

Leukemia Study in Sulaymaniyah Province, Kurdistan, Iraq

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To the Editor: The increased rate of leukemia in several Iraqi cities has been linked to exposure to depleted uranium, which was used during the consequent wars in Iraq from 1990 to 2010.^[1-4] Here, we investigated leukemia occurrence in the Sulaymaniyah Governorate (SG), which has been exposed to wars and crises at the same level as the rest of Iraq.^[5] To the best of our knowledge, this study is the first population-based study on leukemia in SG.

The annual incidence rate for leukemia based on gender, age, and the most common type of leukemia in SG for the period 2009–2013 was calculated from data collected at Hiwa Hospital, which is the only available source of information. Hiwa Hospital had started data collection in 2009, and there were no accurate leukemia data available before. Our study included information about 570 leukemia patients that were registered at Hiwa for treatment. Of these, 367 patients were from SG, which included 176 female and 191 male. The table below summarized the leukemia incidence rate based on gender, age, and type. The statistics indicated that there was higher incidence rate of leukemia among male population (4.1) compared to females (3.6) [Table 1]. In addition, children below age 15 years old have high annual incidence rate (3.4) compared to people aged 15–29 (1.6). Moreover, for >30 years old, an increase trend can be perceived for leukemia in SG [Table 1].

Acute Lymphoblastic Leukemia (ALL) is the most common type of leukemia with 44% in all cases and a higher number of cases in patients older than 15 years. In addition, Chronic myeloid leukemia (CML) (20% of all leukemia incidence) is the second highest followed by Chronic lymphoblastic leukemia (CLL, 18%) and Acute myeloid leukemia (AML, 17%) [Table 1]. This is in agreement with the latest international leukemia statistics. However, as shown in Table 1, no cases for CML or CLL and only 7 cases of AML were registered in 5 years. Furthermore, to infer whether exposure to depleted uranium increased the leukemia incidence rate, we analyzed data available for the USA and IARC World standard. The result indicated a lower annual incidence rate of leukemia in SG [Figure 1], suggesting that leukemia in SG has not increased due to war and usage of depleted uranium in Iraq.

Table 1: Statistics of leukemia occurrence in Sulaymaniyah Governorate for 2009–2013

Parameters	<i>n</i>	Percentage of cases*	Annual rate per 100,000 inhabitants	95% <i>CI</i>
Gender				
Female	176	48	3.6	3.14, 4.06
Male	191	52	4.1	3.59, 4.57
Age (years)				
≤15	110	30	3.4	2.90, 3.87
15-29	45	12	1.6	1.14, 2.06
30-44	54	15	2.8	2.27, 3.33
45-59	56	15	6.0	3.72, 8.28
60-74	69	19	14.6	10.48, 18.72
≥75	33	9	20.2	14.52, 24.68
Types				
ALL	162	44	1.70	27.82, 36.58
CLL	69	19	0.07	12.13, 15.47
AML	62	17	0.65	8.54, 16.26
CML	74	20	0.78	13.13, 16.47

*Total cases = 367 considered 100%. ALL: Acute lymphoblastic leukemia; CLL: Chronic lymphoblastic leukemia; AML: Acute myeloid leukemia; CML: Chronic myeloid leukemia; *CI*: Confidence interval.

Our study is the first population-based study on leukemia and investigates the factors that affect leukemia incidence in Sulaymaniyah province. It also provides information about

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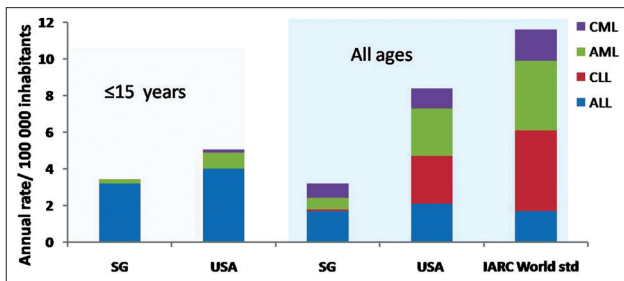


Figure 1: Comparison of different types of leukemia at age ≤ 15 years and all ages in SG to USA and IARC World std. ALL: Acute lymphoblastic leukemia; CLL: Chronic lymphoblastic leukemia; AML: Acute myeloid leukemia; CML: Chronic myeloid leukemia; IARC: International Agency for Research on Cancer; SG: Sulaimaniyah Governorate; USA: United States of America; std: Standard.

disease types that can be used as baseline information for further epidemiological studies on leukemia incidence.

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Conflicts of interest

There are no conflicts of interest.

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