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5th Combined Gulf Cancer Conference
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**CONTINUUM OF CARE
IN CANCER CONTROL
& MANAGEMENT**

Awareness & Prevention | Early Detection & Screening | Diagnosis
Treatment | Palliative Care | Survivorship | Research

**SAVE
THE DATE** **21-23
NOV 2022**

The poster features a dark blue and purple header with a circular logo for the 5th Combined Gulf Cancer Conference. Below the logo, the main title 'CONTINUUM OF CARE IN CANCER CONTROL & MANAGEMENT' is centered. Underneath, a list of topics is provided. At the bottom, a calendar icon indicates the dates '21-23 NOV 2022' and the phrase 'SAVE THE DATE' is written vertically.

Gulf Guidelines for Colorectal Cancer Workshop

**Updating
Colorectal Cancer
Guidelines**

8-9 November 2022

State of Kuwait

The poster is a circular graphic with a blue background. The text 'Updating Colorectal Cancer Guidelines' is written in yellow. Below it, the dates '8-9 November 2022' are in white on a dark blue rectangular background. At the bottom, 'State of Kuwait' is written in white.

MONKEY POX
ALL YOU NEED TO KNOW

The poster features a background of red, spiky virus particles. On the right side, the text 'MONKEY POX' is written in white on a red rectangular background, with 'ALL YOU NEED TO KNOW' written in black below it.

The Official Journal of the Gulf Federation For Cancer Control

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Trends in the Incidence and Mortality of the Most Common Cancers in Iraq (Iraqi Cancer Registry 1999–2019)

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Abstract:

Cancer is the second leading cause of death in Iraq following heart and cerebrovascular diseases. Assessment of incidence and mortality trends is essential for prioritizing cancer control in the national health policies and plans.

Aim:

To determine the patterns and trends in the incidence and mortality of the leading types of cancers affecting the Iraqi population during the last two decades.

Material and Methods:

This is a descriptive retrospective study based on the available data of the Iraqi Cancer Registry for the years (1999 – 2019). The analyzed information included the annual total number of new cancer cases and cancer deaths during the assigned period categorized by site, age, gender and morphology of each cancer. The data was coded according to Cancer Registry Program 4 (Can Reg4) and the International Classification of Diseases for Oncology (ICD–O). The estimated total annual number of Iraqi populations for the same period was retrieved from the Iraqi Ministry of Planning. The incidence and mortality rates were calculated per 100,000 Iraqi population and classified by ICD–O, site of the tumor, gender and age group.

Results:

The overall cancer incidence rate (IR) in 2019 was 91.66/100,000 population (78.14 and 105.46/100,000 in males and females, respectively). The age standardized rate (ASR) was 155.60/100,000. The top five cancers in terms of IR were those of the breast (18.17/100,000; ASR:29.93/100,000), lung (7.24/100,000; ASR:14.81/100,000), colorectum (5.95/100,000; ASR:10.77/100,000), brain/CNS (5.83/100,000, ASR:8.39/100,000)

and leukemia (5.05/100,000; ASR:6.83/100,000). The peak IR was observed among patients of both genders in the eighth decade of life (1127.37/100,000). The trend of IR for all cancers has significantly increased from 43.95/100,000 in 1999 to 91.66/100,000 in 2019 (more than 100%, $p < 0.0001$). The highest increase was demonstrated in cancers of the colorectum (from 1.2 to 5.90, $p < 0.001$), breast (from 6.6 to 18.2, $p < 0.001$) and brain (from 2.0 to 5.80, $p = 0.032$). On the other hand, the mortality rate (MR) was 28/100,000 population in 2019 (28.45 and 27.55/100,000 in males and females, respectively). The highest MR was observed in cancers of the lung (4.48/100,000), breast (3.16/100,000) and leukemia (2.42/100,000). Whereas a non-significant increase in the mortality trends of leukemia, colorectum, breast and lung cancers were noted, our data revealed a decline in the trend of brain/CNS cancer mortality (from 3.2 to 2.3/100,000).

Conclusions:

The top leading cancers in Iraq are steadily increasing in upward trends though they remain lower than the global rates. The underestimated IRs and MRs are possibly attributed to suboptimum registration and missing data due to the lack of a national surveillance system. Efforts should be directed to prioritize the adoption of the national cancer control plan focusing on strengthening the population-based cancer registry.

Key Words: Trends, incidence; mortality, Iraq; common cancers.

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Introduction:

The growing burden of cancer is variable in different countries across the globe; reflecting aging of the population and associated changes in socioeconomic development. Data on cancer incidence and mortality are published routinely by the International Agency for Research on Cancer (IARC). GLOBOCAN highlights the geographical variations in cancer risk by presenting relevant demographic characteristics including age, sex and time⁽¹⁾.

It has been estimated there were 19.3 million new cancer cases and about 10 million cancer deaths in 2020⁽²⁾. The most frequent cancers originated from the female breast (11.7%), lung (11.4%), colorectum (10%), prostate (7.3%) and stomach (5.6%); while the leading causes of related deaths were due to lung (18%), colorectal (9.4%), liver (8.3%), stomach (7.7%) and breast cancers (6.9%). At a global glance, the registered incidence rates for these cancers are at least two–folds higher for both sexes in transitioned versus transitioning countries whereas the mortality rates are declining in the former. On the other hand, in low– and middle–income countries (LMICs) both incidence and mortality rates are increasing^(1, 2).

In the Eastern Mediterranean Region (EMR) cancer is growing at an alarming rate, though less than 50% of countries have operational cancer control policies^(4, 5) and the relevant research output is significantly low^(3, 4). In Iraq cancer is the second leading cause of death following heart and cerebrovascular diseases⁽⁵⁾. The Iraqi Cancer Registry (ICR) was established since 1974 to register new cancer cases and deaths annually from all Iraqi governorates⁽⁸⁾. A national cancer control plan was developed for Iraq in 2010 following the recommendations of the WHO cancer control strategy⁽⁶⁾. Nevertheless, the repercussions of the successive wars, local conflicts and displacement in Iraq during the past decades resulted in severe decline in the availability of the requested medical resources and disruption in the provision of the optimum health care services and infrastructure⁽⁷⁾.

Among an estimated population of 39,127,889 the latest published ICR registered 35,864 new cancer cases and 10,957 deaths in 2019. The five most common sites of cancer were the breast, lung, colorectum, brain and leukemia, whereas the leading causes of related mortality were attributed to lung, breast, leukemia, brain and colorectal cancers⁽⁵⁾.

The assessment of the trends in cancer incidence and mortality rates nationwide is essential to prioritize cancer control in the national policies and health plans. This study aimed to determine the patterns and trends in the incidence and mortality of the leading types of cancers among the Iraqi population during the last two decades (1999–2019) using data compiled by the ICR.

Patients and Methods:

This descriptive study was based on the available data in the ICR for the years 1999 to 2019. The registered data is collected routinely on annual basis from medical records of hospitals and laboratories (public and private) in all governorates including Kurdistan region. The pooled information is registered by well– trained staff who works at the cancer registry units in the major hospitals of each governorate. The recorded data is coded according to the Cancer Registry Program 4 (Can Reg 4) and the International Classification of Diseases for Oncology (ICD–O), third edition. The completed registry forms collected from all over Iraq are referred at three–month intervals to the central cancer registry section that is affiliated to the Iraqi Cancer Board of the Ministry of Health, where they are checked for accuracy and completeness.

This study included all registered cancer cases among Iraqis for the period 1999–2019. The analyzed data comprised the annual total number of new cancer cases and cancer deaths in Iraq during the assigned period classified by their site, age at diagnosis, gender and morphology of each cancer (coded according to ICD–O–3). The estimated total annual number of Iraqi populations for the same period was retrieved from the Iraq Ministry of Planning, Central Statistics Office. The incidence and mortality rates were calculated per 100,000 Iraqi population and classified by ICD–O–3 site of the tumor, gender and age groups (Figure 1, Table 1).

In this study, there was an emphasis on the most prevalent five cancers recorded in the latest ICR of the year 2019; namely cancers of the breast, lung, colorectal, brain and leukemia. The trends of the incidence of the top cancers for the period 1999–2019 were demonstrated. As the information related to cancer deaths was first included in the ICR in 2009, the trends of cancer mortality were assessed by analyzing the data from 2009 to 2019.

The Statistical Package of Social Sciences (SPSS) version 21 was used for data analysis. The percent changes in the incidence (for the years 1999 and 2019) and the mortality (for the years 2009 and 2019) were measured. The simple linear regression equation was used to assess the trend and the regression coefficient (β), R^2 and the p value were calculated for each of the five most common cancers in the country. $P < 0.05$ was considered statistically significant.

Results:

The total number of cancer cases reported in the ICR during the period from the beginning of 1999 till the end of 2019 was 402,932; 45.9% were males and 54.1% were females. Generally, there is a continuous increase

Age Group	Male No.	Male %	Female No.	Female %	Total No.	Total %
0 – 4	2,947,214	7.53	2,793,755	7.14	5,740,969	14.67
5 – 9	2,750,510	7.03	2,589,237	6.62	5,339,747	13.65
10 – 14	2,458,155	6.28	2,294,786	5.86	4,752,941	12.15
15 – 19	2,156,791	5.51	2,037,814	5.21	4,194,605	10.72
20 – 24	1,883,982	4.81	1,738,706	4.44	3,622,688	9.26
25 – 29	1,477,655	3.78	1,436,732	3.67	2,914,387	7.45
30 – 34	1,293,900	3.31	1,331,510	3.40	2,625,410	6.71
35 – 39	1,102,866	2.82	1,162,754	2.97	2,265,620	5.79
40 – 44	1,039,989	2.66	1,053,879	2.69	2,093,868	5.35
45 – 49	768,587	1.96	791,404	2.02	1,559,991	3.99
50 – 54	453,172	1.16	564,330	1.44	1,017,502	2.60
55 – 59	515,182	1.32	539,124	1.38	1,054,306	2.69
60 – 64	354,795	0.91	387,782	0.99	742,577	1.90
65 – 69	233,545	0.60	243,306	0.62	476,851	1.22
70 – 74	152,371	0.39	153,330	0.39	305,701	0.78
75 – 79	80,256	0.21	96,704	0.25	176,960	0.45
80 +	99,354	0.25	144,412	0.37	243,766	0.62
Total	19,768,324	50.52	19,359,565	49.48	39,127,889	100

Table 1: Estimated number and percentage of Iraq population by gender and age groups, 2019.

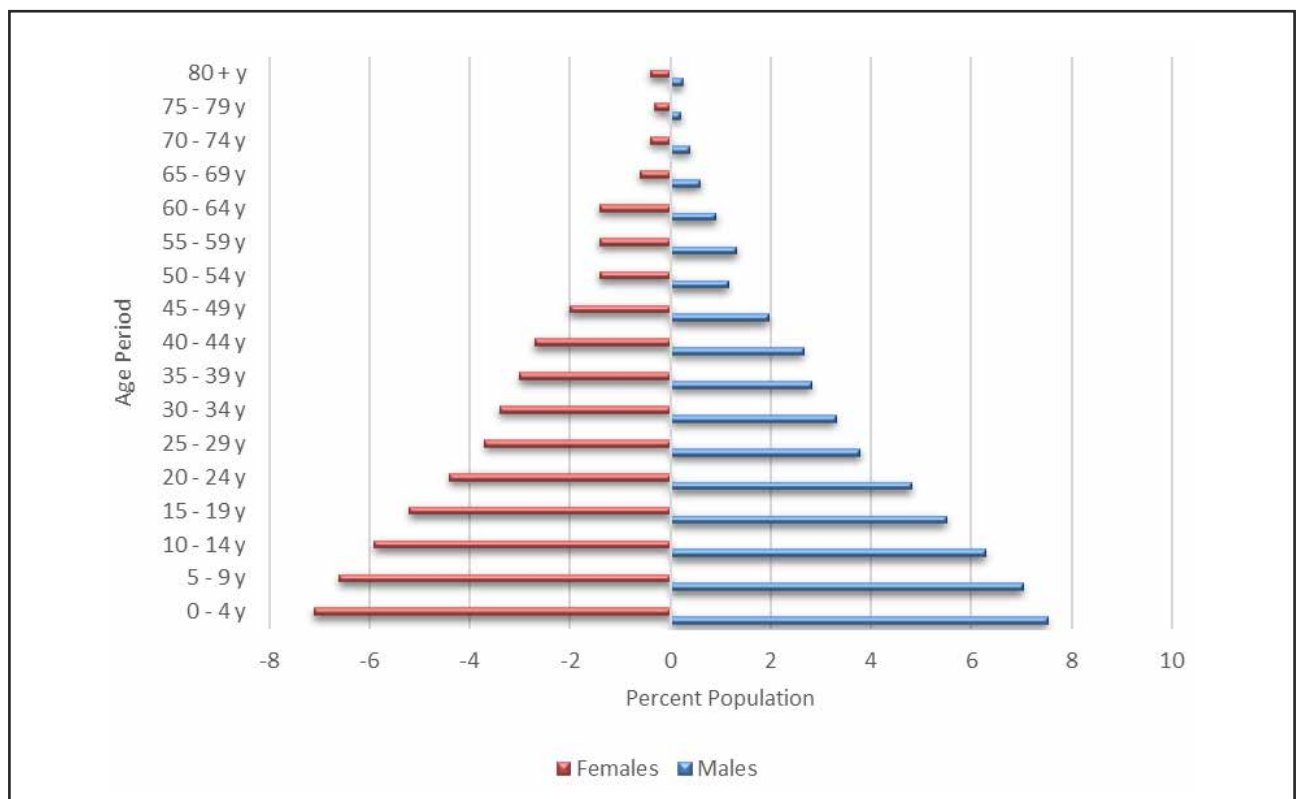


Figure 1: Population pyramid, Iraq, 2019.

in the number of cancer cases over the study period apart from some declines reported in 2003 and 2007. There were 8,936 registered new cancer cases in 1999, expanding to 15,251 in 2009 and reaching to 35,864 in 2019. The incidence rate has significantly increased from 45.67/100,000 in 1999 to 91.66/100,000 in 2019 ($P<0.001$). Overall, females showed higher cancer cases than males except for the years 1999, 2001, 2003 and 2004, where males predominated slightly. In 1999 the male to female ratio was 1.04:1 while in 2019 it was 0.76:1. This ratio was significantly declining over the study period ($P<0.001$) (Figure 2).

Table (2) demonstrates the total number of new cancer cases and deaths in Iraq classified by type during 2019. The overall incidence rate was 91.66/100,000 population. The age standardized rate (ASR) was 155.60/100,000. The top five cancers were those of the breast (overall 19.82%, IR:18.17/100,000, ASR:29.93/100,000), lung (7.9%, IR:7.24/100,000, ASR:14.81/100,000), colorectal (6.49%, IR:5.95/100,000; ASR:10.77/100,000), brain//

CNS (6.37%, IR:5.83/100,000; ASR:8.39/100,000) and leukemia (5.51%, IR:5.05/100,000; ASR:6.83/100,000).

The total number of cancer deaths during 2019 was 10,957 with a mortality rate of 28/100,000 population (28.45 and 27.55/100,000 in males and females, respectively). The highest mortality rate was registered in those who had lung cancer (15.99%, MR:4.48/100,000), followed by breast (overall 11.29%, MR:3.16/100,000), leukemia (8.63%, MR:2.42/100,000), brain//CNS (8.11%, MR:2.27/100,000) and colorectal cancers (6.31%, MR: 1.77/100,000).

The ASR increased significantly with time; from 71.67 in 1999 reaching 155.60 in 2019 ($p<0.001$) (Figure 3).

The frequency distribution of cancer cases according to gender and age in 2019 are presented in Figure (4). The estimated IRs of cancer cases among males and females in 2019 were 78.14/100,000 and 105.46/100,000 respectively. Rates were age-adjusted according to the estimated population of Iraq at that year. Overall, the

Rank	Top Ten Cancers	New Cancer Cases			New Deaths		
		No.	%	IR	No.	%	MR
1	Breast	7,109	19.82	18.17	1,237	11.29	3.16
2	Bronchus & Lung	2,832	7.90	7.24	1,752	15.99	4.48
3	Colorectal	2,328	6.49	5.95	691	6.31	1.77
4	Brain/CNS	2,283	6.37	5.83	889	8.11	2.27
5	Leukemia	1,977	5.51	5.05	946	8.63	2.42
6	Thyroid	1,802	5.02	4.61	125	1.14	0.32
7	Urinary Bladder	1,710	4.77	4.37	462	4.22	1.18
8	Non-Hodgkin Lymphoma	1,477	4.12	3.77	425	3.88	1.09
9	Skin	1,311	3.66	3.35	91	0.83	0.23
10	Prostate	1,224	3.41	6.19*	343	3.13	1.74
	Total Top Ten	24,053	67.07	61.47	8,085	73.79	20.66
	Total Others	11,811	32.93	30.19	2,872	26.21	7.34
	Grand Total	35,864	100	91.66	10,957	100	28.00

Table 2: Distribution of new cancer cases, related deaths, incidence and mortality rates of the top ten cancers in Iraq (ICR, 2019).

*The prostate incidence rate is calculated from the male population.

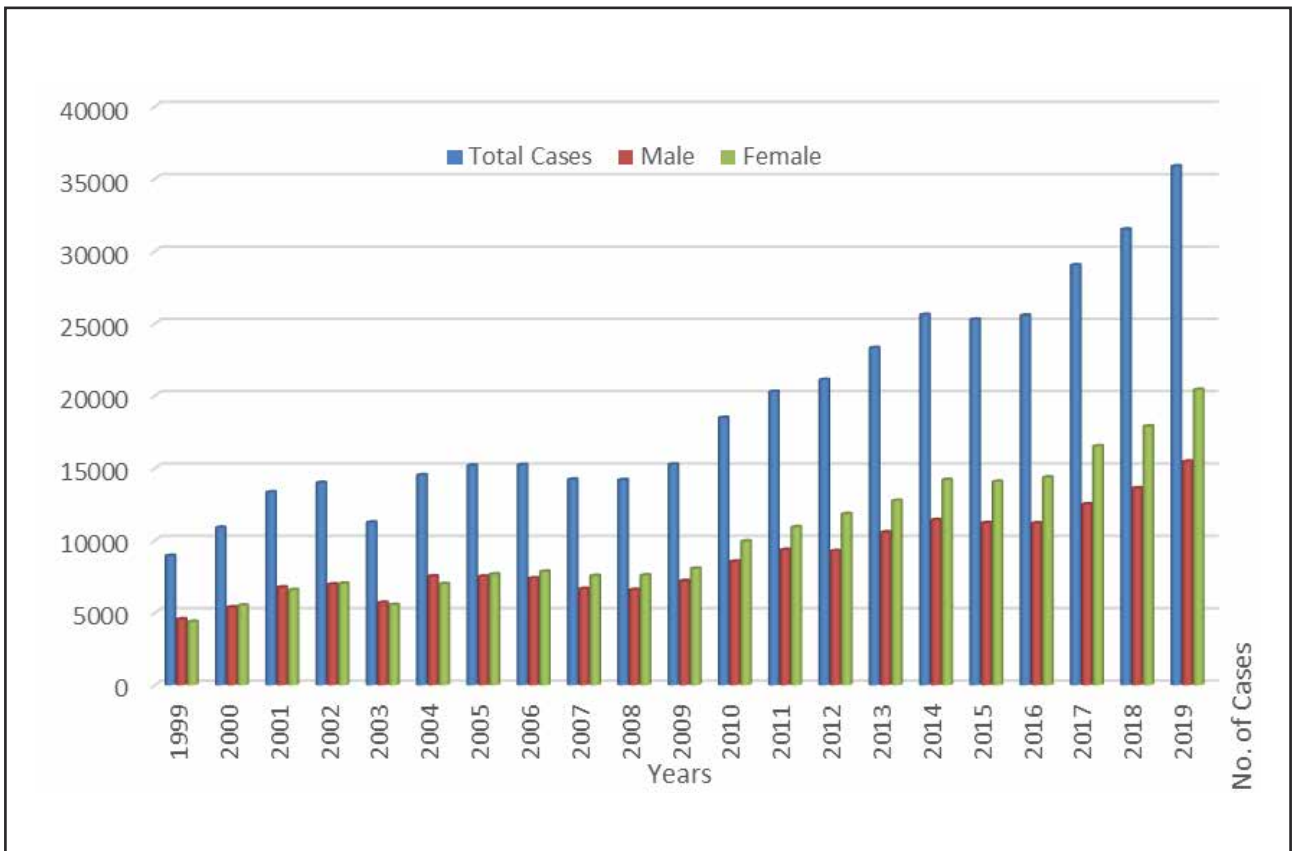


Figure 2: Total number of registered new cancer cases in Iraq classified by gender and year from 1999 to 2019.

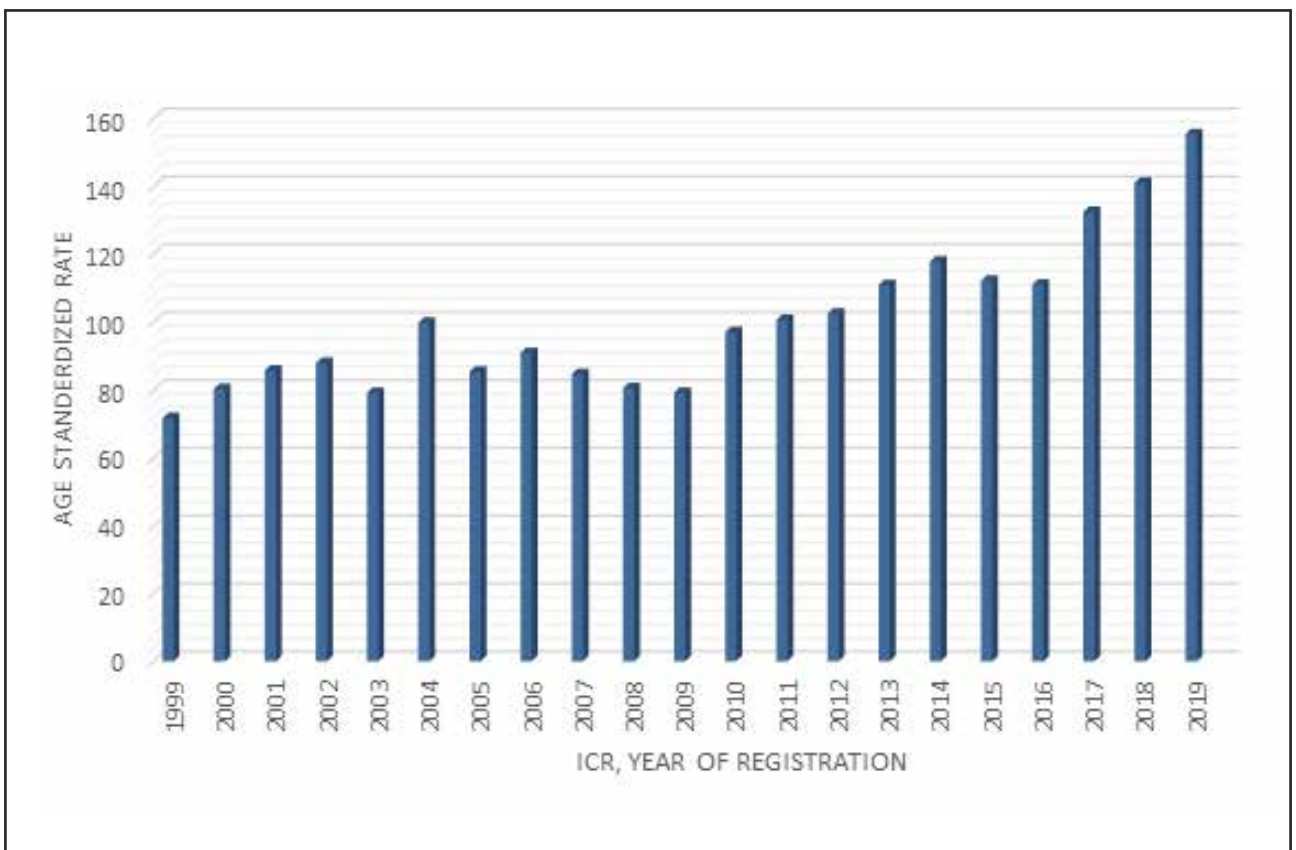


Figure 3: Overall cancer age standardized rates, ICR (1999–2019).

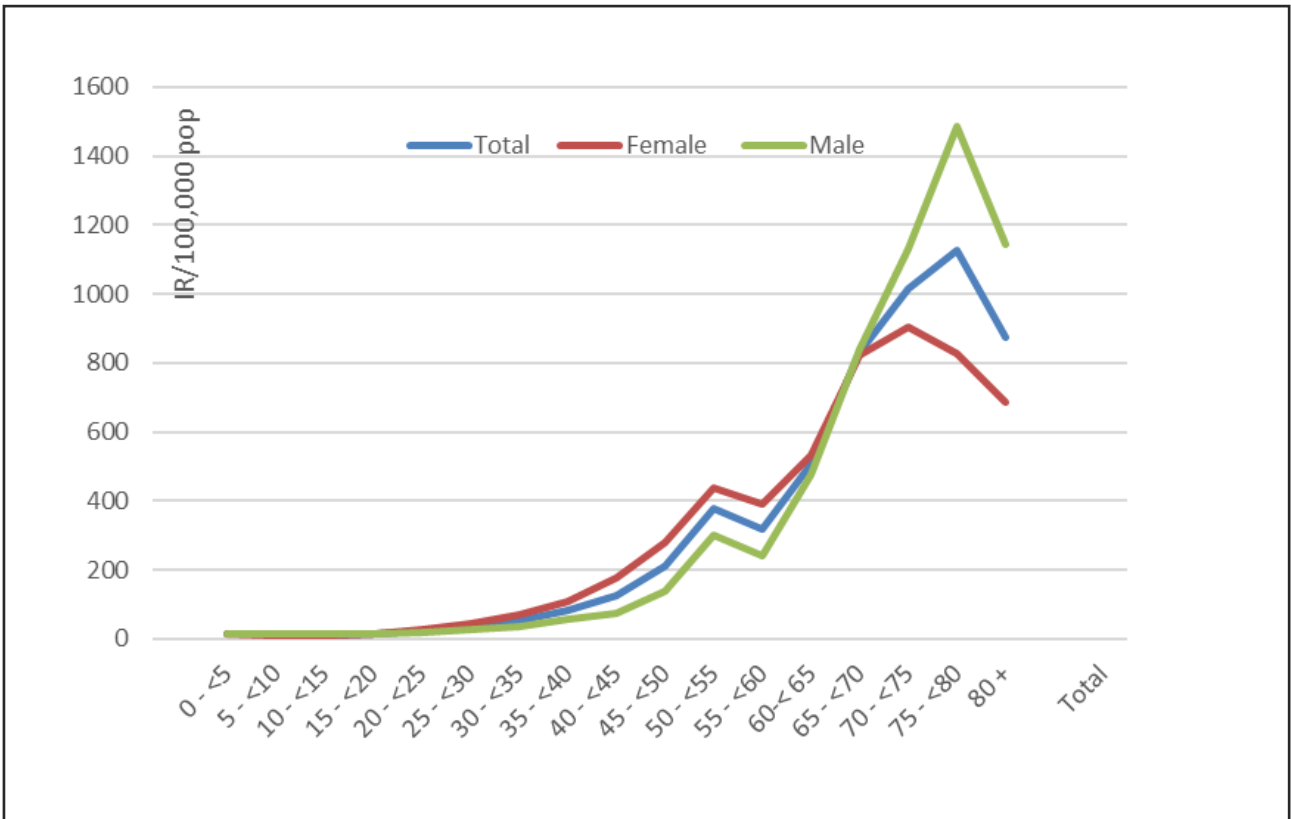


Figure 4: Trends in the IR of cancer per 100,000 Iraqi population by age and sex in 2019.

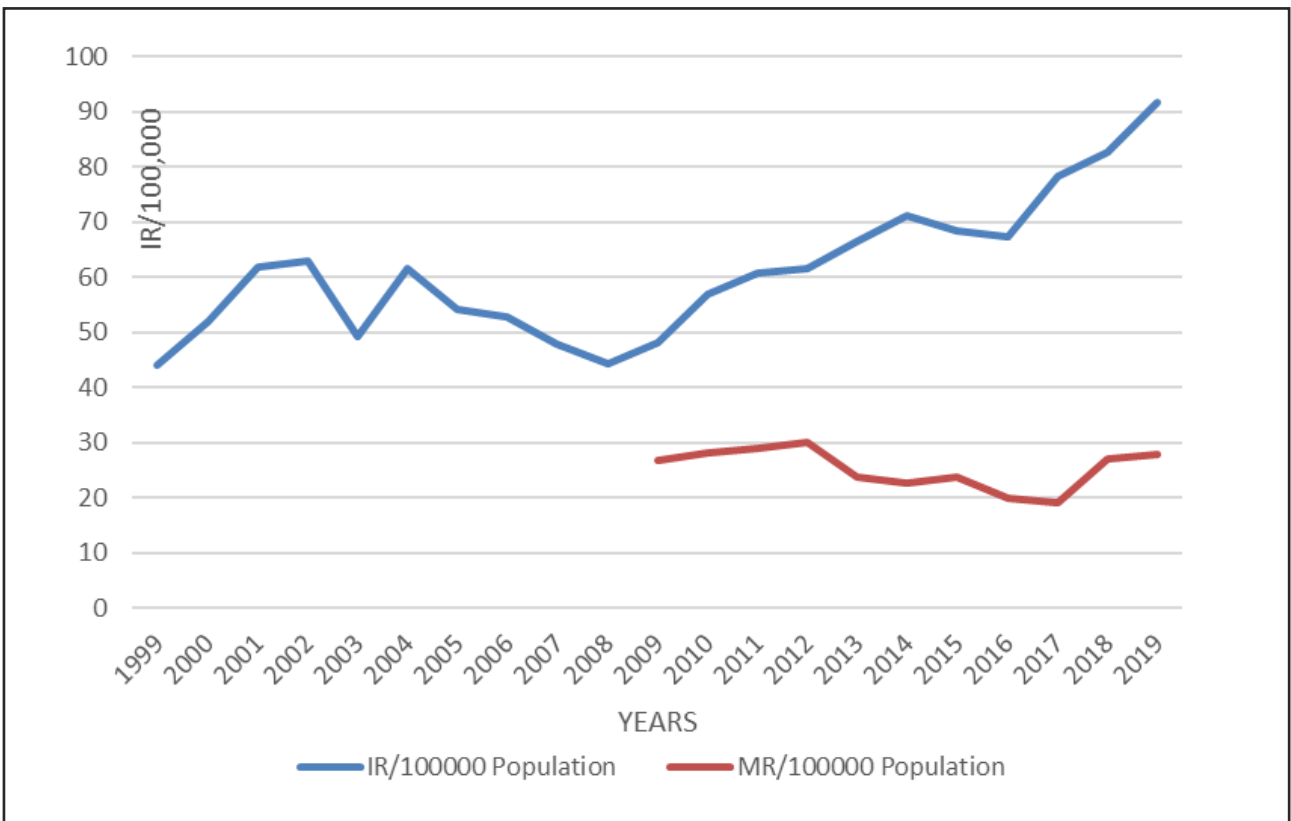


Figure 5: Trends in the overall Crude IR and MR of new cancer cases and related deaths in Iraq per 100,000 population (1999–2019).

peak IR is observed in patients of both genders in the age period 75–80 years (1127.37/100,000).

The overall trend of the cancer incidence in Iraq during the past two decades was rather fluctuating from 1999 to 2007; after which it started to increase steadily with time (Figure 5). In general, the IR has significantly increased from 43.95/100,000 Iraqi population in 1999 to 91.66/100,000 in 2019, i.e., more than 100% change over 21 years ($p < 0.0001$). On the other hand, the trend of mortality did not show such remarkable changes during the past eleven years apart from slight increase from 26.9/100,000 in 2009 to 28.0/100,000 in 2019 (only 4.1% change).

Figure (6) shows a significant increase in the IRs of the top five cancers between 1999–2019 with varying levels of increment. The highest increase (391.7%)

is seen in colorectal cancer where the IR increased by 168% escalating from 1.2 in 1999 to 5.9/100,000 in 2019 ($p < 0.001$), followed by brain cancer (190.0% increase, from 2.0 to 5.8/100,000; $p = 0.032$), breast cancer (175.8% increase, from 6.6 to 18.2/100,000; $p < 0.001$), bronchus and lung (105.7% increase, from 3.5 to 7.2/100,000; $p < 0.001$) while the lowest increase is observed in leukemia (72.4% increase, from 2.9 to 5/100,000; $p = 0.003$).

Regarding trends in cancer deaths, during the past decade from 2009 to 2019, there was a non-significant increase in the MRs of leukemia (166.7% elevation from 0.9 in 2009 to 2.4/100,000 in 2019; $p = 0.931$), colorectal cancer (50.0% change from 1.2 to 1.8/100,000; $p = 0.379$), breast cancer (23.1% from 2.6 to 3.2/100,000; $p = 0.890$) and bronchus and lung cancer (21.6% from

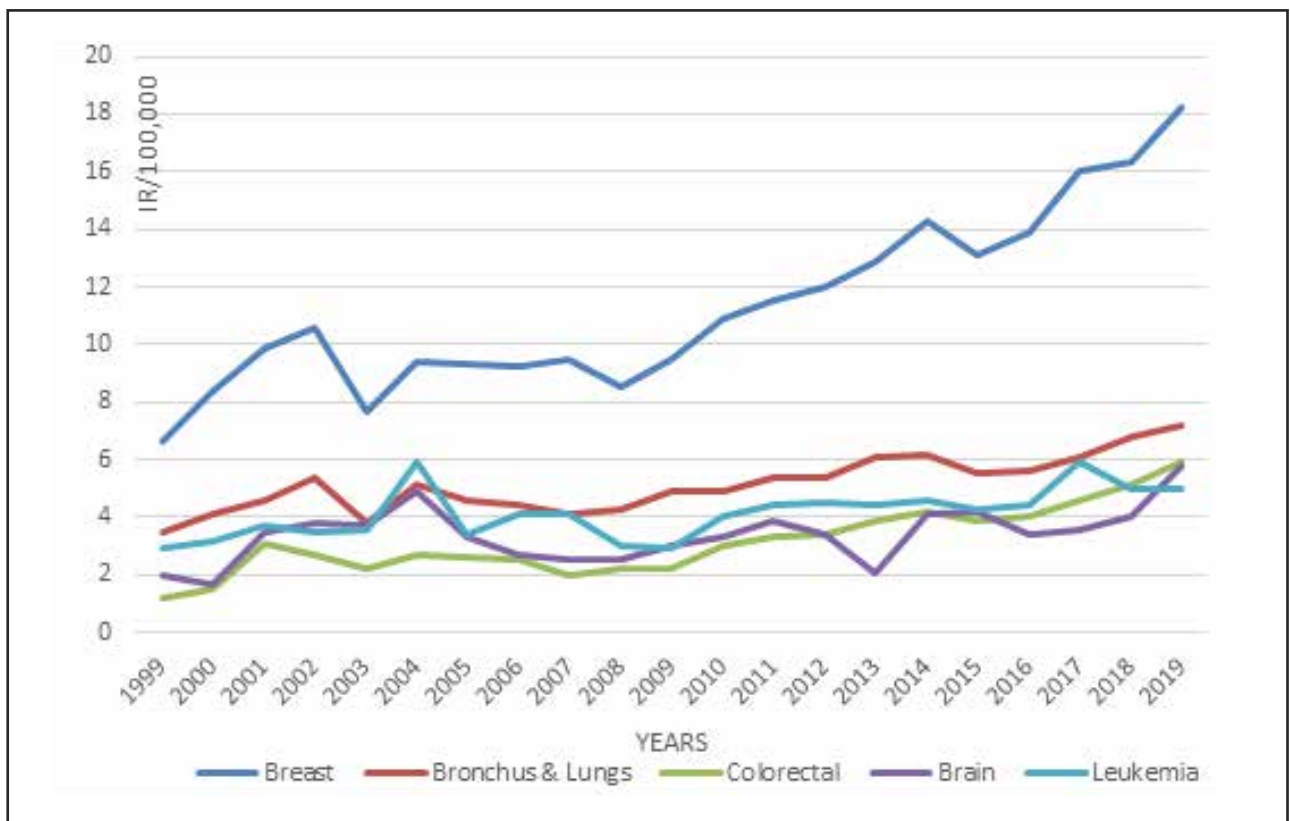


Figure 6: IRs per 100,000 population of the five leading cancers in Iraq (1999–2019).

	β	P	R^2
Breast	0.45	<0.001	0.82
Lung	0.13	<0.001	0.72
Colorectal	0.17	<0.001	0.77
Brain	0.074	0.032	0.22
Leukemia	0.085	0.003	0.33

3.7 to 4.5/100,000; $p = 0.184$). In contrast, there was a significant decline in the MR of brain cancer (–28.13% from 3.2 to 2.3/100,000; $p = 0.003$) (Figure 7).

Discussion:

The current study illustrates the burden and patterns in the incidence and mortality of the most prevalent types of cancers in Iraq. Following the fluctuation in the overall IRs of new cancer cases from 1999–2007, there was a

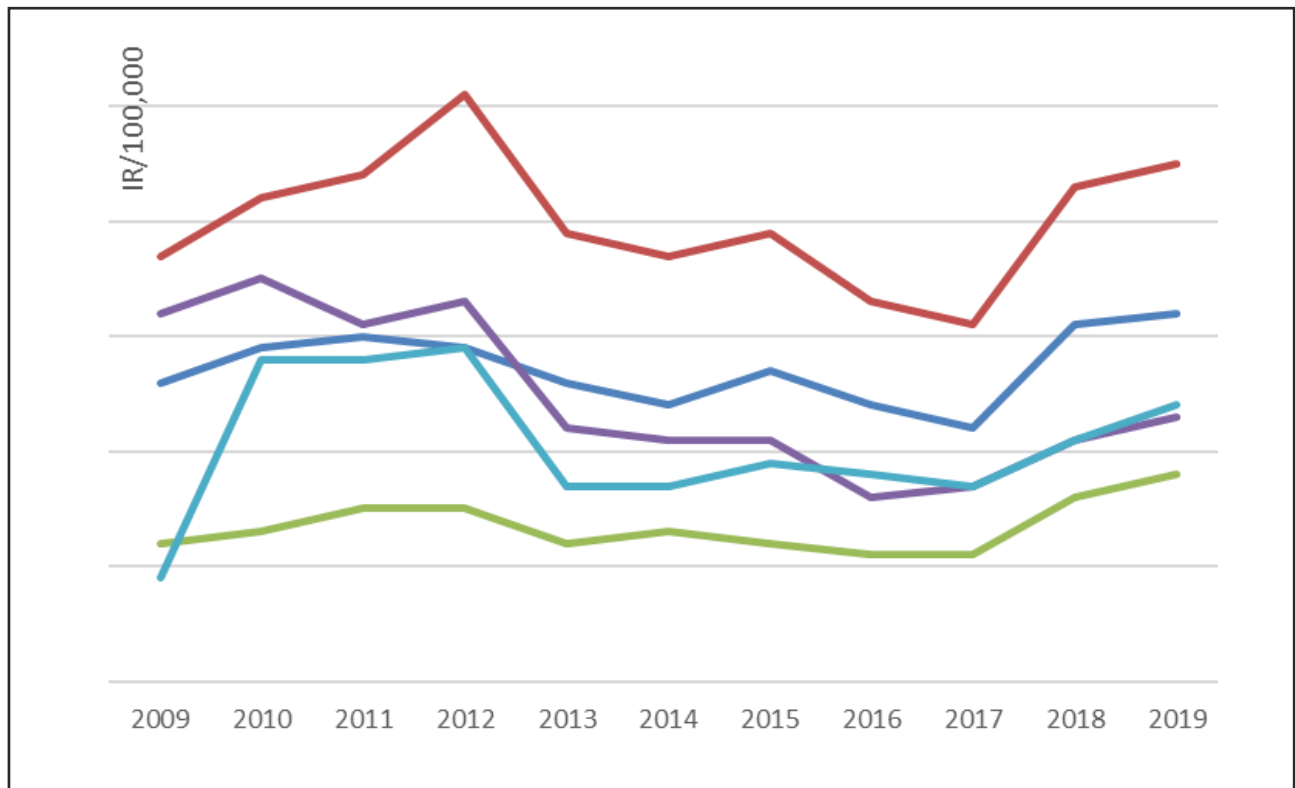


Figure 7: MRs per 100,000 populations of the five leading cancers in Iraq (2009–2019).

steady upward trend over the last 12– year period from 2008 (44.46/100,000) to 2019 (91.66/100,000) with an increment change exceeding 100%. That significant increase could be related to better cancer registration as it shifted to population base after compiling data from Kurdistan Region (that were not included in the preceding years) and commitment of the private sector. Other possible reasons include the reactivation of the national program for early detection of breast cancer and the relative social stability following the settlement of local conflicts^(7–9).

Similar findings were reported in studies from the region that linked the registered upslope in the trend of incident cancer cases to improvement in reporting, shift to westernized tradition, population growth and longer life expectancy^(3, 10, 11). In the EMR, the number of new cancer cases expanded from 495,000 in 2005 to 723,000 cases in 2015 (46.1% increase), with an overall ASR of 180/100,000 (155.60/100,000 in this study)^(12–13). Cancer is the fourth cause of death in the EMR which is experiencing an epidemiological transition from communicable to non-communicable diseases and where projection models predict the highest increase in cancer burden over the coming years⁽¹¹⁾. Globally, the incidence trends of the most common cancers in high-income countries (HICs) are plateauing due to prevention of exposure to risk

factors, screening and improved treatment; whereas the lack of applying these control measures are responsible for the escalation in the incidence and mortality trends in LMICs^(1,2,11).

Overall, the IR of new cancer cases in Iraq was higher among females than males in 2019; possibly due to the remarkable ascending trend of female breast cancer which constituted about 20% of the registered new cancers among the Iraqi population⁽⁵⁾. That is consistent with the findings reported in other surveys^(10,12,13). Conversely, in 2020 the global incidence rate for all cancers combined was 19% higher in men (222.0/100,000) than in women (186/100,000)⁽¹⁾. On the other hand, there was a non-significant increase in the overall MR of the most common cancers in Iraq during the past decade; with a quite low gender gap between males and females in 2019. At a global level, however, the difference in cancer MR between both genders was 43% higher in men (120.8/100,000) versus women (84.2/100,000).

Our findings showed that the estimated trend in the incidence of new cancer cases in Iraq increased steadily with age, specifically after 60, reaching a peak in the eighth decade of life then declining after the age of 80 years (6%). Comparable patterns of cancer distribution among age were demonstrated in other countries in the Arab world^(10, 12, 14).

The five leading cancers reported by the latest ICR (breast, lung, colorectal, brain and leukemia) were consistent with the top cancers registered by GLOBOCAN 2020⁽¹⁾ and the EMR^(3,12) as far as the breast, lung and colorectal cancers are concerned.

Breast Cancer

The female breast continues to be the leading cancer site among the Iraqi population since 1986⁽⁵⁾. In line with international database the male to female ratio in Iraq is 1:49⁽⁵⁾. The IR ascended from 6.6/100,000 in 1999 reaching to 9.5/100,000 in 2009 (44% change) and mounting progressively to 18.2/100,000 in 2019 (further 91.5% increase)^(21,22). An earlier Iraqi study showed a 56% increase in IR from 2000–2016⁽¹⁵⁾. The climbing pattern after 2008 in Iraq could be attributed to enhanced registration and active reinforcement of the national breast cancer campaign by promoting public awareness and upgrading imaging and laboratory diagnostic services^(7–9,16,17).

The ASR of breast cancer in this study was 29.93/100,000, compared to a pooled ASR of 37.10/100,000 person–year for the EMR⁽¹⁴⁾. Breast cancer is currently considered the most prevalent worldwide surpassing lung cancer^(1,2) and its burden is expanding continuously in the Arab world^(3,10,14); with the highest IR reported in Lebanon (84/100,000) and the lowest in Yemen (13/100,000)^(12,18). It is suggested that the diversity in the incidence trend of breast cancer in the EMR countries might be related to variation in the advancement of the operating national cancer registry systems⁽¹⁴⁾. Globally, the incidence of breast cancer is 88% higher in transitioned than transitioning countries^(13–19).

Regarding mortality, breast cancer is the fifth leading cause of cancer related deaths worldwide⁽¹⁾ and the second in Iraq following lung cancer⁽¹⁾. From 2009–2019 the mortality trend increased by 23.1%; obviously less than what is reported globally^(1,5,15,20). It has been illustrated that woman living in transitioning countries have 17% higher MR compared with those in transitioned countries (15 and 12.8/ 100,000 respectively) despite the lower incidence⁽¹⁾; implying that women in less–affluent societies have a shorter survival^(1,19,20). The poor outcome is mainly attributed to late stage at presentation and inappropriate treatment^(9,17,19,20).

Lung cancer

Lung cancer is the second most common cancer and the leading cause of cancer death worldwide and in Iraq^(1,5). The current study revealed 105.7% increase in the IR of lung cancer from 1999–2019 compared to a 37.2% upslope change displayed in a former report that analyzed

Iraqi cancer data from 2000–2016⁽¹⁵⁾. Nevertheless, the inclining trend is still lower than that reported in other regional and western surveys^(1,2,12,13). The male to female ratio in this study is estimated to be 2.3:1; while it varies widely across different regions of the world ranging from 1.2:1 in Northern America to 5.6:1 in Northern Africa⁽¹⁾.

In general, lung cancer remains the main source of cancer related morbidity and mortality among men globally. In women, it ranks third for incidence worldwide, sixth for most frequent female cancers in Iraq⁽⁵⁾ and second for mortality after breast cancer worldwide and in Iraq^(1,5). It is also the most frequent cancer and the leading cause of death among males in EMR with a survival rate not exceeding 8%⁽¹²⁾. In Iraq there was a 21.6% increase in the MR within the past decade.

International variations in lung cancer trends are closely associated with the tobacco epidemic specifically among males⁽²¹⁾. In many HICs mortality rates have peaked and declined later following the smoking prevalence⁽²²⁾. The shift to water pipe smoking in Arab countries is considered a serious risk factor; the highest consumption has been reported in Lebanon (50–60% among males compared to 38% in Iraq)^(12,23).

Colorectal Cancer

Overall, colorectal ranks third in terms of incidence worldwide and in Iraq, and second and fifth in terms of mortality worldwide and in Iraq, respectively⁽¹⁾. There was a 168% increase in the incidence between 1999 and 2019. A previous study in Iraq reported 80.6% increase between 2008 and 2016⁽¹⁵⁾. Principally, there is substantial variation in colorectal cancer incidence trends worldwide. Consistent with the latest global database⁽¹⁾, the male to female ratio of colorectal cancer in Iraq during 2019 was 1.13:1. In the EMR, the corresponding ratio was 1.20:1⁽¹²⁾.

On the other hand, the mortality trend of colorectal cancer in Iraq revealed a 50% increment from 2009 to 2019 (1.2 to 1.8/100,000, respectively). Global cancer statistics estimated that the IRs in 2020 were almost four times higher in transitioned compared to transitioning countries, while there was less variation in mortality due to greater fatality in the transitioning nations^(1,2). Among the Arab world, the highest IRs and MRs were reported in Lebanon and Palestine respectively^(11,12,24). Colorectal cancer is considered a marker of socioeconomic development reflecting changes in lifestyle activity patterns, diet and environmental factors⁽²⁴⁾. The declining rates in transitioned countries have been attributed largely to the uptake of screening colonoscopy and fecal occult blood test or stool DNA test⁽²⁵⁾.

Brain cancer

Whilst brain and other CNS cancers rank fourth in Iraq with respect to the most common cancers and frequent cause of mortality, they were not registered globally within the list of 2020 top ten cancers⁽¹⁾. The recorded data in the ICR for the period from 1999–2019 revealed a peculiar incidence trend that was fluctuating until 2013 thereafter escalating gradually. In general, there was a sluggish growth from 2.0 /100,000 in 1999 to reach 3.0/100,000 in 2009 (50% change) ending in 5.9/100,000 in 2019 (further 96.7%) with an overall 190.0 % change. Similar high increment was observed in another study on cancer burden in Iraq over the period 2000–2016⁽¹⁵⁾. In accordance with relevant local and global surveys^(15,18), the trends were almost similar for both sexes in Iraq with a slight preponderance to affect women (the male to female ratio was 0.89:1).

In contrast to the mortality trends of other prevalent cancers in Iraq (breast, lung and colorectum), the MR of brain cancer declined from 3.2 in 2009 to 2.3/100,000 in 2019 (–28.13% change). In general, it is believed that trends in brain cancer incidence and mortality are difficult to interpret owing to the different histological subtypes and the artefacts associated with modifying diagnostic and classification approaches; in addition to exclusion of nonmalignant tumors from registry reporting⁽²⁶⁾. The Global Burden of Disease Study 2016 reported that East Asia recorded the highest incident cases of CNS cancer for both sexes; emphasizing that geographical and regional variations in the trend could reflect environmental and genetic risk factors⁽²⁷⁾.

Leukemia

Globally leukemia ranks tenth in terms of incidence (among males) and mortality (among both sexes) in 2020⁽¹⁾. In Iraq, it is the fifth most common cancer and the third cause of cancer related deaths among the Iraqi population in 2019 with a male to female ratio of 1.2:1. The incidence trend was fluctuating during the past two decades; escalating to a peak in 2004, probably linked to relative social stability and better registration following the war. That was succeeded by a swinging pattern which ascended to 4.9/100,000 in 2019 (69% change). On the other hand, the mortality trend showed 26.3% increment change (from 1.9 in 2009 to 2.4/100,000 in 2019). Comparable trend patterns were illustrated by other neighboring countries⁽²⁸⁾.

Whereas a significant decrease in the incidence of leukemia was globally recorded between 1990 and 2017^(1,2,29), yet disparities in the trend still vary among different ages and races; mainly associated with exposure to environmental factors, genetic predisposition and

ionizing radiation^(30–31). As Iraq and the surrounding regions were exposed during the Gulf wars to various weapons and depleted uranium ammunitions, the unresolved debate on the association between their potential carcinogenicity and the growing burden of leukemia, brain and other types of cancers needs to be explored⁽⁷⁾.

Conclusion and Recommendations:

The top leading cancers in Iraq are steadily increasing in upward trends though they remain lower than the global rates. The underestimated IRs and MRs might be attributed to suboptimum registration, missing data and loss to follow up due to the lack of a national surveillance system. As civil conflicts, social and economic instabilities increase the cancer burden, there should be a determined political will to implement a comprehensive national cancer control plan. Efforts should be directed to establish evidenced–based protocol guidelines based on the existing resources focusing on strengthening the population–based cancer registry, promoting preventive measures and adopting early detection programs coped with appropriate treatment and palliative care. Relevant high–quality research is essentially needed to address the environmental pollution in Iraq and its associated risk factors.

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