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Cancer in Cross River State

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Authors' contributions

This work was carried out in collaboration among all authors. Author GAE designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors TIU and DEU managed the analyses of the study. Author DEU managed the literature searches. Author SE also contributed in the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Aims: To determine the prevalence of cancer in the rest of Cross River State not covered by the population-based cancer registry which is limited to the capital city of Calabar.
Study Design: Descriptive retrospective study involving a trend analysis of cancers from the rest of Cross River State not covered by the Calabar cancer registry. Cancers incident in the Pathology and Haematology departments of the University of Calabar Teaching hospital are included in the study.
Place and Duration of Study: Pathology and Haematology departments of the University of Calabar Teaching hospital. Data was assessed between April to May 2019.
Methodology: An institution-based trend analysis of cancers originating from the rest of Cross River State, out of population-based cancer registry's coverage was carried out. Such cases incident in the Pathology and Hematology Departments of the University of Calabar Teaching Hospital were included. Cancer data from 1st January 2004 to 31st December 2013 was accessed from the archives of both departments. Data extraction was carried out though filling of a check list and these were fed into IBM statistical package for social sciences SPSS version 21 for analysis.

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Results: Nine hundred and fourty one (941), cancer cases were diagnosed during this period. The mean age of diagnosis was 49.18 ± 18.9.Four hundred and seventy seven (477 or 50.69%) females and 464 or 49.31% males had cancer, representing a female to male ratio 0.97: 1. Overall, the commonest age group was 40 to 64 years (46.3%), followed by 18 to 39 years (25.5%), and 65 years or greater (23.0%).Breast cancer followed by prostate cancer were the commonest cancers in adults, while cancers in the lymphohaematopoietic tissue, soft tissue and eye were the commonest in children.

Conclusion: Cancer occurs at an earlier age in the rest of Cross River State, with breast and prostatic cancer dominating. Efforts should be doubled to institute effective screening programmes.

Keywords: Cancer; Cross River State; breast cancer; prostate cancer.

1. INTRODUCTION

Cross River State is located in the Niger delta region of Nigeria. It is bounded to the south by the Atlantic coast and to the east by the Republic of the Cameroun. The climate is tropical and the vegetation ranges from mangrove forest in its southernmost reaches, through tropical rainforest spanning the south through the central zone and guinea savanna in its northern reaches. Endowed with high rainfall, and populated by Ekoi tribes of the Bantoid classification, and it has many linguistic groups. The predominant occupation is farming. Its capital city Calabar, with a population of just over, three hundred thousand according to the 2006 population census, is projected to have a population of seven hundred thousand now. It has two local government areas which are adequately covered by the Calabar cancer registry based in the University of Calabar Teaching Hospital. Data from these two local government area was published by Ekanem and Parkin in their ˝Five years cancer incidence in Calabar˝ [1]. Data from the rest of the sixteen local government areas of Cross River State, not completely covered in the population-based cancer registration, has never been looked at. This work presents the socio-demographical characteristics as well as the topographical analysis of cancers in the rest of Cross River State. Ekanem and Parkin in a 2009-2013 review, reported that breast and cervical cancers accounted for 60.4% of cancers in women while, prostate cancer was the commonest in males in the city of Calabar. That Hodgkins Lymphoma was common in both sexes, while moderate amounts of AIDS related cancers (Kaposi sarcoma, Hodgkin lymphoma and squamous cell carcinoma of the conjunctiva) were seen [1].

Across the country, population-based cancer registration is limited to less than 5% of the population [2,3]. Efforts are currently coordinated between the institutional registries and the Federal ministry of health to improve on the situation [4-6]. Data from Ibadan (South west) and Abuja (North central) registries which together with Calabar registry are population-based show that Breast and cervical cancers are the commonest in women while Prostate cancer is the commonest malignancy in males [2]. Records from both registries also show a substantial increase in cancer incidence [2]. Data from Sokoto, North west Nigeria shows bladder cancers, followed by prostate cancer to be the commonest in males while, breast followed by cervical cancer, were the commonest in females [7]. This pattern is almost similar in Kano and Zaria, North west Nigeria [8,9]. An aggregation of data from registries of Ibadan and Lagos-the population hob of south west Nigeria over a five year period show breast cancer 20.2% as the commonest overall, cervical cancer 7.9%,liver 4.4%, almost tied with stomach at 4.3% and brain cancer 3.9% almost tying with pancreas 3.8% [10]. From Uyo, South-south Nigeria breast cancer 33%, prostate cancer 25.8%, cervix 11.1%, skin 4.9%, sarcoma 4.6% and colorectal 3.8% were the common tumours in that order [11]. From the south east Nigeria liver cancer was identified as the commonest cause of cancer death (40.8%) in a medical ward [12], and younger and middle age groups were the most affected [12]. The pattern of childhood cancer in Nigeria appears to be similar with some minor variations in the different zones; for instance Lymphomas 22.4% (90% Burkitts), retinoblastoma 21%, Soft tissue sarcoma 14.9%, Leukaemias 10.2%, CNS tumours 6.9% in the West [13], and Lymphomas 46.5% (Burkitts 30.1%), NHL (Non Burkitt's 9.8%), Retinoblastoma 15.2%, Acute Leukaemias 14.1%, CNS and hepatic tumours 4.3% in Northern Nigeria [14]. Also from the South-South, a similar childhood pattern of cancers was reported [15].

In Africa cancer was described in 2004 as an emerging crisis and the 7th highest cause of death [16,17]. Parkin also averred that cancer is often under reported in Africa because they are overshadowed with the high burden of infectious diseases [18]. A review of African cancer literature found breast and cervical cancers in females as the leading cancers, while in males, prostate cancer was the commonest followed by liver colorectal cancer and non Hodgkins lymphoma [16]. Adebamowo et al in 2009 identified the AIDS pandemic to be shaping the cancer pattern in Africa; that breast cancer, cervical cancer and Kaposi sarcoma were the commonest cancers in women, while Kaposi sarcoma, liver cancer and prostate cancer were the commonest male cancers [19]. Recently, dietary transformation from the traditional Kenyan diet rich in fibers, fruits and vegetables to the western diet rich in charred red/organ meat, fats, cholesterol and sugars has was blamed for the rising incidence of cancer in that country [20]. In Kayadondo district of Kampala, Uganda, the population -based cancer registry report of 1991 to 2006 shows breast and prostate cancer incidence increasing at 4.5% annually [21].

The global burden of cancer was reviewed in a 2018 publication by Fitzmaurice et al, they reported that cancer cases increased by 28% between 2006 and 2016 [22]. That in males the most common incident cancer is prostate cancer while tracheal, bronchus and lung were the commonest cause of cancer death, and in females the most common incident cancer and the leading cause of cancer death is breast cancer [22]. Lung cancer is not as common in Nigeria as is seen in the developed world [1,4,22]. Infection related cancers such as liver cancer and the AIDS associated, cancers such as Kaposi sarcoma have a strong showing [2,23]. While Nigeria shares a high burden of Hepatitis B related liver cancer with some developing countries like Pakistan, it differs from it, because Pakistan equally has a high lung cancer incidence, not observed in Nigeria [24]. This may be related to differences in tobacco consumption in the two countries. The global surveillance of trends in cancer survival 2000-2014 (CONCORD-3), analyzed data from 70 countries, 48 these countries with 100% population cancer registration coverage, and found differences between developed and developing nations [25]. They recommended that Governments worldwide should utilize population based cancer surveys as tools for health planning [25].

2. MATERIALS AND METHODS

An institution-based trend analysis of cancers originating from the rest of Cross River State, out of population-based coverage and incident in the Pathology and Hematology Departments of the University of Calabar Teaching Hospital was carried out. Cancer data from 1st January 2004 to 31st December 2013 was accessed from the archives of both departments. Data extraction forms contained patient's demographic, clinical and pathological information as well as laboratory diagnosis. This data is fed into SPSS version 21 for analysis. Patients included are all cancer cases originating from the rest of Cross River State out of range of the Calabar cancer registry. Cancers originating from Calabar South and Calabar municipality- covered by the population-based cancer registry are excluded.

3. RESULTS

Nine hundred and forty-one (941) cases of cancer were seen outside Calabar in Cross River State, within January 2004 and December 2013. Mean age was 49.18 ± 18.9 years, ranging from 1 to 100 years, and female: male ratio was 1: 0.97. Overall, the commonest age group was 40 to 64 years (46.3%), followed by 18 to 39 years (25.5%), and 65 years or greater (23.0%) (Table 1). Among males, the commonest age group was 40 to 64 years (40.1%) followed by 65 years or greater (35.1%). Among females, the commonest age group was also 40 to 64 years (52.4%) but followed by 18 to 39 years (32.7%). Significantly higher proportion of females compared with males was less than 40 years old (36.5% vs. 24.8%), while males were more commonly 65 years or older compared with females (75.2% vs. 63.5%, p=0.00).

Considering both sexes for all ages, the common sites for cancer were breast (21.9%), prostate (21.3%), and lymphohematopoetic tissue (9.2%) (Table 2). Other less common sites were cervix (8.1%), soft tissue (8.0%), skin (5.4%), and head and neck (4.9%). Among males, common sites for cancer were prostate (43.1%), lymphohematopoetic tissue (12.9%), and soft tissue (11.4%). Other sites were head and neck (6.7%), skin (5.0%), and colorectal (4.1%). Among females, common sites were breast (41.1%), cervix (15.9%), and skin (5.9%). Other less common sites were lymphohematopoetic (5.7%), soft tissue (4.6%), and head and neck (3.1%).

Table 1. Age distribution of all cancer cases by gender (N=941)

Age groups (in years)	Gender		Total n (%)	Chi-square (p-value)
	Male n (%)	Female n (%)		
Age groups (in years)				
0-4	10 (2.2)	6 (1.3)	16 (1.7)	Fisher's
5-12	14 (3.0)	7 (1.5)	21 (2.2)	Exact
13-17	7 (1.5)	5 (1.0)	12 (1.3)	0.00
18-39	84 (18.1)	156 (32.7)	240 (25.5)	
40-64	186 (40.1)	250 (52.4)	436 (46.3)	
≥65	163 (35.1)	53 (11.1)	216 (23.0)	
Total	464 (100)	477 (100)	941 (100)	
Age group (at 18 years)				
<18	31 (6.7)	18 (3.8)	49 (5.2)	4.0
≥18	433 (93.3)	459 (96.2)	892 (94.8)	0.05
Total	464 (100)	477 (100)	941 (100)	
Age groups (at 40 years)				
<40	115 (24.8)	174 (36.5)	289 (30.7)	15.1
≥40	349 (75.2)	303 (63.5)	652 (69.3)	0.00
Total	464 (100)	477 (100)	941 (100)	

Among both sexes within 0-17 years old, the common sites for cancer were lymphohematopoetic tissue (44.9%), eye (14.3%), and soft tissue (12.2%) (Table 3). These were also the common sites for cancer among males and females within 0-17 years old.

4. DISCUSSION

The mean age of cancer diagnosis in the rest of Cross River State (49.18) is similar to Calabar, the population -based cancer registration area of Cross River State (43.6 in female and in males 52.3(1)). Cancer tends to occur relatively early as seen in the 18 to 39 age range that accounted for the second highest frequency of 25.5%. This too is similar in Calabar where cancer onset begins early at the 20-24 age range rises steadily and peaks at the 5th decade [1]. Cancer is commoner in females in the 18 to 39 age group 37.2% to 18.1% males in the rest of Cross River State. Equally in the 40 to 64 age range, more females 52.4% than males 40.1% were affected, this age range had the highest prevalence rate of 46.3%.It has been observed that the relatively younger African populations account for why cancer tends to occur in younger average African populations relative to the developed world [18,26]. That were life expectancy to improve in African populations, cancer will equally be a disease of the older population as is observed in the developed world [18,26]. In the age range 65years or older, the prevalence of cancer in males 35.1% dominates over the females 11.1%. The significance of this male dominance in this age range is not easily understood in this study. Whether this represents increased incidence of cancer in males in this age range will need to be elucidated in population- based studies, out of scope of this study. Overall more females 50.69% had cancer compared to males 49.31%. Again, the significance of this finding is not immediately understood in this study, population -based studies in this population will explain the observation.

The pattern of cancers observed in this study reflects the trend in many Nigerian and African studies. Cancers known to be associated with a unhealthy lifestyles such as physical inactivity, and western type diet- breast cancer, prostate cancer occupy the top first and second positions, while infection associated cancers such as lymphohematopoietic (some which may be infection related) and cervical cancer are next in hierarchy [2,7,9,18,26]. Cancers of the soft tissue, skin, head and neck, colorectal, eye, hepatobiliary, were the next. Asuquo et al. and Ekanem and Parking had reported that most of the skin cancer in Calabar are AIDS related Kaposi sarcoma [1,27-30]. Elsewhere head and neck cancers are epidemiologically related to alcohol and tobacco intake [31,32]. It needs to be researched further, whether our head and neck cases share such epidemiology because, they seem to be common in Cross River State. Several studies report an increasing incidence of colorectal cancer in Nigeria [33-35], although rates are much lower than in developed countries

Table 2. Frequency distribution of top-10 cancer sites for all ages by gender (N=941)

s/n	All cases		Male cases only		Female cases	
	Organ/tissue site	**n (%)**	**Organ/tissue site**	**n (%)**	**Organ/tissue site**	**n (%)**
1	Breast	206 (21.9)	Prostate	200 (43.1)	Breast	196 (41.1)
2	Prostate	200 (21.3)	Lymphohematopoetic	60 (12.9)	Cervix	76 (15.9)
3	Lymphohematopoetic	87 (9.2)	Soft tissue	53 (11.4)	Skin	28 (5.9)
4	Cervix	76 (8.1)	Head and Neck	31 (6.7)	Lymphohematopoetic	27 (5.7)
5	Soft tissue	75 (8.0)	Skin	23 (5.0)	Soft tissue	22 (4.6)
6	Skin	51 (5.4)	Colorectal	19 (4.1)	Head and Neck	15 (3.1)
7	Head and Neck	46 (4.9)	Hepatobiliary	11 (2.3)	Colorectal	14 (2.9)
8	Colorectal	33 (3.5)	Eye	10 (2.2)	Ovarian	13 (2.7)
9	Eye	21 (2.2)	Breast	10 (2.2)	Uterus	11 (2.3)
10	Hepatobiliary	19 (2.0)	Urinary tract	9 (1.9)	Eye	11 (2.3)
	Unknown primary site	34 (3.6)	Unknown primary site	19 (4.1)	Unknown primary site	15 (3.1)
	Others	93 (9.9)	Others	19 (4.1)	Others	49 (10.4)
	Total	941 (100)	Total	464 (100)	Total	477 (100)

Table 3. Frequency distribution of top cancer sites for 0-17 years age group by gender (n=49)

s/n	All cases		Male cases only		Female cases	
	Organ/tissue site	**n (%)**	**Organ/tissue site**	**n (%)**	**Organ/tissue site**	**n (%)**
1	Lymphohematopoetic	22 (44.9)	Lymphohematopoetic	13 (41.9)	Lymphohematopoetic	9 (50.0)
2	Eye	7 (14.3)	Eye	4 (12.9)	Eye	3 (16.7)
3	Soft tissue	6 (12.2)	Soft tissue	4 (12.9)	Soft tissue	2 (11.1)
4	Urinary tract	4 (8.2)	Urinary tract	3 (9.7)	Urinary tract	1 (5.6)
5	Skin	2 (4.1)	Skin	1 (3.2)	Skin	1 (5.6)
6	Small intestine	1 (2.0)	Small intestine	1 (3.2)	-	-
	Unknown primary site	7 (14.3)	Unknown primary site	5 (16.1)	Unknown primary site	2 (11.1)
	Total	49 (100)	Total	31 (100)	Total	18 (100)

[36,37]. In our state cross sectional studies need to be carried out to find out the trend in colorectal cancer. Hepatobiliary cancers, majority of which are primary liver cell carcinomas were equally found to be high in our study. In Nigeria and Africa this most primary liver cell carcinoma are hepatitis Virus related [38-40], the situation in the rest of Cross River State however has yet to be documented.

By gender, the pattern of cancers reported in this study mirrors the pattern reported in Calabar and most reports from the southern part of Nigeria, with a some variations [1,2,10]. While prostate cancer is the commonest cancer in males in Southern Nigeria, Calabar and perhaps the rest of Cross liver state have the highest age specific incidence rate as reported by Ekanem and Parkin, 52.0 per 100,000 [1]. In the north of Nigeria, bladder cancer tends to be more prevalent than prostate cancer in males [7], or nearly neck and neck with prostate cancer [8]. Lung and stomach cancers which are relatively common in Ibadan and Lagos males are not common in the rest of Cross River [10]. The pattern of top two cancers in females in the rest of Cross River State is similar to most reports from Nigeria. Breast cancer is often the commonest malignancy followed by cervical cancer [2,7,10]. Similarity in cancer sites in the rest of Cross River States was observed between both sexes. Apart from- organs and sites unique to each sex, cancer sites in the lymphohematopoietic, soft tissue, head and neck, skin, colorectal and eye occupy nearly identical positions in ranking in both sexes in our study. The noticeable difference with case referent in Lagos and Ibadan, South -West Nigeria is that, stomach brain, bone and kidney cancer common in the south west were not common in our area [10]. For brain cancer, paucity in our state could be explained by the lack of well-developed neurosurgical centers in the state and the tertiary facilities studied in this report. The difference with reports from the northern Nigeria is that bladder cancer was commoner in northern Nigeria males compared to our males and ovarian cancer is higher in northern Nigerian females compared to our women [7]. The main difference from the rest of the world is that lungs and airway malignancies [41], which are main killers in males in the developed world are not common in the rest of Cross River state, whereas, infection associated cancers such as cervical cancer in females, skin cancer (Kaposi sarcoma), Hepatobiliary (Hepatitis B. Associated liver cancer) in both sexes, are common.

The pattern of childhood cancer observed in our study was similar in both sexes, the lymphohematopoietic sites, majority of which were non-Hodgkin lymphomas dominated. Eye, (mostly retinoblastomas), soft tissue skin and urinary tract followed in that other. This pattern is similar albiet with minor differences with the other zones in the country [13,14]. The main difference being the lack of central nervous system tumours in our study as well as hepatic tumours. For CNS tumours their absence is due to lack of a functional neurosurgery clinic.

5. CONCLUSION

Cancer pattern in the rest of Cross River state is similar to the pattern in Calabar, the capital city of Cross River State as well as the rest of Nigeria and Africa. There are minor differences between Centre's, however. The pattern is different from that observed in developed countries. There is need to establish population -based cancer registration in the rest of Cross River State to facilitate planning. It is equally important to institute population screening for the top cancers such as breast cancer, prostate cancer and cervical cancer.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It was granted by the institutional ethical review board.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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