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Epidemiological Study of Cancers in Iraq-Karbala from 2008 to 2015

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ABSTRACT

Background: *Cancer is a common malignant disease that affects a large number of individuals world-wide, including Iraq with a high prevalence and mortality rate.* ***Aim:*** *Investigation for cancers in one of Iraq cities.* ***Methods:*** *A total of 12,000 specimens from patients suspected to have cancer in a Karbala city in Iraq between 2008 and 2015 was histopathologically examined to diagnose various types of cancer diseases. The prevalence, incidence rate, and age-specific rate (ASP) were determined for 838 confirmed positive cases (320 males and 518 females).* ***Results:*** *In males, high prevalence and incidence rate were observed for bladder, gastro-oesophageal (GOC), colorectal, lymphoma, and prostate cancers, while in females, breast, thyroid, lymphoma, colorectal, bladder, and gastro-oesophageal cancers were highest. The prevalence of all types of cancer was higher in females than in males during almost all the survey periods. ASR was observed higher in the older age groups for most patients with cancer. Some cancers were also prevalent at younger ages (≤30 years).* ***Conclusion:*** *The high prevalence and incidence rate of many types of cancer in Karbala were of concern, especially for older age groups. In this survey, bladder cancer in males and breast cancer in females were ranked first in each year.*

Keywords: Cancer, Karbala, Iraq, ASR, prevalence, incidence rate

INTRODUCTION

Cancer is a malignant form of disease resulting from uncontrolled cell division. The resulting proliferating cells have the ability to invade other tissues through direct cell migration or through the vascular system [1]. There are more than 200 types of cancer that take the name of the organ, tissue, or cell in which they originate [2]. Although cancers are commonly found all over the world, the prevalence or incidence rate varies during a time and population based on the variability and density of causative factors. In 2012, WHO estimated that about 14 million cases of cancer were diagnosed, resulting in 8.2 million deaths, of which 55% were in developed regions [3]. Many people can survive after treatment for cancer disease as reported in 2012 when there were 13.7 million cancer survivors living in the USA [4].

The Arab countries as part of the developing world had a greater number of cancer cases in comparison with the number of the population, with 14.9 million cases and 8.2 million deaths as reported in 2013 [5]. These countries occupied about 14 million Km^2 with a total population exceeding 330 million as estimated at 2008 [6]. In the countries of the Gulf Cooperation Council (GCC). A total of 32,291 cancer patients was diagnosed during 1998-2001 [7] which increased to 95,183 newly registered cancer six years later (1998-2007) [8].

The present study tries to illustrate the cancer prevalence and incidence rate in one famous province in Iraqi during the last eight years, 2008 to 2015.

MATERIALS AND METHODS

Study design

A survey of the number and types of cancer disease in an important city, Karbala, in Iraq during the last eight years was designed in order to determine the prevalence and incidence rate of these malignant diseases.

Methods

Of 12000 (4330 males and 7670 females) suspected cases of cancer diseases (excluded skin cancer), 838 cases (320 males and 518 females) were positively confirmed with a type of cancer. Their ages ranged from 0 to 91 years for males and 0 to 90 years for females. For diagnosis of each cancer, a histological specimen was taken by surgical excision or by fine needle aspiration (FNA) from the suspected location of the cancer, and examined by members of the histopathology department of AI Ammam AL-Hussein general teaching hospital of Karbala province from April 2008 to June 2015.

Data analysis

All the cancer data were analysed according to the methods of the epidemiological assessment of the U.S. 2000 standard population [9]. The prevalence, incidence, and age-specific rate were calculated based on the equations given by the direct adjustment method for the U.S. 2000 standard population.

RESULTS

A variant types of cancer disease were diagnosed in the population of Karbala city during the last eight years (2008-2015). The data showed that the prevalence and age-specific rate varied between males and females for different types of cancer. In males, bladder cancer was most common, followed by gastro-oesophageal cancer (GOC), colorectal cancer, lymphoma, prostate cancer, and renal cell carcinoma (RCC), respectively (Figures 1 and 2). Meanwhile, in females, breast cancer had the highest incidence, followed by thyroid cancer, lymphoma, colorectal cancer, bladder cancer, GOC, uterine cancer, and ovarian cancer, respectively (Figures 1 and 2). Tongue cancer, liver cancer, urethral cancer, peritoneal cancer, and haemangioma had the lowest prevalence and incidence rate in males, while seven of cancer diseases had the lowest level in females (Figures 1 and 2).

Cancer was more prevalent in females than in males in almost all the survey periods with the highest levels in 2011, 2013, and 2014 (Figure 3). During all the eight years surveyed, breast cancer showed the highest prevalence in females (Figure 4). Meanwhile, bladder cancer was predominant in males during the four years (2012-2015) (Figure 4).

The age-specific rate (ASR) for cancers varied from year to year. In 2008, a high value of ASR was recorded for male patients with breast cancer and laryngeal cancer at the age ≥75 years, and for females with colorectal cancer and GOC at the age ≥50 years (Table 1).

In the second year (2009), prostate cancer and oral squamous cell carcinomas (OSCC) were predominant in males at age ≥70 years. Meanwhile, ASR was higher in females with colorectal cancer, bone cancer, peritoneal cancer, and breast cancer at the age ≥70 years (Table 1).

In the third year (2010) of this survey, GOC and bone cancer were predominant at the age range (70-74 years) of males, while in females, ASR was highest for breast cancer, salivary gland cancer (SGC), and bladder cancer at the age ≥65 years (Table 1). Furthermore, the value of ASR in 2011 was very high in males for the bone cancer, OSCC, and prostate cancer at the age ≥50, while in females, lung cancer, and peritoneal cancer at the age ≥65 years were also higher (Table 1).

In 2012, the ASR in males was higher for small bowel cancer (SBC), throat cancer, RCC, GOC, colorectal cancer, and gallbladder cancer at age ≥60 years. Meanwhile, in females, many cancers showed a high ASR, including RCC, ovary cancer, uterine cancer, GOC, and thyroid cancer at the age ≥50 years (Table 1).

During the sixth year (2013), the high ASR in males was shown for thyroid cancer, prostate cancer, colorectal cancer, bladder cancer, and lymphoma cancer at the age ≥40 years. Meanwhile, in females, RCC, and bladder cancer had the highest value of ASR at the age ≥65 years (Table 1).

In 2014 (the seventh year), the ASR in males was higher for nasopharyngeal cancer, RCC, laryngeal cancer, urethral cancer, bladder cancer, and lymphoma at the age ≥55 years. Meanwhile, in females, the ASR was higher with lung cancer, uterine cancer, bladder cancer, and lymphoma at the age ≥50 years (Table 1).

In the last year of this study (2015), the ASR in males with cancer disease was higher in patients with thyroid cancer, lung cancer, and bladder cancer at the age ≥45 years. Meanwhile, in females, thyroid cancer, and peritoneal cancer had a higher ASR at the age ≥70 years (Shown as Supplementary Table 1).

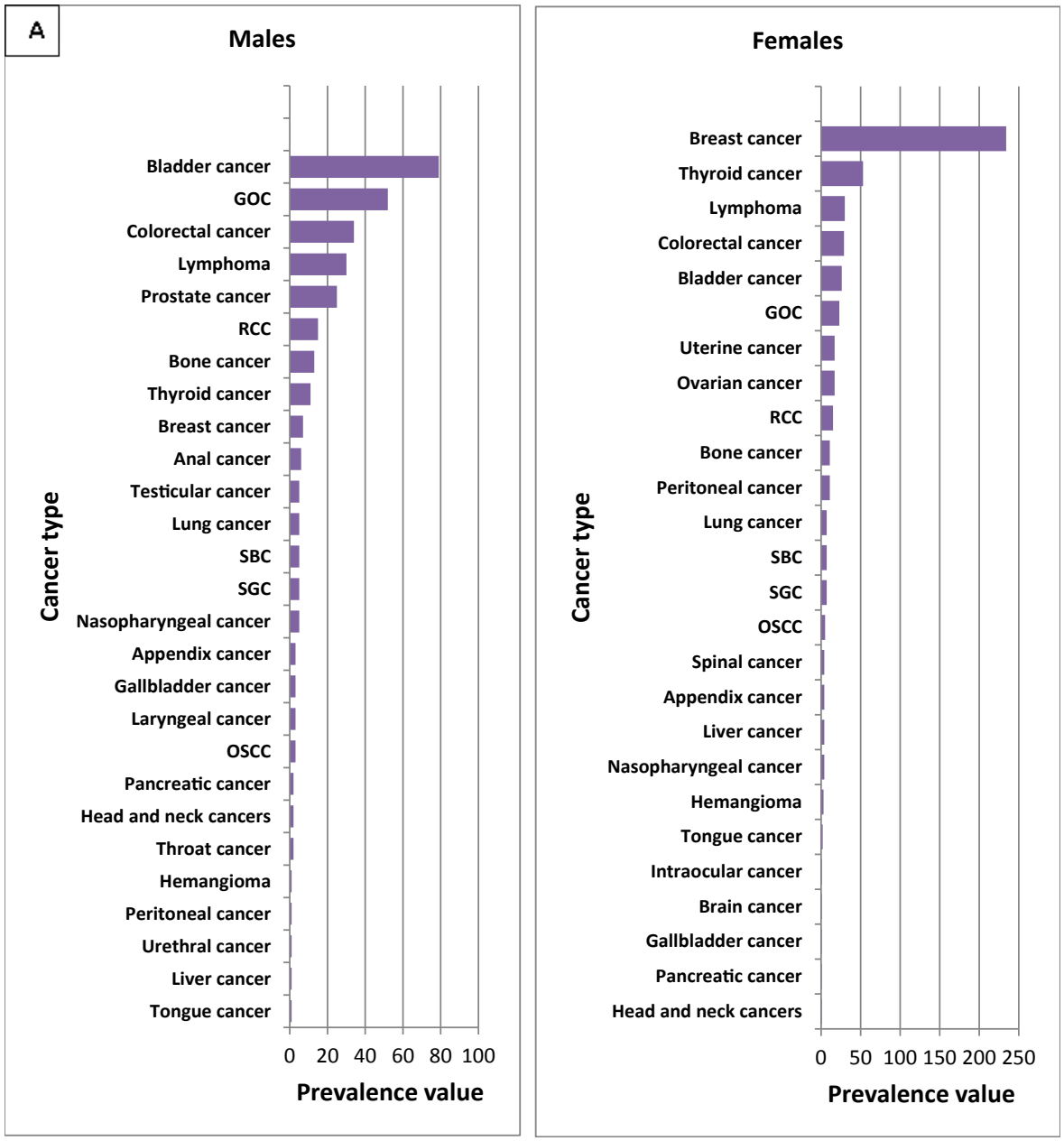

Figure 1 Prevalence of cancer type in males and females from 2008 to 2015
A: Male; B: female

Some cancers were found at younger ages (≤ 30 years) with a higher incidence rate such as lymphoma in females during 2011 and breast cancer from 2012 to 2015. Meanwhile, higher incidence rate was found in younger males with GOC in 2014 (Shown as Supplementary Table 1).

DISCUSSION

Karbala city is one of the important provinces in Iraq. According to the latest statistical data, the total population of this city increased rapidly in the last six years, from approximately 993,903 in 2009, to 1,185,687 in 2015. The number of patients with cancer disease is also expected to increase in associated with the increase of population.

Cancer is considered one of the most common diseases that causes a high morbidity and mortality every year world-wide. Generally, there are no global standard values for the prevalence or incidence of cancer diseases which vary from country to another. In Iraq, which is located in the Northern part of the Arab world, people suffer from a variety

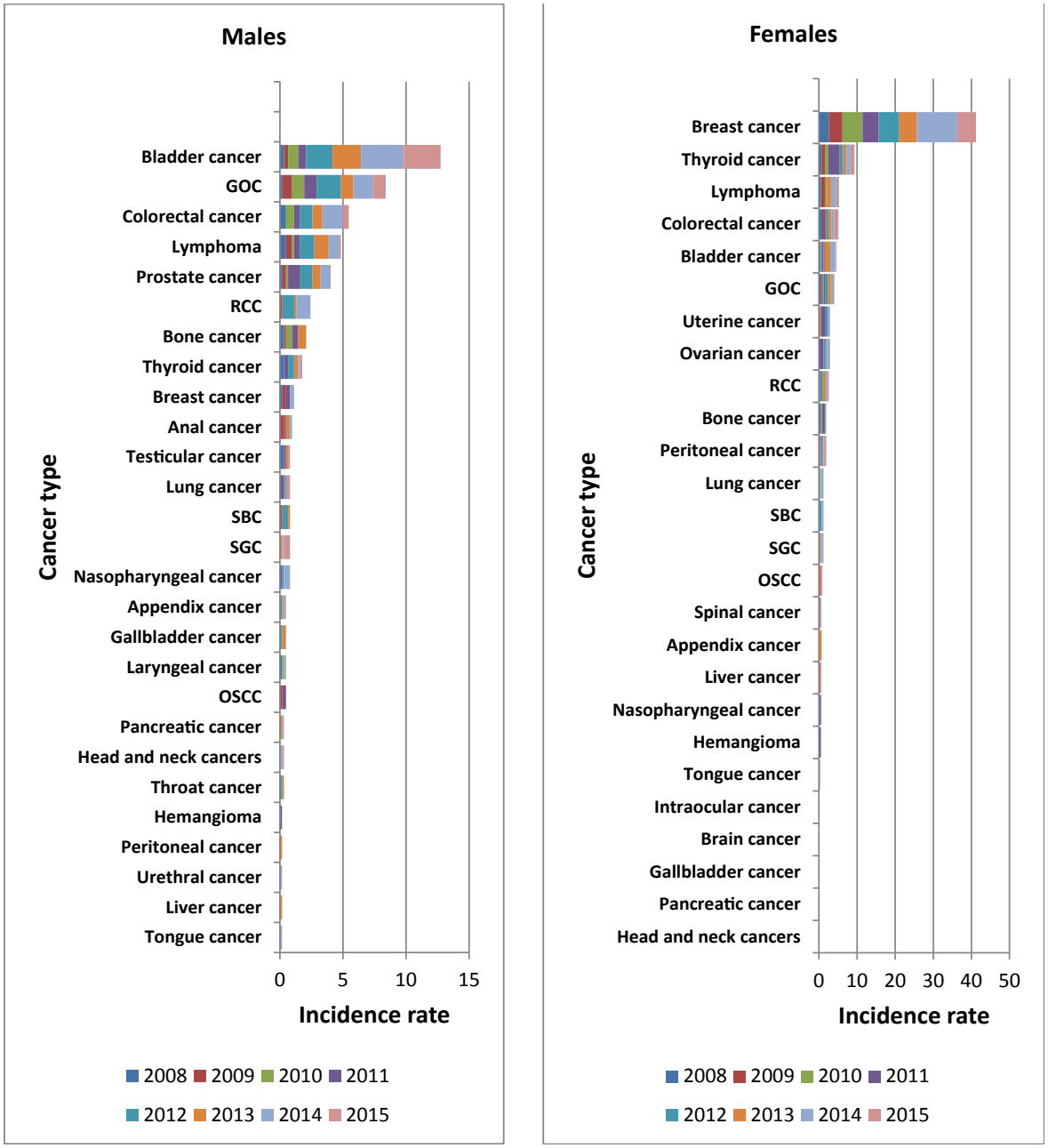

Figure 2 Incidence rate of males and females cancers from 2008 to 2015

A: Male; B: female

types of cancer, especially in the last decade. Unlike in other Arab countries, a cancer registration centre for Iraq was recently set up in 2003, and has grown to 30 screening centres today [10]. Although Iraq has a medium level of the human development index (HDI), it registered in 2008 to contain 47% of cancer and 55% of cancer deaths [3].

From our results, both genders had shown high prevalence and incidence rate of some of cancer diseases, including bladder cancer, lymphoma, colorectal cancer and GOC. Other cancers were observed with a higher value in males than in females such as RCC, and bone cancer with a specificity to prostate cancer in males. Specifically, female organs had been affected by cancer as in ovarian cancer and uterine cancer. The results about the prevalence and incidence rate of cancer among males and females in Karbala city could be different from what the previous studies found in other Iraqi cities. The differences, mainly depending on the city location and the time of occurrence. In Fallujah city, which is in the west of Iraq, the most common cancer types among males as estimated in 2011 were lung cancer, stomach

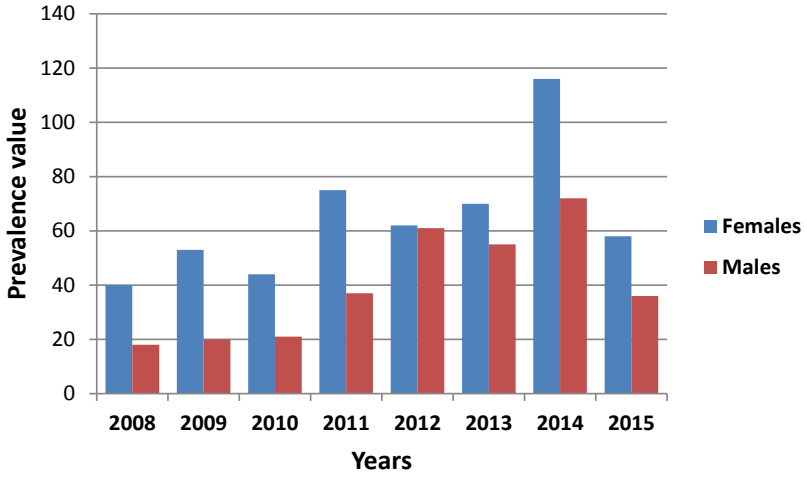

Figure 3 Prevalence of total No. of cancers from 2008 to 2015

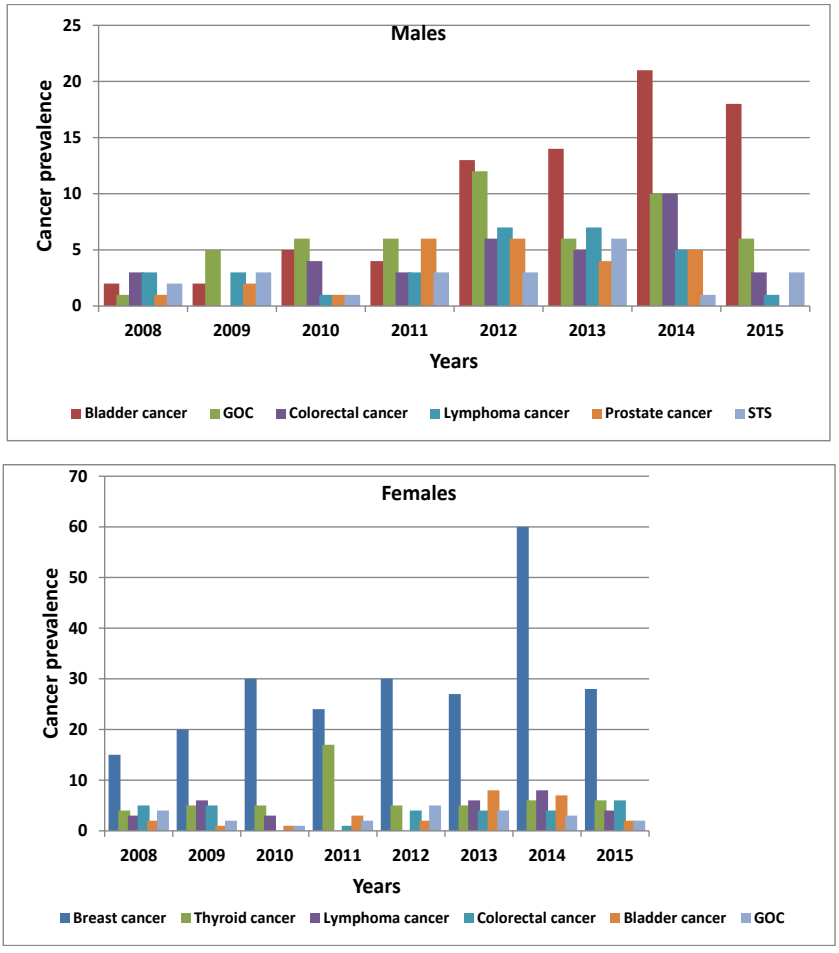

Figure 4 Prevalence of larger No. cancer in males and females from 2008 to 2015
A: Male; B: female

cancer, and bladder cancer, while the vast majority types among females were breast cancer, ovary cancer and uterine cancer [11]. These results were also differed in the cities of the north of Iraq such as in Sulaymaniyah [12]. The survey performed in this city from 2006 to 2014 showed that lung cancer, leukaemia, lymphoma, colorectal cancer, prostate cancer, bladder cancer, brain cancer and others were the most prevalent cancers in males, while breast cancer,

leukaemia, lymphoma, colorectal cancer, ovary cancer, lung cancer, brain cancer and stomach cancer were common in females. However, the prevalence of cancer in females was greater than in males in almost all the survey periods. In 1992, cancer was found to be higher in females (2.5%) who living in the UK than in males (1.5%) [13], while this view was changed in 2006 when males had more cancers than females. In the Arab world, the most common type of cancer in Arab males are lung cancer, bladder cancer, and liver cancer in all age groups [14]. Meanwhile, breast cancer and thyroid cancer, followed by colorectal cancer, NHL, ovary cancer, and uterine cancer were more prevalent among Arab females [8,14]. Moreover, most of the Arab countries had almost the same incidence rate for some cancer types in both of genders such as with colorectal cancer [10].

Although the proportion of younger ages in the Arab population is greater than in developed countries, the peoples rapidly aging during the recent decades [5]. Cancer is known to be common in older ages due to the genomic changes that increase cell susceptibility to the effect of environmental carcinogens [15]. This result was also noted in our survey when most of the patients involved with cancer disease were in an older age group (more than 50 years).

From present data, bladder cancer was ranked first in males and fifth in females with high prevalence and incidence rate. It showed three times more prevalent and incidence in males than in females, especially in the last year (2015). Worldwide, it is considered the 7th most common cancer in males and the 17th in females [16]. The mortality rate of this disease is most significant in many countries, as recorded in Canada, which estimated that there were 170 deaths in 2012 [17]. In the past, this type of cancer was more common in the developed world than in developing countries, but this has changed now. In Egypt, the frequency of bladder cancer could be the highest in the world [18], while it is regarded as one of the predominant cancers in most Arab countries such as in Lebanon (18.5%) [14]. The population of many Iraqi cities has suffered from the high incidence of bladder cancer, such as in Baghdad, Basrah and AL-Anbare [11], whereas it is at variable level in other cities as in Kirkuk [19].

The ASR of bladder cancer was found very high among patients at age ≥70 years over all periods which is similar to what was reported in other countries [20]. Younger ages (>50 years) may also suffer from the bladder cancer, and it is suggested that males will be at the risk to develop bladder cancer after age 40 years [17]. The most common causative factors for bladder cancer are smoking, occupational exposure to aromatic amines and polycyclic aromatic hydrocarbons, exposure to environmental carcinogens such as those used in chemical, rubber, and dye industries, genetic influence, viral and Schistosoma infection, low education level, and consumption of tap water polluted with carcinogenic agents such as arsenic [16,18,20]. In our country, a high percentage of males are smokers and most of them exposed to chemical compounds in their workplace during industrial processing. Thus, bladder cancer had been higher among Iraqi males than in females.

Colorectal cancer occupied number three position in males and number four in females with high prevalence and incidence rate, especially in the last two years. There is no population in the world completely clear from colorectal cancer. Thus, whatever the length of cancer list in any developed or developing country, colorectal cancer should be included, especially at older ages [8,13,14,16]. However, the incidence rate of colorectal cancer is particularly high in developed countries, while it is low in developing countries such as in the Arab world [21]. Recently, this situation has changed, when the incidence of colorectal cancer in Arab regions significantly increased [22,23].

The incidence of colorectal cancer among the population of Karbala city was found to be higher, especially in older males (≥ 70 years), while this cancer was reported as a common in younger peoples of other Iraqi cities such as in Baghdad and Kirkuk until 2012 [22]. However, the older age group is more susceptible to colorectal cancer in many Arab and developed countries [8,13,21]. Younger ages, especially in Arab populations are also affected by colorectal cancer with a high incidence rate [23]. However, colorectal cancer is one of the commonest cancers in Iraq. In 2008, the incidence rate was 5.2 for males and 4.0 for females per 100,000 with the highest level in most Iraqi cities including Baghdad and Kirkuk [21,22].

The development of colorectal cancer in the human body may be related to the effect of many factors, including diet, obesity, diabetes, lack of exercise, smoking, alcohol consumption, colon diseases, genetics, exposure to pesticides, contaminated meat with viruses, folate, and vitamin B_{12} deficiency and family history of the disease [3,23]. However, most of the factors mentioned above are available in our country and they could be the responsible for the high percentage of colorectal cancer among males.

Breast cancer was ranked number one among the cancer types in females with the highest prevalence and incidence

rate during the periods of our survey. Its level had been gradually increased within the time until becoming higher in the last two years. Although the survey included only six months of 2015, the prevalence and incidence rate of breast cancer was more than half that in 2014. However, breast cancer has always occupied the top position in the list of malignant diseases in females. It constitutes 13% to 35% of all female cancers, while it represented 45% of all cancer types all over the world [24]. Worldwide, it is reported that more than one million females are diagnosed with breast cancer every year. As estimated by WHO in 2008, 5 of the 6 regions of WHO members had the highest incidence rate of the breast cancer in females [25]. Generally, the incidence rate of breast cancer in developed countries is more than in developing regions as noted in the estimation of 2000, in which the number of cases reached 597,000 in developed countries, while reaching 471,000 in developing countries [24]. However, the incidence rate was increasing rapidly within the time in Arab regions due to rapid industrialization, delayed and reduced fertility, in addition to many of the social factors that mentioned by Rizwan and Saadullah [26].

From our data, the incidence rate of breast cancer in younger females was very high at age (≤30 years), especially during the last four years (2012-2015). However, this view is in disagreement with the results of the previous study of breast cancer in Iraq (2000-2009) which found that the incidence rate of breast cancer was higher among women in the age group 60-69 [27]. In other Arab countries, almost half of females with breast cancer are below the age of 50 years or even below 40 years compared to more than 65 years in developed countries [13]. From 1998 to 2007, breast cancer was found in 25.2% of females living in Gulf cooperation council (GCC) countries at age above 15 years and in 55% at age 30-44 years [8]. Generally, the causative factors of breast cancer are not clearly known, but they may be related to physiological and human behaviour such as the use of exogenous hormones, reproductive behaviour, differences in weight, exercise, diet, alcohol, and fat consumption, smoking and obesity [3]. Among Arabian females, the most important factors that were found to be associated with breast cancer are obesity, family history with breast cancer, hormonal therapy, post-menopause, lack of education and never having breastfed [28].

Important management steps to decrease the morbidity and mortality of cancer include, increase the education about this disease, early detection through regular screening activities with targeted specifically for the females over the age of 50 years, treatment enhancement, financial support by the government for cancer detection and education, breakdown of fear about diagnosis, and increase warn about the disease [15,24]. Regular screening and diet that includes increased fruit and vegetables with reduction of red meat consumption are the useful management steps to reduce colorectal cancer. In general, education and early screening are the best suggested methods to reduce the incidence of cancers in Iraq.

In conclusion; although Karbala city is considered a small province in Iraq, the prevalence and incidence of many cancer types were of the concert. Bladder cancer in males and breast cancer in females were ranked the first cancer types in all periods. Females had a higher prevalence of cancers as compared with males. Moreover, the older age group commonly suffered from cancer diseases than younger ages.

CONFLICT OF INTEREST

There is no conflict of interest and no fund for this manuscript

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