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## **Pattern of childhood malignant tumours in two tertiary teaching hospitals in Nigeria: comparative study**

DOI:<http://dx.doi.org/10.4314/njp.v40i2.14>

Accepted: 6th June 2012

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**Abstract Background:** Cancer is a public health problem worldwide affecting all categories of persons. It is the second common cause of death in developed countries and among the three leading causes of death in developing countries.

**Objective:** To compare the patterns of malignant childhood tumours in two tertiary hospitals in the north-Western and South western Nigeria. **Methods:** Retrospective studies of childhood malignancies diagnosed at Aminu Kano Teaching Hospital (AKTH), Kano and Obafemi Awolowo University Teaching Hospital Complex (OAUTHC) (Ife Hospital Unit, Ile-Ife and Wesley Guild Hospital Unit, Ilesa, Osun state) were undertaken from January, 2001 to December, 2010. The patterns of childhood cancers in these hospitals were compared.

**Results:** Four hundred and ten children aged 7 months to 15 years were admitted at AKTH with malignancies of which 236 were males and 174 females with male to female ratio of 1.4:1. At OAUTHC, 568 children aged two months to 15 years were admitted with malignancies over the ten year period. There were 401 males and 167 females, with male to female ratio of 2.4:1.

Lymphomas were the commonest type of malignancy in both centers, which accounted for 47.3% and 59.7% at AKTH and OAUTHC respectively. Retinoblastoma was the second commonest tumour at AKTH constituting 14.9% of all malignancies followed by nephroblastoma and acute leukemias. In contrast, acute leukemias were the second commonest malignancy at OAUTHC accounting for 12.7% of all malignancies followed by retinoblastoma and nephroblastoma. Tumours of central nervous system were observed to be commoner at AKTH, while bone tumours were commoner at OAUTHC.

**Conclusion:** The pattern of childhood cancer varies rather little between different regions in Nigeria, with malignant lymphomas being the most common as is the case in most developing countries.

However, the findings in this study suggest that there is variation in prevalence of leukemia, CNS and bone tumours in northern and southern Nigeria.

**Key words:** Childhood, malignant tumours, pattern, teaching hospitals, Nigeria

### **Introduction**

Childhood cancers represent an important global public health problem. This is especially so in poorer countries, where childhood cancer too often is detected too late for effective treatment and where appropriate treatment is either not available or not affordable.<sup>1</sup> Many children are never diagnosed at all, many are diagnosed very late, and when a diagnosis is made the treatment options may be limited.<sup>1</sup>

Genetic, climatic and other environmental factors often exert considerable influence on the pattern of malignant tumours. Even within the same country like Nigeria differences have been noted in the pattern of childhood malignant tumours.<sup>2</sup> Understanding of the pattern of childhood malignancies in different geographical zones support the hypothesis of environmental factors in the aetiopathogenesis of cancers in children. In Nigeria, studies on the differences in the pattern of childhood malignancies in different geographical zones are few, and this study is one of the first few attempts to

characterise such differences.

This study was therefore undertaken to compare the pattern of childhood malignancy in Kano (North western) and Ile-Ife/Ilesa (South western) Nigeria.

## Materials and Methods

A retrospective study of childhood malignancies diagnosed at AKTH, Kano and OAUTHC, Ile-Ife was undertaken from January 2001 to December 2010. Aminu Kano Teaching Hospital (AKTH) is a tertiary centre serving Kano and neighboring states in north western Nigeria. OAUTHC is a multi-centre hospital; Ife Hospital Unit (IHU) and Wesley Guild Hospital Unit (WGH) where the study was carried out are the two main referral facilities of the hospital providing both general and specialist paediatric care for the semi-urban communities of the Osun, Ondo and Ekiti states in south-western Nigeria. Both centres (AKTH and OAUTHC) are fee for service hospitals equipped with histopathological, haematological, surgical, cytochemical and neuro-imaging facilities for diagnosis of malignancies.

Case files of all children admitted with malignancies in the two hospitals during the study period were retrieved and relevant data were extracted and recorded in the study proforma. Such data included socio-demographic characteristics (age, sex, socio-economic class), types of the tumour and parts of the body affected. Patients whose case files were missing or those with incomplete data were excluded from the study. The results from two centres were compared.

## Results

At AKTH, 442 children aged 7 months to 15 years with various types of malignancy were admitted over the study period, which accounted for 2.9% of 15,185 total paediatric admissions. Two hundred and thirty six were males and 174 were females, with male to female ratio of 1.4:1. While at OAUTH, 624 case files of children aged 2 months to 15 years were admitted with malignancies over the study period, which accounted for 3.1% of 20439 total paediatric admissions. There were 401 males and 167 females, with male to female ratio of 2.4:1. However, 32 and 56 children from AKTH and OAUTH respectively whose data were incomplete and those without definitive diagnosis were excluded from further analysis. Hence, 410 and 568 children from AKTH and OAUTH were studied.

### *Comparison of the sociodemographic characteristics between the zones*

The sex distributions in both centres were similar with an overall male preponderance in both centers (Table 2). Similarly, in both centers majority of the cases fall within the age range 6 to 10 years (Tables 3 and 4).

With respect to parental social class, majority (79.3%) of the children with malignancy in AKTH were from low socio-economic background as against 58.5% in OAUTHC (Table 5).

**Table 1:** Types of malignancy observed in AKTH and OAUTH

Types of malignancy	AKTH n (%)	OAUTH n (%)
Lymphoma	194 (47.3)	339 (59.7)
Burkitt's lymphoma	122 (29.8)	301 (53.0)
Non-Hodgkin's lymphoma	46 (11.2)	13 (2.3)
Hodgkin's lymphoma	26 (6.3)	25 (4.4)
Retinoblastoma	61 (14.9)	45 (7.9)
Acute leukaemia	60 (14.7)	72 (12.7)
Nephroblastoma	44 (10.7)	38 (6.7)
Neuroblastoma	21 (5.1)	18 (3.2)
Rabdomyosarcoma	11 (2.7)	17 (3.0)
Nasopharyngeal Ca	3 (0.7)	4 (0.7)
CNS tumour	5 (1.2)	3 (0.5)
Teratoma	1 (0.2)	3 (0.5)
Bone tumours	-	24 (4.2)
Others (CML, Hepatic tumours)	10 (2.4)	5 (0.9)
Total	410 (100)	568 (100)

**Table 2:** Types of malignancy in relation to gender

Types of malignancy	AKTH		Total	OAUTH		Total
	Males	Females		Males	Females	
<i>Lymphomas:</i>						
Burkitt's lymphoma	73	49	122	207	94	301
Non Hodgkin's Lymphoma	20	26	46	7	6	13
Hodgkin's Lymphoma	21	5	26	12	13	25
Retinoblastoma	25	36	61	39	6	45
Nephroblastoma	45	15	60	16	16	38
Leukaemia	23	21	44	60	12	72
Bone tumours	-	-	-	18	6	24
Neuroblastoma	12	9	21	18	0	18
Nasopharyngeal tumour	2	1	3	3	1	4
Rabdomyosarcoma	6	5	11	11	6	17
CNS tumour	3	2	5	3	0	3
Teratoma	-	1	1	0	3	3
Others (CML, Hepatic tumours)	6	4	10	4	1	5
Total	236 (57.6)	174 (42.4)	410	401 (70.6)	167 (29.4)	568

<b>Table 3: Types of malignancy in relation to age group in AKTH-Kano</b>					
Types of malignancy	Age group		6-10 yrs	>10 yrs	Total
	<1yr	1-5 yrs			
<i>Lymphomas:</i>					
BL	-	13	89	20	122
HL	-	-	16	10	26
NHNBL	-	4	16	26	46
Acute Leukaemias	-	22	31	7	60
Retinoblastoma	-	56	5	-	61
Nephroblastoma	4	29	11	-	44
Bone tumour	-	-	-	-	-
Neuroblastoma	3	14	4	-	21
Rhabdomyosarcoma	-	3	6	2	11
Nasopharyngeal Ca	-	-	1	2	3
CNS Tumour	-	-	3	2	5
Teratoma	-	-	1	-	1
Others	-	-	7	3	10
Total	7 (1.7)	141 (34.4)	190 (46.3)	72(17.6)	410

<b>Table 4: Types of malignancy in relation to age groups in OAUTH- Ife</b>					
Types of malignancy	Age group				Total
	<1yr	1-5 yrs	6-10 yrs	>10 yrs	
<i>Lymphomas:</i>					
BL	-	85	172	44	301
HL	-	7	12	6	25
NHNBL	-	-	7	6	13
Acute Leukaemias	-	13	19	40	72
Retinoblastoma	9	26	10	-	45
Nephroblastoma	-	25	13	-	38
Bone tumour	-	-	5	19	24
Neuroblastoma	-	18	-	-	18
Rhabdomyosarcoma	-	1	8	8	17
Nasopharyngeal Ca	-	1	-	3	4
CNS Tumour	-	1	2	-	3
Teratoma	-	1	1	1	3
Others	-	2	2	1	5
Total	9(1.6)	180 (31.7)	251 (44.2)	128 (22.5)	568

<b>Table 5: Parental social class</b>		
Social class	AKTH n(%)	OAUTH n(%)
I	18(4.3)	49(8.6)
II	22(5.5)	60(10.5)
III	38(10.9)	127(22.4)
IV	94(22.9)	185(32.6)
V	231(56.4)	147(25.9)
Total	410(100)	568(100)

### Types of malignancy

Lymphomas were the commonest malignancy observed accounting for 47.3 percent and 59.7 percent in AKTH and OAUTHC respectively. Also, Burkitt Lymphoma was the leading malignancy in both centres. It was responsible for about one-third of the cases in AKTH and about one-half of the cases in OAUTHC.

The prevalence of Burkitt's lymphoma in both centres was not significantly different ( $X^2 = 6.08$ , OR = 1.41,  $p = 0.014$ ). On the contrary, while Non-Hodgkin Lymphoma was not commonly seen in OAUTHC (2.3%), it accounted for 11.2% of cases in AKTH. Acute leukemias were second commonest malignancy in OAUTHC, while retinoblastoma was observed to be the second commonest malignancy in AKTH. Similarly, tumours of the central nervous system were observed to be commoner in AKTH. At OAUTHC, 24 (4.2%) children were admitted with malignant bone tumour. No cases of malignant bone tumour were recorded in AKTH (Table 1).

### Discussion

Lymphomas were the most prevalent childhood malignancy observed in both study centers with Burkitt's lymphoma being the most common childhood cancer constituting 29.8% and 53.0% of the total malignancies in AKTH and OAUTHC respectively. This finding was similar to reports from most centers in Africa,<sup>3-10</sup> but different from reports from developed countries where leukemias and intracranial tumours predominate in children.<sup>11</sup> However, Ojesina et al<sup>12</sup> from Ibadan has observed a significant relative decline in the frequency of Burkitt's lymphoma which was ascribed the relative decline to the improved living conditions and greater control of malaria. In AKTH, retinoblastoma was found to be the second commonest tumour (14.9%) in this study, followed by nephroblastoma and acute leukemias. This finding is similar to reports from other centers where retinoblastoma and nephroblastoma were relatively common.<sup>3, 12, 13</sup> In contrast, acute leukemias were the second commonest malignancy in OAUTHC; similar to report from Jos<sup>14</sup> north central Nigeria where acute leukemia constitute a major childhood cancer. This finding suggests that there are variations in prevalence of retinoblastoma and leukemia in different parts of Nigeria or that leukemia is now more common even in Nigeria where it had earlier been reported to be rare.<sup>13</sup>

The prevalence of nephroblastoma, neuroblastoma and rhabdomyosarcoma was similar in both centers. There is higher prevalence of CNS tumours observed in AKTH and was relatively rare in OAUTHC. Higher prevalence of CNS tumours was equally reported by other workers.<sup>15</sup> In this study, malignant bone tumours were not observed in AKTH. This was probably because, until recently all cases of bone tumours were directly referred to a national orthopaedic hospital in the state. Ethnic and geographic variations in the distribution of different

types of childhood malignancies may be attributed to the interplay of varied causative factors such as exposure to ultraviolet light, chemical carcinogens, oncogenic viruses, genetic factors and cultural practices among various populations.<sup>16</sup>

In this study, it was observed that majority of children with malignancy were within the age group 6 to 10 years. This is not surprising because, Burkitt's lymphoma is most frequent in the age bracket 5 to 9 years. There was also male preponderance in the prevalence of childhood cancer in both centers in this study; this finding is also similar to reports from other centers.<sup>5,7,14</sup> Cancer treatment is generally expensive and often times requiring prolonged hospital stay. The parents of these patients have to bear all the costs of treatment including drugs, diagnostic investigations, meals and hospital stay. Therefore, many families of children with cancer experience financial difficulties. In developed countries, for many patients a portion of the medical expenses is paid by their health insurance plan. For individuals without health insurance or who need financial assistance to cover care costs, resources are available, including government sponsored programs and services supported by voluntary organizations.<sup>17</sup> On the other hand, in resource poor countries where health insurance and resources to help families with children with malignancies through financial difficulties are virtually nonexistent. Majority of the patients from both centres came from very poor families with 79.3% of parents of these children in AKTH from low socio-economic

background and 58.5% from OAUTHC. This was above the national average poverty rate of 71% and 43%<sup>18</sup> for the north-western and south western Nigeria respectively. The socioeconomic statuses of most parents in general paediatric population in both centres are low with few of the patients coming from middle and higher socioeconomic background. However, families of children with malignancy experience more financial difficulties

associated with prolong hospital stay, cost of treatment including drugs and investigations. This contributes to late presentation, high default rates and poor compliance to treatment and eventual high morbidity and mortality.

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## Conclusion

Childhood cancer is common in the north western and south western Nigeria; with malignant lymphomas the most common. There is however, variation in the prevalence of retinoblastoma, acute leukemias and CNS tumours. Free treatment is what is required as majority of the patients particularly in north western Nigeria come from very poor families.

Conflict of interest: None Funding: None
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