Cancer Incidence Rate in Kurdistan-Iraq during 14 Years - Depend on Cancer Registry Program

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ABSTRACT
The aim of this study was to identify the incident rate of different types of cancers and determine risks of cancer in Erbil Capital of Kurdistan Region Government from June 2004 to December 2017. This data was collected from registered cases in Nanakaly hospital for cancer. It included all cancer cases for different age groups during the a fore mentioned period; the results showed that the recorded number of cancer cases was 1021 with 27 types of cancer during. The highest recorded cancers are lung, breast, diffuse cancer, lymphoma, myeloid leukemia and acute lymphocytic leukemia by 9.43%, 24.40%, 10.61%, 9.10%, 8.95% and 8.78% respectively. The annual incident rate per 100,000 was 5712 and for all age groups were 67.26 in female and 4698 in women, from 53 to 376.5 cases/population/year. Incident rate showed to be 51.72% in female and 48.28% in male. It was last noticed that the most common cancer amongst females and males were breast, lung, myeloid leukemia, Lymphoma, Acute lymphocytic leukemia, Colon, ovary, and thalassemia by 21.01%, 1.80%, 5.71%, 4.54%, 4.41%, 1.69%, 1.42%, and 0.50% with the males by 3.05%, 7.68%, 5.56%, 6.17%, 5.67%, 2.81%, 0.18%, and 0.32% respectively. Projections of cancer trends to the year 2030 indicate to expected rises in both incidence and prevalence. It seems that the cancer cases in Erbil city is higher comparing to the cases of other cities like Sulaymaniyah especially for older age groups. In this survey, breast cancer in females, lung cancers in males were ranked first with other cancer all 14 years.

INTRODUCTION
Cancer is the leading cause of death worldwide and also the most important source of anxiety for human health in Kurdistan. The incidence of cancer is increasing all over the world and also rising with age (Curado et al., 2007; Ma and Yu, 2006). Every year, one out of every 250-350 people are diagnosed with cancer in Western countries, the incidence of cancer is even increasing yearly for 4-5 per 300 person, when the people over age of 60 (Yumuk et al., 2013).
According to some of the report, the incidents of cancer have showed increased in different governorates of Iraq, during 30 year period from (1965 to 1994). Nevertheless, all the governorate still register new incidence of cancer according to the reports of authorities (Al-Humadi, 2009; Othman et al., 2011; Hussein et al., 2017).

The variations of incidence of cancer in different geographical locations to some extent are due to different risk factors that are linked with many factor of pattern life (Parkin et al., 2009). Many factors have been identified to be involved in the aetiology of cancer such as alcohol, tobacco, occupation, air contamination, water pollutions, regimen of food and feeding, physical activity, infectious agents, solar radiation, and obesity which are all probable factors (Schottenfeld and Beebe-Dimmer, 2006; Higginson, 1968). Kurdistan region is a semi-autonomous part of Iraq and has been exposed to many epidemiological changes and environmental which lead to increased risk of cancer in this region (Othman et al., 2011). Kurdistan went through made the population more vulnerable to diseases a number of wars. The Kurdish people in Halabja city and many other areas from Kurdistan exposed to chemical bombardment during the Iraqi/Iranian War (from 1980 to 1988) (Salih, 1995). This devastation to Kurdistan may have the role in environmental pollution and increasing cancer incidence, especially high rates of haematological malignancies (Majid et al., 2012; Khoshnaw et al., 2016; Zangana and Garota, 2012).

The aim of this study is to identify incidence rate cancer in Erbil Capital of Kurdistan Region Government and to identify increase risk of cancer in this region.

MATERIALS AND METHODS

This research was started by collecting data registered from Nanakaly Cancer Hospital in Erbil city (Erbil is Capital of Kurdistan Region Government), between June 2004 to December 2017. A total of 1021 cases been registered during thirteen years. All the cases were inserted to excel data sheet and all duplicate names were removed. Data (including Data include name, age, sex, occupation, date of diagnosis, type of cancer, and primary site of involvement) was then sorted and distributed using international classification of diseases and use program (Minitab v.15).

All these hospital are now cooperating with each other to start a national cancer registry in Kurdistan provinces to improve cancer registration database. Although results presented in this paper represent majority of cancer cases but still we believe that some cancer cases are diagnosed and treated outside Kurdistan Region (Othman et al., 2011).

RESULTS AND DISCUSSION

The cancer types which are documented in include 27 different cancers (Table 1). Furthermore, according to the data analysis it can be seen that the
Table 1: Recorded number of cancer cases

| Type of Cancer                                      | Number | Percentage |
|-----------------------------------------------------|--------|------------|
| Human Leukocyte                                     | 263    | 2.50%      |
| Acute lymphocytic leukemia (ALL)                    | 811    | 8.78%      |
| Chronic lymphocytic leukemia (CLL)                  | 146    | 1.39%      |
| Lymphoma                                            | 950    | 9.10%      |
| Hemophilia                                          | 222    | 2.11%      |
| multiple myeloma                                    | 319    | 3.04%      |
| Idiopathic thrombocytopenic purpura (ITP)           | 215    | 2.05%      |
| Myeloid leukemia                                    | 934    | 8.95%      |
| Anaplastic Anaemia                                  | 122    | 1.16%      |
| Myelodysplastic syndrome (MDS)                      | 86     | 0.84%      |
| Anemia                                              | 379    | 3.61%      |
| Diffuse Cancer                                      | 1113   | 10.61%     |
| Sarcoma                                             | 107    | 1.02%      |
| N-blastoma                                          | 61     | 0.58%      |
| Breast                                              | 2457   | 24.40%     |
| Lung                                                | 935    | 9.43%      |
| Prostate                                            | 188    | 1.79%      |
| Colon                                               | 250    | 2.38%      |
| Bladder                                             | 51     | 0.48%      |
| Stomach                                             | 122    | 1.16%      |
| Ovary                                               | 91     | 0.86%      |
| Larynx and Thyroid                                  | 29     | 0.27%      |
| Head and Neck                                       | 68     | 0.64%      |
| Pancreas                                            | 91     | 0.86%      |
| Renal                                               | 38     | 0.36%      |
| Thalassemia                                         | 65     | 0.62%      |
| Pancytopenia                                        | 106    | 1.01%      |
| Total                                               | 1021   | 100%       |

The annual incidence rate in both sex (male and female) was 11424 per-year from June 2004 to Dec. 2017 that is raised from 53.0 to 760.5 during 14 year ago in the all provinces, also the incident rate (IR) for all groups were female 6726 and male 4698 (Table 2). It can be noticed that the IR in the beginning is very low since the Nanakaly centre for cancer was opened in middle of 2004. Therefore, it took a few years to people to understand the mission of this centre and visit them to receive treatment and medication. Thus, the data of the starting years is very low. But then people were educated and visited the centre more and therefore the incident rate is increased dramatically, These finding are in accordance with (Hussein et al., 2017; Curado et al., 2007), and similar with (Khoshnaw et al., 2016).

The distribution of cancers according cases of cancer in patients with myeloid leukemia and lung were increased during fourteen years followed by breast cancer respectively (Figure 1). On the other hand, the lowest incident for cancer was larynx and thyroid and renal which were 29 and 38% respectively. Regarding age groups, it was also seen that the can-
Table 2: The Annual incidence rates in both sexes and age groups per 100,000 populations per year in all provinces from Jun-2004 to Dec-2017

| Years    | Annual IR in female | Annual IR in male | Annual IR* |
|----------|---------------------|-------------------|------------|
| June 2004| 41                  | 65                | 53         |
| 2005     | 120                 | 120               | 120        |
| 2006     | 109                 | 155               | 132        |
| 2007     | 219                 | 276               | 247.5      |
| 2008     | 319                 | 330               | 324.5      |
| 2009     | 361                 | 347               | 354        |
| 2010     | 444                 | 404               | 424        |
| 2011     | 427                 | 380               | 403.5      |
| 2012     | 581                 | 380               | 480.5      |
| 2013     | 725                 | 449               | 587        |
| 2014     | 962                 | 551               | 756.5      |
| 2015     | 891                 | 494               | 692.5      |
| 2016     | 1055                | 466               | 760.5      |
| Dec 2017 | 472                 | 281               | 376.5      |
| Total    | 6726                | 4698              | 5712       |

Table 3: Incidence rate of males and females according cancers from June 2004 to December 2017

| Male Cancer Type | Male (n=4975) | Female (n=6209) |
|-----------------|--------------|-----------------|
| Breast          | 152          | 2305            |
| Lung            | 783          | 167             |
| Lymphoma        | 606          | 344             |
| myeloid leukemia| 579          | 355             |
| Acute lymphocytic leukemia | 486 | 364             |
| Hemophilia      | 206          | 16              |
| Colon           | 140          | 105             |
| ITP             | 96           | 119             |
| Chronic lymphocytic leukemia | 78  | 37             |
| Stomach         | 72           | 50              |
| Anaplastic anaemia | 71 | 51              |
| Pancreas        | 61           | 30              |
| Pancytopania    | 58           | 48              |
| Thalasimia      | 16           | 19              |
| Ovary           | 9            | 82              |
| Head & Neck     | 7            | 6               |

cases with age of patients increased in 40 to 49 years of age (female were highest and male was lowest). Whereas age groups over 70 years showed lowest cases (Figure 2).

The pattern of total cancer incidents is increasing over the age from 10 years up to 40, but again it goes down overage. Similarly, the pattern of female cancer is similar to total cancer over time (Khoshnaw et al., 2016). However, the male of cancer incidence difference was decreases with increasing age up to 40-49, and once more increasing with increasing age group up to 60-69. This research agreement with (Othman et al., 2011; Yilmaz et al., 2011).

That is all the provinces registered in Nanakaly hospital in Erbil capital the model is $Y_t = 255 + 235.9t - 988t^2$. Based on the model the cancer cases will have increased in the chart and value of the projected results will be achieved. In (Figure 3) is Fre-
Table 4: Total cancer of Incidence rate in different countries in the world

| Countries          | Period/year | Incidence rate |
|--------------------|-------------|----------------|
| Capital Erbil      | 2004-2017   | 57.12          |
| Sulaymaniyah       | 2006-2013   | 50.40          |
| Iraq republic      | 1994-2016   | 135.11         |
| Turkey republic    | 1999-2005   | 118.00         |
| Egypt              | 2008-2011   | 82.72          |
| Cyprus             | 2007-2012   | 198.15         |
| European union     | 1980-2003   | 398.52         |
| Urinated state     | 2011-2015   | 519.7          |

Figure 4: Linear Trend Analysis Plot for Erbil Province

Figure 5: Trend Analysis for Women and Men Separately
frequency adjusted by the Patient cases.

The general trend of cancers cases for male and female in all parts of the city is registered in Nanakaly hospital in Erbil capital were studied (Figure 4). The quadratic trend analysis plot for male and female the model is \( Y_t=150.6+23.5t \) but In female, the model \( Y_t=10+64.3t \) shows a rising trend of this cancer, whereas, is male, the model has an exponential trend with equation \( Y_t=150.6+23.5t \) which also has an increasing trend but because of exponentially growth the result will be increased rapidly in male than female also the form is which has quadratic trend (Figure 5). and probably the incidents of cancer regardless of sex might increase in the following years as seen in the figures, this research disagreement with (Roya and Abbas, 2013), but agreement with (Hasnawi et al., 2009).

The most common cancer amongst females were breast, lung, myeloid leukemia, lymphoma, acute lymphocytic leukemia, Colon, ovary, and thalassemia as 21.01%, 1.80%, 5.71%, 4.54%, 4.41%, 1.69%, 1.42%, and 0.50%, respectively. Whereas, the most reported cancers in male were breast, lung, myeloid leukemia, lymphoma, acute lymphocytic leukemia, colon, ovary, and thalassemia as 3.05%, 7.68%, 5.56%, 6.17%, 5.67%, 2.81%, 0.18%, and 0.32% respectively. (Table 3). The average of common occurred cancer was composed of 48.28% of the total male cancers, while in females they accounted for 51.72% of the cases. Agreement with (Hussein et al., 2017) and disagreement with (Jemal et al., 2007).

The incident rate is different among the countries and even between the cities of a country. It can be seen from Table ??, that the incidence rate is dissimilar. Furthermore, it is also obvious that the Erbil and Sulaimaniyah cities recorded the lowest incident rate which is 57.12 and 50.4 respectively (Khoshnaw et al., 2016). On the other hand, the highest incident rate has been recorded in the Union state and European Union respectively with 519.7 and 398.52. (Jemal et al., 2007). Therefore, over the past 14 years, the registered cases of cancer are 57.12. This number seems to be more than the cancer cases which recorded in both Iraq and turkey (Pervaiz et al., 2017; Ibrahim et al., 2014).

CONCLUSIONS

Although Erbil capital of Kurdistan Region Government is considered a small province in Iraq, the prevalence and incidences of many cancers could be worth paying attention. Furthermore, breast cancer in females and anaemia cancer in males and were ranked first with other cancer during 14 years periods. Males had a lower prevalence of cancers as compared to females. Moreover, the older age group commonly suffered from cancer diseases than younger ages, therefore, that encouraging people to adopt healthier lifestyles especially avoiding anxiety and following healthy food habit and raising awareness could be useful to reduce and help cancer prevention.

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Conflict of Interest

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