CHANGING PATTERN OF CHILDHOOD CANCERS AT KORLE BU TEACHING HOSPITAL, ACCRA, GHANA

Segbefia CI[1], Renner LA[1], Dei-Adomakoh Y[2], Welbeck J[1]
[1]Department of Child Health, University of Ghana Medical School, Korle-Bu,Accra, Ghana, Department of Haematology, University of Ghana Medical School, Korle-Bu,Accra, Ghana.

Abstract

Background: Worldwide, the incidence of childhood cancers is increasing and majority of children with cancers live in developing countries. The main aim of the study was to determine the current pattern of childhood malignancies at Korle Bu Teaching Hospital (KBTH), Accra.
Methods: A retrospective review of registry data from the KBTH paediatric oncology unit between January 1, 2008 and December 31, 2011 was conducted, and results analysed.
Results: Out of 495 new cases of cancer, lymphomas (30.7%), leukaemias (18.8%) and retinoblastomas (15.8%) were the commonest cancers diagnosed. CNS tumours were rare (3.4%). Overall, the male: female ratio was 1.3:1. Most patients (232/495; 47%) were in the 5-10 year age group and majority of embryonal tumours were diagnosed in the 0-4 year age group. The peak ages for Burkitt's lymphoma and acute lymphoblastic leukaemia were similar, in contrast to reports from developed countries.
Conclusion: The number of children diagnosed with cancers at KBTH has increased significantly. Concerted efforts and advocacy towards improving childhood cancer care are required.

Key Words: cancer, children, epidemiology, Ghana.

Introduction

Worldwide, childhood cancer burden is increasing[1] and over 80% of children who develop cancers each year live in low and middle income countries.[2] Geographic differences in childhood cancer incidence rates suggest genetic and environmental influences on disease susceptibility[2]. Socioeconomic status, malnutrition, exposure to viral infections and malaria are thought to play important roles in cancer pathology and clinical characteristics[3]. Thus, current and locally relevant epidemiologic data are crucial in the development, implementation and evaluation of any cancer control strategies.

There is limited published data from Ghana on the frequency and distribution of childhood cancers. Based on hospital registry data from 1992 to1995, Welbeck and Hesse[4] reported that lymphomas accounted for two-thirds of all childhood malignancies seen at the paediatric oncology unit (POU) of Korle Bu Teaching Hospital (KBTH), Accra, with Burkitt's lymphoma being the commonest tumour, overall. This high incidence of Burkitt's lymphoma in Equatorial Africa is related to endemic malaria and Epstein Barr virus infections.[3] In contrast, acute leukaemias are the commonest childhood cancers in more developed countries[5,6]. Since the publication of Welbeck and Hesse's study[4], Ghana has achieved middle income status with appreciable reductions in infant and under-5 mortality rates in the country. Key interventions responsible for the decline include improved vaccination coverage under the Expanded Programme on Immunization, increased use of insecticide-treated bed nets, development of guidelines for management of malaria, pneumonia and diarrhoeal diseases in the community and increased access to health care under the National Health Insurance Scheme[7].

The study objective was to describe the recent pattern of malignancies seen at the POU of KBTH and determine if any changes had occurred in comparison to the early 1990s.

Author for Correspondence:
Dr Catherine Segbefia
Department of Child Health
University of Ghana Medical School
Korle Bu
E mail: csegbefia@gmail.com
Conflict of interest: None declared

Methods

KBTH is the main tertiary referral centre for the southern sector of the country. It is the largest hospital in Ghana and one of only two hospitals in Ghana with a POU. Children aged ≤12 years are admitted to the POU. A retrospective review of all patients diagnosed with a malignancy between January 1, 2008 and December 31, 2011 was performed using the POU's cancer registry. Information obtained included age, gender, date of diagnosis and type of cancer, based on the International Classification of Childhood Cancer.[8] Diagnosis of cancer was made by bone marrow aspiration morphology (for leukaemias) and fine needle aspiration cytology or tissue biopsy (for solid tumours). Immunohistochemistry and molecular studies were not routinely available.

Results

During the four-year study period, 495 cases of childhood cancers were diagnosed - an average of 124 new cases per year. 280/495 patients (56.6%) were male, giving a male: female ratio of 1.3:1. The diagnostic categories are shown in Table 1. Lymphomas and leukaemias comprised almost half of all cases diagnosed (245/495; 49.5%). CNS tumours were uncommon (17/495; 3.4%). Germ cell tumours, bone tumours, and carcinomas were also rarely seen - 0.6%, 0.8% and 1.4% of the total cases, respectively. The hepatic tumours comprised eight cases of hepatoblastoma and five cases of hepatocellular carcinoma, making up 2.6% of all cancer cases.

Table 1. Distribution of childhood cancers at KBTH by diagnosis

Diagnosis	**2008- 2011**		**1992- 995[4]**
	N = 495		**N=254**
	No.	%	%
Lymphomas	**152**	**30.7**	67
Burkitt's	109		
Non-Hodgkin's Lymphoma (NHL)	31		
Hodgkin's	12		
Leukaemias	**93**	**18.8**	8.26
Acute lymphoblastic leukaemia (ALL)	65		
Acute myeloid leukaemia (AML)	24		
Chronic leukaemias	4		
Retinoblastomas	**78**	**15.8**	8.66
Wilm's tumour	**61**	**12.3**	7.87
Soft tissue Sarcomas	**32**	**6.5**	1.17
Rhabdomyosarcoma	28		
Other soft tissue sarcomas	4		
Sympathetic nervous system tumours	**29**	**5.9**	1.2
Neuroblastoma	28		
Ganglioneuroblastoma	1		
CNS tumours	**17**	**3.4**	0.78
Hepatic tumours	**13**	**2.6**	1.96
Bone tumours	**4**	**0.8**	0
Osteosarcoma	3		
Ewing's sarcoma	1		
Carcinomas	**7**	**1.4**	
Nasopharyngeal carcinoma	**5**		
Other carcinomas	**2**		
Germ cell tumours	**3**	**0.6**	
Others	**6**	**1.2**	
TOTAL	**495**	**100**	

The age distribution of patients is shown in Table 2. The median age at diagnosis of Burkitt's lymphoma was 7 years (range, 1 – 12 years). All twelve patients with Hodgkin's lymphoma were diagnosed at age ≥ 5 years. Acute leukaemias (ALL and AML) were commonest in the 5 -10 year age group (50/93; 53.8%), while three out of the four cases of chronic leukaemias were in children above age 10 years. No case of infant leukaemia was seen.

Table 2. Age distribution of childhood cancer cases at KBTH

Diagnosis	No.	Age range		
		0 – 4 years	5 – 10 years	> 10 years
Lymphomas	**152**	**26**	**102**	**24**
Burkitt's		18	76	15
Non-Hodgkin's Lymphoma (NHL)		8	17	6
Hodgkin's		0	9	3
Leukaemias	**93**	**28**	**51**	**14**
Acute lymphoblastic leukaemia (ALL)		20	38	7
Acute myeloid leukaemia (AML)		8	12	4
Chronic		0	1	3
Retinoblastomas	**78**	**65**	**13**	**0**
Wilm's tumour	**61**	**45**	**16**	**0**
Soft tissue sarcomas	**32**	**9**	**18**	**5**
Rhabdomyosarcoma		9	15	4
Other soft tissue sarcomas		0	3	1
Sympathetic nervous system tumours	**29**	**19**	**8**	**2**
Neuroblastoma		18	8	2
Ganglioneuroblastoma		1	0	0
CNS tumours	**17**	**7**	**9**	**1**
Hepatic tumours	**13**	**6**	**4**	**3**
Carcinomas	**7**	**0**	**5**	**2**
Bone tumours	**4**	**0**	**1**	**3**
Osteosarcomas		0	1	2
Ewing's sarcoma		0	0	1
Germ cell tumours	**3**	**2**	**1**	**0**
Others	**6**	**2**	**4**	**0**
TOTAL	**495**	**209**	**232**	**54**
Percent	*100*	*42*	*47*	*11*

The youngest patient in the series was six weeks old, diagnosed with bilateral retinoblastoma. Majority of retinoblastoma cases (65/78; 83.3%) were diagnosed in the 0-4 year age group. This was similar to the other principal embryonal tumours – Wilm's tumour (45/61;

73.8%), Neuroblastoma (18/28; 64.3%) and Hepatoblastoma (6/8; 75%).

Discussion

Ghana lacks a population-based childhood cancer registry; hence, hospital-based data such as ours are important sources of epidemiologic information for education, planning and resource allocation. Over a four year period, we diagnosed almost five hundred new cases of cancer - more than a 60% increase in the number of patients seen compared to the early 1990s[4].

Lymphomas, predominantly Burkitt's tumour, remain the commonest childhood cancers at KBTH although the relative incidence is much lower than previously reported (30.7% vs. 67%)[4]. This may be due in part to overall improvements in child health and nutrition and multipronged efforts at malaria control in the country[7]. Interestingly, proportionately more children at KBTH are presenting with acute leukaemias, particularly ALL. This could represent either a true increase in incidence and/or improvements in clinical and laboratory diagnosis. A high index of clinical suspicion for acute leukaemias is required in Ghana, as the presenting symptoms mimic those of more common childhood conditions such as severe malaria and sickle cell disease. Laboratory diagnosis of acute leukaemias could be further improved in Ghana with availability of immunophenotyping, molecular and cytogenetic studies. Of note, our data did not show a peak in the incidence of ALL in the preschool age group, as is reported from industrialized countries[5].

CNS tumours are the second commonest childhood tumours in developed countries[5,6]; however, these remained relatively uncommon in our series and may be related to under diagnosis, as an autopsy study at KBTH (1990-1999) looking at childhood cancer mortality placed CNS tumours second[9]. The commonest major embryonal tumour at KBTH (and third commonest cancer overall) was retinoblastoma, comprising almost 16% of all cases. Although highly curable if diagnosed early, many of the patients at KBTH present at an advanced stage[10]. Public education, screening programmes and training of health care workers need to be stepped up to facilitate early detection and treatment.

Only 11% of our patients were older than age 10 years. Our POU treats patients up to age 12 years, after which they are referred to adult physicians. This age limit may have accounted for the relative rarity of cancers which usually have a peak incidence in adolescents such as Hodgkin's lymphoma and bone tumours[5].

The study limitations included unavailability of immunohistochemistry and molecular studies to better characterize the tumours that were diagnosed. Follow-up data on the patients were also not obtained.

Conclusion

In conclusion, the number of childhood cancer cases diagnosed at KBTH has increased significantly over the past two decades. Childhood cancer care needs to be prioritized and efforts to increase public awareness, improve diagnostic capacity and increase access to cancer treatment should be intensified.

Acknowledgement

The authors would like to thank the Department of Pathology, KBTH for its immense help in confirming the diagnosis of solid tumours and lymphomas.

References

1. Mellstedt H. Cancer initiatives in developing countries. *Ann Oncol* 2006;17 Suppl 8:viii24-viii31.
2. Howard SC, Metzger ML, Wilimas JA, Quintana Y, Pui CH, Robison LL, Ribeiro RC. Childhood cancer epidemiology in low-income countries. *Cancer* 2008;112:461-472.
3. Yaris N, Mandiracioglu A, Büyükpamukcu M. Childhood cancer in developing countries. *Pediatr Hematol Oncol.* 2004;21:237-253.
4. Welbeck JE, Hesse AA. Pattern of childhood malignancy in Korle Bu Teaching Hospital, Ghana. *West Afr J Med* 1998;17:81-84.
5. Li J, Thompson TD, Miller JW, Pollack LA, Stewart SL. Cancer incidence among children and adolescents in the United States, 2001-2003. *Pediatrics* 2008;121:e1470-1477.
6. Peris-Bonet R, Salmerón D, Martínez-Beneito MA, Galceran J, Marcos-Gracera R, Felipe S, Gonzalez V, Sanchez de Toledo Codina J. Childhood cancer incidence and survival in Spain. *Ann Oncol* 2010;21 Suppl 3:iii103-110.
7. 2008 Ghana Millenium Development Goals Report. National Development Planning Commission (NDPC), Government of Ghana and the United Nations Development Programme, Ghana, April 2010.
8. Steliarova-Foucher E, Stiller C, Lacour B, Kaatsch P. International Classification of Childhood Cancer, third edition. *Cancer* 2005;103:1457-1467.
9. Gyasi R, Tettey Y. Childhood deaths from malignant neoplasms in Accra. *Ghana Med J* 2007;41:78-81.
10. Essuman V, Ntim-Amponsah CT, Akafo S, Renner L, Edusei L. Presentation of retinoblastoma at a paediatric eye clinic in Ghana. *Ghana Med J* 2010;44:10-15.