

## Epidemiology of leukemia among children in Nineveh Province of Iraq

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**Objective:** To determine the prevalence of leukemia among children during 2018 – 2021 in Mosul city.

**Methodology:** This retrospective study was conducted on leukemia patients in Oncology Center at Ibn Al-Atheer Hospital from 10th January to 30th April 2022. Data were collected from patients' records.

**Results:** Out of 153 patients, 99 (64.8%) were males and 54 (35.2%) females. The disease was

found in children of school age more than in the rest of the ages and more males and those belonging to urban areas were affected. Acute lymphatic leukemia was commonest form found.

**Conclusion:** The prevalence of the disease is very high and is constantly increasing. The incidence of the disease in school-age children is relatively high.

**Keywords:** Prevalence, leukemia, children.

### INTRODUCTION

Hematologic malignancies are the first of the four leading causes of mortality in children globally.<sup>1</sup> Children and adolescents aged 0 to 19 (hence referred to as “children”) get leukemia most frequently, and leukemia incidence rates in children has been reported to be the highest in the world.<sup>2</sup> Children's cancer survival rates have significantly increased in recent decades, partly due to more intensive, multimodal treatment regimens.<sup>3</sup>

Leukemia is identified by widespread replacement of normal cells in blood marrow and peripheral circulation.<sup>4</sup> There are different forms of leukemia.<sup>5</sup> Leukemia was classified as the 13th most common disease in the world by GLOBOCAN study in 2018, and leukemia mortality climbed by 17% in the same year.<sup>6</sup> Leukemia has been more common over time, but its exact causes are still unknown, Both genetic and environmental risk factors for leukemia, like exposure to chemicals, ionizing radiation, and infection, have a substantial impact on the disease.<sup>7</sup>

Leukemia, is the third most common cause of mortality among children aged “1 to 14 years”, after accidents and unintentional fatalities.<sup>8-10</sup> We recently observed that individuals with chronic myeloid leukemia (CML), who took tyrosine kinase inhibitors had a greater risk of getting second cancers (TKI). We evaluated the occurrence of autoimmune disease (AD), chronic inflammatory illness, and malignancy (CID), into CML patients previous to their “CML” diagnosis to better understand whether this rise may be connected, rather than to TKI.<sup>11</sup> The aim of this study was to determine

the prevalence of leukemia among children during 2018-2021 in Mosul city.

### METHODOLOGY

A purposive sampling method was used from data collection in the Oncology Center at Ibn Al-Atheer Hospital from 10th January to 30th April 2022. The Data were collected from the period 2nd February to 28th February 2022. The Oncology Center at Ibn Al-Atheer Hospital in its alternative headquarters the hospital in Mosul city it was located in the East side of Mosul city.

**Statistical Analysis:** The data were analyzed using SPSS version 26. The descriptive and the inferential statistics were employed. The significance threshold was established at  $p < 0.05$ .

### RESULTS

Table 1 shows types of leukemia seen in province of Nineveh, Iraq. Acute lymphatic leukemia (ALL) was the commonest. ALL was found mostly in urban area (Table 2). Table 3 illustrates the demographic characteristics of studied variables.

**Table 1: Types leukemia in Nineveh Province.**

Type	Number	%
Acute Lymphatic Leukemia	129	82.7
Chronic Myeloid Leukemia	4	2.6
Acute Myeloid Leukemia	20	5.2

## DISCUSSION

AML was the commonest form of leukemia diagnosed in the study population. Similar findings have been reported by other.<sup>1,2,9</sup> Although there were some differences in previous studies. The reason is that the numbers of leukemia differ from one region to another, from one governorate to another, and from one country to another, as the city of Mosul was subjected to many terrorist operations and a lot of aerial bombardment with missiles that carry nuclear waste, which is the reason for the high rate of cancer among our children.

**Table 2: Relationship between types of leukemia and residence of studied children.**

Type of Leukemia	Urban	Rural
Acute Lymphatic Leukemia	47.05%	3.26%
Chronic Myeloid Leukemia	0.65%	1.96%
Acute Myeloid Leukemia	5.88%	7.19%

**Table 3: Demographic characteristics of the studied children with leukemia (n = 153).**

Variable	Number	%
<b>Gender</b>		
Females	54	35.2
Males	99	64.8
<b>Stages (The age)</b>		
Infant	1	0.65
Toddler	20	13.07
Preschool	24	15.68
School	108	75.58

Table 2 shows that highly significant relationship in housing between those who live in the city and those who live in the rural area. A strong relationship was found between both housing, as it was found that the rate of cancers was higher within the cities than in the districts, districts and villages of the city of Mosul because the city is crowded with population and sources of pollution in addition to radioactive pollutants as a result of the military liberation operations.

Table 3 illustrates that demographic characteristics of studied variable showed that there were more males and school going children who suffered leukemia. Other investigators had the same conclusion and same studied variable in demographic characteristics.<sup>7,8</sup> Quality of life

is severely affected in these patients, as in other similar diseases.<sup>12,13</sup>

The study limitations include only one area of Iraq and results may not be generalized to other areas of Iraq or other parts of world. The study period was relatively short.

## CONCLUSION

The prevalence of the disease is very high and it is constantly increasing, and the incidence of the disease in school-age children is relatively high.

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