

RESEARCH ARTICLE

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Distribution and pattern of cancer in patients attending oncology clinic of the University of Nigeria Teaching Hospital, Ituku-Ozalla: A retrospective review of five years' records.

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Abstract

Objective: Cancer prevalence rates have been on the rise throughout the years, with associated high mortality rates. The primary aim of this study was to update existing knowledge and portray the prevailing trends in the occurrence and treatment of cancer in Nigeria.

Methods: An observational cross-sectional study of patients who attended the oncology clinic at the study setting from January 2014 to December 2018. Data was extracted from folders of patients with complete information on cancer diagnosis as well as other relevant information, using a pre-designed data extraction form. These were analysed using the IBM Statistical Package for Social Sciences (SPSS) version 23 and Excel.

Results: A total of 1986 incident cases were observed from 2014 to 2018. The most common cancer in males was soft tissue sarcoma (12.3%), followed by prostate cancer (11.5%) and colorectal cancer (11.5%), while skin tumours accounted for 9.3%. Results in females show that breast cancer (64%) was the most reported cancer, followed by cancer of the cervix (11.4%), colorectal cancer (3.7%), and soft tissue sarcoma (5.4%). The highest number of incident cases was observed in 2014.

Conclusion: Breast cancer was observed to be the most prevalent cancer in our study, followed by cervical and colorectal cancers. The emerging rise in the frequency of colorectal cancer and cancers of soft tissue origin calls for the adoption of intensive primary prevention and screening strategies.

Keywords: Cancer, Distribution, Prevalence, Nigeria

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Plain English Summary

This study reviewed cancer cases at the University of Nigeria Teaching Hospital, Enugu, from 2014 to 2018. It aimed to identify common cancer types and patterns among patients. A total of 1,986 cases were observed, with most patients being female and aged between 41–50 years. Breast cancer was the most common type, followed by cervical, colorectal, and soft tissue cancers. Prostate cancer was the sixth most common, differing from other Nigerian studies, where it ranked higher. Cancer cases were most frequent in 2014, likely due to better equipment availability that year.

The study found that older adults, especially those over 60, were more affected by several cancer types. Differences in cancer types were also seen between men and women. Factors like low awareness, poor access to screening, and cultural beliefs may contribute to delayed diagnosis, especially for cervical cancer. Equipment breakdowns and limited resources also affect cancer care. The study recommends improved cancer screening, awareness campaigns, better equipment, and more research to support national cancer control efforts. A larger, population-based study is also advised to confirm these findings.

Background

A rising pattern in the incidence and mortality rates of cancer has been observed on a global scale over the years. In 2013, there was an estimated incidence of nearly 15 million new cases of cancer, with an associated 8.2 million deaths (1). Presently, cancer is recognised as a major global mortality factor, responsible for around 10 million deaths in the year 2020 (2). Approximately 19.3 million newly reported cases of cancer were recorded globally in 2020. If the current rates persist, it is projected that the incidence of cancer will rise by 47% by the year 2024 (3). Every year, an estimated 400,000 children and adolescents are diagnosed with cancer (4). Significant disparities in incidence and mortality rates of cancer have been documented with respect to age, gender, and geographical location (3). A higher prevalence of cancer cases is seen in the Asian continent, followed by Europe, America, and then Africa. Nevertheless, it has been shown that the mortality rate in Asia and Africa surpasses their incidence rates, which can be attributed to the distinct distribution of different cancer types and the increasing rate of case fatalities in these areas (3). Nigeria reported a total of 124,815 newly reported cases in 2020, alongside a death rate of over 30% (4).

The most commonly diagnosed cancers globally are breast, lung, colorectal, and prostate cancers in increasing order of frequency (4). In terms of mortality, lung cancer remains the first, followed by colorectal, liver, stomach, and breast cancers (3). The incidence rates of these tumours vary both by gender and by different geographical locations (3). In Nigeria, it has been shown that breast and cervical cancer are most prevalent among females, while prostate and colorectal cancer are more typically diagnosed in males (5). This was also found to be the case in a study in Nigeria's south-south region (6). Nevertheless, the study by Fapohunda (7) and the data obtained from the

Nigerian National Systems of Cancer Registry (8) show differing patterns for the incidence of cancer types across genders, suggesting the existence of regional disparities within Nigeria. These patterns equally differed from those observed in Africa generally, as well as global patterns (9, 10). The occurrence of various cancers is influenced by several risk factors, which exhibit different prevalence rates across different countries. These risk factors collectively account for approximately one-third of cancer mortality (4). They include advancing age, tobacco usage, raised body mass index, alcohol intake, dietary habits, insufficient physical activity, and exposure to specific occupational and environmental carcinogens (4, 11). Viral infections, including human papillomavirus (HPV) and hepatitis, have been identified as risk factors in low- and middle-income countries, contributing to approximately 30% of cases (4).

The burden of cancer is evidently increasing, although not consistently across all regions. It is expected that nations with a low Human Development Index (HDI) will have the highest burden of cancer (3, 11). The availability of sufficient information regarding cancer patterns and outcomes among various populations serves as a fundamental basis for directing future research activities, implementing comprehensive policies for cancer control, and monitoring advances (8, 12). The NSCR recognises the need for the prompt dissemination of reliable data regarding cancer (8). Nonetheless, the unavailability of quality and consistent data constitutes a major barrier (8). The primary aim of this study is to update existing knowledge and depict the prevailing trends in the occurrence and treatment of cancer in Nigeria. This was achieved by reviewing patients diagnosed with cancer and seeking cancer care at the oncology clinic of the University of Nigeria Teaching Hospital, Ituku/Ozalla, Enugu, within the five years.

Materials and Methods

Study design

This was an observational cross-sectional study of patients who attended the oncology clinic of the University of Nigeria Teaching Hospital, Ituku/Ozalla, Enugu, from January 2014 to December 2018. The 5-year pattern and distribution of cancer were retrospectively studied.

Setting

The study was conducted at the oncology clinic, University of Nigeria Teaching Hospital, Ituku/Ozalla, Enugu. It is a prominent tertiary and referral medical facility serving the entire southeast zone of the country, which is made up of five (5) states: Enugu, Ebonyi, Anambra, Imo and Abia states. However, the facility also receives referrals from across the country. The oncology clinic serves a diverse population of individuals diagnosed with cancer as well as those in need of pain management and palliative care services. High transportation cost, poor road networks, especially for those in the rural communities, limited access to screening facilities and insecurity are among the major deterrents to accessing cancer care in the region.

Participants and Study Site

Participants included patients who received a diagnosis of any cancer. Data were extracted from folders of patients who were referred to the Oncology clinic with an already established diagnosis of cancer at the time of first presentation, from January 2014 to December 2018.

Data Sources and Variables

A visit was made to the oncology clinic of the hospital, where folders of patients who received a diagnosis of cancer over the specified period were identified and retrieved. A total of 1967 folders were retrieved and included. Relevant information was extracted using a pre-designed data extraction form. The variables of interest include the patient's socio-demographic characteristics (age, gender, and state of residence), year of diagnosis and the cancer site. Thus, the yearly incidence, cancer site patterns, as well as the age and gender distribution of the cancer diagnosis were determined.

Statistical Analysis

Data was presented as statistics of frequency, percentage, mean and standard deviation. Tables and charts were utilised to report the findings. The IBM Statistical Package for the Social Sciences (SPSS) version 23 and Excel were used to analyse and visualise the data.

Results

A total of 1986 incident cases were observed from 2014 to 2018. Out of these, a total of 1967 (99%) case files were retrieved. The highest frequency was observed for patients aged 41-50 years, followed by patients aged >60 years. Most of the patients were female 1515 (76.3%). The highest number of incident cases was observed in 2014, and the lowest in 2018 (Figure 1). Patients were mainly individuals residing in Enugu 713 (37.1%), Anambra 410 (21.3%), Imo 344 (17.9%), and Abia States 188 (9.8%) (Table 1).

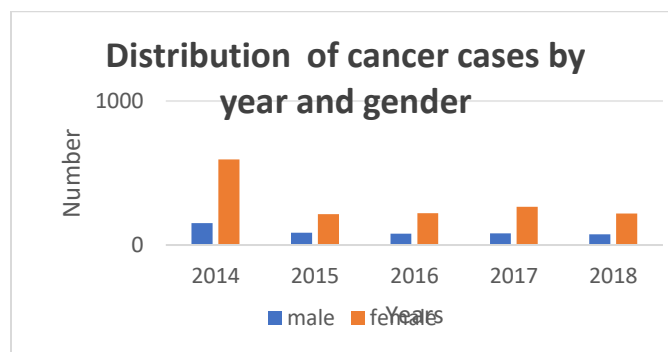


Figure 1: Distribution of cancer cases by year and gender

Table 1: Socio-demographic Characteristics

Variables	Frequency (N = 1986)	Percentage (%)
Age (mean =49.81 ± 14.77)		
≤ 18	27	1.4
19-30	160	8.1
31-40	348	17.5
41-50	500	25.2

51-60	455	22.9
≥ 60	477	24.0
Gender		
Male	471	23.7
Female	1515	76.3
Place of Residence (distance to the facility)		
Enugu (6.2km)	713	37.1
Anambra (87.1km)	410	21.3
Imo (139km)	344	17.9
Abia (139.6km)	188	9.8
Ebonyi (80.9km)	82	4.3
Delta (291 km)	39	2.0
Akwa Ibom (207km)	30	1.6
Rivers (230km)	23	1.2
Benue (223.5km)	17	0.9
Cross River (266km)	17	0.9
Edo (240km)	16	0.8
Kogi (238km)	9	0.5
Kaduna (609.3km)	4	0.2
Ogun (244km)	4	0.2
Taraba (502.3km)	3	0.2
Bayelsa (296km)	3	0.2
Osun (494.3km)	3	0.2
Ondo (384.2km)	3	0.2
Lagos (557.5km)	3	0.2
Cameroon (app. 590km)	1	0.1
Gombe (830km)	1	0.1
Kano (853.5km)	1	0.1
Nasarawa (424km)	1	0.1
Oyo (535km)	1	0.1
Adamawa (793km)	1	0.1
Katsina (897km)	1	0.1
Abuja (414.3km)	1	0.1
Plateau (562km)	1	0.1
Kwara (688.2km)	1	0.1

The reported cancer cases were similar for all the years except 2014, with a rate of 37.7%. The reported rate of cancer was similar for males and

females, except in 2014 when the presenting female cases were about 7% higher than cases reported among males (Table 2).

Table 2: Distribution of cancer cases by year and gender

Year	Male n (%)	Female n (%)	Total N	%
2014	153 (32.5)	595 (39.3)	748	37.7
2015	84 (17.8)	215 (14.2)	299	15.1
2016	79 (16.8)	221 (14.6)	300	15.1
2017	80 (17.0)	265 (17.5)	345	17.4
2018	75 (15.9)	219 (14.5)	294	14.8

Result shows that breast cancer (50.1%) was the most reported cancer, followed by cancer of the cervix (8.7%), colorectal cancer (5.6%) and soft tissue sarcoma (5.4%). The rest had rates between 0.1% and 3.9%. Breast cancer was mostly (64%) reported among females, while prostate cancer was mostly reported among males. The rates of

colorectal (11.5%), soft tissue sarcoma (12.3%), osteosarcoma (4.2%) and laryngeal cancer (4.25%) were higher in males compared to females: 3.7%, 3.2%, 0.9% and 0.1%, respectively (Table 3).

Table 3: Distribution of cancer according to the WHO Classification

Anatomical site	Gender		Frequency (n)	Percentage (%)
	Male N (%)	Female N (%)		
Female Genital Tumours				
Cervix	0 (0.0)	172 (11.4)	172	8.7
Vulva	0 (0.0)	5 (0.3)	5	0.3
Ovarian	0 (0.0)	14 (0.9)	14	0.7
Uterine	0 (0.0)	11 (0.7)	11	0.6
Digestive Tumours				
Oesophageal	1 (0.2)	2 (0.1)	3	0.2
Gastric	16 (3.4)	19 (1.3)	35	1.8
Pancreatic	13 (2.8)	11 (0.7)	24	1.2
Colorectal	54 (11.5)	57 (3.7)	111	5.6
Anal	5 (1.1)	8 (0.5)	13	0.7
Rectal	6 (1.2)	3 (0.2)	9	0.5
Caecal	0 (0.0)	2 (0.1)	2	0.1
Liver	12 (2.5)	9 (0.6)	21	1.1
Gall bladder	1 (0.2)	1 (0.1)	2	0.1
Bile duct	1 (0.2)	0 (0.0)	1	0.1
Head and Neck Tumours				
Nasopharyngeal	35 (7.4)	22 (1.5)	57	2.9
Oral & salivary glands	30 (6.4)	26 (1.8)	56	2.9
Paranasal cavity	7 (1.5)	13 (0.9)	20	1
Oropharyngeal	4 (0.8)	4 (0.3)	8	0.4
Laryngeal	21 (4.4)	3 (0.2)	24	1.3
Nasal	0 (0.0)	4 (0.3)	4	0.2
Urinary and Male Genital Tumours				
Kidney	8 (1.7)	3 (0.2)	11	0.6
Bladder	5 (1.1)	4 (0.3)	9	0.5
Prostate	54 (11.5)	0 (0.0)	54	2.7
Penile	1 (0.2)	0 (0.0)	1	0.1
Testicular	2 (0.4)	0 (0.0)	2	0.1
Breast Tumours	25 (5.3)	969 (64.0)	994	50.1
Skin Tumours	44 (9.3)	33 (2.2)	77	3.9
Soft Tissue & Bone Tumours				
Soft Tissue	58 (12.3)	49 (3.2)	107	5.4
Bone	20 (4.2)	13 (0.9)	33	1.7
Thoracic Tumours				
Lung	15 (3.1)	16 (1.1)	31	1.6
Eye Tumours	3 (0.6)	7 (0.5)	10	0.5
Central Nervous System Tumours	8 (1.7)	10 (0.7)	18	1
Endocrine Tumours				
Thyroid	2 (0.4)	8 (0.5)	10	0.5
Neuroendocrine	1 (0.2)	0 (0.0)	1	0.1
Haematolymphoid Tumours				
Lymphoma	19 (4.0)	16 (1.1)	35	1.8
Multiple Mveloma	0 (0.0)	1 (0.1)	1	0.1

Results show that breast cancer was highest (30.4%) in women aged 41-50 years, followed by women aged 31-40 (22.4%) and 51-60 (22.4%). However, cancer of the cervix was highest (33.9%) in women aged ≥ 60 years, followed by women aged 51-60 (39.4%). Colorectal cancer was highest (42.3%) in individuals aged ≥ 60 years, followed by

individuals aged 51-60 (23.4%). Soft tissue sarcoma numbered highest in 41-50 (21.7%), followed by individuals aged 31-40 (19.8%). Skin cancer was highest (28.9%) in participants aged ≥ 60 years, followed by individuals aged 51-60 (25%) and 41-50 (23.7%). Cancer of the nasopharynx was similarly distributed across all age groups

except for individuals aged ≤ 18 years, who recorded a rate of 5.3%. Prostate cancer was highest (72.2%) in men aged ≥ 60 years, followed by individuals aged 51-60 (24.1%). Gastric cancer (35.3%), lung cancer (42.3%), uterine cancer (45.5%), thyroid cancer (50%), eye/orbital cancer (30%), cancer of bladder cancer and urethral

cancer (55.6%) were all highest in individuals aged ≥ 60 years. Pancreatic cancer (34.8%), laryngeal cancer (42.9%), ovarian cancer (57.1%), anal cancer (30.8%), parotid cancer (45.5%) and cancer of blood/plasma (42.9%) were all highest in individuals aged 51-60 years (Table 4).

Table 4: Age-based distribution of cancer types for the five most prevalent cancers

Age Class	≤ 18	19-30	31-40	41-50	51-60	≥ 60	Total
Cancer Type	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	
Breast	2 (0.2%)	81 (8.25%)	220(22.42%)	298(30.37%)	220(22.42%)	160(16.31%)	981
Cervix	0 (0%)	2 (1.16%)	9 (5.26%)	50 (29.23%)	52(30.41%)	58(33.92%)	171
Colorectal	1 (0.90%)	6 (5.40%)	11(9.91%)	20(18.02%)	26 (23.42%)	47(42.34%)	111
Soft tissue sarcoma	9 (8.49%)	21(19.81%)	19(17.92%)	23(21.69%)	17 (16.04%)	17 (16.04%)	106
Skin	1 (1.32%)	6 (7.89%)	10 (13.15%)	18 (23.68%)	19 (24.99%)	22 (28.94%)	76

Discussion

The result shows breast cancer, cervical cancer, colorectal cancer, soft tissue sarcoma, skin, nasopharyngeal, and prostate cancers were the most common cancer types managed at the study setting between 2014 and 2018. We found that cancer was more prevalent in females than in males. The reason for this may be attributable to the disproportionate rates of cancers specific to females in the region, such as cervical cancer and breast cancer, driven by high-risk Human Papillomavirus (HPV) infection rates, lifestyle changes, early marriage and coitus in some regions, low socio-economic status, and poor health literacy and access to screening services. The most common cancer in males was soft tissue sarcoma, followed by prostate cancer and colorectal cancer, which have equal prevalence, and then skin tumours. Additionally, we found that breast cancer was the most common cancer type in females, followed by cervical cancer, with colorectal cancer coming third. Our finding that breast cancer represents the most common malignancy aligns with the report by Uchendu (2020) from Delta State, which analysed six years of records spanning 2014 to 2019."

However, the fact that prostate cancer ranked sixth in our study was a marked contradiction, as they reported prostate cancer as the third most common cancer (6). A previous study reported prostate cancer to be the second most common cancer managed in selected Nigerian tertiary health institutions (13). It is the most diagnosed cancer in men in the Nigerian context (13). The disparity between our findings and the previous studies could be due to the difference in study location. Our study setting is located in the outskirts of the city, whereas that of Uchendu, 2020 (6), was located in

the Delta, and Jedy-Agba *et al.* (13) analysed data from Ibadan and Abuja. Low preponderance of prostate cancer in their study settings may indicate that treatment and care were sought at other tertiary health institutions and private clinics within the state. Breast cancer has the greatest frequency in this study, with a greater percentage in women. This is also in line with Bosland *et al.* (14) and the National Cancer Institute (15), where breast cancer was ranked the most common type of cancer in women. Age, radiation, hormonal therapy, and obesity, to mention a few, are risk factors for breast cancer (16).

Low values of cervical cancer may suggest that fewer women present themselves for cervical cancer screening. This may be due to inadequate awareness, insufficient screening materials, etc (17). According to the research by Okoeki *et al* (18), certain psychosocial factors affect the participation of women in cervical cancer screening. The method of screening is not supported by the cultural beliefs in most parts of the country, especially the rural areas. Religious beliefs and consent from partners are also factors that can reduce the health-seeking behaviour of women (19). However, cervical cancer was the second most common cancer in females in our setting. This is consistent with a similar Nigerian study (20), which reported cervical cancer as the second most prevalent cancer in females. However, cervical cancer is the fourth most common cancer in women globally (21). About 20% of the global incidence of cervical cancer was found to be in Africa (22). Among the women who presented to our facility with cervical cancer, a greater percentage were within the above-60 age group. This is different from studies done in America. According to the American Cancer

Society (23), the highest incidence of cervical cancer is within the 35 to 44 age group, with the mean age being 50 years. In our setting, however, this disparity may be a result of the reluctance to access healthcare when there is no sign of ill health. Within the age 35 to 44 age group, most women are still in the prime of their lives, and thoughts or signs of ill health are minimal. However, when approaching old age, these signs are more frequent, and the need to go through different routine tests surfaces. Healthcare-seeking behaviour is also increased in women than in men as age increases (24). Values for the distribution of colorectal cancer in males and females are quite similar. Colorectal carcinoma in Nigeria, the most populous nation in West Africa with 155 million inhabitants (25), seems to be increasing in incidence. This can be attributed to certain lifestyle factors, alcohol consumption, smoking and other risk factors (26). The time trends in common cancers in men from the Ibadan cancer registry in Nigeria show that, four decades ago (1960–1969), the top five cancers in men did not include colorectal cancer (27). However, by the last decade, carcinoma of the colon and rectum moved from the tenth to the fourth position (27). Colorectal cancer is the second leading cause of cancer-related deaths, and it has been predicted that there will be about a 47% increase in colorectal cancer cases globally by 2040 (28). The increasing burden of deadly colorectal cancer should serve as a warning to policymakers and other stakeholders in pursuing legislation of policies targeted at primary and secondary prevention.

Again, cancers of soft tissue origin were shown to be more common in males (12.3%). This corroborates reports from other studies, which showed that the male gender is at a higher risk of soft tissue sarcoma than the female gender (29, 30, 31). Among the cancers of soft tissue origin, we observed a low number of Kaposi's sarcoma. This may be attributed to the fact that it is mostly HIV-associated, hence such patients present mostly to the HIV clinic of the facility for treatment and follow-up.

In our study, advancing age is a major risk factor in cancer. Older individuals are more prone to having most types of cancers as compared with the younger age groups (32). This may be associated with the likelihood of cell damage build-up as age increases, as well as accumulation of cell mutations over time (33). Disparities between gender patterns in this study can be attributed to differences in health care-seeking behaviours among genders. Studies have shown that males are less likely to seek medical attention than

females (34, 35, 36). According to Obilor et al. (35), Factors attributed to low health care seeking in males include belief system, income and residence of the patients. Masculinity and societal norms also contribute to the low level of health seeking in this population (36). Finally, the number of patients presenting to the oncology clinic is quite similar in all the years except in 2014, which was significantly higher. Availability of radiotherapy equipment was a major factor. In 2014, that equipment was working, and there were many referrals made to the facility. From the following year, the number of patients reduced as the equipment stopped functioning optimally with frequent breakdowns, causing significant downtimes. Again, it is not clear why the subsequent years within the study period had a variable degree of frequencies; however, economic challenges and seeking treatment in the few other regions with functional radiotherapy centres may have contributed to this observation. Furthermore, studies have shown that there is low availability of Cancer treatment equipment in Nigerian hospitals (37, 38, 39, 40). This factor has therefore crippled the management of cancer in Nigeria.

The outcome of this study is subject to limitations, including its hospital-based design and periods of radiotherapy machine down times, which resulted in fewer cancer patients presenting for care.

Conclusion

Our study demonstrated that Breast cancer is the most prevalent malignancy, followed by cervical and colorectal cancers. Prostate cancer ranked sixth in our study, which was a marked contradiction with some other studies in Nigeria that reported prostate cancer as the second or third most common cancer.

The emerging rise in the frequency of colorectal cancer and soft tissue sarcoma calls for the adoption of intensive primary prevention and screening strategies to combat the frequency of these cancer types. Screening for different types of cancers should be made available at no cost. Awareness on prevention, increasing access to cancer care, improved surveillance systems, grassroots sensitisation and availability of effective screening materials will go a long way in curbing the rate of cancer rise. It is also important to increase advocacy on cancer policy developments. There should also be adequate provision of efficient cancer diagnostic and therapeutic materials and equipment. Training of health care providers on cancer prevention and management should also be put in place. We recommend a

population-based study to verify the findings of this study.

List of Abbreviations

HDI: Human Development Index
HPV: Human Papillomavirus
IRB: Institutional Review Board
NHREC: Nigerian Health Research Ethics Committee
NSCR: Nigerian National System of Cancer Registries
SPSS: Statistical Package for the Social Sciences
UNTH: University of Nigeria Teaching Hospital
WHO: World Health Organisation

Declarations

Ethical approval and consent to participate

This manuscript has been read and approved by all the authors, and the requirements of authorship have been met; each author believes that the manuscript represents honest work. Ethical approval was sought and obtained from the ethics committee at the study location. Ethics number: NHREC/05/01/2008B-FWA00002458-1RB00002323.

Consent for publication

All the author(s) gave consent for the publication of the work under the Creative Commons Attribution-Non-Commercial 4.0 license.

Availability of data and materials

All data generated in the study are available in this article

Competing interests

The authors declare they have no competing interests relevant to the study or publication thereof

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Authors contribution

OVC and OJC: Developed the concept of this work.
OVC and NM: Performed the data acquisition
ACC: Reviewed the work and drafted the manuscript.
All authors contributed to the design of the study, carrying out the research, analysis of results, discussion of findings and the writing of the manuscript.

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