The Epidemiology of Cancers at Lusaka University Teaching Hospital in Zambia.

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Background: The pattern of malignancy in Zambia has not been well studied\(^1\). The high HIV prevalence of 16% is known both to have increased the number of HIV related cancers seen in Zambia as well as to have significantly changed the pattern of malignancies\(^2\).

Methods: This was a retrospective study based on pathology reports of specimens reviewed at the University Teaching Hospital (UTH) pathology laboratory in Lusaka from January 1997 to December 2005. UTH is the main reference hospital in Zambia and has a catchment area of 1.3 million people\(^3\).

Results: A total of 6672 pathology specimens were reported over this period. The male to female ratio was 1:1.5. The most common cancer among men was Kaposi sarcoma which represented 20.9% of all male cancers seen. This was followed by cancer of the eye (14.3%), soft tissue sarcomas (10.9%) and cancer of the prostate (9.2%). The most common cancer in women was cancer of the cervix which represented 41.5%, followed by cancer of the eye (9%), cancer of the Breast (8.6%) and Kaposi Sarcoma 7.6%. Non-Hodgkin’s Lymphoma was the fifth most common cancer in both men and women accounting for 6.3% and 5%, respectively. The study revealed an increase in HIV related malignancies up to 2001 and a small gradual decline after this period. This may be attributed to high HIV and HPV infection in the population prior to the introduction of Anti retroviral therapy and the effect following it’s introduction.

Conclusion: There has been a significant change in the pattern of malignancies at the UTH over the last 20years, with an increase the proportional incidence of Kaposi’s sarcoma, cancer of the Cervix and Cancer of the Eye.

Introduction

Zambia is a landlocked country in south central Africa covering 752,612 square miles and has a population of 10 million with a per capita income of 394 USD dollars per year\(^3\). Over 73% of its population is classified by the United Nations (UN) criteria as living in poverty\(^3\). There are 1,285 health institutions in Zambia in 2000\(^3\); the smallest unit is the health post. There are nine health posts; the next level of care is the health centres, there are 1086 health centres. A health post is the nearest medical facility in the community which is served by a community health worker, who is trained to provide health care to his or her community. The third level of care is the district hospital, and they are 72 district hospitals. They are 18 general hospitals, three central hospitals and four specialized hospitals. In addition there are 19 mission hospitals serving the Zambian population\(^3\).

In Zambia the largest burden of diseases is due to infectious diseases in particular malaria\(^4\). However cancers have increasingly become a major cause of disease particularly following the advent of HIV epidemic in Zambia in the 1980s\(^1\). The HIV prevalence in Zambia is 16%. Clinical evidence indicates an increase in the volume of cancers as well as a decline of the age at presentation\(^5\). The national cancer registry has been poorly resourced and was estimated to capture approximately 10-15% of cancers nationwide. In spite of this review of cancer records suggest an upward trend in cancers in Zambia\(^1\). The University Teaching Hospital (UTH) in Lusaka is the main reference hospital in Zambia; it caters for an immediate catchment area, serving 1.3 million people in Lusaka and Lusaka province. Zambia has 9 province, Lusaka is the largest province. It is on the main line of rail and includes the capital city of Zambia, Lusaka. The UTH also serves a national catchment of 10 million people because it houses the main pathology reference laboratory in the country. Nearly 90% of all biopsy samples obtained
nationally are sent for reviewing and reporting to the UTH pathology laboratory\textsuperscript{1, 2, 3}. The purpose of this study was to examine the pattern of malignancies seen at the UTH in Lusaka, Zambia from January 1997 through December 2005, to examine trends in the five most common cancers in men and women over this period and to compare with previous studies done at UTH. We expected to observe an increase in HIV related malignancies over this period in comparison to non HIV related malignancies.

**Patients and Methods**

A retrospective review of all cancers diagnosed at the University Teaching Hospital pathology laboratory from January 1997 to December 2005. The International Disease Classification (ICD) 10 was used. The specimens collected were fixed in formalin, embedded in paraffin wax and microtome sectioning was done. The slides were routinely fixed with haematoxylin and eosin. All slides were reported by a team of three consultant pathologists at the UTH. Though histological diagnosis was available, for the purpose of this study only the anatomical site of the cancer is used. The data collected were entered into a database; key parameters included patient age, sex, tumour anatomical site and year of diagnosis.2. The incidence of each particular tumour could not be determined because the population pool was uncertain. The study used proportional incidence to determine annual trends. Proportional incidence was defined as the number of malignancies at a particular site over the total number of malignancies reported in that particular year. This allowed for proportional comparisons to be made between malignancies at different sites. The data was purely descriptive therefore no analytic statistics were used.

**Results**

A total of 6672 tumour specimens were reviewed in the UTH pathology laboratory over the 9 year study period. The study population included 2645 male cancers and 4027 female cancers patients.

![Figure 1. Distribution of Cancers in Males](image-url)
Figure 2. Distribution of Cancers in Females

Key: phx=pharynx, Naso=nasal, CNS=central nervous system, Oesop=Oesophagus, NHL=Non Hodgkins Lymphoma, KS=Kaposi Sarcoma, Ca Cx=Cancer of Cervix.

Figure 3. Female Cancer Distribution by Age

Key: Ca Cx=Cancer of the cervix, Ca Eye=Cancer of the Eye, KS=Kaposi Sarcoma, NHL=Non Hodgkins Lymphoma, Ca Beast=Cancer of the Breast.
The male to female sex ratio was 1 to 1.5. The five most common cancers in males were Kaposi Sarcoma (20.6%), Cancer of the Eye (14.3%), Soft Tissue Sarcomas (10.9%), Cancer of the Prostate (9.2%) and Non Hodgkin’s Lymphoma in 6.3% (Figure 1). The five most common cancers in females were cancer of the cervix (41.5%), Cancer of the Eye (9.0%), Cancer of the Breast (8.6%), Kaposi Sarcoma (7.6%) and Non Hodgkins Lymphoma in 5.0% (Figure 2). The highest frequency of cancers was seen in the 31-45 years age group, it was the most common
age group with cancer in both sexes as well as in the 5 main cancers, with the exception of cancer of the prostate (Figure 3 and 4).

![Bar chart showing incidence of cancer over years]

**Figure 6.** Cancer Trends in Females 1997 - 2005

There was a general increase of proportional incidence in the 5 main cancers in both sexes with a peak in 2001, this was followed by a modest decline (Figures 5 and 6). The histological report for cancer of the eye indicated 85% of cancers to be squamous cell cancer of the eye.

**Discussion**

The total number of malignancies reported appears to have declined compared to that reported in the 1980s from the same hospital. Elem et al² reported 7836 cases over a 9 year period compared to the current study of 6672 over a 9 year period. Some possible factors may include increase in private histopathology services in the country, reduction in surgical services at the hospital due to bulk retiring of theatre nurses (as part of a government policy to reduce public service workforce in the early 1990s) and increase in use of Anti-retroviral drug therapy in the population³,⁴. There is a notable change in male to female ratios of the cancers reviewed. Watts in 1980s and O’Riordan⁸ in 1970s reported male to female ratios of 1 to 1.1. The current study shows a wider ratio of 1 to 1.5¹,⁶,⁷,⁸. This appears to be due to an increased volume of cancer of the cervix in the female population. Whereas previous studies showed a proportion of cancer of the cervix ranging from 19-20%, the current study shows 25%¹,⁶,⁷,⁸,⁹.

The pattern of male cancers appears to have changed significantly over the last twenty years, whereas this is less so in the female patterns. Cancer of the liver which was previously reported as the leading cancer in men is now reported as representing only 1.2% of all cancers seen in men. This may reflect under diagnosis due to the high technical skill required to obtain tissue biopsy in favour of clinical diagnosis¹,²,⁹,¹⁰,¹¹. The most common cancer of men seen in this review was Kaposi Sarcoma which is in keeping with expectations from the increasing HIV prevalence rates; from 7.0% (1980-89)¹,² to 13% (2000) in men, shown in the latest demographic and health survey³. There is a notable increase in cancer of the Eye compared to
previous studies, both in females and males, from 2.1% in 1980-89\textsuperscript{1,2} to 11.3% in this review. Cancer of the prostate is the most common urological malignancy in the current study, whereas previous studies showed cancer of the bladder to be the most common cancer\textsuperscript{1,2,9,10,11}.

The peak age incidence was 31-45 years. This is a decade lower than the peak age incidence for cancer in many developed countries\textsuperscript{13}. However many Africa countries have reported declining age of presentation of cancers\textsuperscript{13}. The annual proportional incidence of cancer increased from 1997 to 2001, and showed a modest decline to 2005. Cancer of the eye has increased significantly in both sexes. From 2.5% in males in the period 1976-79 to 14.3% in the current study, representing a 6 fold increase. The changes are even higher in women from 0.6% to 9.0%, a 15 fold increase\textsuperscript{1,2,12}. Kaposi Sarcoma shows similar trends, in men from 3.1% to 20.6%, while in women from 0.0% to 7.6%. Cancer of the Cervix on the other hand showed only a modest increase from 39.8% to 41.8%. It is known that 95% of cancer of the cervix is associated with the high prevalence of oncogenic strains of mucosal Human Papilloma Virus (HPV)\textsuperscript{13,14}. In Zambia Ng'andwe and co-workers have shown a high prevalence of HPV 16 and 18 subtypes, these make up 42% of all HPV strains isolated in contrast to the USA where they make up only 10%\textsuperscript{15}. the prevalence of HIV among random samples of patients visiting the University Teaching hospital was 39.2% and of these 56% were found to be positive for HPV 15. Kaposi’s Sarcoma is associated with Human Herpes Virus 8 (HHV 8) in HIV positive patients there has been a notable increases in the KS in Zambia\textsuperscript{16}. Cancer of the eye is a new and unexpected cancer not previously recognized but increasingly regional reports have indicated an increase in Eye Cancer related to HIV infection. Particularly squamous cell cancer of the eye, as reported in the current study, which has been shown to be associated with HPV subtype\textsuperscript{16,17,18,19}.

References


