribution of histopathological types. Squamous cell carcinoma is more frequent in females 69/124 (55.6%), while adenocarcinoma is more frequently seen in males 3/3 (100%) as in **Table 2**.

The highest incidence of Squamous cell carcinoma 98 of 124 (79%) was found in the age groups of 41 – 80 years for either gender while the minimum number 18 of 124 (14.5%) was seen below the age of 40 years and 8 of 124 (6.4%) was seen above the age of 80 years. For adenocarcinoma 2 of 3(66.6%) was seen in the age group of 41 – 80 year while a minimum number of patients 1 of 3 (33.3%) at age group above 80 years old for male gender and the age group below 40 years was not seen 0 of 3 (0%) as in **Table3**.

DISCUSSION

There is no an exactly reports deals about the aspects of esophageal carcinoma prevalence , incidence and even demographic characteristics in the Somali Republic that are published yet in peer reviewed journals; only two reports that are published in journal; one is case report and another is case series . This is the first study of its type in Somalia that

evaluating esophageal carcinoma and it deals with large number of esophageal carcinoma and it demonstrate some light on the frequencies of demographic characteristics including gender and age and its relation to Histopathological types. The total number of esophageal carcinoma of this study was 127 cases that confirmed by histological.

We found that the common age group affected by esophageal carcinoma is between 51 to 60 years, this similar results of other countries (51 -59, 40 -59, 41- 50 and 50 -59) Kenya, Uganda, Tanzania and Ghana respectively [14, 15, 7, 16]. In a systematic review of esophageal carcinoma in Sub-Saharan Africa, the disease was common among the age group of 45 - 65 years in both sexes [8]. While In USA and Western countries was slightly be at variance from developing countries; because they reported the peak incidence of esophageal carcinoma at seventh to ninth decade of life while in developing countries was at fourth, fifth and Sixth decade of life and this disparity between developed and developing world is attributed to the level of education, socioeconomic and culture [17]. The mean age of our patients was 57.83 years as we compared other Africa and Arab studies showed was similar to our mean age and it is Kenya 58.69, Uganda 55.5, Ghana 60.1and Niger Delta 60.1 years [14,15,16,18] while in Arab studies showed Sudan 58.7 and Yemen 62 years [18,20].

In our study showed a female predominance with ratio of female to male was 1.2:1. However, female predominance was reported in some studies published in Sudan and Thailand [19, 20, 21]; while another study from Nigeria and Uzbekistan was showed that esophageal carcinoma affected both sexes equally [22, 25]. Although in our neighboring countries in Africa and Arab was different in our study and reported a male predominance such Kenya [14], Uganda [15], Tanzania [7], Ethiopia [24], Niger Delta [18], Ghana [16] and Yemen [17] as we shown in **Table 4** and even in high risk countries for esophageal carcinoma was different in our study including 1.4:1

in Linxian , People's Republic of China [25], 0.85:1 in the Gonbad region of Iran [26] and in lower risk regions for esophageal carcinoma such as 3.0:1 in Lithuania [27], 4.6:1 in the European Union [28] and 2.4:1 among USA whites [29] as we shown **Table 4**. Before we described the predominance of female in our study we would like to discuss the factors that related to esophageal carcinoma and female predominance in such studies described; in Sweden there is a study described a link between pernicious anemia and increased risk of esophageal carcinoma, although the pernicious anemia was a risk factor for stomach cancer, so Swedish study reported a significant excess risk of esophageal carcinoma in the pernicious anemia[30]. In Somalia there is no any available research that was done in pernicious anemia, but there is high prevalence of anemia reported among reproductive age, non-pregnant women, and pregnant women with results of 42.6%, 42.3% and 45.5% respectively in Somalia [31]. Iron deficiency it also plays a role in the occurrence of esophageal carcinoma in Somalia, because it effects in women of reproductive age through volume blood loss during menstrual cycle and through repeated pregnancies (average fertility rates in Somalia are 6.67 births per woman). Other probable risk factor is the smoke produced by the burning of charcoal which is used for cooking food usually done in enclosed space but it is unknown if this inhalation of the smoke from charcoal has any role a cancer causing agent. Indoor air pollution from charcoal burning is a known human carcinogen [32]. Although a study that was done in China and India reported that indoor air pollution from charcoal burning is a risk factor for esophageal and hypopharygeal carcinoma [33,34], so it may suggest that the long term of indoor smoke exposure created from cooking with charcoal may be a risk factor for esophageal carcinoma among Somali females. This is behavioral related among Somalis of which the females are known for working in Kitchen for cooking and preparing food and are more exclusively involved in indoor

activates than their gender counterparts. The other reason of female predominance in our study; for our knowledge there are sex differences in healthcare-seeking behavior in Somalia and that is in our society there is priority of females rather than men in terms of healthcare-seeking, so in our study more females were visited to the hospitals in the country.

The most common histopathological subtypes of esophageal carcinoma in our study was Squamous cell carcinoma 124 patients (97.6%) as we compared the other type of esophageal carcinoma; which was only 3 patients (2.4%). This percentage is similar to other studies that was done in Kenya, Uganda, Tanzania, Sudan, and Pakistan where over 90% patients was diagnosed with esophageal carcinoma had squamous cells carcinoma while in adenocarcinoma of these countries was similar or close to our study results of 7.5%, 7.1%, 4%, 9%, 7.5% respectively [14,15,16,20,36]. In Iran which is considered in high risk area of esophageal carcinoma were revealed 67% of squamous cell carcinoma and 22% of adenocarcinoma[36]. In Western countries such as USA reports showed frequency of adenocarcinoma 81% and in low frequency in Squamous cell carcinoma which results of 17% [37]. So the variation of frequency between the Histopathological types of esophageal carcinoma in present study and different international studies was clear and well observed. We could explained in many ways such as the diagnostic approaches, lifestyle, geographical and risk factor differences; according to the Western countries, nearly 90% of most risk factors are smoking (Tobacco) and alcohol consumption [38] but in our country smoking cigarette was rare or not widely used by men and women but in men was mostly used smoking/chewing tobacco in Somalia while the alcohol consumption in an prohibited in the Muslim society due to their religion. However, Somalis people were commonly used of drinking hot beverages; particularly tea and coffee and its usually they added another hot substance called ginger, which irritate the mucosa of the

esophagus (chronic esophagitis) especially when consumed in large amounts and drinking tea with high temperatures has been related with increased risk of esophageal carcinoma in high risk areas in Iran[9] Unfortunately, it's difficult to obtain available data for smoking/tobacco use and drinking hot beverages (tea and coffee) in Somalia and its relation of esophageal carcinoma. Other probable risk factor which so different in rest of the world in our country and some other counties in the world especially in East Africa and Western Asia is Qat plant (Catha edulis) are commonly chewed in most of the Somali people especially by men and it contains tannins that thicken the mucosa of the oropharynx and esophagus and may be carcinogenic factor [39] Pakistan studies reported smoking, chewing paan and inhaling snuff (tobacco powder) are high risk factors among esophageal carcinoma patients[40, 41], so in our people was similar to the high incidence countries which they have lifestyles and habits. In terms of the adenocarcinoma which is very low in this study may be attributed the cause of the esophageal adenocarcinoma which is complication of gastro-esophageal reflux disease, Barrett's esophagus and obesity which are not common in the study population as we compared to the Western population [15].

In this study; there is high incidence of Squamous cell carcinoma among Somali women patients which is 55.6%, as we compared the other studies in the literature from Yemen , Sudan and Turkey showed a higher rate 66.9% 86.2 and 61.8% among female's patients respectively, although adenocarcinoma was showed low rate in this study which is 0% for women and 100% for male population as we comparing the other counties such as Yemen and Sudan showed with results of 30% and 33% among females respectively , while in males of these countries was showed Yemen 66% and Sudan 66.7% [18,21, 42]. The explanation of this variation are not understood , but there are some risk factors plays a role the incidence of frequency of Squamous cell carcinoma among females and it may be

explained these factors was different such as long standing iron deficiency anemia with Plummer Vinson Syndrome, malnutrition and the low of socioeconomic status [43].

The main limitations of our study was a retrospective study and incomplete information of demographic data from the records such as gender , and age missing and this data have been obtained from one private hospital which is most referral hospital for species of the biopsies from other hospitals of the country, and even we didn't obtained any explanation for staging of this cancer, clinical manifestations , location of the cancer and the residency of patients of the country , all these issues are limited to our study to describe more information about this cancer . This report will be a baseline for other studies of the future in the country and it served as the knowledge of esophageal carcinoma in Somalia and the other important information that revels of this study is to establishing a national cancer registry in Somalia. So the question is what are the future studies focusing in this disease? Is the to find the local risk factors and its relation to esophageal carcinoma in the country such as Qat, Charcoal , and other risk factors of the world.

CONCLUSION

Esophageal carcinoma in Somalia was more predominant for females than males, the reasons of affecting more females were unknown, so we must to address the report exposure to establish risk factors that are less in male population and so we believe to do researches about these risk factors that are less in male but are more in female population such as charcoal and other risk factors. Squamous cell carcinoma is the commonest Histopathological type in this study and it affecting more in females than males while in adenocarcinoma are more frequent in males than females.

What is known about this topic

- That the commonest gender of esophageal carcinoma was male in East Africa, Africa and rest of the world
- The commonest Histopathological type was Squamous cell Carcinoma in developing countries followed by Adenocarcinoma. The commonest age group in developing countries was fifth and sixth.
- The is no study done in the country about esophageal carcinoma including prevalence, incidence and any characteristics such as demographic data (age and gender) and histopathological types in Somalia.

What this study adds

- The most common gender in this study was Female
- The most common Histopathological types in this study was Squamous cell carcinoma with followed by Adenocarcinoma. The most common age group in this study was fifth and sixth
- Now we had a baseline date for esophageal carcinoma in this study such as demographic data (age and gender) and Histopathological types in Somalia and the region.

Acknowledgments

We wish to acknowledge the Department of Pathology, Liban Clinic for permission to carry out this work. We thank to Abrar Research and Training Centre, Abrar University for their financial support to publish this manuscript. We thank our father and brothers for their encouragement especially Dr. Ahmed Abdulkadir H. Kadle.

Competing interests

The authors declare no competing interests.

Authors' contributions

Conceptualization and design of study: Mohamed Abdulkadir Hassan-Kadle, Ahmed Mohamed Moallim Musse Data acquisition and analysis: Mohamed Abdulkadir Hassan-Kadle

Drafting of article: Mohamed Abdulkadir Hassan-Kadle. Critical Revision: Ahmed Mohamed Moallim Musse All the authors have read and approved the final version of the manuscript.

Tables and figures

Table 1: Distribution of esophageal carcinoma according to Gender

Table 2: Frequency of Histopathological types of esophageal carcinoma according to Gender

Table 3: Frequency distribution of Histopathological types of esophageal carcinoma according to Age

Table 4: Comparison of gender ratio between present study and other studies in the world

Figure 1: Distribution of esophageal carcinoma according to Age groups

Figure 2: Male Age range

Figure 3: Female Age range

Figure 4: Distribution of esophageal carcinoma according to Histopathological types

REFERENCES

1. Zhang Y. Epidemiology of esophageal cancer. World J Gastroenterol 2013; 19(34): 5598-5606.
2. Jemal A, Bray F, Center MM, Ferlay J, Ward E, Forman D. Global cancer statistics. CA: a cancer journal for clinicians. 2011 Mar 1;61(2):69-90..
3. Melhado RE, Alderson D, Tucker O. The changing face of esophageal cancer. Cancers. 2010 Jun 28; 2(3):1379-404.
4. Ahmed N, Cook PA. The incidence of cancer of the oesophagus in West Kenya. British journal of cancer. 1969 Jun; 23(2):302.

5. Zhang ZX, Li BY, Jin SS. Epidemiologic trends of esophageal cancer in Linxian. Shi Guan Ai Fang Zhi Yan Jiu Linxian. 1990; (1):1-4.
6. Mannell A, Murray WY, DIPRAD DN. Oesophageal cancer in South Africa. Cancer. 1989; (64):2604-8.
7. Mchembe MD, Rambau PF, Chalya PL, Jaka H, Koy M, Mahalu W. Endoscopic and clinicopathological patterns of esophageal cancer in Tanzania: experiences from two tertiary health institutions. World journal of surgical oncology. 2013 Oct 4;11(1):257.
8. Kachala R. Systematic review: Epidemiology of oesophageal cancer in Sub-Saharan Africa. Malawi Medical Journal. 2010;22(3):65–70.
9. Islami F, Boffetta P, Ren JS, Pedoeim L, Khatib D, Kamangar F. High-temperature beverages and foods and esophageal cancer risk—A systematic review. International journal of cancer. 2009 Aug 1;125(3):491-524.
10. Vizcaino AP, Moreno V, Lambert R, Parkin DM. Time trends incidence of both major histologic types of esophageal carcinomas in selected countries, 1973–1995. International journal of cancer. 2002 Jun 20;99(6):860-8.
11. Napier KJ, Scheerer M, Misra S. Esophageal cancer: A Review of epidemiology, pathogenesis, staging workup and treatment modalities. World J Gastrointest Oncol. 2014 May 15;6(5):112-20.
12. Kadle MA, Dufle OM. Oesophageal Carcinoma in a Young Adult Somali Patient: A Case Report with Brief Literature Review. Case Reports in Clinical Medicine. 2015 Jun 4;4(06):241.
13. Hassan MY, Elmi AM, Baldan M. Experience of thoracic surgery performed under difficult conditions in Somalia. East and Central African Journal of Surgery. 2004;9(1).

14. 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.
15. Alema ON, Iva B. Cancer of the esophagus; histopathological sub-types in northern Uganda. African health sciences. 2014;14(1):17-21.
16. Tettey M, Edwin F, Aniteye E, Sereboe L, Tamatey M, Ofosu-Appiah E, Adzamli I. The changing epidemiology of esophageal cancer in sub-Saharan Africa–the case of Ghana. Pan African Medical Journal. 2012;13(1).
17. Al-Samawi AS, Aulaqi SM. Esophageal cancer in Yemen. Journal of the College of Physicians and Surgeons Pakistan. 2014 Mar 1;24(3):182-5.
18. Okugbo, S. U., and R. A. Ugiagbe. Histologically Confirmed Carcinoma of the Oesophagus; Study from the Niger Delta. BJMMR, 16(12): 1-7, 2016; Article no.BJMMR.27638
19. Gasmelseed N, Abudris D, Elhaj A, Eltayeb EA, Elmadani A, Elhassan MM, Mohammed K, Elgaili EM, Elbalal M, Schuz J, Leon ME. 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. 2015;16(15):6481-90.
20. Mohammed ME, Abuidris DO, Elgaili EM, Gasmelseed N. Predominance of females with oesophageal cancer in Gezira, Central Sudan. Arab Journal of Gastroenterology. 2012 Dec 31;13(4):174-7.
21. Chanvitan A, Ubolcholket S, Chuprapawan C. Surveillance of oesophageal carcinoma in southern Thailand in 1988. Journal of the Medical Association of Thailand= Chotmaihet thangphaet. 1991 Jan;74(1):8-13.
22. Pindiga HU, Akang EE, Thomas JO, Aghadiuno PU. Carcinoma of the oesophagus in Ibadan. East African medical journal. 1997 May;74(5):307-10.

23. Zaridze DG, Basieva T, Kabulov M, Day NE, Duffy SW. Oesophageal cancer in the Republic of Karakalpakstan. International journal of epidemiology. 1992 Aug 1;21(4):643-8.
24. Bane A, Ashenafi S, Kassa E. Pattern of upper gastrointestinal tumors at Tikur Anbessa Teaching Hospital in Addis Ababa, Ethiopia: a ten-year review. Ethiopian medical journal. 2009 Jan;47(1):33-8.
25. Yu Y, Taylor PR, Li JY, Dawsey SM, Wang GQ, Guo WD, Wang W, Liu BQ, Blot WJ, Shen Q, Li B. Retrospective cohort study of risk-factors for esophageal cancer in Linxian, People's Republic of China. Cancer Causes and Control. 1993 May 1;4(3):195-202.
26. Mahboubi EO, Aramesh B. Epidemiology of esophageal cancer in Iran, with special reference to nutritional and cultural aspects. Preventive medicine. 1980 Sep 1;9(5):613-21.
27. Kolicheva NI. Epidemiology of esophageal cancer in the USSR. In: Levin DL, editor. Cancer Epidemiology in the USA and USSR. Bethesda: NIH Publication, 1980: 191-198
28. Cancer incidence in Five Continents Vol, VII, Parkin, DM, Whelan, SL, Ferlay, J Raymond L, Young J. editors. Lyon:1997
29. Daly JM, Fry WA, Little AG, Winchester DP, McKee RF, Stewart AK, Fremgen AM. Esophageal cancer: results of an American College of Surgeons patient care evaluation study. Journal of the American College of Surgeons. 2000 May 1;190(5):562-72.
30. Ye W, Nyren O. Risk of cancers of the oesophagus and stomach by histology or subsite in patients hospitalised for pernicious anaemia. Gut. 2003 Jul 1;52(7):938-41.
31. Stevens GA, Finucane MM, De-Regil LM, Paciorek CJ, Flaxman SR, Branca F, Peña-Rosas JP, Bhutta ZA, Ezzati M, Nutrition Impact Model Study Group. Global,

regional, and national trends in haemoglobin concentration and prevalence of total and severe anaemia in children and pregnant and non-pregnant women for 1995–2011: a systematic analysis of population-representative data. The Lancet Global Health. 2013 Jul 31;1(1):e16-25. http://www.indexmundi.com/facts/somalia/prevalence-of-anemia

32. Monographs on the evaluation of the carcinogenic risk of chemicals to humans," in Indoor Air Pollution from Heating and Cooking: Some Solid Fuels and Cooking Oil Fumes 95, vol. 95, IARC Press, Lyon, France, 2006.
33. Pan G, Takahashi K, Feng Y, Liu L, Liu T, Zhang S, Liu N, Okubo T, Goldsmith DF. Nested case-control study of esophageal cancer in relation to occupational exposure to silica and other dusts. American journal of industrial medicine. 1999 Mar 1;35(3):272-80.
34. Sapkota A, Gajalakshmi V, Jetly DH, Roychowdhury S, Dikshit RP, Brennan P, Hashibe M, Boffetta P. Indoor air pollution from solid fuels and risk of hypopharyngeal/laryngeal and lung cancers: a multicentric case–control study from India. International journal of epidemiology. 2008 Apr 1;37(2):321-8.
35. Ali A, Naseem M, Khan TM. Esophageal cancer in Northern areas of Pakistan. J. Ayub Med Coll Abbottabad. 2009;21(2):148-50.
36. Froutan H, Keshmiri MS, Shafaghi A. Aclinicopathological survey of esophageal cancer in patients referred to a gastroenterology clinic in Tehran, 1991-2005. Medical Journal of The Islamic Republic of Iran (MJIRI). 2008 Feb 15;21(4):173-6.
37. Schlansky B, Dimarino AJ, Loren D, Infantolino A, Kowalski T, Cohen S. A survey of oesophageal cancer:

pathology, stage and clinical presentation. Alimentary pharmacology & therapeutics. 2006 Mar 1;23(5):587-93.

38. Tavassoli FA, Devilee P, editors. WHO classification of tumors. Pathology and genetics, tumors of the digestive system. Lyon: IARC Press; 2003.
39. Balint EE, Falkay G, Balint GA. Khat–a controversial plant. Wiener Klinische Wochenschrift. 2009 Oct 1;121(19):604-14.
40. Jamal S, Ahmad M, Khan AH, Mushtaq S. Carcinoma esophagus-a clinicopathological study of 50 cases at Armed Forces Institute of Pathology, Rawalpindi. Pak J Patho. 1997;(8):24-8.
41. Afridi SP, Khan A, Waheed I. High risk factors in patient with carcinoma esophagus. J Coll Physicians Surg Pak 2000;10(10):368-70.
42. Ilhan M, Ozer N, Dulger C, Mete R, Onbasi K, Bayram I. A descriptive study on 213 esophagus carcinoma cases in Van region-Turkey. Semin Oncol 2001; 28:153-7.
43. Sadjadi A, Marjani H, Semnani S, Nasseri-Moghaddam S. Esophageal cancer in Iran: A review. Middle East Journal of Cancer. 2010 Jan 1;1(1):5-14.

Table1: Distribution of esophageal carcinoma according to Gender		
Gender	**Frequency**	**Percent**
Male	58	45.7%
Female	69	54.3%
Total	127	100.0%

Table 2: Frequency of Histopathological types of esophageal carcinoma according to Gender				
Histopathological Types	**Gender**		**Total**	**Percent**
	Male	Female		
Squamous cell carcinoma (SCC)	55	69	**124**	97.6%
Adenocarcinoma (ADC)	3	0	**3**	2.4%
Total	**58**	**69**	**127**	100.0%

Table 3: Frequency distribution of Histopathological types of esophageal carcinoma according to Age									
Histopathological Types	**Age**								**Total**
	11 - 20	**21 - 30**	**31 - 40**	**41 - 50**	**51 - 60**	**61 - 70**	**71 - 80**	**81 - 90**	
Squamous cell carcinoma (SCC)	2	6	10	25	34	23	16	8	124
Adenocarcinoma (ADC)	0	0	0	1	1	0	0	1	3

Table 4 Comparison of gender ratio between present study and other studies in the world		
Country	**Male: Female**	**Author/ Reference**
This study	**1:1.2**	
Two studies in Sudan	1:1.8, 1:3.3	Nagla Gasmelseed,et.al [20], Moawia Elbalal Mohammed et.al [21]
Thailand	1:3.7	Chanvitan, A. et.al [22]
Kenya	1.5:1	Johnston Wakhisi, et.al[14]
Uganda	3:1	Alema ON, et.al [15]
Tanzania	2.2:1	Mabula D Mchembe, et.al[7]
Ethiopia	1.5:1	Bane A, et.al [25]
Niger Delta	2.2:1	S. U. Okugbo et. al [19]
Ghana	4:1	Mark Tettey, et.al [16]
Yemen	1.1:1	Al-Samawi , et.al [18]
Lithonia	3.0:1	Kolicheva NI. [28]
USA	3:1	Daly JM, et.al [30]
China	1.4:1	Yu Y , et.al [26]

Figure 1: Distribution of esophageal carcinoma according to Age groups

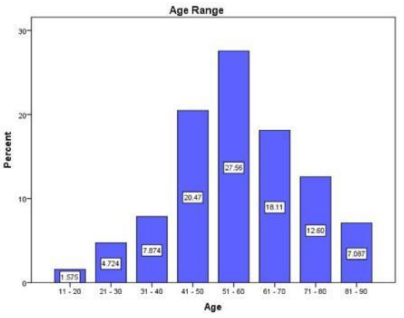

Figure 2: Age range of the Gender: A) Male

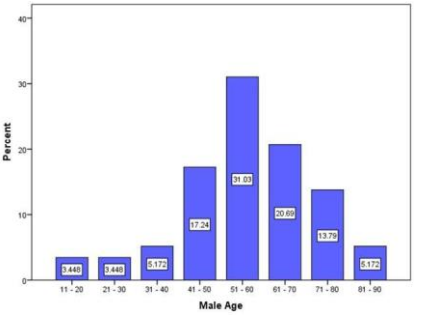

Figure 3: Female Age range

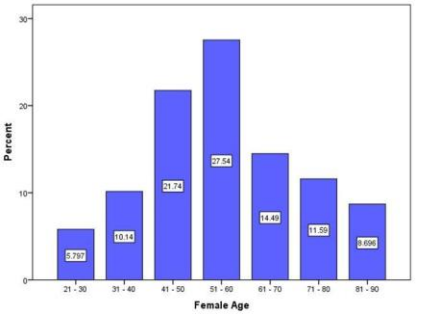

Figure 4: Distribution of esophageal carcinoma according to Histopathological types