

Original Article

The Pattern and Distribution of Cancers in Akwa Ibom State, Nigeria

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ABSTRACT

Introduction: The pattern of cancer is known to vary by location based on people's lifestyle and socioeconomic development status. **Aim:** The aim of this study is to describe the pattern of cancers seen in University of Uyo Teaching Hospital. **Materials and Methods:** This is a retrospective study of all cancer cases that were histologically diagnosed in the Histopathology Department of University of Uyo Teaching Hospital for 9 years (January 2007–December 2015). **Results:** There were 1186 cases, identified and included in this study. Females accounted for 59.7% of cases while males accounted for 40.3% of cases, with the mean ages for females and males being 45.69 ± 14.38 and 59.63 ± 17.77 years, respectively. Age group 60–69 years accounted for most cases (20.4%). The common cancers in both sexes were breast (33%), prostate (25.8%), cervix (11.1%), skin (4.9%), sarcoma (4.8%), and colorectal (3.8%). **Conclusion:** There is a variation between the pattern of cancer in Akwa Ibom and other regions of Nigeria warranting further clinicopathological evaluation, and these results will be useful in the overall context of planning and evaluation of cancer control activities in Akwa Ibom State. A population-based cancer registration in Uyo is suggested.

KEYWORDS: Akwa Ibom, cancer, pattern

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INTRODUCTION

Cancer constitutes an enormous burden on society in both economically developed and less developed countries alike.^[1] Worldwide, cancers are a leading cause of disease and death, with an estimated 14.1 million new cancer cases and 8.2 million deaths reported in 2012.^[2] According to WHO, lung, female breast, colorectal, and stomach cancers accounted for more than 40% of all cases diagnosed worldwide, with lung cancer and breast cancer being the most common cancer diagnosed in men and women, respectively. Despite this latest WHO report on cancer distribution worldwide, the pattern of cancer is known to vary from place to place, country to country, depending on people's lifestyle and socioeconomic development status of a given country.^[1-4] Even in the same country, various patterns have been noted.^[5]

Studies have shown that the burden of cancer in economically developed and developing countries (more in developing countries) is on the rise, possibly due to the following reasons: growth and aging of the population, an adoption of cancer-associated lifestyle, exposure

to different infections, increase in smoking habits, physical inactivity, overweight, changing reproductive patterns (including lower parity and later age at first birth) associated with urbanization and economic development and "westernized" diets.^[1,4] Based on Human Development Index (HDI), countries in the world are divided into four groups and studies have shown that the cancer pattern in these four groups varies.^[1] The most common cancers in countries with very high HDI in order of occurrence are breast, prostate, lungs, bowel, and stomach. In medium HDI countries, lung, liver, stomach, breast, and bowel cancers top the list, while in low HDI countries which include Nigeria, breast, cervix, prostate, liver, and esophagus are said to be the most common.^[2] In general, economically less developed countries are said to be experiencing an increased frequency of cancers with historically low rates, such as female breast, lung,

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and colorectal cancers, in addition to a disproportionately high burden of infection-related cancers.^[1]

Population-based cancer registries (PBCR) of a country are the best sources of incidence and pattern of cancer information since they capture the population of an entire country and play an important role in disease surveillance, probable identification of cause and risk factors, planning and evaluating national cancer prevention and cure.^[1,5-10] Some other studies captured subregions, while others are one-city-based cancer registries.^[11-14] Most Nigerian data and research on cancer have focused on specific cancers or specific age group, with a few focusing on all cancers at a glance and are mostly hospital based (with no reference population) with even fewer been population-based studies. An all-inclusive PBCR is not available in Nigeria as a whole, and the few hospital-based cancer registries are barely existing and severely handicapped by multiple constraints such as structural, financial, and technical inputs.^[15] In the absence of national PBCR, regional-, state-, or hospital-based cancer registries, a pathology laboratory-based cancer pattern has been shown to provide important clues in determining the burden of cancer in a community, though its major shortcoming is bias and underestimation; however, they may be the only source available in indicating a local pattern.^[15,16-19]

Almost all cancer patients in Akwa Ibom State are referred to University of Uyo Teaching Hospital for further investigations and therapy because it is where all the histopathologists and oncologists in the state are practicing. Therefore, this study may serve as a baseline description of cancers in Akwa Ibom State.

MATERIALS AND METHODS

This is a retrospective study of all cancer cases that were histologically diagnosed in the Histopathology Department of University of Uyo Teaching Hospital over a 9-year period, from January 1, 2007, to December 31, 2015. This histopathology laboratory is the only facility where histopathology services are rendered in Akwa Ibom State, South-South region of Nigeria and as such renders services to the host hospital, secondary health centers and privately owned hospitals within the state. Data were extracted from the files and records of the department. Information extracted includes age, sex, tissue/organ affected, and histological diagnosis. Data were analyzed using predictive analytical software, version 17 (IBM, SPSS Inc, Chicago, IL, USA).

Eleven cases with ambiguous conclusions or missing of any major variables were excluded. Ethical clearance was obtained from the institution, and there was no conflict of interest, while integrity of personal health information and confidentiality was maintained in this study.

RESULTS

A total of 1186 cases were included in this study, accounting for 24.4% of all histopathologically diagnosed

Table 1: Age group and sex distribution of cases

Age group	Male	Female	Total, n (%)
0-9	10	9	19 (1.6)
10-19	10	11	21 (1.8)
20-29	13	60	73 (6.2)
30-39	29	156	185 (15.6)
40-49	40	172	212 (17.9)
50-59	73	158	231 (19.5)
60-69	132	110	242 (20.4)
70-79	132	26	158 (13.2)
80-89	34	5	39 (3.3)
90 and above	5	1	6 (0.5)
Total	478	708	1186 (100)

Table 2: Systems and organs affected by malignant tumors

System/organ	Frequency (%)
Breast	391 (33)
Urogenital malignancy	328 (27.6)
Gynecology malignancy	182 (15.5)
Skin malignancy	58 (4.9)
Sarcoma (soft tissue and bone)	57 (4.8)
Gastrointestinal malignancies	45 (3.8)
Hematology malignancies	37 (3)
Head and neck malignancies	34 (2.8)
Pleural/lung tissue	5 (0.4)
Ophthalmology malignancies	5 (0.4)
Endocrine	4 (0.4)
Liver	2 (0.2)
Sacrococcygeal	1 (0.1)
Metastasis (lymph nodes, omentum, and retroperitoneum)	37 (3.1)
Total	1186 (100)

Table 3: Distribution of cancers in males and females

Cancer	Males		Females		
	Frequency (%)	Mean age	Cancer	Frequency (%)	Mean age
Prostate	306 (64)	67	Breast	388 (54.8)	44.3
Sarcoma	33 (6.9)	43.7	Cervix	132 (18.6)	49.9
Skin	33 (6.9)	53.5	Skin	25 (3.5)	51.1
Colorectal	21 (4.4)	53.4	Colorectal	24 (3.4)	54
NHL	21 (4.4)	32.6	Sarcoma	24 (3.4)	39.9
Nasopharynx	11 (2.4)	62.8	Ovary	21 (3)	42
Salivary glands	8 (1.7)	45.4	Endometrium	15 (2.1)	52.5
Testis	5 (1)	38.8	NHL	13 (1.8)	45.5
Penis	5 (1)	74.8	Nasopharynx	10 (1.4)	31
Others	35 (7.3)		Others	56 (8)	
Total	478 (100)		Total	708 (100)	

NHL=Non-Hodgkin's Lymphoma

Table 4: Comparison by rank (order) and frequency for the most common cancers in pathology laboratory-based studies

Organ/system involved	Akwa Ibom (n=1186)		Jos (n=2341)		Ekiti (n=498)		Sokoto (n=913)		Zaria (n=1995)		Uganda (n=585)		Gabon (n=2602)	
	Rank	Frequency (%)	Rank	Frequency (%)	Rank	Frequency (%)	Rank	Frequency (%)	Rank	Frequency (%)	Rank	Frequency (%)	Rank	Frequency (%)
Breast	1	391 (33)	1	528 (18.6)	1	162 (32.5)	1	126 (13.8)	4	221 (11.3)	5	45 (13)	2	362 (13.9)
Prostate	2	306 (25.8)	4	225 (7.9)	2	67 (13.5)	5	41 (4.5)	8	81 (4.1)	-	-	-	-
Cervix	3	132 (11.1)	2	524 (17.7)	5	27 (5.4)	3	70 (7.7)	1	315 (16.1)	1	140 (41)	1	168 (26.3)
Skin	4	58 (4.9)	8	116 (4.1)	-	-	-	-	3	241 (12.3)	-	-	4	133 (5.1)
Sarcoma	5	57 (4.8)	-	-	4	28 (5.6)	-	-	7	87 (4.4)	-	-	-	-
Colorectal	6	45 (3.8)	6	158 (6.5)	6	21 (4.2)	6	35 (3.8)	6	119 (6.1)	-	-	-	-
Hematology	3	132 (11.1)	3	251 (8.9)	5	27 (5.4)	4	46 (5)	2	248 (12.7)	3	55 (9.4)	3	185 (7.1)
Liver	5	203 (7.2)	5	203 (7.2)	3	31 (6.2)	-	-	5	121 (6.2)	-	-	5	101 (3.9)
Oral cavity	-	-	-	-	-	-	2	80 (8.7)	-	-	-	-	-	-
Bladder	-	-	-	-	-	-	-	-	-	-	2	56 (9.6)	-	-
Kaposi Sarcoma	-	-	-	-	-	-	-	-	-	-	4	50 (8.5)	-	-
Stomach	-	-	-	-	8	817 (3.4)	-	-	-	-	-	-	6	86 (3.3)
Ovary	-	-	-	-	-	-	-	-	-	-	-	-	-	-

cases over the study period. Females accounted for 59.7% of cases while males accounted for 40.3%, with a female to male ratio of 1.5:1. The ages ranged from 1 to 97 years with a mean age of 51.31 ± 17.24 years. The mean ages for males and females were 59.63 ± 17.77 and 45.69 ± 14.38 years, respectively.

Table 1 shows age group distribution. There was a steady increase in the number of cancer cases as the age advances, with the peak occurring at the 7th decade (20.4%), followed by a sharp decline thereafter with further age increase. Age group 90 and above accounted for the least number of cases (0.5%).

Table 2 shows the systems and organs affected by cancer. Breast cancers were the most common accounting for 33%, followed by urogenital system cancers which accounted for 27.6% of all cancers. Gynecological cancers were responsible for a distant third (15.5%). The fourth and fifth most frequent cancers seen were skin cancers and sarcomas which accounted for 4.9% and 4.8%, respectively.

Prostate cancer was the most common cancer in males, accounting for 64% of all male cancers. Sarcomas and skin cancers occurred in equal proportions each accounting for 6.9% of male cancers, respectively. Colorectal cancers and non-Hodgkin's lymphoma each accounted for 4.4%, respectively, of male cancers as seen in Table 3. The five most common cancers seen in females were breast cancers, cervical cancers, skin cancers, colorectal cancers, and soft tissue sarcomas, which accounted for 54.8%, 18.6%, 3.5%, 3.4%, and 3.4%, respectively, as shown in Table 3.

Table 4 shows a comparison by rank (order) and frequency between the index study and other pathology laboratory-based frequency of cancer studies in Nigeria and some African States.

DISCUSSION

Cancer is the most dreaded disease in the world which brings tremendous social distress, psychological suffering, and hardship to the patients and relatives; Its pattern is known to vary in different environments and localities, hence the need to know common cancer types and risk factors prevalent in a particular population. Such a knowledge will influence management positively.^[4,11,20] The regional differences observed might be due to the following: genetic differences among populations, environmental exposures, lifestyle variations, and other risk factors.^[4] This belief is reinforced by migration patterns that show that incidence of cancer among migrants changes to more closely and reflects the rates in the adoptive country.^[4] Furthermore, research

has shown that variations in cancer rates for most cancers largely reflect differences in environmental risk factors (including lifestyle and culture) rather than genetic differences.^[21]

Cancer specimens accounted for 22.4% of all cases submitted to our laboratory over the study period. This is far higher than 14.6% observed in Jos although Jos study had a larger sample size and covered a longer duration.^[5] The reason for the high rate is not clear and should be further studied. The practice of clinicians (especially those in peripheral and private hospitals) in the locale where we practice submitting only cases of suspected malignancy is speculated.

Apart from specific childhood tumors, most carcinomas occur in the later years of life (>55 years), mainly between 40 and 79 years for both sexes and decline after age 80 (mainly due to the lower number of individuals who get to this age). The higher incidence of cancer with age is probably due to the progressive accumulation of somatic mutations and decline in immune competence that accompanies aging.^[22] Our finding agrees to this, as 56.9% of cancers were seen in people aged 50 years and above. Age group 60–69 years accounted for 20.4% of all cancer cases. This is similar to observation in Qatar and a decade higher than the age reported in Ghana and Ethiopia.^[4,8,12] This agrees with the known fact that increase in the life expectancy is one of the major factors for an increased incidence of cancer and that cancer is predominantly a disease of middle and old age although no age is immune.^[11] Cancers occurring among adolescents and young adults are more likely related to genetic predisposition and exposure to risk factors early in life as compared with cancers among the elderly population.^[8]

Similar studies from other parts of Nigeria and Ethiopia show more females are affected than males, unlike studies in Gabon, India, and Ghana which reported more males than females.^[4,5,8,11-14,17,19] This is likely due to the gender-based malignancies of breast cervical and ovarian carcinomas which affect relative younger segment of the population in our part of the world. Nigerian females are said to have more health-seeking behaviors and many secondary and tertiary hospitals have well-developed gynecology units.^[14]

Breast cancer was not only the most common female cancer (54.8%) but was also the overall most common cancer (33%) in the index study. This rate is similar only to 32.5% observed in Ekiti, Nigeria and higher than rates reported in other studies. Breast cancer was the most common cancer seen in America (29%), Europe (13.5%), Ghana (24.1%), and

Sokoto (13.8%).^[6,7,12,14,19] Breast cancer was the 2nd most common cancer in Jos (12.5%) and Gabon (13.9%) and ranked 5th (13%) and 6th in Uganda and Yemeni (8%), respectively.^[5,10,16,17] Globally, breast cancer is the most frequently diagnosed cancer and the leading cause of cancer death among females, with an estimated 1.7 million cases and 521,900 deaths in 2012 alone.^[1] Variation in breast cancer incidence rates in different environments has been observed and reflects differences in the availability of early detection techniques (mainly mammography) as well as risk factors.^[1] Risk factors for breast cancer include gender, age at menarche, age at first live birth, germline mutations, race/ethnicity, estrogen exposure (postmenopausal hormone replacement), obesity, physical inactivity, long menstrual history, lack of breastfeeding and alcohol consumption.^[22] Majority of females in our setting like other places in Nigeria not only marry but also marry early, mainly in the second decade and early third decade, averagely have 3–5 children, breastfeeds for close to a year, while hormone replacement therapy is very unpopular. The high rate of breast cancer in this environment (compared to other studies) may be due to germline mutations, and no studies have been done in respect to that. There is need for studies to ascertain their role. Recent increase in breast cancer screening activity (mainly mammography) and other not completely understood factors such as changing reproductive patterns, increasing obesity, and decreasing physical activity are responsible for increased rates noticed in many countries in South America, Africa, and Asia.^[23] The magic of increase in breast cancer detection rate by mammography (usually at an early stage, when treatment is more effective and a cure is more likely) is not applicable to our environment because it is not widely available and when available, cost is a major limiting factor. Another limitation of mammography in our environment is that the age group where it picks lesions most is in the postmenopausal women that have a less dense breast, whereas most breast cancer cases in our environment are in younger women with dense breast. The young mean age of breast cancer cases implies that more young people are involved and calls for greater awareness for self-breast examination, clinical breast examination, and establishment of national breast cancer screening programs.^[24]

Globally, prostate cancer is the second most frequently diagnosed cancer in men, with 1.1 million new cases.^[1] There is a great variation in the incidence rates (by more than 25-fold worldwide). Highest incidence is seen in Australia/New Zealand, Northern America, Northern and Western Europe, and some Caribbean nations, while the lowest incidence is seen in Asia.^[1] Prostatic cancer was the 2nd most common

cancer (25.8%) and the most common cancer in males in this study. This is similar to observations in America and most parts of Europe.^[6,7] Apart from observation in Ekiti, our finding is different from other pathology laboratory-based studies either from Nigeria or other African countries, showing strong regional variation and accounting for 7.8% in Gabon, 6.2% in Jos, 4.5% in Sokoto, 4.1% in Zaria, and 4% in Ghana.^[5,14,16-19] The reasons for this significant variation cannot be explained readily but indicates that more efforts should be made to reduce the morbidity and mortality caused by prostate cancer in our males and calls for further research in Akwa Ibom. Researches from Yemeni, Qatar, India, Pakistani, and Ethiopia all reported a far lower incidence of prostate cancer. Prostatic cancer incidence in native Asian men is relatively low when compared with other cancer types.^[25] Reasons for this lower rate in Asia is not well known though genetic and environmental factors could partially explain these differences; however, lower exposure to prostate-specific antigen screening in Asian individuals might also be a major contributing factor.^[25] Considering the nature of this study, prostatic cancer of 25.8% may be an underestimation of the magnitude of prostate cancer in our environment. As has been observed in previous works, efforts at early detection and awareness should be increased, as applied to cervical and breast cancer campaigns (usually by nongovernmental organizations), which occasionally even do free screening and examination.^[26]

Globally, there is a large geographic variation in cervical cancer rates, which reflects the differences in the availability of screening, which allows for the detection and removal of precancerous lesions and human papillomavirus (HPV) infection prevalence.^[27] In females, cervical cancer is the second most commonly diagnosed cancer and third leading cause of cancer death in less developed countries. Research has shown that sub-Saharan Africa, Latin America, the Caribbean, and Melanesia have the highest incidence rates with lowest incidence rates seen in Western Asia, Australia/New Zealand, and Northern America.^[1] Similarly, HPV infection has a high prevalence of 21% in Africa, 16% in Latin America and the Caribbean, 9% in Asia, and 5% in Northern America.^[28] Cervical cancer was the 3rd most common cancer generally (11%) and the 2nd most common in women (18.6%) in the index study. This is at variance with the other pathology laboratory, hospital- and city-based cancer studies, where cervical cancer was the most common cancer seen and accounted for 26.3%, 25.4%, 20.6%, 19.5%, 16.1%, and 13% in Gabon, Ethiopia, Ghana, Jos, Zaria, and Uganda, respectively.^[4,5,12,16-18] Findings in Sokoto are fairly similar to the index study, in been the 2nd most common female

cancer, though it accounted for 7.7% of cases, while in the index study, it accounted for 11.1%.^[19] This variation may be related to prevention of cervical cancer campaign program initiated and sustained by the “Medical Women Association, Akwa Ibom State branch” over the years, which runs a free clinic twice monthly in their secretariat and visits different parts of the state at well-organized periodic intervals doing free cervical smear screening, thereby helping to reduce the incidence. The campaign and screening should be sustained, intensified and vaccines provided at markedly reduced prizes, so as to further reduce the rate in our environment because our rate of 11% is far higher than findings in America, Europe, and Indian studies, where cervical cancers were negligible and accounted for <0.8% of cases.^[6,7,11]

Skin cancer was the 4th most common cancer and accounted for 4.9% of cases. Skin cancer was the 4th most common cancer in Jos, Yemeni, and Gabon though their rates were higher than rate observed in the index study.^[5,10,17] The reason may be due to difference in average weather conditions.

Colorectal cancer seen were few (3.8%) which is similar to rates in Sokoto, Ekiti, and Zaria and far less than observations in Yemeni and Europe.^[7,10,14,18,19] Globally, in 2012, colorectal cancer was the third most commonly diagnosed cancer in males and the second in females, with an estimated 1.4 million cases and 693,900 deaths. Countries with the highest incidence rates included Australia/New Zealand, Europe, and Northern America, while low rates were seen in Africa and South-Central Asia.^[1] Diet is known to play a significant role in causation of colorectal cancers, with diets low in fruit, vegetables, and unrefined plant food, and high in red meat, processed food, and fat been shown to confer an increased risk of colorectal cancer. A healthy diet, an appropriate weight for height and a non-sedentary life style may reduce the risk of colorectal cancer.^[1,29] In Akwa Ibom State, the staple food is pounded yam/processed cassava flour in combination with a variety of soups, which are usually prepared fresh with various types of vegetables that abound in the environment like “Afang, Editan, Atama, Ikon, Etidot, Edikang-ikong, Mkpafere, Adusa, and Efere Ikong.” Inhabitants of the State should be encouraged not to leave these natural foods, irrespective of level of westernization, social status, or socialization. In addition, the impact of colorectal cancer predisposing diseases such as inflammatory bowel disease and familial adenomatous polyps may be low in this environment, though studies are yet to be done.

The major limitations of this study are its retrospective nature, low coverage (not a population-based

epidemiological study), and no information on estimated deaths.

CONCLUSION

In the absence of a population-based survey, this study serves as a rough guide to the cancer pattern in Akwa Ibom State and provides a basis for establishing priorities to cancer control actions in Akwa Ibom State and will serve as a baseline data on which future studies can be supported.

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Conflicts of interest

There are no conflicts of interest.

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