

PROFILE OF PAEDIATRIC MALIGNANCIES: A FIVE YEAR STUDY

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Abstract:

Objective: The objective of this study was to find out the profile of childhood cancers in National Institute of Cancer Research and Hospital, (NICRH), Dhaka during 2005 to 2009.

Methodology: It was a retrospective study using hospital based cancer registry records from January 2005 to December 2009. All the children below 15 years with confirmed diagnosis of cancer by means of histological or cytological examinations were included in this study.

Results: There were 28409 new confirmed cases attended out patient department of NICRH during these 5 years. Among which 1250 were below 15 years of age. An average 250 cases attended per year. Overall pediatric tumours were 4.4% of total cancers. The frequency of cancer was found to be higher among boys (62%) than girls (38%) with a ratio of 1.6:1. Majority of the children were from rural areas (67%) compared to (33%) from urban areas. The results showed that Lymphoma (24.2%), Retinoblastoma (17.4%) and Leukaemia (14.3%) were the commonly found childhood cancers among the children attended at NICRH during data collection period. Other less commonly found tumor were bone tumour (7.2%), kidney tumor (6.8%) Central Nervous System Tumour (3.7%), Testicular Tumour (3.7%), and Hepatocellular cancer (1.3%).

Conclusion: Lymphoma, acute lymphoblastic leukemia and bone tumor commonly found in children above 5 years in contradiction to retinoblastoma, leukaemia and lymphoma which were prevalent in children less than 5 years of age.

Key Words: Cancer registry, paediatric malignancies, cancer profile.

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Introduction:

Worldwide, the annual number of new cases of childhood cancer exceeds 200,000 and more than 80% of these are from the developing world.¹ Cancer remains one of the major causes of death in children between the ages of 0 to 14 years.² Paediatric cancers differ markedly from adult cancers in their nature, distribution and prognosis. Paediatric oncologists face unique challenges because treatment with irradiation, surgery and chemotherapy can adversely affect the children's growth and development. The incidence of childhood cancer and type vary greatly throughout the world. Though lower compared with the incidence of some adult cancers, it comes next to accidents as the leading cause of death among children in the developed world.²

Cancer is rare in children under 15, compared to adults; but cancer patterns at a young age present peculiar characteristics and deserve separate analysis.

Unfortunately, good-quality population-level statistics on the occurrence of cancer at young ages have been more difficult to obtain than in adults³ and serious under-reporting, even in western countries, has been documented^{4,5}.

The patterns of childhood cancer in America and Europe are almost the same, with leukemia and tumors of the central nervous system accounting for over one-half of the new cases. Children in developing nations are increasingly affected by malignancy in addition to rampant malnutrition and infections, but committed registry maintenance of paediatric

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tumours is lacking. As many of common childhood malignancies are curable there is a need to have a dedicated pediatric cancer registry for assessing the magnitude of problem in our country. However, there is a dearth of data due to lack of nation wide population based cancer registries on the incidence and patterns of childhood cancer in developing countries. Although many papers have been published on this in some developing countries, ⁶ reports on the pattern and incidence of childhood cancer in Bangladesh are very few. The objective of this study was to find out the profile of childhood cancer in National Institute of Cancer Research and Hospital (NICRH), Dhaka, Bangladesh.

Materials and Methods:

We used last 5 years hospital records in this retrospective study from January 2005 to December 2009. All children with cancer, aged 0 to 14 years diagnosed by means of histological or cytological examination during that period, were included in the study. In NICRH, hospital based cancer registry is running from 2005, under supervision of Department of Cancer Epidemiology. Patients from all over the country attend this government hospital for better care and cure.

The profile of childhood cancer was studied focusing on the prevalence of tumors according to age, sex, rural and urban distribution. Data were processed by editing and post-coding and analyzed by SPSS version 15.0.

Results:

There were twenty eight thousand four hundred and nine (28409) confirmed new cases attended out patient department of NICRH during January 2005 to December 2009. Among which twelve hundred and fifty (1250) belong to pediatric group (below 15 years of age). An average of 250 cases attended per year. The pediatric tumours comprised of 4.4% of all malignancies during these 5 years time. Out of 1250 patients, 62% were male and 38% were female with a male: female ratio of 1.6:1.0. Almost all were (92%) Muslim. Their average family size was 4.6 (SD±2.5334) and parent's average monthly family income was TK.8, 129.88 (SD ±2,809.21). Most of the children with cancer came from the rural areas (67%) compared to 33% from urban areas (Table-I).

Table- I

Distribution of childhood cancer patients according to place of residence and gender

Sex	Place of residence		Total(n%)
	Rural (n%)	Urban (n%)	
Male	496 (59.5)	279 (66.9)	775 (62.0)
Female	337 (40.5)	138 (33.1)	475 (38.0)
Total	833 (100.0)	417 (100.0)	1250 (100.0)

Year- wise frequency of pediatric tumours was worked out as shown in Fig. 1. There were 191 cancer children in 2005, 222 in 2006, 187 in 2007, 259 in 2008 and 391 in 2009 attended NICRH for seeking cancer treatment. There was a gradual rise of paediatric cancer patients during the study period.

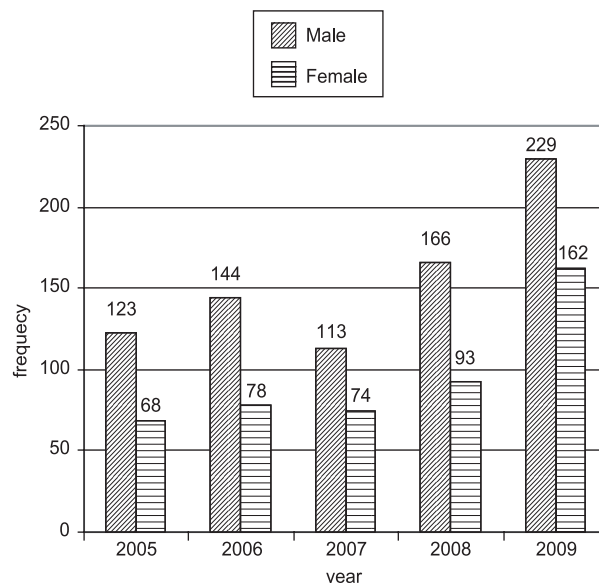


Fig.-1: Multiple bar diagram showing sex of the respondents by year

Tumours were arranged according to patient's age group in 0-4 year, 5-9 year and 10-14 years. The distribution of children according to their age showed that the majority of them belonged to 10-14 years(37.7%), followed by 5-9 years (31.4%) and rest 30.9% were from 0-4 years age group. The mean age of the patients was 9.48 (SD±2.66) years (Table-II).

Lymphomas were the most prevalent malignancies, accounting for 302 cases (24.2%). Among the lymphomas, non-Hodgkin lymphomas (NHL) were more prevalent than Burkitt's lymphoma and Hodgkins lymphoma.

The prevalence of NHL in males was found to be 65% while it was 35% in females. Male preponderance of Hodgkins' lymphoma was 83% while it was 17% in females. (Fig.-2)

Retinoblastoma was the second (17.4%) most commonly found cancer in children attended NICRH during the study period. About 70% belonged to 5 years or below age group. There was no difference between male to female ratio

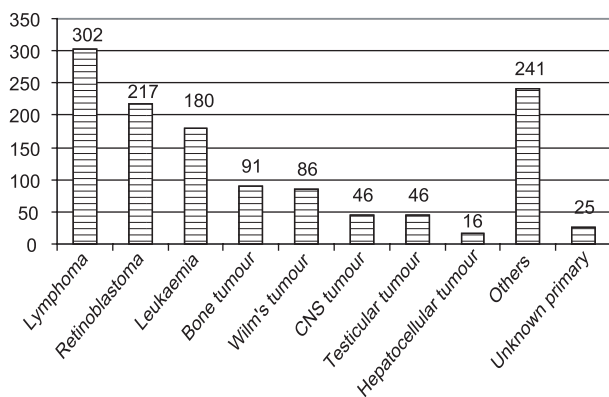


Fig.-2: Paediatric cancer pattern of NICRH from January 2005 to December 2009

for retinoblastoma among our patients, both were almost equal in number. Leukaemia constituted about 14.3% of all childhood malignancies; among them ALL were commonly found, and almost 77% sufferers were male. Bone tumour (7.3%) was found more common among 10-14 years children. About 52% sufferers were male patients. Osteogenic sarcomas were more common in male children than their counterparts. Kidney tumour were found 6.8% among the children and 70% were male. Majority suffered from Wilm's tumour and was found most commonly in 5-9 years age group. Central nervous system tumours (3.7%) were found in all three groups, and here also 73% sufferers were male. All the cases of Hepatocellular cancer (1.3%) were found below the 5 years age group and 83% were male. (Fig.-2)

The results showed that lymphoma, leukemia and bone tumor commonly occurred in children above five years of age in contradistinction to retinoblastoma, leukaemia and lymphoma commonly occurred in children younger than 5 years. (Table-III)

Table- II
Distribution of childhood cancer according to age group

Types	Age (years)			Total
	0-4	5-9	10-14	
All Lymphomas	40	98	164	302 (24.2%)
-NHL	20	44	109	
-Burkitt's Lymphoma	7	11	27	
-Hodgkin's Lymphoma	10	29	35	
Retinoblastoma	151	59	7	217 (17.4%)
All Leukaemias	82	33	65	180 (14.3%)
-Acute Lymphocytic	69	22	51	
- Acute Non Lymphocytic	5	5	9	
All Bone	0	39	52	91 (7.3%)
-Osteogenic Sarcoma		34	49	
All Kidney	33	46	7	86 (6.8%)
-Wilm's Tumour	31	43	6	
All Brain & Spinal	13	20	13	46 (3.7%)
- Astrocytoma	4	11	8	
- Medulloblastoma	6	4	3	
Testicular Tumour	0	7	39	46 (3.7%)
Hepatocellular	16	0	0	16 (1.3%)
Others	40	90	111	241 (19.3%)
Unknown primary	12	0	13	25 (2.0%)
Total	387(30.9%)	392 (31.4%)	471(37.7%)	1250 (100.0)

Table-III

Distribution of childhood cancer pattern by below and above 5 years age

Cancer Pattern	Age in years (n %)	
	< 5 yrs	> 5yrs
Retinoblastoma	151 (39.0)	66 (7.7)
Lymphoma	40 (10.3)	262 (30.2)
Leukaemia	82 (21.2)	98 (11.5)
Bone tumour	0	91 (10.5)
Wilm's Tumour	33 (8.5)	53 (6.2)
CNS Tumour	13 (3.4)	33 (3.9)
Testicular Tumour	0	46 (5.5)
Hepatocellular	16 (4.1)	0
Others	40 (10.3)	201 (23.3)
Unknown primary	12 (3.2)	13 (1.5)
Total	387(100.0)	863 (100.0)

Discussion:

Incidence of paediatric tumours is on rise³. In our study paediatric tumours constituted 4.4% of all malignancies, our result is almost similar to Rathi et al.⁷, where they found 3.58% childhood cancers among all malignancies.

But the proportion of childhood cancers seems to be high compared to that of developed countries. In USA, where childhood cancers are 0.8% of the total,⁸ two possible reasons for this difference could be that our data is from hospital and so is not a true representation of the cancer burden. Moreover, children form a larger part of the population in a developing country where the life expectancy is lower than in the developed world. Majority (92%) of our respondents was Muslims, out of 1250 patients, 62% were male and 38% were female. Male female ratio was 1.6:1.0. This ratio does not accord to our national statistics, but it might be the reflection of our culture where male child is considered as more valuable than female. Their average family size was 4.6 (SD±2.5334) and parent's average monthly family income was TK.8, 129.88 (SD ±2,809.21). Most of the children with cancer came from the rural areas (67%) compared to 33% from urban areas. This result reflects our national statistics.⁹

We found that the three most common cancer groups in our series were lymphomas (24.2%), retinoblastomas (17.4%) and leukaemias (14.3%). This is similar to that reported from North African countries, Morocco.¹⁰ However, it is in contrast to the data from the developed world, for example, in the USA⁸ the three most frequent major childhood cancers diagnosed were leukemia (30.2%), central nervous system cancers (21.7%) and lymphomas (10.9%).

Lymphomas (302, 24.2%) were the commonest cancer among the children attended NICRH during the study period. NHL was more frequent than Burkitt's and Hodgkin's lymphomas. NHL constituted 57% of all lymphomas, Burkitt's lymphoma was about 15%, and Hodgkin's disease was 24.5%. In some studies, Burkitt's lymphoma has been reported to be around 18–20% of total lymphomas¹¹. In our study of Hodgkin's disease frequency was found higher around 10-14 years age group.

Retinoblastoma was the second most common childhood tumour affecting 17.4% of study population. Almost 70% of retinoblastoma at our hospital presented below 5 years of age, and rest 30% presented late- at ages older than 5 years. Retinoblastoma accounts for 2.5-4% of all childhood cancers in most developed countries.⁵ This study result accords with the findings observed by Ayodeji¹², where they found retinoblastoma as second most common malignancies among children. In our study majority of the retinoblastoma cases were referred from different eye hospitals for radiotherapy treatment.

Leukaemia (14.3%) is the third most common childhood cancer found in NICRH. Almost 79% of leukamias were acute lymphoblastic leukaemia (ALL). In the Childhood Cancer Report UICC 2006¹³ it is found that hematological malignancies were second most common malignancies affecting 18.1% children. In our study leukaemias were more common in less than 5 years old. Study result similar with the observations made by McKinney¹⁴, they found leukaemia commonly among 0-4 years old. Literature review shows acute lymphoblastic leukemia is the most

common childhood malignancy⁴ but the frequency of leukaemia was lower in our centre, may be our hemato-oncology department started fully only a year back.

Bone tumour comprises 7.3% of all malignancies among our children. Almost 90% belonged to osteogenic sarcoma of long bones. This study accords with Mirabello¹⁵ study, where they reported that osteosarcoma occurs predominantly in adolescents and young adults and osteosarcoma accounts for approximately 5% of childhood tumors.

Nephroblastoma (86, 6.8%) was the fifth most common cancer identified in the study; this is comparable with data from other countries.¹⁶

Brain tumours were not much commonly found malignancy at our institute, affecting only 3.7% of children in our study. Most common brain tumour was astrocytomas. Majority of astrocytomas occurred in age >5 years. In developed countries CNS cancers are the second most common childhood cancer (22-25%) and lymphomas a distant third.¹⁷ In contrast, in India lymphomas often exceed CNS tumours, particularly in males. Interestingly, the incidence of CNS tumours in children in developed world has increased in the last 30-40 years with increasing availability of CT and MRI scanners.¹⁸

The pattern of childhood tumours showed wide variation among the age groups. Frequency of Retinoblastoma, leukaemia and lymphoma was higher in children less than five years and lymphomas, leukaemia and bone tumours were found more in above five years aged children. This result was similar with Huda¹⁹ where they found lymphoma, acute lymphoblastic leukemia and bone tumor commonly occurred in children above 5 years in contradistinction to kidney tumor and retinoblastoma which was prevalent in children less than 5 years of age. However, our study findings may not reflect our national statistics, as we have collected data from hospital, not from population.

From the study findings, it can be concluded that lymphoma, acute lymphoblastic leukaemia and bone tumour were commonly

found in children above five years in contradiction to retinoblastoma, leukaemia and lymphoma which were prevalent in children less than 5 years of age.

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