

## Prevalence of Leukemia in Ajmer Region

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### ABSTRACT

**Introduction:** The prevalence of leukemia is known to vary throughout the India. An attempt was made to find out pattern of leukemia and its distribution throughout the Ajmer region.

**Materials and Methods:** Samples of 45,391 cases were collected in Haematology section, Department of Pathology, Jawahar Lal Nehru Medical College, Ajmer during last 2 years and 6 months from January 2014 to June 2016. Clinically suspected patients were sent for Complete Blood Count, Peripheral Blood Film and bone marrow examination and other routine investigations.

**Results:** Most prevalent leukemia was Chronic Myeloid Leukemia 47 cases (35%) and least prevalent is Chronic Lymphocytic Leukemia 13 cases (9.7%). Acute leukemia were more diagnosed in young adult, while chronic leukemia were more in middle and old age group. Leukemia was found more in male patient (male:female ratio 1.19:1).

**Conclusion:** The commonest leukemia was found to be

Chronic Myeloid Leukemia. Leukemia was more prevalent in males.

**Keywords:** Leukemia, Prevalence, Type, Ajmer.

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### INTRODUCTION

Leukemia is defined as neoplastic proliferation of abnormal white blood cells. These abnormal white blood cells accumulate and interrupt the production of normal and functional white blood cells as well as the synthesis of erythrocytes and platelets resulting in anemia and thrombocytopenia. Broadly, Leukemias are classified into four subtypes: Acute Myelogenous Leukemia, Acute Lymphoblastic Leukemia, Chronic Lymphocytic Leukemia and Chronic Myeloid Leukemia.<sup>1</sup> Myelogenous leukemia is present when myeloid cell lineages such as granulocytes or monocytes are affected but when lymphocytes are affected then lymphocytic leukemia is present.<sup>2</sup> The difference between the acute and chronic leukemias is that the acute leukemias are rapidly progressing immature cells (immature cell proliferation which is blast or blast equivalent) while the chronic leukemias are slowly progressing mature cells.<sup>3</sup>

Hematological malignancies are quite common and affect all ages and genders. The diagnosis involves a multiparameter approach including morphologic examination and phenotypic or genotypic studies. The geographical distribution of various types of haematological malignancies has been provided by various authors but no such data have been published regarding the Ajmer region in State of Rajasthan in India.

Due to the lack of any nationwide leukemia screening programme, the majority of the population of India is still unaware of this blood

disorder. Lack of awareness also plays a role in underlying late presentation and non-compliance with screening guidelines. Hence it is important for the physicians and pathologists to determine the current burden of leukemias in India as well as to understand how the occurrence and outcome of the disease differs across the whole country<sup>5</sup>.

In this context, this study aims to describe the frequency and prevalence of Leukemia in the Ajmer region population of Rajasthan, India.

### AIM AND OBJECTIVES

1. To study the prevalence of leukemias in Ajmer region.
2. To study the age and sex wise distribution of leukemias.

### MATERIALS AND METHODS

The study was performed for 2 years and 6 months from January 2014 to June 2016 on patients diagnosed to have immature cells on peripheral blood smear study. Further typing and evaluation was done by bone marrow study. The medical records are collected from Haematology section, Department of Pathology, Jawahar Lal Nehru Medical College, Ajmer, Rajasthan. Care was taken to see that records of patients were not repeated in follow up cases. The data was collected in relation to types of leukemia, patient's age, and gender of the patients. In laboratory, patient's

bone marrow sample was received and peripheral blood/ bone marrow smears made from it and the smear stained with Leishman's stain and examined under microscope for the detection of leukemic cells and their relative percentages. According to the percentage of blast cells and premature cells in

smear, leukemia was diagnosed either as acute or chronic form and their variants. Special stains were done in order to determine the myeloid or lymphoid series. Special stains included Myeloperoxidase stain, Periodic Acid Schiff stain and Sudan Black.

**Table 1: Distribution Pattern of Leukemias**

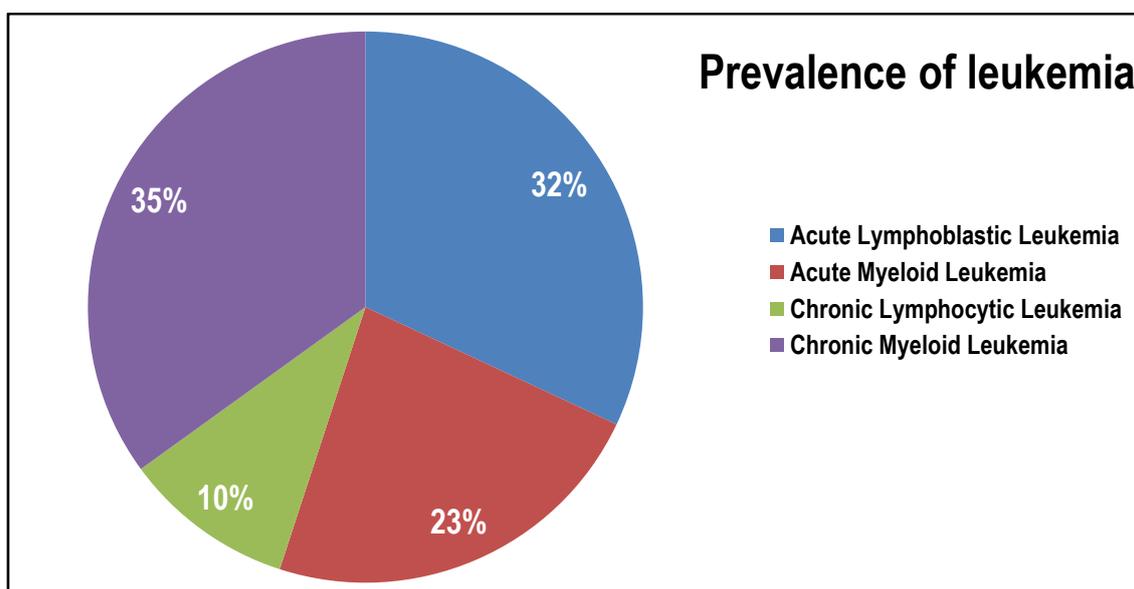
S.No.	Type of Leukemia	No. of Cases	Percentage
1.	Acute Lymphoblastic Leukemia	43	32%
2.	Acute Myeloid Leukemia	31	23%
3.	Chronic Lymphocytic Leukemia	13	10%
4.	Chronic Myeloid Leukemia	47	35%
	<b>TOTAL</b>	<b>134</b>	<b>100%</b>

**Table 2: Age-Wise Distribution Of Leukemias**

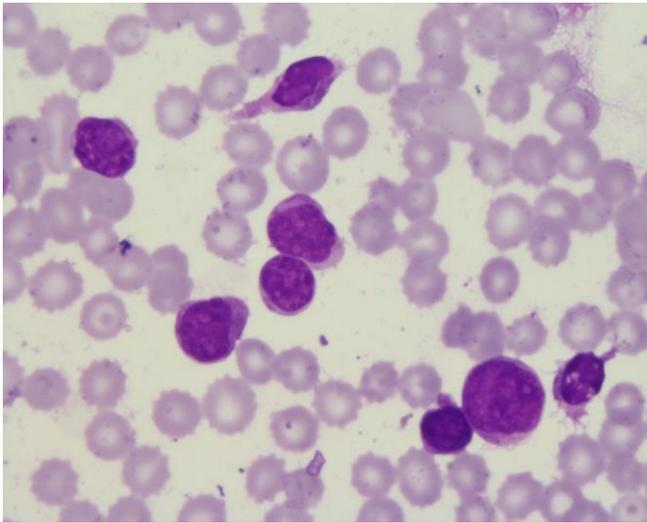
Age group	Acute Lymphoblastic Leukemia	Acute Myeloid Leukemia	Chronic Lymphocytic Leukemia	Chronic Myeloid Leukemia	Total	%
0-10 years	26	4	0	2	32	23.88%
11-20 years	10	6	0	1	17	12.68%
21-30 years	2	5	0	7	14	10.44%
31-40 years	1	7	0	7	15	11.19%
41-50 years	3	3	3	13	22	16.41%
51-60 years	1	4	6	9	20	14.92%
61-70 years	0	0	2	4	6	4.47%
71-80 years	0	2	1	3	6	4.47%
81-90 years	0	0	0	1	1	0.74%
91-100 years	0	0	1	0	1	0.74%
<b>Total</b>	<b>43</b>	<b>31</b>	<b>13</b>	<b>47</b>	<b>134</b>	<b>100%</b>
<b>Percentage</b>	<b>32%</b>	<b>23%</b>	<b>10%</b>	<b>35%</b>	<b>100%</b>	

**Table- 3: Sex-Wise Distribution of Leukemias**

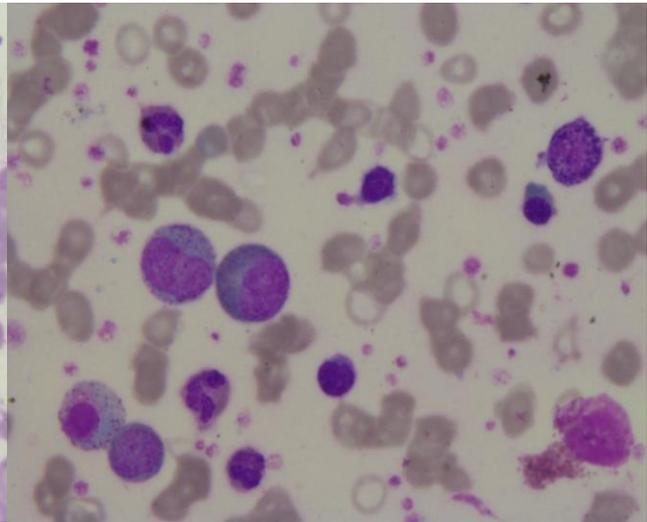
S.No.	Type of Leukemia	Male	Female	Total
1.	Acute Lymphoblastic Leukemia	27	16	43
2.	Acute Myeloid Leukemia	11	20	31
3.	Chronic Lymphocytic Leukemia	11	2	13
4.	Chronic Myeloid Leukemia	24	23	47
	<b>TOTAL</b>	<b>73</b>	<b>61</b>	<b>134</b>
	<b>PERCENTAGE</b>	<b>54%</b>	<b>46%</b>	<b>100%</b>



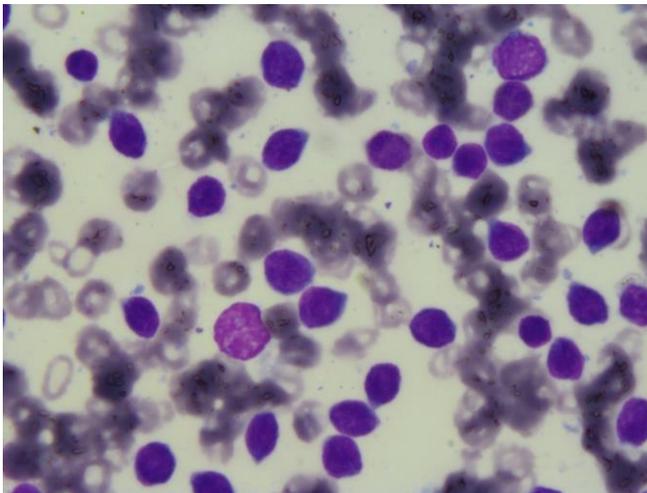
**Graph 1: Prevalence of Leukemia**



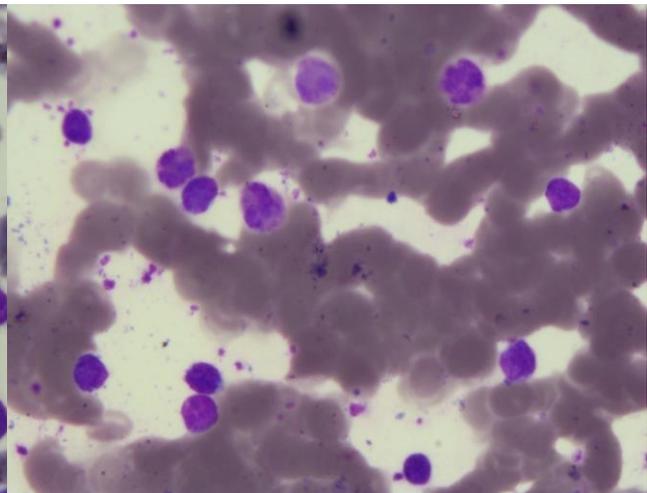
**Figure 1: Morphology of cells in Acute Myeloid Leukemia stained with Leishman's stain(100x), which show high leucocyte count with majority of them being blast cells.**



**Figure 2: Morphology of cells in Chronic myeloid leukemia stained with Leishman's stain(100x), which show leucocytosis with all stages of myeloid cells from blast cell to neutrophils. Basophil and eosinophil also seen in this picture.**



**Figure 3: Morphology of cells in Acute Lymphoblastic Leukemia stained with Leishman's stain (100x), which show leukocytosis with majority of them being lymphoblast cells.**



**Figure 4: Morphology of cells in Chronic Lymphocytic Leukemia stained with Leishman's stain (100x), which shows lymphocytosis with mainly mature lymphocytes showing irregular border due to fragile cytoplasm.**

## RESULTS

Total numbers of cases registered were 45,391. Of which, leukemias constitute 134 (0.29%). The data have been divided according to the age group and according to sex. The data obtained during the present study are presented in tables 1, 2 & 3. The most common leukemia was found to be Chronic Myeloid Leukemia (35%), which is closely followed by Acute Lymphoblastic Leukemia (32%). Acute form of leukemia is more common than chronic form (Table-1).

It is evident from the table that acute leukemias like Acute Myeloid Leukemia and Acute Lymphoblastic Leukemia are more commonly seen below 20 year of age and Chronic Leukemia like Chronic Myeloid Leukemia and Chronic Lymphocytic Leukemia are more common in older age groups (Table-2).

Percentage of male patients is 54% and that of female patients is 46%. Out of 134 patients 73 are males and 61 are females (Male: Female ratio 1.19:1)(Table-3).

## DISCUSSION

The largest contributors to mortality from childhood cancer in Britain are Central Nervous System tumors, reflecting the relatively poor survival in this group, followed by Leukemia and Neuroblastomas. In contrast, in India, Leukemia continues to be the largest contributor to cancer-related mortality in children followed by Lymphoma and Central Nervous System tumors, which have similar mortality rates. Hematological malignancies are common in our country. Different studies have been conducted on various aspects of individual hematological malignancies in the past. Reports revealed that in India all haematological malignancies were highly prevalent in Delhi followed by Mumbai.<sup>6</sup>

In our present study; acute leukemia was more prevalent than Chronic leukemia. Among all subtypes of leukemias myeloid series leukemias are much more common than lymphoid series. Among lymphoid Acute Lymphoblastic Leukemia was more

common (32%) than Chronic Lymphocytic Leukemia. (10%) Similar findings have been reported in several previous studies. However, a markedly high incidence of Chronic Lymphocytic Leukemia has been reported by some other studies. This compilation reveals geographic variation in frequency of leukemia. Among acute leukemias Acute Lymphoblastic Leukemia has more prevalence than Acute Myeloid Leukemia and among chronic type Chronic Myeloid Leukemia has more prevalence than Chronic Lymphocytic Leukemia.

The incidence of leukemia varies with the age and gender. In present study the prevalence of leukemia is more in males than in females. As males are more exposed to the environment due to occupation.

From the present study we can see that the prevalence of acute leukemia is more in younger age group, between and among them Acute Lymphoblastic Leukemia is more common in younger or paediatric age group. In contrast to acute leukemia chronic form of leukemia whether myeloid or lymphoid series is common in older age group and among them Chronic Myeloid Leukemia is more common.

Present study shows male to female ratio 1.19:1, which is similar as shown in study by Harendra Modak et al<sup>7</sup>, the distribution of various types of leukemias in population is similar, acute leukemias are more common than chronic leukemias. Present study and study by Harendra Modak et al<sup>7</sup> show similar results.

The reference studies, by Radha Rathee et al<sup>8</sup>, by Kinjal Bera et al<sup>9</sup> and by Sujatha. B et al<sup>10</sup> show high male prevalence of leukemias which is similar to our present study and also there is a similar frequency of distribution of types of leukemias in present study and study by Radha Rathee et al<sup>8</sup> and by Kinjal Bera et al.<sup>9</sup>

## CONCLUSION

Present study revealed that acute leukemias exceed in frequency than chronic leukemias. The most common type of leukemia was Chronic Myeloid Leukemia followed by Acute Myeloid Leukemia, Acute Lymphoblastic Leukemia and Chronic Lymphocytic Leukemia.

Overall leukemia was more prevalent in male patients. Age has significant effect on type of leukemia. Acute lymphoblastic leukemia was more commonly observed in children whereas both Chronic Myeloid Leukemia and Chronic Lymphocytic Leukemia were only observed in adults. The incidence of Acute Myeloid Leukemia was higher in adults as compare to children and decrease towards older age. The majority of patients presented with low hemoglobin, high leukocyte count and low platelet count. Clinically, majority of the patients presented with complaints of low grade fever, progressive pallor, generalized weakness, anemia, generalized body aches, lymphadenopathy, jaundice, purpura and retinal haemorrhages.

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