Survival from childhood cancer in Kampala, Uganda

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Abbreviations:

AFCRN	African Cancer Registry Network
BL	Buikitt lymphoma
KS	Kaposi sarcoma
NHL	non Hodgkin lymphoma
SSA	sub-Saharan Africa

Abstract (86 words)

Population-based data on survival from childhood cancers in sub-Saharan Africa is sparse. We report data for nine childhood cancers in the population of Kampala Uganda. Survival for eight out of nine cancers was below the WHO's global target of 60% (the exception was Hodgkin lymphoma (86% at 3 years)). There was significant ($p<0.05$) decline in survival between 1 and 3 years for Wilms tumour and Kaposi sarcoma (30% and 34% at 3-years respectively). Survival from Burkitt lymphoma, Wilms tumour and Kaposi sarcoma has not changed since 2005.

INTRODUCTION

With limited population-level data, it is difficult to understand the true burden and survival from childhood cancers in Africa, making effective planning for cancer management and control challenging. In 2018 we reported results of survival from four childhood cancers, diagnosed in residents of Kampala Uganda in 2005-2009 [1]. In this paper, we provide more recent survival data on the same four cancers (Burkitt lymphoma, retinoblastoma, Wilms tumour and Kaposi sarcoma) and on five other common cancers of childhood in this population.

Kampala Cancer Registry is a population-based cancer registry, collecting information on all cases of cancer diagnosed in residents of Kyadondo County (Kampala city and adjacent peri-urban area) [2]. The data collected include contact details (including telephone number) of the parents/next of kin of registered childhood cancer cases, allowing the possibility of follow-up after discharge from hospital.

RESULTS

Cases of cancer in children, of nine types (as defined by the 2-character categories of the International Classification of Childhood Cancer, third edition (ICCC-3) [3]) for which 20 or more cases had been registered in 2010-2014, were included in the study. They were cases of acute lymphoid leukaemia (ALL – 1a in the ICCC), Hodgkin lymphoma (HL- 2a), Burkitt lymphoma (BL- 2c), non-Hodgkin lymphoma (excluding Burkitt) (Other NHL- 2b), retinoblastoma (5), Wilms tumour (6a), osteosarcoma (8a), rhabdomyosarcoma (9a) and Kaposi sarcoma (KS- 9c).

Follow-up

The closing date of the study was 31 December, 2017. The clinical records of cases whose status (alive or dead) was not known on this date were traced in hospital records and the date and status at last contact were updated. Cases whose status was still unknown were traced by direct contact, either by telephone or (rarely) home visits. Cases were excluded from the analysis if the basis of diagnosis was death certificate only (DCO), when there was no information on follow up (date of diagnosis was the same as date of last follow-up, or both date of death and date of last follow-up were missing).

Statistical analysis

We used the semi-complete approach [4] to estimate survival at 1 and 3 years after diagnosis. We present the Ederer II relative survival estimates, prepared using the 'strs' commands in STATA version 14. Relative survival was calculated by cancer type, using population life tables derived using the method previously described by Joko-Fru et al [1]. For patients who remained alive, survival time was censored at either three years after diagnosis or the last known date of follow-up, whichever occurred first. Estimated survival and 95% confidence intervals (95% CIs) were reported for one and three years after diagnosis.

Of a total 265 registered childhood cancer patients, 44 cancer cases (one fifth (ranging from 0% of ALL to 50% of NHL)) were excluded due to lack of follow-up information after the date of diagnosis. The remaining 221 malignancies available for analysis are shown in Table 1, with the largest groups being Kaposi sarcoma (n=42, 19%), Wilms tumour (n=37, 17%), and Burkitt lymphoma (n=35, 16%).

As shown in Table 1, there were nearly three times as many cases of acute lymphoblastic leukaemia in males compared with females (n=14:5), and twice as many cases of Burkitt lymphoma (n=24:11). Rhabdomyosarcoma was the only cancer with more female patients than males (n=6:13).

Overall median follow-up time was 277 days (interquartile range = 54-1532 days). Just over half (n=112, 51%) of the children in the study cohort died from any cause within three years of diagnosis. Of those whose status was last recorded as being alive, 55 of 109 (50%) were lost to follow-up before the end of the three years.

Relative survival at three years after diagnosis was 86% for Hodgkin lymphoma, but less than 60% for all other cancers (Table 2). Survival was poorest for Wilms tumours – 55% at one year and 30% at 3 years.

The decrease in survival between one and three years was significant only for Wilms and Kaposi sarcoma ($P<0.01$); the decline for osteosarcoma (81% at 1 year and 49% at 3 years) just failed to be significant ($P = 0.15$).

Compared with the previous study (cases diagnosed in 2005-2009), survival at 1 year and at 3 years was higher (Table 2). However, in all instances the number of cases available for analysis was small and confidence intervals were wide, there was no statistical difference between the results from the two periods ($Z=1.12$ for Wilms).

Survival at 3 years was not available for cases of retinoblastoma in the previous study. One year after diagnosis, survival in the current study was higher (63% vs. 43%) but confidence intervals were wide and the difference non-significant.

DISCUSSION

Childhood cancer is generally not preventable but more than 80% of paediatric cancer cases are curable. In 2018, WHO launched the Global Initiative for Childhood Cancer to help countries to achieve at least 60% survival for all children with cancer globally by 2030 [5, 6]. Compared with this goal, our findings reveal the areas where more efforts are needed to close the gap. At three-years, only survival from Hodgkin lymphoma remained above 60% (85%). Survival for all of the other eight malignancies examined here was less than 60%; and, in the case of Wilms and KS, was much less than 50% (30% and 34%, respectively).

Our findings are similar to a recently published study from the largest hospital in Blantyre, Malawi [7] which found that the combined observed survival at the end of treatment of 53% for five common childhood cancers, within a 2-year period. 19% of the patients in this Malawi cohort abandoned treatment [7].

A hospital-based study from South Africa [8] described overall five-year survival for retinoblastoma of 58%, similar to the three-year estimate of 57% for Kampala as reported here.

In the present study, there was no significant difference in survival at 1 and 3 years post diagnosis, except for Wilms tumour and Kaposi sarcoma ($P<0.1$). Mutyaba et al. [9] noted that a high percentage (more than one-third) of patients did not complete treatment for these cancers by the end of first year after diagnosis, with one-year survival of 44% for Wilms tumour and 67% for KS, consistent with our one-year survival results for these two cancers. The French African Paediatric Oncology Group Study found three-year observed survival of 72% for Wilms tumour patients aged 6 months to 17 years across seven sub-Saharan facilities [10].

The best survival in our study was for cases of Hodgkin lymphoma (86% at 3 years), similar to the findings in a multi-centre study from South Africa [8], which reported five-year observed survival of 79% among Hodgkin lymphoma patients. We found 57% (95% CI 32-76) of children with acute leukaemia alive one year after diagnosis, compared with only 20% of children admitted to the Uganda Cancer

Institute in 2006-2009 [9]; survival of children with Burkitt lymphoma was, however, comparable (a one-year survival of 59% and 55%, respectively).

CONCLUSIONS

Data on survival for population-based series of childhood cancers are very sparse for Africa, and confirm the very poor survival compared with that from high-income countries. Our results from two time periods (2005-09 & 2010-14) provide a benchmark against which progress in the results from earlier detection and treatment can be evaluated.

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During the later phrase of the study, AFCRN has funded extra data abstraction and data cleaning.

Conflict of Interest Statement:

No conflict of interest reported by authors

Data availability

The data that support the findings of this study are available on request. All data requests will be evaluated by the AFCRN research committee. Details of the data application process are outlined on the AFCRN website (http://afcrn.org/index.php/research/how-to-apply/76-research-collaborations).

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