Original Article

Cancer in Kano, Northwestern Nigeria: A 10-year Update of the Kano Cancer Registry

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Abstract

Background and Objectives: Cancer is an increasing problem in Africa. This study analyzes the profile of cancers recorded in the second decade of Kano cancer registry (KCR), and compare data with a similar previous 10 years (1995–2004) study in the registry to detect changing patterns. **Materials and Methods:** Cancer cases received by the registry from January 2005 to December 2014 were retrieved from the records and classified by organ/sites of affectation in accordance with the international classification of diseases for oncology. The data are presented in tables according to the organ/sites and ranked accordingly. **Results:** A total of 47,734 specimens were received within the study period out of which 6548 (13.2%) were malignant. The malignant cases comprised 3598 (54.9%) females and 2950 (45.1%) males (f: m = 1.2:1); there were 516 (7.9%) Paediatric cancers in the series. Overall, breast cancer (14.1%) was the most frequent followed by cancers of the cervix (11.1%), prostate (10.9%), nonmelanoma (nm) skin (7.3%), and colorectum (7.2%), respectively. The leading six cancers among females were the breast (25.0%), cervix (19.8%), colorectum (6.8%), connective tissue (6.6%), nm skin (6.5%), and uterus (5.7%). The corresponding ones in the males were prostate (24.7%), bladder (10.9%), nm skin (8.2%), colorectal (7.8%), connective tissue (7.5%), and eye (4.8%) cancers. Retinoblastoma was responsible for more than half of all Paediatric cancers (61.4%). **Conclusion:** This study detected some change in the pattern of cancers in KCR. More females than males are affected, and breast cancer is the most common malignancy among women. This contrasts with the previous study which showed male predominance and cervical cancer as the commonest malignancy in women. Prostate and bladder cancer still remain the most common malignancies in men. Data from this study will help to further focus efforts and resources toward tackling the most prevalent cancers in our region most of which are potentially preventable.

Keywords: Cancer, hospital-based registry, Kano, Nigeria, profiles

Introduction

Cancer is a leading cause of death in both less or more developed countries of the world.[1] An estimated 14.1 million new cancer cases and 8.2 million cancer deaths occurred in 2012 worldwide. More than half of all cancer cases and 65% of cancer-related deaths occurred in less-developed countries.[1,2] Projections based on the 2012 GLOBOCAN estimates predict a substantive increase to 19.3 million new cancer cases per year by 2025.[1]

Cancer burden in Africa is increasing as a result of the growth and aging of the population. Other factors associated with such increase include the presence of risk factors such as smoking, alcohol, obesity, physical inactivity, reproductive behavior, and prevalence of certain infectious agents associated with cancer etiology. About 847,000 new cancer cases (6% of world total) and 591,000 cancer-related deaths (7.2% of world total) were estimated to have occurred in the 54 countries of Africa in 2012 with about three-quarters in 47 countries of Sub-Saharan Africa.[2] According to GLOBOCAN 2012 estimates, a total of 102,100 new cancer cases were recorded in the year 2012 in Nigeria with estimated 71,600 cancer-related deaths. Nigeria contributed 8.3% of all cancer cases in Africa.[1]

Despite high cancer burden in Nigeria, cancer registration has been plagued with multiple challenges over the years since inception. However, recently there has been renewed interest

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resulting from improvement in public health financing and management. National System of Cancer Registries (NSCR) has been providing training, capacity development, mentoring, technical, and scientific support to cancer registries in Nigeria to enable them attain population-based cancer registration status and generate high-quality data for the country. These efforts are already yielding positive results as the data from Abuja, Calabar, and Ibadan population-based cancer registries have attained sufficient quality to be included in the GLOBOCAN 2012 database.[3]

The Kano cancer registry (KCR) is a hospital-based registry established in 1999, and domiciled in the Pathology Department of Aminu Kano Teaching Hospital, Kano, Northwestern part of Nigeria. A previous 10-year study (1995–2004) from the KCR[4] has shown the five most predominant cancer types to be those of the cervix, breast, prostate, nonmelanoma skin (nm skin), and colorectum, respectively. In that study, cancer of the cervix was the most commonly diagnosed in females while prostate cancer was the predominant malignancy in males. This review is a 10-year update of all cancer cases received in the KCR from January 2005 to December 2014. The study analyzes the profile of cancers recorded in the second decade of KCR, and compares data with the previous 10-year (1995–2004) profile of cancers documented in the registry to detect changing trends, if any, in the frequency and pattern of cancer cases in our setting.

Materials and Methods

Cancer cases morphologically diagnosed by histology and cytology in the department of pathology from January 2005 to December 2014 were retrieved from the records and documented by the registry. Borderline lesions and *in situ* carcinoma were excluded from this study. The cancers that satisfy the inclusion criteria were classified by topography based on organ/site according to the International Classification of Diseases for Oncology.[5] The data obtained were tabulated by topography and ranked according to their frequencies and proportions in descending order by sex. Paediatric cancers (aged 13 years and below) were classified according to their histological types and presented using tables in descending order of frequencies and percentages.

Results

A total of 47,734 surgical specimens were received for histological examination during the study period. Out of these, 6548 (13.7%) were diagnosed as malignant, 28,920 (60.6%) were benign neoplasms, and 12,266 (25.7%) were other nonneoplastic lesions. The malignant cases constitute 18.5% of all the neoplastic lesions recorded. There were 3598 (54.9%) cancers in females and 2950 (45.1%) in males. Paediatric cancers constituted 7.9% (516 cases) of the total. For adults of both sexes, breast cancer (14.1%) was the most frequent followed by cancers of the cervix (11.1%), prostate (10.9%), nm skin (7.3%), and colorectum (7.2%), respectively [Table 1].

Table 2 shows the frequency of cancers among adult females. The most prevalent cancers among females were breast (25%), cervix (19.8%), colorectum (6.8%), connective tissue (6.6%), nm skin (6.5%), uterus (5.7%), metastasis (4.9%), and ovary (3.8%).

Among adult males, cancer of the prostate (24.7%) predominated; this was followed by cancers of the bladder (10.9%), nm skin (8.2%), colorectum (7.8%) connective tissue (7.5%), eye (4.8%), metastasis (4.6%), and nasopharynx (4.3%) Table 3.

Retinoblastoma constituted 61.4% of all Paediatric cancers recorded. Other common cancers in this age group include Burkitt's lymphoma (10.5%), nephroblastoma (8.0%), and rhabdomyosarcoma (7.8%). Four cases of medulloblastoma (0.8%) were also encountered [Table 4]. Paediatric malignancies show male predominance (M:F, 1.3:1) Table 5.

Discussion

The pathology laboratory received 47,734 specimens over the 10-year study period out of which 6548 (13.7%) were malignant, 28,920 (60.6%) were benign neoplasms, and 12,266 (25.7%) were other nonneoplastic lesions. The malignant cases constitute 18.5% of all the neoplastic lesions. This implies that more than one-tenth of our patients presenting with diseases requiring tissue biopsies will turn out malignant and nearly a fifth of all the neoplastic lesions were malignant. This is in keeping with the relatively high cancer burden affecting the Nigerian population.[3] In terms of frequency of affectation, females predominated over males by a significant margin and the male-to-female ratio is 1:1.2. This female bias appeared to have resulted from very high relative frequencies of breast and cervical cancers. Among the Paediatric tumors recorded, retinoblastoma constituted the vast majority with a male preponderance. Compared to the index study, the previous analysis of cancer cases in KCR showed significantly lower figures for malignancies (1990 cases), revealed a slight male preponderance and Burkitt's lymphoma as the most common Paediatric tumor[4] [Tables 1, 4 and 5].

The 3-fold increase in total malignancies recorded by this study over the previous one might be due to significant upsurge of surgical pathology and cytology samples received from several secondary and tertiary hospitals from Northwestern part of the country. Although data from KCR is essentially only hospital based, the pathology laboratory in which it is domiciled received request for services from several hospitals over a large area of the Northern part of the country. Still, the data might be an underestimation of true cancer burden as some cases would have been missed as a result of deaths before presentation to health-care facilities and/or when patients choose to seek alternative/traditional forms of treatment. Such an attitude may have resulted from ignorance and/or limited or lack of access to specialized medical care.

Table 1: Profiles of cancers of index and previous 10 years study of Kano cancer registry

Profile of the most common cancers in KCR (2005-2014)			Profile of the most common cancers in KCR (1995-2004)[4]		
Rank	**Site**	**Number of cases (%)**	**Rank**	**Site**	**Number of cases (%)**
1	Breast	851 (14.1)	1	Cervix	226 (11.4)
2	Cervix	670 (11.1)	2	Breast	193 (9.7)
3	Prostate	656 (10.9)	3	Prostate	165 (8.3)
4	Nm skin	438 (7.3)	4	Nm skin	161 (8.1)
5	Colorectum	437 (7.2)	5	Colorectum	127 (6.4)
6	Connective tissue	422 (7.0)	6	Bladder	124 (6.2)
7	Bladder	372 (6.2)	7	Connective tissue	105 (5.3)
8	Metastasis	289 (4.8)	8	Metastasis	99 (5.0)
9	Eye	218 (3.6)	9	Eye	85 (4.3)
10	Uterus	191 (3.2)	10	Ovary	81 (4.1)
11	Melanoma	180 (3.0)	11	NHL	75 (3.8)
12	Nasopharynx	169 (2.8)	12	Uterus	61 (3.1)
13	NHL	141 (2.3)	13	Burkitt's lymphoma	58 (2.9)
14	Ovary	129 (2.1)	14	Melanoma	55 (2.8)
15	Kaposi sarcoma	126 (2.1)	15	Leukemia	45 (2.3)
16	Stomach	115 (1.9)	16	Hodgkin's lymphoma	40 (2.0)
17	Salivary gland	95 (1.6)	17	Bone	37 (1.9)
18	Thyroid	84 (1.4)	18	Nasopharynx	33 (1.7)
19	Hodgkin's lymphoma	72 (1.2)	19	Liver	32 (1.6)
20	Larynx and hypopharynx	36 (0.6)	20	Thyroid	30 (1.5)
21	Esophagus	33 (0.5)	21	Stomach	26 (1.3)
22	Kidney	31 (0.5)	22	Kidney	24 (1.2)
23	Bone	25 (0.4)	23	Salivary gland	19 (1.0)
24	Oral	24 (0.4)	24	Larynx and hypopharyx	17 (0.9)
25	Liver	12 (0.2)	25	Oral	14 (0.7)
26	Others	217 (3.6)	26	Others	58 (2.5)
Total		6032 (100.0)		Total	1990 (100.0)

KCR: Kano Cancer Registry, Nm skin: Nonmelanoma skin, NHL: Non-Hodgkin lymphoma

Table 2: Profiles of female cancers of index and previous 10 years study of Kano Cancer Registry

Profile of the most common cancers in KCR (2005-2014)			Profile of the most common cancers in KCR (1995-2004)[4]		
Rank	**Site**	**Number of cases (%)**	**Rank**	**Site**	**Number of cases (%)**
1	Breast	841 (25.0)	1	Cervix	226 (22.9)
2	Cervix	670 (19.8)	2	Breast	187 (18.9)
3	Colorectum	230 (6.8)	3	Ovary	81 (8.2)
4	Connective tissue	224 (6.6)	4	Nm skin	62 (6.3)
5	Nm skin	219 (6.5)	5	Uterus	61 (6.2)
6	Uterus	191 (5.7)	6	Metastasis	43 (4.4)
7	Metastasis	166 (4.9)	7	Connective tissue	42 (4.3)
8	Ovary	129 (3.8)	8	Eye	38 (3.8)
9	Eye	91 (2.7)	9	Colorectum	34 (3.4)
10	Melanoma	87 (2.6)	10	NHL	24 (2.4)
11	Bladder	82 (2.4)	11	Bladder	22 (2.2)
12	Thyroid	64 (1.9)	12	Melanoma	21 (2.1)
13	Others	382 (11.3)	13	Others	148 (14.9)
Total		3376 (100.0)		Total	989 (100.0)

KCR: Kano Cancer Registry, Nm skin: Nonmelanoma skin, NHL: Non-Hodgkin lymphoma

This review has shown that, for adults of both sexes, breast cancer was the most common, followed by cancers of the cervix, prostate, nm skin, and colorectum, respectively [Table 1]. Nigerian studies from hospital-based cancer registries in Zaria and Sokoto showed similar findings.[6,7] The Zaria registry reported breast cancer, cervical, and prostate cancers as the three most common overall with proportions of 20.4%, 16.8%, and 8.3%, respectively.[6] This is comparable to reports from the

Table 3: Profiles of male cancers of index and previous 10 years study of Kano Cancer Registry

Profile of the most common cancers in KCR (2005-2014)			Profile of the most common cancers in KCR (1995-2004)[4]		
Rank	**Site**	**Number of cases (%)**	**Rank**	**Site**	**Number of cases (%)**
1	Prostate	656 (24.7)	1	Prostate	168 (16.5)
2	Bladder	290 (10.9)	2	Bladder	102 (10.2)
3	Nm skin	219 (8.2)	3	Nm skin	99 (9.9)
4	Colorectum	207 (7.8)	4	Colorectum	93 (9.3)
5	Connective tissue	198 (7.5)	5	Connective tissue	63 (6.3)
6	Eye	127 (4.8)	6	Metastasis	56 (5.6)
7	Metastasis	123 (4.6)	7	NHL	51 (5.1)
8	Nasopharynx	114 (4.3)	8	Eye	47 (4.7)
9	Melanoma	93 (3.5)	9	Burkitt's lymphoma	37 (3.4)
10	Kaposi sarcoma	88 (3.3)	10	Melanoma	34 (3.2)
11	NHL	86 (3.2)	11	Leukemia	32 (3.1)
12	Stomach	81 (3.0)	12	Hodgkin's lymphoma	31 (2.9)
13	Others	374 (14.1)	13	Others	160 (17.1)
Total		2656 (100.0)		Total	1001 (100.0)

KCR: Kano Cancer Registry, Nm skin: Nonmelanoma skin, NHL: Non-Hodgkin lymphoma

Table 4: Profiles of Paediatric cancers of index and previous 10 years study of Kano Cancer Registry

Profile of the most common cancers in KCR (2005-2014)			Profile of the most common cancers in KCR (1995-2004)[4]		
Rank	**Site**	**Number of cases (%)**	**Rank**	**Site**	**Number of cases (%)**
1	Retinoblastoma	317 (65.4)	1	Burkitt's lymphoma	58 (31.4)
2	Rhabdomyosarcoma	42 (8.6)	2	Retinoblastoma	37 (20.0)
3	Nephroblastoma	40 (8.3)	3	NHL	19 (10.3)
4	Burkitt's lymphoma	29 (6.0)	4	Acute leukemia	13 (7.0)
5	Hodgkin lymphoma	23 (5.0)	5	Hodgkin's lymphoma	12 (6.5)
6	NHL	15 (3.0)	6	Nephroblastoma	11 (5.9)
7	Gonadal neoplasm	6 (1.3)	7	Osteogenic sarcoma	9 (4.9)
8	Medulloblastoma	4 (0.9)	8	Rhabdomyosarcoma	8 (4.3)
9	Neuroblastoma	3 (0.6)	9	Gonadal neoplasm	6 (3.2)
10	Others	4 (0.9)	10	Neuroblastoma	3 (1.6)
Total		483 (100.0)		Total	185 (100.0)

KCR: Kano Cancer Registry, NHL: Non-Hodgkin lymphoma

Sokoto registry, in which breast (19.4%), cervical (7.9%), and prostate (6.8%) cancers form the leading three malignancies.[7] Similar trend was noted in population-based cancer registries in Calabar, Ibadan, and Abuja who also reported breast and cervical cancers among women and prostate cancer in men as the 3 most commonly occurring malignancies.[3,8,9]

Global estimates for 2012 has revealed 1.67 million breast cancer cases worldwide ranking it as the second most common malignancy.[1,10] Breast cancer is the most commonly diagnosed tumor in Africa and in Sub-Saharan Africa and is also the leading cause of death from cancer (63,100 deaths in 2012).[2] Indeed, the latest data on breast cancer has shown that it is the most frequently diagnosed malignant tumor among women in 140 of the 184 countries worldwide and represents one in four of all cancers in women.[10] Most cancer estimates from Nigerian registries ranked breast cancer as the most commonly occurring malignancy in adult females with Calabar, Ibadan, and Abuja registries recording relatively higher proportions of 39.2%, 40.8%, and 50.8% respectively.[8,9] In concordance with the aforementioned reviews, this study has revealed breast cancer as the most commonly diagnosed constituting one in four (25%) of all cancer cases among women in Kano. A change in trend with breast cancer superseding cervical cancer as the most frequently recorded malignancy for adults of both sexes and also among women has also been observed. Unfortunately, in Nigeria, most breast cancer cases present at an advanced stage due to lack of effective breast cancer screening policy, lack of or limited access to specialized health care, paucity of diagnostic facilities, and trained personnel. Deaths due to breast cancer occur as a result of late presentation and inability to afford the cost of treatment.

Cancer of the cervix is the second most frequently diagnosed cancer in Africa, Sub-Saharan Africa, and Nigeria in 2012 and is ranked second among the cancers affecting women in this study [Table 2].[1,2,10] Similar to this finding, Samaila *et al*., in Zaria, Sahabi in Sokoto, and reports from population-based registries in Calabar, Ibadan, and Abuja also ranked cervical cancer as the second most frequently occurring malignancy.[6-9]

Table 5: Profile of the most common Paediatric cancers in Kano Cancer Registry (2005-2014)

Rank	Site	Males	Females	Number of cases (%)
1	Retinoblastoma	178	139	317 (65.4)
2	Rhabdomyosarcoma	27	15	42 (8.6)
3	Nephroblastoma	19	21	40 (8.3)
4	Burkitt's lymphoma	16	13	29 (6.0)
5	Hodgkin lymphoma	17	6	23 (5.0)
6	NHL	9	6	15 (3.0)
7	Gonadal neoplasm	1	5	6 (1.3)
8	Medulloblastoma	2	2	4 (0.9)
9	Neuroblastoma	3	-	3 (0.6)
10	Others	1	3	4 (0.9)
Total		273	210	483 (100.0)

NHL: Non-Hodgkin lymphoma

The previous study and a study from Benin, however, ranked cervical cancer as the most common.[4,11] The reduction of cervical cancer cases relative to breast cancer may be attributed to larger sample size of the index study perhaps revealing the true pattern. Although studies have shown increasing knowledge about cervical cancer among women in our environment, attitude to cervical screening still remains poor.[12] This malignancy is potentially preventable as there exists a precancerous stage lasting for several months or years and there are cheap, cost-effective means of detection such as Pap smear tests and visual inspection with acetic acid. An estimated 3.5% of women in the general population are shown to harbor cervical human papillomavirus (HPV)-16/18 infection at a given time, and 66.9% of invasive cervical cancers are attributed to HPVs 16 or 18.[13] The factors that predispose to the transmission of HPV virus are rife within our community; multiparity, multiple sexual partners, and sexually transmitted infections. The World Health Organization recommends health education/behavioral modification and HPV immunization as primary prevention methods, screening of target population aged >30 years, and free treatment as secondary and tertiary preventive measures, respectively.[14] It is hoped that this recommendations, if fully implemented, will reduce the burden of cervical cancer in this country.

According to GLOBOCAN 2012 estimates, prostate cancer ranked as the most common cancer in males worldwide.[1] Similarly, prostate cancer is the most frequently diagnosed malignancy among males in both Africa and Sub-Saharan Africa.[15] In this review, and in a similar previous study carried out in the same cancer registry, prostate cancer was the third most frequently occurring malignancy recorded for both sexes and the most common among males accounting for 24.7% [Table 3].[4] In agreement with the findings of this study, Mandong *et al*. in Jos and Ogunbiyi in Ibadan also reported prostate cancer predominance among males.[16,17] Rising incidence of prostate cancer in developed countries has been partly attributed to routine screening of males with resultant early detection; however, a significant number of cases seen in our setting were diagnosed in men with clinical disease because screening is not routinely carried out in Nigerian hospitals. More cases of prostate cancer will be recorded if routine screening is established in Nigerian population.[4,17]

Nm skin cancers constituted 7.3% of all cancers recorded and ranked the fourth most common malignancy for adults of both sexes. This is comparable to the previous 10-year study in which nm skin was ranked as the fourth most common malignancy comprising 8.1% of cancers affecting adults of both sexes.[4] Squamous cell carcinoma forms the bulk of the skin cancers recorded with malignant skin adnexal lesions contributing approximately 3.0% of the total. A previous study found sebaceous carcinoma forming the majority (38.5%) of the skin adnexal cancers.[18] The increased frequency of squamous carcinomas of the skin result from malignant transformation of chronic, nonhealing skin ulcers caused by factors such as poor management of trauma cases, high rate of wound infection in our environment, and other associated conditions such as diabetes mellitus, hypertension, and sickle cell anemia.[19,20]

Colorectal cancer is the third most common cancer in men and the second in women worldwide. The highest incidences are seen in developed world while the lowest are noted in Africa where it ranked as the fifth most common malignancy.[1,10,21] In Nigeria, colorectal cancer is not as rare as previously believed and reports from various centers showed rising incidence of up to as high as four-fold in some regions over the last 50 years. Recent studies from Nigeria showed colorectal carcinoma ranking between the 4th and 6th most common cancer with relative frequency of 4.6%–7.1% of all malignant tumors.[22] Colorectal cancer comprised 7.2% and ranked fifth among the most frequent cancers recorded by this study. There is a more than 3-fold increase in the number of cases (437 cases, 7.2% vs. 127 cases, 6.4%) recorded by this study over the previous 10-year review in this registry.[4] This relative increase in frequency may be attributed to an increased number of samples received overall by the laboratory. Increased awareness and improved diagnostic facilities are also indicated by Olorunda and Abdulkareem as a reason for such an increase in the number of cancers reported in their systematic review of published Nigerian literature on colorectal cancer. Their review also found a mean age of presentation of 46.2 years which is two decades earlier than that seen in Caucasians.[22]

Tumors of the connective tissue (soft tissue) comprised 7.0% of all the cancers recorded and is ranked as the sixth most frequent cancer for both males and females. The etiology of most connective tissue cancers are unknown.[23] They have, however, been associated with urbanization, overcrowding, toxic fumes and emissions from motor vehicles, and industrial machines. Other associations include industrial wastes containing large quantities of polycyclic aromatic hydrocarbons, agricultural and agro-allied chemicals, irradiation, chemicals, and heat burns as well as trauma in addition to oncogenic viruses, genetic predispositions, and immunosuppression.[24] Most

Nigerian studies found that these tumors constituting between 2.8% and 11.3% of solid malignancies with a male predominance.[25-27]

The majority of bladder cancer occur in males.[28] This study documented male preponderance with a male-to-female ratio of 4:1. Overall, this tumor comprised 6.2% of the malignancies recorded. A large proportion of bladder cancer cases in Africa are squamous carcinomas and between 30% and 60% of all bladder cancer cases are due to chronic infection with the parasite *Schistosoma haematobium*.[2] Previous estimates from this registry found squamous carcinoma constituting 53% of bladder cancers and *Schistosoma haematobium* associated with such carcinomas in 12% of the cases.[4,29] A study by Mungadi and Malami in the Northwestern region of Nigeria showed 65% of bladder cancer cases comprising of squamous cell carcinoma and 29.9% composed of transitional carcinoma subtype.[30] Eradication of schistosomiasis will certainly reduce the incidence of this malignancy.

Among adult males, cancers involving the eye, metastatic tumors, and nasopharyngeal cancers occupy the 6th, 7th, and 8th places, respectively. In adult females, however, uterine cancers, metastatic tumors, and cancers of the ovary ranked 6th, 7th, and 8th place among all the malignancies recorded. Nasopharyngeal cancer is about two-to-three times higher in males than in females in both more and less developed countries with 90% occurring in economically less developed countries.[1] In this study, twice as many males as females were diagnosed with nasopharyngeal cancer.

Liver cancer is much more common in men than in women. It is the second leading cause of cancer death among males worldwide and in less developed countries, including Nigeria.[1,3] This study and a previous one from our registry recorded abysmally low figures for liver cancer. This low figure is as a result of the reluctance of clinicians to undertake liver biopsy due to late presentation of patients with advanced chronic liver disease and often deranged clotting profile and other attendant potential complications. The diagnosis of "chronic liver disease" is made by clinicians often relying on the clinical examination, liver function test, serology for viruses, ultrasound scan, etc., to the exclusion of definitive diagnosis utilizing liver biopsy. Other factors include very low autopsy rate and inability to secure Consent of family of deceased individuals with chronic liver disease and indeed other diseases for postmortem examination. This has also been noted by Mohammed *et al*.,[4] and Ogunbiyi[31] in Kano and Ibadan Cancer Registries, respectively.

Paediatric cancers constituted 7.9% of total malignancies recorded. Retinoblastoma is by far the most common and was responsible for 61.4% of paediatric tumors. This high relative frequency of retinoblastoma has also been observed in estimates from the Zaria study (39.0%) of paediatric malignancies.[6] This tumor is also the most common ophthalmic tumor recorded in this center comprising 44.5% of all orbito-ocular tumors. Most patients present late with the advanced tumor.[32] Burkitt's lymphoma and nephroblastoma form 10.5% to 8.0% of the paediatric tumours, respectively, seen in this study. Rhabdomyosarcomas comprised 7.8% of the paediatric malignancies and constituted 54.2% of all cases of rhabdomyosarcoma seen in our center and has a slight female preponderance. Majority of them were located in the head and neck.[33]

Conclusion

This study has shown changes in the pattern of cancers in KCR. More females than males are affected, and breast cancer is now the most common malignancy among women. This is in contrast to the previous study which showed male predominance and cervical cancer as the commonest malignancy in women. Prostate and bladder cancers still remain as the most common malignancies in men. These findings are similar to those in most Nigerian cancer registries. This study is, however, limited by the fact that it is hospital based, and generalizations must be drawn with caution. It is hoped that the study will provide data to policymakers when taking decisions on the prevention and management of cancers in the Northwestern part of Nigeria in particular and Nigeria in general.

Finally, it is hoped that NSCR will continue to provide support to our registry and other registries in the country, while at the same time working toward upgrading these registries into population-based ones so that more qualitative and more useful data can be generated from them.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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