Epidemiological Survey of Malignant Neoplasms in Sokoto, Nigeria

Saddiku M Sahabi, Kabiru Abdullahi

Abstract—**Background:There is an increasing trend in the incidence of cancers in developing countries without commensurate data on the pattern and spread of individual tumour variant or sites of predilection. This study aims to provide current data on the frequency, histological types and characteristics of histopathologically confirmed cancers in Sokoto, North West Nigeria.**

Material and methods: A descriptive 10 years (2006-2015) analysis of all diagnosed cancers in the Department of Histopathology, Usmanu Danfodiyo University Teaching Hospital, Sokoto. Archives of all histology reports, tissue slides and paraffin blocks of patients' biopsies that had been stored were studied. The data were analyzed for age, sex and histological types classified using the diagnostic criteria provided by the International Classification of Diseases for Oncology (ICD-O)

Result: A total of 3933 cancer patients were registered at the histopathology department of UDUTH during the ten-year period. There were more female cancers (n=2260 57.5%) compared to male cancers (n=1673, 42.5%). The overall mean age was 44.28years, median age 45.0years, modal age 50years and SD 18.69. Males (mean age 45.77, median age in male 50.0, modal age 60 and SD was 21.03) were significantly older than females (mean age 43.18, median age 45.0, modal age 50, and SD was 16.67) year. The Adult cancers accounted for 90.9% (n = 3575) and childhood cancers accounted for 9.1% (n= 358). Overall, the ten most common sites of cancer involvement were the breast 763(19.4%), cervix 312(7.9%), prostate 267(6.8%), lymph node 248(6.3%), bladder 191(4.9%), skin 225(3.6%), rectum 114(2.9%), ovary 110(2.8%), eye 97(2.5%) and soft tissue 95(2.4). In males, the most frequent cancer sites were the prostate 267(16.00%), bladder 160(9.60%), skin 138(8.20%) nasopharynx 87(5.2%), lymph node 85(5.10%) and rectum 61(3.60%) while in females, the most common sites were the breast 731(731%), cervix 302(13.40%), lymph node 163(7.20%), ovary 110(4.90%), skin 87(3.80%) and endometrial 61(2.70%).

Conclusion: There is significant difference in the pattern of cancer distribution amongst males and females in Sokoto and the cancer burden is highest in young to middle aged adults. The breast, prostate, lymph node, skin and bladder cancers were the most frequent in our setting. This study provides useful Information, a baseline data on cancer distribution in our environment and also serves as a guide for health intervention measures and future research.

Index Terms: Cancer, Breast cancer, Prostate Cancer, Adult Cancers

Dr Saddiku M Sahabi ,Senior Lecturer/Consultant Pathologist, Department of Morbid Anatomy & Forensic Medicine/Department of Histopathology, Usmanu Danfodiyo University /Usmanu Danfodiyo University Teaching Hospital Sokoto

Dr Kabiru Abdullahi, Lecturer/Consultant Pathologist, Department of Morbid Anatomy & Forensic Medicine/Department of Histopathology,Usmanu Danfodiyo University /Usmanu Danfodiyo University Teaching Hospital Sokoto

I. INTRODUCTION

Cancer is a dreaded non-communicable disease that has become an important contributor to the global burden of diseases. This burden is increasing exponentially worldwide with significant mortality particularly in developing countries where health indices are abysmally low.[1] There are more than 100 types of cancer and their symptoms vary widely.[2] Globally, approximately 10 million people are diagnosed with a new cancer annually.[3] In 2013,approximately 14.9 million cases were diagnosed.[4]

The proportion of new cancer cases diagnosed in less developed countries is projected to increase from about 56% of the world total in 2008 to more than 60% in 2030 because of the increasing trends in cancer rates and expected increases in life expectancy and growth of the population.[5]With increasing industrialization and adoption of life styles that place one at risk in most developing countries, it is estimated that the burden of cancer will increase to epidemic proportions in the 21st Century.[6]Deaths from cancer in the world are projected to continue to rise, with an estimated nine million people expected to die from cancer in 2015 and 11.4 million in 2030.[7] The cancer epidemiological report in Africa showed 667,000 incident cases and 518,000 deaths in 2008.[8]

The burden of cancer in Nigeria is under-reported though, the World Health Organization, estimates that 100,000 new cancer cases are being reported in the country each year. However, different observers believe the figure could be as high as 500,000 new cases annually by 2010.[9] It is also projected that by 2020, cancer incidence for Nigerian males and females may rise to 90.7/100,000 and 100.9 /100,000, respectively. In Nigeria, with a population of nearly 180 million people, complex diseases such as cancer are currently emerging as important health care priority for the future. The subsequent attendant increase in life expectancy is likely to lead to an increase in the incidence of all types of cancers, as a higher proportion of the population reaches the complex diseases-bearing age.[2]

Information on the incidence, prevalence, pattern and associated risk factors are essential to plan, implement and to evaluate cancer control measures.However, this information is not readily available for most of the developing countries.1,8 This dearth of information may be due to poor health facilities utilization, low educational status, poverty, poor record keeping and limited number of available cancer registries.

The quality and coverage of cancer surveillance in the country is currently undergoing significant improvement by

establishment of cancer registries with proper cancer incidence documentation in order to address this growing category of chronic diseases. However, it is made difficult by economic, geographic and social cultural challenges.[10]Between 7.2%[11] to 10.5%[12] of the population of sub-Saharan Africa are covered by GLOBOCAN which is approximately a total population of 90.7 million. Of the regions with a cancer registry, Sokoto is unfortunately left behind.[10]This analysis is a follow up of the pioneer study in the same institution 10years ago.[13] This is a documentation of the current cancer distribution pattern in Sokoto. The Histopathology laboratory of the Usmanu Danfodiyo University Teaching Hospital (UDUTH) Sokoto offer services to patients within Sokoto town and environ and receives an average of 1500 surgical pathology specimens and 1000 cytology samples annually.

II. MATERIALS AND METHOD

All records of patients with the diagnosis of cancer from January 2006 to December 2015 were retrieved from departmental register. Archived histopathological reports, tissue slides and stored paraffin blocks of patients' biopsies were also retrieved. All histological sections were stained with hematoxylin and eosin. The stained slides were reviewed independently by the two/ three pathologists for confirmatory. Relevant data on age, sex, and sites of affectation were also retrieved from accompanying case files and departmental records.

The cancer histological types were classified using the International Classification of Diseases for Oncology (ICD-O).[14]

III. RESULT

A total of 3933 cancer patients were diagnosed in the histopathology department of UDUTH during the ten-year period. There were 2260 female cancers (57.5%) compared to 1673 male cancers (42.5%). The ages ranged from 1-99years and the overall mean age was 44.28years with a median age of 45.0, modal age of 50, and (SD 18.69). The male mean age was 45.77years with a median age of 50.0, modal age 60 and SD was 21.03) while the female mean age was 43.18years with a median age of 45.0, modal age 50, and SD was 16.67). (Table 1)

There were 3575 Adult Cancer accounting for 90.9% and 358 Childhood cancers which accounted for 9.1%. Overall, the most common cancer sites were the breast 763 (19.4%), cervix 312(7.9%), prostate 267(6.8%), lymph node 248(6.3%), skin 225(5.7%), bladder 191(4.9%), rectum 114(2.9%), ovary 110(2.8%), eye 97(2.5%) and soft tissue 95(2.4).

In males, the most frequent cancers were in the prostate 267(16.00%), bladder 160(9.60%), skin 138(8.20%) nasophraynx 87(5.2%), lymph node 85(5.10%), rectum 61(3.60%), eye 55(3.30%), Salivary gland 38(2.3%), Larynx 37(2.20%), and anal 37(2.20%). While in females, the most common cancer site of occurrence were the breast 731(731%), cervix 302(13.40%), lymph node 163(7.20%), ovary 110(4.90%), skin 87(3.80%) endometrial 61(2.70%), rectum 53(2.30%), Nasophraynx 45(2.0%), soft tissue 43(1.90%), and eye 42(1.90%). (Table 2)

Table 1 – Frequency Distribution of cancer by gender

| RANK* | MALE | | OLD** RANK | FEMALE | | OLD** RANK |
	CANCER SITE	FREQUENCY (%)		CANCER SITE	FREQUENCY (%)	
1	PROSTATE	267 (16)	2	BREAST	731 (32.3)	1
2	BLADDER	160 (9.6)	1	CERVIX	302 (13.4)	2
3	SKIN	138 (8.2)	4	LYMPH NODE	163 (7.2)	4
4	NASOPHARYNX	87 (5.2)	7	OVARY	110 (4.9)	3
5	LYMPH NODE	85 (5.1)	3	SKIN	87 (3.8)	9
6	COLORECTAL	61 (3.6)	5	ENDOMETIRUM	61 (2.7)	8
7	EYE	55 (3.3)	NA	COLORECTAL	53 (2.3)	5
8	SALIVARY GLAND	38 (2.3)	NA	NASOPHRAYNX	45 (2.0)	7
9	LARYNX	37 (2.2)	NA	SOFT TISSUE	43 (1.9)	NA
10	ANAL	37 (2.2)	NA	EYE	42 (1.9)	NA
	OTHERS	708 (42.3)		OTHERS	623 (27.6)	
	TOTAL	1673 (100)			2260 (100)	

A. * Incidence from 2005 to 2015 ** from 1999 to 2004[13]NA - not among top 10

Table 2 -Frequency Distribution of top cancers by age group and cancer site

CANCER SITE	0- 5	6 - 10	11- 15	16- 25	26- 35	36 - 45	46- 55	56- 65	66- 75	76- 85	86- 95	>100	TOTAL	%
BREAST	0	0	0	33	180	221	200	85	38	5	0	1	763	19.4
CERVIX	2	2	2	7	41	79	76	70	23	8	2	0	312	7.9
PROSTATE	0	0	0	0	1	3	19	106	85	44	9	0	267	6.8
LYMPH NODE	5	0	10	21	47	54	59	36	13	3	0	0	248	6.3
SKIN	2	4	4	17	46	36	52	36	24	4	0	0	225	5.7
BLADDER	0	0	1	5	28	35	56	39	19	6	2	0	191	4.9
RECTUM	0	0	2	23	13	36	14	18	8	0	0	0	114	2.9
OVARY	1	3	7	15	18	22	19	17	8	0	0	0	110	2.8
EYE	36	24	3	5	6	6	7	6	4	0	0	0	97	2.5
SOFT TISSUE	8	4	6	13	22	13	13	8	6	2	0	0	95	2.4

Table 3 – Total cancer Incidence by site and comparison with other regions in Nigeria

Cancer Site	Frequency (%)	Study area	Zaria[A]	Ife-Ijesha[B]	Ibadan[C]	Benin[D]	Nigeria[E]
				RANK			
BREAST	763 (19.4)	1	1	1	1	2	1
CERVIX	312 (7.9)	2	2	6	2	1	2
PROSTATE	267 (6.8)	3	3	3	3	3	3
LYMPH NODE	248 (6.3)	4	7	2	5	10	5
SKIN	225 (5.7)	5	4	NA	6	8	NA
BLADDER	189 (4.8)	6	8	NA	NA	NA	NA
COLORECTAL	114 (2.9)	7	5	7	4	5	6
OVARY	110 (2.8)	8	13	NA	NA	NA	8
EYE	97 (2.5)	9	7	NA	NA	NA	NA
SOFT TISSUE	95 (2.4)	10	6	4	8	9	NA

NA – not among top list; Data for [A,B,C,D] and [E] obtained from [29],[30],[31],[32] and [15] respectively.
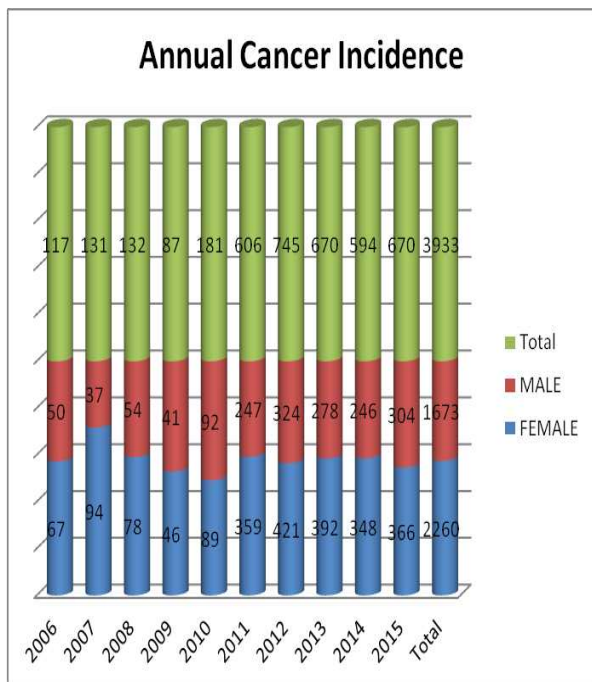
Figure 1 – Stacked bars graph showing yearly and gender distribution of cancers in the study area

IV. DISCUSSION

According to WHO estimates for 2011, cancer now causes more deaths than all coronary heart disease or all stroke and infectious and parasitic diseases.[17] The continuing global demographic and epidemiologic transitions signal an ever-increasing cancer burden over the next decades, particularly in low and middle income countries (LMIC), with over 20 million new cancer cases expected annually as early as 2025.[18] The GLOBOCAN estimates for 2012[19] aim to provide the evidence and impetus for developing resource-contingent strategies to reduce the cancer burden worldwide.

The findings from this work reveals that there are more female cancers in the region than males. This is in agreement with the earlier work of Malamiet al.[13] and of several authors [2, 20] but was at variance to the work of Binu et al [1] who showed a higher frequency in males than in females in Nepal. This finding may be as a result of the high number of female patients with breast and cervical cancer (about 25% of all cancers) seen in this study. It could also be due to improved diagnosis, better case finding, improved access to care and may be due to increasing prevalence of risk factors of such cancers.[21]

The increasing incidence may be the result of increased participation by the populace towards proper medical practices as data obtained from sub Saharan Africa are usually inadequate. Cancer registration though vital is often neglected in sub Saharan Africa owing to competing demands for resources for healthcare.[22]

The mean age of diagnosis in males (45.77) was higher than in females (43.18). This is lower than that obtainable from Ibadan (male – 51.1, female – 49.1)[22] and that observed from Abuja (male – 49.1, female – 45.4).[22]This reduction in the mean age may be due to the relatively younger marriage age that women from the Northern part of

the country practice.[23,24]

This study has indicated a rise in the incidence of prostate cancer in males as recorded in the previous study done in the institution. It might be a consequence of an aging and growing population.[4] Males also had an increased incidence of skin cancers and cancer of the nasopharynx. The study has also indicated the rising incidence of lymphoid cancers as well as skin and endometrial cancers in women. Nevertheless, the trend remains unchanged for breast and cervical cancer in women as they are the most diagnosed among female patients in the study. The frequency percentage gotten in this study for breast cancer (32.3%) was about twice the predicted incidence documented in GLOBOCAN (14.3%) and that of cervical cancer was also higher (13.4%) was higher than their estimate (12%).[16]

Of note in females is that almost a third of all breast cancers were diagnosed in the 36-45 age group as documented by Malamiet al.[13] The finding is lower than those obtainable in the southern part of the country where they were most diagnosed at more than 50 years of age. Cervical cancer diagnosis was found to be a decade earlier than previously [13] documented. It is known sexually transmitted Human Papilloma Virus (HPV) infection has a relatively high rate in this environment. This view was shared by Auwalet al.[25] among women attending gynecology clinic in a city in Northern Nigeria.

Frequency of prostate cancer has risen from 4.5%[13] to 6.8% in the current findings. Presenting age (>50 years) is consistent with previous findings and those from other parts of the country,[2, 10, 15, 20, 22] Africa [10, 12, 26] and the rest of the world.[4, 16, 21] All authors have implicated ageing, family history, high consumption of fat and red meats as well as use of sex Use of sex hormones (as hormone replacement therapy) as associated risk factors. Increase in westernization and life expectancy has also been implicated.

The overall incidence of cancers in this finding is at complete variance to data obtained from GLOBOCAN for the whole world. Cervical cancer which is the 2nd most occurring cancer is ranked 7th in the whole world,[4] 6th in less developed regions of the world and ranked much lower in more developed regions in the world.[16] Early screening and HPV vaccination accounts for the low incidence is more developed countries.

Skin and bladder cancer ranked 5th and 6th in this finding is However, not among the top 15 cancers seen in the world and less developed regions but oddly close to incidence in more developed regions of the world.[4] Impaired wound healing and chronic inflammation are implicated in the progression of squamous cell carcinoma which is the most frequent skin malignancy in the region.[27] Chronic infection by Schistosoma haematobium is also important in the progression of bladder cancer as shown in this finding. The frequency of this parasitic infestation is 60.8%, one of the highest recorded in this country.[28]

Of concern is the high rate of uncommon cancers in the region notably eye (retinoblastoma) and soft tissue sarcomas. Childhood cancers are common fairly common in this region accounting for about 9.1% of all malignancies in this study. Kaposi sarcoma is an extremely rareform of cancer in most

regions of the world, but it is one ofthe most common in certain regions of Sub-Saharan Africa, where 84% of the estimated 44,000 cases occurred; a major consequence of HIV-AIDS infection.[16]

Findings from this work are in agreement with the Zaria cancer registry which is a population based register and located in North-West Nigeria. The top 5 cancers recorded in the Zaria cancer registry were breast (20.4%), cervix (16.8%), prostate (8.3%), skin (7.4%) and GIT (6.5%)[29]. The incidence of the breast cancer was by and large similar to our findings (19.4%) but we recorded a relatively lower frequency of cervical cancer (7.9%). The age and sex distribution were also similar to the Zaria cancer registry. Comparison to the Zaria cancer registry (the nearest cancer registry to our location) has further validated the reliability and comparability of the cancer data.[10,12, 26]

There is also variance in the rates of cancers of bladder, ovary and eye in Southern parts of Nigeria as per data obtained from their registry.[30-32] This variance to data obtained from Northern Nigeria might be due to better management of risk factors associated with such as cancers such as schistosomiasis, other chronic inflammatory diseases etc. Contrary to findings in most part of the Nigeria, cancer of the cervix uteri was the most common cancer in Benin cancer registry with cancer of the corpus uteri ranking 4th.[32] This might be an indication of higher HPV infection rates in the region. By and large, the incidence of skin, colorectal and soft tissue malignancies were comparable with other regions of the country; thereby further validating the data.

V. CONCLUSION

This study has shown, that there are differences in the patterns, age group and/or relative frequencies particularly of breast, cervical, skin, bladder,eye, and soft tissue cancers in Sokoto compared to other regions of Nigeria, Africa and the rest of the World which warrant further clinico-pathological elucidation. The cancer patterns revealed in this study provide valuable insights to cancer epidemiology in the north-western region of Nigeria. Breast, prostate, lymph node, skin and bladder cancers are the most frequent cancer in the area. This underscores the need for closer implementation of screen tools on a wider scale. Also, data generated from this study can shift focus of the health planning authorities and guide future research The cancer patterns elucidated in this study reveal that malignant neoplasms are relatively common in Sokoto. They also give useful insight into its epidemiology. The observed discrepancies in the frequencies when compared to other centers' may not be readily explicable. However, a rise in the population of the elderly, increased adoption of life-styles that place people at risk and other yet to be identified variables seem to play crucial roles. A larger scale method for early detection of these diseases and the establishment of a robust cancer registry will greatly alter the dismal scenario in this region of Nigeria.

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Dr Saddiku M Sahabi , Senior Lecturer/Consultant Pathologist, Department of Morbid Anatomy & Forensic Medicine/Department of Histopathology, Usmanu Danfodiyo University /Usmanu Danfodiyo University Teaching Hospital Sokoto

Dr Kabiru Abdullahi, Lecturer/Consultant Pathologist, Department of Morbid Anatomy & Forensic Medicine/Department of Histopathology,Usmanu Danfodiyo University /Usmanu Danfodiyo University Teaching Hospital Sokoto