



# Age-specific Incidence Patterns Of Childhood Cancer In Two Tertiary Hospitals In Ghana From 2015 – 2019: A Retrospective Observational Study

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## Introduction

An estimated 80% of childhood cancer cases are found in low and middle-income countries (LMICs).[1,2] More deaths result from cancer in LMICs than in developed countries.[3] Accurate epidemiological data are vital in estimating the burden of disease in a country and optimising healthcare. Ghana has few published data on the incidence of childhood cancer.

## Aim

To describe cancer incidence patterns in children less than 14 years and 11 months from 2015 to 2019 at the only two main paediatric cancer referral centres in Ghana.

## Methodology

**Study design:** multi-centre, observational retrospective cohort

**Study setting:** Korle Bu Teaching Hospital (KBTH) and Komfo Anokye Teaching Hospital (KATH)

**Data source:** patient's medical records & cancer registry

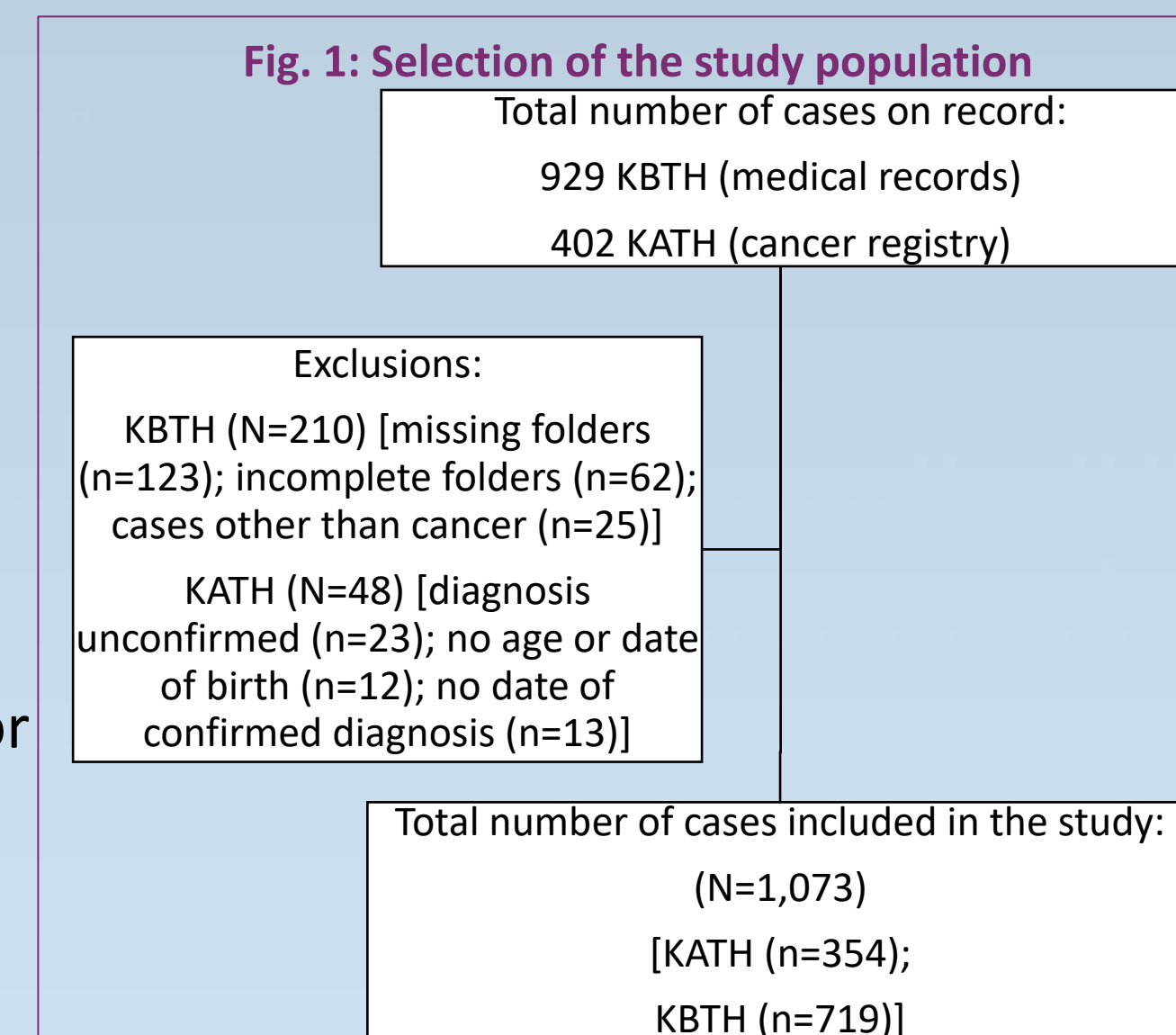
**Study population:** all patients between birth and 14 years and 11 months diagnosed with at least one form of cancer according to the International Classification of Childhood Cancer (ICCC) from 1 January 2015–31 December 2019 in Ghana each year (Fig. 1).

**Measurements:** Childhood cancer incidence rate, reported as an age-specific rate in a given year (ASRs per 100 000 person-years), using projected population estimates by the United States Census Bureau for Ghana by age groups and sex each year as the denominator.[4]

Incidence rates and ASRs were estimated as the weighted average of 0–4, 5–9 and 10–14 years and 11 months, using the corresponding weights of the Segi 1960 World Standard Population[5] using the formula:

$$ASR = \frac{\text{Number of new cases in the age group in each year}}{\text{Population estimate in the specific age group in the year}} \times \text{Segi World Population per 100 000 person years}$$

ASRs were determined by age groups (0–4, 5–9, 10 to 14 years and 11 months), sex, region of residence and cancer types based on the International Childhood Cancer Classification, third edition.



## Results

- 1073 childhood cancer ASR cases (mean (SD) age 5.85 (3.87) [95% CI: 5.62, 6.08] years), sex ratio (male-to-female) was 1.30:1 were included in the study.
- Overall ASR from 2015–2019: 9.36 per 100 000 person-years, with a decrease from 1.60 in 2015 to 1.45 in 2019.
- Most prevalent cancers: lymphomas (2.17 per 100 000 person-years), leukaemias (1.88 per 100 000 person-years), retinoblastoma and renal tumours (1.36 per 100,000 person-years) (Figure 2).
- The ASR in males (2.10 per 100 000 person-years) were higher compared to females (1.64 per 100 000 person-years) ( $p < 0.0002$ , Cramer's V = 0.18), with lymphomas more common in males (0.53 per 100 000 person-years) than in female patients (0.34 per 100,000 person-years). Germ cell tumours were more common in female patients (0.1 per 100 000 person-years) than in males (0.03 per 100,000 person-years) (Table 1).

**Table 1: Age-specific incidence rate of childhood cancer (2015–2019), stratified by cancer type, sex and age group**

Type of cancer	Sex		Age group		
	Males ASR/100 000 person-years	Females ASR/100 000 person-years	0-4 years ASR/100 000 person-years	5-9 years ASR/100 000 person-years	10-14 years ASR/100 000 person-years
Leukaemia & myelodysplastic/myeloproliferative diseases	0,44	0,32	0,04	0,05	0,03
Lymphomas and reticuloendothelial neoplasms	0,53	0,34	0,02	0,06	0,05
CNS and miscellaneous	0,06	0,06	0,01	0,01	0,00
Neuroblastoma and other peripheral nervous cell tumours	0,08	0,07	0,02	0,01	0,00
Renal tumours	0,28	0,26	0,06	0,02	0,00
Retinoblastoma	0,28	0,26	0,07	0,01	0,00
Hepatic tumours	0,06	0,02	0,01	0,00	0,00
Malignant bone tumours	0,07	0,07	0,00	0,01	0,01
Soft tissue and other extra-osseous sarcomas	0,18	0,012	0,02	0,01	0,01
Germ cell tumours, trophoblastic tumour, gonadal neoplasms	0,03	0,10	0,01	0,01	0,00
Other malignant epithelial neoplasms and melanoma	0,07	0,01	0,00	0,00	0,00
Other	0,01	0,00	0,00	0,00	0,00
<b>Total</b>	<b>2,10</b>	<b>1,64</b>	<b>2,22</b>	<b>1,80</b>	<b>1,49</b>

Denominators for determining ASR: Males (n = 28,909,590); Females (n = 28,423,301); Age category, 0 – 4 years (n = 21,596, 240), 5 – 9 years (n = 19,236,591); 10 – 14 years 11 months (n = 16,500,060)

- The ASR of leukaemia was highest in the Greater Accra region (1.04 per 100 000 person-years), followed by the Ashanti region (0.45 per 100 000 person-years).
- Lymphomas were commonly diagnosed in children living in the Greater Accra and Ashanti regions at ASRs of 0.67 and 0.65 per 100 000 person-years, respectively.
- In the Central region, the ASR of leukaemias and renal tumours were relatively high among the cancer groups. Lymphomas (ASR 0.41 per 100 000 person-years) and retinoblastoma (0.38 per 100 000 person-years) were the most frequently diagnosed childhood cancers in the Volta region (see publication).

## Conclusions

The results from this study provide insight into the incidence of childhood cancer over a five-year period from 2015 to 2019 in two major tertiary hospitals in the country. Key findings:

- The incidence of childhood cancer decreased over the study period.
- Lymphomas, leukaemias, renal tumours and retinoblastoma were the four most commonly diagnosed cancers observed.
- Burkitt Lymphoma was the most commonly diagnosed type of lymphoma during the period. Tightening malaria controls can positively impact its reduction in the country.
- Childhood cancer cases were the highest in children in the 0–4 years category, with renal tumours and retinoblastoma dominant in this age category. Screening for cancer during and after pregnancy can help in the early identification and treatment of cancers commonly diagnosed in this age group.
- Most cases were recorded in the Greater Accra region. Further studies should be conducted to explain the results observed in this current study focusing on the Ghanaian socio-economic setting coupled with health-seeking behaviour.

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## For more information

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## Declaration

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