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Original Article

Cancer Patterns among Patients Admitted to the Oncology Department at Benghazi Medical Center, Libya (2013-2017)

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ABSTRACT

Background: Cancer is a major public health problem that faces health managers and decision-makers in many countries. Cancer is constantly growing and is one of the major causes of mortality in Libya.

Aim: To estimate the geographical distribution and patterns of cancer among patients admitted to the Oncology Department at Benghazi Medical Center (BMC).

Methods: A retrospective cross-sectional study was conducted from March to April 2019. A total of 4649 patients' files with a diagnosis of cancer at the BMC were extracted as hard copies due to the absence of electronic medical files. A sampling approach was performed to facilitate the analyses. The sample size was (206) files out of (4649) files, which was determined via a statistical software program (Epi Info7) Data was collected retrospectively from patients' files; on age, gender, address, and classification of the cancer diagnosis which was made according to (ICD–Oncology) for a specific period (5 years – from January 1st, 2013 to December 31st, 2017).

Results: The results revealed that more than half of the cancer cases admitted to Benghazi Medical Center were from Benghazi City and (52.4%) of cases were females whereas (47.6%) were males, (18.9 %) were (<40y), (49.5 %) were between (40 to 65y), and (31.6%) were > 65y. The most common cancers among females were breast cancer (28.6%) and endometrial cancer (7.3%), whereas among males were colorectal cancer (8.3%), prostate cancer (6.8%), gastrointestinal (6.3%) and lung cancer (6.3%).

Conclusion: The most common cancer among women was breast cancer and among men was colorectal and prostate cancer. The majority of cases were from Benghazi. Further studies are required to confirm such results. Educating people about the risk factors that could increase cancer incidence, especially lifestyle, and dietary patterns.

Keywords: cancer pattern, Libya, Benghazi medical center, geographical distribution

INTRODUCTION

Cancer is defined as a group of diseases characterized by the uncontrolled growth and spread of abnormal cells. The main causes of cancer are still largely unknown and if the cancer spread cannot be managed and controlled, it could lead to death.^[1] Several studies have documented that cancer rates are constantly growing around the world due to many factors such as lifestyle, culture, inherited genetics, smoking, dietary patterns, excess body weight, mutations, hormones, and immune conditions.^[2] Cancer is a major public health problem that faces health managers and decision-makers in many countries. The rates of cancer incidence are different from one country to another. These differences in cancer incidence

around the world may be due to the differences in risk factors of cancer among countries.^[3] There are significant differences in cancer incidence rates between developing and developed countries.^[4] Furthermore, there are various types of cancers worldwide; some types are common in incidence and others are rare. Cancer types differ from country to country due to various risk factors.^[5]

In Libya, there is a scarcity of medical literature on cancer epidemiology due to the limitation of cancer registrations and lack of electronic medical records. In light of several published reports, there are little geographical variations in cancer incidence and types. Lung cancer was common in men, and breast cancer in women in the Western region.^[6] A study from Tobruk in the Eastern region^[7] found Breast and uterine cancers were the most common cancers in women, and bladder and colorectal cancer were the most common cancers in men, followed by colorectal cancer in both genders. A previous study^[8] from the BMC indicated that lung cancer and colorectal cancer followed by cancers of the head, neck, and bladder were the most frequently diagnosed malignancies in males. Among females, they were breast cancer, cancer of the colon and rectum, uterus, and non-Hodgkin lymphoma. It is well documented in all published studies that cancer incidence increases with age. However, Adult acute myeloid leukemia (AML) was more common in middle age than acute lymphocytic leukemia (ALL) in adults which was common in young age.^[9] A recent study^[10] from the middle region demonstrated that breast, colorectal, lung, and prostate cancer had the highest prevalence compared to the World Cancer Report.

Yet the actual estimate of cancer epidemiology remains underestimated. Despite the researcher's efforts in retrospective cancer data collection on prevalence, results based on a single health center may be prone to bias. Additionally, data quality regarding competence, reliability, accuracy, and timeliness represents considerable national concerns with a lack of robust data based on a national cancer registry covering all country regions.

As an attempt to measure cancer patterns, and estimate its burden, this retrospective study aims to estimate the geographical distribution and patterns of cancer among patients admitted to the Oncology Department at Benghazi Medical Center (BMC) based on medical records of cancer patients admitted in the period from January 1st, 2013 to December 31st, 2017.

METHODS

A retrospective cross-sectional study was conducted from March to April 2019 by reviewing the medical records to assess the prevalence of cancer and its distribution according to the geographical area (Libyan cities), gender, and age groups. Data were collected from Benghazi Medical Center (BMC) which is a referral tertiary health care center serving the whole Eastern part of Libya.

Selected data were collected from patients' files for a specific period (5 years from January 1st, 2013 to December 31st, 2017) including Gender, age address, and classification of the cancer diagnosis which was made according to (the International Classification of Diseases – oncology).

The population was represented in all files of patients who were admitted to BMC. During the specified period. A total of 4649 patients' files with a diagnosis of cancer at the BMC were extracted as hard copies due to the absence of electronic medical files. A sampling approach was performed to facilitate the analyses. The sample size was (206) file out of (4649) file, which was determined via a statistical software program (Epi Info7) at an error rate (of 5%) and a significance limit (95%). After determining the sample size, a probability (randomized) method (stratified technique) was used to determine the sample size for every single year using the following formula:

Sample Size for a Single Year = Size of the Population for Specific Year ÷ Overall Population / Sample Size.

As such, a withdrawal interval was calculated to determine which items (files) should be selected to represent the sample according to the following formula:

Withdrawal Interval = Overall Population ÷ Sample Size

Withdrawal interval = $4649 \div 206 = (22)$

A random number between (1 and 22) was selected randomly to represent the first file out of 206 files, the 1st file was a file number (4) of patients' files which were coded according to the (patient's number) which was given during the admission procedures. The second file was selected by adding the withdrawal interval (22) to the file number (4), so it was the file number (26), and so on.

Table 1: Population and Sample Size

No	Year	Population	Sample size
1	Jan 1st to Dec. 31st 2013	917	$917 \div 4649 / 206 = 41$
2	Jan 1st to Dec. 31st 2014	956	$956 \div 4649 / 206 = 42$
3	Jan 1st to Dec. 31st 2015	707	$707 \div 4649 / 206 = 31$
4	Jan 1st to Dec. 31st 2016	1039	$1039 \div 4649 / 206 = 46$
5	Jan 1st to Dec. 31st 2017	1030	$1030 \div 4649 / 206 = 46$
Total		4649	206

RESULTS

A total of 206 patients' files who were admitted to Benghazi Medical Center during the 5 years (2013 – 2017) were included in the study. Approximately 52.4% (n=108) of patients were females whereas 47.6% (n=98) of them were males. The females to male ratio were 1.1:1. Approximately half of the patients 49.5% (n = 102) were in the age group (40 – 65years), and 31.6% (n = 65) of them were in the age group (older than 65 years), whereas 18.9% (n = 39) of them were in the age group (less than 40 years).

Table 2 shows the geographical distribution of cancer cases based on patients' recorded addresses in the medical file. Most recorded cancer cases are from Benghazi city.

Table 2: Distribution of Cancer According to the Libyan cities

City	(n)	(%)
Benghazi	111	53.9
Al-Bayda	15	7.2
Al-Marj	12	5.7
Derna	9	4.4
Tobruk	9	4.4
Shahhat	7	3.4
Tripoli	6	3.0
Ajdabiya	6	3.0
Sabha	6	3.0
Al-Qubah	5	2.4
Al-Rajma	4	2.0
Al-Kufra	4	2.0
Tawergh	3	1.4
Suluq	3	1.4
Al-Abyar	3	1.4
Daryana	3	1.4

Regarding cancer occurrence according to body organs among patients in the Department of Oncology at the BMC, table 3 shows that cancer was diagnosed in 14 body sites. Breast cancer is the most occurred cancer.

Cancer occurrence is different from person to person according to gender, table 4 shows the distribution of cancer among patients in the Department of Oncology at the BMC by their gender.

Table 3: Distribution of Cancer According to Organs of the Body

Organ	(n)	(%)
Breast	59	28.6
Colorectal	26	12.6
Endometrial, Ovarian, and cervical	18	8.7
Gastrointestinal	18	8.7
Lung and Bronchus	14	6.8
Prostate	14	6.8
Nasopharyngeal	11	5.4
Brain	11	5.3
Urinary bladder	10	4.9
Pancreas	8	3.9
Thyroid	8	3.9
Kidney	5	2.4
Skin	2	1
Testicular	2	1

Table 4: Distribution of Cancer According to Patients' Gender

Cancer	Male		Female		Total	
	(n)	(%)	(n)	(%)	(n)	(%)
Breast	0	0.0	59	28.6	59	28.6
Colorectal	17	8.3	9	4.3	26	12.6
Endometrial, Ovarian, and cervical	0	0.0	18	8.7	18	8.7
Gastrointestinal	13	6.3	5	2.4	18	8.7
Lung and Bronchus	13	6.3	1	0.5	14	6.8
Prostate	14	6.8	0	0.0	14	6.8
Nasopharyngeal	8	3.9	3	1.5	11	5.4
Brain	7	3.5	4	1.8	11	5.3
Urinary bladder	9	4.4	1	0.5	10	4.9
Pancreas	6	2.9	2	1.0	8	3.9
Thyroid	5	2.4	3	1.5	8	3.9
Kidney	4	1.9	1	0.5	5	2.4
Skin	0	0.0	2	1	2	1
Testicular	2	1	0	0.0	2	1

Cancer occurrence is different from person to person by the age of the patient, table 5 shows the distribution of cancer among patients in the Department of Oncology at the BMC according to their age groups. As the table illustrates, most cancer patients diagnosed in the age group (40 – 65 y) were female with breast cancer. Colorectal cancer was the second most prominent among the same age group in males and females.

DISCUSSION

The results presented in the current study were based on a retrospective review of a sample of medical files of cancer patients admitted to the BMC over five years. It focused on measuring the distribution of cancer cases and types across districts covered by the BMC health services in the Eastern region. This could estimate the magnitude of cancers and the expected burden on society. More than half of cancer

cases (53.9%) were among people residing in Benghazi, the second-largest city in Libya. Cases were referred from different cities including Al-Bayda, Al-Marj, Derna, Tobruk, Shahhat, Tripoli, Ajdabiya, Sabha, Al-Qubah Al-Rajma, Al-Kufra, Tawergh, Suluq, Al-Abyar, Daryana. We noticed few cases were treated in the BMC outside of the geographical health area. The following discussion will focus on comparing our findings with previous national studies. Generally, previous studies reported higher incidence rates of most cancer types in the eastern region compared with the western region ⁶. In terms of the period of data analyses, updated statistics are required to understand the current cancer trends.

Table 5: Distribution of Cancer According to Patients' Ages

Cancer	< 40 year		40 – 65 year		> 65 year		Total	
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)
Breast	12	5.8	41	19.9	6	2.9	59	28.6
Colorectal	0	0.0	15	7.3	11	5.3	26	12.6
Endometrial, Ovarian, and cervical	4	1.9	11	5.3	3	1.5	18	8.7
Gastrointestinal	3	1.5	11	5.3	4	1.9	18	8.7
Lung and Bronchus	2	1.0	1	0.5	11	5.3	14	6.8
Prostate	2	1.0	4	1.9	8	3.9	14	6.8
Nasopharyngeal	7	3.5	4	1.9	0	0.0	11	5.4
Brain	5	2.4	4	1.9	2	1.0	11	5.3
Urinary bladder	0	0.0	2	1.0	8	3.9	10	4.9
Pancreas	1	0.5	3	1.5	4	1.9	8	3.9
Thyroid	2	1.0	2	1.0	4	1.9	8	3.9
Kidney	0	0.0	1	0.5	4	1.9	5	2.4
Skin	1	0.5	1	0.5	0	0.0	2	1
Testicular	0	0.0	2	1.0	0	0.0	2	1

Regarding cancer occurrence according to body organs among patients, breast cancer was the most occurred type. All cases were reported in women. These findings were in line with previous analyses of the BMC data in 2003⁽⁸⁾, in addition to other studies from other regions ⁽⁷⁾⁽¹⁰⁾. For women at high risk of this type of cancer, early detection and implementation of effective national screening programs are required to minimize the burden of this silent killer when diagnosed at an advanced stage.

The second most occurred type of cancer was colorectal cancer which was more diagnosed in men. In contrast, the previous analyses of the BMC data in 2003⁽⁸⁾, and the Western study in 2009⁽⁶⁾ found that lung cancer was the most frequent among men. As such, colorectal cancer was the most common cancer in men in Tubrok's study ⁽⁷⁾. These comparable findings suggest changes in cancer patterns in men. therefore, related risk factors need to be considered.

As mentioned before, the age group (40 – 65 y) was the most critical age for both genders. Moreover, our results found a slightly higher number of women with cancer compared with men. Whereas, and the Western study in 2009⁽⁶⁾ found higher cancer incidence rates in men than in women.

This study has several limitations, being cross-sectional based on a retrospective review of a systematic sample of patient files may affect the validity and generalizability of results. However, this study would add to the body of a small body of national medical literature, and contribute to understanding the change in the pattern of cancer in Libya. Inclusion of the total patient files during the study period and conducting survival analyses over the five years is recommended. Taking into account the challenges in

data collection and management in the absence of electronic databases of medical files in the Libyan health system and the quality of medical research.

CONCLUSION

In conclusion, most cancer cases treated in the BMC during the period (2013 -2017) were from Benghazi, breast cancer was the most diagnosed malignancy in females. Most males were diagnosed with colorectal cancer. Further investigations are needed to understand the current trend in cancer epidemiology in Libya. Improvement in cancer registrations and health informatics is recommended.

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Conflict of Interest

The authors declare that there is no conflict of interest relevant to this article.

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