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# A Descriptive Retrospective Study of the Pattern of Malignant Diseases in Sokoto, North Western Nigeria (1999-2004)

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This study aims to provide baseline data on the frequency, types and characteristics of cancers in an undeserved part of the country for the purposes of research, records and planning. A descriptive, retrospective study of all pathologically-diagnosed cancers in the records of the Histopathology Department of the UDUTH hospital Sokoto, between January 1999 and December 2004. The 913 patients with histologically and/or cytologically diagnosed malignant disease. 17.3% were children below the age of fifteen years. The mean age of patients was 50.6±14.2 and 42.5±16.8 for male and females, respectively. The most common cancers were cancer of the breast (128 cases). Considered separately, bladder cancer was the most common cancers in males (15.7%) followed by prostate 41 cases (9.9%), non-Hodgkin's lymphoma 27 cases (6.5%) and skin 19 cases (4.6%). For females, the cases were topped by breast cancer (25.3%), followed by cervix uteri (14.1%) and ovary (5.6%). Almost half of the breast cancers were diagnosed in women in the 30-49 years age group, while cervical cancer tended to affect women a decade later. Rates of liver and colon/rectal cancers are low and Kaposi's sarcoma is relatively rare in this series. This study has shown, that there are differences in the patterns and relative frequencies particularly of breast, bladder and cervical cancers in Sokoto compared to other regions of Nigeria and other African countries which warrant further clinico-pathological elucidation.

**Key words:** Cancer, pattern, Sokoto, Nigeria

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## INTRODUCTION

While the incidence and mortality rates of cancer in the industrialized nations appear to be stabilizing, they are increasing at an alarming rate in the developing countries. This had been attributed to the successful control of infectious diseases and the adoption of Western lifestyle with increasing exposure to known or suspected risk factors (Ogunbiyi, 2000; Parkin *et al*., 2005). From these and other sets of data it is now evident that cancer is no longer a rare disease in developing countries and that tragically prognosis is much poorer in such resource-poor settings (Bhurgri *et al*., 1999; Pisani *et al*., 2002; El-Akkad *et al*., 1986). Additionally, in sub-Saharan Africa, the AIDS epidemic has created a new problem in the form of Kaposi's sarcoma and other AIDS associated malignancies (Mahmoud *et al*., 2006; Parkin *et al*., 2005).

Little information had been available on the cancer pattern in Nigeria and until recently, the diagnosis and treatment of cancer was accorded low priority in this developing country (Solanke, 1992). Population-based cancer registration is yet to be widely accepted and the few hospital-based cancer registries in existence had been handicapped by impressive structural, financial and technical constraints (Malami *et al*., 2004). In the absence of population-based cancer registry data, however, a pathology laboratory based series can provide important clues to determine the burden of cancer in a community (Wabinga, 2002; Nze-Nguema *et al*., 1996). Although these types of hospital based cancer surveys are usually prone to bias and underestimation they may be the only means of providing information on the cancer load in a poor-resource setting (Rafindadi, 1998).

Therefore, in this study, the authors reviewed confirmed cases of cancer diagnosed by histology and cytology based on the records of the UDUTH hospital for the years 1999-2004, to permit comparison with incidence rates from similar studies done in other Nigerian centers and the rest of Africa. It is intended that this study would provide a picture of the contemporary profile of cancers in this part of Nigeria to provide baseline data for future research, records and planning.

## MATERIALS AND METHODS

**Study area:** The Usmanu Danfodiyo University Teaching Hospital (UDUTH) Sokoto has a capacity for 400 beds and is the only center available for cancer treatment in northwestern region of Nigeria (estimated population 14.6 million people according to the 1991 census).

Diagnostic and therapeutic facilities in the hospital compare favourably with those available at older and more sophisticated medical centers in the country. The histopathology laboratory facilities process specimens from patients of tertiary, secondary and private hospitals located in Sokoto and the surrounding towns and villages in the northwestern region of Nigeria. On average 1500 surgical pathology specimens and 1000 cytology samples are processed annually. Archives of histology and cytology reports, microscopic slides and paraffin blocks of patients' biopsies that had been stored serially on yearly basis are routinely kept in a store for future references.

All records of patients with the diagnosis of cancer were retrieved from register of pathological diagnoses in the Department of Histopathology in the period January 1999 to December 2004. The slides were reviewed independently by the pathologists to arrive at consensus diagnoses. All histological sections had been stained with H and E and the cytological specimens were stained with both Papanicolaou and Giemsa stains. To avoid duplication all retrieved cases were double-checked by name and hospital number. Cases in which request cards were missing were excluded from the study.

The data were analyzed for age, sex and histological types using EPI-Info version 6.0 software. The results are presented in form of simple frequency tables.

## RESULTS

Nine hundred and thirteen cases of cancer occurred during the period reviewed or an average of 183 new cases each year. The male-to-female ratio was 1.0:1.2. Over seventeen % (158) were children below the age of 15 years. The mean age of patients diagnosed with malignancy was 50.6±14.2 and 42.5±16.8 for male and females, respectively.

The distribution of cancers showed typical gender patterns (Table 1). Among males, the five most frequently reported cancers were bladder 65 cases (19.3%), prostate 41 cases (9.9%) and non-Hodgkin's lymphoma 27 cases (6.5%). Cancer of the prostate in this center is essentially a disease of the elderly (half occurred in men above 60 years old).

The most frequent sites of cancers in females by rank order, topped by breast (25.3%) and followed by cervix uteri (14.1%) and ovary (5.6%). Almost half of the breast cancers were diagnosed in premenopausal women (in the 30-49 years age group), while cervical cancer tended to affect women a decade later. Significantly, bladder cancer did not appear to be at all frequent in females as only 15 cases were recorded amounting to 3% of the cancers diagnosed in that sex category. Excluding Burkitt's lymphoma, a total of sixty-six lymphomas (comprising of

Table 1: Frequency distribution of cancers in adult males and females in Sokoto, 1999-2004

| | Gender | | | | | |
|---|---|---|---|---|---|---|
| | Male | | | Female | | |
| Rank order | Site | Frequency | RRF (%) | Site | Frequency | RRF (%) |
| 1 | Bladder | 65 | 19.3 | Breast | 126 | 25.3 |
| 2 | Prostate | 41 | 9.9 | Cervix | 70 | 14.1 |
| 3 | NHL | 27 | 6.5 | Ovary | 28 | 5.6 |
| 4 | Melanoma | 19 | 4.6 | NHL | 19 | |
| 5 | Colorectal | 18 | 4.3 | Colorectal | 17 | 3.4 |
| 6 | Soft tissue | 18 | 4.3 | Bladder | 15 | 3.0 |
| 7 | Nasopharynx | 17 | 4.1 | Nasopharynx | 13 | 2.6 |
| 8 | Bone | 11 | 2.6 | Uterus | 13 | 2.6 |
| 9 | Liver | 9 | 2.2 | Melanoma | 12 | 2.4 |
| 10 | Others | 73 | 17.6 | Others | 85 | 17.1 |
| Total | All male | 298 | | All female | 398 | |

* Excluding 158 childhood cancers and 59 Non melanoma skin cancers; NHL = Non Hodgkin's lymphoma

Table 2: Distribution of cancers in Sokoto according to the organ/system affected

| Organ | Male | Female | M: F Ratio | Frequency (%) |
|---|---|---|---|---|
| Breast | 2 | 124 | 1.0:62.0 | 126 (13.8%) |
| Ductal Carcinoma | 2 | 102 | | |
| Lobular carcinoma | - | 7 | | |
| Papillary carcinoma | - | 5 | | |
| Cystosarcoma | - | 4 | | |
| Medullary carcinoma | - | 4 | | |
| Mucinous | - | 1 | | |
| Metastatic melanoma | - | 1 | | |
| Cervix | - | 70 | 1.0:70.0 | 70 (7.7%) |
| Squamous cell | - | 58 | | |
| **Adenocarcinoma** | | | | |
| Well differentiated | - | 5 | | |
| Mucinous | - | 1 | | |
| Papillary | - | 1 | | |
| Spindle cell | - | 1 | | |
| Poorly differentiated | - | 4 | | |
| Bladder | 26 | 54 | 1.0:2.1 | 80 (8.7%) |
| Squamous cell | 13 | 41 | | |
| Transitional cell | 8 | 9 | | |
| Adenocarcinoma | 3 | 1 | | |
| Signet ring | 1 | - | | |
| Undifferentiated | 1 | 3 | | |
| Lymph nodes | 37 | 44 | 1.0:1.2 | 81 (5.0%) |
| Hodgkin's | 2 | 8 | | |
| Non-Hodgkin's | 24 | 20 | | |
| Metastatic | 11 | 16 | | |
| Prostate | 41 | - | 41.0:1.0 | 41 (4.5%) |
| Adenocarcinoma | 41 | - | | |

20 cases of Hodgkin's disease and 46 non-Hodgkin's lymphomas) were recorded. In Table 2 the types of cancer found in each organ are outlined. Whereas the ratio of transitional cell carcinoma of the bladder that occurred in both sexes is almost equal, there are far more cases of squamous cell carcinoma in males (41) compared to females (13). Additionally, n on-Hodgkin's lymphoma (44 cases) is seen to be the predominant malignancy that affected the lymph nodes.

## DISCUSSION

Present data is compared and contrasted with selected Nigerian and African pathology-based cancer surveys in Table 3. The conclusions drawn from available sets of data on the incidence and relative proportions of cancers in previous hospital based cancer surveys from various parts of Nigeria had been rather conflicting (Ogunbiyi, 2000; Thomas, 2000; Solanke, 2000; Rafindadi, 1998; Holcombe and Babayo, 1991; Pindiga *et al*., 2004; Mandong *et al*., 2003; Okobia and Aligbe, 2005). The dominant malignancy in the present study was cancer of the female breast, followed by cervical cancer among females and bladder cancer in the males. Most of the recent data emanating from Nigeria show that breast cancer had overtaken cervical cancer as the most frequent cancer in Nigerian women (Ogunbiyi, 2000; Mandong *et al*., 2003). Various reasons had been adduced for this rapid increases including westernization, diet. This opinion is supported by Parkin *et al*. (2005) on the basis of current epidemiological evidence incidence of breast cancer has increased by 0.5% annually since 1990, with the changes usually greatest in those countries where the rates were previously low.

Due to the incompleteness of our method of cancer registration the relatively high prevalence of cervical cancer (14.1%) recorded in the present study is probably an underestimation. It constituted the commonest female malignancy in Calabar, Jos and Zaria (Mandong *et al*., 2003; Rafindadi, 1998). Similarly, cancer of the cervix had been shown to be the most frequent female cancer in some sub Saharan African countries by workers in Uganda and Gambia (Wabinga, 2002; Koulibaly *et al*., 1997). It is known that Human Papilloma Virus (HPV) infection rates are high in those settings. This sex-related risk factor is strongly implicated in the pathogenesis of cervical cancer and it is itself related to multiple sexual partners, high parity and early age at intercourse (Bosch and Sanjose, 2003). Since national or regional cervical cancer control programmes do not exist in the Nigeria at the moment, control of cervical cancer therefore presents daunting challenges deserving of immediate attention.

This study has shown bladder cancer is the most frequent male cancer in Sokoto, in contrast to the findings

Table 3: Comparison by rank order and frequency for the commonest cancers in selected Nigerian and African pathology-based cancer surveys (All sexes)

| | Sokoto (n = 913) | | Zaria ( n = 1959) | | Jos (n = 2341) | | Uganda (n = 585) | | Gabon ( n = 2602) | |
|---|---|---|---|---|---|---|---|---|---|---|
| Organ/System involved | Rank | Freq | Rank | Freq | Rank | Freq | Rank | Freq | Rank | Freq |
| Breast | 1 | 126 (13.8%) | 4 | 221 (11.3%) | 2 | 293 (12.5%) | 5 | 45 (13%) | 2 | 362 (13.9%) |
| Cervix | 3 | 70 (7.7%) | 1 | 315 (16.1%) | 1 | 456 (19.5%) | 1 | 140 (41%) | 1 | 168 (26.3%) |
| Bladder | 2 | 80 (8.7%) | | | 7 | 128 (5.5%) | | | | |
| Lymph nodes | 4 | 46 (5.0%) | 2 | 248 (12.7%) | | | 3 | 55 (9.4%) | 3 | 185 (7.1%) |
| Prostate | 5 | 41 (4.5%) | 8 | 81 (4.1%) | 6 | 145 (6.2%) | | | | |
| Colon/Rectum | 6 | 35 (3.8%) | 6 | 119 (6.1%) | 3 | 246 (10.5%) | | | | |
| Skin | | | 3 | 241 (12.3%) | 4 | 213 (9.1%) | | | 4 | 133 (5.1%) |
| Soft tissues (All) | | | 7 | 87 (4.4%) | 5 | 147 (6.3%) | | | | |
| Soft tissues (KS) | | | | | | | 2 | 56 (9.6%) | | |
| Liver | | | | | | | | | 5 | 101 (3.9%) |
| Stomach | | | | | | | 4 | 50 (8.5%) | | |
| Oral cavity | | | 5 | 121 (6.2%) | | | | | | |
| Ovary | | | | | | | | | 6 | 86 (3.3%) |

*Freq = Frequency (Percentage); KS = Kaposi's sarcoma

of earlier studies done in other parts of Nigeria including Jos, Zaria, Maiduguri and Ibadan. These might be explained by the regional differences in prevalence of the major risk factor squamous cell carcinoma of the bladder which is chronic schistosomal infestation. Cancer of the bladder in this study is predominantly of the squamous cell variety. *S. haematobium* is endemic in this part of the country. The prevalence of this parasitic infestation in the area of this study is 52%, one of the highest reported in Nigeria (Bello *et al*., 2003) and this combined with the bladder cancer sex ratio of 4.3:1.0 in favour of males these would support the role of a chronic schistosomal cystitis associated with occupational exposure (farming) in the aetiology. The association of schistosomiasis with bladder cancer is supported strongly by the accumulated experience in the Nile valley area of Africa where most cases of schistosomiasis-associated bladder cancers occurred in male farmers (IARC, 1994). Bladder cancer is an important cause of morbidity and mortality, accounting for 357,000 new cases throughout the world in 2002 alone and therefore a disease for which control is worthy of urgent and serious consideration. About 10% of all male cancers in Sokoto are prostate cancers in keeping with the trend in other parts of Nigeria. Ogunbiyi (2002) and Mandong *et al*. (2003) from Ibadan and Jos, respectively, had remarked that the commonest male malignancy in Nigerian is prostate cancer, followed by colorectal cancer. In this study it is the second commonest cancer and the number of cases could soon increase significantly due to the availability of new facilities for earlier diagnosis in Sokoto. Prostatic carcinoma had been noted to especially common in elderly black American men in whom up to 70% higher incidence and mortality rates had been found compared to their White counterparts and this is may be mediated *via* population differences in alleles of genes coding for enzymes involved in testosterone metabolism. (Shibata and Whittemore, 1997).

Kaposi's Sarcoma (KS) does not feature in the leading cancers in the present study as opposed to the experience in other parts of Africa where HIV is endemic i.e., Uganda and Zimbabwe (Chokunonga *et al*., 2000; Wabinga, 2002). Colorectal cancer ranks fourth among the male cases studied in Sokoto. Its incidence in Africa and Asians tend to be low and are correlated by different environmental exposures. Some of the strongest associated risks are due to high per capita consumption of meat, animal fat and low fibre diets (Parkin *et al*., 2005) Investigation of the dietary preferences in the people of Sokoto may shed more light on the rates of incidence of colorectal cancer. A striking observation in this study was the low frequency of liver cancer. Significantly, Holcombe and Babayo (1999) had reported very high rates for hepatocellular carcinoma in Maiduguri in northern Nigeria after analyzing a total of 780 admissions for malignancy (Holcombe and Babayo, 1991). In support of this findings a high prevalence of HBV infection as well as dietary exposure to aflatoxin, the dominant co-factors in the aetiology of hepatocellular carcinoma, had been reported in Nigeria (Olubuyide *et al*., 1993). Hepatocellular carcinoma (17% of total) ranked first in the Maiduguri series followed by breast cancer (8%) and bladder cancer (7%). A decade later it was shown that the pattern had changed for that geographic area and prostate cancer had overtaken liver cancer among males while the dominant cancers in females were those of cervix and breast accounting for 19.5 and 12.5% of all cases, respectively (Pindiga *et al*., 2004). From Ibadan in western Nigeria liver cancer was the second commonest tumour in, similarly, in Guinea liver cancers were the most frequent cancer overall (41.7%) and also the principal in Gambian males (Thomas, 2000; Koulibaly *et al*., 1997; Bah *et al*., 2001). In the present study the least number of cases were recorded for the cancers of the central nervous system and the lungs. Lung cancer is rare in this study as in earlier

studies done in Nigeria perhaps because tobacco smoking prevalence and its complications in Nigeria have not attained the epidemic proportions typical of affluent western societies. However, the actual rates of brain and nervous system cancers might be under represented due to the non-availability of diagnostic facilities.

The observed regional differences in the frequency of some cancers in this study compared to earlier works done in Nigeria and some parts of Africa are difficult to explain. In our opinion, this study has shown that malignant diseases are common in Sokoto and some of the cancers may have certain peculiarities in terms of patterns and relative frequencies which warrant detailed epidemiologic and clinico-pathological studies. We conclude that pathology-based cancer registration is feasible and could be an invaluable source of information on cancer pattern in resource-poor settings where population wide incidence data are not yet available. Nonetheless, these findings emphasize the need for establishing population-based cancer registries to collect accurate data that would guide therapy and resource allocation in the health system.

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