

Cancer in Cross River State.

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 through filling of a check list and these were fed into IBM statistical package for social sciences SPSS version 21 for analysis.

Results: Nine hundred and forty 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, Breast cancer, Prostate cancer.

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 Ekoï 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

39 2006 population census, is projected to have a population of seven hundred thousand now. It has two
40 local government areas which are adequately covered by the Calabar cancer registry based in the
41 University of Calabar Teaching Hospital. Data from these two local government area was published by
42 Ekanem and Parkin in their "Five years cancer incidence in Calabar"(1).Data from the rest of the sixteen
43 local government areas of Cross River State, not completely covered in the population-based cancer
44 registration, has never been looked at. This work presents the socio-demographical characteristics as
45 well as the topographical analysis of cancers in the rest of Cross River State. Ekanem and Parkin in a
46 2009-2013 review, reported that breast and cervical cancers accounted for 60.4% of cancers in women
47 while, prostate cancer was the commonest in males in the city of Calabar. That Hodgkins Lymphoma was
48 common in both sexes, while moderate amounts of AIDS related cancers(Kaposi sarcoma, Hodgkin
49 lymphoma and squamous cell carcinoma of the conjunctiva) were seen(1).

50 Across the country, population-based cancer registration is limited to less than 5% of the population(2,
51 3).Efforts are currently coordinated between the institutional registries and the Federal ministry of health
52 to improve on the situation(4-6). Data from Ibadan(South west) and Abuja(North central) registries which
53 together with Calabar registry are population-based show that Breast and cervical cancers are the
54 commonest in women while Prostate cancer is the commonest malignancy in males(2).Records from both
55 registries also show a substantial increase in cancer incidence(2).Data from Sokoto, North west Nigeria
56 shows bladder cancers, followed by prostate cancer to be the commonest in males while, breast followed
57 by cervical cancer, were the commonest in females(7).This pattern is almost similar in Kano and Zaria,
58 North west Nigeria(8, 9). An aggregation of data from registries of Ibadan and Lagos-the population hob
59 of south west Nigeria over a five year period show breast cancer 20.2% as the commonest overall,
60 cervical cancer 7.9%,liver 4.4%,almost tied with stomach at 4.3% and brain cancer 3.9% almost tying with
61 pancreas 3.8%(10).From Uyo, South-south Nigeria breast cancer 33%,prostate cancer 25.8%,cervix
62 11.1%,skin 4.9%,sarcoma 4.6% and colorectal 3.8%were the common tumours in that order(11).From the
63 south east Nigeria liver cancer was identified as the commonest cause of cancer death(40.8%) in a
64 medical ward(12),and younger and middle age groups were the most affected(12).The pattern of
65 childhood cancer in Nigeria appears to be similar with some minor variations in the different zones; for
66 instance Lymphomas 22.4%(90% Burkitts),retinoblastoma 21%,Soft tissue sarcoma 14.9%,Leukaemias
67 10.2%,CNS tumours 6.9% in the West (13),and Lymphomas 46.5%(Burkitts 30.1%),NHL(Non Burkitt's
68 9.8%),Retinoblastoma 15.2%,Acute Leukaemias 14.1%,CNS and hepatic tumours 4.3% in Northern
69 Nigeria(14).Also from the South-South, a similar childhood pattern of cancers was reported(15).

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

82 The global burden of cancer was reviewed in a 2018 publication by Fitzmaurice et al, they reported that
83 cancer cases increased by 28% between 2006 and 2016(22).That in males the most common incident
84 cancer is prostate cancer while tracheal, bronchus and lung were the commonest cause of cancer death,
85 and in females the most common incident cancer and the leading cause of cancer death is breast
86 cancer(22).Lung cancer is not as common in Nigeria as is seen in the developed world(1, 4, 22). Infection
87 related cancers such as liver cancer and the AIDS associated, cancers such as Kaposi sarcoma have a
88 strong showing(2, 23). While Nigeria shares a high burden of Hepatitis B related liver cancer with some
89 developing countries like Pakistan,it differs from it, because Pakistan equally has a high lung cancer
90 incidence, not observed in Nigeria..(24).This may be related to differences in tobacco consumption in the
91 two countries. The global surveillance of trends in cancer survival 2000-2014(CONCORD-3),analyzed

92 data from 70 countries, 48 these countries with 100% population cancer registration coverage, and found
 93 differences between developed and developing nations(25).They recommended that Governments
 94 worldwide should utilize population based cancer surveys as tools for health planning(25).

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

104 **RESULTS:**

105 Nine hundred and forty-one (941) cases of cancer were seen outside Calabar in Cross River State, within
 106 January 2004 and December 2013. Mean age was 49.18 ± 18.9 years, ranging from 1 to 100 years, and
 107 female: male ratio was 1: 0.97. Overall, the commonest age group was 40 to 64 years (46.3%), followed
 108 by 18 to 39 years (25.5%), and 65 years or greater (23.0%) (table 1). Among males, the commonest age
 109 group was 40 to 64 years (40.1%) followed by 65 years or greater (35.1%). Among females, the
 110 commonest age group was also 40 to 64 years (52.4%) but followed by 18 to 39 years (32.7%).
 111 Significantly higher proportion of females compared with males was less than 40 years old (36.5% vs.
 112 24.8%), while males were more commonly 65 years or older compared with females (75.2% vs. 63.5%,
 113 p=0.00).

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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 Exact 0.00
5-12.	14 (3.0)	7 (1.5)	21 (2.2)	
13-17	7 (1.5)	5 (1.0)	12 (1.3)	
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)	

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116 Considering both sexes for all ages, the common sites for cancer were breast (21.9%), prostate (21.3%),
 117 and lymphohematopoetic tissue (9.2%) (table 2). Other less common sites were cervix (8.1%), soft tissue
 118 (8.0%), skin (5.4%), and head and neck (4.9%). Among males, common sites for cancer were prostate
 119 (43.1%), lymphohematopoetic tissue (12.9%), and soft tissue (11.4%). Other sites were head and neck
 120 (6.7%), skin (5.0%), and colorectal (4.1%). Among females, common sites were breast (41.1%), cervix
 121 (15.9%), and skin (5.9%). Other less common sites were lymphohematopoetic (5.7%), soft tissue (4.6%),
 122 and head and neck (3.1%).

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)

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125 Among both sexes within 0-17 years old, the common sites for cancer were lymphohematopoetic tissue
 126 (44.9%), eye (14.3%), and soft tissue (12.2%) (table 3). These were also the common sites for cancer
 127 among males and females within 0-17 years old.

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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)

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131 **DISCUSSIONS:** The mean age of cancer diagnosis in the rest of Cross River State (49.18) is similar to
 132 Calabar, the population -based cancer registration area of Cross River State(43.6 in female and in males
 133 52.3(1)).Cancer tends to occur relatively early as seen in the 18 to 39 age range that accounted for the
 134 second highest frequency of 25.5%.This too is similar in Calabar where cancer onset begins early at the
 135 20-24 age range rises steadily and peaks at the 5th decade(1).Cancer is commoner in females in the 18 to
 136 39 age group 37.2% to 18.1% males in the rest of Cross River State. Equally in the 40 to 64 age range,
 137 more females 52.4% than males 40.1% were affected, this age range had the highest prevalence rate of
 138 46.3%.It has been observed that the relatively younger African populations account for why cancer tends
 139 to occur in younger average African populations relative to the developed world(18, 26). That were life
 140 expectancy to improve in African populations, cancer will equally be a disease of the older population as
 141 is observed in the developed world(18, 26). In the age range 65years or older, the prevalence of cancer in
 142 males 35.1% dominates over the females 11.1%. The significance of this male dominance in this age

143 range is not easily understood in this study. Whether this represents increased incidence of cancer in
144 males in this age range will need to be elucidated in population- based studies, out of scope of this study.
145 Overall more females 50.69% had cancer compared to males 49.31%. Again, the significance of this
146 finding is not immediately understood in this study, population -based studies in this population will
147 explain the observation.

148 The pattern of cancers observed in this study reflects the trend in many Nigerian and African studies.
149 Cancers known to be associated with a unhealthy lifestyles such as physical inactivity, and western type
150 diet- breast cancer, prostate cancer occupy the top first and second positions, while infection associated
151 cancers such as lymphohematopoietic (some which may be infection related) and cervical cancer are
152 next in hierarchy.(2, 7, 9, 18, 26).Cancers of the soft tissue, skin, head and neck, colorectal ,eye,
153 hepatobiliary, were the next. Asuquo et al and Ekanem and Parking had reported that most of the skin
154 cancer in Calabar are AIDS related Kaposi sarcoma(1, 27-30).Elsewhere head and neck cancers are
155 epidemiologically related to alcohol and tobacco intake(31, 32). It needs to be researched further,
156 whether our head and neck cases share such epidemiology because, they seem to be common in Cross
157 River State. Several studies report an increasing incidence of colorectal cancer in Nigeria(33-35),although
158 rates are much lower than in developed countries(36, 37).In our state cross sectional studies need to be
159 carried out to find out the trend in colorectal cancer. Hepatobiliary cancers, majority of which are primary
160 liver cell carcinomas were equally found to be high in our study. In Nigeria and Africa this most primary
161 liver cell carcinoma are hepatitis Virus related(38-40),the situation in the rest of Cross River State
162 however has yet to be documented.

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

184 The pattern of childhood cancer observed in our study was similar in both sexes, the
185 lymphohematopoietic sites, majority of which were non-Hodgkin lymphomas dominated. Eye, (mostly
186 retinoblastomas), soft tissue skin and urinary tract followed in that other. This pattern is similar albiet with
187 minor differences with the other zones in the country(13, 14).The main difference being the lack of central

188 nervous system tumours in our study as well as hepatic tumours. For CNS tumours their absence is due
189 to lack of a functional neurosurgery clinic.

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

196

197 **COMPETING INTEREST:** The authors declare no competing interest in this work.

198 **CONSENT:** No consent was required for this work.

199 **ETHICAL APPROVAL:** Was granted by the institutional ethical review board.

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299

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