



Epidemiological data of 1418 Cancer Cases of Inpatient in Al-Sadder Teaching Hospital, Misan Province from 2011-2018 (Surveillance Study)

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This study was conducted to evaluate the epidemiologic indices of 1418 patients diagnosed with cancer in Misan province, Iraq, all patients admitted to Al-Sadder Teaching Hospital from 2011 to 2018. All cases eventually proved by histopathology of primary. The study excluded pediatric cancers because the number of cases registries at time of study were few and can't give us accepted statistical figures to reflect true situations of cancer in pediatrics. Cancers are equal prevalence in male and female. In this surveillance study statically we analyzed the data which were collected for cancer. There was no previous local study conducted for comparison, but our data compare with National Iraqi Ministry of Health (MOH) and Iraqi Cancer Registry Center (ICRC) report for years 2011 – 2018. The data based contains information regarding the age, sex, address, date of diagnosis, primary cancer site, histological type, most valid diagnostic method, and Surveillance, Epidemiology, and End Results (SEER) stage. All cancer cases were reported based on the 12 cancer types. Of those cases lung cancer prevalent as most common cancer diagnosed, mean±SD 21.9±4.5, followed by, breast, bladder, leukemias and prostate. Liver and pancreas, head and neck cancers with skin cancers represented the lowest cancer types. Among ages of cancer diagnosis, the leukemias, colorectal and lymphoma were mostly evented in young age peoples. Head and neck cancers, prostate and bladder were mostly presented in old age group. Regarding gender, cancer can affect both, but some cancers are specific for one sex. The characteristics of the study population n=1364 (54 missing*[due to ISIS war and other reasons]) (659 males and 705 females) were statistically calculated. The approximate percentage of men and women diagnosed with cancers were 48.3% and 51.7%, respectively. Our finding indicated that there was no statistically significant association between males and females for getting cancer disease ($P > 0.05$). In male, the commonest type of cancer was lung cancer 29.4%, followed by bladder and prostate as 18.2%, 14.6%, respectively. In female the highest three cancer type in this study were breast, lung and bladder as 29.6%, 16.5%, 15.7%, respectively. About 967 peoples died from cancer in period 1st of January 2011 to 1st of June 2018. Data showed approximate percentage of people died from lung, bladder, breast, and leukemias cancers were 26.2%, 22.4%, 10.9% and 8.5%, respectively. Cancer affects different parts of the human body in different proportions and it is multi-factorial conditions. Cancer can also affect both men and women, but some cancers are sex related diseases. In some cancers, the prevalence occurs largely in men higher than in women, or the opposite. Lung recorded as most common cancer types regarding prevalence and death rate. Breast cancers are in the first place recorded in female. In relation to age, the concluding age ranged from 2nd – 6th decade. More than half cancer patients' died throughout period of study, which mirrored to low education, low socioeconomic, low health quality and bad services, decrement of tools and equipment, anti-cancer chemotherapy drugs and anti-cancer management options unavailability, low staff numbers and training, in this part of Iraq.

INTRODUCTION

Cancer is one of the major diseases in western and eastern world. It is a major life-threatening disease worldwide. Approximately 14.1 million patients were newly diagnosed with cancer and 8.2 million people died

from cancer in 2012 worldwide (Ferlay et al, 2017). The global burden of cancer is expected to grow rapidly due to aging population (GBD, 2017). It is the second leading cause of death America and some European countries beyond cardiac diseases. It is major cause of morbidity and mortality in Iraq and other neighbor countries. The number of cancer incidences and deaths are expected to increase with the aging population and westernized lifestyles (Jung et al, 2015), additionally, the economic burden of cancer also (Lee et al, 2015). Four organ sites, lungs, colo-rectum, breast, and prostate accounted of 57% of all incident cancer cases and 55% of all cancer death (GBD, 2017).

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In this context, cancer statistics are the most important indicator of the national cancer burden and can be used to form cancer prevention and control strategies. This study aims to provide nationwide cancer statistics including the incidence, survival, prevalence, and mortality in 2011-2018.

METHODOLOGY

We studied 1418 cancer cases, admitted to Al-Sadder Teaching Hospital in Misan province from January 2011 to June 2018. All cases eventually histo-pathologically proven. In this surveillance study statically we analyzed the date which were collected for cancer. There was no previous local study conducted for comparison, but our data compare with National Iraqi Ministry of Health (MOH) and Iraqi Cancer Registry Center report for years 2011 – 2018.

Data sources

The Iraqi Cancer Registry Center (ICRC) was established by the Ministry of Health (MOH) in 1976 as a nationwide hospital-based cancer registry. Since 1988, the ICRC has collected cancer incidence data for the entire nation by compiling a nationwide hospital-based ICRC database that contains data from regional cancer registry programs. The ICRC currently provides the nationwide cancer incidence and prevalence statistics annually reports (ICRC, 2017; MOH, 2016). The data based contains information regarding the age, sex, address, date of diagnosis, primary cancer site, histological type, most valid diagnostic method, and Surveillance, Epidemiology, and End Results (SEER) stage.

Classification

All incident cases were registered according to the International Classification of Diseases for Oncology, third edition (Fritz et al, 2000), and converted to the International Classification of Diseases, 10th edition (ICD-10) codes (WHO, 1994). The mortality cases were registered according to ICD-10 codes. All cancer cases were reported based on the 12 cancer types.

Statistical analyses

Rates were expressed as death rate was calculated as the total number of incidence/mortality cases divided by the mid-year population for the specified years (Howlader et al, 2013). Prevalent cases were defined as the number of cancer patients alive on July 1, 2018 (time of finished data collected) among all cancer patients diagnosed between 2011 and 2018. Limited-duration prevalences were calculated using SEERStat software. Any p-values less than 0.05 were considered statistically significant. All confidence intervals (CIs) were calculated at the 95% level of statistical significance. SEERStat 8.2.1 (National Cancer Institute, Bethesda, MD), Join point 4.1.1 (National Cancer Institute), and SAS 9.4 (SAS Institute Inc., Cary, NC) were used in this report. Descriptive statistics was calculated and data were analyzed using IBM SPSS Statistics Software (version 20.0, SPSS, Inc., Chicago, Illinois, USA).

RESULTS

Prevalence

A total 1418 cases diagnosed as cancer since 2011 till May 2018 in Misan. Of those cases lung cancer prevalent as most common cancer diagnosed, mean $\pm$ SD 21.9 $\pm$ 4.5, followed by, breast, bladder, leukemias and prostate as 17.1 $\pm$ 2.2, 16.3 $\pm$ 1.9, 12.6 $\pm$ 2.1, 6.8 $\pm$ 0.8, respectively, table 1. Liver and pancreas, head and neck cancers with skin cancers

represented the lowest cancer types as 2.7 $\pm$ 1.1, 2.4 $\pm$ 0.9, 2.2 $\pm$ 0.7, respectively, table 1, fig 1.

Age

Among ages of cancer diagnosis, the leukemias, colorectal and lymphoma were mostly evented in young age peoples in MSA 25.5 years, 30.1 years, 34.8 years, respectively, table 2. Head and neck cancers, prostate and bladder were mostly presented in old age group as 68.3 years, 66.4 years, 63.1 years, respectively, table 2. MSA for lung cancer was 60.8 years and for breast cancer was 50.6 years, table 2, fig 2.

Gender

Regarding male and female, cancer can affect both gender, but some cancers are specific for one sex. The percentage of patients (male and female) with cancer in Misan province from 2011 to 2018 is shown in table 3. The characteristics of the study population n = 1364 (54 missing*) (659 males and 705 females) were statistically calculated. The approximate percentage of men and women diagnosed with cancers were 48.3% and 51.7%, respectively. This indicates that women were almost 2.4% more likely than men to develop cancer. Our finding indicated that there was no statistically significant association between males and females for getting cancer disease ($P > 0.05$). In male, the commonest type of cancer was lung cancer 29.4%, followed by bladder and prostate as 18.2%, 14.6%, respectively, table 3. In female the highest three cancer type in this study were breast, lung and bladder as 29.6%, 16.5%, 15.7%, respectively, table 3, fig 3.

Mortality

Death from cancer is stay in second place beyond cardiac problems. About 967 peoples died from cancer in period 2011-2018. Data showed that there were 253, 217, 106 and 82 cases died from lung, bladder, breast and leukemias, respectively. The approximate percentage of people died from lung, bladder, breast, and leukemias cancers were 26.2%, 22.4%, 10.9% and 8.5%, respectively, table 4, fig 4.

DISCUSSION

One of the important findings in this work showed that the percentage of cancer cases have been increased overall during almost last five years in Misan, especially in the years 2013 and 2018. The significant increase in cancer incidence rates suggests that there has been no progress made in cancer control. Cancer control should decrease the expected number of new diagnoses, minimize the severity of disease and improve the quality of life for those diagnosed with cancer (Canadian Brest cancer foundation, 2013).

Bronchogenic carcinoma (21.9%) prevalent as most common cancer diagnosed, followed by, breast (17.1%), bladder (16.3%), leukemias (12.6%) and prostate (6.8%), while liver and pancreas (2.7%), head and neck cancers (2.4%) and skin cancers (2.2%) recorded the lowest cancer types in data of this study. Lung cancer is the most popular cancer in men (Cancer Research UK, 2015) and it kill more than any other cancers (NCIN, 2010; WHO, 2004). Tobacco is the main factor causing of lung cancer and approximately 80 -90% of lung cancer cases can be related to it (NCIN, 2010). Most of all cancer incidences are related to environmental and life-style factors. Also, 35% of all cancers are related to unbalanced diets; while 30% of all cancers are related to smoking (Katzin, 2012).

The most significant risk factor is age. According to cancer researcher Robert A. Weinberg, If we lived long enough, sooner or later

Table 1 Cancer prevalence rate in Misan province, Iraq (2011-2018)

Cancer site/type	Prevalence rate (%)									95% CI
	2011 N=96	2012 N=105	2013 N=137	2014 N=149	2015 N=188	2016 N=203	2017 N=254	2018 N=286	Mean±SD	
Breast	16.1	16.7	16.5	17.5	17.8	18.7	16.2	17.4	17.1±2.2	12.8-21.4
Lymphomas	4.2	4.1	4.2	5.4	4.3	4.3	5.3	4.2	4.5±2.7	-0.8-9.8
Bladder	16.3	16.6	16.5	16.2	17.5	16.6	15.3	15.4	16.3±1.9	12.6-20.0
Colorectal	3.1	3.5	3.6	3.1	3.3	3.6	3.2	3.8	3.4±1.2	1.0-5.8
Liver and pancreas	2.5	3.5	3.8	2.2	3.2	2.2	3.2	3.3	2.7±1.1	0.5-4.9
Cervix	3.2	3.8	3.9	3.1	3.3	3.5	3.2	3.6	3.5±0.6	2.3-4.7
Lung	22.2	20.9	21.9	22.1	21.8	21.4	22.3	20.5	21.9±4.5	13.1-30.7
leukemias	13.2	12.6	12.7	11.3	13.7	12.6	12.3	12.2	12.6±2.1	8.5-16.7
Head and neck	1.2	1.4	2.7	2.1	2.3	3.5	2.9	2.8	2.4±0.9	0.6-4.2
Skin	1.3	2.7	1.8	2.8	1.9	2.2	2.1	2.4	2.2±0.7	0.8-3.6
CNS	1.9	2.8	2.3	2.7	3.8	3.7	3.6	3.8	3.1±1.1	0.9-5.3
Prostate	6.5	6.9	6.9	6.8	6.4	6.7	7.2	6.8	6.8±0.8	5.2-8.4

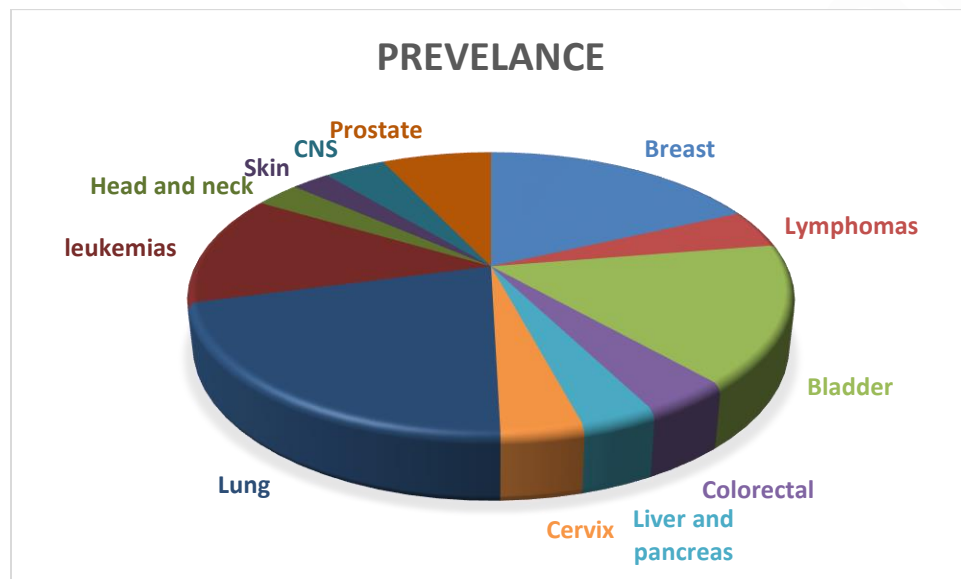
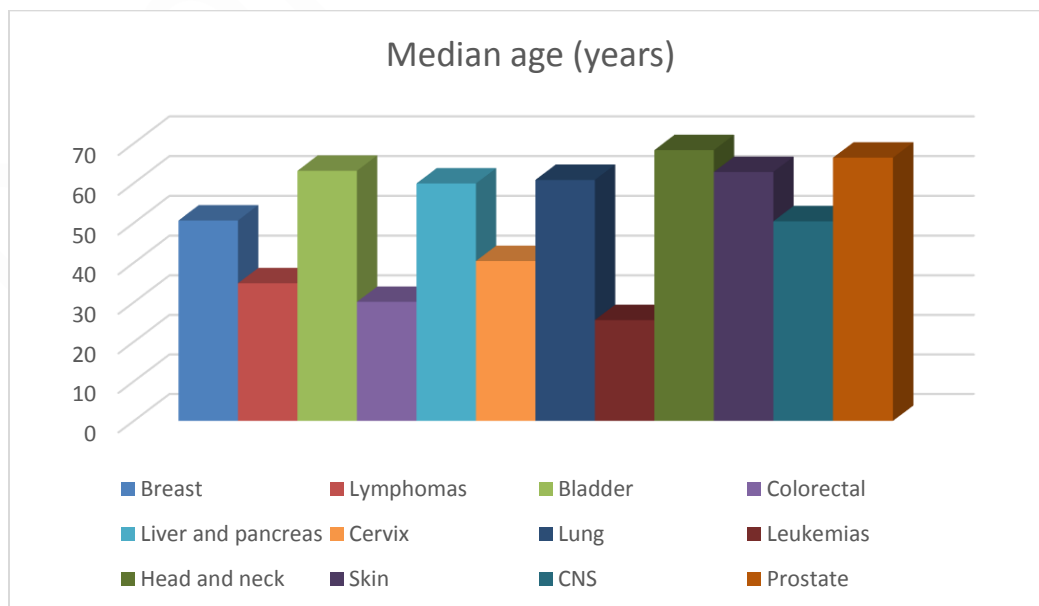
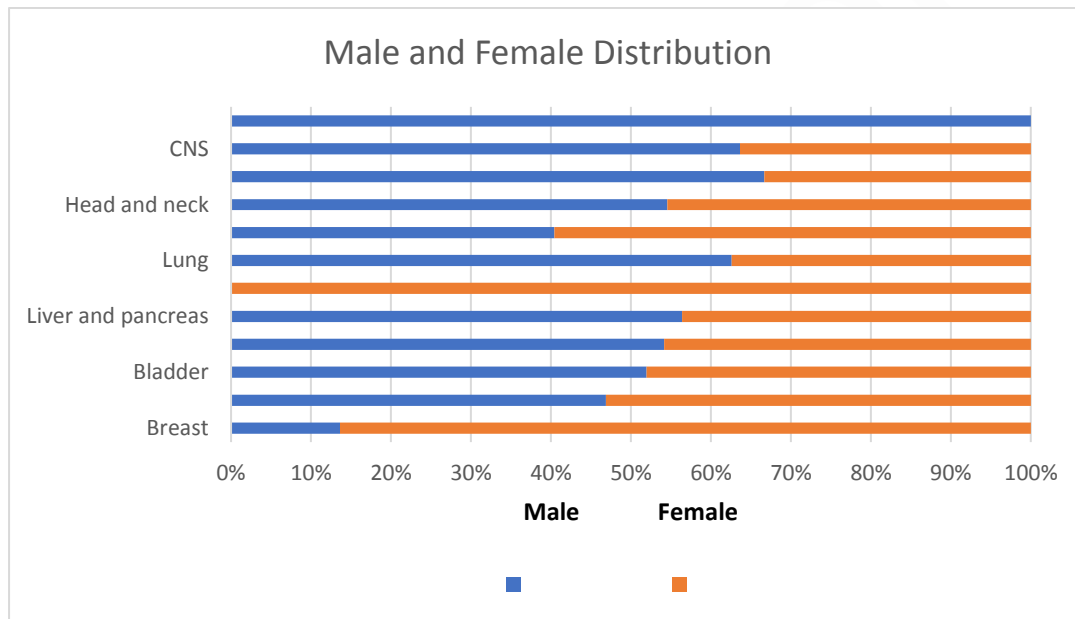
**Figure 1** Pie chart of cancer prevalence in Misan province, Iraq (2011-2018)**Figure 2** Barchart of Median age (years) of cancer site/type in Misan province, Iraq (2011-2018)

Table 3 The percentage of patients (male and female) with cancer in Misan province, Iraq (2011-2018)

Cancer site/type	Gender		
	Male (%)	Female (%)	Total (%)
Breast	33(5.0%)	209(29.6%)	242(17.7%)
Lymphomas	30(4.6%)	34(4.8%)	64(4.7%)
Bladder	120(18.2%)	111(15.7%)	231(16.9%)
Colorectal	26(3.9%)	22(3.1%)	48(3.5%)
Liver and pancreas	22(3.3%)	17(2.4%)	39(2.9%)
Cervix	-	49(6.9%)	49(3.6%)
Lung	194(29.4%)	116(16.5%)	310(23.1%)
leukemia	72(10.9%)	106(15.0%)	178(13.1%)
Head and neck	18(2.7%)	15(2.1%)	33(2.4%)
Skin	20(3.0%)	10(1.2%)	30(2.2%)
CNS	28(4.2%)	16(2.3%)	44(3.2%)
Prostate	96(14.6%)	-	96(7.0%)
Total	659(48.3%)	705(51.7%)	1364 (54 missing)*
P = 0.145			

*Total sample sizes and numbers missing may differ due to missing values for selected variables

**Figure 3** Male and female distribution of cancer types in Misan province, Iraq (2011-2018)**Table 4** Death rate among cancer site/type in Misan province, Iraq (2011-2018)

Cancer site/type	Death rate (%) 2011-2018 (n=967)
Breast	106(10.9)
Lymphomas	33(3.4)
Bladder	217(22.4)
Colorectal	46(4.8)
Liver and pancreas	39(4.0)
Cervix	26(2.7)
Lung	253(26.2)
Leukemias	82(8.5)
Head and neck	27(2.8)
Skin	29(3.0)
CNS	44(4.6)
Prostate	65(6.7)
P = 0.027	

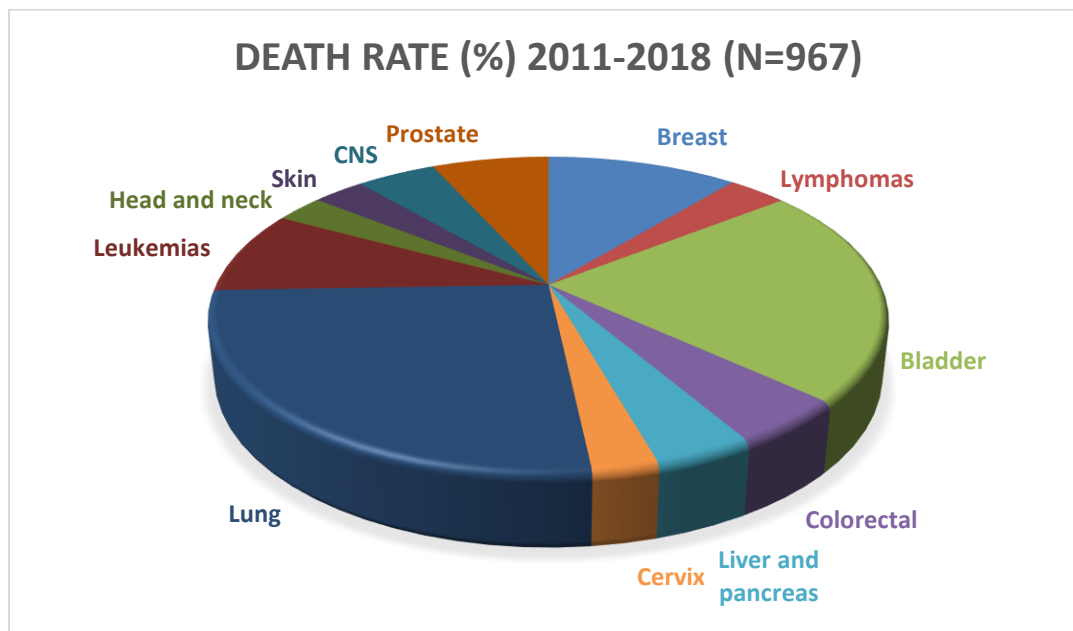


Figure 4 Pie chart of death rate among cancer site/type in Misan province, Iraq (2011-2018)

we all would get cancer (Johnson, 2010). Younger people mostly in 2nd and 3rd decades of life affected by leukemias (MSA=25.5), colorectal (MSA=30.1) and lymphoma (MSA=34.8) as a results obtain from this study. Cervix cancer (MSA=40.4) was occurred in 4th decade. In middle age groups, breast (MSA=50.6), CNS cancers (MSA=50.4) and liver and pancreas cancers (MSA=59.9) were mostly happened in 5th decade of life. In old aged peoples the prostate (MSA=66.4), lung (MSA=60.8), bladder (MSA=63.1), skin (MSA=62.8) and head and neck cancers (MSA=68.3) were old age related cancer presented in 6th decade in this study. Essentially all of the increase in cancer rates between prehistoric times and people who died in England between 1901 and 1905 is due to increased lifespans (Johnson, 2010). Although the age-related increase in cancer risk is well-documented, the age-related patterns of cancer are complex (de Magalhaes, 2013).

Cancer affects various parts of the body, but different risk factors may lead to it. Cancer can also affect both men and women, but some cancers are specific for one sex. In some cancers, the incidence occurs largely in men higher than in women, or the opposite. This is because the difference in smoking, drinking behaviors, occupational exposures and differences in the metabolism of estrogen and androgen. Also, men are more likely to die from cancer than women. For lung cancer, results reveal a gap between men and women mortality because women do not mostly smoking (Agilaand Benyounis, 2015).

Some cancers specifically occur in men and are affected by age, family history and smoking such as lung and prostate cancers (WHO, 2004). Three types of cancers recorded in men with large percent which were lung (29.4%), bladder (18.2%) and prostate (14.6%).

On other hand, breast (29.6%), lung (16.5%) and bladder (15.7%) cancers mostly occurred in women and represented the most three types of cancers.

This distribution can be affected by sex, age, family history and lifestyle. At the previous time, experts found that about one out of every eight women will be diagnosed with breast cancer at some time during her life (NCI, 2012). Women can be affected by many factors such as lifestyle, utilization of screening mammography, and availability of appropriate care. These factors are very important because they allow diagnosis and treatment the cancer disease at the early stage (Ermiah,

2013). Approximately, 15% of females diagnosed with breast cancer have a family history, whereas 5 – 10% may be related to genetic mutations. However, 85 % of women diagnosed with breast cancer have no family history, but the most significant causes for breast cancer are sex (being women) and age (growing older) (NCI, 2012).

Urinary bladder carcinoma is the third most common cancer in Misan, the reasons behind that, the province was endemic with Schistosomiasis (*schistosoma haematobium*), smoking habit and tobacco addiction is another contributory factor, these observations are on contrary to dates from other comparative studies conducted in the Kurdistan Region/Iraq (Othman et al, 2011), Jordan (Qasem, 2004), and Lebanon (Shamseddine et al, 2004).

Breast cancer is the most common cancer in the female and second cancer overall others. The size of problems morbidity and mortality compatible with other studies conducted, in Iraq (Al-Hashimi and Wang, 2014), Iran (Rafiemanesh et al, 2016), Egypt (Omar et al, 2003), Saudi Arabia (Ravichandran et al, 2005), Kuwait (Salehand Abdeen, 2007), so it is important problem and recommendations for early detection of it, an important issue, so the need for breast clinic for early detection and diagnosis of breast cancer is of vital importance (breast self-examination, examine by physician, mammography, FNA for cytology, ultrasound, and recently MRI breast).

Breast cancer in female (29.6%) was six times more than in male (5%). Cervical carcinoma (6.9%) was only recorded in female while prostate cancer (14.6%) was totally prevalent in male. Lung cancer was double in male (29.4%) in comparison with female (16.5%), this resemble CNS tumors which was also double in male (4.2%) than female (2.3%).

Skin cancers was triple in male (3.%) than female(1.2%),this is because of exposure to the sun in most seasons in this governorate and almost always covered women, but the cancers actually more common than these figure because of the patients included in this study where in-patients, and patients with skin cancers or ulcers, usually presented with mild signs and symptoms, unless it is presented with metastasis to vital organs that is why most of patients skin cancers treated and followed-up in out-patient clinic and private clinic.

In last few years, leukemias especially chronic myeloid leukemia (CML), recorded in highest prevalence in both sex (10.9% and 15%) in male and female respectively. The factors related to this new model of prevalence is multi-factorials, most probably related to environmental factors. It might be exposure to radiation especially exposed to depleted uranium used in Gulf war (II). Regarding bladder (18.2% and 15.7%), lymphomas (4.6% and 4.8%), colorectal (3.9% and 3.1%), liver and pancreas cancers (3.3% and 2.4%) and head and neck cancers (2.7% and 2.1%), there were no statistically differences in prevalence among male to female.

Mortality events reflected low education, low socioeconomic, low health quality and bad services, decrement of tools and equipment, anti-cancer chemotherapy drugs and anti-cancer management options unavailability, low staff numbers and training, all these are important in control and prevention of cancer to decrease its prevalence, incidences and mortality. 967 died which almost diagnosed with cancers in this study in period from 2011 to 2018, whether from cancers or other reasons, since Iraq pass through ISIS terrorism in 2015-2018. Lung cancers was responsible for (26.2%) of all death from cancer, followed by bladder cancers (22.4%) and breast cancers (10.9%) in this study.

In the US cancer is second only to cardiovascular disease as the leading cause of death; (Jemal et al, 2008), but in the UK it is the leading cause of death (BBC, 2005). In many Third World countries cancer incidence (insofar as this can be measured) appears much lower, most likely because of the higher death rates due to infectious disease or injury. With the increased control over malaria and tuberculosis in some Third World countries, incidence of cancer is expected to rise; in the Eastern Mediterranean region, for example, cancer incidence is expected to increase by 100% to 180% in the next 15 years due to increases in life expectancy, an increasing proportion of elderly people, and the successful control of childhood disease (Khatiband Aljurf, 2008). According to the National Cancer Registry Programme of the India Council of Medical Research (ICMR), more than 1300 Indians die every day due to cancer. Between 2012 and 2014, the mortality rate due to cancer increased by approximately 6%. Breast cancer is the most common one, with stomach and lung cancers the leading cause of death by cancer for the population as a whole (NCRP, 2013).

In Canada, as of 2007, cancer is the number one cause of death, contributing to 29.6% of all deaths in the country followed by cardiovascular diseases. As of 2011, prostate cancer was the most common form of cancer among males (about 28% of all new cases) and breast cancer the most common in females (also about 28% of all new cases). The leading cause of death in both males and females is lung cancer, which contributes to 26.8% of all cancer deaths (NCI, 2012). In the United States, cancer is responsible for 25% of all deaths with 30% of these from lung cancer. The most commonly occurring cancer in men is prostate cancer (about 25% of new cases) and in women is breast cancer (also about 25%), (NCI, 2012; SEER, 2007).

CONCLUSION

Cancer affects different parts of the human body, and it multi-factorials conditions. Cancer can also affect both men and women, but some cancers are sex related diseases. In some cancers, the prevalence occurs largely in men higher than in women, or the opposite. This is because the difference in tobacco habits, occupational exposures and differences in the hormonal status. Lung recorded as most common cancer types regarding prevalence and death rate. Breast cancers are in the first place in female. In relation to age, the concluded age ranged from 2nd – 6th decade, mostly affected by cancer overall cancers types obtained in this

study. More than half cancer patients' died throughout period of study, which mirrored to low education, low socioeconomic, low health quality and bad services, decrement of tools and equipment, anti-cancer chemotherapy drugs and anti-cancer management options unavailability, low staff numbers and training, in this part of Iraq.

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Article Keywords

Cancer, Epidemiology, Misan province

Abbreviations

MOH-National Iraqi Ministry of Health; ICRC-Iraqi Cancer Registry Center; SEER-Surveillance, Epidemiology, and End Results; GBD- Global Burden of Disease Study; WHO-World Health Organization; NCI-National Cancer Institute; MSA-Median standardized age; NCRP-National Cancer Registry Programme.

Competing interests

We (authors) declare that we have no conflict of interest.

Disclosure statement

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Consent

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this article.

Ethical approval

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee from Iraqi Ministry of Health (**code:270000425**) and Faculty of Medicine / Misan University (**code:94**) and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

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