

RESEARCH PAPER

PATTERNS OF ACUTE CHILDHOOD LEUKEMIA IN DUHOK CITY

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Abstract

Background: There is substantial variation in the incidence rate of acute lymphoblastic leukemia by ethnicity. In addition, leukemia has broad-spectrum variations in clinical and laboratory findings at presentations. This study aimed to determine the patterns of acute childhood leukemia in Duhok city.

Methods: In this cross-sectional study, the patients who were diagnosed with leukemia and admitted at Jin pediatric Oncology Haematology center in Duhok were included. The general and clinical features of the patients included age, sex, season diagnosis, socioeconomic status, clinical features, and biochemical parameters were collected between the 1st of September, 2015 and 1st of September 2016.

Results: The study revealed that most of the patients were in the 1-5 age group (54.8%) followed by 5-10 years (24.7%). The patients were males (56.2%) and females (43.8%) with 1.28:1.0. Acute lymphoblastic leukemia was the most prevalent type of leukemia (86.3%). The patients were admitted in dry and rainy seasons; 54.8% and 45.2%, respectively. Most of the patients were admitted in winter (45.2%), followed by summer (34.2%). The patients had low (45.2%), middle (42.2%), and high (12.35) socio-economic status. Pallor was the most prevalent presentation of the patients with leukemia (n=50) followed by fever (n=36), and splenomegaly (n=32). Some of the patients had multiple signs and symptoms. The HB and WBC of most of the patients were abnormal (84.9% and 71.2%, respectively), similar to platelets (53.4%).

Conclusion: This study showed that there is variation in the age group, clinical features, season of diagnosis, and biochemical parameters in leukemia patients.

Keywords: clinical presentation; cancer; pediatrics; Duhok

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Introduction

Childhood leukemias and lymphomas are considered to be the most common types of cancers in childhood and adolescence.^[1] The

factors responsible for hematopoietic malignancies are infectious diseases, therapeutic agents and lifestyle, immune dysfunction, environmental factors, and other exposures.^[2] These kinds of associations are based on the difference in the incidence rates in different populations ^[3], birth cohort variations ^[4], and the changes occurred between the first and later generations of migrants.^[5]

In contrast to the wide studies conducted across the world about incidence trends and patterns for adult cancers, there are fewer investigations worldwide patterns for childhood cancer. There are few studies conducted (many studies were done in Basra and Baghdad) about childhood cancer in Iraqi Kurdistan [6-8] and Iraq.^[9, 10]

The aim of this study was to determine the patterns of acute childhood leukemia in Duhok city. The specific aim of the study was exploring the children leukaemia pattern for demographic and clinical features, type and season of diagnosis of leukemia.

Methods

Study design and sampling: In this cross-sectional retrospective study, the pediatric patients who were diagnosed with leukemia were included consecutively. The patients were consecutively screened for the eligibility criteria by a pediatrician at Jin Pediatric Oncology – Hematology Center in Duhok city, Kurdistan Region. The data collection was performed over 12 months; from September 2015 to August 2016.

Inclusions and exclusion criteria

The population of this study was children with acute leukemia, aged less than 18 years of both genders who had been recorded at Jin pediatric Oncology-Hematology center for one year. Patients were not included in this study who with incomplete medical records

Data Collection

The data required for the study were recorded in a pre-designed questionnaire. The general information of the study was recorded in the first part of the questionnaire. The general information was age, gender, the season of diagnosis, and socioeconomic status. The biochemical

parameters (Hb, WBC, Platelets and blood film) and clinical information were recorded in the second part. The clinical information was a type of leukemia and clinical presentation. The sociodemographic characteristics was arranged based on the criteria given by Omer and Al-Hadithi [11].

Statistical Analysis

Data were entered into Microsoft Excel 2013. The findings were presented in number and percentage. The number of population of leukemia type, clinical features, and prevalence of lamiae in diagnosis seasons was determined in number and percentage.

Ethical views

Data collection was started following taking approval of the proposal from the Iraqi Board for Medical Specializations in Pediatrics.

Results

A total of 73 patients with leukemia included in this study. Most of the patients were in 1-5 age group (54.8%) followed by 5-10 years (24.7%), >10 years (12.3%), and 0-<1 year (8.2%). The patients were males (56.2%) and females (43.8%) with 1.28:1.0. Acute lymphoblastic leukemia was the most prevalent type of leukemia (86.3%), see Table 1.

Table 1: General characteristics of patients with leukemia

Patients' characteristics (n=73)	Statistics	
	Number	Percentage
Age categories		
0-1 year	6	8.2
>1 or < 5 years	40	54.8
5-10 years	18	24.7
>10 years	9	12.3
Gender		
Male	41	56.2
Female	32	43.8
Type		
ALL	63	86.3
AML	9	12.3
CML	1	1.4

The patients were admitted in dry and rainy seasons; 54.8% and 45.2%, respectively. Most of the patients were admitted in winter (45.2%), followed by summer (34.2%), see Table 2.

Table 2: Seasonal variation

Statistics	Dry Seasons		Total	Rainy Seasons		Total
	Autumn	Summer		Spring	Winter	
Number	15	25	40	18	15	33
Percentage	20.5	34.2	54.8	24.7	20.5	45.2

The patients had low (45.2%), middle (42.2%), and high (12.35) socioeconomic status (Table 3).

Table 3: Socioeconomic classes of patients with leukemia

Socio-economic status (n=73)	Statistics	
	Number	Percentage
Low	33	45.2
Middle	31	42.5
High	9	12.3

Pallor was the most prevalent presentation of the patients with leukemia (n=50) followed by fever (n=36), and splenomegaly (n=32). Some of the patients had multiple signs and symptoms (Table 4).

Table 4: Presenting signs and symptoms

Presenting Sign & Symptoms	Number of patients (%)	
	Number	(%)
Splenomegaly	32	14.5
Pallor	50	22.6
Fever	36	16.3
Hepatomegaly	23	10.4
LAP	32	14.5
Bleeding tendency	15	6.8
Bone pain	31	14.
Organomegaly	1	0.45
Jaundice	1	0.45

The HB and WBC of most of the patients were abnormal (84.9% and 71.2%, respectively) similar to platelets (53.4%), see table 5.

Table 5: Hematological parameters of patients

Presenting Hematological Parameters	Statistics	
	Number of patients	Percentage
Hb categories		
Hb <10 g/dl	62	84.9
Hb >10g/dl	11	15.1
WBC categories		
WBC < 50 x 10 ⁹ /L	52	71.2
WBC > 50 x 10 ⁹ /L	21	28.8
Platelets		
Platelets (<50 x 10 ⁹ /L)	39	53.4
Platelets (50-100x 10 ⁹ /L)	17	23.3
Platelets (100-150 x 10 ⁹ /L)	8	11.0
Normal Platelets (>150 x 10 ⁹ /L)	9	12.3

Discussion

The total number of childhood acute leukemia cases reported at Jin pediatric Oncology Hematology center were 73 for one year. The number of childhood acute leukemia has been increased compared to the year 2011. Abdurrahman and Al Allawi et al^[6] reported 20.7 cases in year in 2011. The number of childhood acute leukemia in Duhok city has been increased possibly due to increasing the population and a considerable number of displaced people were settled in the region. In addition, the previous study focused on ALL type only.

The present study found that acute lymphoblastic leukemia was the most prevalent type of leukemia (86.3%). This finding is in agreement with the literature.^[10]

Many studies revealed that there is a male predominance in all age groups except in infants, while in this study, both males and females were affected equally. The number of the patients with leukemia is not sufficient to make a statistical comparison with those findings in other studies.^[11, 12, 6]

The peak age incidence was between 1-5 years (54.8%) I agreement with the literature.^[11, 12, 6] A significant peak in the incidence of childhood ALL has been reported in ages of 2-5 in developed countries.^[13]

Close to half of leukemia patients presented during rainy seasons in Duhok (45.2%). The first papers published on the seasonal variation in the prevalence of leukemia was in winter in Belgium.^[14, 15] Many other studies in different countries investigated the seasonal variation of leukemia. While many of them did identify a clear seasonal patterns, others failed to do so.^[16]

The accepted explanation of this seasonal pattern refer to that in winter months certain environmental effects, specially viral infections, may provoke the manifestation of disease.^[17]

There is disagreement between different studies regarding the effect of socioeconomic status on the incidence and patterns of childhood leukemia. However, Dockerty and Draper et al^[18] observed increased risk of leukemia in children with middle and high socioeconomic classes in contrast with.^[19] Increase incidence of childhood

leukemia in low socioeconomic classes might be contributed to poor nutrition resulting in the effect on immune system and predispose to recurrent infections in children.

In this study, only two of the patients (8.2%) had Down syndrome. Hoffbrand mentioned that a small proportion of patients have hereditary genetic abnormalities.^[20]

The most common presenting feature was pallor (n=50), followed by fever (n=36). These findings were consistent with the previous study in Duhok.^[6] Pallor, as a presenting feature in our study was more frequent in comparison with most other studies done elsewhere. Other studies have reported 40% of the patients have pallor on presentation.^[21, 22]

Hematological parameters of patients were not different from other studies^[23, 24] in which the majority of patients had cytopenias; especially anemia (84.8 %) followed by thrombocytopenia (81.8 %).

CONCLUSIONS

This study showed that there is variation in the age group, clinical features, season of diagnosis, and biochemical parameters in leukemia patients.

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