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Demographic Characteristics, Institutional Incidence and Mortality Rates of Cancers at the Rivers State University Teaching Hospital (RSUTH), Port Harcourt, Nigeria

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ABSTRACT

Background: *The issue of cancer is a global concern, and in the year 2022, one out of every six human deaths was attributed to cancer. This study aims to evaluate the demographic characteristics, institutional incidence and mortality rate of different cancers at the RRivers State University Teaching Hospital (RSUTH).*

Materials and Methods: *A retrospective observational study was carried out among all patients diagnosed with cancer at the RSUTH between January 2021 to December 2024, using data obtained from the Cancer Registry and other Departments of the hospital. Data collected were organized into tables and expressed as rates, ratios, and percentages.*

Results: *Patients ranged in age between 20-90 years was observed, and most cancers were at the peak age between 40 and 59 years, especially for the most common cancers – breast and prostate. The incidence rate for cancers in year 2024*

were as follows: breast cancer was 120.67/100,000, prostate cancer was 85.47/100,000, cervical cancer = 19.11/100,000, endometrial cancer = 14.08/100,000, skin cancers = 14.08/100,000, and others. The cancers with high institutional mortality rates were breast cancer (33.18/100,000), prostate cancer, ovarian cancer (7.04/100,000), etc. Cancer mortality to incidence ratios in ascending order: prostate cancer (0.04), cervical cancer (0.11), etc.

Conclusion: *A wide range of cancers were reported, and the cancers with high incidence rates were breast cancer, prostate cancer, cervical cancer, endometrial cancer, skin cancers, colorectal cancer, ovarian tumors. The institutional cancer mortality rates were derived, and the high mortality cancers were breast cancer, prostate cancer, ovarian cancer, endometrial cancer. Cancer mortality to incidence ratios were found to be relatively higher than observed global findings.*

Keywords
Cancers, Demographic Characteristics, Incidence, Mortality, Port Harcourt, Nigeria.

Introduction
Derived from the Latin word "*cancer"* meaning "crab", and translated from the Greek word *"karkinos",* this six-letter word "cancer", strikes fear in the minds of the public. Documentations on the first human cancer were in scripts written between 1500 and 1600 BC discovered in the 19th century (especially Edwin Smith and George Ebers papyri) [1,2]. Cancer is seen in every human society, and hence is a matter of global concern, and in the year 2022, one out of every six human deaths was attributed to cancer. [3] Globally, the most commonly diagnosed cancers, in descending order of frequency are breast, lung, colorectal, prostate, and non-melanoma skin cancers. In contrast, the leading causes of cancer-related death worldwide, ranked in descending order, are cancers of the lung, colon, liver, stomach, and breast [4]. Identified cancer risk factors are numerous and broadly grouped into behavioral and lifestyle risk factors, environmental and infectious risk factors, and hereditary or genetic risk factors; or environmental and occupational, behavioral, and metabolic categories; and there are significant variations with different cancers. Some of these risk factors include: tobacco use, high body mass index, unhealthy diets, alcohol consumption, lack of physical activity, tobacco, obesity, ultraviolet radiation, air pollution, some infections, ionizing radiation, etc. [5-8].

The cancer outlook in Africa was also reported as poor. Cancers such as cervical, lung, liver, which have high burden and are preventable, and were documented to have 52·3%, 32·4% and 18·1% survival rates respectively, based on data obtained from 10,500 individuals from population-based cancer registries in 11 countries [9]. Additionally, 1.1 million new cancer cases were seen in Africa, and 711,429 cancer deaths occurred in the year 2020 [10]. In that same study, while the age-standardized incidence rate was (ASIR) 32.1/100,000 and the age-standardized mortality rate (ASMR) was 88.8/100,000, the mortality-to-incidence ratio (MIR) for all cancers in Africa was reported as 0.64 in Africa. Available information on cancers, jointly published by International Agency for Research on Cancers, the World health Organization, Global Cancer Observatory, Cancer Today: GLOBACOM 2022, revealed that there were 127,763 new cancer cases, 79,542 cancer-related deaths, and 269,109 prevalent cancers cases in Nigeria in the year 2022 [11]. In that report, the top five most frequent cancers in both sexes in descending order were breast, prostate, cervical, colorectum caners, and non-Hodgkin's Lymphoma (NHL). The order in females was breast, cervix uteri, colorectal, NHL and ovarian cancers; while it was prostate cancer, colorectal cancer, liver cancer, NHL, and Kaposi sarcoma in males.

The University of Port Harcourt Teaching Hospital's cancer registry provided data from 2007 to 2017, which was published in 2019. This suggests that Port Harcourt's cancer data is at least eight years old. Another study reviewed breast cancer in Rivers State, Nigeria, over a ten-year period and was published in 2019. The study's data came from the University of Port Harcourt Teaching Hospital's (UPTH) Cancer Registry and covered the years 2008 to 2017 [12,13]. The Rivers State University Teaching Hospital is a fast-growing State-owned 375 bedded hospital [14], 571 beds capacity Multispecialty Tertiary Health Facility [15], with a Cancer Registry. Although there was a study on childhood cancers reported in year 2020 [16], and another on skin tumours [17], a comprehensive study on cancers in the centre appear to be lacking. The aim of this study was to evaluate the demographic characteristics, institutional incidence and mortality rates of different cancers at the Rivers State University Teaching Hospital from January 2021 to December 2024.

Materials and Methods
Research Design: A retrospective analytical observational study was carried out.

Study Area: Port Harcourt, the capital of Rivers State, in the South-South of the Federal Republic of Nigeria, was the study area.

Study Setting: The study setting was conducted at the Rivers State University Teaching Hospital, a tertiary healthcare facility in Port Harcourt City.

Study Population: Patients of all ages who were diagnosed with cancer at the Rivers State University Teaching Hospital within the study period (January 2022 to December 2024) were included in the study.

Sample Size Determination: All identified patients were included in the study.

Sampling Method: Total population of all cancer cases found was used.

Study Instrument: A designed proforma was used to extract data from the Cancer Registry of the hospital, and where deficiencies or discrepancies exist were observed – cross-checking was done from the medical records, and registers of the outpatient clinics, the surgical wards (male and female), and data at the different Departments.

Study Variables: Information of interest were demographic characteristics (age and sex) of the cancer patients, total number of patients who had new specific cancers yearly (2021-2024), total number of deaths from specific cancers for the year 2024, and the total population of patients' attendance at the hospital for the year 2024.

Data Analysis: Data obtained was formed into tables and presented as percentages, ratios, incidence rates, mortality rates.

Validity/Reliability of Instrument: The study data was scrutinized by all the authors for authenticity or otherwise before use.

Ethical Considerations: The approval of the Research and Ethics Committee of the Rivers State University Teaching Hospital was sought and obtained, and confidentiality of information was maintained in the process of data collection. This study involved only contact with patients' medical records with no direct contact with the individual patients.

Results

Table 1 shows the common age ranges, total numbers, and percentages of all cancers at the RSUTH. There was variation in age of occurrence of individual cancers. However, although a wide range of 20-90 years was observed, most cancers seem to peak between 40 and 59 years, especially for the most common cancers – breast and prostate. The female population was more involved in cancer as there were 442 breast cancer cases, 292 gynecologic cancers (101 cervical, 80 ovarian, 80 endometrial, 11 vulval, 8

Table 1: Common Age Ranges, Numbers, and Percentages of Cancers at the RSUTH – 2021-2024.

S/No	Type of Cancer	Common Age Range (Years)	Total Number within the Study Period	Percentage of All Cancers (%)
1	Breast Cancer	40-59	442	36.05
2	Prostate Cancer	40-90	176	14.36
3	Cervical Cancer	20-80	101	8.24
4	Endometrial Cancer	20-80	80	6.52
5	Ovarian Cancer	20-80	80	6.52
6	Meningeal & Brain Tumours	20-80	52	4.24
7	Colorectal Cancer	40-89	32	2.61
8	Ophthalmic Cancer	Nil	Nil	-
9	Skin Cancer	20-80	21	1.71
10	Leukaemia	20-90	18	1.47
11	Lymphoma	40-90	14	1.14
12	Throat/Neck Cancer	20-80	12	0.98
13	Bone Cancer	14-59	11	0.89
14	Vulva Cancer	20-80	11	0.89
15	Other Genital Tract Cancer	40-80	10	0.81
16	Vagina Cancer	40-80	8	0.65
17	Multiple Myeloma	40-59	6	0.49
18	Urinary Bladder Cancer	20-90	5	0.40
19	Anal Cancer	20-59	5	0.40
20	Soft Tissue Cancer	20-59	5	0.40
21	Renal Cancer	40-90	4	0.33
22	Thyroid Cancer	60-80	4	0.33
23	Liver Cancer	40-59	4	0.33
24	Gastric Cancer	60-80	3	0.24
25	Pancreatic Cancer	60-80	3	0.24
26	Urethra Cancer	20-59	3	0.24
27	Testicular Cancer	20-59	3	0.24
28	Lung Cancer	20-80	3	0.24
29	Oral/Maxillofacial Cancer	40-80	2	0.16
30	Other Urothelial Cancer	20-39	2	0.16
31	Polycythaemia Vera	20-90	2	0.16
32	Uterine Cancer	20-59	2	0.16
33	Heart Cancer	60-80	1	0.08
34	Oesophageal Cancer	60-80	1	0.08
Total			1,226	100

vaginal, 2 uterine, and 10 other genital cancers) accounting for 734 (59.9%) out of the total of 1,226 There was no ophthalmic cancer seen at the institution within the period of study.

Table 2 shows the total number of General Surgery cancers in RSUTH from year 2021 to 2024. There were 498 new cases of cancer in General Surgery specialty within the study period, out of which there were 442 (88.76%) breast cancer new cases, followed by 32 (6.43%) colorectal cancers, 5 (1.00%) anal cancers, 5 (1.00%) soft tissue cancers, 4 (0.80%) thyroid cancers, 4 (0.80%) liver cancers, 3 (0.60%) gastric cancers, and 3 (0.60%) pancreatic cancers.

Table 3 shows urological cancers in RSUTH from year 2021 to 2024. There were 193 urological cancers within the period under study, out of which 176 (91.19%) were prostate cancer, 5 (2.59%) urinary bladder cancers, 3 (1.55%) urethral cancers, 4 (2.07%) renal cancers, 3 (1.55%) testicular cancers, and 2 (1.04%) others urothelial cancers.

Table 4 shows the Gynaecologic Cancers in RSUTH from year 2021 to 2024. There were 281 new cancers cases within the study period, out of which 101 (35.94%) were cervical cancers. There were also 80 (28.50%) endometrial cancers, 69 (24.56%) ovarian cancers, 11 (3.91%) vulval cancer, 8 (2.85%) vaginal cancers, and 10 (3.56%) other genital cancers.

Table 5 shows the hematologic cancers seen at the RSUTH from year 2021 to 2024. There were 40 hematologic cancers, out of which leukemia was 18 (45%), 14 (35%) cases of lymphoma, 6 (15%)

Table 2: New Cases of Cancers in General Surgery in RSUTH from year 2021 to 2024.

Year	2021					2022					2023					2024					Grand Total (%)
Age→ Cancers ↓	0-19	20-39	45-59	60-80	*T*	0-19	20-39	40-59	60-80	*T*	0- 19	20-39	40-59	60-80	*T*	0-19	20-39	40-59	60-80	*T*	
Thyroid Cancer	0	0	0	0	*0*	0	0	0	2	*2*	0	0	0	0	*0*	0	0	1	1	*2*	4 (0.80)
Breast Cancer	3	25	42	5	*75*	3	7	74	41	*125*	5	32	58	27	*122*	3	24	65	28	*120*	442 (88.76)
Liver Cancer	0	0	0	0	*0*	0	0	2	0	*2*	0	0	1	0	*1*	0	0	1	0	*1*	4 (0.8)
Gastric Cancer	0	0	0	0	*0*	0	0	0	1	*1*	0	0	0	0	*0*	0	0	1	1	*2*	3 (0.60)
Pancreatic Cancer	0	0	0	0	*0*	0	0	0	1	*1*	0	0	0	0	*0*	0	1	0	1	*2*	3 (0.60)
Colorectal Cancer	0	7	0	0	*7*	0	1	3	3	*7*	0	0	3	2	*5*	0	4	6	3	*13*	32 (6.43)
Anal Cancer	0	0	0	0	*0*	0	0	0	1	*1*	0	0	0	0	*0*	0	2	2	0	*4*	5 (1.00)
Soft Tissue Cancer	0	0	0	0	*0*	0	0	0	0	*0*	0	1	1	0	*2*	0	0	3	0	*3*	5 (1.00)
Total	3	32	42	5	*82*	3	8	79	49	*139*	5	33	63	29	*130*	3	31	79	34	*147*	498 (100)

Table 3: Urological cancers in RSUTH from year 2021 to 2024.

Year	2021					2022					2023					2024					Grand Total (%)
Age→ Cancers ↓	0-19	20-39	40-59	60-90	*T*	0-19	20-39	40-59	60-90	*T*	0-19	20-39	40-59	60-90	*T*	0-19	20-39	40-59	60-90z	*T*	
Renal Cancer	0	0	0	0	*0*	0	0	0	0	*0*	0	0	1	1	*2*	0	0	0	2	*2*	4 (2.07)
Bladder Cancer	0	0	0	0	*0*	0	0	2	0	*2*	0	1	0	1	*2*	0	0	0	1	*1*	5 (2.59)
Prostate Cancer	0	0	3	4	*7*	0	1	15	24	*40*	0	0	7	37	*44*	0	1	13	71	*85*	176 (91.19)
Urethral Cancer	0	0	1	0	*1*	1	0	0	0	*1*	0	1	0	0	*1*	0	0	0	0	*0*	3 (1.55)
Testicular Cancer	0	1	0	0	*1*	0	0	0	0	*0*	0	0	1	0	*1*	0	1	0	0	*1*	3 (1.55)
Other Urothelial Cancer	0	1	0	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*	0	1	0	0	*1*	2 (1.04)
Total	0	2	4	4	*10*	1	1	17	24	*43*	0	2	9	39	*50*	0	3	13	74	*90*	193 (100)

Table 4: Gynaecologic Cancers in RSUTH from year 2021 to 2024.

Year	2021					2022					2023					2024					Grand Total (%)
Age→ Cancers ↓	0-19	20-39	40-59	65-80	*T*	0-19	20-39	40-59	60-80	*T*	0-19	20-39	40-59	60-80	*T*	0-19	20-39	40-59	60-80	*T*	
Ovarian Cancer	0	22	5	0	*27*	0	0	5	5	*10*	0	6	12	14	*32*	0	3	6	2	*11*	80 (27.40)
Uterine Cancer	0	0	0	0	*0*	0	0	0	0	*0*	0	1	1	0	*2*	0	0	0	0	*0*	2 (0.68)
Endometrial Cancer	0	13	13	6	*32*	0	0	3	10	*13*	0	4	11	6	*21*	0	3	7	4	*14*	80 (27.40)
Cervical Cancer	0	18	24	6	*48*	0	0	6	11	*17*	1	3	9	4	*17*	2	4	6	7	*19*	101 (34.59)
Vagina Cancer	0	0	0	0	*0*	0	0	1	1	*2*	0	0	2	1	*3*	1	1	1	0	*3*	8 (2.74)
Vulva Cancer	0	0	1	0	*1*	1	0	0	2	*3*	0	0	0	1	*1*	0	3	3	0	*6*	11 (3.76)
Genital Tract Cancer	0	0	0	0	*0*	0	0	0	0	*0*	0	0	2	1	*3*	0	0	3	4	*7*	10 (3.42)
Total	0	53	43	12	*108*	1	0	15	29	*45*	1	14	37	27	*79*	3	14	26	17	*60*	292 (100)

cases of multiple myeloma, and 2 (5%) cases of polycythemia vera.

Table 6 show cardiopulmonary, neural, bone and skin cancers in RSUTH from year 2021 to 2024. There were 52 meningeal & brain tumours, 21 skin cancers, 11 bone cancers, and 3 lung cancer.

Table 7 shows other Head and Neck Cancers in RSUTH from year 2021 to 2024. There were 17 throat and neck (nasopharyngeal and oropharyngeal) cancers within the age range of 20-80 years. No ophthalmic cancer was seen within the period of study.

Table 8 shows the institutional incidence rates, mortality rates, and mortality to incidence ratio for cancers at The RSUTH in Year 2024. The incidence rate for cancers in year 2024 were as follows: breast cancer was 120.67/100,000, prostate cancer was 85.47/100,000, cervical cancer = 19.11/100,000, endometrial cancer = 14.08/100,000, skin cancers = 14.08/100,000, colorectal cancer = 13.07/100,000, ovarian tumors = 11.06/100,000, meningeal and brain tumors = 8.04/100,000, and others. Cancers with the least incidence rates (1.01/100,000) were liver cancer, urinary bladder cancer, testicular tumors, polycythemia vera, and multiple myeloma. Breast cancer had the highest percentage of all cancers in the year 2024. The cancers with high institutional mortality rates were breast cancer (33.18/100,000), ovarian cancer (7.04/100,000), endometrial cancer (6.03/100,000). Cancer mortality to incidence ratios in ascending order: prostate cancer (0.04), cervical cancer (0.11), meningeal and brain tumors (0.13), vulval cancer (0.17), breast cancer (0.28), lung cancer (0.33), endometrial cancer (0.43), gastric cancer (0.5), pancreatic cancer (0.5), ovarian cancer (0.64), bone cancer (0.75), and renal cancer (1).

Table 5: Hematologic Cancers in RSUTH from year 2021 to 2024.

Year	2021					2022					2023					2024					Grand Total
Age→ Cancers ↓	0-19	20-39	40-59	60-90	*T*	0-19	20-39	40-59	60-90	*T*	0-19	20-39	40-59	60-90	*T*	0-19	20-39	40-59	60-90	*T*	
Polycythaemia Vera	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Lymphoma	0	0	1	0	1	0	0	2	2	4	0	1	1	0	2	0	1	4	2	7	14
Leukaemia	0	3	2	3	8	0	0	1	1	2	0	1	1	1	3	0	2	1	2	5	18
Multiple Myeloma	0	0	2	1	3	0	0	1	0	1	0	0	0	1	1	0	0	1	0	1	6
Total	0	4	5	4	13	0	0	4	3	7	0	2	2	2	6	0	3	6	5	7	40

Table 6: Cardiopulmonary, Neural, Bone and Skin Cancers in RSUTH from Year 2021 to 2024.

Year	2021					2022					2023					2024					Grand Total
Age→ Cancers ↓	0-19	20-39	40-59	60-80	*T*	0-19	20-39	40-59	60-80	*T*	0-19	20-39	40-59	60-80	*T*	0-19	20-39	40-59	60-80	*T*	
Heart Cancer	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	1	*1*	0	0	0	0	*0*	1
Meningeal & Brain Tumours	0	1	7	5	*13*	1	4	2	4	*11*	1	3	10	6	*20*	0	1	6	1	*8*	52
Lung Cancer	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*	0	1	1	1	*3*	3
Oesophageal Cancer	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	1	*1*	1
Total	0	1	7	5	*13*	1	4	2	4	*11*	1	3	10	7	*21*	0	2	7	3	*12*	57
Year	**2021**					**2022**					**2023**					**2024**					**Grand Total**
Age→ Cancers ↓	**0-19**	**20-39**	**40-59**	**60-80**	***T***	**0-19**	**20-39**	**40-59**	**60-80**	***T***	**0-19**	**20-39**	**40-59**	**60-80**	***T***	**0-19**	**20-39**	**40-59**	**60-80**	***T***	
Skin Cancer	0	0	0	0	*0*	0	0	1	0	*1*	0	2	2	2	*6*	1	4	6	3	*14*	21
Bone Cancer	1	1	1	0	*3*	0	1	0	0	*1*	1	1	1	0	*3*	2	1	1	0	*4*	11
Total	1	1	1	0	*3*	0	1	1	0	*2*	1	3	3	2	*9*	3	5	7	3	*18*	32

Table 7: Other Head and Neck Cancers in RSUTH from year 2021 to 2024.

Year	2021					2022					2023					2024					Grand Total
Age→ Cancers ↓	5-14	15-44	45-64	65-80	*T*	0-19	20-39	40-59	60-80	*T*	0-19	20-39	40-59	60-80	*T*	0-19	20-39	40-59	60-80	*T*	
Ophthalmic Cancer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oral/Maxillofacial Cancers	0	1	0	1	2	0	0	0	0	0	1	1	1	0	3	0	0	0	0	0	5
Throat/Neck Cancer	0	1	0	2	3	0	1	1	1	3	0	1	1	0	2	0	1	2	1	4	12
Total	0	1	0	3	5	0	1	1	1	3	1	2	2	0	5	0	1	2	1	4	17

Type of Cancer	Number of New Cancers	Percentage (%)	Incidence Rate	Number of Cancers Deaths	Mortality Rate	Cancer Mortality-to-Incidence Ratio
Meningeal & Brain Tumours	8	2.35	8.04/100,000	1	1.01/100,000	0.13
Ophthalmic Cancers	Nil	Nil	Nil	Nil	Nil	-
Oral/Maxillofacial Cancer	Nil	Nil	Nil	Nil	Nil	-
Throat/Neck Cancer	4	1.17	4.02/100,000	Nil	Nil	-
Thyroid Cancer	2	0.59	2.01/100,000	Nil	Nil	-
Breast Cancer	120	35.19	120.67/100,000	33	33.18/100,000	0.28
Heart Cancer	Nil	Nil	Nil	Nil	Nil	-
Lung Cancer	3	0.88	3.02/100,000	1	1.01/100,000	0.33
Bone Cancer	4	1.17	4.02/100,000	3	3.02/100,000	0.75
Skin Cancer	14	4.10	14.08/100,000			
Liver Cancer	1	0.29	1.01/100,000	1	3.02/100,000	
Gastric Cancer	2	0.59	2.01/100,000	1	1.01/100,000	0.5
Pancreatic Cancer	2	0.59	2.01/100,000	1	1.01/100,000	0.5
Colorectal Cancer	13	3.81	13.07/100,000	5	5.03/100,000	0.38
Renal Cancer	2	0.59	2.01/100,000	2	2.01/100,000	1
Urinary Bladder	1	0.29	1.01/100,000	1	3.02/100,000	1
Prostate Cancer	85	24.92	85.47/100,000	2	2.01/100,000	0.04
Urethral Cancer	Nil	Nil	Nil	Nil	Nil	-
Testicular Cancer	1	0.29	1.01/100,000	-	-	-
Other Urothelial Cancer	1	0.29	1.01/100,000	-	-	-
Anal Cancer	4	1.17	4.02/100,000	Nil	Nil	-
Soft Tissue Cancer	Nil	Nil	Nil	Nil	Nil	-
Ovarian Cancer	11	3.22	11.06/100,000	7	7.04/100,000	0.64
Endometrium	14	4.10	14.08/100,000	6	6.03/100,000	0.43
Cervical Cancer	19	5.57	19.11/100,000	2	2.01/100,000	0.11
Vaginal Cancer	3	0.88	3.02/100,000	-	-	-
Vulval Cancer	6	1.76	6.03/100,000	1	1.01/100,000	0.17
Other Genital Tract Cancer	7	2.05	7.04/100,000	3	3.02/100,000	0.43
Polycythaemia Vera	1	0.29	1.01/100,000	-	-	-
-Lymphoma	7	2.05	7.04/100,000	-	-	-
Leukaemia	5	1.46	5.03/100,000	-	-	-
Multiple Myeloma	1	0.29	1.01/100,000	-	-	-
Total	341	100		?	-	-
2024 Cancer Institutional Incidence (IR) $= \frac{\text{New Cases}}{\text{Total Population at Risk}} x100,000$ IR $= \frac{x}{99,448} x100,000 = IR$						
2024 Cancer Institutional Mortality Rate (MR) $= \frac{Number\ of\ Deaths}{\text{Total Population at Risk}} x100,000 =$ MR $= \frac{x}{99,448} x100,000 = MR$						
Total Hospital Attendance in Year 2024: 99,448						

Discussion

Variations in cancer incidence have been reported in many countries for many reasons. [3,18] Although institutional cancer incidence is hospital-based, it showcases information that guides healthcare policy and allocation of resource; provides guidance on development of effective prevention and early detection strategies for cancers; assists in evaluating treatment outcomes; and highlights inequities in cancer care. In this study, there were variations in the age of occurrence of individual cancers-being 20-90 years, most common cancers seem to peak between 40 and 59 years for breast cancer and 40-90 years for prostate cancer. This is similar to the peak age of 40–49 years reported in a study at the University of Port Harcourt Teaching Hospital which is in the same region [19]. The observed age range is similar to the 1-98 years reported in Abraka, in Delta State of Nigeria [18]. However, in that report, the peak age of cancer occurrence was in the 6th and 7th decade, while we observed predominantly 5th and 6th decades. Gynaecologic malignancies (100%) and breast cancers (99%) were more common in women, while prostate and testicular cancers were only found in men, according to the analysis of the demographic features of the tumors. A Nigerian study that highlighted data from the Zaria cancer registry showed a similar finding of female preponderance [20].

General surgery cancers constituted 40.62% of all cancers seen in the hospital. The most common cancer in General Surgery practice was breast cancer (88.76%), colorectal cancer (6.43%) and the least common were gastric cancers (0.60%) and pancreatic cancers (0.60%). These findings are similar to findings from other Nigerian studies [18,21,22]. and studies in the West African countries [23]. A three-year study in Ghana, showed that breast cancer was found to be the most common malignancy seen by General Surgeons followed by colorectal cancer [24]. However, our findings differ from the observations seen in some west African countries like Burkina Faso, Cape Verde, Côte d'Ivoire, Ghana, Guinea (HBC was highest), Guinea-Bissau, Liberia, Mauritania, Niger, Senegal,

Sierra Leone, The Gambia, and Togo, where hepatobiliary cancers (HBC) ranked second after breast cancer.

Urologic cancers comprised 15.74% of all cancers seen in the hospital. The most common cancer in urological practice was prostate cancer (91.19%), followed by urinary bladder cancer (2.59%) and the least seen were testicular cancers (1.55%) and others urothelial cancers (1.04%). These findings are similar to the observations reported in Kano Nigeria where prostate cancer was highest followed by bladder cancer [25]. However, our study differs from this Kano study in the higher percentage of prostate cancer observed - 91.19% as against 56.6% in Kano; and the higher percentage of bladder cancers reported in the Kano study - 36.0% as against 2.59% in our study. Similar higher cases of urinary bladder cancers was reported in Federal Medical Centre Gombe [26], Yobe State University Teaching Hospital Damaturu [27], and Jos University Teaching Hospital [28]. The sequence of cancer incidence in our study is rather similar to the report from the University of Calabar Teaching Hospital, in South-South region of Nigeria, where prostate cancer accounted for 91.4% of urologic cancers, followed by kidney cancer (4.4%), and urinary bladder cancer (1.5%) [29]. The explanation for the difference in these studies may be regional where schistosomiasis, a risk factor associated with bladder cancer is prevalent in Northern Nigeria [30-32].

Gynecologic cancers constituted 23.82% of all cancers in the institution. Cervical cancer was the most common (35.94%) of all gynecologic cancers, followed by endometrial cancers (28.50%) and ovarian cancers (24.56%). This study share similarity with the findings of other researchers – north-eastern Nigeria [33], Lagos in Nigeria [34], Katsina in Katsina State [35], Akure in Ondo State [36], literature review of gynecologic cancers in south-south and South-East regions of Nigeria [37], findings of systematic review of gynecologic malignancies in Nigeria [38], - where the cervical cancer was the most commonly occurring gynecologic cancer. However, our study differs from observations in some centers in Nigeria – Owerri in Imo State [39], were ovarian cancer was the most common gynecologic cancer. Our study findings also slightly differs from the general observations reported in south-south and south-eastern Nigeria where cervical cancer comprised 61.7% of gynecologic cancers, as against 35.94% in our study [37].

Hematologic cancers made up 3.26% of all cancers seen in the hospital. The most commonly encountered hematologic cancer was leukemia (45%) followed by lymphoma (35%) and multiple myeloma (15%), and the least was polycythemia vera (5%). Our findings share similarity with the observations of other Nigerian researchers – Makurdi in Benue State [40], Ilorin in Kwara State [41], Jos in Plateau State [42], Ikeja in Lagos State [43], where the most common hematologic cancer was reported to be leukemia followed by lymphomas and multiple myeloma. Similar order of occurrence was reported in other African studies [44,45].

Cardiopulmonary, neural, bone and skin cancers constituted 7.26% of all cancers in the study. In this category, meningeal & brain tumors were commoner (n=52, 58.4%), followed by cutaneous cancers (n=21, 23.6%), and bone cancers (n=11, 12.4%). CNS tumors in Nigeria contributed to 42.3% of all CNS tumors in Africa [46], and meningeal and brain tumors in this study accounted for 4.24% of all tumors in the study. Globally, cancers of the brain and central nervous system comprises 3.6% of all cancers [47]. Skin cancer comprised 1.71% of all cancers in this study, comparable to 7.9% in year 2022 global cancer statistics [48]. Bone cancers constituted 0.9% of all cancers in this study, Primary bone neoplasm is known to contribute to 0.2% of all human neoplasm [49,50]. Although globally lung cancer is rated high in incidence and mortality especially among global male population [51,53], and in Nigeria [54,55], very few cardiac and lung cancers were reported in this study. The explanation for this observation could be that there was no specialized cardiothoracic unit within the hospital optimally functional within the study period, and hence limited referrals to the hospital.

Other head and neck (ear, nose, throat) cancers accounted for 0.98% of all cancers in the institution. A Nigerian study had reported that nasopharyngeal cancer and laryngeal tumors constituted 1.4% of cancers seen at Delta State University Teaching Hospital [18]. There was no death from head and neck cancers at the institution within the study period. However, cancers of the head and neck are known to have high mortality – as much as 10% [56]. Some of the patients may have died outside the hospital, making it difficult to obtain data for evaluation of the mortality to incidence ratio. Oral maxillofacial cancers accounted for 0.4% of all cancers in the institution. Oral cancer is ranked amongst the first 10 most common cancer types in Nigeria [3,57]. Globally, the mortality-to-incidence ratio in oral cancers was reported to be 0.68 in low and medium-income countries as against 0.43 in high income countries [58,59]. It is noteworthy to state that there was no single case of ophthalmic cancer seen within the period of study, hence the incidence, mortality rate and mortality to incidence ratio for ophthalmic cancers at the institution was not determined. However, the global mortality-to-incidence ratio for ophthalmic cancers in 2020 was reported to be 0.16 [60].

The institutional incidence rate of breast cancer reported in this study aligns with current global report [4] and Nigerian findings [18,61], where breast cancer is the most common cancer in both males and females. However, among the female population, breast cancer was closely followed by cervical cancer (19.11/100,000), endometrial cancer (14.08/100,000), and ovarian cancer (11.06/100,000). In the male specific cancers, prostate cancer (85.47/100,000) was followed by testicular cancer (1.01/100,000). Although there is similarity in the most common cancers, the order of cancer occurrence is a little different from the report of cancers among Nigerian female population - breast, cervix uteri, colorectum, non-Hodgkins lymphoma, others [62] and also among the male population – prostate, colorectum, liver, non-Hodgkins lymphoma, Kaposi sarcoma [62]. Cancers with high mortality rates were breast cancer (33.18/100,000) followed by ovarian cancers (7.04/100,000), endometrial cancers (6.03/100,000), liver cancers (3.02/100,000), urinary bladder cancers (3.02/100,000),

bone cancers (3.02/100,000). This order differs from the World Health Organization list of most common causes of cancer death of lung, colon, liver, stomach and breast in descending order [4]. However, our institutional experience share some similarity with the report on cancer mortality in Nigeria [62].

Cancer mortality-incidence ratios in this study were: prostate cancer (0.04), cervical cancer (0.11), meningeal and brain tumours (0.13), vulval cancer (0.17), breast cancer (0.28), lung cancer (0.33), endometrial cancer (0.43), gastric cancer (0.5), pancreatic cancer (0.5), ovarian cancer (0.64), bone cancer (0.75), and renal cancer (1.0). The mortality-to-incidence ratio (MIR) additionally serve as an indicator of cancer management outcomes [63]. Higher values suggest poorer cancer outcomes, and the mortality to incidence ratio of cancers in Africa has been reported as 0.64 [20]. Cancers with high mortality-incidence ratio in descending order include: renal cancer, bone cancer, ovarian cancer, gastric cancer, pancreatic cancer, lung cancer, colorectal cancer, and breast cancer. The observed values are relatively higher than the mortality to incidence ratios reported for cancers in countries like Saudi Arabia, China, United Arab Emirate, United States, Japan and Germany, where the health expenditure and human development index were relatively higher [64]. However, it shares similarity with the findings in global observatory report on Nigeria [53,62,65]. This underscores the need for efforts to be directed at improving healthcare services funding and improving cancer care services in Nigeria, including our institution.

Study Limitations

The detailed demographic characteristics of individual cancers could not be provided in this study as it was not part of the study objectives. The provided age ranges of cancers were observed estimates rather than calculated figures. Incomplete or missing record of data was a challenge that affected the calculation of some mortality rate. Sourcing of data from multiple sites has the potential of introducing errors – omissions, etc. Some cancer patients who had presented to the hospital but opted for discharge for any reason and died at home were not captured in the mortality – a potential error. However, the data on cancers in this study has provided a lattice for insight and future research.

Conclusion

Wide range of cancers were reported among the patients at the Rivers State University Teaching Hospital. Although age range of 20-90 years was observed, most cancers seem to peak between 40 and 59 years, especially for the most common cancers – breast and prostate, and the female population was more involved. The institutional cancer incidence rates were evaluated, and the cancers with high incidence rates in descending order were breast cancer (120.67/100,000), prostate cancer (85.47/100,000), cervical cancer (19.11/100,000), endometrial cancer (14.08/100,000), skin cancers (14.08/100,000), colorectal cancer (13.07/100,000), ovarian tumors (11.06/100,000). The mortality rates of cancers in the institution were derived, and the cancers with high institutional mortality rates were breast cancer (33.18/100,000), ovarian cancer (7.04/100,000), endometrial cancer (6.03/100,000). Cancer mortality to incidence ratios were calculated and were found to be relatively higher than observed global findings.

Recommendation

Available data at the Cancer Registry were inadequate, thereby leaving the researchers to undertake a painstaking pathway of sourcing for data at the various Departments for the study. The following recommendations would therefore help to enrich the Cancer Registry in the Hospital:

1. The Institutional Cancer Registry should be supervised by a Consultant Medical Doctor involved in Oncology practice.
2. A medical officer should be drafted to be involved in data collection, as some of the medical terminologies may not be easily understood by non-medical cancer registry staff.
3. Every new cancer case seen in the hospital should be notifiable to the cancer registry as soon as possible for data capturing.
4. Improvement in attention and funding for healthcare in needed at State and National levels to improve outcome in cancer care services and reduce observed cancer mortality figures.

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