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DEMOGRAPHIC STUDY OF CHRONIC MYELOID LEUKEMIA IN NEAPLESE POPULATION IN EASTERN NEPAL

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ABSTRACT

Background: Chronic Myeloid leukemia is a clonal myeloproliferative disorder of the primitive hematopoietic stem cell. CML is characterized by the presence of chromosomal marker the Philadelphia chromosome (Ph) in the leukemic cell. Although patients can be of all age group it is usually common in adulthood. Male population is more commonly affected than female population. The study aims to identify the CML by detection of Philadelphia Chromosome and study the demographic pattern in the Nepalese Population. **Method:** Thirty cases of Chronic Myeloid leukemia which were diagnosed clinically were randomly selected for study. Bone marrow samples were collected in heparinized vials. Cytogenetic analysis was done by karyotyping. Philadelphia Positive and negative case were identified. Hematological parameters were noted and correlated with features of CML. **Results:** Out of thirty diagnosed case of Chronic Myeloid leukemia 23 were male and 7 were female. The male female ratio was 3.29:1. The age of disease presentation varied from 16 – 68 years with highest number of patient observed in age group 20-29. **Conclusion:** Although CML can occur at any age group, it was observed that in this study the incidence was more in early adulthood. Small sample size is the limitation in this study to establish the exact age of incidence in eastern Nepal.

KEYWORDS: CML, demography, Nepalese population.

INTRODUCTION

Chronic myeloid leukaemia (CML) is one of the commonest leukaemias in Asian population.[1] The incidence of CML is prevalent in the fourth decade of life, although patients of all ages can be affected. It is characterized by granulocytosis, marked splenomegaly and constitutional symptoms. The incidence is higher in men than in women (2:1.2).[2]

CML is the first cancer in which a consistent chromosomal abnormality the Philadelphia chromosome was found, which was described by Nowell and Hungerford in 1962. This abnormality was identified to be due to reciprocal translocation involving t(9;22) (q34;q11.2) and involved the fusion of genes breakpoint cluster region(BCR) and the Tyrosine kinase human homologue of the Abelson Murine leukemia Virus (ABL).[3,4]

METHODS AND MATERIALS

This study was a hospital based study done over a period of two years at B.P. Koirala Institute of Health Sciences.

Patient selection

Thirty clinically diagnosed case of CML were randomly selected. Laboratory reports of hematological parameters were noted. Informed consent was taken from the participating patients'. Hematological malignancies other than chronic myeloid leukemia was excluded from the study.

Methods

The bone marrow aspirate was collected in a heparinized syringe from the posterior superior iliac spine. Bone marrow aspirates were examined for both direct and short term culture. The collected sample was stored at 4degree c before culture was initiated. Three sterile vials with 5ml of RPMI-1640 was taken, 1 ml of fetal bovine serum was added to the culture vials and heparinize bone marrow sample was added in each vial. They were gently mixed by shaking. The vials were kept in incubator at 37degree for one hour.

After one hour colchicine was added to arrest the dividing cells at metaphase stage and then again incubated for one hour at 37degree Celsius. The culture was then transferred to sterile centrifuge tube and then centrifuged at 1000rpm. after discarding the supernatant

the cell pellet was suspended in pre warmed hypotonic solution (0.56%KCl) at 37degree for 30 minutes. The cells were then fixed with fixative 3:1 methanol: acetic acid for 20 minutes. The slides were prepared and stained with 5% gimesa. Minimum 20 metaphase spread was analyzed using Zeiss light microscope. Homologous pairs were arranged according to International system for human cytogenetic Nomenclature 1995 on a predesigned format.

RESULT

Thirty clinically diagnosed and hematologically proven patients were randomly selected for this study.

Data analysis according to age, sex and percentage

This study had 23 male and 7 female patients, showing male predominance over female. The male: female sex ratio was 3.29:1.

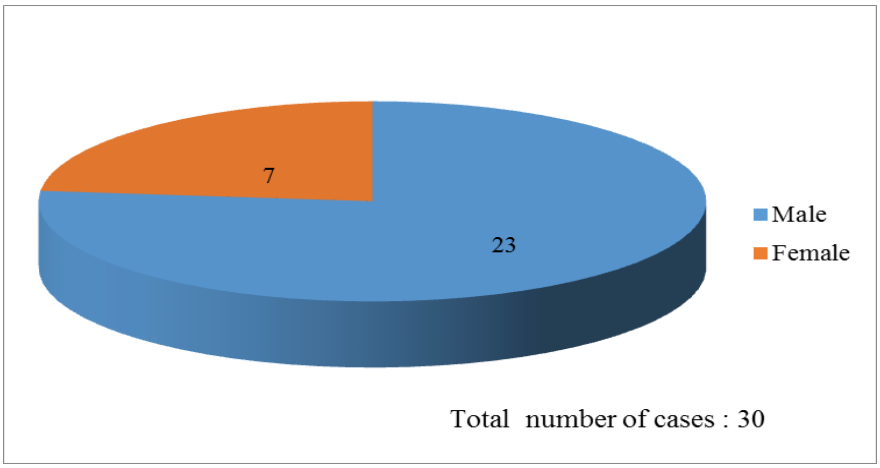


Figure 1: Pie chart showing distribution of data according to sex.

Data analysis according to age – group

The age group varied from 16 years to 68 years, with the mean age group being 34 years.

The highest number of patients was observed in age group 20 -39 with the percentage being 56.7 of the total.

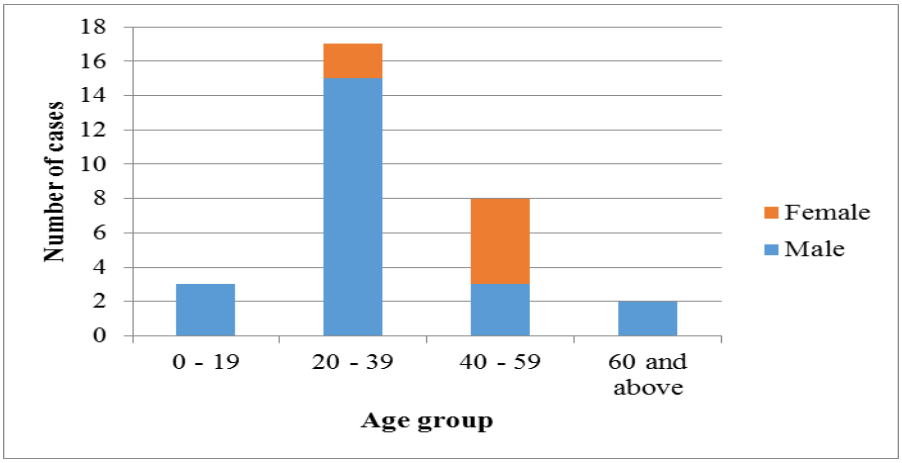
In the age group 60 and above, least number of patients, 6.7%were observed.

The age group (0-19) and (40-49) had 10 and 26.7% of total patients respectively.

Table 1: Distribution of data according to age-group, sex and percentage.

Age- group	Number of patients		Total	Total in Percentage (%)
	Male	Female		
0-19	3	0	3	10
20-39	15	2	17	56.7
40-59	3	5	8	26.7
60 and above	2	0	2	6.7

Table 2: Bar diagram showing distribution of data according to age and sex.



DISCUSSION

From 2006-2010, the median age at diagnosis for chronic myeloid leukemia was 64 years of age Approximately 2.9% were diagnosed under age 20; 7.5% between 20 and 34; 9.3% between 35 and 44; 14.3% between 45 and 54; 17.2% between 55 and 64; 18.3% between 65 and 74; 20.5% between 75 and 84; and 10.0% 85+ years of age.[5]

In the study done in BPKIHS by Kulshrestha R, Chronic myeloid leukemia constituted the single largest group comprising 35.2% of all cases, CML accounted for (63/148) 42.6% of adult and 6/48 (12.5%) of childhood leukemia. A male preponderance seen in this study is similar to reports in literature.[6]

Study by Subramanium P.G shows that CML is the commonest adult leukemia in India and the annual incidence ranges from 0.8–2.2/100,000 population in males and 0.6–1.6/100,000 population in females in India. The median age of diagnosis is 38-40 years. This is a decade earlier than the median incidence in the western world. Though CML is disease affecting adults, a minority of patients are children and young adults.

The presentation of leukemia can be at any age group, but studies show that they are rare in children. CML is commonly diagnosed in the age group 30 – 40 in the Asian region[7], this is almost a decade earlier than the western region where it is commonly manifested at the age of 40 – 60 years[8], and median age of diagnosis is about 65 years.[9]

The present study had age variation of the patient from 16 to 68 year with mean age of 34 years. This is similar to study done by Lee JP et al, the range of patient was found to be 17- 65 year with mean age of 39 years.[10]

In another study done in the African population by Aissata D.T et al, which was a retrospective and descriptive study, the age range of CML patient was similar to the present study ranging from 13- 68 years and the mean age of 38 years. The study also saw higher male patient compared to female, i.e. male, female ratio is 2:1.

In a study in Shanghai, by Wang A.H et.al, it was reported that CML affected those aged 40 – 60 years. This study also showed that there was higher number of male patient than female.[11]

The age group 20 -39 had maximum number of patients (N= 17), consisting 56.7% of the total sample. The age group above 60 years recorded the least number of cases (N=2), 6.7%.

CONCLUSION

In Nepalese population, Chronic Myeloid leukemia has higher incidence in male population as compared to female population. It is more prevalent in early adulthood. The study could lay a foundation for epidemiological data for CML as not much data is available.

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