CANCER INCIDENCE IN THE NIGER DELTA REGION OF NIGERIA; A POPULATION BASED REVIEW OF PORT HARCOURT CANCER REGISTRY

***[1]Christopher C Obiorah, [2]Babatope B Osagbemiro, [3]Nwadiuto A Akani**
[1]Department of Anatomical Pathology and Cancer Registry Unit, University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria.
[2]Department of Preventive Dentistry, University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria.
[3]Paediatric Oncology Unit, University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria.
***Corresponding author:** Dr Christopher Obiorah
Email: christopher.obiorah@uniport.edu.ng

ABSTRACT

Background: *Cancer poses growing threat to public health in Nigeria.*

Aim*: To present the first population based cancer incidence data in the two most populous local government areas of Rivers state.*

Methodology: *Ten years review of Port Harcourt cancer registry data.*

Results: *Of the 2,682 cancers recorded, 1,191 (44.4%) were males and 1,491 (55.6%) were females. The overall age range and mean age for males and females combined were 1 - 125 years and 51.9± 17.7 respectively. While the mean and peak ages for males only were 57.6± 19.1 and 70 - 74 years, those of females were 47.3± 15 and 40 - 44 years respectively. Seventy three percent of patients less than 45 years were females while 54.5% of patients older than 45 years were males. The age standardized incidence rates/100,000 (ASR) ranged between 28 in 2014 and 101.5 in 2017 with annual mean of 52.5. The five commonest cancer sites were - breast - (29%), prostate (25.2%), cervix - (6.6%), colorectal - (5.4%) and blood (leukaemia) - (4.3%). The bases of diagnoses were: Histology: (71.7%), cytology: (21.2%) clinical impression: (5.3%), autopsy/death certificate review finding: (1.8%).*

Conclusion: *Cancer incidence is increasing in our locality without commensurate efforts at controlling it. More females are involved and they present at younger ages compared to males. Breast and prostate are by far the commonest cancer sites observed. Government and donor agencies should support cancer registration efforts in order to optimize generation of quality population-based data that is necessary for cancer control.*

Key Words: *Cancer, Registry, Population, Port Harcourt, Rivers State.*

INTRODUCTION

Cancer poses growing threat to public health in sub-Saharan Africa (SSA). According to GLOBOCAN, cancer incidence increased from 12.7 million in 2008 to 14.1 million in 2012 with the associated mortality also increasing from 7.6 to 8.2 million, of which 56% occurred in developing countries, including Nigeria [1, 2]. Owing to population growth and increased life expectancy, reduced mortality from infectious diseases, increasing prevalence of smoking, physical inactivity, obesity as well as changing dietary and lifestyle patterns, it is projected that 70% of all new cancer cases will be found in developing countries by 2030 [1,3,4].

In recent times, information on cancer incidence, prevalence and mortality in Nigeria generally and Port Harcourt in particular have been based on estimates from reviews of case series, medical records, mortality records and hospital based cancer registries but no population based publication with robust and encompassing data has so far emanated from an organized cancer registry in Rivers state. This is more so considering the globally acclaimed hydrocarbon pollution of many communities in the state; sequel to the poorly regulated oil and gas operations in the Niger Delta region, of which Rivers state is the epicentre [5].

Since 2007 when proper organization, coordination and productivity of Port Harcourt cancer registry commenced, the registry has gone through internal and external audits and participated in different national and international collaborative studies that have strengthened and standardised the activities and documentation of data in the registry. This is in line with the recommendations of the Nigerian National System of Cancer Registries (NSCR), African Cancer Registries Net Work (AFCRN) as well as the international agency for research on cancer (IARC)[6,7]. With the assistance from the Federal Ministry of Health (FMOH) of Nigeria and the Institute of Human Virology Nigeria (IHVN), the staff and director of the registry have benefitted from series of trainings, mentoring and provision of computer hardware and software. Data is sent annually to the IHVN and the FMOH but in-house analysis have not been done.

With the analysed population based data, this paper presents credible information on the incidence and pattern of reported cancer cases in the two most populous local government areas of Rivers state, Nigeria. It is hoped that the information gives an insight on the cancer burden in Rivers state and provides a framework for the initiation and monitoring of effective cancer control programme in the state.

MATERIALS AND METHODS

Study site: Port Harcourt Cancer Registry (PHCR) – population based registry covering Port Harcourt City and Obio Akpor local government areas of Rivers state, Nigeria. PHCR operates as a unit in the University of Port Harcourt Teaching Hospital (UPTH).

Study population: The denominator population is composed of Port Harcourt City and Obio Akpor local government areas. The two local government areas are upland by topography, together constitute the geographic capital of Rivers state and have mixed rural and urban settlement patterns. They are the most populous with a joint

population of 1,000,908 (19.3% of Rivers state population) in the 2006 national census [10]. These local governments host the seat of government and maintain the nucleus of specialized medical care in the state.

Data collection: PHCR is population based registry that employs active data gathering technique. Cancer cases are generally defined by histology, cytology and haematology smear reports as well as patients' physical examination findings, clinical impressions and autopsy/death certificate review findings. Data is collected actively by routine, scheduled visitation of notification centres by cancer registrar(s). The notification centres include: out-patients' departments and wards of both government and privately owned and operated hospitals noted for the diagnoses and treatment of cancer patients in the denominator population. Also major private pathology and radio diagnostic centres operating in the two local government areas of interest constitute data sources. Death certificates of bodies deposited in UPTH mortuary are intermittently reviewed as well. At notification centres, registrar(s) document reported cases onto the FMOH-issued register. Back in the office, the cases are later classified, coded and transcribed into electronic format stored in IHVN-issued Canreg 4 software, with hard drive back up. The International Classification of Disease for Oncology, 3rd Edition (ICD-O3) is used for the classification and coding of cases [8]. As much as possible completeness of case identification and prevention of duplication were ensured through regular visits to case notification centres and reviews of the electronic data.

Study Design: This is a retrospective review of PHCR data, from January 2007 to December 2017. Information sought for were: dates of incidence, patients' "usual" place of domicile, gender, age, topography, morphology of the lesion and degree of differentiation. Population projection for the years of study (2008 – 2017) was made from the 2006 national census figures, by officials of the National Population Commission.

Data Analysis: Data were analysed using the IBM Statistical Package for Social Sciences version 20.0 (IBM SPSS Statistics, Armonk New York). Analysed data were presented in the form of frequency tables, charts, and cross tabulations. The age standardised rates per 100 000 (ASRs) for each age group for all cancers in men and women were computed from the age specific incidence rate for each age group. The age specific incidence rate was first calculated by dividing the number of reported cancers in an age group by the specific denominator population of that age bracket and multiplied by 100,000. Age standardized rates (ASR) which is weighted average of the age specific rate were then calculated directly from the age specific rate by multiplying the latter by the applicable age-matched WHO age standardization figures [9]. Mean ASR was calculated by summing the annual ASR and dividing same by the number of years of study. The mean ages at diagnoses and their standard deviations were also computed. Results were expressed in frequency and percentages for the categorical variables (age groups, sex, types of cancer). Categorical variables were compared using the Chi-square (χ^2) test with Fisher's exact correction. Statistical significance was set at $P < 0.05$.

Ethical Approval: Approval for the study was given by the Research ethics committee of UPTH.

RESULTS

A total of 2682 cancers were recorded; 1191 (44.4%) males and 1491 (55.6%) females, giving a male: female ratio of 0.8:1. The overall age range and mean (SD) for both sexes were 1 - 125 years and 51.9 (17.7) respectively. The annual mean ages ranged between 46.8 years and 53.7 years. - Figure 1. The peak incidence for males and females combined was at 60 - 64 years with 293 patients (10.9%) and least at 5 - 9 years with 18 patients (0.7%). Children and young adolescents aged 0-19 years constituted 100 cases (3.7%) with a mean (SD) age of 8.2 (6.14) years. - Table 1. The mean (SD) and peak ages for cancers among males were 57.6 (19.1) and 70 - 74 years; for females, they were - 47.3 (15) and 40 - 44 years. Among patients below 45 years, only 264 (23%) were males while 716 (73%) were females, while among patients 45 years and above, there were 927 (54.5%) males and 775 (45.5%) females.

The annual Age Standardized Rate (ASR) ranged between 101.49/100,000 persons in 2017 and 27.95/100,000 in 2014, the mean was 52.5. The overall trend was undulating but skewed upwards. For males only, the annual ASR ranged between 22.2 - 96.4/100,000 with a mean of 49.9. The peak ASR was 101.1/100,000 for 65 - 69 years. For females, it ranged between 26.3 - 113.1/100,000 with mean of 54.5. The peak age group was 60 - 64 years with ASR of 105/100,000) The extremes of age (0-4 and 85 yrs) had the least incidence (ASR of 2.1 and 5.8 respectively). Table 2

Overall, the most common cancer sites are as follows: breast - 777 (29%), prostate - 676 (25.2%), cervix - 177 (6.6%), colorectal - 146 (5.4%) and leukaemia - 115 (4.3%). These five cancers represent 70.5% of the incidence burden of cancers in our locality. For males, the five commonest cancers in descending order were: prostate 56.8%, colorectal - 6.5%, leukaemia - 4.7%, lymphomas - 4.5%, and breast 3% while for females, they include: breast - 49.7%, cervix - 11.9%, ovary - 5.8%, colorectal - 4.6%, and leukaemia - 4%. Table 3.

For males older than 45 years, the five commonest cancer sites were: prostate - 658 cases (71%), colorectal 52 cases - (5.6%), lymphoma 33 (3.6%), breast cancers - 25 cases (2.7%) and leukaemia - 19 cases (2%). For those younger than 45 years, they were: leukaemia - 37 cases (14%), colorectal - 25 (9.5%), lymphoma - 20 (7.6%), head and neck cancers - 19 cases (7.2%) and all skin cancers and prostate cancers each recording similar rates of 18 cases (6.8%). For females older than 45 years, the five most common cancer sites were: breast - 329 (42.5%), cervix - 133 (17.2%), ovary - 52 (6.7%), colorectal - 46 (5.9%), and endometrium - 26 (3.4%). For females of 45 years and below, the order was: breast - 412 (57.5%), cervix - 44 (6.1%), ovary - 35 (4.9%), leukaemia - 32 (4.5%), colorectal - 23 (3.2%).

For children and adolescents, male female ratio was 61:39 and the five most common cancers were Leukaemia – 26 cases (26.0%), nephroblastoma– 20 cases (20%), sarcomas of the musculoskeletal system – (17%), lymphomas – 12 cases (12%) and retinoblastoma – 8 cases (8%).

Histology was the most frequent bases of case diagnoses with 1923 cases (71.7%), followed by cytology with 569 cases (21.2%) and clinical impression with 142 cases (5.3%). Other means of cancer diagnosis including autopsy and death certificate review finding, constituted only 48 cases (1.8%). Figure 2

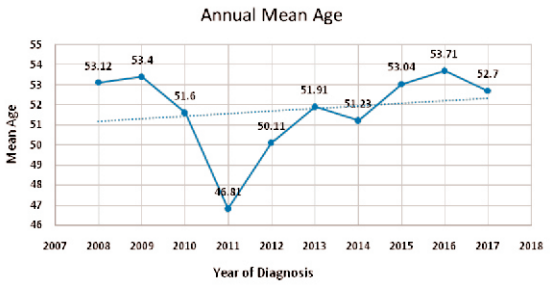

Figure 1: Distribution of Annual Mean Age

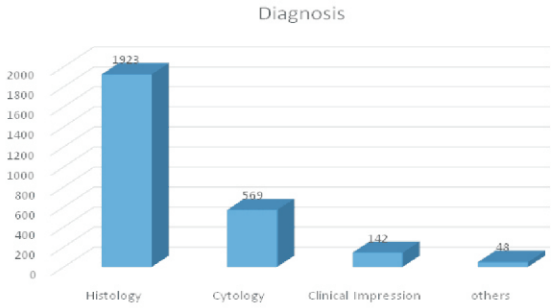

Figure 2: Methods of diagnoses

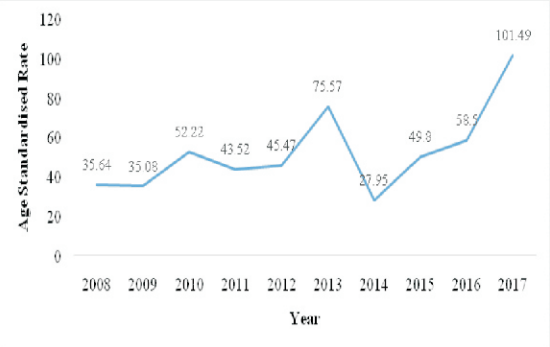

Figure 3: Distribution of age standardized incidence rates.

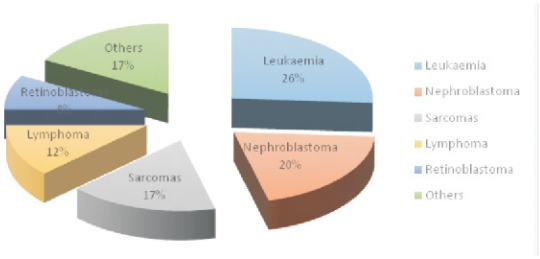

Figure 4: Distribution of common cancers among children and adolescence.

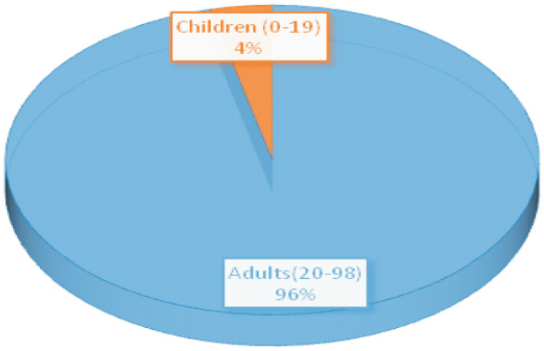

Figure 5: Distribution of cancer in children and adults.

Table1. Age and gender distribution of cancers.

	Gender of patients		Total	Chi-square, P-value
	Female	Male		
	N (%)	N (%)	N (%)	
Age groups(years)				
0-45	716 (73.0)	264 (27.0)	980 (36.5)	190.88, 0.000
>45	775 (45.5)	927 (54.5)	1702 (63.5)	
Age groups(years)				
0-4	15 (1.0)	27 (2.3)	42 (1.6)	
5-9	6 (0.4)	12 (1.0)	18 (0.7)	
10-14	8 (0.5)	12 (1.0)	20 (0.7)	
15-19	10 (0.7)	10 (0.8)	20 (0.7)	
20-24	26 (1.7)	14 (1.2)	40 (1.5)	
25-29	76 (5.1)	32 (2.7)	108 (4.0)	
30-34	156 (10.5)	45 (3.8)	201 (7.5)	
35-39	168 (11.3)	40 (3.4)	208 (7.8)	
40-44	195 (13.1)	56 (4.7)	251 (9.4)	446.36, 0.000
45-49	170 (11.4)	60 (5.0)	230 (8.6)	
50-54	175 (11.7)	110 (9.2)	285 (10.6)	
55-59	143 (9.6)	112 (9.4)	255 (9.5)	
60-64	146 (9.8)	147 (12.3)	293 (10.9)	
65-69	90 (6.0)	156 (13.1)	246 (9.2)	
70-74	59 (4.0)	163 (13.7)	222 (8.3)	
75-79	19 (1.3)	106 (8.9)	125 (4.7)	
80-84	15 (1.0)	56 (4.7)	71 (2.6)	
85+	14 (0.9)	33 (2.8)	47 (1.8)	
Total	**1491 (44.4)**	**1191 (55.6)**	**2682(100.0)**	

Table 2a. Distribution of age standardized incidence rate for 0-44 years.

	Age Standardized Rate								
Age/ Years	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44
2008	0.15	0.08	0.00	0.15	0.30	0.54	0.79	1.02	0.50
2009	0.14	0.15	0.00	0.14	0.17	0.23	0.46	0.89	1.56
2010	0.14	0.00	0.07	0.14	0.23	0.96	1.56	1.62	2.56
2011	0.47	0.36	0.07	0.26	0.22	0.71	1.44	2.96	2.37
2012	0.32	0.28	0.27	0.13	0.11	0.37	2.03	1.88	1.75
2013	0.13	0.07	0.27	0.19	0.36	0.77	2.44	2.52	4.76
2014	0.30	0.07	0.00	0.00	0.00	0.60	0.85	0.93	0.82
2015	0.29	0.00	0.12	0.12	0.10	0.24	1.08	1.39	2.48
2016	0.40	0.00	0.00	0.00	0.14	0.09	0.92	1.34	3.85
2017	0.28	0.24	0.47	0.16	0.45	1.09	2.03	3.45	5.32
Total	**2.61**	**1.24**	**1.28**	**1.28**	**2.07**	**5.61**	**13.62**	**18.00**	**25.96**

Table 2b. Distribution of age standardized incidence rate for >45.

Age Standardized Rate										
Age/ Years	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	Total
2008	0.61	2.75	2.83	5.94	6.87	4.93	7.27	0.56	0.37	**35.64**
2009	1.61	3.37	3.02	3.74	7.91	5.97	4.53	0.82	0.36	**35.08**
2010	2.56	3.79	6.91	5.58	13.31	5.79	4.39	2.11	0.52	**52.22**
2011	3.99	4.17	5.15	4.60	7.42	5.23	1.89	1.53	0.67	**43.52**
2012	1.87	3.23	3.99	7.86	8.71	6.88	3.66	1.49	0.65	**45.47**
2013	3.49	5.95	11.36	11.42	10.27	10.18	7.10	3.36	0.94	**75.57**
2014	1.13	2.58	2.81	5.41	5.69	2.72	2.58	1.16	0.30	**27.95**
2015	3.16	3.68	6.58	6.67	8.27	8.57	5.41	0.90	0.74	**49.80**
2016	4.24	6.41	6.82	7.16	7.01	10.86	6.86	1.97	0.43	**58.50**
2017	6.39	8.15	11.29	14.99	15.20	15.47	11.34	2.96	2.21	**101.49**
Total	**29.04**	**44.08**	**60.74**	**73.36**	**90.65**	**76.61**	**55.02**	**16.87**	**7.18**	**525.24**

Table 3- Gender and topographic distribution of cancers.

Primary Site of Tumour	Gender of Patient		Total	Chi-square, P-value
	Female	Male		
	N (%)	N (%)	N (%)	
Colorectal	69 (4.6)	77 (6.5)	146 (5.4)	
Leukemia	59 (4.0)	56 (4.7)	115 (4.3)	1569.50,
Breast	741 (49.7)	36 (3.0)	777 (29.0)	
Lymphoma	39 (2.6)	53 (4.5)	92 (3.4)	0.000
Cervix	177 (11.9)	0 (0.0)	177 (6.6)	
Ovary	87 (5.8)	0 (0.0)	87 (3.2)	
Prostate	0 (0.0)	676 (56.8)	676 (25.2)	
Others	319 (21.4)	293 (24.6)	612 (22.8)	
Total	**1491(100.0)**	**1191 (100.0)**	**2682 (100.0)**	

DISCUSSION

The Niger Delta region of Nigeria is strongly associated with oil and gas exploration and production activities. This is in turn associated with decades of hydrocarbon environmental pollution. In view of the potential carcinogenic nature of hydrocarbon pollutants, deciphering and documenting population based cancer burden in the two most populous local government areas of Rivers state, which is the epicentre of the Niger Delta region is imperative. This study has also obviated the single institutional based, scope-limiting protocol of few cancer-related studies ever conducted in Rivers state.

Although the mean ASR in this study was 52.5/100,000, 2017 recorded the highest rate of 101/100,000. This peak ASR underscores the high incidence rate of cancer in our catchment local government areas. Most studies with high cancer incidence such as ours attributed the high rate to increased number of aged persons in the population [11]. Besides, studies have noted that biologic mechanisms that regulate aging propel cancer [12 - 14]. However, the attribution of high cancer incidence to growth and aging of the population is unlikely to apply to our patients, considering the structure of our denominator population. The last official national census figures in Nigeria showed that the population structure of our denominator local governments - Port Harcourt City and Obio/Akpor was significantly predominated by adolescents and young adults, with persons who were within the age bracket of 20 - 24 years constituting the peak followed by those within 25 -29 years. Overall, persons aged below 45 years constituted 87% of the population while those aged 45 years and above constituted 13% [10]. In order words, the observed high incidence rate is not because of an overall increase in the population of aged persons. Rather it is more plausible that other risk factors such as environmental influences may account for the alluded high incidence of cancer. It is documented by the United Nations Environment Programme

(UNEP) investigation report that farm lands and portable drinking water sources of some of the coverage areas of our registry are highly polluted with hydrocarbon contaminants as a result of decades of poorly regulated oil and gas activities in the Niger Delta region [5].

Further population based epidemiologic studies that will evaluate health impacts of hydrocarbon polluted areas in Rivers state especially determining the relative risk of cancer development is imperative.

The overall predominance of females among cancer patients in this review is similar to the review reports of other notable population based cancer registries in Nigeria, including Nnewi Cancer Registry (NCR) located in the South Eastern region of Nigeria, Ibadan (IBCR) located in South Western region and Abuja (ABCR) located in North central region, thus suggesting that there is an overall preponderance of females in cancer incidence in Nigeria [15,16]. On the contrary global studies show overall preponderance of males in cancer incidence [17 - 20]. Previous researchers attributed the female predominance in cancer burden in Nigeria to the relative ease of diagnosis and more specific symptoms of common female cancers compared with those in men, more frequent contact with the health care system by women due to uptake of maternal/child health care services, greater population awareness of breast and cervical cancers and the generally better health-seeking behaviour of women compared to men [21]. However among children and adolescent patients, there was a reversal of gender ratio as there were more males compared with females – 1.6:1. The reason for the involvement of more males in this age category is not certain but is in keeping with global trends of predominance of cancers among males. Such skew will likely extend to older age groups in the future as the young ones age.

The 51.9 years mean age at diagnosis of cancer among our patients generally is comparable with the 49.9 and 51.1 years reported for ABCR and IBCR respectively. However, these overall mean ages for cancer diagnoses are low compared with figures from Western countries.

While the mean and peak ages of men were 57.6 and 70 - 74 years, those of women were 47.3 and 40 - 44 years, clearly showing that on the average, cancers are diagnosed a decade earlier and peak two decades earlier among women than men among our cohort. Although other registries across Nigeria reported similar trend of earlier onset of cancer among women than men, none reported gap in the difference of mean ages between men and women as wide as 10 years seen in this study. To our knowledge, the next highest discrepancy of 5.8 years was reported by NCR. Besides, the proportion of female patients aged less than 45 years is about thrice that of males of the same age range - (73% vs. 27%) while for patients 45 years and above, there was predominance of males - (54.5% vs 45.5%).This further alludes to the early onset of cancers among our female patients and further suggests that significant proportion of our women is interrupted by cancer at the peak of their productive lives with devastating consequences on families and the society. Also, the observed disparity may reflect the differences in cancer profiles in the different

environments, especially ours with decades of environmental hydrocarbon pollution. More specific epidemiological surveys need to be carried out in our environment to further probe the cancer profile of our environment.

For both males and females, the commonest five cancers are breast - 29%, prostate - 25.2%, cervix -6.6%), colorectal - 5.4% and leukaemia - 4.3%. The first four in descending order are similar to the report from the NCR, except that the fifth in Nnewi was liver while ours was leukaemia. Although the proportion of occurrence differs while breast and prostate cancer occurred in higher proportion in UPTH, cervical and colorectal on the contrary occurred in a higher proportion in Nnewi registry. Compared to the GLOBOCON global data, the two most common cancers for both males and females are lungs and breast. Relatively, lung cancer is not common in our environment, despite the fact that smoking is common [29]. It is possible that under-diagnosis and under-reportage partly account for the perceived low incidence of lung cancer [29]. The latter may be ascribed to dearth of lung biopsies following inadequacy of experienced man power and poor supportive technical infrastructure generally in Nigeria. For males only, the five commonest invasive cancers: were - prostate - 56.8%, colorectal - 6.5%, leukaemia - 4.7%, lymphomas - 4.5%, and breast 3%. Compared to the findings from other cancer registries across Nigeria, there is no consistency of order of occurrence especially among the males, except for prostate cancer which was the commonest in all registries (available to us) as the commonest male cancer. This differing order of common cancers may be a reflection of the variation of cancer profile across different geographic boundaries within Nigeria and may underscore the impact of environmental factors in the profile of cancers as well as highlight the need to tailor cancer control and prevention programmes to specific local needs. For females only, breast cancer was the commonest. Constituting - 49.7%, followed by cervix - 11.9%, ovary - 5.8%, colorectal - 4.6%, and leukaemia - 4.1%. However, contrary to the inconsistent order among males, there is relative consistency among the 4 commonest cancers in females across notable Nigerian registries referenced in this work, including ours. They are: breast, cervix and ovary and colorectal. This consistency is important because it is helpful for proposing and executing cancer control and prevention programmes on a national level. However, our local order is partially inconsistent with the overall female global order of: breast, colorectum, lungs cervix and stomach. The continued rise in breast cancer among women in Nigeria may not be unrelated to improved diagnosis, better case finding and improved access to healthcare as well as increasing prevalence of risk factors for this cancer [21, 22]. This calls to question opinions that African countries including Nigeria are low incidence region for breast cancer [17,23,24]. Public health measures aimed at reducing some potential modifiable risk factors of breast cancer like: encouraging multiparity, breast feeding, weight control, use of menopausal hormone therapy (combined estrogens and progestin), physical activity, and minimizing alcohol consumption are advocated [25,26].

While prostate cancer (CaP) is the second most frequently diagnosed cancer among men world-wide, across registries in Nigeria,

including ours it is the commonest male cancer. Specifically in our case, it constituted as much as 56.8% of male cancers, well above the range of 21.7% - 35.4% recorded in the other registries. The mean annual ASR for CaP of 36.2/100,000 is lower than the 89/100,000 reported by the Calabar cancer registry but higher than the 17.4 and 25.8 per 100,000 reported by Ibadan and Abuja registries respectively. This high incidence of CaP is comparable to what obtains in the high incidence developed countries like, Australia, North America and some Caribbean nations like Jamaica [17]. Although good uptake of PSA screening is largely responsible for the high incidence in the developed countries, such screening does not have good patronage by residents of our locality, thus making it more likely that the actual incidence of CaP in our environment is more than what was reported.

That histology of primary tumours was by far the most frequent basis of diagnosis in our registry reflects the method of data gathering which is largely dependent on use of pathology laboratories within and outside of the teaching hospital. It also denotes high accuracy of diagnoses of cases as histologic diagnosis is definitive [27]. It is also arguable that there is good validity in our practice with the 71% histology basis of diagnosis despite the opinion that histological verification of less than 80% means poor validity [28]. That cytology and clinical impressions constituted 21.2% and 5.3 % respectively while autopsy and death certificate review constituted 1.8% suggests completeness of case registrations. However, compared to other local centres, the proportion of histologically diagnosed cases was highest in our case followed by ABCR while the proportion of the cytologically and clinically diagnosed cases fall within the range of reports from other centres.

Limitations: The non presentation of some patients on account of poverty and non affordability of hospital bills, makes under reportage more likely in this work. Also the inconsistent documentation of patient information in the various hospitals makes missing out on some cases possible and finally the lack of dedicated staff and regular logistic support to the registry makes consistency of data gathering porous.

CONCLUSION

Incidence of cancer in our registry is higher among females than males, contrary to global finding. Also females are diagnosed with cancers about a decade earlier than males. Overall mean age at diagnoses of cancer is earlier than what obtains among the developed nations. The five commonest cancers are breast, prostate, cervix, colorectal and leukaemia. Histology as the predominant basis of diagnosis is supplemented by cytology, clinical and autopsy/death certificate review. Since cancer is mostly age related and our population structure is bottom-heavy, it is logical to suggest that other risk factors like environmental pollution should be given due consideration among our patients. Public health measures aimed at encouraging the public to adopt primary and secondary cancer preventive measures against breast and prostate cancer in our environment need to be urgently instituted by government and supportive donor agencies.

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