



## Assessment of the Pattern of Childhood Malignant Diseases seen at the University of Benin Teaching Hospital (2004-2008), Benin City, Nigeria

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### KEYWORDS

Childhood Malignancies Pattern

#### ABSTRACT

##### Background:

Malignant diseases have been reported in children worldwide. Pattern of these diseases vary from continent to continent and even in the same country from region to region. Pattern of malignant diseases have been described from various parts of Nigeria, but none from Benin.

##### Aim:

To assess the pattern of malignant diseases seen in the University of Benin Teaching Hospital, Benin-City, Edo State

##### Methods:

In a bid to accurately document Cancers at the University of Benin Teaching Hospital, a cancer registry was established in the unit as all cases are usually managed in the unit. All cases of childhood admissions for malignant diseases were documented in the cancer registry. This data was recalled and a reviewed of malignant diseases seen between January 2004 and December 2008 (5years) was done. Frequencies were expressed as means and percentages, and chi square was used to compare proportions.

##### Results:

A total of 174 children presented with malignant disorders during this period. Burkitt's lymphoma was the commonest cause of malignancy accounting for 23.6% of all cases. This was followed by retinoblastoma (17.8%), Non Hodgkin's lymphoma (12.64%), Nephroblastoma (10.3%), Leukemia (9.2%), Rhabdomyosarcoma (6.9%), Neuroblastoma (6.9), Hodgkin lymphoma (2.3%) and others (10.3%). Malignant disorders were commoner in children 1- 5years largely due to retinoblastoma, although Burkitt's lymphoma was the overall most common cause of cancer occurring more commonly in children aged 5-10 years

##### Conclusion:

A higher prevalence of lymphoma in this study typifies what is seen in developing countries unlike the developed countries where leukemias predominate. As has been postulated, environmental and genetic predisposition may be important in the pathogenesis of cancers.

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### INTRODUCTION

Ninety percent of the world's children are born in the developing countries.<sup>1</sup> Infectious diseases still pose the greatest threat to child survival in the developing countries despite interventional programmes that have been put in place to curtail these deaths.<sup>2,3</sup> Because of the burden posed by these infectious diseases on the health care system, not much attention has been given to the threat that malignant diseases pose to child survival in the

developing countries. Most childhood tumors are curable,<sup>4</sup> although prognosis relates to the tumor type, and the extent of the disease at the time of diagnosis. Early diagnosis and effective therapy optimizes the chances of a cure.<sup>4</sup> Thus while interventional programmes have been put in place for diseases due to infectious organisms, none exist for the prevention, and early detection of malignancy in children.

The burden of malignant diseases on

Nigeria's health care system is not known because of poor data collection as there are no central cancer registries and where they exist, collection is poor. Pattern of malignant disorder in children vary in each geographic locale.<sup>5</sup> In the industrialized countries and Japan leukemia and brain tumors are the commonest causes of cancers in children.<sup>6-9</sup>

In the developing countries, lymphomas are the most prevalent tumors seen.<sup>9</sup> The reason for this geographic variation in the types of tumor seen is not readily known and environmental and genetic factors have been postulated.<sup>4</sup> In Africa, the pattern of malignant disease also vary. In West<sup>10</sup> and East Africa,<sup>11,12</sup> Burkitt Lymphoma is the most prevalent malignancy, while in Namibia,<sup>13</sup> southern part of Africa, brain, renal tumors and leukemia were the prevalent tumors seen in children. In Nigeria, retinoblastoma was the commonest tumor seen in Lagos<sup>14</sup> while it was rhabdomyosarcoma in Jos.<sup>15</sup> Studies from other parts of Nigerian showed that Burkitt lymphoma was the most prevalent tumor in childhood<sup>16-24</sup>. Since pattern of malignancy vary from region to region, it is important to document the pattern of malignancies seen in Benin-City.

## MATERIALS AND METHOD

The study was conducted in the Department of Child Health University of Benin Teaching Hospital (UBTH), Benin-City, Edo State. The UBTH is a 500 bed tertiary hospital which serves Edo, Delta, Ondo, and Kogi states.

A cancer register was opened in the unit in January 2004.

The data collected include the age and sex of the child, the sites of the tumor, the histological diagnosis, treatment protocol used and outcome of patients managed. Patients without histologic diagnosis and those whose tumors turned out to be benign were excluded from the study.

Record of patients with malignant disorders admitted into the Paediatric Oncology unit from January 2004 to December 2008 was reviewed. Data was analyzed using the instat package, GraphPad Instat tm, Graph Pad Soft ware V2.05a 971042. Values were expressed as means and frequencies as percentages. Chi square was used to compare proportions.

## RESULTS

One hundred and seventy four children were diagnosed with malignant disorders. They were aged between 1 and 18 years. The mean age was  $6.6 \pm 4.8$  years and the median was 5.5years. One hundred and one were males and the rest were females with a male/ female ratio of 2:1.4. Burkitt's lymphoma was the commonest malignancy accounting for 41 (23.5%), followed by retinoblastoma 31 (17.8%), then Non Hodgkin's Non Burkitt Lymphoma 22 (12.6%), Wilms tumor 18(10.3%), leukemia 16(9.2%), rhabdomyosarcoma 12(7%), neuroblastoma 12(7%), Hodgkin lymphoma 4(2.3%) and others 18(10.3%) (Table I).

Four (2.3%) of all the malignancies occurred in children less than 1 year, 81 (46.8%) in children aged 1- 5 years, 55 (31.2%) in children aged of 6-10 years, 27 (15.6%) in children aged 11-15 years and 7 (4.1%) in children aged 16-18 years (table II).

Forty one children had Burkitt lymphoma. The mean age for the occurrence of Burkitt's lymphoma for both sexes is 7.3 years. Most tumors

**Table I. Frequency of Malignant tumors in children N=174**

Type of Tumors	Frequency	Percentage
Burkitt's lymphoma	41	23.5
Retinoblastoma	31	17.8
Non Hodgkin's Lymphoma	22	12.6
Nephroblastoma	18	10.3
AcuteLeukemia	16	9.2
Rhabdomyosarcoma	12	7.0
Neuroblastoma	12	7.0
Hodgkin lymphoma	4	2.3
Others	18	10.3

**Table II. Frequency distribution of malignancies by age****N=174**

Types of Tumor	AGE					Mean Age (yrs)	Total N(%)
	<1	1 -5	6 -10	11 -15	16 -18		
	n(%)	n(%)	n(%)	n(%)	n(%)		
Burkitt's lymphoma	0(0)	15(18.5)	20(36.4)	4(14.8)	2(28.6)	7.3	41 (23.5)
Retinoblastoma	3(75)	24(29.6)	4(7.3)	0(0.0)	0(0.0)	2.9	31 (17.8)
Non Hodgkin's Lymphoma	0(0)	6 (7.4)	5(9.1)	10(37.0)	1(14.2)	8.6	22 (12.6)
Nephroblastoma	0(0)	11(13.6)	6(10.9)	1(3.7)	0(0.0)	5.0	18 (10.3)
Rhabdomyosarcoma	0(0)	5(6.2)	6(10.9)	1(3.7)	0(0.0)	5.2	12 (6.9)
Neuroblastoma	0(0)	12(14.8)	0(0.0)	0(0.0)	0(0.0)	3.3	12(6.9)
Leukemia	0(0)	1(1.2)	5(9.1)	8(29.7)	2(28.6)	10.6	16 (9.2)
Hodgkin lymphoma	0(0)	0(0)	3(5.4)	1(3.7)	0(0.0)	10.5	4 (2.3)
Others	1 (25)	7(8.7)	6(10.9)	2(7.4)	2(28.6)	7.7	18 (10.3)
	4(100)	81(100)	55(100)	27(100)	7(100)		174(100)

**Table III. Sex distribution of patients with malignant tumors****N=174**

Type of Tumors	Sex		Total N (%)	P - value
	Males	Females		
	n (%)	n (%)		
Burkitt's lymphoma	22 (53.7)	19 (46.3)	41 (100)	0.72
Retinoblastoma	21 (67.7)	10 (32.3)	31 (100)	0.32
Non Hodgkin Lymphoma	15 (68.2)	7 (31.8)	22 (100)	0.49
Nephroblastoma	7 (38.9)	11 (61.1)	18 (100)	0.13
Acute Leukemia	10 (62.5)	6 (37.5)	16 (100)	0.79
Rhabdomyosarcoma	6 (50)	6 (50)	12 (100)	0.76
Neuroblastoma	6 (50.0)	6 (50.0)	12 (100)	0.76
Hodgkin lymphoma	2 (50)	2 (50)	4 (100)	1.0
Others	12 (66.7)	6 (33.3)	18 (100)	0.61
	101 (58.0)	73 (42.0)	174 (100)	

occurred between 6 and 10 years (Table II). There was no difference in the occurrence of this tumor between both sexes (Tables III). Of the 41 cases with Burkitt's lymphoma, 20 (48.8%) were jaw tumors only, while in 21(51.2%) tumors were in the abdomen. The organs involved in the abdominal Burkitt included the ovaries in 6 cases, the spleen 1, while the others were from intra-abdominal lymph nodes.

The mean age for the occurrence of retinoblastoma was 2.9years (Table II). This malignancy was more common in males than females but this was not statistically significant

(Table III). Retinoblastoma was the commonest tumor in children less than 1 year and those aged 1-5 years (Table II). Of the 31 cases with retinoblastoma, 6(19.3%) were bilateral, 15 (48.4) were from the right eye while the remaining 10 (32.2%) were from the left eye.

Wilms tumor accounted for 18 of the cases; 2(11.1%) were bilateral, 8(44.4%) from the right kidney, 8(44.4%) from the left kidney. The mean age for the occurrence of Wilm's tumor was 4 years.

Neuroblastoma accounted for 12 cases; 2 were paraspinal while the rest were supra-renal. Rhabdomyosarcoma accounted for 12 of the cases;

4 from the orbit, 4 from the lower extremities; 1 gluteus, 3 thigh), 2 retroperitoneal intra abdominal masses, and 2 from the neck.

Leukemia was present in 16 children; 2 were Acute Myelocytic Leukemia (AML) and the rest were Acute Lymphoblastic Leukemia (ALL).

The rest of the tumors were hepatoblastoma 2, nasopharyngeal carcinoma 3, Dysgerminoma of the ovaries 2, choriocarcinoma of the testis 1, yolk sac tumor 2, osteogenic sarcoma 2, Ewing sarcoma 1, liposarcoma 1, intra-abdominal desmoplastic small cell tumor 1, hepatocellular carcinoma 2 and 1 posterior fossa tumor)

## DISCUSSION

While infectious diseases continue to account for most of the hospital admission in children, malignant diseases however are posing a threat. With 90% of the world children living in developing countries and with a rising incidence of cancer, the third world bears the greatest burden of pediatric cancer.<sup>1</sup> It is said that 80% of children with malignancy die because they live in developing countries where access to medical care is inadequate.<sup>1</sup> In addition, pediatric cancer care is expensive and available in few centers.<sup>1</sup> Development of most cancers is thought to involve environmental and genetic factors.<sup>4</sup> Almost one out of every 5 cancers is due to a possible infectious cause.<sup>25</sup> This study enabled the description of the pattern of neoplasms seen at the UBTH, Benin-City. Burkitt's lymphoma was the commonest cause of malignancy, followed by retinoblastoma, Non Hodgkin's lymphoma, Nephroblastoma, Rhabdomyosarcoma, neuroblastoma, and leukemia. Burkitt's lymphoma was also the commonest cause of tumor in children seen in other parts of Nigeria like Ibadan<sup>16,17</sup>, Calabar,<sup>18</sup> Enugu,<sup>19-21</sup> Ife,<sup>22</sup> Abuja<sup>23</sup>

and Zaria.<sup>24</sup> This pattern is also similar to that of Ghana,<sup>10</sup> another west African country, Kenya,<sup>11,12</sup> and Tanzania,<sup>26</sup> both East African countries, Zaire,<sup>27</sup> and Papua New Guinea.<sup>28</sup> In Zambia, a southern African country, NHL was the commonest cause of malignancy followed by Burkitt's lymphoma and retinoblastoma.<sup>29</sup> However this pattern of childhood malignancy differed from some other parts of Nigeria and other African countries. A study in Lagos revealed that retinoblastoma and nephroblastoma occurred more commonly than Burkitt's lymphoma.<sup>14</sup> In Jos, rhabdomyosarcoma was the most prevalent solid tumor.<sup>15</sup> In Namibia, another southern African country, tumors of the central nervous system, renal tumors and leukemia were commoner than lymphoma.<sup>13</sup> In the industrialized countries and Japan, leukemia and brain tumors remained the commonest cause of childhood tumors.<sup>6-9</sup> The association of malaria and Epstein Barr virus in some developing countries is thought to play a role in the pathogenesis of the lymphoma but this is not so in the developed countries.<sup>30</sup> Also, according to the Hygiene theory and its relationship with malignancies, solid tumors prevail in circumstances where hygiene and sanitation are poor and infectious diseases abound.<sup>31,32</sup> Therefore, the similarity of the pattern that was observed in this study to what has been described in other sub-Saharan settings with similar environmental situation can be explained.

In this study, 49% of all the malignancies occurred in children aged <1-5 years (85/174). This was also the finding in Egypt.<sup>33</sup> However, in the Egyptian study, neuroblastoma was the commonest tumor in this age group while it was retinoblastoma in this study. Both tumors are embryonal tumors which occurs more frequently in children <5 years old.<sup>34</sup> In the developed countries leukemia,

lymphoma and CNS tumors are the prevalent tumors in children <5 years.<sup>34</sup>

In children aged 6-10 years, Burkitt lymphoma was the commonest cause of malignant tumor, followed by neuroblastoma, rhabdomyosarcoma and Non Hodgkin, non Burkitt (NHNB) lymphoma. Again this pattern differs from that of the industrialized country where >50% of tumors in this age group are due to acute leukemias, and CNS tumors and lymphomas only accounting for 16% of tumors seen in this age group.<sup>34</sup> In children aged 11-15 years, Non Hodgkin non Burkitt lymphoma (37%) and leukemia (29.7%) were the commonest causes of malignant tumors. This is similar to that of the industrialized world.<sup>34</sup> The reason for this similarity is not immediately apparent since there was a difference in the pattern of malignant diseases in all the other age groups.

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