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Original Article

Frequency of cancer distribution in Somalia: A four-year retrospective epidemiological study

Abdifetah Ibrahim Omar[1, 2]

[1] *Faculty of Medicine and Health Sciences, Jamhuriya University of Science and Technology, Mogadishu, Somalia*
[2] *Advance Medical Research, Jamhuriya Research Center, Jamhuriya University of Science and Technology, Mogadishu, Somalia*

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Abstract

Background: Cancer ranks the leading cause of morbidity and mortality worldwide, with approximately 19.3 million new cases and 10 million deaths. The most common causes of cancer death were cancers of the lung (1.69 million deaths), liver (788,000 deaths), colorectal (774,000 deaths), stomach (754,000 deaths), and breast (571 000 deaths). Cancer rates in Somalia are under-reported, national population-based cancer registry in the country is missing to conduct a nationwide prevalence study. The study aimed to estimate the prevalence of cancer and determine the most common organ affected and the existence of Benign or Metastasis among cancer patients.

Methods: The study undertook a retrospective cross-sectional design using a quantitative approach. Secondary data from patient records between January 2014 to November 2017, clinically diagnosed with cancer and referred from other hospitals to Kamil diagnostic center for radiological analysis were selected for this study in Mogadishu, Somalia.

Results: 583 registered cancer patients, 60.2% (351) were reported in men and 39.8% (232) in women. The primary cancer types were hepatocellular carcinoma (HCC) which was diagnosed among 151 (26%) patients, of which 124 (82%) were male, and 27(18%) were female. HCC followed by esophageal carcinoma (EC), which was diagnosed among 97 (17%) patients, of which 50 (52%) were female, in comparison to 47 (48%) were male, followed by renal cell carcinoma (RCC), which was diagnosed among 56 (10%) patients of which 31 (55.4%) were male while 25 (44.6%) were female. Lymphoma was diagnosed in 40 (7%) patients, of which 20 (50%) were male, and 20 (50%) were female. It was also established that metastatic cancer was found among 152 (26%) patients, which is little compared to 431 (73.9%) patients whose cancer was not metastatic. The major organs of metastatic were lymph node 48 (8.2%), pulmonary and hepatic with lymph node each 22 (3.8%), and bones 20 (3.4%).

Conclusion: The study reveals an increasing trend of cancer prevalence in Somalia. HCC was found to be the major type, followed by EC. The study recommends that people take timely screening and diagnosis of cancer to stand higher chances of preventing and surviving cancer death. Healthy lifestyles such as a healthy diet, avoiding tobacco, alcohol, risky behaviors, maintaining a healthy weight, vaccination (HBV and HPV), and public health efforts could stem this trend.

Keywords: Distribution, Cancer, Metastatic, Organ of metastatic, Somalia.

Introduction

Cancer statistics showed that cancer is the leading cause of morbidity and mortality worldwide, with an estimated 19.3 million new cases around the globe and 10 million deaths. (1) Cancer is a group of diseases characterized by the uncontrolled growth and spread of abnormal cells. If the spread is not controlled, cancer can result in death; hence the need for an early diagnosis becomes inevitable at this time. (2)

Between 2005 and 2015, cancer cases increased by 33 percent, primarily due to population aging. The odds of developing cancer during a lifetime were 1 in 3 for men and 1 in 4 for women. (3) Prostate cancer was the most common cancer globally in men (1.6 million cases); tracheal, bronchus, and lung (TBL) cancer was the leading cause of cancer deaths for men. Female breast cancer was the most common cancer for women (2.4 million cases), the leading cause of cancer deaths in women, and surpassed lung cancer as the most commonly diagnosed cancer worldwide. (1, 3)

In Sub-Saharan Africa (SSA), cancer is emerging as a significant public health problem because of population aging and the increased prevalence of key risk factors, including those associated with low

Address for correspondence: Abdifetah Ibrahim Omar, Faculty of medicine and Health Sciences, Jamhuriya University of Science and Technology, Mogadishu, Somalia. Email: abdifatah@just.edu.so

socioeconomic status. A high residual burden of infectious agents (HIV/ AIDS, human papillomavirus, hepatitis B virus) in certain SSA countries still drives the rates of certain cancers high. (4, 5) About one-third of all cancers in the region are estimated to be infection-related. In females, the numbers of cases and rates of breast and cervical cancer are almost equal and comprise 50% of the overall cancer burden in SSA. (3, 4) In males, cancer of the prostate dominates in terms of the number of cases (51,900 cases, 27.9% of the total estimated cases in the region), followed by liver cancer (10.6%) and Kaposi sarcoma (6.6%). (1)

In East Africa, Kenya, Uganda, and Ethiopia face a high prevalence of cancer incidences. For example, in Kenya, cancer is the third highest cause of morbidity, causing 7% of deaths per year, after infectious diseases and cardiovascular diseases. About 47,887 estimated new cancer cases are found each year in Kenya, with more than 32,987 deaths per year. (6) About 60% of Kenyans affected by cancer are younger than 70 years old. The leading cancers are breast cancer for women (34 per 100,000), Cervical (25 per 100,000), prostate cancer for men (17 per 100,000), and Esophageal (9 per 100,000). (7, 8) In Uganda, cancer prevalence is one of the highest in East Africa, with about 300 cases reported in every 1,000 people. Prostate and cervical cancers are the leading causes of death. (1, 9) In Ethiopia, cancer accounts for 6% of total national deaths, with about 60,960 new cases and 44,000 deaths per year. Ethiopia represents the highest prevalence of any other country in East Africa. (10)

In Somalia, cancer is becoming a major disease that risks the lives of people to death. A high incidence of viral hepatitis induced liver cancer and esophageal cancer associated with significant strong environmental risk factors and nutritional habits strongly impacts this population. (11-13) Estimated 403 and 1306 esophageal cancer cases were diagnosed between 2016-2017 and 2017- 2020. A previous study reported esophageal (32.3%), non-Hodgkin lymphoma (8.7%), liver (6.5%), breast (6.0%), skin (4.2%), thyroid (3.2%), brain (3.0%), bone (2.7%), colorectal (2.7%) and soft tissue (2.7%) were commonest forms. (12) Recent study reported as well that esophageal carcinoma and liver cancer were the most predominant cancer types, accounting for each 284 (22%) and 99 (8%), respectively. (11)

There is a knowledge gap between which type of cancer, which category of people, and which body organs are mainly affected by the cancer epidemic in Somalia. In addition, cancer epidemiology in Somalia is under-reported, national population-based cancer registry in the country is not yet established to conduct a nationwide prevalence study. There is a need to study the prevalence of cancer in Somalia and reduce prediction practices in operation among health officials. This facility-based study focused on examining the prevalence of cancer among people in Somalia by deeply understanding which type of cancer and which body organs are mainly affected by different cancer types in Somalia

Methodology

The study undertook a cross-sectional design using facility-based retrospective records review. Cancer data from patients records between January 2014 to November 2017 clinically diagnosed with cancer and referred from other hospitals to Kamil diagnostic center for radiological examination (CT or MRI Scan) in Mogadishu, Somalia, were selected for this study.

Study site

Kamil diagnostic center, Mogadishu, is one of the referral centers for radiological diagnosis in Mogadishu and the first center in Mogadishu to bring CT scans.

Statistical data analysis

Data were processed using a statistical package for the Social Science (SPSS) program. Descriptive statistics were used to present findings of the demographic characteristics of the patients. Chi-square was used to present the distribution of cancer among different patient groups.

Ethical consideration of the study

The study obtained ethical approval from the research ethics committee of Jamhuriya University of Science and Technology. The Kamil diagnostic center, Mogadishu, Somalia, granted permission to conduct this study in the hospital. All patients' personal

information, such as names, was omitted from data analysis, respecting ethical values, confidentiality, and moral expectations.

Results

The study revealed that most of the patients were male, 351 (60.2%), while 232 (39.8%) were female, which means that more males were diagnosed with cancer than females. The majority of the patients were between the ages of 61 to 75 years 163 (28%), followed by patients of 46-60 years 146 (25%), as shown in Table 1. This means that people in the old ages of between 45 and elder were more diagnosed with cancer compared to young people in Somalia. In 2016 alone, about 248 (42.5%) cancer cases were registered compared to 2015, of which 165 (28.3%) cases were recorded. A total of 99 (17%) and 71 (12.2%) cases were registered in 2014 and 2017, respectively, as shown in Table 1.

Table 2 revealed results on the distribution of cancer among age groups. Results indicated that HCC was the most commonly diagnosed cancer. Out of 151 patients diagnosed with HCC, 108 (72%) were between 46-90 years of age. Out of 97 patients diagnosed with EC and 56 patients diagnosed with RCC, 56 (71%) and 33 (59%) were between the age of 46-75 years, respectively. This means that HCC, EC, and RCC were much diagnosed among elderly populations. In contrast, out of 40 patients diagnosed with lymphoma, 9 (23%) were younger than 15 years, and 17 (43%) were between the age of 16-45 years. This means that lymphoma was cancer of younger age.

Table 3 revealed that the major cancer type diagnosed as hepatocellular carcinoma (HCC), accounting for 151/583 (26%) patients. Out of the 151 patients, 124 (82%) were male while 27 (18%) were female, which means that HCC was much among males than females. The second type of cancer diagnosed among patients was esophageal carcinoma (EC) which was diagnosed among 97/583 (17%); of these, 47 (48%) were males while 50 (52%) were females, which means that EC was much among females than males. The third common type of cancer was renal cell carcinoma (RCC) which was diagnosed among 56 (10%) patients, of which 31 (55.4%) were male while 25 (44.6%) were female. A total of the 40/583 (7%) patients were diagnosed with lymphoma, containing 20 (50%) each male and female. Other cancer types with less prevalence rate include colorectal 33 (6%), prostatic 30 (5%), gastric 18 (3%), thyroid 16 (3%), lung 14 (2.4%), and female breast 6 (1%).

Results from Table 4 demonstrate that metastatic cancer was found among 152 (26.1%) patients, which is little compared to 431 (73.9%) patients whose cancer was not metastatic. The major organs of metastatic were lymph node 48 (32%), pulmonary 22 (14%), hepatic and lymph node 22 (14%), and bones 20 (13%) as summarized in Table 5.

Table 1. General characteristics of patients (N=583) in Mogadishu, Somalia, during 2014-2017

Variables	Frequency	%
Gender		
Male	351	60.2
Female	232	39.8
Age of the Respondents		
0-15	22	3.8
16-30	64	11.0
31-45	103	17.7
46-60	146	25.0
61-75	163	28.0
76-90	76	13.0
91 and above	9	1.5
Year of Diagnosis		
2014	99	17.0
2015	165	28.3
2016	248	42.5
2017	71	12.2

Table 2. Cancer distribution among age groups (N=583) in Mogadishu, Somalia, during 2014- 2017

	Age of the patient						
	0-15	**16-30**	**31-45**	**46-60**	**61-75**	**76-90**	**>91**
Hepatocellular carcinoma	1	22	18	32	49	27	2
	.7%	14.6%	11.9%	21.2%	32.5%	17.9%	1.3%
Colorectal carcinoma	0	1	5	10	12	4	1
	0%	3%	15%	30%	37%	12%	3%
Gastric carcinoma	0	0	5	9	2	2	0
	.0%	.0%	27.8%	50.0%	11.1%	11.1%	.0%
Esophageal carcinoma	0	7	18	29	34	9	0
	.0%	1.3%	17.7%	32.9%	38.0%	10.1%	.0%
Prostatic carcinoma	0	1	0	3	11	14	1
	.0%	3.3%	.0%	10.0%	36.7%	46.7%	3.3%
Renal cell carcinoma	0	7	8	18	15	4	4
	.0%	12.5%	14.3%	32.1%	26.8%	7.1%	7.1%
Bladder carcinoma	0	1	1	3	5	2	0
	.0%	8.3%	8.3%	25.0%	41.7%	16.7%	.0%
Laryngeal carcinoma	0	0	1	3	5	0	1
	.0%	.0%	10.0%	30.0%	50.0%	.0%	10.0%
Nasopharyngeal carcinoma	1	4	5	4	0	0	0
	7.1%	28.6%	35.7%	28.6%	.0%	.0%	.0%
Hypopharyngeal carcinoma	0	2	12	11	4	3	0
	.0%	6.2%	37.5%	34.4%	12.5%	9.4%	.0%
Medulloblastoma	4	1	2	0	0	0	0
	57.1%	14.3%	28.6%	.0%	.0%	.0%	.0%
Brainstem glioma	1	2	2	2	0	0	0
	14.3%	28.6%	28.6%	28.6%	.0%	.0%	.0%
Lymphoma	9	7	10	6	5	3	0
	22.5%	17.5%	25.0%	15.0%	12.5%	7.5%	.0%
Cervical carcinoma	0	1	2	4	0	0	0
	.0%	14.3%	28.6%	57.1%	.0%	.0%	.0%
Thyroid carcinoma	1	2	3	3	5	2	0
	6.2%	12.5%	18.8%	18.8%	31.2%	12.5%	.0%
Lung carcinoma	0	1	3	2	5	3	0
	.0%	7.1%	21.4%	14.3%	35.7%	21.4%	.0%
Bronchogenic carcinoma	0	1	1	3	6	2	0
	.0%	7.7%	7.7%	23.1%	46.2%	15.4%	.0%
Endometrial carcinoma	0	0	2	2	5	1	0
	.0%	.0%	20.0%	20.0%	50.0%	10.0%	.0%
Retinoblastoma	5	2	0	0	0	0	0
	71.4%	28.6%	.0%	.0%	.0%	.0%	.0%
Mucinous Carcinoma	0	1	2	0	0	0	0
	.0%	33.3%	66.7%	.0%	.0%	.0%	.0%
Breast Carcinoma	0	1	3	2	0	0	0
	.0%	16.7%	50.0%	33.3%	.0%	.0%	.0%
Total	22	64	103	146	163	76	9
	3.8%	11.0%	17.7%	25.0%	28.0%	13.0%	1.5%

Discussion

The study reveals an increasing trend of cancer prevalence in Somalia. HCC was the most prevalent cancer type in Somalia, followed by esophageal carcinoma (EC), renal cell carcinoma (RCC), and lymphoma. HCC, EC, and RCC were frequently diagnosed among elderly populations compared to young people in Somalia. The study found that the highest frequencies of HCC occurred in males than females. The high prevalence rates of HCC in Somalia are likely due to due to viral infections such as hepatitis B virus (HBV), and hepatitis C virus (HCV), and aflatoxins contamination with food. (11) Previous studies reported less rate of HCC (7 to 7.6%) but agreed HCC was more prevalent in men. This was likely due to the small sample size of the earlier study. However, further studies should be conducted to find the etiology and molecular mechanism of aflatoxin exposure in liver cancer secondary to chronic hepatitis infection. (11, 12) Our study's second most prevalent cancer was esophageal carcinoma (EC), with an estimated 14% rate. This high prevalence of EC was

also reported in other similar studies. (11-13) A study reported by Hassan-Kadle and Musse in 2017 indicates that 129 out of 1607 (8%) were diagnosed with EC. (13) Another study reported higher rates of EC (32.3%). Moreover, 284 (22%) out of 1306 total patients were diagnosed with EC in another study conducted in Mogadishu, Somalia. (11) A high incidence of esophageal cancer in Somalia is strongly associated with environmental risk factors and nutritional habits. The excessive use of hot tea and rice and intake of tobacco and khat are likely associated risks.

This study revealed lymphoma was common cancer among younger ages. The etiology of this highly prevalent cancer among young age is unknown. However, lymphomas are attributed to infection. Notably, human T-lymphotropic virus type 1 (HTLV1) for adult T-cell leukemia/lymphoma (ATLL), hepatitis C virus (HCV) for non-Hodgkin lymphoma, Epstein-Barr virus (EBV) for Hodgkin and Burkitt lymphomas, and H. pylori for gastric lymphoma are the most causing pathogens and types lymphomas. (5) The process of cancer cells spreading other body organs distinct from the primary organ is called metastasis. (14) Metastatic cancer represents more than 90% of cancer death. (15) In this study, about 26% of patients had metastatic cancer, with significant organs for metastasis were lymph node, hepatic, and bone; these were reported in previous studies. (15, 16)

The limitation of this study was the lack of breast cancer cases in this center; this could be likely that the center did not have Mammography for breast cancer diagnosis, and patients preferred other diagnostic center offering this service. The use of a single-center registry base may not accurately represent all cancer cases in Somalia. However, This is the most preferred diagnostic center for radiological examination for most hospitals in Mogadishu, so we assume that this data captures most cases. The selection of four-year retrospective data was the availability of accurate data that is retrievable during this year

Table 3. Cancer distribution among gender (N=583) in Mogadishu, Somalia during 2014- 2017

Cancer types	Total (%)	Male (%)	Female (%)
Hepatocellular carcinoma	151 (26)	124 (82)	27 (18)
Colorectal carcinoma	33 (6)	23 (70)	10 (30)
Gastric carcinoma	18 (3)	8 (44)	10 (56)
Esophageal carcinoma	97 (17%)	47 (48)	50 (52)
Prostatic carcinoma	30 (5)	30 (100)	0
Renal cell carcinoma	56 (10)	31(55)	25 (45)
Bladder carcinoma	12 (2)	6 (50)	6 (50)
Laryngeal carcinoma	10 (1.7)	9 (90)	1 (10)
Nasopharyngeal carcinoma	14 (2.4)	7 (50)	7(50)
Hypopharyngeal carcinoma	32 (5.5)	9 (28)	23 (72)
Medulloblastoma	7 (1.2)	4 (57)	3 (43)
Brainstem glioma	7 (1.2)	3 (43)	4 (57)
Lymphoma	40 (7)	20 (50)	20 (50)
Cervical carcinoma	7 (1.2)	0	7 (100)
Thyroid carcinoma	16 (3)	7 (44)	9 (56)
Lung carcinoma	14 (2.4)	9 (64)	5 (36)
Bronchogenic carcinoma	13 (2.2)	8 (62)	5 (38)
Endometrial carcinoma	10 (1.7)	0	10 (100)
Retinoblastoma	7 (1.2)	3 (43)	4 (57)
Mucinous Carcinoma	3 (0.5)	1 (33)	2 (67)
Breast Carcinoma	6 (1)	0	6 (100)
Total	583 (100)	351 (60.2)	232 (39.8)

Table 4. A patient diagnosed with metastatic cancer (N=583) in Mogadishu, Somalia during 2014-2017

Metastatic	Frequency	%
Yes	152	26.1
No	431	73.9
	583	**100.0%**

Table 5. Organ of metastatic among cancer patients (N=152) in Mogadishu, Somalia during 2014-2017

Organ of Metastatic	Frequency	%
Lymph node	48	32
Hepatic	19	13
Bone	20	13
Pulmonary	22	14
Abdominal wall	7	5
Peritoneal	6	4
Hepatic & lymph node	22	14
Bone & lymph node	8	5
Total	**152**	**100.0**

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Conclusion

The study reveals an increasing trend of cancer prevalence in Somalia. Hepatocellular carcinoma fellowed by esophageal carcinoma was the most predominant type. The study recommends that people take timely screening and diagnosis of cancer to stand higher chances of preventing and surviving cancer death. Healthy lifestyles and public health efforts could stem this trend. The ministry of Health and Human Services of Somalia and its federal member states should establish a cancer registry database to conduct a nationwide prevalence study of cancer.

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Conflict of interests: No conflict of interests is declared.

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