Pattern of Cancer in Irrua Specialist Teaching Hospital

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Authors' contributions

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ABSTRACT

Aims: To reveal the pattern and trend of cancer in a predominantly rural population in Nigeria and compare the findings with those of earlier researches across the world.
Study Design: A descriptive retrospective analysis of all cancer cases seen among surgical specimens in Irrua Specialist Teaching Hospital. The cancer cases are classified according to the organ/tissue involved and the data obtained were analysed using SPSS (version 25).
Place and Duration of Study: The Department of Anatomic Pathology, Irrua Specialist Teaching Hospital, Nigeria; between January 2011 and December 2020.
Results: A total of 9,058 histologic samples were reviewed out of which 1,474 (16.27%) were cancer cases. The yearly number of cancer cases increased from 85 in 2011, to 258 over the next 10-year study period. At variance with WHO 2020 GLOBOCAN worldwide estimates, the common

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cancer types seen in this study (both sexes combined) were prostate cancer, breast cancer, cervical cancer, colorectal cancer and non-melanoma skin cancer, in decreasing frequencies. The peak age of occurrence was the 7th decade while the mean age was 54.21 years, and the gender-specific mean ages for males and females were 59.92 years and 49.44 years respectively. The male to female ratio was 1:1.2 and males are more likely to be diagnosed of cancer approximately 10 years later than their female counterparts.

Conclusion: Many of the findings in this study are similar to those of previous researches across the country. It is our hope that the findings in this study would contribute to national data and be found useful in efforts to build a more inclusive and robust national system of cancer registration.

1. INTRODUCTION

Cancer is a group of diseases resulting from uncontrolled growth of abnormal cells which can spread to any part of the body in an obstinate manner causing extensive tissue damage and death of the individual if not detected early and controlled [1,2]. It is rapidly growing in incidence and mortality worldwide; a reflection of both aging and growth of the population as well as the changes in the prevalence and distribution of the main risk factors for its development [3,4]. In 2020 alone, there was an estimated 19.3 million new cases of cancer and almost 10 million cancer-associated deaths, making it a very important cause of morbidity and mortality in every world region irrespective of the level of human development [5]. Worldwide, female breast cancer is now the most commonly diagnosed cancer, with an estimated 2.3 million new cases (11.7% of the total cases) in GLOBOCAN 2020 estimates [5,6]. This is closely followed by lung cancer (11.4%, formerly the most common), colorectal cancer (10.0%), prostate cancer (7.3%) and stomach cancer (5.6%) [5].

There are regional variations in cancer incidence and mortality across continents, world regions, countries, and within each county with some cancers being more common in some parts of the globe [7]. In Sub-Saharan Africa (SSA) region, even though the morbidity and mortality from communicable diseases remain considerable, there is a relative proportion of health burden due to cancer [7]. In Nigeria, available evidences show a continuous rise in the number of cancer cases, however there is still poor government and private funding of the subnational population-based cancer registries (PBCRs) scattered around the country, making it difficult for the relevant agencies of the World Health Organisation (WHO) to use the registries as sources for high quality data [8,9]. Therefore, the hospital records for cancer cases available in tertiary institutions, especially in their surgical pathology units where the cases are histologically confirmed, come in handy for extrapolation into national figures that can be used to guide policy makers. Hence, our aim is to look at the pattern of cancer occurrence in the area served by Irrua Specialist Teaching Hospital (ISTH) in Nigeria.

2. MATERIALS AND METHODS

This is a 10-year (2011-2020) descriptive retrospective analysis of all histologically confirmed cancer cases in ISTH, one of the two federal teaching hospitals in Edo State of Nigeria. It is a 375 bedded hospital, popular for being the centre of excellence for the diagnosis, management, and control of viral haemorrhagic fever (with special reference to Lassa fever) in Nigeria and the West African subregion. The hospital is located in Irrua town in Edo Central Senatorial District which, together with the Edo North Senatorial District, is the primary area it serves as the only tertiary referral centre to all the primary and secondary healthcare facilities (government or privately owned) in the region. It also serves as a referral centre to similar healthcare facilities in parts of neighbouring Kogi State, Delta State and Ondo State.

Data of reported primary (invasive and non-invasive) cancer cases were retrieved from histopathological records in the surgical unit of the Department of Anatomic Pathology in the hospital. The collected data include the involved organ/tissue, and the age and gender of the patients. All the cancer cases obtained were then grouped according to their anatomical sites (i.e., organ/tissue affected) in line with the classification, and modification for colorectal cancer, used by the International Agency for Research on Cancer (I.A.R.C.) in the GLOBOCAN estimates [5,6]. However, we made

small intestinal cancer a separate entity; this was not mentioned in the above modified classification. The specimens analysed were a mix of excisional, incisional and needle biopsies, while cytology samples were excluded. All metastatic (secondary) cancer cases and premalignant lesions were excluded from this study. Also excluded were the few cancer cases with incomplete data. The data retrieved were analyzed using the Statistical Package for Social Sciences (SPSS) version 25 and the summary is presented in tables.

3. RESULTS

We reviewed a total of 9,058 (cancer and non-cancer) cases out of which 1,474 (16.27%) were cancers (Table 1). The yearly distribution of the cancer cases (Table 1) shows a staggering rise in trend both in terms of the actual count per year and the percentage to the total numbers of cases seen in the corresponding year.

Table 2 depicts that 671 (45.5%) of the cancer cases were males while the remaining 803 cases (54.5%) were females, giving a male to female ratio of approximately 1:1.2. These cases fell within the age range of 0.1 year (5 weeks) to 100 years; the mean age was 54.21 years, and the gender-specific mean ages for males and females were 59.92 years and 49.44 years respectively.

In respect of the distribution of cancer cases across age-group (Table 3), we found that the modal age-group in males was the 7th decade (25.0%), with the 8th decade having approximately the same proportion (24.9%). In females, the modal age-group was the 5th decade (22.2%), although the 6th decade also had a high value (21.5%). For both genders put together, the modal age-group was clearly the 7th decade.

Prostate cancer (24.8%) was the commonest cancer in this study when both sexes are considered together. It was closely followed by breast cancer (22.8%) and then cervical cancer (9.8%), colorectal cancer (7.6%) and non-melanoma skin cancer (NMSC, 5.2%). The top 5 cancers alone accounted for 70.2% of the total cancers and Table 4 shows that their modal age-group were the 8th decade (prostate), 5th decade (breast), 7th decade (cervix uteri), 6th decade (colorectal cancer) and 4th decade (NMSC).

By sex, prostate cancer was the commonest in males, accounting for over one-half (54.5%) of the total cancers in males (Table 2). This was followed by colorectal cancer (7.6%), NMSC (6.9%), Non-Hodgkin lymphoma (NHL, 5.5%), and bone and soft tissue cancer (3.9%). In females, the most common cancers were breast cancer (40.5% within the gender), cervical cancer (17.9%), colorectal cancer (7.6%) cancer of the corpus uteri (5.6%), and bone and soft tissue cancer (4.2%).

At both extremes of the age-range was a case each of eye cancer and breast cancer, occurring in females of 0.1year (5 weeks) old and 100 years old respectively.

4. DISCUSSION

The WHO issues periodic reports on the worldwide incidence and mortality of cancer via her agency, the IARC, the most recent being the GLOBOCAN 2020 estimates. The validity of the reports depends on the degree of representativeness and quality of the information obtained by the agency using the best available

Table 1. Yearly distribution of specimens, cancer cases and percentages of cancer

Year	Number of specimens	Number of cancer cases	Percentage of cancer (%)
2011	615	85	13.82
2012	828	123	14.85
2013	700	112	16.00
2014	607	89	14.17
2015	939	131	13.95
2016	902	149	16.51
2017	1043	182	17.45
2018	990	146	14.74
2019	1242	199	16.02
2020	1192	258	21.64
Total	9058	1474	16.27

Table 2. Gender distribution of cancer cases

Organ/tissue	Male		Female		Total	
	Count	Percent (%)	Count	Percent (%)	Count	Percent (%)
Prostate	366	54.5	0	0.0	366	24.8
Breast	11	1.6	325	40.5	336	22.8
Cervix uteri	0	0.0	144	17.9	144	9.8
Colorectum	51	7.6	61	7.6	112	7.6
[a]NMSC	46	6.9	30	3.7	76	5.2
Bone and soft tissue	26	3.9	34	4.2	60	4.1
[d]NHL	37	5.5	21	2.6	58	3.9
Corpus uteri	0	0.0	45	5.6	45	3.1
Eye	14	2.1	23	2.9	37	2.5
Stomach	22	3.3	12	1.5	34	2.3
Ovary	0	0.0	31	3.9	31	2.1
Hodgkin Lymphona	17	2.5	4	0.5	21	1.4
Melanoma	8	1.2	13	1.6	21	1.4
Nasopharynx	12	1.8	8	1.0	20	1.4
Small intestine	11	1.6	4	0.5	15	1.0
Others	50	7.1	48	5.7	98	6.6
Total	671	100.0	803	100.0	1474	100.0

[a]NMSC, non-melanoma skin cancer, [b]NHL, NonHodgkin lymphoma, [c] CNS, central nervous system

Table 3. Cancer distribution across age-group

Decade (age-group)	Male		Female		Total	
	Count	Percent (%)	Count	Percent (%)	Count	Percent (%)
1st (0-9)	22	3.3	12	1.5	34	2.3
2nd (10-19)	16	2.4	20	2.5	36	2.4
3rd (20-29)	30	4.5	54	6.7	84	5.7
4th (30-39)	46	6.9	133	16.6	179	12.1
5th (40-49)	60	8.9	178	22.2	238	16.1
6th (50-59)	64	9.5	173	21.5	237	16.1
7th (60-69)	168	25.0	131	16.3	229	20.3
8th (70-79)	167	24.9	73	9.1	240	16.3
9th (80-89)	87	13.0	26	3.2	113	7.7
10th (90-99)	11	1.6	2	0.2	13	0.9
11th (100-109)	0	0.0	1	0.1	1	0.1
Total	671	100.0	803	100.0	1474	100.0

Table 4. Modal age-group for the top 5 cancers

Age -group	Prostate (%)	Breast (%)	Cervix uteri (%)	Colorectum (%)	NMSC (%)
1st Decade	0.0	0.0	0.0	0.0	0.0
2nd Decade	0.0	0.0	0.0	1.8	1.3
3rd Decade	0.0	5.7	0.7	5.4	13.2
4th Decade	0.3	23.8	5.6	7.1	22.4
5th Decade	1.1	30.1	22.2	19.6	17.1
6th Decade	5.2	23.2	25.0	30.4	9.2
7th Decade	33.9	9.8	27.1	22.3	11.8
8th Decade	36.9	4.8	14.6	10.7	18.4
9th Decade	20.5	2.1	4.2	2.7	6.6
10th Decade	2.2	0.3	0.7	0.0	0.0
11th Decade	0.0	0.3	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0

sources of data on cancer within a given country [5]. Data from many PBCRs in sub-Saharan Africa usually do not meet the IARC criteria for inclusion but are added to increase the coverage of cancer registration within the region [10]. In Nigeria, cancer data are obtained from cancer registries which are subnational, covering usually selected urban areas or at best a state, irrespective of whether they are from PBCR or hospital-based cancer registry. The essence for a good representative coverage of an area cannot be overemphasized because regional variation in environmental and other risk factors' exposures impacts greatly on the type of cancer predominant in a given geographical region [7,11]. Hence more researches are required in the country to bring out the peculiarities of the common cancer types especially in areas that are yet uncovered by the nation's system of cancer registration.

In this study, we observed a definite rise in the trend of cancer both in terms of the actual count per year and proportion to the total number of cases (i.e., cancers and non-cancers) seen in the corresponding year. This conforms with many studies within and outside Nigeria and is in line with WHO's observation that cancer incidence is rapidly growing and expected to rank as the leading cause of death and the single most important barrier to increasing life expectancy in every country of the world in the 21st century [6,8,9,12-15]. Better policies and allocation of more funds and resources towards primary and secondary prevention of cancer is advised to mitigate against this trend and reduce the current and impending health burden due to this disease.

There is a slight female predominance in the gender distribution of cancer in this study, with a male/female ratio of 1:1.2. Similarly, in an earlier report from the Benin Cancer Registry, located in the South Senatorial District of this state (not covered by the current study), Obaseki et al found a ratio of 1:1.5 [16]. This high preponderance of cancers in females seen in this state is consistent with findings from many states in Nigeria [8,13,17-21]. The bias for the female gender can be attributed to high proportion of female breast cancer and cervical cancer among the common cancer types seen in the country. It may also be due to a better health-seeking behaviour of Nigerian females in comparison to their male counterparts, and the relative vibrancy of obstetrics and gynecological unit in many Nigerian tertiary health institutions [22]. Some parts of the world with similar female preponderance of cancer include Ghana,

Uganda, United States of America, while in China the reverse is the case [15,23-25]. According to 2020 GLOBOCAN estimates, the incidence rate for cancers is about 19% higher in men (ASR, 222.0 per 100,000) than in women (ASR 186.0 per 100,000) worldwide [5].

The mean age for cancer diagnosis in our study is 54.21 years when both sexes are considered together. Males are however, more likely to be diagnosed of cancer approximately 10 years later that their female counterparts as their specific mean ages were 59.92 years and 49.44 years respectively. Also, the gender-specific modal age group was 7th and 8th decade for males while for females it was 5th and 6th decades. The relatively higher age for cancer diagnosis in males appears to cut across the country but with variable margins [8,17-19,21]. In Ibadan and Abuja cancer registries, the highest number of cancer cases in men was seen in 65years and older age-group in both registries, while in women it was 45-54 years and 35-44 years respectively [8]. One of the reasons that can be adduced for this observation is that prostate cancer which is the predominant cancer in males has a higher peak age incidence when compared to breast and cervical cancers which are the most frequently diagnosed in females.

In the GLOBOCAN estimates of 2020, the most commonly diagnosed cancer worldwide, and in both sexes combined, was female breast cancer (11.7% of the total cases), closely followed by lung cancer (11.4%), and then colorectal cancer (10.0%), prostate cancer (7.3%) and stomach cancer (5.6%). The cancer mix from one region of the world to the other varies tremendously, with some cancers more frequent in some region than the others [6]. Even within a region, there can be change in the pattern of cancer occurrence depending on the time interval between the studies as was observed in Jos, North Central Nigeria by Silas OA et al [26]. The top 5 cancers encountered in this study (both sexes combined) were prostate cancer (24.8%), breast cancer (22.8%), cervical cancer (9.8%), colorectal cancer (7.6%) and NMSC (5.2%.), three of which are part of the 5 most common cancers in the GLOBOCAN report mentioned above. Also, these were the top 5 cancers obtained in neighbouring Delta State and faraway Kano State of Northern Nigeria, although the orders of ranking from 1st to 5th are different [13,17]. Many other researches within Nigeria had at least 3 of the 5 most common cancers in this study making their list of top 5 cancers [8,18-21]. Lung cancer, which until the year 2020 was

the commonest cancer worldwide, is conspicuously absent in this study. The absence is due to the non-presence of a good functioning cardiothoracic unit in our institution.

The common cancer types in the different gender also vary greatly among different geographical regions. In males, this study observed prostate cancer, colorectal cancer, NMSC, NHL, and bone and soft tissue cancer as the 5 most common cancers in this part of Edo State, Nigeria. But for the order of ranking, the cancers were also the top 5 documented by Uchendu OJ in Delta State while bladder cancer displaced NHL from the list of top 5 male cancers in Kano State [13,17]. In the earlier report in this state by Obaseki et al, bladder and oesophageal cancers replaced NHL, and bone and soft tissue cancer among the top 5 most frequently diagnosed cancers in this study. The difference between the initial report and the findings in this current study may not be unconnected to the different socioeconomic statuses of the study population; the initial report covers areas that are largely urban while ours covers a predominantly rural or at best semi-urban areas. Also reported in other parts of the country are varying mix of common cancers containing a good number of the ones in our list of top 5 cancers [8,18-21]. The WHO listed lung cancer, prostate cancer and colorectal cancer at the global level [5]. Breast cancer is by far the most common cancer in females in this study. This had been observed in earlier researches conducted in this state and in Delta State [16,17]. Although, breast cancer remains the most common cancer in females in most countries of the world, in SSA it is usually surpassed by cervical cancer; in this study, like many of the previous ones in Nigeria, cervical cancer is the 2nd most common cancer [5,7,8,13,18-21]. This observation may be due to the impact of cervical cancer screening programmes carried out in many of the country's tertiary health facilities. Besides breast and cervical cancers, the other common cancers we observed in females were colorectal cancer, cancer of the corpus uteri, and bone and soft tissue cancer.

5. CONCLUSION

This study has systematically shown, through simple statistics, an increase in the trend of cancer in this largely rural population in Nigeria. Many of the findings are similar to those of previous researches across the country. The most common cancer types in both sexes were prostate cancer, breast cancer, cervical cancer, colorectal cancer and NMSC in order of decreasing frequency. More cancer cases were seen in females than in males and the overall peak age of occurrence was the 7th decade. Being the first and only of such study on all cancers seen in the centre and this part of the state, it is our hope that the information will be vital in policy making until our national system of cancer registration becomes more functionally robust to give coverage to this area.

ETHICAL APPROVAL

This study was reviewed and granted an EXEMPT status by the ISTH Health Research Ethics Committee. Protocol no: ISTH/HREC/20210402/150.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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