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## Histopathological patterns of childhood malignancies seen at Federal Teaching Hospital Abakaliki, Ebonyi State, Nigeria: A 10 year retrospective study

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### Introduction

Childhood Malignancies cause a significant number of deaths in children in both the developing and developed countries. However, they rank lower than infections and

**Abstract:** *Introduction:* Childhood malignancies (CM) have been one of the major causes of death in the world. It appears to be increasing in significance due to the ongoing reduction in both infectious and nutritional diseases. *Aims:* The study was conducted to document the histopathological pattern, age and sex distribution of childhood malignancies in a University Teaching Hospital in Southeast Nigeria.

*Method:* The materials consisted of histology slides, formalin-fixed paraffin-embedded tissue blocks (FPTB), and requisition forms of all cases diagnosed with CM at a University Teaching Hospital between the periods January 2005 and December 2015

*Results:* A total of 2,528 surgical biopsies were received at the Department. Only 60 (2.4%) specimens represented childhood malignancies. Thirty-one cases (51.7%) of the entire CM were lymphomas; 12 (20.0%) were non

-Hodgkin lymphoma, 17 (28.3%) others were Burkitt's type whereas 2(3.3%) were Hodgkin lymphoma. Childhood malignancies were more in males 36 (60.0 %) than females 24 (40.0%), giving a male to female ratio of 3:2. However, Burkitt's lymphoma was higher in females 12 (70.6%) than males 5 (29.4%) with a male to female ratio of 1.2:3. Twenty-six (43.3%) cases of the CM occurred in children aged 0-5 years but 20 (36.7%) presented in children aged 11 to 15 years. Twelve (20.0%) cases were seen in children 6 to 10 years. Six (23.1%) of the children had Burkitt's lymphoma all of whom were under 5 years.

*Conclusion:* Lymphomas were the commonest CM, Burkitt's lymphoma being the dominant subtype in this study. There was a female preponderance of Burkitt's lymphoma.

**Key words:** Burkitt, Childhood malignancies, Lymphoma

malnutrition as etiology of childhood mortality in Sub Saharan Africa.<sup>1</sup> They are important pediatrics problems because of the documented gradual reduction in infectious and nutrition-related diseases in developing countries.<sup>1</sup> Childhood malignancies constitute more than half of the global cancer burden in developing countries as compared to the global cancer incidence in developed countries.<sup>2</sup> A considerable variability in incidence and prevalence has been observed in different localities of the world.<sup>3</sup> Several factors within the regions including ethnicity and environmental factors impact on the patterns of childhood malignancies in developing nations.<sup>4</sup> The pattern of childhood cancer is almost the same for America and Europe, with a preponderance of leukemia and brain tumors.<sup>5,6</sup> Although some studies show that lymphomas are more common in developing countries,

the true pattern of childhood malignancy is not clear in many countries because of poor record-keeping, inadequate diagnostic facilities and preference for traditional medical care.<sup>2,7-9</sup> A study carried out by the research group of Onwasigwe in South-eastern Nigeria showed that lymphoma constituted about 40% of all childhood malignancies with Burkitt's lymphoma representing over 60% of them. At the same time, leukaemia was the fifth commonest childhood malignancy.<sup>10</sup> Although lymphoma was the leading childhood malignancy, sarcomas and acute leukemia ranked second and third among childhood cancers in that centre.<sup>10</sup> A similar pattern was recorded in 2013 by Shehu *et al* in Kano, North-western Nigeria.<sup>11</sup> However, another study done by Chukwu *et al.* showed a reversed trend in the pattern of malignancies of childhood in Enugu as acute leukaemia became one of the leading malignancies of children.<sup>12</sup> The pattern of childhood tumours in Africa has been characterized by the high prevalence of lymphoma and low prevalence of leukemia.<sup>10,13,14</sup>

Because of the variations in the patterns of childhood malignancies from different populations, it therefore became imperative to periodically survey the histopathologic patterns of childhood malignancies in our own locality in a University teaching hospital, South-eastern Nigeria.

## Materials and methods

All surgical specimens of childhood malignancies received at the Department of Morbid Anatomy of the University Teaching Hospital between January 2005 and December 2015 constituted the study's materials. Only tumours from patients aged 0-15 years were included in this study. The age, sex, sites of the tumour, and final histological diagnoses were obtained from the surgical daybook and requisition forms at the Morbid Anatomy Department's archives. The data obtained were subjected to statistical analysis using the SPSS programme. The variables were presented in tables. The cases under study were classified based on the International classification of childhood Cancer.<sup>(5)</sup>

## Results

### General observation

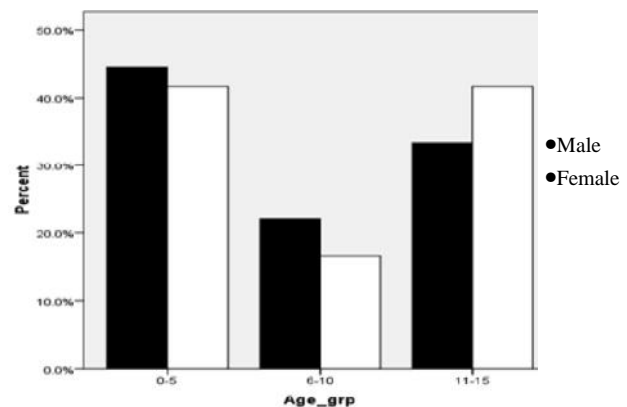
During the period under review, a total of 2,528 surgical biopsies were received in the Department. Childhood malignancies constituted 60 (2.37%) cases of all the surgical biopsies. Thirty-six patients were males, 24 were females giving the male to the female ratio of 3:2.

### Age distribution

The patient's ages under study ranged from 0 to 15 years, with a mean age of  $7.5 \pm 5.2$  years. The peak inci-

dence was between 0 – 5 years, accounting for 26 (43.3%) cases (Figure 1). The difference between the mean male age ( $7.2 \pm 4.9$  years) and mean female age ( $7.8 \pm 5.4$  years) was not significant,  $t = 0.537$  degrees of freedom (df) = 58,  $p = 0.6$ . Figure 1 shows the distribution of solid childhood malignancies across the various age groups in both males and females.

**Fig 1:** Age and sex distribution of children with Childhood malignancies



### Histological types of Childhood tumours

Lymphomas (Non-Hodgkin's lymphoma, Burkitt's lymphoma, and Hodgkin's lymphoma) were the commonest CM accounting for 31 (51.7%) of cases (Table 1). This was followed by sarcomas present in 9 (15.0%) patients. Nephroblastoma 6(10.0%) and retinoblastoma 6(10.0%) were third-most-common CM. acute myeloblastic carcinoma, There was one case each of adenoid cystic carcinoma, malignant giant cell and yolk sac tumors which suggested that they were less prevalent. The lymphomas were mostly Burkitt's lymphomas 17 (28.3%) and Hodgkin lymphoma 12 (20%).

Burkitt's lymphoma occurred in 5 males and 12 females. The male to female ratio among patients who had malignant lymphoma was 1.2:3.0. All the Nephroblastoma cases in this study were seen in males. Of all the cases of malignant lymphomas, Burkitt's lymphoma (a subtype of Non-Hodgkin's lymphoma) was the commonest, accounting for 17(28.3%). Out of the 17 cases of Burkitt's lymphoma, 5 representing 13.9% were males while 12 (50.0%) were females, giving a male to female ratio of 1.2:3 (Table 2).

**Table 1: Relative frequency of childhood malignancies**

Diagnosis	Frequency	Percentage
Non-Hodgkin lymphoma	12	20.0
Burkitt's lymphoma	17	28.3
Retinoblastoma	6	10.0
Nephroblastoma	6	10.0
Hodgkin lymphoma	2	3.3
Pleomorphic Rhabdomyosarcoma	2	3.3
Adenocarcinoma	4	6.7
Acute myeloblastic leukemia	1	1.7
Adenoid cystic carcinoma	1	1.7
Alveolar rhabdomyosarcoma	2	3.3
Alveolar soft part sarcoma	1	1.7
Embryonal Rhabdomyosarcoma	2	3.3
Fibrosarcoma	1	1.7
Chondrosarcoma	1	1.7
Malignant giant cell tumor	1	1.7
Yolk Sac Tumour	1	1.7
CNS Tumours		
Total	60	100.0

**Table 2: Diagnosis according to gender**

Diagnosis	Male	Female	Total
Non-Hodgkin Lymphoma	8 (22.9)	4(16.0)	12 (20.0)
Burkitt's lymphoma	5(14.3)	12 (48.0)	17 (28.3)
Retinoblastoma	5 (14.3)	1 (4.0)	6 (10.0)
Nephroblastoma	6 (17.1)	0 (0.0)	6 (10.0)
Hodgkin lymphoma	1 (2.9)	1 (4.0)	2 (3.3)
Pleomorphic Rhabdomyosarcoma	1 (2.9)	1 (4.0)	2 (3.3)
Adenocarcinoma	2 (5.7)	2 (8.0)	4 (6.7)
Acute myeloblastic leukemia	0 (0.0)	1 (4.0)	1 (1.7)
Adenoid cystic carcinoma	0 (0.0)	1 (4.0)	1 (1.7)
Alveolar rhabdomyosarcoma	1 (2.9)	1 (4.0)	2 (3.3)
Alveolar soft part sarcoma	0 (0.0)	1 (4.0)	1 (1.7)
Embryonal Rhabdomyosarcoma	2 (5.7)	0 (0.0)	2 (3.3)
Fibrosarcoma	1 (2.9)	0 (0.0)	1 (1.7)
Chondrosarcoma	1 (2.9)	0 (0.0)	1 (1.7)
Malignant giant cell tumor	1 (2.9)	0 (0.0)	1 (1.7)
Yolk Sac Tumor	1 (2.9)	0 (0.0)	1 (1.7)
Total	35 (100.0)	25 (100.0)	60 (100.0)
Chi Square = 17.843	Df = 15	P – Value = 0.271	

Non Hodgkin's Lymphoma is seen more in 6-10 years age group accounting for 5 cases (41.7%) and only 3 cases (10.7%), Retinoblastoma, Nephroblastoma and Burkitt's lymphoma are seen more in 0-5 year's age group (Table 3).

**Table 3: Diagnosis according to age group**

Diagnosis	Age group			
	0-5	6-10	11-15	Total
Non-Hodgkin lymphoma	3 (10.7)	5 (41.7)	4 (20.0)	12 (20.0)
Retinoblastoma	5 (17.9)	0 (0.0)	1 (5.0)	6 (10.0)
Nephroblastoma	6 (21.4)	0 (0.0)	0 (0.0)	6 (10.0)
Hodgkin lymphoma	1 (3.6)	0 (0.0)	1 (5.0)	2 (3.3)
Burkitt's lymphoma	9 (32.1)	4 (33.3)	4 (20.0)	17 (28.3)
Pleomorphic Rhabdomyosarcoma	1 (3.6)	0 (0.0)	1 (5.0)	2 (3.3)
Adenocarcinoma	0 (0.0)	0 (0.0)	4 (20.0)	4 (6.7)
Acute myeloblastic leukemia	0 (0.0)	0 (0.0)	1 (5.0)	1 (1.7)
Adenoid cystic carcinoma	1 (3.6)	0 (0.0)	0 (0.0)	1 (1.7)
Alveolar rhabdomyosarcoma	0 (0.0)	1 (8.3)	1 (5.0)	2 (3.3)
Alveolar soft part sarcoma	0 (0.0)	1 (8.3)	0 (0.0)	1 (1.7)
Embryonal Rhabdomyosarcoma	1 (3.6)	0 (0.0)	1 (5.0)	2 (3.3)
Fibrosarcoma	0 (0.0)	0 (0.0)	1 (5.0)	1 (1.7)
Chondrosarcoma	0 (0.0)	0 (0.0)	1 (5.0)	1 (1.7)
Malignant giant cell tumor	0 (0.0)	1 (8.3)	0 (0.0)	1 (1.6)
Yolk Sac Tumor	1 (3.6)	0 (0.0)	0 (0.0)	1 (1.7)
Total	28 (100.0)	12 (100.0)	20 (100.0)	60 (100.0)
Chi Square = 42.378		Df = 30	P-value	0.066

Information obtained from the requisition forms showed the distribution of cases according to the various sites of the body. The most affected parts of the body are the cervical lymph nodes (30%), abdomen (13.3%) and kidneys (11.7%), table 4.

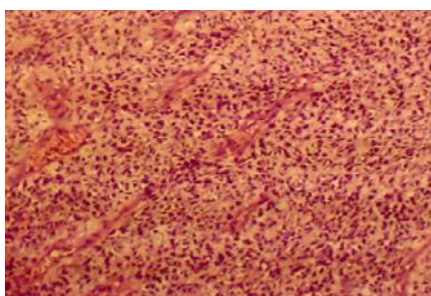
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**Table 4:** Distribution of cases according to various sites of the body

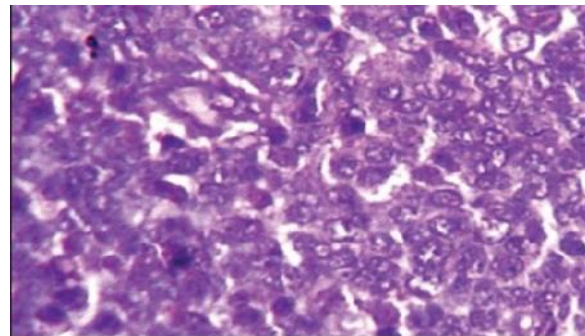
Site	Frequency	Percentage
cervical lymph node	18	30.0
Face	3	5.0
Neck	2	3.3
Abdomen	8	13.3
Jaw	3	5.0
Thigh	1	1.7
Ileum	1	1.7
Kidney	7	11.7
Nose	1	1.7
Eye	6	10.0
Ear	1	1.7
Oral	1	1.7
Perineum	1	1.7
Cervix	1	1.7
Caecum	3	5.0
Scapular	1	1.7
Pelvis	1	1.7
bone marrow	1	1.7
<b>Total</b>	<b>60</b>	<b>100.0</b>

The study also showed that males were more affected in 0-5 years and 6-10 years age groups, but females were more affected than males in 11 -15 years age group, Figure 1. Photomicrographs of Burkitt's lymphoma, Carcinoma, and Embryonal Rabdomyosarcoma are represented in figures 2, 3 and 4 respectively.

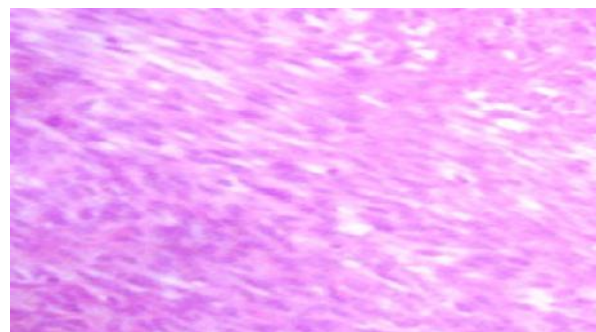
**Fig 2:** Photomicrograph of Burkitt's lymphoma of a 8 year old male x4



**Fig 3:** Photomicrograph of carcinoma in a 10 year old female x4



**Fig 4:** Photomicrograph of Embryonal Rhabdomyosarcoma in a 12 year old male, x4.



## Discussion

In this study, a total of 60 cases of childhood malignancies were recorded over a period of 10 years. In a similar study in the south-western part of Nigeria, Agboola *et al.* documented an average of 7 cases per annum over 11 years.<sup>7</sup> A similar study in Ghana also documented an annual rate of 76.9, which is far above the findings in most part of Nigeria.<sup>15</sup> The male to female ratio of 3:2 in this study compares favorably with the male to female ratios of 1.3:1 and 1.5:1 reported by Okocha *et al.* and Agboola *et al.* among children diagnosed with malignancy in Nnewi, South-eastern Nigeria and Sagamu, Southwestern Nigeria respectively.<sup>7,16</sup> Our study revealed that the four most common cancers in our centre were Burkitt's lymphoma (28.3%), Non-Hodgkin lymphoma (20%), retinoblastoma and nephroblastoma, (10% each). Others were adenocarcinoma (6.7%) and Hodgkin lymphoma (3.3%). These findings are similar to reports from Enugu and Nnewi within the same south-eastern region of Nigeria. In those centers, Non-Hodgkin lymphoma (60%) and (80%) were respectively reported by Onwasaigweet *et al.* and Okocha *et al.* as the commonest childhood tumors.<sup>10,16</sup> These differ from another survey within the same region of Nigeria by Obioha *et al.* who found a much higher proportion of lymphomas (40%) followed by Nephroblastoma (14%), Leukemia (12.9%) and CNS tumors (9.7%) among childhood malignancies.<sup>17</sup> Conversely, Tanko *et al.* at Jos, North-central part of Nigeria, identified rhabdomyosarcoma as the commonest childhood malignancy (31%)



exceeding Non-Hodgkin(19.5%) and Burkitt lymphoma (13.8%).<sup>13</sup> Environmental factors such as diet and cultural practices may account for these differences. Omotayo *et al.* in Ilorin, North-central part of Nigeria had also observed Nephroblastom as the 2nd commonest childhood cancer in their centre.<sup>18</sup> But our findings slightly differs from reports from Ibadan, Jos and Lagos where retinoblastoma occupied the second place alone without Nephroblastoma.<sup>8,12,19</sup> All 6 cases of nephroblastoma in our series were males within the 0 – 5 years age bracket. The incidence of childhood cancer in the current report is higher than 0.9% obtained by Okocha *et al.* at Nnewi.<sup>16</sup>

## Conclusion

Lymphomas, with Burkitt's lymphoma sub-type, are the dominant childhood malignancies seen in this study while there was no incidence of central nervous tumor. Male preponderance in childhood malignancy was observed except for Burkitt's lymphoma. The spectrum of paediatric malignant tumours in this study compare with the trend elsewhere in Nigeria and other African countries

**Conflict of Interest:** None

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