Research Article

Distribution of Leukemia in Chennai Population:- An Epidemiological Study

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ABSTRACT

The aim of the research is to analyse the distribution and incidence of leukemia in Chennai sub population. It focuses on the trends in the incidence rates of four major types of Leukemia in the population of Chennai, which accounts for the 2.5% of the whole population of India. Leukemia is a group of cancers that usually begin in the bone marrow and result in high numbers of abnormal white blood cells. The exact cause of Leukemia is unknown. Different kinds of Leukemia are believed to have different causes. In 2014, Leukemia developed in 352,000 people globally and caused 265,000 deaths. It is the most common type of cancer in children. However, about 90% of all Leukemias are diagnosed in adults. It occurs more commonly in the developed world. Due to the lack of any nationwide leukemia screening program, the majority of the people are not aware of the disease. Epidemiological study can play a vital role in understanding the occurrence and outcome of the disease.

Keywords: leukemia, distribution, incidence, epidemiology.

INTRODUCTION

Leukemia is a type of cancer that mainly occurs in the blood or bone marrow. Leukemia causes an uncontrolled growth of abnormal white blood cells, the infection fighting cells in the blood. Leukemia is one of the most common types of cancer and one of the top ten cancer killers. It is a general term for four types of malignant disease of the blood and bone marrow. These include acute lymphocytic leukemia and acute myelogenous leukemia, which progress rapidly. The other forms of leukemia, chronic lymphocytic leukemia and chronic myelogenous leukemia, progress more slowly.[1]

The cause of these cases of leukemia is unknown, but in some cases, leukemia is caused by abnormalities in the chromosomes[2]. People at risk for developing leukemia include those who have been exposed to high doses of radiation, certain types of chemotherapy, or chemicals, such as benzene. Having Down syndrome or Fanconi's syndrome increases the risk as well. Additionally, certain viruses, such as Epstein-Barr virus, are associated with the development of leukemia. Smoking also increases the risk of formation of leukemia[3]. It is most treatable and curable if caught in the earliest stages of the disease. Untreated and/or advanced leukemia results in a proliferation of abnormal white blood cells that spread throughout the blood stream. These abnormal cells crowd out normal white blood cells. The abnormal white blood cells are not able to fight infections as effectively as the normal white blood cells. This results in increased infections.

The abnormal white blood cells of leukemia also crowd out red blood cells, resulting in anemia, a low number of red blood cells[4]. Leukemia also results in lower numbers of platelet cells in the blood, which are needed for normal clotting. This results in impaired clotting. The abnormal white blood cells formed in leukemia also accumulate in the organs of the body, such as the spleen, liver, spleen, lymph nodes, testes, and brain, and interfere with normal organ functioning[5].

MATERIALS AND METHODS

The reports of around 38 patients suffering from leukemia in various cancer institute of chennai were collected. The information such as patients name, age, sex, type of Leukemia and treatment done was noted. The collected data was compiled to calculate the percentage distribution and graphs were drawn for the individual data.

DISCUSSION

There has been little literature about leukemia epidemiology in Chennai sub population in these recent years. The purpose of this study was to explore the incidence rate, gender, age distribution as well as the treatment done for all types of leukemia in Chennai sub population using the leukemia database of the city. There were more than 50 cases of leukemia out of which some where diagnosed and treated properly.

In this study a total of 38 patients diagnosed with leukemia were analysed. It was found that out of 38 patients, 17 were male and rest 21 were female patients, that is males accounted for 44.7% of the total leukemia population and female accounted for 55.2% of the leukemia population. [Table-1] In a previous study by James G. Gurney Ph.D, large differences in rates within sex groups were found for many histologic types. Substantial differences also were observed for non-Hodgkin's lymphoma, neuroblastoma, Hodgkin's disease, acute lymphoid leukemia, acute myeloid leukemia, and osteosarcoma. In general, rates were higher among males

than females, although female rates were often higher among young children[6].

Table 1

Sex	Number	Percentage
Male	17	44.70%
Female	21	55.20%

Table 2

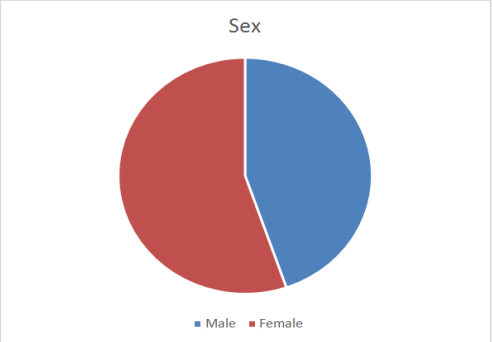
Age Group	Number	Percentage
10 to 20	3	7.89%
21 to 30	15	39.47%
31 to 40	6	15.70%
41 to 50	7	18.42%
51 to 60	7	18.42%

Table 3

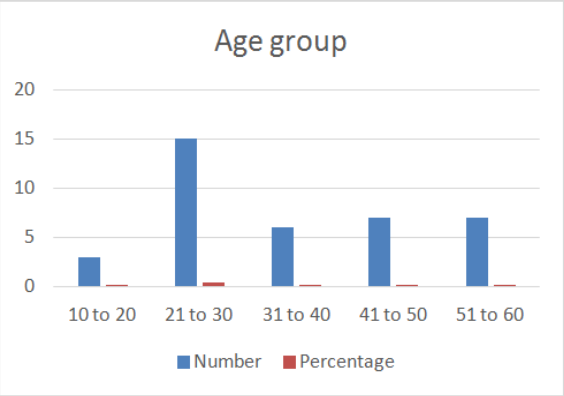
Leukemia	Number	Percentage
AML	17	44.70%
ALL	1	2.63%
CML	7	18.42%
CLL	13	34.20%
Total	38	

Table 4

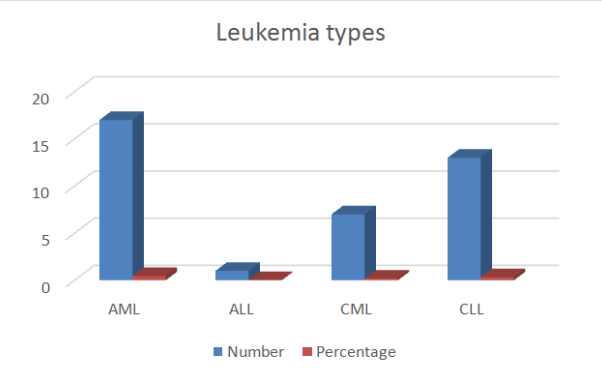
Treatment	Number	Percentage
Chemotherapy	11	28.94%
Radiation therapy	5	13.15%
Bone marrow	3	7.89%
Targeted therapy	4	10.52%
Immune therapy	1	2.63%
Chemo+radiation	2	5.26%
Bone marrow+chemotherapy	10	26.30%
Targeted therapy +chemotherapy	2	5.26%



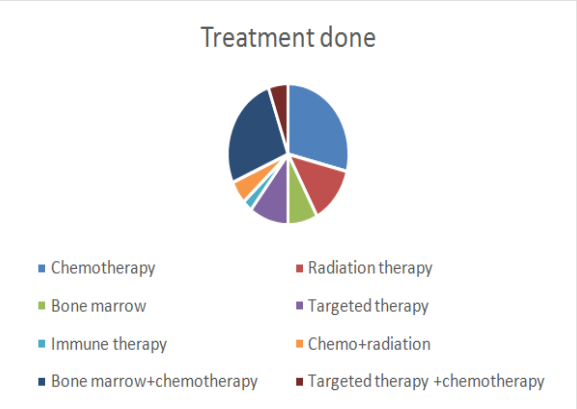
Graph 1



Graph 2



Graph 3



Graph 4

It was found that there were no leukemia between the age group of 0 to 10 years of age. 7 percentage of people between the age 10 – 20years, 40 percentage of people between the age 21-30 years, 16 percentage of people between the age 31-40 years and 28.4 percentage of people between the ages 41-50 and 51-60 years respectively was found to be affected by leukemia in Chennai sub population. Hence it was concluded that majority of the patients suffering from leukemia was in the age group between 21-30 years. It has got least prevalence between 10-20 years and also below 10 years, as there is a 0% prevalence between age groups 0-10. [Table-2, Graph-2]

In a study conducted by Bao-An Chen. It was found that the leukemia incidence rate in old age groups was generally high, and reached to the peak in group aged 80 years but this was still lower than the highest rate in Shenyang-the group aged 75 years[7].

Although the incidence rate of leukemia in children was lower than that in the old age group, leukemia accounted for a big proportion in the child malignant tumors[8,9], therefore, leukemia has become the children's primary malignant tumor.

In this study among the 4 types of leukemia the most prevalent one was AML with 45% incidence rate and the least prevalent one was found to be ALL with 2.63% incidence rate.

The second commonest type of leukemia was found to be CLL with an incidence rate of 34.2%. The incidence rate of CML was estimated around 18.42% of total population.

In a Population-Based Age- and Sex-Specific Incidence Rates in the 4 main Types of Leukaemia study by Hans Brincker it was found that Chronic lymphatic leukaemia constituted 38 % and chronic myeloid leukaemia 15 % of the cases. These figures are larger and smaller, respectively, than these previously reported[10].

The median age of all cases combined was 67 years, and the median age in cases of acute non-lymphocytic leukaemia was 64 years with 59 % of the latter patients more than 60 years of age. In childhood myeloid leukaemia, an early incidence peak, not previously described, was observed before the age of 2 years[11].

There are many treatments done in Chennai for each type of leukemia according to specific and accurate diagnosis. The most common treatment involved is chemotherapy and combination of chemotherapy and bone marrow transplantation. 29% of patients are undergoing chemotherapy whereas 26.3% of patients are undergoing chemotherapy as well as bone marrow transplantation.

Patients undergoing bone marrow alone is about 7.89%. Other treatment controls include radiation therapy and combination of radiation and chemotherapy.13.57% of patients are under radiation therapy. 5.26% of patients are under combined radiation and chemotherapy.

The same percentage is seen in patients undergoing combination of chemotherapy and targeted therapy. But only 10.52% of patients are under targeted therapy alone. It was estimated that the least percentage was for immune therapy which was about 2.63% of the total patients [Table, Graph: 4].

The studies conducted previously on the treatment options given for all types of leukemia it was found out that the main 5 types of standard treatments done were radiation therapy, Chemotherapy, Surgery, Targeted therapy and immune therapy.

New types of treatment are being tested in clinical trials. They are Chemotherapy with stem cell transplant, Biologic therapy, Chimeric antigen receptor (CAR) T-cell therapy[12].

CONCLUSION

From this study it was concluded that females are affected by leukemia than males between the age group of 21-30 years and showing least occurrence below the age of 10 years.

Coming to the types of leukemia it was found out that AML has the highest occurrence rate and the least rate was for ALL type. Chemotherapy and combination if chemotherapy and bone marrow was found to be the most commonly treatment. Patients were treated successfully using these treatment methods.

The survival rate was high compared to other treatment options[13]. Current study has provided detailed information of the leukemia epidemiology in Chennai sub population.

Long-term follow-up investigations are needed for better understanding of characteristics of leukaemia including etiology, survival and risk indicators, which may lend support to the corresponding protocols for prevention and intervention[14].

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